

Natura Impact Statement

Proposed Housing Development,
Moneyduff, Oranmore,
Co. Galway



Planning & Environmental Consultants

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1 INTRODUCTION

1.1 Background

McCarthy Keville O’Sullivan Ltd. (MKO) has been appointed to provide the information necessary to allow the competent authority to conduct an Article 6(3) Appropriate Assessment of the proposed housing development at Moneyduff, Oranmore, Co. Galway. An Appropriate Assessment Screening Report has been prepared and is provided in Appendix 1. The screening assessment concluded as follows:

“It cannot be excluded beyond reasonable scientific doubt, in view of best scientific knowledge on the basis of objective information and in light of the conservation objectives of the relevant European site, that the Proposed Development, individually or in combination with other plans and projects, could have a significant effect on the following European Sites:

- *Galway Bay Complex SAC (000268)*
- *Inner Galway Bay SPA (004031)*
- *Cregganna Marsh SPA (004142)*
- *Rahasane Turlough SPA (004089)”*.

This report has been prepared in accordance with the European Commission guidance document *Assessment of Plans and Projects Significantly affecting Natura 2000 Sites: Methodological Guidance on the provisions of Article 6(3) and 6(4) of the Habitats Directive 92/43/EEC* (EC, 2001) and the Department of the Environment’s Guidance on the Appropriate Assessment of Plans and Projects in Ireland (December 2009, amended February 2010).

In addition to the guidelines referenced above, the following relevant guidance was considered in preparation of this report:

1. DoEHLG (2010) *Appropriate Assessment of Plans and Projects in Ireland Guidance for Planning Authorities*. Department of the Environment, Heritage and Local Government,
2. European Communities (2000) *Managing Natura 2000 Sites: the provisions of Article 6 of the ‘Habitats’ Directive 92/43/EEC*, Office for Official Publications of the European Communities, Luxembourg. European Commission,
3. European Communities (2018) *Managing Natura 2000 Sites: the provisions of Article 6 of the ‘Habitats’ Directive 92/43/EEC*, Office for Official Publications of the European Communities, Luxembourg. European Commission,
4. *Directive 92/43/EEC*, Office for Official Publications of the European Communities, Luxembourg. European Commission,
5. EC (2007) Guidance document on Article 6(4) of the ‘Habitats Directive’ 92/43/EEC – *Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission*. European Commission,
6. EC (2013) *Interpretation Manual of European Union Habitats. Version EUR 28*. European Commission

The Development Applications Unit (DAU) of the Department of Culture, Heritage & The Gaeltacht was consulted. A letter in response was received on the 29th of January 2019. This initial correspondence was followed up with a meeting with the National Parks and Wildlife Service. A Stage 3 pre-submission consultation meeting was held with the

NPWS on 27th of February 2019 to address the issues raised by the DUA. The consultation response received from the DAU and the minutes of the meeting with the NPWS are provided as Appendix 2. All comments raised by the DAU and NPWS have been considered in the preparation of this application.

1.2 Appropriate Assessment Methodology

The information contained in this NIS is designed to allow the Competent Authority to assess:

- 1) whether there will be any adverse effects on the integrity of a European Site, and
- 2) the implications of the project, alone or in combination with other plans and projects, for a European Site in view of its Conservation Objectives.

Firstly, in Section 2 of the report, the proposed development is fully described.

In Section 3, the results of the field surveys that were undertaken are presented to provide all necessary details of the ecological baseline conditions at the site of the proposed development.

In Section 4, the Qualifying Interests and Conservation Objectives of the “screened in” European sites are described, with identification of potential pathways for effects on each individual Qualifying Interest. In Section 5, the interaction of the proposed development on the baseline environment is considered in the context of the potential for the proposed development to result in adverse effects on the integrity of any European Site.

The assessment of potential adverse effects follows the precautionary principle as detailed in Article 191 of the Treaty on the Functioning of the European Union (EU). It aims at ensuring a higher level of environmental protection through preventative decision-taking in the case of risk and underpins the Habitats Directive (DoEHLG 2010). The precautionary principle is the underlying concept of sustainable development which implies that prudent action be taken to protect the environment even in the absence of scientific certainty (DoEHLG 2010).

Following the assessment of potential adverse effects on a European Site resulting from the project itself, a further assessment of the potential for effects when the project is considered cumulatively and in combination with other proposed developments is made in Section 6.

Finally in Section 7, a concluding statement is made. This includes a summary of the results of the assessment along with a checklist that demonstrates the lack of adverse effects on the integrity of any European Site (limited to the Conservation Objectives of the site) (as per Box 10 of EC, 2002). As per EC, 2002, the meaning of integrity is defined as follows;

The integrity of a site involves its ecological functions. The decision as to whether it is adversely affected should focus on and be limited to the site's conservation objectives' (MN2000, paragraph 4.6(3)).

The information contained in this report will allow the Competent Authority to determine that the proposed development will not adversely affect the integrity of any European Site.

2 DESCRIPTION OF THE PROJECT

2.1 Site Location

The proposed site is located in the townlands of Moneyduff and Oranhill, approximately 590m south of the centre of Oranmore, Co. Galway. Oranmore is positioned along the inner shoreline of Galway bay, approximately 7km east of Galway city. The area is characterised by existing and emerging residential development. The subject lands are located to the south of a well-established residential area of predominantly single storey bungalows (Beech Grove/Park). The proposed site has an elevation ranging between approximately 3.4 and 12.8m OD (Ordnance Datum). The overall local topography generally slopes from east to west with deposited fill located in mounds around the site creating artificial high points.

The subject lands extend to approximately 8.7 ha. The site is a greenfield site comprising a mosaic of scrub and dry calcareous and neutral grassland that has been modified in the recent past by the clearance of scrub. The site location is provided in Figure 2.1.

2.2 Characteristics of the Proposed Development

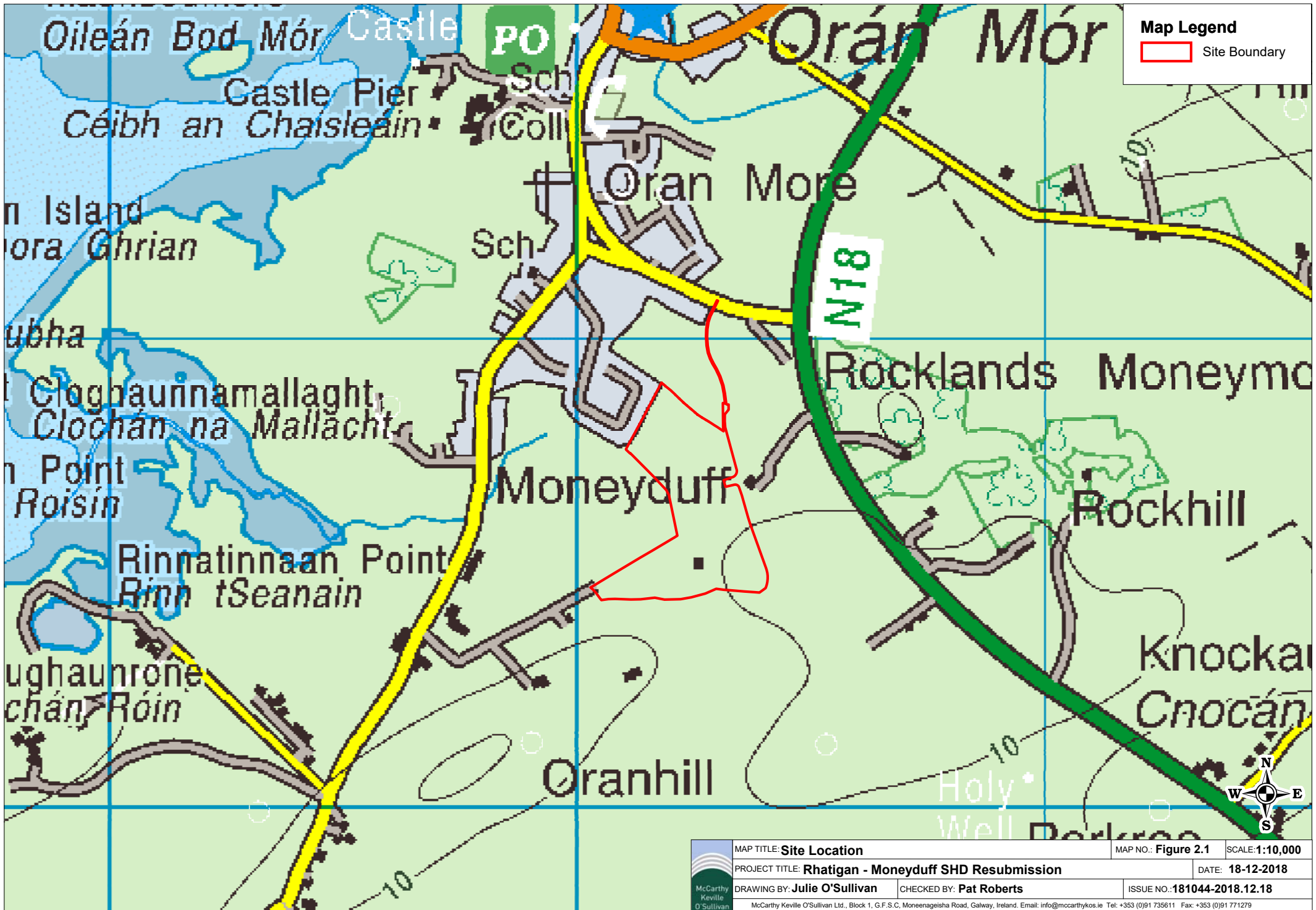
The proposal is for the construction of a housing estate comprising 212 residential houses, amenity areas a creche and associated parking facilities. The proposed development will consist of the following:

- 1) Construction of 212 no. residential units comprising:
 - 34 no. House Type A [four-bed semi-detached unit]
 - 54 no. House Type B [three-bed semi-detached unit]
 - 16 no. House Type C [four-bed detached]
 - 16 no. House Type D [three-bed terraced unit]
 - 24 no. House Type E [four-bed semi-detached unit]
 - 50 no. House Type G [25 no. two-bed ground floor duplexes and 25 no. two-bed plus study first/second floor duplexes]
 - 6 no. House Type H [two-bed duplex apartments]
 - 12 no. house Type J [two-bed terrace]
- 2) Development of a creche facility [374 sqm] and associated outdoor play areas and car parking.
- 3) Provision of new vehicular and pedestrian site access from the North-South Oranmore Distributor Road [the route of which was permitted under An Bord Pleanála Reference PL 07.237219, which was extended under Pl Ref 15/1334].
- 4) Provision of shared communal and private open space, site landscaping, car parking, site services and all associated site development works.

The full description of the proposed development is provided in Appendix 3 which is the description Chapter from the EIAR that accompanies the application. The main best practice measures to be employed are provided below. A Construction Environmental Management Plan (CEMP) demonstrates exactly how these measures will be implemented and is included as Appendix 4. A layout drawing is provided in Drawing number 2325-P-003.

2.2.1 Drainage and flood risk

Watermains



The site will connect to the local public water supply as shown in drawing number 10402-2000 (Proposed Drainage and Watermain Key Plan), included in Chapter 2 of the EIAR, Appendix 2. The watermain servicing the houses within the site running east through the adjacent lands and along the side of the main road N18 to reach the next available watermain connection as identified by Irish Water.

Foul Sewers

As described in the Report on Civil Works (Tobin, 2018), the sewer layout provides for the gravity sewer network falling to a pumping station located centrally in the open space on the western area of the site. The foul waste will then discharge from the pumping station via pumped rising main which will run out through the adjacent lands and along the side of the main road (N18) to reach the next available foul sewer as identified by Irish Water. The existing public foul sewer is shown on drawing. no. 10402-2000 (Proposed Drainage and Watermain Key Plan), Appendix 2 of this report.

Storm Sewers

The storm water drainage design has been designed to cater for all surface water runoff from all hard surfaces in the proposed development including roadways, roofs etc. All stormwater generated on site from roadways and roofs will discharge via Oil/Petrol Interceptor to one of 5 no. proposed soakaways which are situated in the centre and west of the site. The stormwater will soak away through the soil. Details of the soakaways are shown in Appendix C of the Report on Civil Works (Tobin, 2018).

Site drainage design

The Flood Risk Assessment for the site describes the drainage within and adjacent to the site (Hydro-Environmental Services, 2018). The protection of the watercourses adjacent to the site, and downstream catchments that they feed is of utmost importance in considering the most appropriate drainage proposals for the site of the proposed development. The proposed development's drainage design has therefore been proposed specifically with the intention of having no negative impact on the water quality of the site, and consequently no impact on downstream catchments and ecological ecosystems.

Existing watercourses

The proposed development site does not contain any mapped watercourses and no watercourses were identified within the site during site visits. The Millpot Stream, located to the west of the proposed site, flows west away from the development to Oranmore Bay in excess of 295m downstream (Hydro-Environmental Services, 2018).

Flood Risk Assessment

A site-specific Flood Risk Assessment has been prepared to establish the potential flood risk to the proposed residential development at Moneyduff (Hydro-Environmental Services, 2018). The assessment found that the overall risk of flooding posed by the proposed residential development and downstream of the site is estimated to be low.

This assessment concludes the following findings:

"No instances of historical flooding were identified in historic OS maps. No instances of recurring flooding were identified on OPW maps within the proposed site.

Areas of the proposed site were identified with the Preliminary Flood Risk Assessment (PFRA) and Catchment Flood Risk Assessment and Management (CFRAM) Flood Zones:

- *The PFRA mapping indicates that there is a small area in the west of the proposed site located in the coastal Flood Zone A (200-year flood zone) and the coastal Flood Zone B (1000-year flood zone). The remainder of the proposed site is located in Flood Zone C – where the probability of flooding is low (less than 0.1% or 1 in 1,000).*
- *From the site survey conducted, there appears to be depressions in the west of the site that are prone to pluvial flooding. These depressions are earmarked for open space as opposed to residential development for the proposed project.*
- *The CFRAM mapping indicates that there are no areas within the site that are within the tidal Flood Zone A and B. The extent of tidal flood zones ends in the centre of the field to the west of the site.*
- *The site infrastructure layout has been designed to ensure all highly vulnerable infrastructure are located outside the mapped PFRA flood zones. This ensures development located in mapped PFRA flood zones are limited to water compatible development i.e. amenity open space.*
- *With the application of standard best practice SuDS drainage controls within the proposed site, no downstream flooding from storm water runoff resulting from the proposed development is anticipated.*
- *Road levels and floor levels in the proposed development are proposed above >5.10mOD, and for recommended floor levels this includes for tolerances in completed CFRAM/ICPSS modelling, predicted sea level rise due to climate change, and also includes a freeboard of 0.3m” (Hydro-Environmental Services, 2018).*

2.2.2 Construction Phase Best Practice Measures

2.2.2.1 Prevention Pollution Control Measures

The Construction Industry Research and Information Association (CIRIA) provide guidance on the control and management of water pollution from construction sites ('Control of Water Pollution from Construction Sites, guidance for consultants and contractors', CIRIA, 2001), which provides guidance. This will ensure that surface water arising during the course of construction activities will contain minimum sediment. The following methods and best practice measures will ensure that sediment release and potential for pollution during the construction phase is minimised and reduced to insignificant:

Drainage

The proposed development site does not contain any mapped watercourses and no watercourses were identified within the site during site visits. The Millpot Stream, located to the west of the proposed site, flows west away from the development to Oranmore Bay in excess of 295m downstream. However, the following measures will be put in place to prevent the transportation of silt laden water or pollutants from entering the wider environments including downstream watercourses.

- There will be no release of suspended solids to any watercourse as a direct or indirect result of the proposed works. There is no surface watercourse on the site of the proposed development.

- No watercourse will be interfered with as part of the proposed works. No temporary instream crossings or temporary culverting will take place. Instream works will not take place.
- Any requirement for temporary fills or stockpiles will be damped down or covered with polyethylene sheeting as required to avoid sediment release associated with heavy rainfall.
- Prior to the commencement of earthwork silt fencing will be placed down-gradient of the construction areas where drains or drainage pathways are present. These will be embedded into the local soils to ensure all site water is captured and filtered;
- As construction advances there may be a small requirement to collect and treat surface water within the site. This will be completed using perimeter swales at low points around the construction areas, and if required water will be pumped from the swales into sediment bags prior to overland discharge allowing water to percolate naturally to ground or disperse by diffuse flow into local drainage ditches;
- Discharge onto ground will be via a silt bag which will filter any remaining sediment from the pumped water. The entire discharge area from silt bags will be enclosed by a perimeter of double silt fencing

Hydrocarbons

The use of hydrocarbons during the construction process can result in the potential for pollution and accidental spillage to enter natural watercourses downstream of the site via surface runoff and groundwater. The following measures have been built into the construction design phase of the project.

- On site re-fuelling of machinery will be carried out using a mobile double skinned fuel bowser. The fuel bowser, a double-axel custom-built refuelling trailer will be re-filled off site and will be towed around the site by a 4x4 jeep to where machinery is located. The 4x4 jeep will also carry fuel absorbent material and pads in the event of any accidental spillages. The fuel bowser will be parked on a level area in the construction compound when not in use and only designated trained and competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations;
- Fuels stored on site will be minimised. Any storage areas will be bunded appropriately for the fuel storage volume for the time period of the construction;
- The plant used should be regularly inspected for leaks and fitness for purpose; and,
- Spill kits will be available to deal with accidental spillages.

The following guidelines and documents will inform the detailed planning of the works phase: -

- Good practice guidelines on the control of water pollution from construction sites developed by the Construction Industry Research and Information Association (CIRIA) in particular;
- C532 Control of water pollution from construction sites: guidance for consultants and contractors (Masters-Williams et al, 2001); and
- SP156 Control of water pollution from construction sites - guide to good practice (Murnane et al, 2002).

- Requirements for the protection of fisheries habitat during construction and development works at river sites developed by the ERFB. <http://www.fisheriesireland.ie/Research/recent-publications.html>.

2.2.3 Landscaping works

Prior to completion of works on the development site, the landscaping works will be carried out. The proposed landscaping plan is shown as Drawing 18223-3-100 (Landscape Master Plan). The finishes include areas of amenity grassland, footpaths and tree planting. This work will be carried out before the completion of each phase in order to ensure that the development will be aesthetically pleasing place for residents to live. These works will involve the use of plant and machinery in order to carry out tasks such as earth moving. Materials which have been stockpiled for the task will be used as much as possible, and material will only be imported where it is required. Solid barriers will be erected around the site boundary for the duration of the construction works. A Habitat Management Plan has been completed for the proposed development and is provided as Appendix 5.

2.2.4 Invasive Species

The introduction and/or spread of invasive species such as Japanese Knotweed and Himalayan Knotweed for example, could result in the establishment of the species and this may have knock on effects on the surrounding environs.

Appropriate control measures will be incorporated into the design and construction phase of the development to ensure that the relevant measures (outlined in the following section below) will be implemented.

2.2.4.1 Control Measures for the Management of Invasive Species

Invasive species, such as Japanese Knotweed, Himalayan Knotweed, Himalayan Balsam, *Gunnera*, and Giant Hogweed pose a serious threat to biodiversity and the health of native vegetation types. Construction machinery can act as a vector for the spread of these plants. Machinery that has worked at an infected site is likely to cause the spread of such species by transferring their tiny seeds or plant fragments, in soil trapped in their tyre tread for instance. Equally, they can cause the spread of species within a site. The duration of the impact could be short-term or permanent depending on whether or not an eradication effort is made but once established, eradication is time-consuming and expensive. Himalayan Knotweed, for example, propagates vegetatively, forming a new plant from even very small plant fragments. Thus, there is a high risk of causing the spread of this species to other parts of the site. The UK Environment Agency's '*Japanese Knotweed Code of Practice*' provides guidance on managing Japanese Knotweed and Himalayan Knotweed on development sites. A number of control measures have been drawn up and included in the design and construction phase of the proposed works to avoid the introduction and spread of invasive plant species. The following project design elements have been devised to avoid such effects. The following measures address potential effects associated with the construction phase of the development:

- All earthworks machinery will be thoroughly pressure-washed prior to arrival on site and prior to their further use elsewhere.
- Care will be taken not to disturb or cause the movement of invasive species fragments, either intentionally or accidentally.
- There are not believed to be any existing stands of invasive species on site, but should any be found, they will be clearly demarcated by temporary fencing and

tracking within them will be strictly avoided. A minimum buffer of seven metres will be applied to avoid disturbance of lateral rhizomes.

- If any excavations must be carried out in areas of Japanese Knotweed, the excavated material will not be moved from the location. The machinery must be thoroughly pressure-washed in a designated area at least 25 metres from any watercourse before moving on to an area that is not yet infected.
- All contractors and staff will be briefed about the presence, identification and significance of Japanese Knotweed before commencement of works.
- Good construction site hygiene will be employed to prevent the spread of these species with vehicles thoroughly washed prior to leaving any site with the potential to have supported invasive species. All plant and equipment employed on the construction site (e.g. excavator, footwear, etc.) will be thoroughly cleaned down using a power washer unit prior to arrival on site to prevent the spread of invasive plant species such as Japanese Knotweed and Rhododendron. All washing must be undertaken in areas with no potential to result in the spread of invasive species.
- When working at locations in proximity to natural watercourses, a suitable barrier will be erected between the watercourse and the stand of invasive species. This will assist in preventing the spread of any invasive species into the watercourse during their removal. There are no watercourses on the proposed development site, but cognizance will be had of any watercourses on neighbouring sites.
- Any material that is imported onto any site will be verified by a suitably qualified ecologist to be free from any invasive species listed on the 'Third Schedule' of Regulations 49 & 50 of Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011). This will be carried out by searching for rhizomes and plant material.
- Any soils or subsoils contaminated with invasive species will be sent for disposal to an authorized waste facility.

The treatment and control of invasive alien species will follow guidelines issued by the National Roads Authority – *The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads* (NRA 2010) and the Environment Agency (2013) – *The Knotweed Code of Practice: Managing Japanese Knotweed on Development Sites* (Version 3, amended in 2013).

2.2.5 Waste Management

The treatment of waste is to be employed by the contractor or a specialist waste management contractor as a trade package. This contractor is responsible for:

- Ensuring the site is kept clean and safe
- The collection of waste from a central point
- Segregation of waste on site.

The waste management contractor should ensure that all access routes, fire escapes and staircases are swept and kept clear of debris on a regular basis to maintain high standards of health and safety on the project. No fires will be permitted on site.

The Contractor will prepare a Construction Waste Management Plan in accordance with the "Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects" (Department of Environment, Heritage and Local Government, 2006) and ensure that all material is disposed of at an appropriately

licensed land fill site. The Contractor will also outline detailed proposals within the Construction Management Plan to accommodate construction traffic.

In order to ensure appropriate segregation of waste on site, a material storage zone will be provided in the compound area. This storage zone will include material recycling areas and facilities. A series of 'way finding' signage will be provided to route staff and deliveries into the site and to designated compound or construction areas, as appropriate.

2.2.6 Dust

Dust prevention measures will be included for control of any site airborne particulate pollution. The Contractor will put in place and monitor dust levels in the vicinity using a Bergerhoff gauge instrument. The minimum criteria to be maintained will be the limit for Environmental Protection Agency (EPA) specification for licensed facilities in Ireland, which is 350mg/m²/day. The Contractor will continuously monitor dust over the variation of weather and material disposal to ensure the limits are not breached throughout the project. Dust suppression systems should be implemented if required based on the continuously monitored dust levels.

Dust control should be achieved by:

- Dampening down the dust at the source
- Sheeting will be used as required for stockpiled materials
- Use of barriers such as debris netting on scaffolding around the building to block dust escaping where the building is within 10m of the site boundary where residential properties exist.
- Site road ways will be maintained in a stoned hard core condition not allowing soil to accumulate which when dry can create dust.
- Wheel wash equipment will be set up at the site exit gate for all construction vehicles to pass through prior to leaving the site thus ensuring that no dirt etc. is transported outside the site onto the roadways.
- Plant and equipment that have the potential to create volumes of dust will have appropriate attachments to allow water source to dampen dust to not allow it to get airborne.
- Plant and equipment that have the potential to create volumes of dust will be located away from sensitive receptors where possible.
- Deploy Road Sweeper as required on External Roads.
- Deployment of dust monitors across the site if required

2.2.7 Noise

The Contractor will be required to monitor base noise levels at the site location before commencement of the project. Noise monitoring will be required throughout all phases of the project. Variation of noise levels from those experienced as part of everyday life in an area can result in extreme disruption. The Contractor will implement measures to eliminate where possible and reduce noise levels where not. Noise levels will be kept below those levels specified in the National Roads Authority – "Guidelines for the Treatment of Noise and Vibration in National Roads Schemes" or such further limits as imposed by Galway County Council. The proposed development will comply with BS 5228 "Noise Control on Construction and open sites Part 1: Code of practice for basic information and procedures for noise control."

Construction equipment for use outdoors will comply with the European Communities Regulations– Noise Emission by Equipment for Use Outdoors – SI 241 - 2006.

Noise emissions arising from construction phase operations at the proposed development site will not exceed the identified 65 dB $L_{Aeq\ 1\ h}$ criterion at receptors, with a single exception: use of tracked excavators over approximately 15 t in size in immediate proximity to the boundaries adjoining Beech Park and Coill Clocha is likely to give rise to levels which marginally exceed the criterion. This will be avoided through use of excavators which do not exceed 15 t approximately, depending on plant power output and condition.

No other specific mitigation measures are warranted. Several general measures are proposed as follows:

- Construction operations will in general be confined to the period Monday-Friday 0800-1900 h, and Saturday 08:00-14:00 h.
- Plant used onsite during the construction phase will be maintained in a satisfactory condition and in accordance with manufacturer recommendations. In particular, exhaust silencers will be fitted and operating correctly at all times. Defective silencers will be immediately replaced.
- Where it is proposed to operate plant during the period 0700-0800 h, standard 'beeper' reversing alarms will be replaced with flat spectrum alarms.
- Erection of solid barriers (hoarding) to site boundary

2.2.8 Road Cleaning and Wheel Washing

The Contractor will make provision for the cleaning by road sweeper etc. of all access routes to and from the site during the course of the works as required. It is intended that cleaning will be undertaken on a daily basis during the excavation works and as required thereafter. A wheel wash facility will be provided on site to clean site traffic leaving the site. Waste water generated at this washing facility will be suitably treated on site and all settled silts disposed offsite to licensed landfill. All road sweeping vehicles will be emptied off site at a suitably licensed facility as per our construction stage environmental waste management document.

2.2.9 Water Supply

Water will be supplied on site by water tankers for general use. Potable water will be provided in the form of bottled water for staff use.

2.2.10 Wastewater Management

Portable toilets will be provided for the working on the construction site. Wastewater arising on-site from these toilets is stored in a sealed tank located within the portable toilets, and these will be emptied periodically (as required) by permitted waste contractors and transported to municipal wastewater treatment plants for treatment.

Any sewage or greywater generated during the operational phase of the proposed development will be directed to the local municipal wastewater treatment plants for treatment via the sewage collection network.

2.2.11 Aggregates

The aggregates required for the construction of the proposed development will be sourced, as much as is possible and practicable, from quarries and suppliers located as near as possible to the proposed development. This will reduce the potential for any negative impacts associated with the haulage of the materials to the site of the proposed development. Existing soils and subsoils located on the site will be used where possible to reduce the amount of such materials required for import onto the site.

2.2.12 Construction Traffic/Plant

The following mitigation measures will be implemented in relation to construction traffic and plant/machinery:

2.2.13 Operational Phase

The proposed development will require periodic maintenance throughout the operational phase. The operation of a residential development is not a recognized source of environmental emissions or nuisance and so there will be no adverse effects associated with its operation.

It is proposed that the development will drain via gravity to 5 no. soakaways proposed on site. Water draining to soakaways will pass through silt traps and hydrocarbon interceptors prior to reaching each soakaway. No surface water from roofs or paved surfaces will be discharge from the site, other than via the soakaways to ground. The proposed on-site foul sewers will discharge by gravity to a pumping station to the west of the site, and the foul waste will discharge from this pumping station via pumped rising main to the adjacent public (Irish Water) foul sewer network.

2.2.14 Decommissioning Phase

It is not intended that the proposed buildings will be removed, as permanent planning permission is being sought for this development. The proposed development will form an integral part of the local housing needs. Therefore, it is intended that the proposed development will be retained as permanent and will not be decommissioned.

3 CHARACTERISTICS OF THE RECEIVING ENVIRONMENT

3.1 Ecological Survey Methodologies

3.1.1 Ecological Multidisciplinary Walkover Surveys

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

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

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

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

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

The multi-disciplinary walkover field surveys within the development site were conducted in September 2016 and mid-August 2017 which is within an adequate survey period for grassland habitat (May – June/Aug – Sept). Therefore, it is concluded that the habitats and species that could potentially be impacted by the proposed development were adequately assessed during the survey period and a thorough and comprehensive ecological assessment was achieved. Seasonal factors that affect distribution patterns and habits of species were taken into account when conducting the surveys. The potential of the site to support certain populations (in particular those of conservation importance that may not have been recorded during the field survey due to their seasonal absence or nocturnal/cryptic nature) was assessed.

3.1.2 Survey of Alkaline Fen Within the SAC

An Alkaline Fen habitat was identified within the Galway Bay Complex SAC that is located to the west of the site of the proposed development. A detailed assessment of the fen vegetation that is located to the west of the site was undertaken in autumn and winter 2018 and April 2019. The survey followed the methodology and assessment criteria outlined in Foss & Crushell (2008) (Fen). Habitats were identified in accordance with the Heritage Council’s *‘Guide to Habitats in Ireland’* (Fossitt, 2000). Habitat mapping was undertaken with regard to guidance set out in *‘Best Practice Guidance for Habitat Survey and Mapping’* (Smith *et al.*, 2011). Grassland habitat identified during

the fen survey was assessed following methodologies outlined in O’Neil et al. (2013) and Martin et al. (2018). Plant nomenclature for vascular plants follows New Flora of the British Isles (Stace, 2010), whilst mosses and liverworts follows Mosses and Liverworts of Britain and Ireland - a field guide (British Bryological Society, 2010). The results of this survey are presented in Appendix 6.

3.1.3 Otter Survey

Dedicated otter surveys were carried out on 22nd of February 2019 by Irene Sullivan (BSc.) and on the 9th of April 2019 by James Owens (B.Sc., M.Sc.), both of McCarthy Keville O’Sullivan Ltd. The otter surveys were conducted as per NRA (2006) guidelines. This involved a search for otter signs e.g. spraints, scat, prints, slides, trails, couches and holts. In addition to the development site footprint, the otter surveys covered the adjacent fen and the shoreline and saltmarsh habitats of the most proximal part of Galway Bay Complex SAC.

3.1.4 Winter Bird Surveys

In addition to the ecological surveys described above, detailed winter bird usage surveys were undertaken both within the site red line boundary and surrounding area (including both the nearby Inner Galway Bay SPA and Cregganna Marsh SPA). These involved monthly surveys from October to March 2019 inclusive.

3.2 Results of Ecological Surveys

3.2.1 Description of Habitats within the Ecological Survey Area

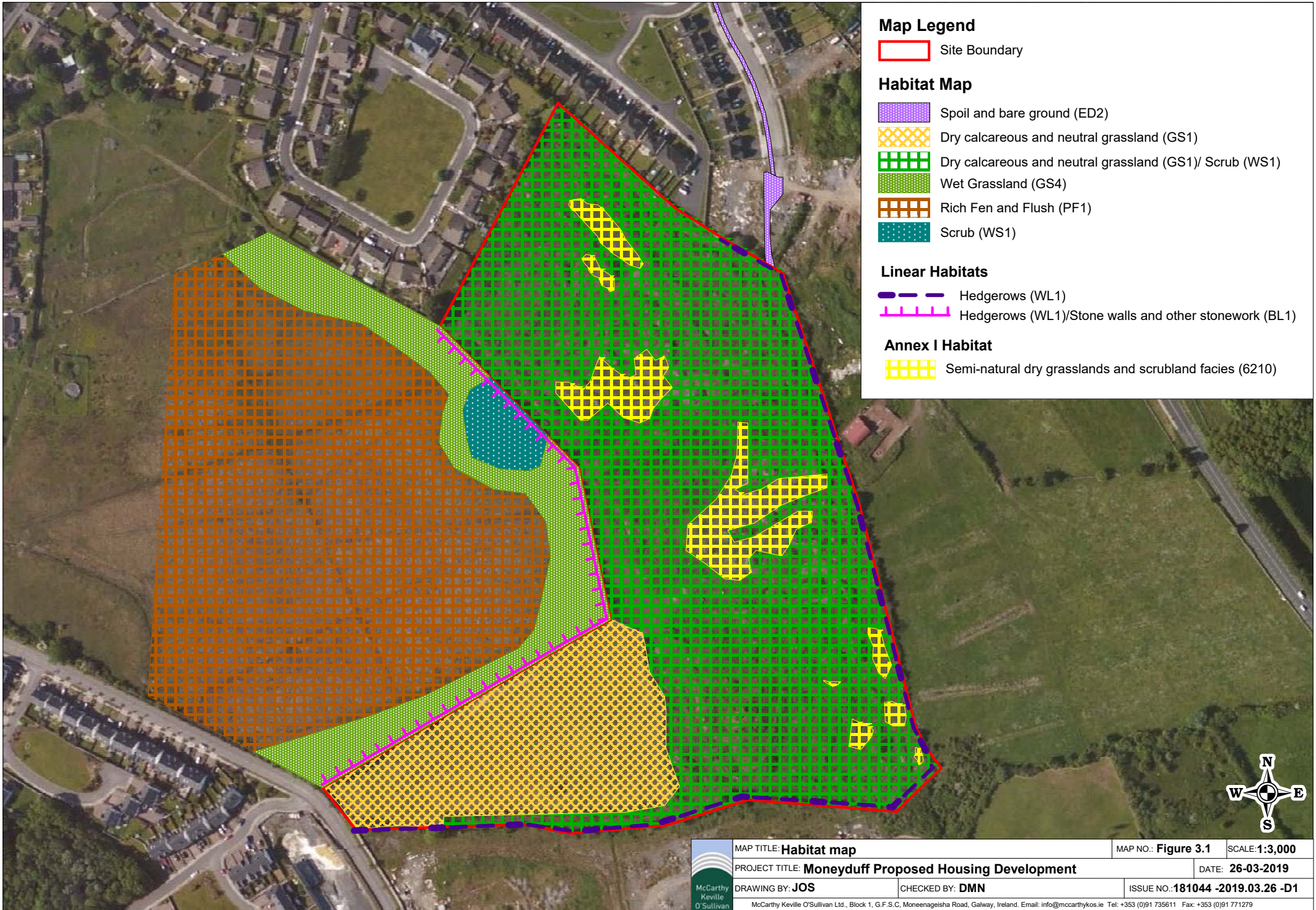
A total of six habitats were recorded within and directly adjacent to the site of the proposed development (Table 3.1). Habitats within and surrounding the site of the proposed development are provided in Figure 3.1

Table 3.1.- Habitats recorded within the proposed development boundary (Fossitt, 2000).

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

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

The larger eastern section of the site was found to be predominantly overgrown by **Scrub (WS1)** species including blackthorn (*Prunus Spinosa*), bramble (*Rubus fruticosus* agg.) and bracken (*Pteridium aquilinum*) with some ash (*Fraxinus excelsior*), willow (*Salix* spp.), whitebeam (*Sorbus aria*) and alder (*Alnus glutinosa*) trees becoming established across the site. Plate 3.1 provides an example of scrub habitat within the site.



Map Legend

Site Boundary

Habitat Map

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

Linear Habitats

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

Annex I Habitat

- Semi-natural dry grasslands and scrubland facies (6210)

	MAP TITLE: Habitat map	MAP NO.: Figure 3.1	SCALE: 1:3,000
	PROJECT TITLE: Moneyduff Proposed Housing Development		DATE: 26-03-2019
	DRAWING BY: JOS	CHECKED BY: DMN	ISSUE NO.: 181044 -2019.03.26 -D1
	<small>McCarthy Keville O'Sullivan Ltd., Block 1, G.F.S.C. Moneenageisha Road, Galway, Ireland. Email: info@mccarthykos.ie Tel: +353 (0)91 735611 Fax: +353 (0)91 771279</small>		

Interspersed throughout the areas of scrub were grassland habitats classified as ***Dry Calcareous and Neutral Grassland (GS1)*** on thin soils with some bare limestone rock visible in parts. Common species included common knapweed (*Centaurea nigra*), oxeye daisy (*Leucanthemum vulgare*), selfheal (*Prunella vulgaris*), red clover (*Trifolium pratense*), crested dog's-tail (*Cynosurus cristatus*) and sweet vernal-grass (*Anthoxanthum odoratum*). This habitat corresponds to the Annex I habitat "Semi-natural dry grasslands (*Festuco-Brometalia*) [6210]" (O'Neill et al., 2013). This community type is characterised by a wide variety of grasses and herbs, in which there is a moderate representation of calcicolous species (i.e. species with a preference for calcium rich soils). Nine discreet mappable areas of this habitat type were identified within the site from the 2016 and 2017 surveys period. This equates to approximately 0.89 hectares or 10.3% of the development area. The areas mapped during the site visits range from 0.003 – 0.33 hectares in size. The 2017 survey found that all the areas classified in 2016 still correspond to Annex I habitat and found that an additional three areas also conformed to this Annex I quality habitat. Similar habitat also occurred interspersed within the areas of scrub. Plate 3.2 & Plate 3.3 provide examples of semi-natural dry grassland to the east and south east of the site with surrounding encroaching scrub. The distribution of Annex I semi-natural dry grassland is shown in Figure 3.1. The southwestern portion of the site comprises a mosaic of ***Wet Grassland (GS4)*** and ***Dry Calcareous and Neutral Grassland (GS1)*** and is grazed by horses and cattle.

A small area within the northern part of the site, that will form part of the site access road, comprises ***Spoil and Bare Ground (ED2)***.



Plate 3.1: Example of scrub habitat within the site.



Plate 3.2: Example of semi - natural dry grassland in the eastern and south eastern sections of the site with surrounding encroaching scrub.



Plate 3.3: Example of scrub encroaching on semi - natural dry grassland habitat to the east of the site.

In addition to the habitats recorded within the site boundary, as provided in Table 3.1, habitats in the wider area comprised of *Buildings and Artificial Surfaces (BL3)* to the south and north, *Semi-improved Agricultural Grassland (GA1)* to the east, *Hedgerows (WL1)*, *Treelines (WL2)* and *Rich Fen (PF1)* to the west.



Plate 3.4: Example of Buildings and Artificial Surfaces (BL3) surrounding the north of the site



Plate 3.5: Example of Buildings and Artificial Surfaces (BL3) surrounding the south and southwest of the site

An Alkaline fen (**Rich Fen PF1**) habitat is present adjacent to the western boundary of the site and within the boundary of Galway Bay Complex SAC (Plate 3.6 and Plate 3.7). This fen was the subject of dedicated botanical surveys, the results of which are

presented in Appendix 7. This habitat has been degraded by artificial drainage (Plate 3.6) but still supports Annex I Alkaline Fen (7230) habitat. A thin strip of wet grassland (GS4) surrounds the fen and buffers it from the site of the proposed development (Plate 3.6). Sections of this grassland correspond to the Annex I habitat Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinia caerulea*) (6410). There is a network of drainage ditches (FW4) (Plate 3.7) within the fen. These provide hydrological connectivity with Galway Bay to the west.



Plate 3.6: Photo of Feb (PF1), left of photo, and wet grassland (GS4), right, bordering the west of the development boundary.



Plate 3.7 Photo of drainage within the Feb (PF1), outside the west of the development boundary.

3.2.2 Significance of Habitats

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

The surveys found that the site supports discontinuous sections of EU Habitats Directive Annex I habitat – *Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco – Brometalia)*. These were dispersed throughout the site, primarily within fields in the eastern, northeastern and southeastern sections of the development boundary (see Figure 3.1). The total combined area of Annex I habitat covers a small proportion of the site, 0.89 hectares or 10.3% of the development area (8.7ha). These areas occur in disjointed patches which are threatened by scrub encroachment. Given the nature and extent of scrub encroachment surrounding the smaller areas, they are not considered to be 'viable areas' of Annex I habitat (NRA, 2009b) and are continually decreasing in size through lack of management. The habitat patches are assigned **Local Importance (Higher Value)** because of their fragmentation and degradation through scrub encroachment.

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

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

3.3 Fauna in the Existing Environment

3.3.1.1 Mammals

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

Dedicated otter surveys were carried out in February 2019 and April 2019. The areas covered during the otter surveys are illustrated in Figure 3.2. No evidence of otter was recorded within the development site during the dedicated otter surveys carried out in 2019, or during any of the field surveys carried out in 2017 – 2019.

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

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

3.3.1.2 Birds

The site of the proposed development was assessed for its suitability to support protected bird species. The scrub and hedgerow habitats on the site provide potential habitat for a range of common farmland bird species but do not provide significant habitat for the species for which the nearby SPAs are designated or for any other



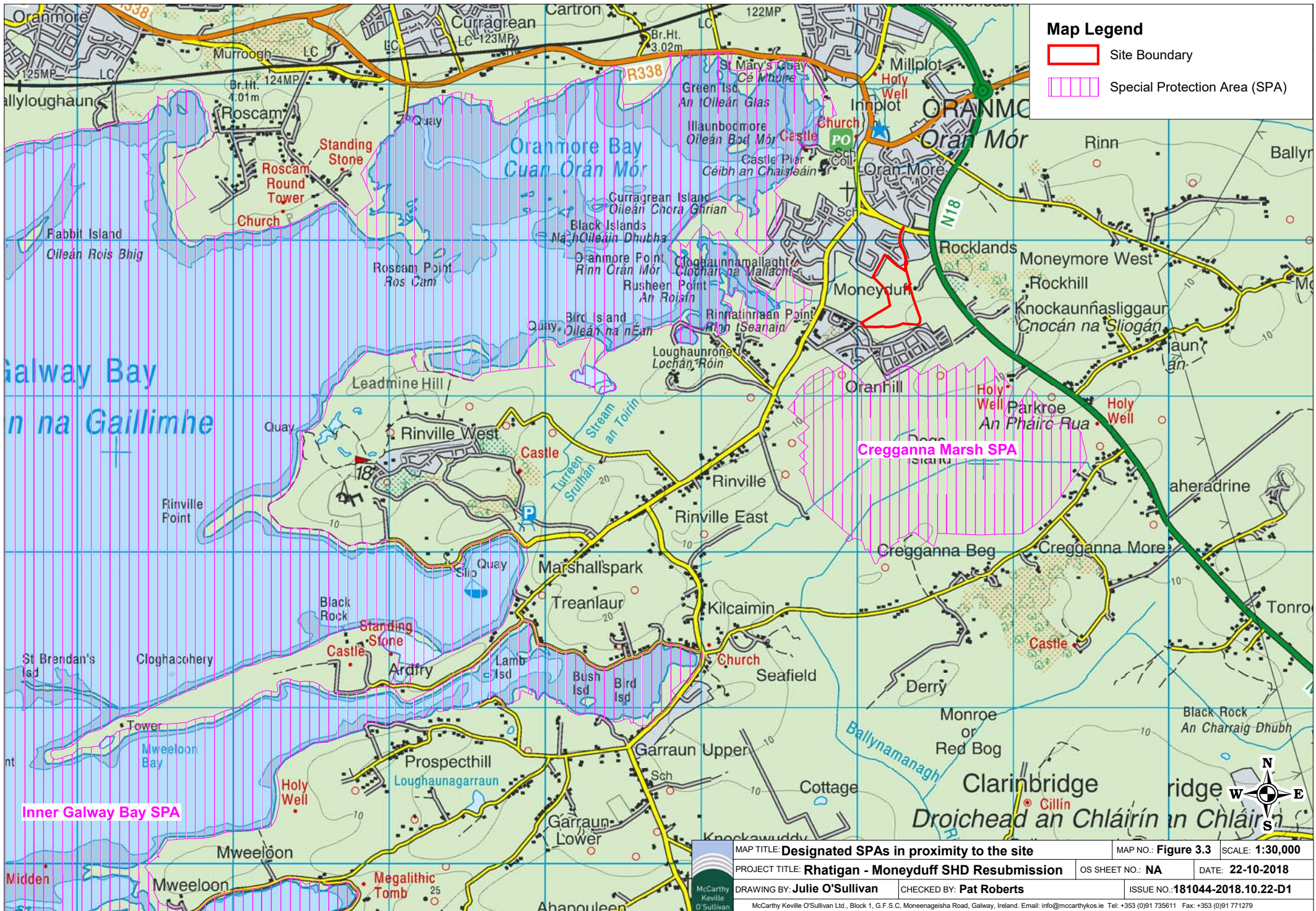
species listed on Annex I of the EU Birds Directive or on the BOCCI Red List. The wetlands to the north (fen habitat within the SAC but not within any SPA) are dominated by dense rushes and do not provide significant habitat for wildfowl such as Greenland white fronted goose (*Anser albifrons flavirostris*) that is the qualifying interest of the nearby Cregganna Marsh SPA. No EU Annex I or red listed bird species were recorded during the multidisciplinary walkover surveys and no significant habitat for birds was recorded.

However, following the precautionary principle, monthly bird surveys were undertaken monthly between October 2018 and March 2019. The results of these surveys are provided below. Surveys were carried out on the development site and the surrounding habitats including the adjacent fen (Figure 3.4). In summary, the site of the proposed development did not support significant wintering bird populations. None of the SCI species for any nearby SPAs were recorded utilising the site or in the surrounding fen during the surveys undertaken. Vantage Point surveys of the most proximal sections of the Cregganna Marsh SPA and the Inner Galway Bay SPA were undertaken as part of the bird survey (see Figure 3.3 and Figure 3.5). No Greenland white fronted geese were recorded at any location during the surveys completed. A number of the SCI species, for which the Inner Galway Bay SPA has been designated, were recorded within the SPA during winter bird surveys. However, these individuals were recorded at a distance removed from the site of the proposed development and to the west of the Maree road. Species including curlew (*Numenius arquata*), grey heron (*Ardea cinerea*) and black-headed gull (*Chroicocephalus ridibundus*) were recorded flying over the site of the proposed development but were not recorded utilising it. Snipe (*Gallinago gallinago*) were recorded within grassland habitats of the development site.

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

Species records for Moneyduff

Table 3.2 provides an overview of the target species and species of conservation interest recorded during the surveys carried out between October and March 2019. Non-target bird species recorded within the development site are presented in Table 3.3, along with their Birds of Conservation Concern in Ireland (BoCCI) status. None of the SCIs of Inner Galway Bay SPA were recorded roosting or feeding within the proposed development site during walkover surveys. There were six observations of Special Conservation Interest species associated with the Inner Galway Bay SPA; including three observations of Curlew flying over the site during surveys in October and November and two observations of Black-headed Gull flying over the development site; and one observation of Grey heron. A peregrine was recorded hunting over the south eastern boundary of the development site. Twelve snipe were recorded within the grassland surveys during October, November, January, February and March surveys. Flightlines recorded during the bird survey are presented in Figure 3.6.



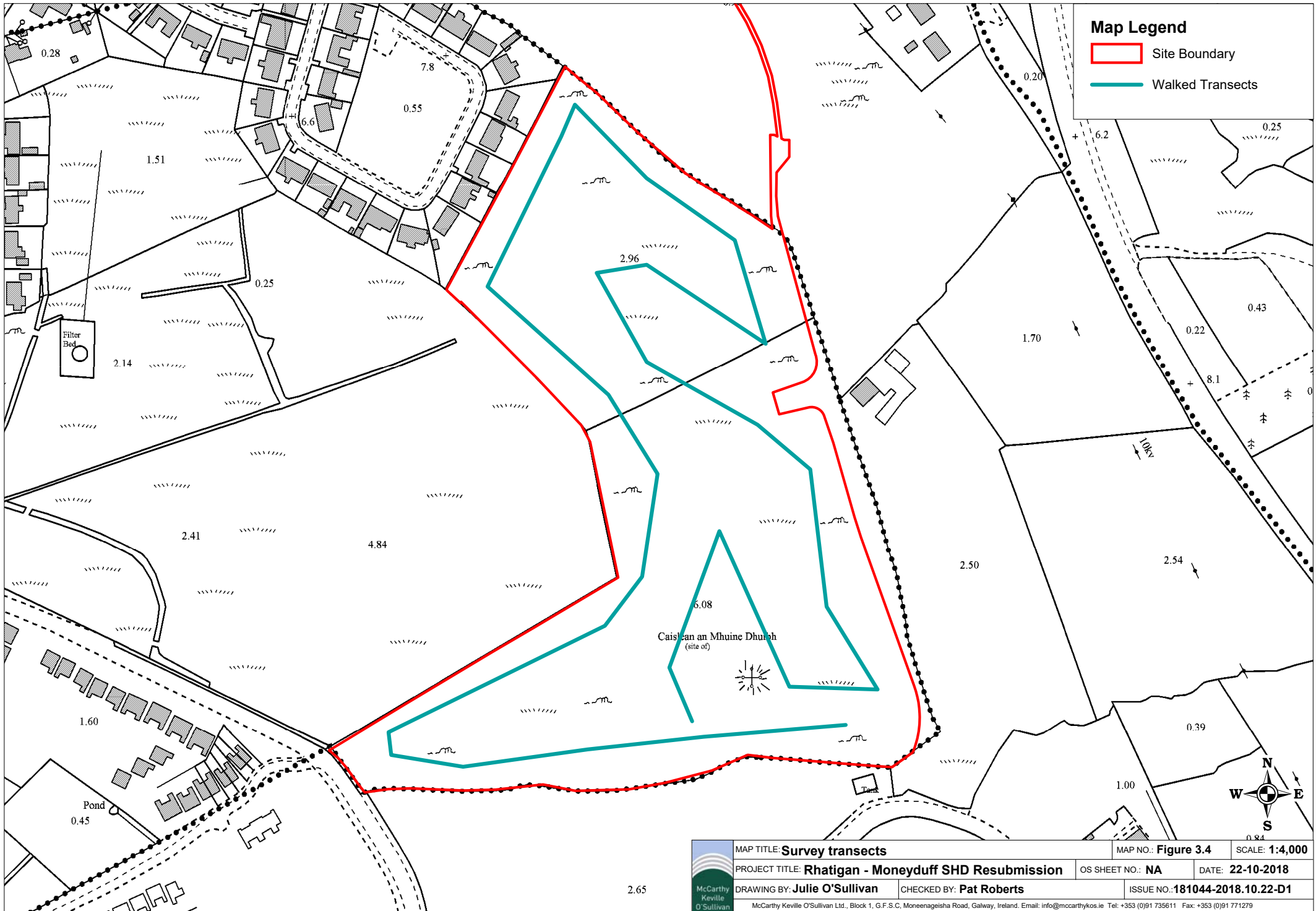
MAP TITLE: **Designated SPAs in proximity to the site** MAP NO.: **Figure 3.3** SCALE: **1:30,000**

PROJECT TITLE: **Rhatigan - Moneyduff SHD Resubmission** OS SHEET NO.: **NA** DATE: **22-10-2018**

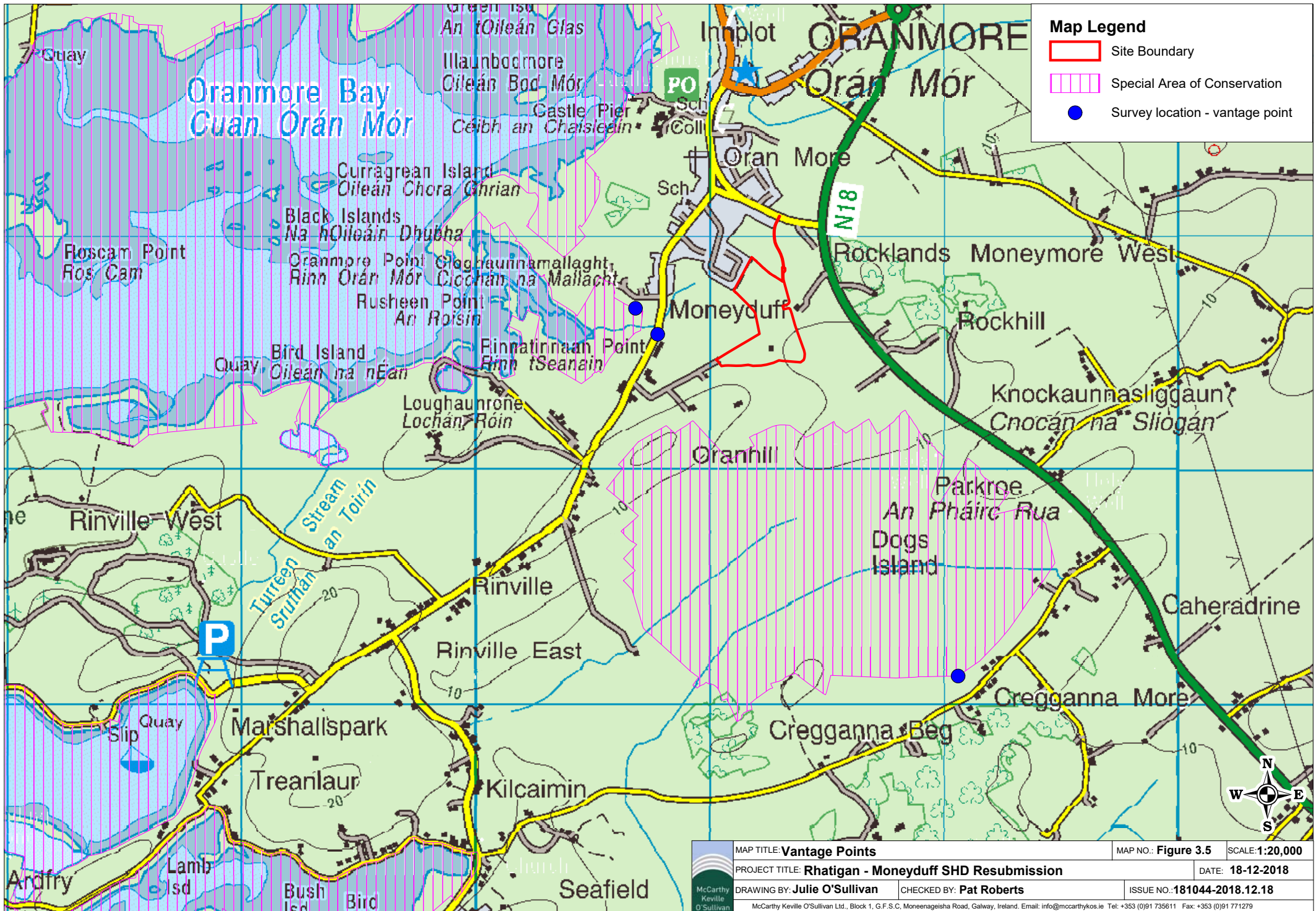
DRAWING BY: **Julie O'Sullivan** CHECKED BY: **Pat Roberts** ISSUE NO.: **181044-2018.10.22-D1**

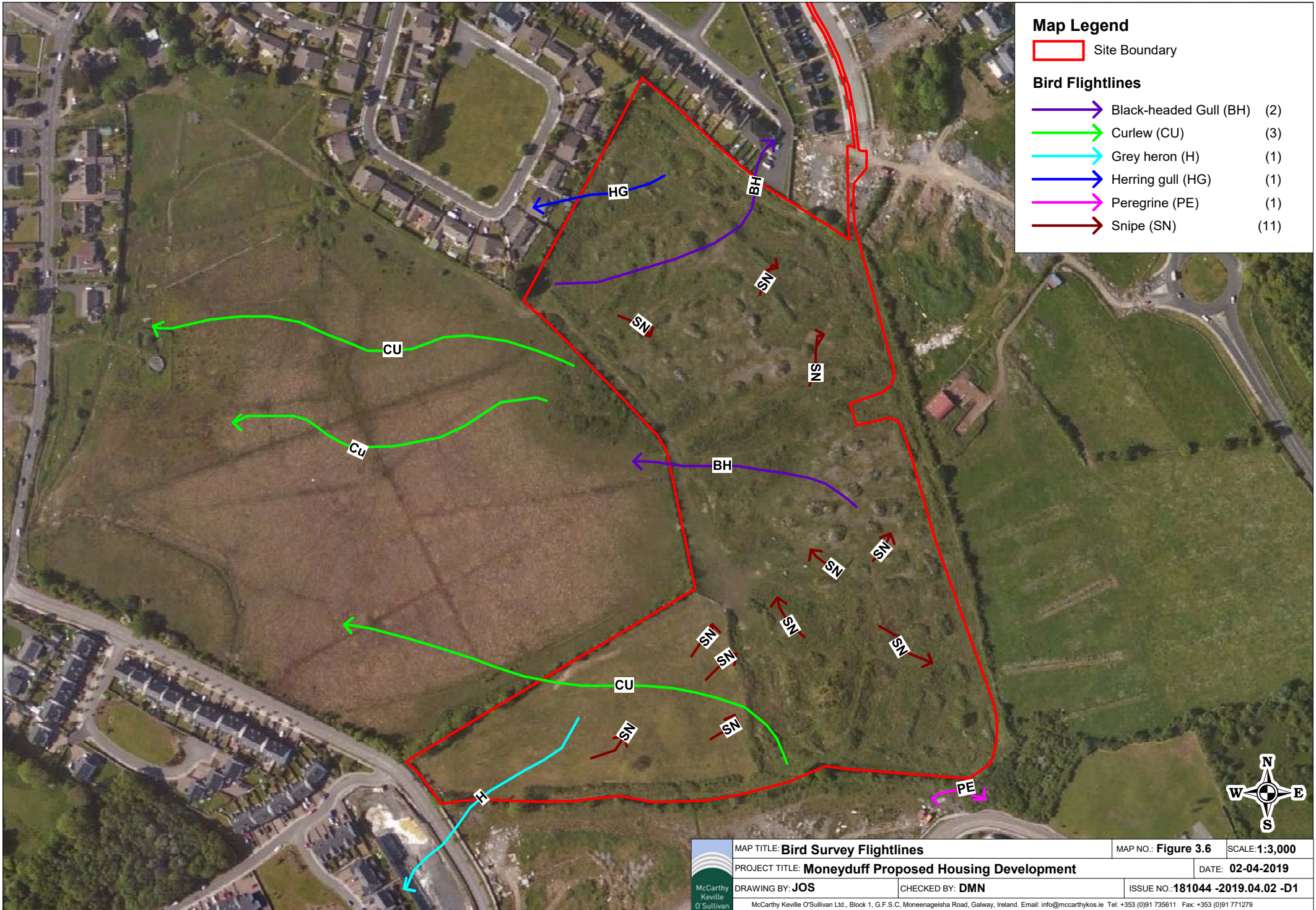
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	MAP TITLE: Survey transects		MAP NO.: Figure 3.4	SCALE: 1:4,000
	PROJECT TITLE: Rhatigan - Moneyduff SHD Resubmission		OS SHEET NO.: NA	DATE: 22-10-2018
	DRAWING BY: Julie O'Sullivan	CHECKED BY: Pat Roberts	ISSUE NO.: 181044-2018.10.22-D1	
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	MAP TITLE: Bird Survey Flightlines	MAP NO.: Figure 3.6	SCALE: 1:3,000
	PROJECT TITLE: Moneyduff Proposed Housing Development	DATE: 02-04-2019	
	DRAWING BY: JOS	CHECKED BY: DMN	ISSUE NO.: 181044 -2019.04.02 -D1
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Table 3.2. Target bird survey results for Moneyduff

Common Name	Number of Individuals	Notes	Date	Conservation status
Curlew (<i>Numenius arquata</i>)	2	Two individuals recorded in flight outside of the site boundary, over the fen west of the site, heading west.	23/10/2018	Birds of Conservation Concern – Red list SCI of Inner Galway Bay
Curlew (<i>Numenius arquata</i>)	1	One individual recorded in flight over site heading west, over fen habitat.	29/11/2018	Birds of Conservation Concern – Red list SCI of Inner Galway Bay
Black-headed Gull (<i>Chroicocephalus ridibundus</i>)	1	One individual recorded flying north-east over the development site.	29/11/2018	Birds of Conservation Concern – Red list SCI of Inner Galway Bay
Black-headed Gull (<i>Chroicocephalus ridibundus</i>)	1	One individual recorded flying west over the development site.	30/01/2019	Birds of Conservation Concern – Red list SCI of Inner Galway Bay
Peregrine (<i>Falco peregrinus</i>)	1	Hunting over south-east corner of the development site.	29/11/2018	Annex I
Snipe (<i>Gallinago gallinago</i>)	3	Three individuals flushed from grassland habitats.	23/10/2018	Birds of Conservation Concern – Amber list
Snipe (<i>Gallinago gallinago</i>)	3	Three individuals flushed from grassland habitats.	29/11/2018	Birds of Conservation Concern – Amber list
Snipe (<i>Gallinago gallinago</i>)	1	Individual flushed from grassland.	30/01/2019	Birds of Conservation Concern – Amber list
Snipe (<i>Gallinago gallinago</i>)	4	Four individuals flushed from grassland habitats.	22/02/2019	Birds of Conservation Concern – Amber list

Common Name	Number of Individuals	Notes	Date	Conservation status
Grey Heron (<i>Ardea cinerea</i>)	1	One individual recorded in flight over south-western portion of the site, flying in a south-westerly direction	22/02/2019	SCI of Inner Galway Bay
Herring Gull (<i>Larus argentatus</i>)	1	Individual spotted flying over the site.	22/02/2019	Birds of Conservation Concern - Red list
Snipe (<i>Gallinago gallinago</i>)	1	Individual flushed from grassland habitat.	21/03/2019	Birds of Conservation Concern - Amber list

Table 3.3. Non-target bird species recorded at Moneyduff (Within the development site)

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

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

Species records for Inner Galway Bay SPA

A section of Inner Galway Bay SPA, approximately 370m west of the development site was surveyed. The vantage point overlooked an area of saltmarsh and mudflat in order to record bird distribution during high and low tide and to determine whether birds listed as Qualifying interests of the Inner Galway Bay SPA may utilize habitats within the development site. During the surveys there were no movements of wintering wildfowl and waders between this SPA and the site. Table 3.4 provides an overview of the species recorded.

Table 3.4 Bird survey results for Inner Galway Bay SPA.

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

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

3.3.2 Species Records for Cregganna Marsh SPA

Cregganna Marsh SPA, approximately 390m south of the development site was surveyed, to determine whether Greenland White-fronted Geese, listed as Qualifying interests of Cregganna Marsh SPA, were moving between the SPA and the proposed development site. Table 3.5 provides an overview of the species recorded. Greenland White-fronted Geese were not recorded at Cregganna Marsh SPA during any of the surveys.

Table 3.5 Bird survey results for Cregganna Marsh SPA.

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

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

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

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

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

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

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

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

3.3.2.1 Other Faunal Taxa

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

3.3.3 Significance of the Fauna

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

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

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

3.4 EPA River Catchments & Watercourses

On a regional scale, the site is located within Hydrometric Area 29. The site is located in the Galway Bay South East catchment and Carrowmoneash (Oranmore)_SC_010 sub-catchment under the Water Framework Directive (WFD).

The Proposed Development site does not contain any mapped watercourses. The closest mapped watercourse is the Millplot Stream, which originates within the fen to the west of the proposed site, and continues west, discharging into Oranmore Bay in excess of 295m downstream.

The Water Framework Directive (WFD) Coastal Waterbody risk score for this section of Galway Bay has been assessed as "not at risk" and the water quality is classed as "unpolluted". The Water Framework Directive (WFD) Ground Waterbody Approved risk score for the area (Clarinbridge) has been assessed as "at risk".

4 Identification of individual Qualifying Interests/Special Conservation Interests with the Potential to be Affected

The Appropriate Assessment Screening Report that is provided as Appendix 1 to this NIS identified four European Sites with the potential to be affected by the proposed development. It also identified the pathways by which the sites may be affected. Table 4.1 below identifies the individual Qualifying Interests and Special Conservation Interests that have the potential to be affected via the identified pathways. The potential for adverse effects on these identified receptors is considered further in this NIS, Those QIs/SCIs for which no pathway for effect is identified are excluded at this stage. A desk study of the habitats/species with the potential to be affected in the context of the European Sites then follows.

Table 4.1 Individual Qualifying Interests/Special Conservation Interests with the potential to be affected

European Site	QI/SCI	Determination of potential for effects
Galway Bay Complex SAC Immediately adjacent to the north and west of the development site boundary.	<ul style="list-style-type: none"> ▪ 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] ▪ Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] ▪ Salicornia and other annuals colonising mud and sand [1310] ▪ Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330] ▪ Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] ▪ Turloughs [3180] ▪ <i>Juniperus communis</i> formations on heaths or calcareous grasslands [5130] ▪ Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210] 	<p>This SAC is located immediately adjacent to the north and west of the proposed development site.</p> <p>Indirect impacts on the following QIs can be ruled out due to the terrestrial/marine nature of the habitats/species, the distance from the proposed works area and the absence of a complete source-pathway-receptor chain:</p> <ul style="list-style-type: none"> ▪ Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> [7210] ▪ Limestone pavements [8240] ▪ Turloughs [3180] ▪ Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210] ▪ <i>Juniperus communis</i> formations on heaths or calcareous grasslands [5130]

- Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* [7210]
- Alkaline fens [7230]
- Limestone pavements [8240]
- *Lutra lutra* (Otter) [1355]
- *Phoca vitulina* (Harbour Seal) [1365]

Potential for impact on these habitats/species is therefore not considered further in this document.

There is the potential for emissions to surface and ground water and for changes to the hydrological regime in the area during the construction and operational phases to result in adverse impacts on the following aquatic or surface water influenced QI habitats and species within the SAC in the absence of mitigation:

- *Salicornia* and other annuals colonising mud and sand [1310]
- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330]
- Mediterranean salt meadows (*Juncetalia maritima*) [1410]
- Alkaline fens [7230]
- Reefs [1170]
- Mudflats and sandflats not covered by seawater at low tide [1140]
- Perennial vegetation of stony banks [1220]
- Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]
- Coastal lagoons [1150]
- Large shallow inlets and bays [1160]
- *Lutra lutra* (Otter) [1355]
- *Phoca vitulina* (Harbour Seal) [1365]

Taking a precautionary approach, there is potential for disturbance, displacement and habitat fragmentation related impacts to Otter.

The potential for adverse effects on these habitats and species is therefore considered further in this document.

<p>Inner Galway Bay SPA</p> <p>0.34km west of the development site boundary.</p>	<ul style="list-style-type: none"> ▪ 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] ▪ Shoveler (<i>Anas clypeata</i>) [A056] ▪ 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] 	<p>Inner Galway Bay SPA is located 0.34km to the west of the proposed development site and is buffered from it by a national road, urban infrastructure and grassland. However, taking a precautionary approach, there is the potential for adverse effect as a result of disturbance and displacement during the construction and operational phase of the proposal on the SCI species for which the SPA has been designated.</p> <p>There is the potential for emissions to surface and ground water and for changes to the hydrological regime in the area during the construction and operational phases to result in adverse effect on the supporting habitat 'Wetland [A999]' on which the SCI species depend.</p> <p>The potential for adverse effects on all these habitats and species is therefore considered further in this document.</p>
<p>Cregganna Marsh SPA</p> <p>0.26km south and south-west of the development site boundary.</p>	<ul style="list-style-type: none"> ▪ Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395] 	<p>The European Site is located 0.26km south of the proposed development site and is buffered from it by housing estates and improved agricultural grassland. No surface water connectivity exists between the European site and the proposed development. However, taking a precautionary approach, there is the potential for adverse effect as a result of disturbance and displacement related impacts on the SCI species during the construction and operational phase of the proposal due to the proximity of the proposed development.</p>

		<p>The potential for adverse effects on Greenland White Fronted Goose is therefore considered further in this document.</p>
<p>Rahasane Turlough SPA (004089)</p> <p>8.8km south-east of the proposed development.</p>	<ul style="list-style-type: none"> ▪ Whooper Swan (<i>Cygnus cygnus</i>) [A038] ▪ Wigeon (<i>Anas penelope</i>) [A050] ▪ Golden Plover (<i>Pluvialis apricaria</i>) [A140] ▪ Black-tailed Godwit (<i>Limosa limosa</i>) [A156] ▪ Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395] ▪ Wetland and Waterbirds [A999] 	<p>The European Site is located 8.8km away from the proposed with no identified hydrological connectivity.</p> <p>No pathway for effect on the following species was identified:</p> <ul style="list-style-type: none"> ▪ Whooper Swan (<i>Cygnus cygnus</i>) [A038] ▪ Wigeon (<i>Anas penelope</i>) [A050] ▪ Golden Plover (<i>Pluvialis apricaria</i>) [A140] ▪ Black-tailed Godwit (<i>Limosa limosa</i>) [A156] ▪ Wetland and Waterbirds [A999] <p>However, the SCI species Greenland white-fronted geese are known to move outside of Rahasane Turlough SPA to Cregganna Marsh SPA on occasion, depending on flood levels and other environmental reasons. There is therefore potential for indirect effect, as a result of disturbance and displacement during construction and operation, to the population occurring outside of Rahasane Turlough SPA.</p> <p>The potential for adverse effects on Greenland White Fronted Goose is therefore considered further in this document.</p>

4.1.1 Qualifying Interests of Galway Bay Complex SAC

The following aquatic or marine QI habitats have the potential to be affected through deterioration of surface or ground water or through changes to the hydrological regime:

- *Salicornia* and other annuals colonising mud and sand [1310]
- Atlantic salt meadows (*Glauco-Puccinellietalia maritima*) [1330]
- Mediterranean salt meadows (*Juncetalia maritim*) [1410]
- Reefs [1170]
- Mudflats and sandflats not covered by seawater at low tide [1140]
- Perennial vegetation of stony banks [1220]
- Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]
- Coastal lagoons [1150]
- Large shallow inlets and bays [1160]
- Alkaline fens [7230]
- *Lutra lutra* (Otter) [1355]
- *Phoca vitulina* (Harbour Seal) [1365]

There is potential for disturbance, displacement and habitat fragmentation related impacts during construction and operation of the proposed development to the following species:

- Otter [1355]

4.1.1.1 *Salicornia* and other annuals colonising mud and sand [1310]

The extent of this habitat is illustrated on Map 9 of the site-specific conservation objective document (NPWS 2013). According to the site-specific conservation objectives (NPWS, 2013) the extent of this habitat within Galway Bay Complex SAC is estimated as 1.347ha, based on data from the Saltmarsh monitoring Project (McCorry and Ryle, 2009). This habitat was recorded at eight of the ten sub-sites surveyed with Galway Bay Complex SAC. The nearest mapped extent to the proposed development site is at Roscam, approximately 3.5km west of the proposal. According to the site-specific conservation objectives (NPWS, 2013), further unsurveyed examples of this habitat may occur within the SAC.

4.1.1.2 Atlantic salt meadows (*Glauco-Puccinellietalia maritima*) [1330]

The extent of this habitat is illustrated on Map 9 of the site-specific conservation objective document (NPWS 2013). According to the site-specific conservation objectives (NPWS, 2013) the extent of this habitat within Galway Bay Complex SAC is estimated as 263.80ha, based on data from the Saltmarsh monitoring Project (McCorry, 2007; McCorry and Ryle, 2009), with further unsurveyed examples of this habitat possibly occurring within the SAC. The nearest mapped extent of this habitat, is approximately 364m west of the proposal, surveyed as part of the saltmarsh monitoring project 2007-2008 and designated Atlantic saltmarsh/ Mediterranean salt meadow mosaic.

The nearest known mapped non-mosaic stand of Atlantic salt meadows is at Oranmore North, 1.1km north-west of the development site, covering 4.838ha. This habitat was surveyed in 2007 as part of the Saltmarsh Monitoring Project (McCorry and Ryle, 2009).

The survey noted that some of the natural saltmarsh topography has been disturbed by infilling and seawall development. The survey highlighted that the impacts and activities adjacent to this site included urbanization, dispersed urbanisation, roads and grazing of livestock, and noted that these activities have little or no measurable impact on the saltmarsh habitats.

4.1.1.3 Mediterranean salt meadows (*Juncetalia maritima*) [1410]

The extent of this habitat is illustrated on Map 9 of the site-specific conservation objective document (NPWS 2013). According to the site-specific conservation objectives (NPWS, 2013) the extent of this habitat within Galway Bay Complex SAC is estimated as 19.887ha, based on data from the Saltmarsh monitoring Project (McCorry, 2007; McCorry and Ryle, 2009), with further unsurveyed examples of this habitat possibly occurring within the SAC. The nearest known mapped extent of this habitat is located approximately 364m west of the proposal, surveyed as part of the saltmarsh monitoring project 2007-2008 and designated Atlantic saltmarsh/ Mediterranean salt meadows mosaic.

4.1.1.4 Reefs [1170]

The extent of this habitat is illustrated on Map 6 of the site-specific conservation objective document (NPWS 2013). According to the site-specific conservation objectives (NPWS, 2013) the extent of this habitat within Galway Bay Complex SAC is estimated as 2,773ha, using 2009 and 2010 intertidal survey data and 2009 subtidal survey data (Aquafact, 2010a, b; RPS, 2012). The nearest known mapped example of this habitat is located approximately 762m west of the proposed development site.

4.1.1.5 Mudflats and sandflats not covered by seawater at low tide [1140]

The extent of this habitat is illustrated on Map 3 of the site-specific conservation objective document (NPWS 2013). According to the site-specific conservation objectives (NPWS, 2013) the extent of this habitat within Galway Bay Complex SAC is estimated as 744ha, using OSI data. The nearest known mapped example of this habitat is located approximately 490m west of the proposed development site.

4.1.1.6 Perennial vegetation of stony banks [1220]

The extent of this habitat within the SAC is currently unknown according to the site-specific conservation objective document (NPWS 2013). The known extent of this habitats is listed as 0.6241ha according to the Natura Standard Data Form (NPWS, 2017) for Galway Bay Complex SAC.

4.1.1.7 Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]

The Natura Standard Data Form (NPWS, 2017) for Galway Bay Complex SAC lists the known extent of this habitat as 18.85ha. No further information on this habitat is available in the site-specific conservation objectives.

4.1.1.8 Coastal lagoons [1150]

The extent of this habitat is illustrated on Map 4 of the site-specific conservation objective document (NPWS 2013). According to the site-specific conservation objectives (NPWS, 2013) the extent of this habitat within Galway Bay Complex SAC is estimated as 76.7ha, using data derived from calculated from spatial data derived from Oliver, 2007. The nearest known mapped extent of this habitat is Turren Lough located approximately 1.1km south west of the proposed development site.

4.1.1.9 Large shallow inlets and bays [1160]

The extent of this habitat is illustrated on Map 5 of the site-specific conservation objective document (NPWS 2013). According to the site-specific conservation objectives (NPWS, 2013) the extent of this habitat within Galway Bay Complex SAC is estimated as 10,825ha using OSi data and the Transitional Water Body area as defined under the Water Framework Directive. The nearest mapped extent of this habitat is located approximately 2.85km west of the proposed development site.

4.1.1.10 Alkaline fen [7230]

According to the site-specific conservation objectives (NPWS, 2013) the full extent and distribution of this habitat within Galway Bay Complex SAC is unknown and further areas are likely to occur. The closest occurrence of this habitat was identified during the field surveys and is located at the upper extent of Galway Bay Complex SAC boundary, adjacent to the proposed development site on its western and north western extent.

The site synopsis for Galway Bay Complex SAC notes that “*Areas of alkaline and Cladium fen as best represented near Oranmore, and species such as Great Fen-sedge, Common Reed (Phragmites australis), Purple Moor-grass (Molinia caerulea), Bogbean (Menyanthes trifoliata) and Long-stalked Yellow-sedge (Carex lepidocarpa) are found along with the usually dominant, Black Bog-rush,*” (NPWS, 2015).

4.1.1.11 Otter [1355]

The extent of terrestrial commuting otter habitat is illustrated on Map 11 of the site-specific conservation objective document (NPWS 2013). According to the site-specific conservation objectives (NPWS, 2013) the extent of terrestrial habitat within Galway Bay Complex SAC is estimated as 262ha, above high-water mark. These areas are mapped to include a 10m terrestrial buffer above the high-water mark along shorelines. The nearest mapped extent of this habitat is located approximately 480m west of the proposed development site. The site-specific conservation objective document notes the importance of maintaining connectivity between commuting routes.

4.1.1.12 Harbour Seal [1365]

The extent of Seal habitat and breeding, moulting and resting sites is illustrated on Map 12 of the site-specific conservation objective document (NPWS, 2013). The harbour seal population monitoring program recorded a maximum count of 105 individuals in Oranmore Bay in 2009 and 122 individuals in 2010 (NPWS, 2010; NPWS 2011).

4.1.2 Qualifying Interests of Inner Galway Bay SPA

There is potential for disturbance and displacement impacts to listed SCIs of this SPA during construction and operation. In addition, emissions to surface and ground water and potential changes to the hydrological regime during the construction and operational phases have the potential to result in adverse impacts on *Wetlands and Waterbirds [A999]*.

4.1.2.1 Wetlands and Waterbirds [A999]

According to the site-specific conservation objectives the extent of wetland habitat within the SPA was estimated as 13,267ha, using OSi data and relevant orthophotographs (NPWS, 2013). The following relevant extracts have been gleaned from the NPWS site synopsis and Natura 2000 Data From for the SPA:

“Inner 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, and comprises 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. A number of small islands and rocky islets in the Bay are included within the site.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Great Northern Diver, Cormorant, Grey Heron, Light-bellied Brent Goose, Wigeon, Teal, Shoveler, Red-breasted Merganser, Ringed Plover, Golden Plover, Lapwing, Dunlin, Bar-tailed Godwit, Curlew, Redshank, Turnstone, Black-headed Gull, Common Gull, Sandwich Tern and Common Tern. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds

Inner Galway Bay SPA is of high ornithological importance with two wintering species having populations of international importance and a further sixteen wintering species having populations of national importance. The breeding colonies of Sandwich Tern, Common Tern and Cormorant are also of national importance. Also of note is that six of the regularly occurring species are listed on Annex I of the E.U. Birds Directive, i.e. Black-throated Diver, Great Northern Diver, Golden Plover, Bar-tailed Godwit, Sandwich Tern and Common Tern. Inner Galway Bay is a Ramsar Convention site and part of the Inner Galway Bay SPA is a Wildfowl Sanctuary”.

4.1.2.2 SCI Species of Inner Galway Bay SPA

Species listed as Special Conservation Interests SCIs of Inner Galway Bay SPA and their population type as listed in the standard data form are listed in table 4.2.

Table 4.2: SCIs of Inner Galway Bay SPA (004031) and their population type

Special Conservation Interests	Population type
Common Gull (<i>Larus canus</i>) [A182]	Wintering
Great Northern Diver (<i>Gavia immer</i>) [A003]	Wintering
Cormorant (<i>Phalacrocorax carbo</i>) [A017]	Reproducing
Grey Heron (<i>Ardea cinerea</i>) [A028]	Not listed
Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046]	Wintering
Wigeon (<i>Anas penelope</i>) [A050]	Wintering
Teal (<i>Anas crecca</i>) [A052]	Wintering
Shoveler (<i>Anas clypeata</i>) [A056]	Wintering
Red-breasted Merganser (<i>Mergus serrator</i>) [A069]	Wintering

Special Conservation Interests	Population type
Ringed Plover (<i>Charadrius hiaticula</i>) [A137]	Wintering
Golden Plover (<i>Pluvialis apricaria</i>) [A140]	Wintering
Lapwing (<i>Vanellus vanellus</i>) [A142]	Wintering
Dunlin (<i>Calidris alpina</i>) [A149]	Wintering
Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157]	Wintering
Curlew (<i>Numenius arquata</i>) [A160]	Wintering
Redshank (<i>Tringa totanus</i>) [A162]	Wintering
Turnstone (<i>Arenaria interpres</i>) [A169]	Wintering
Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179]	Wintering
Sandwich Tern (<i>Sterna sandvicensis</i>) [A191]	Reproducing
Common Tern (<i>Sterna hirundo</i>) [A193]	Reproducing

A review of the Inner Galway Bay conservation objectives supporting document (version 1, NPWS, 2013) pertaining to the SPA was conducted. This document indicates that the subsite Oranmore Bay (OG495) was surveyed as part of the Inner Galway Bay Survey Programme 2009/10. Data indicates that this subsite is among the most species rich of the subsites surveyed, with mean numbers of 25 and a peak of 27 species recorded on one low tide occasion. A summary of data collect over four surveys of the site at low tide is presented in Table 4.3.

Table 4.3: Inner Galway Bay SPA subsite assessment survey 2009/2010

Species	Total numbers
Common Gull (<i>Larus canus</i>)	High
Great Northern Diver (<i>Gavia immer</i>)	Not recorded
Cormorant (<i>Phalacrocorax carbo</i>)	High
Grey Heron (<i>Ardea cinerea</i>)	Very high
Light-bellied Brent Goose (<i>Branta bernicla hrota</i>)	Not recorded
Wigeon (<i>Anas penelope</i>)	Very high
Teal (<i>Anas crecca</i>)	Very high
Shoveler (<i>Anas clypeata</i>)	Low
Red-breasted Merganser (<i>Mergus serrator</i>)	Moderate
Ringed Plover (<i>Charadrius hiaticula</i>)	Not recorded
Golden Plover (<i>Pluvialis apricaria</i>)	Very high
Lapwing (<i>Vanellus vanellus</i>)	Very high
Dunlin (<i>Calidris alpina</i>)	High
Bar-tailed Godwit (<i>Limosa lapponica</i>)	High
Curlew (<i>Numenius arquata</i>)	Very high
Redshank (<i>Tringa totanus</i>)	Very high
Turnstone (<i>Arenaria interpres</i>)	High

Species	Total numbers
Black-headed Gull (<i>Chroicocephalus ridibundus</i>)	High
Sandwich Tern (<i>Sterna sandvicensis</i>)	Not recorded
Common Tern (<i>Sterna hirundo</i>)	Not recorded

The Inner Galway Bay conservation objectives supporting document includes data on roosting birds within Oranmore Bay. Data collected during the winters of 2005/06 & 2007/08 indicate that Oranmore Bay is an important roost location for Golden Plover and Lapwing. A roost survey carried out in February 2010 indicated two individual roost locations within the bay, with 308 waterbirds recorded with species including including black-headed gull, cormorant, curlew, dunlin, lapwing, oystercatcher and turnstone. These two roost locations are not in close proximity to the proposed development site, occurring along the north eastern shore of Oranmore Bay and along the northern shore.

Irish Wetland Bird Survey (I-WeBS) data was obtained from BirdWatch Ireland (on 20th December 2018) following a formal data request. This data combines the most up to date information on the species present at the Oranmore Bay subsite (0G495).

Details of I-WeBS data for the Oranmore Bay subsite for each of the SCIs of Inner Galway Bay SPA are presented in table 4.4, and include annual peak counts for the period 2011-2015. The tables also show where Nationally or Internationally important numbers of each species have been recorded in the past, with all important congregations highlighted in yellow. A site is considered nationally important if it supports 1% or more of the all-Ireland population, based on the most recent estimates for Ireland, namely Crowe and Holt (2013). A site is classified as internationally important if it regularly supports in excess of 20,000 waterbirds or 1% or more of the flyway population estimate of a species, based on Wetlands International (2017).

Table 4.4: IWeBs Data for Oranmore Bay (OG495), Inner Galway Bay.

Inner Galway Bay - Oranmore Bay (OG495)									
Species	1% National	1% International	2011/12	2012/13	2013/14	2014/15	2015/16	Mean 11-15	Peak 11-15
Light-bellied Brent Goose	360	400	322	142	30	55	90	128	322
Wigeon	630	15000	2797	228	276	463	291	811	2797
Teal	340	5000	1148	273	110	236	25	358	1148
Shoveler	30	400				1		0	1
Red-breasted Merganser	20	1700	8		5	3		3	8
Great Northern Diver	20	50	24	1	2	2	3	6	24
Cormorant	120	1200	6		4	17	1	6	17
Grey Heron	25	2700	7		7	12	3	6	12
Golden Plover	1200	9300	370		480	48		180	480
Lapwing	1100	20000	503	34	181	427	341	297	503
Dunlin	570	13300	100	87	250	287	218	188	287
Bar-tailed Godwit	150	1200	9	3	21			7	21
Curlew	350	8400	144	39	61	147	144	107	147
Redshank	300	3900	81	29	70	118	27	65	118
Turnstone	95	1400	27	2	13	17	35	19	35
Black-headed Gull		20000	43	21	350	5287	179	1176	5287
Common Gull		16400	1		3	739	32	155	739

4.1.3 Special Conservation Interests of Cregganna Marsh SPA

There is potential for disturbance and displacement impacts during construction and operation to wintering populations of Greenland White-fronted Goose (*Anser albifrons flavirostris*), a listed SCI of this SPA.

A review of desktop literature pertaining to the SPA was conducted. The Site Synopsis, as updated in 2015, states; states that the population of Greenland White-fronted Goose for which the SPA was designated was a sub-population of the population that form the Rahasane flock. The standard data form, updated in 2017, lists the population size as 129 individuals and states;

“Cregganna Marsh is of importance as it is the principal alternative feeding site for the nationally important population of Anser albifrons flavirostris that is based at nearby Rahasane turlough. Numbers using Cregganna Marsh vary between winters but in most winters the qualifying threshold for national importance is exceeded”.

“Cregganna Marsh is situated about 3 km south of Oranmore, to the west of the Galway - Ennis road. The predominant habitats on the site are lowland wet grassland and improved grassland, but areas of limestone pavement and other exposed rock, Hazel (Corylus avellana) scrub, freshwater marsh, drainage ditches and dry grassland are also represented. The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Greenland White-fronted Goose. The site is of major conservation importance as a feeding site for a nationally important flock of Greenland White-fronted Goose (157 – 5 year mean peak between 1994/95 and 1998/99. The birds using this site form part of the Rahasane flock.”

4.1.4 Special Conservation Interests of Rahasane Turlough SPA

A generic conservation objective document is available for Rahasane Turlough SPA (Version 6, NPWS, 2018). The only Special Conservation Interests of Rahasane Turlough SPA with the potential to be affected is Greenland White Fronted Goose and the conservation objectives for this species is:

Maintain the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA.

There is potential for disturbance and displacement impact to wintering populations of Greenland White-fronted Goose (*Anser albifrons flavirostris*) where they occur within Cregganna Marsh SPA.

Greenland White-fronted Goose (*Anser albifrons flavirostris*), are known to move outside of Rahasane Turlough SPA to Cregganna Marsh SPA on occasion, depending on flood levels and other environmental reasons. There is therefore potential for indirect effect, as a result of disturbance and displacement, to the population occurring outside of Rahasane Turlough SPA.

The following relevant extracts have been taken from the NPWS site synopsis and Natura 2000 Data Form for the SPA:

“Rahasane Turlough lies in gently undulating land, approximately 2 km west of Craughwell, Co. Galway. It consists of two basins which are connected at times of flood but separated as the waters recede. The larger of these, the

northern basin, takes the Dunkellin River westwards. Rahasane was formerly the natural sink of the Dunkellin River, but now an artificial channel takes some of the water further downstream. Water escapes the artificial channel to sweep around the northern basin, and again in the west, where it flows into an active swallowhole system. Some minor collapses are found elsewhere in the turlough, as well as a small number of more permanent pools.

Rahasane is a traditional site for Greenland White-fronted Goose, and supports a population of national importance (157 individuals - five year mean peak for the period 1994/95 to 1998/99)."

5 ASSESSMENT OF POTENTIAL EFFECTS

The Screening for Appropriate Assessment Report, included as Appendix 1 of this document, ‘screens in’ the potential for adverse effects only on specific QIs of Galway Bay Complex SAC, Inner Galway Bay SPA, Cregganna Marsh SPA and Rahasane Turlough SPA.

This Natura Impact Statement (NIS) presents the data and information on the project and provides an analysis of the potential adverse effects on the aquatic habitats and features of Galway Bay Complex SAC and on SCI species of Inner Galway Bay SPA, Cregganna Marsh SPA and the Greenland White-fronted Goose (*Anser albifrons flavirostris*) listed as an SCI of Rahasane Turlough SPA. Potential adverse effects are assessed in view of best scientific knowledge, on the basis of objective information in relation to the proposed development including the proposed avoidance, reduction and preventive measures. The location of the EU Designated Sites is provided in Figure 5.1.

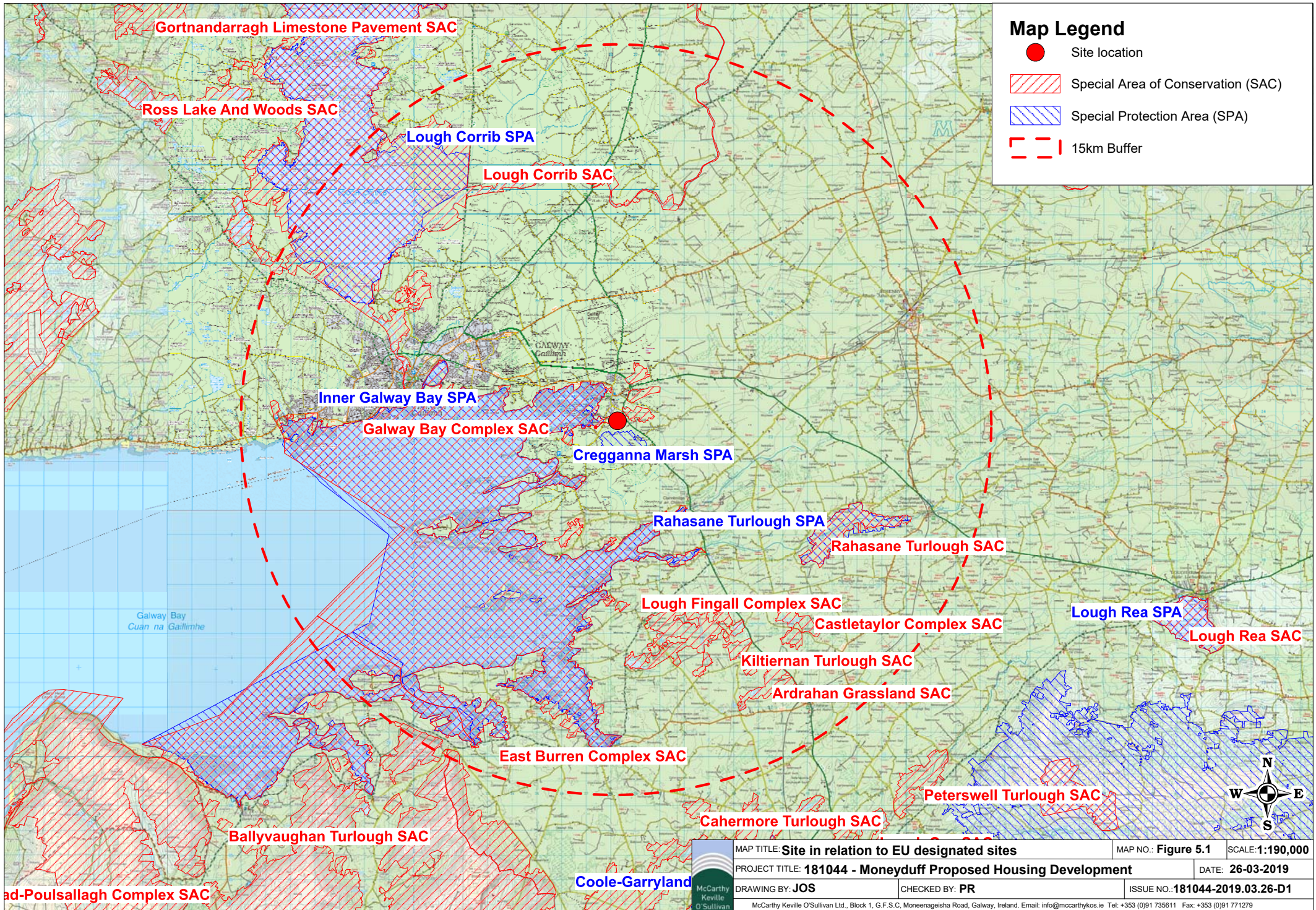
5.1 Galway Bay Complex SAC

5.1.1 Review of Conservation Objectives for Galway Bay Complex SAC

The relevant QIs and the associated conservation objectives of the site are presented in Table 5.1. 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 5.1 Qualifying Interest and Conservation Objectives (Version 01, 2013)

Qualifying Interest	Conservation Objective
Salicornia and other annuals colonising mud and sand [1310]	To maintain the favourable conservation condition of Salicornia and other annuals colonising mud and sand in Galway Bay Complex SAC.
Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330]	To restore the favourable conservation condition of Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) in Galway Bay Complex SAC.
Mediterranean salt meadows (<i>Juncetalia maritim</i>) [1410]	To restore the favourable conservation condition of Mediterranean salt meadows (<i>Juncetalia maritim</i>) in Galway Bay Complex SAC.
Reefs [1170]	To maintain the favourable conservation condition of Reefs in Galway Bay Complex SAC.
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.
Perennial vegetation of stony banks [1220]	To maintain the favourable conservation condition of Perennial vegetation of stony banks in Galway Bay Complex SAC
Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]	Not listed in Site Specific Conservation Objectives document.
Coastal lagoons [1150]	To restore the favourable conservation condition of Coastal lagoons in Galway Bay Complex SAC



Qualifying Interest	Conservation Objective
Large shallow inlets and bays [1160]	To maintain the favourable conservation condition of Large shallow inlets and bays in Galway Bay Complex SAC
Alkaline fens [7230]	To maintain the favourable conservation condition of Alkaline fens in Galway Bay Complex SAC.
<i>Lutra lutra</i> (Otter) [1355]	To restore the favourable conservation condition of Otter in Galway Bay Complex SAC.

5.1.2 Review of site-specific pressures and threats for Galway Bay Complex SAC

As per the Natura 2000 Data Form (NPWS, 2015), the site-specific threats, pressures and activities with potential to impact on the SAC are as follows:

- H01.08 diffuse pollution to surface waters due to household sewage and waste waters (High)
- I01 invasive non-native species (Medium)
- A04.02.02 non- intensive sheep grazing (Medium)
- J02.01.02 reclamation of land from sea, estuary or marsh (Medium)
- D03.01.01 slipways (Low)
- D01.01 paths, tracks, cycling tracks (Low)
- J02.05.01 'modification of water flow (tidal & marine currents) (Low)
- J02.01.02 'reclamation of land from sea, estuary or marsh (Medium)
- G02.01 golf course (Low)
- C01.01 Sand and gravel extraction (Medium)
- H01.05 diffuse pollution to surface waters due to agricultural and forestry activities (High)
- J02.12.01 sea defense or coast protection works, tidal barrages (High)
- A04.02.01 non- intensive cattle grazing (Medium)
- D03 shipping lanes, ports, marine constructions (High)
- F02.03.01 'bait digging / collection (Low)

The proposed development relates to the construction of a housing estate at Moneyduff, Oranmore, Co. Galway. *H01.08 diffuse pollution to surface waters due to household sewage and waste waters (High)* is identified above and an activity with the potential to impact on the SAC. The activity has the potential, in the absence of best practice and mitigation, to result in *pollution to surface waters*.

No pathways for impact with regard to any additional site-specific threats, pressures and activities were identified.

5.2 Inner Galway Bay SPA

5.2.1 Review of Conservation Objectives for Inner Galway Bay SPA

The relevant QI and the associated conservation objective of the site are presented in Table 5.2. The Target and Attributes for the species, as described in the Inner Galway Bay SPA Conservation Objectives supporting documents, were reviewed and considered in this assessment (NPWS, 2013¹).

¹ NPWS, 2013, Inner Galway Bay Special Protection Area; [Conservation Objectives Supporting Document](#) VERSION 1

Table 5.2 Qualifying Interest and Conservation Objectives (Version 01, 2013)

Special Conservation Interest	Conservation Objective (Version 01, May 2013)
Great Northern Diver (<i>Gavia immer</i>) [A003]	<i>To maintain the favourable conservation condition of the bird species as Special Conservation Interests for this SPA.</i>
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]	
Shoveler (<i>Anas clypeata</i>) [A056]	
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 [A999]	<i>'To maintain the favourable conservation condition of wetland habitat in Inner Galway Bay SPA as a resource for the regularly occurring migratory waterbirds that utilise it.'</i>

5.2.2 Review of site-specific pressures and threats for Inner Galway Bay SPA

As per the Natura 2000 Data Form (NPWS, 2015), the site-specific threats, pressures and activities with potential to impact on the SPA are as follows:

- E02 Industrial or commercial areas (Medium)
- A04 grazing (Low)
- F01 Marine and Freshwater Aquaculture (Medium)
- G01.02 walking, horse-riding and non-motorised vehicles (Medium)
- J02.12 'Dykes, embankments, artificial beaches, general (Medium)
- J02.01.02 reclamation of land from sea, estuary or marsh (High)
- A08 Fertilisation (Medium)
- E01 Urbanised areas, human habitation (High)
- F02.03 Leisure fishing (Medium)
- E03 Discharges (High)
- F03.01 Hunting (Low)
- G01.01 nautical sports (Medium)
- D01.02 roads, motorways (Medium)

E01 Urbanised areas, human habitation (High) and *G01.02 walking, horse-riding and non-motorised vehicles (Medium)* has been identified above as an activity with the

potential to impact on the SPA. The development has the potential, in the absence of best practice and mitigation, to result in increased anthropogenic activity.

The impact assessment of the proposed development identified potential for water pollution associated with the construction phase and operational phases of the development.

5.3 Cregganna Marsh SPA

5.3.1 Review of Conservation Objectives for Cregganna Marsh SPA

The relevant QI and the associated conservation objective are presented in Table 5.3. No detailed Conservation Objectives are available for Cregganna Marsh SPA. However, targets and attributes for the conservation of QI species are available in detailed Conservation Objectives for other SPAs. Such targets and attributes are representative of factors considered in the conservation of the QI species in other areas and were considered in the preparation of this assessment.

Table 5.3 Qualifying Interest and Conservation Objectives (Version 06, 2018)

Special Conservation Interest	Conservation Objective (Version 01, May 2018)
Greenland White-fronted Goose [A395]	<i>'To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA.'</i>

5.3.2 Review of site-specific pressures and threats for Cregganna Marsh SPA

As per the Natura 2000 Data Form (NPWS, 2015), the site-specific threats, pressures and activities with potential to impact on the SPA are as follows:

- A04 Grazing (Medium)
- A08 Fertilisation (Medium)
- E01.02 Discontinuous urbanisation (Medium)

Discontinuous urbanisation (Medium) has been identified above as an activity with the potential to impact on the SPA. The development has the potential, in the absence of best practice and mitigation, to result in increased anthropogenic activity.

The impact assessment of the proposed development identified potential disturbance associated with the construction phase and operational phases of the development. No additional pathways for impact via the site-specific threats, pressures and activities were identified in relation to the Qualifying Interest for this site.

5.4 Rahasane Turlough SPA

5.4.1 Review of Conservation Objectives for Rahasane Turlough SPA

The relevant QI and the associated conservation objective of the site are presented in Table 5.4. No detailed Conservation Objectives are available for Rahasane Turlough SPA. However, targets and attributes for the conservation of QI species are available in detailed Conservation Objectives for other SPAs. Such targets and attributes are representative of factors considered in the conservation of the QI species in other areas and were considered in the preparation of this assessment.

Table 5.4: Qualifying Interest and Conservation Objectives (Version 06, 2018)

Special Conservation Interest	Conservation Objective (Version 01, May 2018)
Greenland White-fronted Goose [A395]	<i>‘To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA.’</i>

5.4.2 Review of site-specific pressures and threats for Rahasane Turlough SPA

As per the Natura 2000 Data Form (NPWS, 2015), the site-specific threats, pressures and activities with potential to impact on the SPA are as follows:

- A04 Grazing (High)
- A08 Fertilisation (Low)
- F03.01 Hunting (Low)

No pathways for impact with regard to any site-specific threats, pressures and activities were identified.

5.5 Assessment of Pathways for Adverse Effect

5.5.1 Potential for Direct Effects on the European Sites

There will be no direct effects on the Qualifying Interest of Galway Bay Complex SAC, Inner Galway Bay SPA, Cregganna Marsh SPA or Rahasane Turlough SPA. There will be no land take associated with the proposal as the development site is located entirely outside of any EU Designated Site. There is also no direct surface water connectivity between the proposal and any EU Designated Site.

5.5.2 Potential for Indirect Effects on the European Sites

5.5.2.1 Effects on Surface and Ground waters and the Hydrological Regime

Impacts on surface and ground water and the hydrological regime were identified as having the potential to result in adverse effects on the following Qualifying Interests of the Galway Bay Complex SAC:

- *Salicornia* and other annuals colonising mud and sand [1310]
- Atlantic salt meadows (*Glauco-Puccinellietalia maritima*) [1330]
- Mediterranean salt meadows (*Juncetalia maritimi*) [1410]
- Reefs [1170]
- Mudflats and sandflats not covered by seawater at low tide [1140]
- Perennial vegetation of stony banks [1220]
- Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]
- Coastal lagoons [1150]
- Large shallow inlets and bays [1160]
- Alkaline fens [7230]
- *Lutra lutra* (Otter) [1355]
- *Phoca vitulina* (Harbour Seal) [1365]

These impacts also have the potential to result in adverse effects on the following Special Conservation Interests of the Inner Galway Bay SPA:

- Wetlands and Waterbirds

An assessment of the potential effects on the above receptors in respect of hydrological and hydrogeological impacts is provided below. This assessment is informed by the detailed field and desk surveys that were undertaken and are described in this NIS. They are also informed by the detailed hydrological/hydrogeological assessments that were undertaken to inform the EIAR that accompanies the application. The Hydrology chapter of the EIAR is included as Appendix 8. The potential for adverse effects on each of the QI/SCI in view of its site-specific conservation objectives has been considered in this assessment. Details of the assessment of the potential for adverse effects on the site-specific targets and attributes for each individual habitat or species are provided in Appendix 9.

5.5.2.1.1 Impacts on Water Quality or hydrological regime during construction

The construction of the development will involve earth moving and levelling operations which create the potential for pollution in various forms to run off the site. Whilst there are no watercourses within or adjacent to the development site which could act as potential conduits for pollution, wet grassland and fen habitats are located adjacent to the development site at its western extent. There are drainage ditches in the fen area but not within or adjacent to the site of the proposed development itself. As there is no direct conduit for pollution, there is low potential for effect. The fen habitat outside of the site boundary to the west of the site is within the boundary of Galway Bay Complex SAC and is a designated qualifying interest of the SAC. All the other identified QIs and SCIs are hydrologically connected to the fen area.

There is a full assessment of all potential effects on the fen both during construction and during operation in the Hydrology chapter of the EIAR (Appendix 8). No deep excavations are proposed that could affect groundwater during construction and it is unlikely that significant dewatering or water management will be required. In addition, there will be no changes in recharge of waters to the fen during construction

Mitigation

Standard best practice environmental control measures will be implemented during the construction phase of the development. These will include the construction of a solid fence along the border between the site and the adjacent wet grasslands and fen within the SAC, appropriate treatment of any waters that arise on site during construction within the site, appropriate storage and use of materials and machinery to avoid potential pollution events. All such measures are provided in Section 7.4 of the Hydrology chapter (Appendix 8). In summary this states that the following measures will be implemented for the avoidance of impact on the water quality:

Proposed Mitigation Measures

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

- Prior to the commencement of earthwork silt fencing will be placed down-gradient of the construction areas. These will be embedded into the local soils to ensure all site water (should any arise) is captured and filtered;
- As construction advances there may be a small requirement to collect and treat surface water within the site. This will be completed using perimeter swales at low points around the construction areas, and if required water will be pumped from the swales into sediment bags prior to overland discharge allowing water to percolate naturally to ground or disperse by diffuse flow into local drainage ditches;

- Discharge onto ground will be via a silt bag which will filter any remaining sediment from the pumped water. The entire discharge area from silt bags will be enclosed by a perimeter of double silt fencing;
- Any proposed discharge area will avoid potential surface water ponding areas, and will only be located where suitable subsoils are present;
- No pumped construction water will be discharged directly into any local watercourse;
- Daily monitoring and inspections of site drainage during construction will be completed;
- Earthworks will take place during periods of low rainfall to reduce run-off and potential siltation of watercourses;
- Good construction practices such as wheel washers and dust suppression on site roads, and regular plant maintenance will ensure minimal risk. The Construction Industry Research and Information Association (CIRIA) provide guidance on the control and management of water pollution from construction sites ('Control of Water Pollution from Construction Sites, guidance for consultants and contractors', CIRIA, 2001), which provides information on these issues. This will ensure that surface water arising during the course of construction activities will contain minimum sediment.

Further measures are prescribed in detail in Section 7.4 of Appendix 8. In addition, standard best practice environmental control measures have also been incorporated in the Construction Environmental Management Plan (CEMP). The CEMP is provided in Appendix 4.

Residual Effect

No adverse residual impacts on water quality or the hydrological regime during construction are anticipated following the implementation of the best practice described in Appendix 8 (the Hydrology Chapter) and Appendix 4 (the CEMP) and summarised above.

5.5.2.1.2 Effects on Surface Water Quality and downstream aquatic habitats during Operation

The impacts of the proposed development on hydrology and surface water quality have been fully assessed in Chapter 7 (Appendix 8) but are also discussed here as they relate to the identified QIs/SCIs.

Production of Foul Sewage

The proposed development will result in the production of foul sewage during its operational phase. If released untreated into the environment, this foul sewage has the potential to result in pollution of the downstream receptors including the adjacent alkaline fen and indirectly, via the drainage ditches within the fen to the wider area within Galway Bay. As all the downstream lands, including the fen that is adjacent to the site are designated for conservation as the Galway Bay Complex SAC with the lands to the north of the Maree Road also designated as the Inner Galway Bay SPA.

Mitigation

As described in the Report on Civil Works (Tobin, 2018), the sewer layout provides for the gravity sewer network falling to a pumping station located centrally in the open space on the western area of the site. The foul waste will then discharge from the pumping station via pumped rising main which will run out through the adjacent lands and along the side of the main road (N18) to reach the next available foul sewer as identified by Irish Water. The existing public foul sewer is shown on drawing no. 10402-

2000 (Proposed Drainage and Watermain Key Plan). This plan is provided in Chapter 3 of the EIAR (Appendix 3). There is full agreement with Irish Water that there is adequate capacity and capability to fully treat all sewage generated by the proposed development in the public sewage treatment system. The proposed development, as assessed for the confirmation of feasibility, is a standard connection, requiring no network or treatment plant upgrades or water or wastewater by either the customer or Irish Water.

Residual Effect

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

Run off of Surface Waters from the site

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

Mitigation

The storm water drainage design has been designed to cater for all surface water runoff from all hard surfaces in the proposed development including roadways, roofs etc. All stormwater generated on site from roadways and roofs will discharge via Oil/Petrol Interceptor to one of 5 no. proposed soakaways which are situated in the centre and west of the site. The stormwater will soak away through the soil. Details of the drainage system are provided in Section 2.2.1 of this NIS and are also provided in Appendix 3 (the description chapter of the EIAR) soakaways are shown in Appendix C of the Report on Civil Works (Tobin, 2018). The surface water treatment and discharge has been designed to avoid any change in the discharge of waters from the site in terms of either volume or discharge rate. A flood risk has been carried out and demonstrates that the proposed management of water on the site poses no risk of any flooding and mimics existing conditions on the site.

Residual Impact

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

5.5.2.1.3 Effects on Groundwater

The potential for the proposed development to result in effects on groundwater has been fully assessed in Appendix 8 (the Hydrology Chapter) and summarized below where it applies to the identified QIs and SCIs.

Changes to Hydrogeological regime

The proposed development will not effect the hydrological regime within the area. As fully described in Section 7 of the EIAR. The proposed development will not involve any change to the recharge to groundwater with all roof water being discharged to soakaways after first passing through hydrocarbon interceptors. No large-scale excavations are proposed that would have the potential to significantly, disrupt any groundwater flow in the area. No new drainage channels are proposed. The hydrogeological regime in the area will remain largely unchanged. As stated in Appendix 8 (the Hydrology Chapter), there is no potential for the proposed development to result in effects on the downgradient fen to the north and west or on the wetlands

that are located in the wider area to the east of the N18 or to the south in Cregganna Marsh.

Pollution of Groundwaters

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

Mitigation

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

Residual Impact

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

5.5.2.1.4 Conclusion

Based on the above, it can be concluded in view of best scientific knowledge, on the basis of objective information that the proposed development will not adversely affect surface or ground water or the hydrological regime in the area during either construction or operation of the proposed development. There is no potential for adverse effect on the identified QIs/SCIs or on any European Site via this identified pathway, which has been robustly blocked.

5.5.2.2 Effects of disturbance and displacement on otter

Disturbance and displacement were identified as having the potential to result in adverse effects on the following Qualifying Interests of the Galway Bay Complex SAC:

- Otter

An assessment of the potential effects on otter in respect of disturbance and displacement impacts is provided below. This assessment is informed by the detailed field and desk surveys that were undertaken and are described in this NIS. The potential for adverse effects on this species in view of its site-specific conservation objectives has been considered in this assessment. Details of the assessment of the potential for adverse effects on the site-specific targets and attributes for the species are provided in Appendix 9.

A dedicated otter survey was carried out in February and April 2019. Details of this survey are provided in Section 3.3.1.1 of the EIAR. The areas covered during the otter survey are illustrated in Figure 3.2. No evidence of otter was recorded within the development site during the dedicated otter surveys carried out in 2019, or during any of the field surveys carried out in 2017 – 2019.

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

No suitable habitat for otter exists on the site of the proposed development and the fen that is located to the west provides few aquatic features such as drainage ditches and thus provides little suitable habitat for the species. None of the other surrounding lands provide any suitable habitat for the species. No signs of the species were recorded either on the site or on the adjacent lands during the dedicated otter surveys that were undertaken. The site is separated from any potential otter habitat by a tree line and the proposed grassland habitat that will be retained and enhanced.

Irish Wildlife Manual No 76 (*National Otter Survey of Ireland 2010/2012*) notes that the occurrence of Otter was unaffected by perceived levels of disturbance at the survey sites. It also notes that there is little published evidence demonstrating any consistent relationship between Otter occurrence and human disturbance (Mason & Macdonald 1986, Delibes et al. 1991; Bailey & Rochford, 2006). Irish Wildlife Manual No 23 (*National Otter Survey of Ireland 2004/2005*) found no significant relationship between disturbance and otter occurrence. It also states "the lowest percentage occurrence was found at the sites with the lowest recorded disturbance".

Channin P (2003) ^[1] provides a literary review with regard to anthropogenic disturbance and refers to several reports which have found that disturbance is not detrimental to Otters (Jefferies, 1987), (Durbin, 1993), (Green & Green, 1997). The report also describes successful breeding in towns, under ferry terminals and under the jetties of one of Europe's largest oil and gas terminals at Sullom Voe in North Scotland.

The proposed development does not have the potential to impact on otter species in terms of habitat fragmentation. The site does not offer any suitable refugia for resting otter. The habitats within the site are dominated by dry calcareous grassland and scrub habitats, with no watercourses present. The fen and wet grassland habitats adjacent to the site offered sub-optimal otter habitat.

The proposed development site is set back from the designated otter commuting corridor at the upper reaches of Galway Bay by 225m. The designated commuting corridor along the upper shoreline of Galway Bay Complex SAC is separated from the site by a saltmarsh and a network of urban infrastructure and residential developments. The site has no potential to be used as a commuting corridor between the shoreline of Galway Bay SAC and the wider SAC to the east of the site. There are no watercourses or linkages within the proposed development site that could potentially form a commuting corridor for otter travelling between foraging sites. The site is surrounded on all sides by permitted development. A national road lies between the site and the wider Galway Bay Complex SAC to the east of the development site.

5.5.2.2.1 Conclusion

Based on the above, it can be concluded in view of best scientific knowledge, on the basis of objective information that the proposed development will not adversely affect otter associated with the Galway Bay Complex SAC during either construction or operation of the proposed development. There is no potential for adverse effect on otter

^[1] Chanin P (2003). *Ecology of the European Otter*. Conserving Natura 2000 Rivers Ecology Series No. 10. English Nature, Peterborough.

5.5.2.3

5.5.2.3 Disturbance and Displacement - Birds

Disturbance and displacement were identified as having the potential to result in adverse effects on the following Qualifying Interests of the Inner Galway SPA:

- Great Northern Diver (*Gavia immer*) [A003]
- Cormorant (*Phalacrocorax carbo*) [A017]
- Grey Heron (*Ardea cinerea*) [A028]
- Light-bellied Brent Goose (*Branta bernicla hrota*) [A046]
- Wigeon (*Anas penelope*) [A050]
- Teal (*Anas crecca*) [A052]
- Shoveler (*Anas clypeata*) [A056]
- Red-breasted Merganser (*Mergus serrator*) [A069]
- Ringed Plover (*Charadrius hiaticula*) [A137]
- Golden Plover (*Pluvialis apricaria*) [A140]
- Lapwing (*Vanellus vanellus*) [A142]
- Dunlin (*Calidris alpina*) [A149]
- Bar-tailed Godwit (*Limosa lapponica*) [A157]
- Curlew (*Numenius arquata*) [A160]
- Redshank (*Tringa totanus*) [A162]
- Turnstone (*Arenaria interpres*) [A169]
- Black-headed Gull (*Chroicocephalus ridibundus*) [A179]
- Common Gull (*Larus canus*) [A182]
- Sandwich Tern (*Sterna sandvicensis*) [A191]
- Common Tern (*Sterna hirundo*) [A193]

Similarly, the potential for disturbance and displacement of the following SCI of both Cregganna Marsh and Rahasane Turlough SPAs has been identified:

- Greenland White Fronted Goose [A395]

An assessment of the potential effects on these SCI species in respect of disturbance and displacement impacts is provided below. This assessment is informed by the detailed field and desk surveys that were undertaken and are described in this NIS. The potential for adverse effects on these species in view of their site-specific conservation objectives have been considered in this assessment. Details of the assessment of the potential for adverse effects on the site-specific targets and attributes for each individual species are provided in Appendix 9.

Inner Galway Bay SPA lies 340 metres to the west of the development (separated by hedgerows, marsh/wet grassland and a main road/Maree Road). None of the listed SCI species of Inner Galway Bay SPA were recorded utilising habitats within the development site during the field surveys carried out from November 2018 – March 2019. The site of the proposed development did not support significant wintering bird populations. None of the SCI species for any nearby SPAs were recorded roosting or feeding within the development site or in the surrounding wetlands during the surveys undertaken. Whilst no significant disturbance to these SCI bird species is anticipated during construction an assessment of the distance at which birds respond to human disturbance (flight initiation distance or FID) was undertaken for each of the SCI species. Flight initiation distances for each of the SCI species listed for Inner Galway Bay SPA are provided in Table 5.5 based on a review of the most recent literature.

Livezey et al. (2016) ^[2] provides a literary review with regard to bird flight initiation distances in response to anthropogenic disturbance. The study compiles a database of published alert distances (distances at which birds exposed to an approaching human activity exhibit alert behavior), flight initiation distances (distances at which birds exposed to an approaching human activity initiate escape behavior), and minimum approach distances (distances at which humans should be separated from wildlife) by taxonomic order. This table demonstrates that the proposed development is well outside the disturbance distance for any SCl species of Inner Galway Bay SPA. The most sensitive species are potentially disturbed at 71metres. The proposed development is over 340 metres from the SPA and separated from it by tree lines and the main Maree road. No disturbance effects on the SCl species of Inner Galway Bay are anticipated.

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

Table 5.5: Disturbance Distance of SCI species of Inner Galway Bay SPA

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

Table 5.5: Disturbance Distance of SCI species of Inner Galway Bay SPA

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

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

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

Assessment of indirect disturbance in the wider Oranmore area as a result of population increase

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

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

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

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

The development does not in any way provide any access to any SAC or SPA that are outside the site boundary and does not encourage such access. No impact on any faunal populations of more than local significance is anticipated. It is designed in accordance with the Oranmore LAP, which has itself been the subject of Appropriate Assessment.

Furthermore, the proposed development ensures the provision of a network of recreational greenspaces located within the development site, including a looped walk, playground, wildflower meadow, communal garden and public parkland open space. Recreational and amenity space within the development site is above the minimum 15% set out in the Oranmore Local Area Plan 2012-2022 (LAP). This is in accordance with good planning, which ensures that the eventual residents of the estate have their recreational requirements considered in the design of the scheme and are not entirely

dependent on recreational facilities outside the site. This is in accordance with the extant Oranmore LAP, which has been the subject of its own Appropriate Assessment. This amenity space is clearly shown on the site layout and on the landscaping plan (see drawing 18223-3-100, Landscape Master Plan).

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

5.5.2.3.1 Conclusion

Based on the above, it can be concluded in view of best scientific knowledge, on the basis of objective information that the proposed development will not adversely affect any of the SCI species associated with the Inner Galway Bay SPA, Cregganna Marsh SPA or the Rahasane Turlough SPA during either construction or operation of the proposed development. There is no potential for adverse effect on any of these species.

5.5.3 Preventive Measures to Avoid Impacts

The potential pathways for impacts on the various QIs/SCIs of Galway Bay Complex SAC, Inner Galway Bay SPA, Cregganna Marsh SPA and Rahasane Turlough have been identified in the sections above. The measures employed in the design of the Proposed Development to prevent any such impacts are discussed in the assessment above and standard best practice environmental control measures have also been incorporated in the design of the development as provided in Section 2 of this NIS and in Appendix 3 (EIAR Description Chapter). A Construction Environmental Management Plan (CEMP), has been prepared for the development and sets out how the best practice will be implemented. The CEMP is provided in Appendix 4. These following best practice construction measures are standard procedures and will be adhered to during the site works to minimise potential for impact on the receiving environment. These are an integral part of the design of the project.

5.6 Conclusion of Impact Assessment

Taking cognisance of best practice measures incorporated into the project design the Proposed Development will not result in adverse impacts on the integrity of the European Sites. It will not prevent the QIs/SCIs of the European Sites from achieving favourable conservation status in the future as defined in Article 1 of the EU Habitats Directive. A definition of Favourable Conservation Status is provided below:

*'conservation status of a species means the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within the territory referred to in Article 2;
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.'*

Based on the above, it can be concluded in view of best scientific knowledge, on the basis of objective information that the Proposed Development will not adversely affect the Qualifying Interests/Special Conservation Interests associated with the Galway Bay Complex SAC, Inner Galway Bay SPA, Cregganna Marsh SPA and Rahasane Turlough SPA.

6 CUMULATIVE EFFECTS

A search and review in relation to plans and projects that may have the potential to result in cumulative and/or in-combination impacts on European Sites was conducted during the Screening for Appropriate Assessment report, see Appendix 1. This assessment focuses on the potential for cumulative in-combination effects on the QIs for which potential pathway for impact were identified at Screening Stage. This included a review of online Planning Registers and served to identify past and future plans and projects, their activities and their predicted environmental effects.

6.1.1 Plans

The proposed development lies within land zoned for development in the Oranmore Local Area Plan 2012-2022. The policies and objectives of this plan have already been assessed in the Oranmore LAP Natura Impact Report (Doherty Environmental, 2012). This report concluded “*It is considered that the adoption of the LAP will not result in likely significant effects to the conservation management or integrity of Natura 2000 Sites, either individually or in combination with other plans or projects.*”

The development is in compliance with the Galway County Development Plan 2015-2021.

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

- Galway County Development Plan 2015-2021,
- Variation No.1 to the County Development Plan 2015 – 2021
- Oranmore Local Area Plan 2012-2022
- The Regional Planning Guidelines for the West 2010-2022.
- Draft Galway County Heritage and Biodiversity Plan 2017-2022
- Galway BAP 2014 - 2020

The review focused on policies and objectives that relate to European Sites and natural heritage (table 6.1). No potential for cumulative impacts when considered in conjunction with the current proposal were identified.

Table 6.1: review of plans and projects

Plans	Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of development compliance with policy
<p>Galway County Development Plan 2015-2021</p>	<p>Policy NHB 1 – Natural Heritage and Biodiversity It is the policy of Galway County Council to support the protection, conservation and enhancement of natural heritage and biodiversity, including the protection of the integrity of European sites, that form part of the Natura 2000 network, the protection of Natural Heritage Areas, proposed Natural Heritage Areas Ramsar Sites, Nature Reserves, Wild Fowl Sanctuaries and Conamara National Park (and other designated sites including any future designations) and the promotion of the development of a green/ecological network within the plan area, in order to support ecological functioning and connectivity, create opportunities in suitable locations for active and passive recreation and to structure and provide visual relief from the built environment.</p>	<p>The surveys undertaken in the preparation of this application have demonstrated that the proposed Development will not adversely affect the Qualifying Interests/Special Conservation Interests associated with the Galway Bay Complex SAC, Inner Galway Bay SPA, Cregganna Marsh SPA and Rahasane Turlough SPA.</p> <p>There will be no adverse effects on sensitive aquatic receptors listed as QIs/SCI, as a result of deterioration in water quality. The proposed development has been designed to avoid any effect on surface or ground water outside the site and this is demonstrated within the EIAR</p> <p>There will be no adverse effects in terms of disturbance of SCIs of Inner Galway Bay SPA, Cregganna Marsh SPA and Rahasane Turlough SPA.</p>
	<p>Objective NHB 1 – Protected Habitats and Species Support the protection of habitats and species listed in the Annexes to and/or covered by the <i>EU Habitats Directive (92/43/EEC) (as amended)</i> and the <i>Birds Directive (2009/147/EC)</i>, and regularly occurring-migratory birds and their habitats and species protected under the <i>Wildlife Acts 1976-2000</i> and the <i>Flora Protection Order</i>.</p>	<p>This has been demonstrated following extensive dedicated surveying of the site for wintering birds and during multidisciplinary walkover surveys. No significant habitat for birds was recorded within or in the vicinity of the development site. The proposed development site is set back 340m from Inner Galway Bay SPA and separated from it by a road, fen and urban infrastructure</p>
	<p>Objective NHB 2 – Biodiversity and Ecological Networks Support the protection and enhancement of biodiversity and ecological connectivity within the plan area, including woodlands, trees, hedgerows, semi-natural grasslands, rivers, streams, natural springs, wetlands, stonewalls, geological and geomorphological systems, other landscape features and associated wildlife where these form part of the ecological network and/or may be considered as ecological corridors or stepping stones in the context of <i>Article 10</i> of the <i>Habitats Directive</i>.</p>	<p>There will be no net loss of hedgerow or tree line on the site and a large strip of the western portion of the site has been set aside for semi-natural dry calcareous and neutral grassland management, in addition to other green spaces for local amenity use. The lands are not currently within a formal management regime and are therefore becoming encroached by scrub. Consequently, the current lack of management of the site is likely to result in the long-term deterioration in quality of the calcareous grassland and the further encroachment of scrub through succession. The proposed development commits to the protection of this habitat, where currently no such protection exists.</p>

Plans	Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of development compliance with policy
		<p>There will be no deterioration in water quality due to the proposal. All drainage proposals for the development will be consistent with SUDs principles and best practice SUDs drainage design.</p> <p>Storm water drainage design has been designed to cater for all surface water runoff from all hard surfaces in the proposed development including roadways, roofs etc. All stormwater generated on site from roadways and roofs will discharge via Oil/Petrol Interceptor to one of 5 no. proposed soakaways which are situated in the centre and west of the site. The stormwater will soakaway through the soil to groundwater.</p>
<p>Variation No.1 to the County Development Plan 2015 - 2021</p>	<p>Objective DS 6 – Natura 2000 Network and Habitats Directive Assessment Protect European sites that form part of the Natura 2000 network (Including Special Protection Areas and Special Areas of Conservation) in accordance with the requirements in the EU Habitats Directive (92/43/EEC), EU Birds Directive (2009/147/EC), the Planning and Development (Amendment) Act 2010, the European Communities (Birds and Natural Habitats) Regulations 2011(SI No.477 of 2011) (and any subsequent amendments or updated legislation) and having due regard to the guidance in the Appropriate Assessment Guidelines 2010 (and any updated or subsequent guidance). A plan or project (e.g. proposed development) within the plan area will only be authorised after the competent authority (Galway County Council) has ascertained, based on scientific evidence, Screening for Appropriate Assessment, and/or a Habitats Directive Assessment where necessary, that:</p> <p>a) The plan or project will not give rise to significant adverse direct, indirect or secondary effects on the integrity of any European site (either individually or in combination with other plans or projects); or</p>	<p>The proposed development will not adversely affect the Qualifying Interests/Special Conservation Interests associated with the Galway Bay Complex SAC, Inner Galway Bay SPA, Cregganna Marsh SPA and Rahasane Turlough SPA.</p> <p>There will be no adverse effects on sensitive aquatic receptors listed as QIs/SCI, as a result of deterioration in water quality.</p> <p>There will be no adverse effects in terms of disturbance of SCIs of Inner Galway Bay SPA, Cregganna Marsh SPA and Rahasane Turlough SPA as described in relation to NHB 1 above</p>

Plans	Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of development compliance with policy
	<p>b) The plan or project will have significant adverse effects on the integrity of any European site (that does not host a priority natural habitat type/and or a priority species) but there are no alternative solutions and the plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature. In this case, it will be a requirement to follow procedures set out in legislation and agree and undertake all compensatory measures necessary to ensure the protection of the overall coherence of Natura 2000; or</p> <p>c) The plan or project will have a significant adverse effect on the integrity of any European site (that hosts a natural habitat type and/or a priority species) but there are no alternative solutions and the plan or project must nevertheless be carried out for imperative reasons for overriding public interest, restricted to reasons of human health or public safety, to beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest. In this case, it will be a requirement to follow procedures set out in legislation and agree and undertake all compensatory measures necessary to ensure the protection of the overall coherence of Natura 2000.</p>	
	<p>Objective DS 10 – Impacts of Developments on Protected Sites Have regard to any impacts of development on or near existing and proposed Natural Heritage Areas, Special Protection Areas and Special Areas of Conservation, Nature Reserves, Ramsar Sites, Wildfowl Sanctuaries, Salmonoid Waters, Refuges for Flora and Fauna, Conamara National Park, shellfish waters, freshwater pearl</p>	<p>The proposed development will not adversely affect the Qualifying Interests/Special Conservation Interests associated with the Galway Bay Complex SAC, Inner Galway Bay SPA, Cregganna Marsh SPA and Rahasane Turlough SPA.</p> <p>There will be no adverse effects on sensitive aquatic receptors listed as QIs/SCI, as a result of deterioration in water quality.</p>

Plans	Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of development compliance with policy
	mussel catchments and any other designated sites including future designations.	The proposed development will not adversely affect the Qualifying Interests/Special Conservation Interests associated with the Galway Bay Complex SAC, Inner Galway Bay SPA, Cregganna Marsh SPA and Rahasane Turlough SPA as described above in relation to NHB 1.
Oranmore Local Area Plan 2012-2022	<p>Policy NH 1 – Natural Heritage, Landscape and Environment</p> <p>It is the policy of Galway County Council, to support the conservation and enhancement of natural heritage and biodiversity, including the protection of the integrity of Natura 2000 sites, the protection of Natural Heritage Areas and proposed Natural Heritage Areas and the promotion of the development of a green/ecological network within the Plan Area, in order to support ecological functioning and connectivity, create opportunities in suitable locations for active and passive recreation and to structure and provide visual relief from the built environment. The protection of natural heritage and biodiversity, including Natura 2000 sites, will be implemented in accordance with relevant EU environmental directives and applicable national legislation, policies, plans and guidelines, including the following (and any updated/superseding documents):</p> <ul style="list-style-type: none"> • EU Directives, including the <i>Habitats Directive</i> (92/43/EEC), the <i>Birds Directive</i> (2009/147/EC codified version of Directive), the <i>Environmental Impact Assessment Directive</i> (85/337/EEC), the <i>Water Framework Directive</i> (2000/60/EC) and the <i>Strategic Environmental Assessment Directive</i> (2001/42/EC). • National legislation, including the <i>Wildlife Act 1976</i>, the <i>European Communities (Environmental Impact Assessment) Regulations 1989</i> (SI No. 349 of 1989) (as amended), the <i>Wildlife (Amendment) Act 2000</i>, the <i>European Union (Water Policy) Regulations 2003</i> (as amended), the <i>Planning and Development (Amendment)</i> 	<p>The proposed development will not adversely affect the Qualifying Interests/Special Conservation Interests associated with the Galway Bay Complex SAC, Inner Galway Bay SPA, Cregganna Marsh SPA and Rahasane Turlough SPA.</p> <p>There will be no adverse effects on sensitive aquatic receptors listed as QIs/SCI, as a result of deterioration in water quality.</p> <p>The proposed development will not adversely affect the Qualifying Interests/Special Conservation Interests associated with the Galway Bay Complex SAC, Inner Galway Bay SPA, Cregganna Marsh SPA and Rahasane Turlough SPA as described above in relation to NHB 1</p>

Plans	Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of development compliance with policy
	<p><i>Act 2010 and the European Communities (Birds and Natural Habitats) Regulations 2011</i> (S.I. No. 477 of 2011).</p> <ul style="list-style-type: none"> • National policy guidelines, including the <i>Landscape and Landscape Assessment Draft Guidelines 2000</i>, the <i>Environmental Impact Assessment Sub-Threshold Development Guidelines 2003</i>, <i>Strategic Environmental Assessment Guidelines 2004</i> and the <i>Appropriate Assessment Guidelines 2010</i>. • Catchment and water resource management plans, including the <i>Western River Basin District Management Plan 2009-2015</i>. • Biodiversity plans and guidelines, including <i>Actions for Biodiversity 2011-2016: Ireland's National Biodiversity Plan</i>, the <i>Biodiversity Action Plan for County Galway 2008-2013</i> and the <i>Biodiversity Guidelines</i> produced by Galway County Council. 	
	<p>Objective NH 1 – Natura 2000 Sites Protect European sites that form part of the Natura 2000 network (including Special Protection Areas and Special Areas of Conservation) in accordance with the requirements in the EU Habitats Directive (92/43/EEC), EU Birds Directive (2009/147/EC), the Planning and Development (Amendment) Act 2010, the European Communities (Birds and Natural Habitats) Regulations 2011 (SI No. 477 of 2011) (and any subsequent amendments or updated legislation) and having due regard to the guidance in the Appropriate Assessment Guidelines 2010 (and any updated/superseding guidance). A plan or project (e.g. proposed development) within the Plan Area will only be authorised after the competent authority (Galway County Council) has ascertained, based on scientific evidence and a Habitats Directive Assessment where necessary, that:</p>	<p>The proposed development will not adversely affect the Qualifying Interests/Special Conservation Interests associated with the Galway Bay Complex SAC, Inner Galway Bay SPA, Cregganna Marsh SPA and Rahasane Turlough SPA.</p> <p>There will be no adverse effects on sensitive aquatic receptors listed as QIs/SCI, as a result of deterioration in water quality.</p> <p>The proposed development will not adversely affect the Qualifying Interests/Special Conservation Interests associated with the Galway Bay Complex SAC, Inner Galway Bay SPA, Cregganna Marsh SPA and Rahasane Turlough SPA as described above in relation to NHB 1</p>

Plans	Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of development compliance with policy
	<p>1. The plan or project will not give rise to significant adverse direct, indirect or secondary impacts on the integrity of any Natura 2000 site (either individually or in combination with other plans or projects); or</p> <p>2. The plan or project will adversely affect the integrity of any Natura 2000 site (that does not host a priority natural habitat type and/or a priority species) but there are no alternative solutions and the plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature. In this case, it will be a requirement to follow procedures set out in legislation and agree and undertake all compensatory measures necessary to ensure the protection of the overall coherence of Natura 2000; or</p> <p>3. The plan or project will adversely affect the integrity of any Natura 2000 site (that hosts a priority natural habitat type and/or a priority species) but there are no alternative solutions and the plan or project must nevertheless be carried out for imperative reasons of overriding public interest, restricted to reasons of human health or public safety, to beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest. In this case, it will be a requirement to follow procedures set out in legislation and agree and undertake all compensatory measures necessary to ensure the protection of the overall coherence of Natura 2000.</p>	

Plans	Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of development compliance with policy
	<p>Objective NH 2 – Protected Habitats and Species Support the protection of protected habitats and species listed in the annexes to the EU Habitats Directive 1992 (92/43/EEC) and the Birds Directive (2009/147/EC) and regularly occurring-migratory birds and their habitats, and species protected under the Wildlife Acts. This includes the protection of bats and their roosts, and the maintenance of woodland, hedgerows, treelines, ecological networks and corridors which serve as feeding areas, flight paths and community routes for bats.</p>	<p>The proposed development will not adversely affect the Qualifying Interests/Special Conservation Interests associated with the Galway Bay Complex SAC, Inner Galway Bay SPA, Cregganna Marsh SPA and Rahasane Turlough SPA.</p> <p>There will be no adverse effects on sensitive aquatic receptors listed as QIs/SCI, as a result of deterioration in water quality.</p> <p>The proposed development will not adversely affect the Qualifying Interests/Special Conservation Interests associated with the Galway Bay Complex SAC, Inner Galway Bay SPA, Cregganna Marsh SPA and Rahasane Turlough SPA as described above in relation to NHB 1</p>
	<p>Objective NH 6 – Water Resources Protect all water resources in the Plan Area, including rivers, streams, springs, surface waters, coastal waters, designated shellfish waters, estuarine waters and groundwater quality, in accordance with the requirements and guidance in the EU Water Framework Directive 2000 (2000/60/EC), the European Union (Water Policy) Regulations 2003 (as amended), the Western River Basin Management Plan 2009-2015, and other relevant EU Directives, including associated national legislation and policy guidance (including any superseding versions of same). Support the application and implementation of a catchment planning and management approach to development and conservation, including the implementation of Sustainable Drainage System techniques for new development in the Plan Area.</p>	<p>There will be no deterioration in water quality due to the proposal. All drainage proposals for the development will be consistent with SUDs principles and best practice SUDs drainage design.</p> <p>Storm water drainage design has been designed to cater for all surface water runoff from all hard surfaces in the proposed development including roadways, roofs etc. All stormwater generated on site from roadways and roofs will discharge via Oil/Petrol Interceptor to one of 5 no. proposed soakaways which are situated in the centre and west of the site. The stormwater will soakaway through the soil to groundwater.</p>
	<p>Objective NH 13 – Consultation with Environmental Authorities Ensure that all development proposals are screened to determine whether they are likely to have a significant direct, indirect or cumulative effect on the integrity or conservation objectives of any Natura 2000 site and, where significant effects are likely or</p>	<p>All relevant ecological and environmental authorities were consulted in the course of preparing this application. Details of all consultation is available in Appendix 2 of this NIS.</p>

Plans	Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of development compliance with policy
	uncertain, there will be a requirement for consultation with the relevant environmental authorities as part of any Habitats Directive Assessment that may be required.	
The Regional Planning Guidelines for the West 2010-2022	EAP13: To support the protection of Natural Heritage Areas, Special Protection Areas, Special Areas of Conservation, Nature Reserves, Ramsar Sites (Wetlands), Wildfowl Sanctuaries, National Parks, Nature Reserves and the biodiversity designated under the Habitats Directive, Birds Directive, Wildlife Act, Flora Protection Order and other designated or future designated sites.	The proposed development will not adversely affect the Qualifying Interests/Special Conservation Interests associated with the Galway Bay Complex SAC, Inner Galway Bay SPA, Cregganna Marsh SPA and Rahasane Turlough SPA.
	EA018: Support the achievement of favourable conservation status of Annex I habitats, Annex II species, Annex I bird species and other regularly occurring migratory bird species and their habitats in the region.	There will be no adverse effects on sensitive aquatic receptors listed as QIs/SCI, as a result of deterioration in water quality. The proposed development will not adversely affect the Qualifying Interests/Special Conservation Interests associated with the Galway Bay Complex SAC, Inner Galway Bay SPA, Cregganna Marsh SPA and Rahasane Turlough SPA as described above in relation to NHB 1
National Biodiversity Action Plan 2017-2021	Target 6.2 - Sufficiency, coherence, connectivity, and resilience of the protected areas network substantially enhanced by 2020.	There will be no impact on SCI species of Inner Galway Bay SPA or the QIs of Galway Bay Complex SAC. The proposed development will not impact on connectivity within the wider area. There are no watercourses within the proposed development site that could be used as a commuting corridor. There will be no deterioration in water quality, or impact on fen habitat adjacent to the proposed development site, or wetlands of Inner Galway Bay SPA, due to the proposal.

6.1.2

6.1.2 Other Plans & Projects

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

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

The comprehensive review of the Galway County Council planning register documented relevant general development planning applications within the vicinity of the proposed works, since the designation of Inner Galway Bay SPA in 1994 and Galway Bay Complex in 1997. Most of the developments relate to the provision and/or alteration of dwelling units. The developments assessed in the context of the cumulative assessment are provided in figure 6.1 and figure 6.2 and in Appendix 10.

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

The site of the proposed development was considered in the context of all the other surrounding developments to determine if there were any potential for it to result in the loss of a potential commuting corridor for species between sensitive habitats within the Galway Bay Complex to the west and other areas of ecological sensitivity to the east and south. As shown on Figure 6.1, the proposed development is surrounded to the north, east and south by either existing or permitted developments. No potential commuting corridor was identified. In addition, even in the absence of the permitted development that runs along the eastern boundary, no habitat connectivity (watercourse, hedge, tree line) through the site to the lands to the east was identified.

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

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
















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

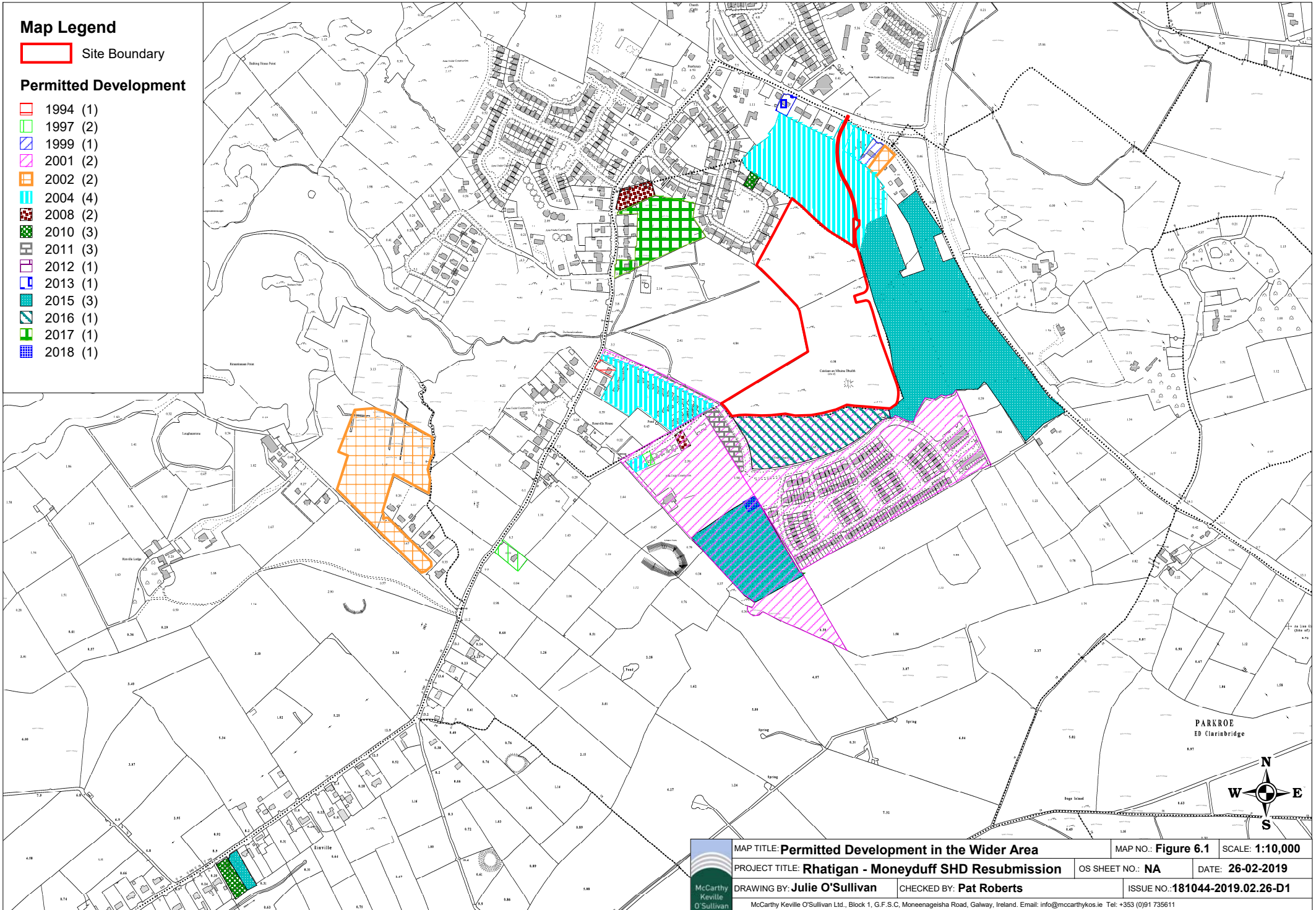
Following the detailed assessment provided in the preceding sections, it is concluded that, the proposed housing development will not result in any residual adverse effects on any of the European Sites, their integrity or their conservation objectives when considered on its own. There is therefore no potential for the proposed development to


Map Legend

 Site Boundary

Permitted Development

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







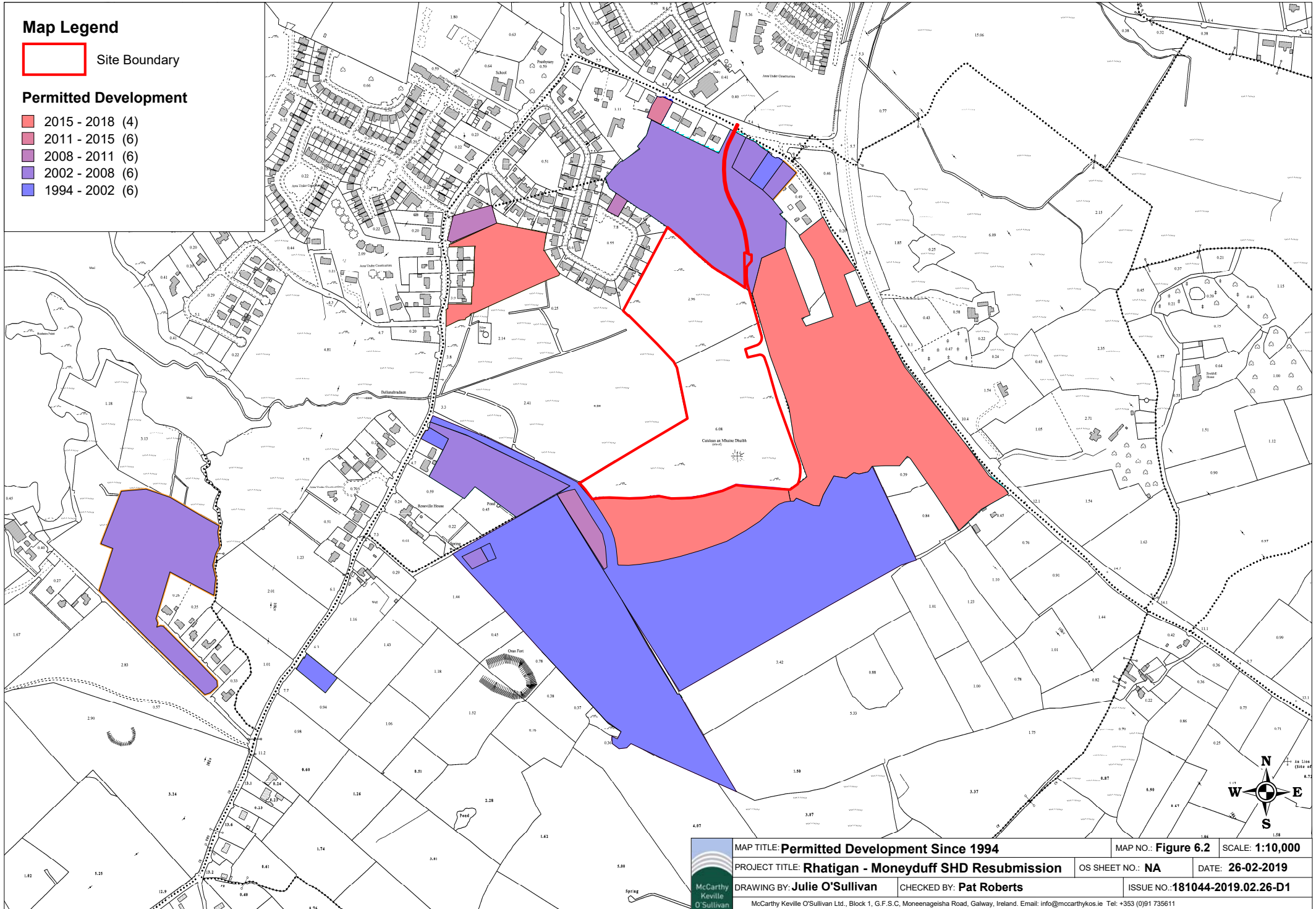
		MAP TITLE: Permitted Development in the Wider Area	MAP NO.: Figure 6.1	SCALE: 1:10,000
		PROJECT TITLE: Rhatigan - Moneyduff SHD Resubmission	OS SHEET NO.: NA	DATE: 26-02-2019
		DRAWING BY: Julie O'Sullivan	CHECKED BY: Pat Roberts	ISSUE NO.: 181044-2019.02.26-D1
McCarthy Keville O'Sullivan Ltd., Block 1, G.F.S.C. Moneenageisha Road, Galway, Ireland. Email: info@mccarthykos.ie Tel: +353 (0)91 735611				


Map Legend

 Site Boundary

Permitted Development

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



		MAP TITLE: Permitted Development Since 1994	MAP NO.: Figure 6.2	SCALE: 1:10,000
PROJECT TITLE: Rhatigan - Moneyduff SHD Resubmission		OS SHEET NO.: NA	DATE: 26-02-2019	
DRAWING BY: Julie O'Sullivan		CHECKED BY: Pat Roberts		ISSUE NO.: 181044-2019.02.26-D1
McCarthy Keville O'Sullivan Ltd., Block 1, G.F.S.C. Moneenageisha Road, Galway, Ireland. Email: info@mccarthykos.ie Tel: +353 (0)91 735611				

contribute to any cumulative adverse effects on any European Site when considered in-combination with other plans and projects.

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

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

7 CONCLUDING STATEMENT

7.1 Characteristics of the Site and Development

Name and Location of European Sites

- Galway Bay Complex SAC and
- Inner Galway Bay SPA
- Cregganna Marsh SPA
- Rahasane Turlough SPA

Description of Project

The project is described in Section 2 of this report.

Is the project directly connected with or necessary to the management of the site?

The project is not directly connected with or necessary to the management of any European Site.

Are there any other projects or plans that together with the project being assessed could affect the site?

A search in relation to plans and projects that may have the potential to result in cumulative impacts on European sites was carried out as part of the Appropriate Assessment Process. As detailed above in Sections 6, the proposed development will have no individual or in combination impacts on any European site in any regard.

7.2 Data Collected to Carry Out Assessment

In preparation of the report, the following sources were used to gather information:

- Review of NPWS published information on European Sites including Site Synopses, Natura 2000 Standard Data Forms, European Site mapping and Conservation Objectives for European Sites
- Review of other plans and projects within the area.
- Review of the documentation, mitigation measures and engineering reports, including flood risk assessment and Screening for Appropriate Assessment Report.
- Review of the information contained within the Biodiversity Chapter of the EIAR.
- Review of Annex I Habitat Assessment of Fen Report (included as Appendix 7), Bird Survey Report and CEMP (included as Appendix 4).

7.3 Integrity of the European Sites

Based on the objective information gathered and the predictions made about the changes that are likely to result from the construction and operation stages of the project, the integrity of site checklist, as per Box 10 of EC, 2002, is completed with regard to Galway Bay Complex SAC (000268), Inner Galway Bay SPA (004031), Cregganna Marsh SPA (004142), Rahasane Turlough SPA (004089) in Table 7.1.

Table 7.1 Integrity of site checklist and assessment for European Sites

Does the project have the potential to:	Assessment	Residual Impact: Yes/No
Conservation objectives		
Cause delays in progress towards achieving the conservation objectives of the site?	The proposed development will not cause delays or interrupt progress towards achieving the conservation objectives of the European Sites.	No
Interrupt progress towards achieving the conservation objectives of the site?	A suite of best practice measures have been incorporated into the project design to avoid and minimise potential impacts.	No
Disrupt those factors that help to maintain the favourable conditions of the site?	No potential adverse effects on any QI of any European site has been identified.	No
Interfere with the balance, distribution and density of key species that are the indicators of the favourable condition of the site?		No
Other Indicators		
Cause changes to the vital defining aspects (e.g. nutrient balance) that determine how the site functions as a habitat or ecosystem?	The proposed development will not cause changes to the structure and function of the habitats or ecosystems of the European Sites. A suite of best practice measures have been incorporated into the project design to avoid and minimise potential impacts.	No
Change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site?	No potential adverse effects on any QI of any European site has been identified.	No
Interfere with predicted or expected natural changes to the site (such as water dynamics or chemical composition)?	As outlined in section 2 and in the CEMP, a suite of best practice measures have been incorporated into the project design to avoid potential impacts on aquatic ecological receptors due to water pollution. No potential adverse effects on any QI/SCI of any European site have been identified.	No
Reduce the area of key habitats?	There will be no reduction in area of key habitat.	No
Reduce the population of key species?	The proposed development will not reduce population of key species or change the balance between Key species. The development is not anticipated to result in a reduction in diversity within any European site.	No
Change the balance between key species?		No
Reduce diversity of the site?		No

Does the project have the potential to:	Assessment	Residual Impact: Yes/No
Result in disturbance that could affect population size or density or the balance between key species?	A suite of best practice measures have been incorporated into the project design to avoid potential impacts. No potential adverse effects on any QI/SCI of any European site has been identified.	No
Result in fragmentation?	The development has been designed to maintain and retain habitat connectivity within and to areas outside the development site boundary.	No
Result in loss or reduction of key features (e.g. tree cover, tidal exposure, annual flooding, etc.)?	No key features will be lost as a result of the proposed development.	No

7.4 Conclusion of Natura Impact Statement

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

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Appendix 1

Appropriate Assessment Screening Report

Appropriate Assessment Screening Report

Proposed Housing Development
Moneyduff Oranmore
Co. Galway.



Planning & Environmental Consultants

DOCUMENT DETAILS

Client: Arlum Ltd

Project title: Proposed Housing development
Moneyduff, Oranmore
Co. Galway

Project Number: 181044

Document Title: Appropriate Assessment Screening
Report

Doc. File Name: AASR – F - 2019.04.10 – 181044

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1 INTRODUCTION

1.1 Background

McCarthy Keville O’Sullivan Ltd. (MKO) has been appointed to provide the information necessary to allow the competent authority to conduct an Article 6(3) Screening for Appropriate Assessment of a proposed housing development at Moneyduff, Oranmore, Co. Galway.

Screening for Appropriate Assessment is required under Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive). Where it cannot be excluded that a project or plan, either alone or in combination with other projects or plans, would have a significant effect on a European Site then same shall be subject to an appropriate assessment of its implications for the site in view of the site's conservation objectives. The current project is not directly connected with, or necessary for, the management of any European Site consequently the project has been subject to the Appropriate Assessment Screening process.

The assessment in this report is based on a desk study and field surveys undertaken during September 2016 and August 2017. It specifically assesses the potential for the proposed development to effects on European sites.

This Appropriate Assessment Screening Report has been prepared in accordance with the European Commission guidance document *Assessment of Plans and Projects Significantly affecting Natura 2000 Sites: Methodological Guidance on the provisions of Article 6(3) and 6(4) of the Habitats Directive 92/43/EEC* (EC, 2001) and the Department of the Environment’s Guidance on the Appropriate Assessment of Plans and Projects in Ireland (December 2009, amended February 2010).

In addition to the guidelines referenced above, the following relevant guidance was considered in preparation of this report:

1. DoEHLG (2010) *Appropriate Assessment of Plans and Projects in Ireland Guidance for Planning Authorities*. Department of the Environment, Heritage and Local Government,
2. European Communities (2000) *Managing Natura 2000 Sites: the provisions of Article 6 of the ‘Habitats’ Directive 92/43/EEC*, Office for Official Publications of the European Communities, Luxembourg. European Commission,
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7. EPA (2017), *Revised Guidelines on the Information to be Contained in Environmental Impact Statements*. Environmental Protection Agency, and EPA (2003), *Advice Notes on current practice in the preparation of Environmental Impact Statements*. Environmental Protection Agency.

1.2 Appropriate Assessment

1.2.1 Screening for Appropriate Assessment

Screening is the process of determining whether an Appropriate Assessment is required for a plan or project. Under Part XAB of the Planning and Development Act, 2000, as amended, screening must be carried out by the Competent Authority. As per Section 177U of the Planning and Development Act, 2000, as amended 'A screening for appropriate assessment 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'. The Competent Authority's determination as to whether an Appropriate Assessment is required must be made on the basis of objective information and should be recorded. The Competent Authority may request information to be supplied to enable it to carry out screening.

Consultants or project proponents may undertake a form of screening to establish if an Appropriate Assessment is required and provide advice, or may submit the information necessary to allow the Competent Authority to conduct a screening with an application for consent. Where it cannot be excluded beyond reasonable scientific doubt, that a proposed plan or project, individually or in combination with other plans and projects, would have a significant effect on the conservation objectives of a European site, an Appropriate Assessment (Natura Impact Statement (NIS)) of the plan or project is required. This Screening for Appropriate Assessment has been prepared in compliance with the provision of section 177U of the Planning & Development Act 2010 as amended.

1.2.2 Appropriate Assessment (Natura Impact Statement)

The term Natura Impact Statement (NIS) is defined in legislation¹. An NIS, where required, should present the data, information and analysis necessary to reach a definitive determination as to 1) the implications of the plan or project, alone or in combination with other plans and projects, for a European site in view of its conservation objectives, and 2) whether there will be adverse effects on the integrity of a European site. The NIS should be underpinned by best scientific knowledge, objective information and by the precautionary principle.

1.2.3 Statement of Authority

A baseline ecological survey was undertaken on the 8th September 2016 by Pamela Boyle (BSc, MSc, PhD) and on the 16th of August 2017 by James Owens (BSc, MSc) of McCarthy Keville O'Sullivan Ltd. This report has been prepared by David McNicholas (BSc, M.Sc, MCIEEM), with input from James Owens. David is a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and has over 7 years professional ecological consultancy experience. This report has been reviewed by Pat Roberts (B.Sc. Environmental Science, MCIEEM) who has over 12 years' experience in management and ecological assessment.

¹ As defined in Section 177T of the Planning and Development Act, 2000 as amended, an NIS means a statement, for the purposes of Article 6 of the Habitats Directive, of the implications of a proposed development, on its own and in combination with other plans and projects, for a European site in view of its conservation objectives. It is required to include a report of a scientific examination of evidence and data, carried out by competent persons to identify and classify any implications for the European site in view of its conservation objectives

2 DESCRIPTION OF THE PROPOSED DEVELOPMENT

2.1 Site Location

The proposed site is located in the townland of Moneyduff, approximately 590m south of the centre of Oranmore, Co. Galway. Oranmore is positioned along the inner shoreline of Galway bay, c.7km east of Galway city. The area is characterised by existing and emerging residential development. The subject lands are located to the south of a well-established residential area of predominantly single storey bungalows (Beech Grove/Park). The proposed site has an elevation ranging between approximately 3.4 and 12.8m OD (Ordnance Datum). The overall local topography generally slopes from east to west with deposited fill located in mounds around the site creating artificial high points.

The subject lands which extend to approximately 8.7 ha. The site is a greenfield site comprising a mosaic of scrub and dry calcareous and neutral grassland that has been modified in the recent past by the clearance of scrub. The site location is provided in Figure 2.1.

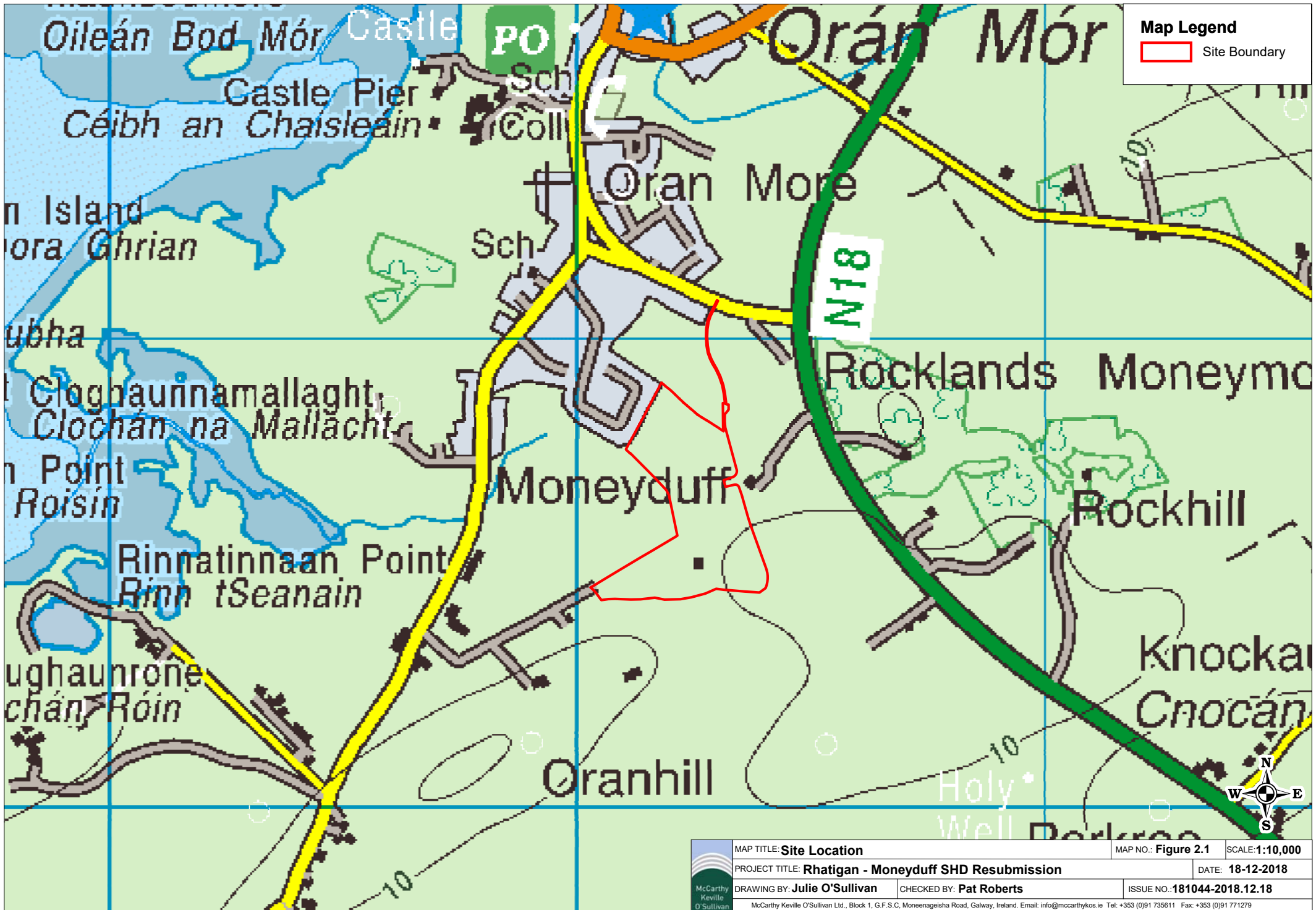
2.2 Characteristics of the Proposed Development

2.2.1.1 General description of the project

The proposal is for the construction of a housing estate comprising 212 residential houses, amenity areas a creche and associated parking facilities. The proposed development will consist of the following:

- 1) Construction of 212 no. residential units comprising:
 - 34 no. House Type A (four-bed semi-detached unit)
 - 54 no. House Type B (three-bed semi-detached unit)
 - 16 no. House Type C (four-bed detached)
 - 16 no. House Type D (three-bed terraced unit)
 - 24 no. House Type E (four-bed semi-detached unit)
 - 50 no. House Type G (25 no. two-bed ground floor duplexes and 25 no. two-bed first/second floor duplexes)
 - 6 no. House Type H (two-bed duplex apartments)
 - 12 no. house Type J (two-bed terrace)
- 2) Development of a crèche facility (374 sqm) and associated outdoor play areas and car parking.
- 3) Provision of new vehicular and pedestrian site access from the North-South Oranmore Distributor Road (the route of which was permitted under An Bord Pleanála Reference PL 07.237219, which was extended under Pl Ref 15/1334).
- 4) Provision of shared communal and private open space, site landscaping, car parking, site services and all associated site development works.

The proposal layout is provided in drawing number 2325-P-003, Appendix 1 of this report.



Oileán Bod Mór Castle

PO

Orán Mór

Castle Pier
 Céibh an Chaisleain

Sch
 Coll

Oran More

n Island
 ora Ghrian

Sch

N18

ubha

Cloghaunnamallacht
 Clochán na Mallacht

Rocklands Moneymo

n Point
 Roisín

Moneyduff

Rockhill

Rinnatinnaan Point
 Rinn tSeanain

ughauróne
 chán, Róin

Oranhill

Knocka
 Cnocán

Holy
 Well



	MAP TITLE: Site Location		MAP NO.: Figure 2.1	SCALE: 1:10,000	
	PROJECT TITLE: Rhatigan - Moneyduff SHD Resubmission			DATE: 18-12-2018	
	DRAWING BY: Julie O'Sullivan		CHECKED BY: Pat Roberts		ISSUE NO.: 181044-2018.12.18
	<small>McCarthy Keville O'Sullivan Ltd., Block 1, G.F.S.C. Moneenageisha Road, Galway, Ireland. Email: info@mccarthykos.ie Tel: +353 (0)91 735611 Fax: +353 (0)91 771279</small>				

3 IDENTIFICATION OF RELEVANT EUROPEAN SITES

3.1 Background to European Sites

The Habitats Directive (92/43/EEC) (together with the Birds Directive (2009/147/EC)) forms the cornerstone of Europe's nature conservation policy. It is built around two pillars: the Natura 2000 network of protected sites and the strict system of species protection. All in all the Directive protects over 1,000 animal and plant species and over 200 "habitat types" (e.g. special types of forests, meadows, wetlands, etc.), which are of European importance.

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

Habitats Directive/Special Areas of Conservation

Articles 3 – 9 of the EU Habitats Directive (92/43/EEC) provide the EU legislative framework of protecting rare and endangered species of flora and fauna, and habitats. **Annex I** of the Directive lists habitat types whose conservation requires the designation of **Special Areas of Conservation (SAC)**. Priority habitats, such as Turloughs, which are in danger of disappearing within the EU territory are also listed in Annex I. **Annex II** of the Directive lists animal and plant species (e.g. Atlantic Salmon and Killarney Fern) whose conservation also requires the designation of **SAC**. **Annex IV** lists animal and plant species in need of strict protection such as Lesser Horseshoe Bat and Otter, and **Annex V** lists animal and plant species whose taking in the wild and exploitation may be subject to management measures. In Ireland, species listed under Annex V include Irish Hare, Common Frog and Pine Marten.

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

Birds Directive/Special Protection Areas

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

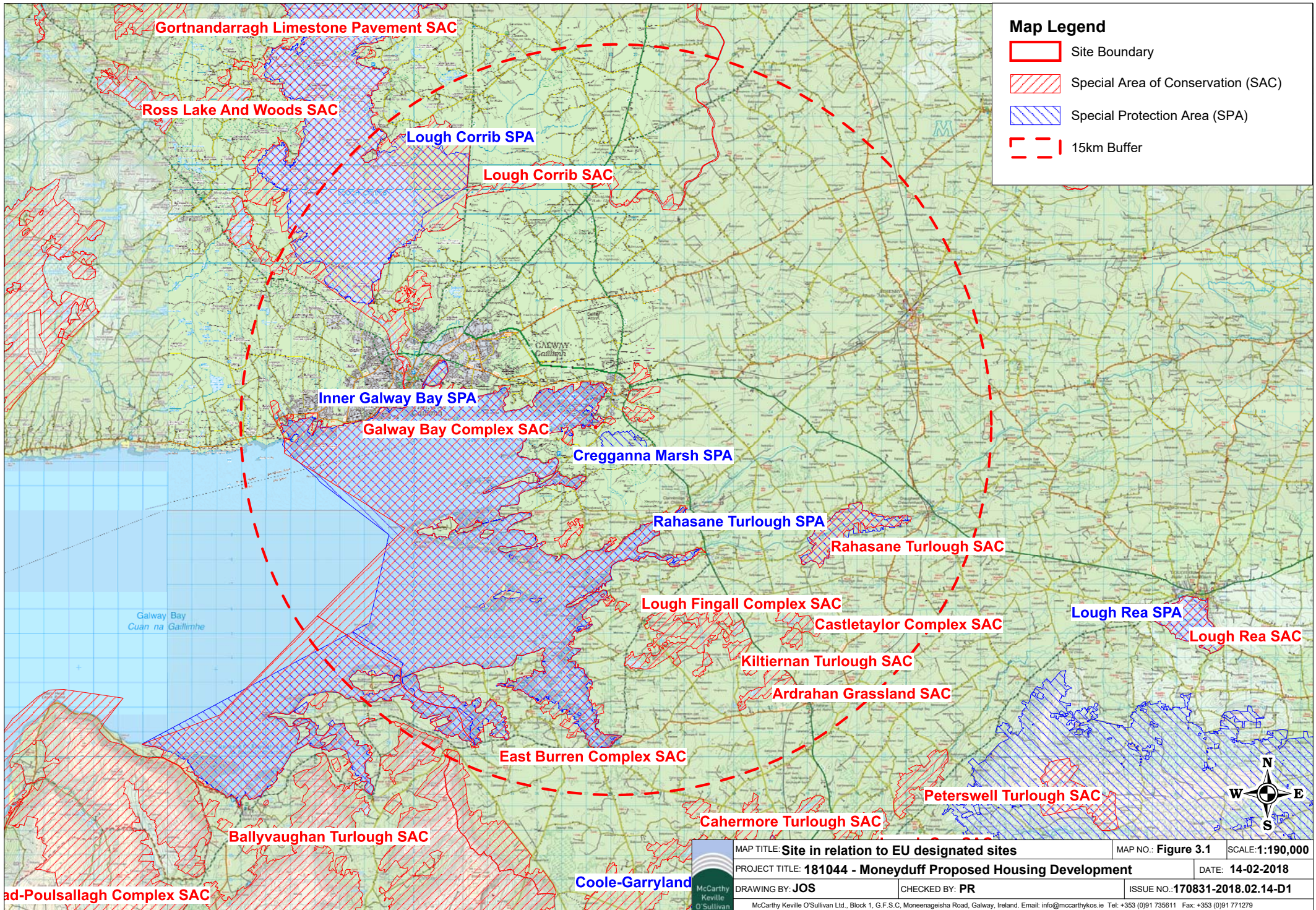
A subset of bird species have been identified in the Directive and are listed in **Annex I** as requiring special conservation measures in relation to their habitats. These species have been listed on account of inter alia: their risk of extinction; vulnerability to specific changes in their habitat;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

3.2 Identification of the Designated Sites within the Zone of Likely Impact

The most up to date GIS spatial datasets for European designated sites were downloaded from the NPWS website (www.npws.ie) on the 04/04/2019. Using the GIS software, MapInfo (Version 10.0), European sites within the zone of likely impact of the project were identified. The following rationale was used to identify the Zone of likely impact. Initially, sites within a 15km radius of the proposed development were identified (as per the DoEHLG Guidance (2010)). Where no potential for significant effect was identified, sites were not considered to be within the likely Zone of Impact. In addition, using the precautionary principle, European Sites located outside the 15km buffer zone were also considered but no pathway for effects on sites outside the 15km buffer distance were identified.

Figure 3.1 shows the location of the proposed development in relation to all European sites within 15km of the proposed development. Figure 3.2 shows the site in relation to nearby EU Designated Sites.

Table 3.1, lists all European Sites within 15km and assesses which are considered to be within the likely Zone of Impact. The site synopses and conservation objectives of these sites, as per the NPWS website (www.npws.ie), were considered at the time of preparing this report (04/04/2019). Details of these sites, including their distance from the proposed development, are provided in Table 3.1.



Map Legend

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



MAP TITLE: Site in relation to EU designated sites	MAP NO.: Figure 3.1	SCALE: 1:190,000
PROJECT TITLE: 181044 - Moneyduff Proposed Housing Development		
DATE: 14-02-2018		ISSUE NO.: 170831-2018.02.14-D1
DRAWING BY: JOS	CHECKED BY: PR	

ad-Poulsallagh Complex SAC

Coole-Garryland

Table 3.1 Designated sites within the Likely Zone of Impact

European Sites	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 04/04/2019)	Conservation Objectives	Likely Zone of Impact Determination
Special Areas of Conservation (SAC)			
Galway Bay Complex SAC (000268) 0km (Immediately adjacent to part of the site).	<ul style="list-style-type: none"> ▪ 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>Glaucopuccinellietalia maritima</i>) [1330] ▪ Mediterranean salt meadows (<i>Juncetalia maritim</i>) [1410] ▪ Turloughs [3180] ▪ <i>Juniperus communis</i> formations on heaths or calcareous grasslands [5130] ▪ 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 davalliana</i> [7210] ▪ Alkaline fens [7230] ▪ <i>Lutra lutra</i> (Otter) [1355] ▪ <i>Phoca vitulina</i> (Harbour Seal) [1365] 	Detailed conservation objectives for this site, dated April 2013, were reviewed as part of the assessment and are available at www.npws.ie	The site of the proposed development is adjacent to the boundary of the European Site and following preliminary assessment it is considered to be within the Likely Zone of Impact and further assessment is required.

European Sites	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 04/04/2019)	Conservation Objectives	Likely Zone of Impact Determination
<p>Lough Fingall Complex SAC (000606) 7.3km</p>	<ul style="list-style-type: none"> ▪ Alpine and Boreal heaths [4060] ▪ <i>Juniperus communis</i> formations on heaths or calcareous grasslands [5130] ▪ 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] ▪ Limestone pavements [8240] ▪ <i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303] 	<p>Detailed conservation objectives for this site (Version 1, January 2019) were reviewed as part of the assessment and are available at www.npws.ie</p>	<p>No surface water connectivity exists between the European site and the proposed development. No pathway for effect was identified and the site is not within the Likely Zone of Impact.</p>
<p>Lough Corrib SAC (000297) 8.4km</p>	<ul style="list-style-type: none"> ▪ 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>Callitriche-Batrachion</i> vegetation [3260] ▪ Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) [* important orchid sites] [6210] 	<p>Detailed conservation objectives for this site (Version 1, April 2017) were reviewed as part of the assessment and are available at www.npws.ie</p>	<p>This European Site is located in a separate hydrological catchment from the proposed development. No pathway for effect was identified and the site is not within the Likely Zone of Impact.</p>

European Sites	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 04/04/2019)	Conservation Objectives	Likely Zone of Impact Determination
	<ul style="list-style-type: none"> ▪ <i>Molinia</i> 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 <i>Rhynchosporion</i> [7150] ▪ Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> [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] 		

European Sites	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 04/04/2019)	Conservation Objectives	Likely Zone of Impact Determination
	<ul style="list-style-type: none"> ▪ <i>Drepanocladus vernicosus</i> (Slender Green Feather-moss) [1393] ▪ <i>Najas flexilis</i> (Slender Naiad) [1833] 		
Rahasane Turlough SAC (000322) 8.9km	<ul style="list-style-type: none"> ▪ Turloughs [3180] 	This site has the generic conservation objective: <i>'To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.'</i> (Generic version 6.0 NPWS 2018)	The European Site is located within a separate ground waterbody catchment from the proposed development (www.gis.epa.ie/EPAMaps/). Therefore, no pathway for significant effect via groundwater pathways exist. No pathway for effect was identified and the site is not within the Likely Zone of Impact.
Castletaylor Complex SAC (000242) 9.6km	<ul style="list-style-type: none"> ▪ Turloughs [3180] ▪ Alpine and Boreal heaths [4060] ▪ <i>Juniperus communis</i> formations on heaths or calcareous grasslands [5130] ▪ Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210] ▪ Limestone pavements [8240] 	This site has the generic conservation objective: <i>'To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.'</i> (Generic version 6.0 NPWS 2018)	The European site is located up-gradient of the proposed development site. No pathway for effect was identified and the site is not within the Likely Zone of Impact.
Kiltiernan Turlough SAC (001285) 9.8km	<ul style="list-style-type: none"> ▪ Turloughs [3180] 	This site has the generic conservation objective: <i>'To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.'</i> (Generic version 6.0 NPWS 2018)	The European Site is located within a separate ground waterbody catchment from the proposed development (www.gis.epa.ie/EPAMaps/). Therefore, no pathway for significant effect via groundwater pathways exist. No pathway for effect was identified and the site is not within the Likely Zone of Impact.
Ardrahan Grassland SAC (002244)	<ul style="list-style-type: none"> ▪ Alpine and Boreal heaths [4060] 	This site has the generic conservation objective:	This European site is designated for terrestrial habitats. No pathway for effect was identified

European Sites	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 04/04/2019)	Conservation Objectives	Likely Zone of Impact Determination
10.9km	<ul style="list-style-type: none"> ▪ Juniperus communis formations on heaths or calcareous grasslands [5130] ▪ Limestone pavements [8240] 	<p><i>'To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.'</i> (Generic version 6.0 NPWS 2018)</p>	<p>and the site is not within the Likely Zone of Impact.</p>
<p>East Burren Complex SAC (001926) 14.5km</p>	<ul style="list-style-type: none"> ▪ Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. [3140] ▪ Turloughs [3180] ▪ Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] ▪ Alpine and Boreal heaths [4060] ▪ <i>Juniperus communis</i> formations on heaths or calcareous grasslands [5130] ▪ Calaminarian grasslands of the <i>Violetalia calaminariae</i> [6130] ▪ Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210] ▪ Lowland hay meadows (<i>Alopecurus pratensis</i>, <i>Sanguisorba officinalis</i>) [6510] ▪ Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> [7210] ▪ Petrifying springs with tufa formation (Cratoneurion) [7220] ▪ Alkaline fens [7230] ▪ Limestone pavements [8240] 	<p>This site has the generic conservation objective: <i>'To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.'</i> (Generic version 6.0 NPWS 2018)</p>	<p>The European Site is located within a separate ground waterbody catchment from the proposed development (www.gis.epa.ie/EPAMaps/). Additionally, no surface water connectivity exists between the proposed development site and the European site. Therefore, no pathway for significant effect via groundwater pathways exist. No pathway for effect was identified and the site is not within the Likely Zone of Impact.</p>

European Sites	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 04/04/2019)	Conservation Objectives	Likely Zone of Impact Determination
	<ul style="list-style-type: none"> ▪ Caves not open to the public [8310] ▪ Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0] ▪ <i>Euphydryas aurinia</i> (Marsh Fritillary) [1065] ▪ <i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303] ▪ <i>Lutra lutra</i> (Otter) [1355] 		
Special Protected Areas (SPA)			
Cregganna Marsh SPA (004142) 0.26km	<ul style="list-style-type: none"> ▪ Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395] 	This site has the generic conservation objective: 'To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests of this SPA.' (NPWS Generic version 6.0, 2018)	The site of the proposed development is 0.26km from the boundary of the European Site and following preliminary assessment it is considered to be within the Likely Zone of Impact .
Inner Galway Bay SPA (004031) 0.34km	<ul style="list-style-type: none"> ▪ 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] ▪ Shoveler (<i>Anas clypeata</i>) [A056] ▪ Red-breasted Merganser (<i>Mergus serrator</i>) [A069] ▪ Ringed Plover (<i>Charadrius hiaticula</i>) [A137] 	Detailed conservation objectives for this site, dated May 2013, were reviewed as part of the assessment and are available at www.npws.ie	The site of the proposed development is 0.34km from the boundary of the European Site and following preliminary assessment it is considered to be within the Likely Zone of Impact .

European Sites	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 04/04/2019)	Conservation Objectives	Likely Zone of Impact Determination
	<ul style="list-style-type: none"> ▪ 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] ▪ Wetlands [A999] 		
<p>Rahasane Turlough SPA (004089) 8.8km</p>	<ul style="list-style-type: none"> ▪ Whooper Swan (<i>Cygnus cygnus</i>) [A038] ▪ Wigeon (<i>Anas penelope</i>) [A050] ▪ Golden Plover (<i>Pluvialis apricaria</i>) [A140] ▪ Black-tailed Godwit (<i>Limosa limosa</i>) [A156] ▪ Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395] ▪ Wetland and Waterbirds [A999] 	<p>This site has the generic conservation objective:</p> <p><i>‘To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA’</i></p> <p>And the additional objective:</p> <p><i>‘To maintain or restore the favourable conservation condition of the wetland habitat at Rahasane Turlough SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.’</i></p>	<p>The site of the proposed development is 8.8km from the boundary of the European Site. As the population of Greenland white-fronted geese that use the SPA are also known to use Creganna Marsh SPA, potential for effect has been identified, as a result of disturbance, to the population where they occur at Creganna Marsh and following preliminary assessment it is considered to be within the Likely Zone of Impact from a precautionary perspective.</p>

European Sites	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 04/04/2019)	Conservation Objectives	Likely Zone of Impact Determination
Lough Corrib SPA (004042) 10.7km	<ul style="list-style-type: none"> ▪ 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] 	<p>(NPWS Generic version 6.0, 2018)</p> <p>This site has the generic conservation objective:</p> <p><i>'To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA'</i></p> <p>And the additional objective:</p> <p><i>'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.'</i> (NPWS Generic version 6.0, 2018)</p>	<p>This European Site is located in a separate hydrological catchment from the proposed development. In addition, the proposal is separated from the SPA by over 10.7km and Galway Bay and Galway City. No pathway for effect was identified and the site is not within the Likely Zone of Impact.</p>

4 ASSESSMENT OF LIKELY EFFECTS ON EUROPEAN SITES

Any likely direct or indirect impacts of the proposed development, both alone and in combination with other plans and projects, on European Sites by virtue of the following criteria: size and scale, land-take, distance from the European Site or key features of the site, resource requirements, emissions, excavation requirements, transportation requirements and duration of construction, operation and decommissioning have been considered in this Screening Assessment.

Table 4.1 provides the Screening Assessment with regard to each of the European Sites located within the Likely Zone of Impact. The Galway Bay Complex SAC, Cregganna Marsh SPA, Rahasane Turlough SPA and Inner Galway Bay SPA were the only sites within the Likely Zone of Impact.

Table 4.1 Screening Assessment of European Sites within the Zone of Likely Impact of the Proposed Works

European Site	Pathways for Direct Effects	Pathways for Indirect Effects	Assessment of Potential for significant effects on the European Site
Galway Bay Complex SAC (000268)	The proposed works are located outside the boundary of the SAC and will not result in any direct impacts on the QI habitats or species for which the SAC has been designated.	<p>There is the potential for emissions to surface water during the construction and operational phases to result in significant impacts on aquatic or surface water influenced QI habitats and species within the SAC in the absence of mitigation.</p> <p>Taking a precautionary approach, there is the potential for disturbance related impacts to the QI species otter has also been identified.</p> <p>For this reason, potential impacts on the QIs of the Galway Bay Complex SAC cannot be screened out at this stage and further assessment is required.</p>	There is potential for significant effects on the European Site, in the absence of mitigation, as a result of water quality impacts during all phases of the Proposed Project. Further assessment is required.
Cregganna Marsh SPA (004142)	The proposed works are located outside the boundary of the SPA and will not result in any direct impacts on the SCI's for which the SPA has been designated.	<p>No surface water connectivity exists between the European site and the proposed development.</p> <p>The European Site is located 0.26km south of the proposed development site and is buffered from it by housing estates and improved agricultural grassland. However, taking a precautionary approach, there is the potential for significant effect as a result of disturbance related impacts on the SCI</p>	There is potential for significant effects on the European Site as a result of disturbance during both the construction and operational phase of the proposal. Further assessment is required.

European Site	Pathways for Direct Effects	Pathways for Indirect Effects	Assessment of Potential for significant effects on the European Site
		<p>species during the construction and operational phase of the proposal due to the proximity of the proposed development.</p> <p>For this reason, potential impacts on the SCI species of Cregganna Marsh SPA cannot be screened out at this stage and further assessment is required.</p>	
Inner Galway Bay SPA (004031)	<p>The proposed works are located outside the boundary of the SPA and will not result in any direct impacts on the SCI's for which the SPA has been designated.</p>	<p>There is the potential for emissions to surface water during the construction and operational phases to result in significant effect on the supporting habitat 'Wetland [A999]' on which the SCI species depend.</p> <p>Inner Galway Bay SPA is located 0.34km to the west of the proposed development site and is buffered from it by a national road, urban infrastructure and grassland. However, taking a precautionary approach, there is the potential for significant effect as a result of disturbance during the construction and operational phase of the proposal on the SCI species for which the SPA has been designated.</p> <p>For this reason, potential for disturbance related impacts on the SCI species of the Inner Galway Bay SPA cannot be screened out at this stage and further assessment is required.</p>	<p>There is potential for significant effects on the European Site as a result of disturbance during both the construction and operational phase of the proposal. Further assessment is required.</p>
Rahasane Turlough SPA (004089)	<p>The proposed works are located outside the boundary of the SPA and will not result in any direct impacts on the SCI's for which the SPA has been designated.</p>	<p>The European Site is located 8.8km away from the proposed development site and is buffered from it by roads, housing estates and agricultural fields. For this reason, there is no potential for significant effect on the SCI species for which the SPA has been designated as a result of disturbance/ displacement. However, as the SCI species Greenland white-fronted geese are known to move outside of Rahasane Turlough SPA to Cregganna Marsh SPA on occasion, depending on flood levels and other environmental reasons. There is therefore potential for indirect effect, as a result of disturbance, to the population occurring outside of Rahasane Turlough SPA.</p> <p>For this reason, and from a precautionary perspective, potential for disturbance related impacts on the SCI species of Rahasane Turlough SPA,</p>	<p>There is potential for significant effects on the SCI species Greenland white-fronted goose, occurring outside of the European Site, as a result of disturbance during both the construction and operational phase of the proposal. Further assessment is required.</p>

European Site	Pathways for Direct Effects	Pathways for Indirect Effects	Assessment of Potential for significant effects on the European Site
		occurring outside of the Designated Site, cannot be screened out at this stage and further assessment is required.	

4.1 Data Collected to Carry Out Assessment

In preparation of the assessment, the following sources were used to gather information:

- Review of NPWS Site Synopses and detailed Conservation Objectives supporting documents for European Sites.
- Review of online web-mappers: National Parks and Wildlife Service (NPWS), Environmental Protection Agency (EPA).
- Desk study of relevant ecological information.
- Review of the information contained within Section 5.3 (*Baseline Conditions and Receptor Evaluation*) of the Biodiversity: Flora and Fauna Chapter of the EIAR.

4.2 Overall Conclusions

In view of best scientific knowledge, on the basis of objective information and in light of the conservation objectives of the relevant European sites, it is concluded that the Proposed Development, whether individually or in combination with other plans or projects, beyond reasonable scientific doubt will not have significant effects on the following European Sites. They have therefore been screened out.

- Lough Fingall Complex SAC (000606)
- Lough Corrib SAC (000297)
- Rahasane Turlough SAC (000322)
- Castletaylor Complex SAC (000242)
- Kiltiernan Turlough SAC (001285)
- Ardrahan Grassland SAC (002244)
- East Burren Complex SAC (001926)
- Lough Corrib SPA (004042)

It cannot be excluded beyond reasonable scientific doubt, in view of best scientific knowledge on the basis of objective information and in light of the conservation objectives of the relevant European site, that the Proposed Development, individually or in combination with other plans and projects, could have a significant effect on the following European Sites:

- Galway Bay Complex SAC (000268)
- Inner Galway Bay SPA (004031)
- Cregganna Marsh SPA (004142)
- Rahasane Turlough SPA (004089)

As a result, an Appropriate Assessment of the Proposed Development is required, and a Natura Impact Statement shall be prepared in respect of the proposed development

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Appendix 2

Consultation



Your Ref: **ABP-303294-18**
Our Ref: **G Pre00012/2019**
(Please quote in all related correspondence)

29 January 2019

An Bord Pleanála
Strategic Housing Development Unit
64 Marlborough Street
Dublin 1
D01 V902

Re: Request for Pre-SHD application Consultation for planning permission The proposed development will consist of the following:

- 1) Construction of 212 no. residential units comprising:**
- 2) Development of a crèche facility (373 sqm) and associated outdoor play areas and car parking.**
- 3) Provision of new vehicular and pedestrian site access from the North-South Oranmore Distributor Road (the route of which was permitted under An Bord Pleanála Reference PL 07.237219, which was extended under PI Ref 15/1334).**
- 4) Provision of shared communal and private open space, site landscaping, car parking, site services and all associated site development works.**

A chara

On behalf of the Department of Culture, Heritage and the Gaeltacht, I refer to correspondence received in connection with the above.

Outlined below are heritage-related observations/recommendations of the Department under the stated heading(s).

Nature Conservation

The Department refers to the Board's correspondence of 08/01/19 inviting observations in relation to a pre-application consultation¹ for a proposed Strategic Housing Development (SHD) at Moneyduff and Oranhill, Oranmore, Co. Galway. Reference is also made to the documentation, including the EIAR and NIS (by McCarthy Keville O'Sullivan), which have been supplied.

This submission is made by the Department in its role as a prescribed body under planning legislation and as the authority with overarching responsibility for nature conservation and

¹ Under Section 5 of the Planning and Development (Housing) and Residential Tenancies Act 2016



the nature directives (i.e. the Birds and Habitats Directives). The observations are not exhaustive and are intended to assist the Board in its consideration of the current proposal at pre-application stage. They cover matters relating to nature conservation, European sites, biodiversity and environmental protection, proper planning and sustainable development, and the scope of the Environmental Impact Assessment Report (EIAR) and the Natura Impact Statement (NIS).

In addition to the observations below, the Board is advised to consider the Department's submission in relation to the original SHD at the site (PL07.301952).

As before, the current proposal entails 212 residential units, a crèche and all associated site development works, and has a similar layout within the same proposed development site.

The proposed SHD site is located on the south-eastern margins of Oranmore in an area that has been subject to progressive development and residential and urban expansion in recent decades (see dates from which European sites were protected below).

Likely significant effects on European sites

The current proposal and other surrounding developments (recently constructed and permitted, but not yet constructed) are located between three European sites, Galway Bay Complex SAC (site code 000268), Cregganna Marsh SPA (site code 004142) and Inner Galway Bay SPA (site code 004031).

Galway Bay Complex SAC has been protected since 1997, and has site specific conservation objectives (version 1.0, dated 16/04/13²). Cregganna Marsh SPA has been protected since 2002, and has generic conservation objectives (dated 21/02/18³). Inner Galway Bay SPA has been protected since 1994, and has site specific conservation objectives⁴ (version 1, 01/05/13). Habitat and species mapping datasets are available in connection with and form part of the site specific conservation objectives. These datasets can be downloaded from www.npws.ie.

The SHD site adjoins part of Galway Bay Complex SAC, a wetland area comprising alkaline fen which grades into other qualifying interest coastal and salt marsh habitats to the west. Further east and north-east, three separate or disjoint parts of the SAC comprise fen areas. The primary concerns are in relation to potential effects of the development, on its own and in combination with other developments (existing and permitted) in this general area, on hydrological regime, peat formation, water quality and vegetation composition, as per the attributes and targets of the conservation objectives for this site. Flood risks, including from coastal flooding and predicted sea level rise, and the need for (future) flood protection measures, may also be a concern in this area and should also be addressed.

² https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000268.pdf

³ https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004142.pdf

⁴ https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004031.pdf



The potential in combination effects of disturbance, displacement and habitat fragmentation are also a concern in the case of Otter.

Cregganna Marsh SPA and Inner Galway Bay SPA are located to the south and west of the SHD site, respectively. The former comprises wetlands designated for and utilised by Greenland White-fronted Goose, a wintering Annex I bird species that is highly susceptible to disturbance from human activity. The geese that occur in Cregganna Marsh also utilise Rahasane Turlough SPA (site code 004089); the importance of the former for the geese increases when water levels in the turlough are high, meaning there are interrelationships between these two sites. Inner Galway Bay SPA comprises the bay and fringing coastal wetlands, and has been selected for a variety of Annex I and other migratory waterbirds, and wetlands.

A second key concern arising from the development, on its own and in combination with other plans and developments (existing and permitted) in the general Oranmore area, is the potential for disturbance and displacement of birds and encroachment of the SPAs, including wetlands and their margins. This could arise from increased population, increased recreation and amenity pressure, and the need for infrastructure and services such as roads, cycleways, coastal protection measures and lighting along the coastline and in other open lands in the area.

The assessment in the NIS should be undertaken with respect to the conservation objectives for each of the sites, habitats and species at risk as determined by objective information and analysis, rather than the blanket application of a '15km buffer'. Where relevant, the attributes and targets, and any notes and supporting documents should be taken into account and it should be noted whether the specific conservation objective is 'to maintain' or 'to restore' the favourable conservation condition of the habitat or species in the site concerned. The assessment should be specific to the development in question, and to any potential cumulative or in combination effects which may already exist or could arise. Pressures of increasing amenity and recreational activity, including dog-walking, due to increasing development and population pressure in the area, and progressive losses and fragmentation of open spaces, will require particular attention, noting the potential for increased disturbance in two nearby SPAs in particular.

The scope of the NIS should be such that it contains the necessary scientific evidence, data and analyses to assess the implications of the proposal, on its own and in combination with other plans and projects (existing and permitted) in this general area, for the conservation objectives and integrity of the sites concerned. It is again noted that the NIS presented with this consultation comprises mainly narrative and is lacking scientific examination of evidence and data necessary to conform to the definition of 'NIS'.

Likely significant effects on the environment – biodiversity

The Biodiversity chapter of the EIAR should describe the baseline environment in terms of the habitats and species of flora and fauna present, and/or likely to be affected by the



proposed development, taking any relevant cumulative effects into account. It should be noted that likely significant effects on European sites are also a matter for the EIA.

Surveys should reflect the current baseline but should also take account of changes that have taken place, whether with or without development consents, and with or without environmental or ecological assessments being carried out. For example, when surveyed for NPWS in 2006, the SHD site supported a mosaic of species-rich calcareous heath (including Juniper), calcareous grassland and rocky outcrops, as well as some disturbed ground. Scrub clearance and ground excavations occurred in the past, and there is evidence of past areas of limestone pavement on the site. More recently, substantial excavations (which may have constituted development) were undertaken in connection with archaeological testing. Lower areas fringing the SAC have deeper soils and there are indications of poor drainage and waterlogging.

Where Annex I habitats are present or potentially present, these should be mapped and described, including in terms of vegetation communities present. Among other things, the significance of losses of the Annex I habitat resource (outside a European site) should be evaluated in the context of the national conservation status for that habitat, see, for example, the Habitats Directive Article 17 reports for 2007 and 2013 which are available from <http://www.npws.ie/article-17-reports-0>. Note also that further conservation status assessment reports will become available in 2019. Cumulative effects, including the combined losses of limestone pavement and other rocky calcareous habitats in the wider Oranmore area over recent decades, should also be taken into account.

The EIAR should address any potential effects on rare/protected species. Any necessary surveys should be carried out at the appropriate time(s) of year to determine presence of rare/protected, and the need for and details of any mitigation measures to avoid or reduce any adverse effects on species and their key habitats (i.e. breeding sites and resting places). In particular, there should be surveys of rare/protected plant species (Flora (Protection) Order, 2015), noting the type of habitats present, and species of fauna, including bats, badgers and other mammals (and noting the extent of scrub cover on the site), and birds, including nesting birds.

Proper planning and sustainable development

The extent to which the development and associated biodiversity losses that would occur at the SHD site are consistent with protective objectives and policies of Galway County Development Plan (CDP) and Oranmore Local area Plan (LAP) should be examined in the EIAR:

CDP: Objective NHB 1 – Protected Habitats and Species

CDP: Objective NHB 2 – Biodiversity and Ecological Networks

CDP: Objective NHB 11(b) – Trees, Parkland/Woodland, Stonewalls and Hedgerows

CDP: Policy NHB 1 – Natural Heritage and Biodiversity

CDP: Policy NHB 2 – Non-Designated Sites

LAP: Objective NH 2 – Protected Habitats and Species



You are requested to send further communications to this Department's Development Applications Unit (DAU) at manager.dau@chg.gov.ie (team monitored); if this is not possible, correspondence may alternatively be sent to:

The Manager
Development Applications Unit (DAU)
Department of Culture, Heritage and the Gaeltacht
Newtown Road
Wexford
Y35 AP90

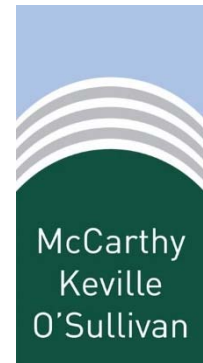
Is mise, le meas

Diarmuid Buttimer
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MEETING MINUTES

Project/Reference:	Strategic Housing Development (SHD), Moneyduff, Oranmore (ABP-303294-18)
Time & Date:	27 th February 2019. 11:30 am
Meeting Type:	Stage 3 pre-submission consultation
Location:	NPWS office, Custom House, Galway
Minutes By:	David McNicholas
Issue Date:	27/02/2019
Filename:	181044

Attendance Details

	Individual	Company	Abbreviation
Attendees	David McNicholas	MKO	DMN
	Pat Roberts	MKO	PR
	Padraig Rhatigan	JJ Rhatigan	PRh
	Paul Fitzmaurice	JJ Rhatigan	PF
	Julie Fossitt	NPWS	JF
Apologies			

Circulation: All attendees

Item	Description
1.0	<p>Introductions</p> <p>PRh – Introduced himself and PF and explained the nature of their involvement in the project. He explained that they were interested in attending the meeting in order to gain a better understanding of the items raised in the DAU submission and how they will be addressed in the application.</p> <p>PR introduced himself and explained that the purpose of the meeting was to discuss the items raised in the submission from the Development Applications Unit of the Department of Culture, Heritage and the Gaeltacht dated the 29th January 2019 and to provide details on how they are to be addressed.</p> <p>JF queried aspects of EIA scoping via ABP, including whether ABP had observations on scope of EIA and was aware of the meeting with NPWS, in this SHD pre-application case. JF also queried whether minutes would be produced and supplied to ABP. It was confirmed that agreed minutes would be supplied to ABP.</p> <p>JF noted that the proposal was similar to or the same as the previous application, and asked if any other (third party) submissions had been made in relation to that case, noting that details of submissions are not normally known or publicly available in ABP/SHD cases.</p>

	<p>It was confirmed by PF that the only other submissions in relation to the project were from local residents and did not specifically relate to issues surrounding natural heritage. They were predominantly restricted to issues over traffic, roads and pedestrian crossings.</p> <p>JF noted that although the meeting was to focus on the DAU submission dated 29/01/2019, items raised in previous submissions in relation to the previous application (ABP – 301952 – 18) continue to stand and need to be addressed.</p>
2.0	<p>Consideration of potential disturbance to the Qualifying Interest (QI) or Special Conservation Interests (SCI) species of nearby Special Areas of Conservation (SACs)/Special Protection Areas (SPAs):</p> <p>PR explained that issues relating to disturbance and habitat loss and degradation had been addressed in the application and through further survey works including the following:</p> <ul style="list-style-type: none"> • Monthly bird surveys have been undertaken of the site and nearest parts of the Inner Galway Bay SPA as well as Creganna Marsh SPA throughout the winter of 2018/2019 and are ongoing. These surveys follow an adapted I-WeBS survey methodology. • The site of the proposed development and its immediate surroundings including the adjacent fen do not provide suitable habitat for Qualifying Interest (QI) or Special Conservation Interests (SCI) species for which the nearby Galway Bay Complex SAC, Creganna Marsh SPA or Inner Galway Bay SPA have been designated. • No SCI bird species have been recorded within the site during dedicated bird surveys that have been undertaken between October 2018 and February 2019. No evidence of the site of the proposed development being on any commuting route was recorded. • There is a physical and visual barrier between the proposed development site and Creganna Marsh in the form of existing housing estates. • Dedicated otter surveys have been undertaken both on the site and in the surrounding area with no suitable habitat present on the site and no signs of otter activity recorded in the wider area. • The proposal will not result in any physical loss of habitat for QI/SCI species. • The applicant is developing within lands that have been zoned for development within the Oranmore Local Area Plan 2012 and the County Development Plan, which have been subject to the Appropriate Assessment process (CAAS, 2015)¹. <p>Following these surveys, it is further demonstrated that the site of the proposed development and surrounding lands do not provide significant habitat for QI/SCI species of the nearby SACs/SPAs and that the proposed development will not result in any adverse effects in relation to disturbance of these species. The data obtained from these surveys</p>

¹ CAAS, 2015, Natura Impact Report In Support of the AA of the Galway County Development Plan 2015-2021, Online, Available at: <http://www.galway.ie/en/services/planning/developmentplansandpolicy/galwaycountydevelopmentplan2015-2021/environmentalsupportingdocuments/>, Accessed: 01/03/2019

	<p>will be presented in the Natura Impact Statement (NIS) and Environmental Impact Assessment Report (EIAR) presented with the Stage 3 SHD application.</p> <p>In addition, PR explained that a review of all developments in the area surrounding the proposed development since 1994 (when the Inner Galway Bay SPA was designated) has been undertaken and will inform the final cumulative assessment in the EIAR Biodiversity Chapter and NIS. PR confirmed that none of the developments reviewed had encroached onto any designated site. He also confirmed that although, the site of the proposed development was surrounded by existing, proposed and recently constructed developments, no evidence that there was a commuting route for any species through the site was recorded during any of the surveys undertaken. Neither was there any continuity of habitats through the site (i.e. the fen that is within the SAC does not continue through the site of the proposed development and it does not provide a significant link to sensitive habitats in the wider area).</p> <p>JF noted the above in relation to direct and indirect effects on birds in the application area but advised that the NIS needed to focus on matters of relevance, and the European sites and conservation objectives that were realistically at risk from construction and operation of the development, including any ex-situ and cumulative effects or pressures that might result, e.g. increased disturbance and amenity and recreational pressures, pressures on water and wastewater services, road infrastructure and other facilities etc. resulting from increased housing, population and development in the wider Oranmore area. JF said the definition of NIS should be checked as the NIS is required to include scientific examination of evidence and data necessary to identify and classify and implications for conservation objectives of sites, and noted that these are broader than QIs or SCIs alone. JF said the key concerns in relation to potential effects on European sites were outlined in the Department's latest submission and advised that these needed to be addressed in the NIS. She referenced the standards of the AA process that would have to be reached on the basis of the NIS submitted. JF mentioned Scottish Natural Heritage (SNH) guidelines in relation to addressing recreational pressures on SACs/SPAs.</p> <p>PR said that the proposed development did not provide any direct or indirect access to any SAC or SPA and that the development was located on zoned land and fully in accordance with the provisions of the Oranmore Local Area Plan 2012, Galway County Development Plan 2015-2021 and its Core Strategy. These plans were the subject of Appropriate Assessment in their own right (CAAS, 2015 - *note consultants prepare reports, AA competent authorities carry out AA).</p> <p>PR stated that he was not aware of the Scottish Natural Heritage Guidance that was referenced by JF but will use it in the completion of an assessment of the ex-situ impacts on SACs/SPAs as a result of recreational activity.</p> <p>PF added that the proposal is required to have 15% of the developable areas as amenity and recreational areas and that the proposal has been designed to have this, including an additional 14.3% of open space. This provides adequate provision for recreation and amenity within the site, without impacting on the surrounding SAC/SPA.</p>
3.0	<p>Consideration of potential Hydrological and Hydrogeological effects on nearby SACs/SPAs</p> <p>JF said that the NIS should contain all scientific information relating to how the effects were analysed and assessed, including cumulative effects on groundwater dependent receptors in the SAC. She explained that if key potential effects were hydrological/hydrogeological effects on fen habitats (including an assessment of their structure and function as well as the relevant conservation objectives), this should form part of the NIS.</p>

	<p>Will the development, alone or in combination with other constructed and permitted developments, affect or impede groundwater flow to/from the fen habitat in the SAC to the east, or affect fen hydrology? The attributes and targets of the site-specific conservation objectives, and the requirements of the habitat, should be checked and will guide the detail of the assessment required. These matters will guide the content of the NIS.</p> <p>PR stated that all relevant information/data from the hydrological assessment of the site on the Sustainable Drainage Design (SuDS) and the Flood Risk Assessment was considered in the assessment of the hydrological/hydrogeological impacts on the designated sites. All this information is available in the EIA/Biodiversity and Hydrology/Hydrogeology chapters and associated appendices. This information confirms that the proposed development will have no effect on downstream SAC/SPA and was cross referenced in the NIS. However, in light of the DAU submission, the NIS will be updated to include this information to provide the scientific reasoning within the document itself. The NIS will address all other issues raised in the DAU submission.</p> <p>PR agreed to update the Hydrogeological assessment to address this issue</p>
4.0	<p>Biodiversity:</p> <p>PR explained that whilst the site may have contained high quality Annex I habitats in the past, it was assessed on the basis of the habitats that currently exist on the site and that the current owner was not responsible for any previous works undertaken on the site.</p> <p>JF noted that Annex I habitats do occur on the site, as established by the various surveys, including those of MCKOS. JF noted that excavations were undertaken (in connection with archaeological investigations) on the site and may have been development which required planning permission, noting the range of restrictions on exemptions that could have applied. Various types of ground excavations and testing are classes of exempted development.</p> <p>PF – An archaeological Licence was granted from the Department following consultation. JF outlined that the granting of such a licence does not negate any planning requirements that might arise. The client not aware of any requirement for planning permission for such exploration works and was not advised by any party that such permission was required.</p> <p>PR explained that site has been the subject of detailed habitat surveys and mapping. Isolated areas of Annex I calcareous grassland were recorded on the site and have been mapped. The site is currently subject to low intensity grazing and is in the process of being engulfed by scrub and rank grassland. The area of Annex I habitat within the site is decreasing as a result of scrub encroachment and this trend is likely to continue.</p> <p>PR confirmed that the proposed development has provided for the retention and ongoing management of almost 0.71 hectare Annex I calcareous grassland within the site and forming a strip along the boundary with the SAC to the west and north. A Habitat Management Plan has been included within the application? and has defined roles and responsibilities for the implementation of the plan and monitoring of the results. The plan also provides for the enhancement of general biodiversity on the site with the retention and enhancement of hedgerows and treelines.</p> <p>PR confirmed that mammal surveys of the site have been undertaken and details are provided within the EIA/Biodiversity including all dedicated badger and otter surveys. Bat surveys were not required as the site does not support any suitable roosting features and is not considered to provide a significant area of suitable foraging habitat. In addition, no obvious potential for the site to be a significant commuting route was identified.</p>

	<p>JF questioned the lack of data on bats and the lack of surveys to establish usage of the site by bats, noting that PR confirmed that bats used and overflew the site. JF raised the issue of the site being a potential ecological corridor, and noted the extent of cumulative habitat loss and fragmentation in the area. JF said that bat surveys were required to establish the baseline ecological environment.</p> <p>Post meeting it has been decided to undertake nighttime bat detector surveys of the site in advance of submission.</p> <p>JF stated that there is a need to address and assess the cumulative effects that could result or which may already exist.</p> <p>PR confirmed that the proposed development has been designed to comply with the various plans and policies referenced in the DAU submission. JF advised reviewing the proposal in the context of consistency or compliance with the protective nature conservation objectives and policies in these plans, noting that these are matters for consideration in relation to proper planning and sustainable development of an area.</p> <p>JF suggested reviewing the recent EU Commission Guidelines on EIAR, in particular the checklists of the project description to ensure all items have been addressed.</p>
5.0	<p>Closing</p> <p>PR asked if there were any other issues that JF wanted to discuss.</p> <p>JF said no.</p>

END

Appendix 3

EIAR Chapter 3: Development Description

3 DESCRIPTION OF THE PROPOSED DEVELOPMENT

3.1 Introduction

This section of the Environmental Impact Assessment Report (EIAR) describes the proposed development and its component parts. The proposed development will consist of the following:

- 1) Construction of 212 no. residential units comprising:
 - 34 no. House Type A (four-bed semi-detached unit)
 - 54 no. House Type B (three-bed semi-detached unit)
 - 16 no. House Type C (four-bed detached)
 - 16 no. House Type D (three-bed terraced unit)
 - 24 no. House Type E (four-bed semi-detached unit)
 - 50 no. House Type G (25 no. two-bed ground floor duplexes and 25 no. two-bed plus study first/second floor duplexes)
 - 6 no. House Type H (two-bed duplex apartments)
 - 12 no. house Type J (two-bed terrace)
- 2) Development of a crèche facility (374 sqm) and associated outdoor play areas and car parking.
- 3) Provision of new vehicular and pedestrian site access from the North-South Oranmore Distributor Road (the route of which was permitted under An Bord Pleanála Reference PL 07.237219, which was extended under Pl Ref 15/1334).
- 4) Provision of shared communal and private open space, site landscaping, car parking, site services and all associated site development works.

3.2 Existing Site Description

3.2.1 Site Layout

The site measures approximately 8.7 hectares and is located to the south east of the town core of Oranmore (approximately 590 metres). The site consists of a green field of previous agricultural use, with evidence of previous site clearance and levelling apparent.

The development site is adjoined by lands also in the ownership of the applicant which are part of the Galway Bay Complex Proposed Natural Heritage Area and Special Area of Conservation (000268). To the north of the development site are existing housing developments, Beech Park and Coill Clocha. There are historic castle tower remains (GA 095-084) within the development site which are to be protected via an exclusion zone and will be incorporated within the public open space. Views to the castle mound from the north west are also to be maintained. There are no existing buildings or structures on the development site other than these castle remains. An aerial photograph of the existing site is shown on Figure 2.2 in Chapter 2 of this EIAR.

3.2.2 Site Access

To the west of the application site is the Roykeel Ltd. scheme comprising a proposed hotel and 161 no. dwelling housing development. The scheme was granted planning permission on 1st December 2010 under An Bord Pleanála Ref PL 07.237219 / Galway County Council (GCC) Pl Ref P09/1925. The application was extended by GCC Pl Ref 15/1334 and will expire on 20th December 2020.

Access to the proposed development is to be facilitated via the road infrastructure proposed as part of the adjoining committed development, as already permitted. The proposed road infrastructure of the adjacent development will comprise the construction of a new North-South Link Road, from the existing road network infrastructure of the Coill Clocha Housing in the North, to the Orancourt / Oranhill Housing Estate in the South. In addition, a link road from the N67 Rocklands Roundabout Junction to the East is proposed across the adjacent Roykeel Ltd. site, to the proposed application site, linking with the proposed North-South Link Road as detailed in Figure 3.1.

A network of footpaths throughout the proposed development will provide a high rate of accessibility to the local facilities with the town of Oranmore. The inclusion of these attractive, well designed walking routes will encourage pedestrians to access the local facilities on foot as opposed to taking their personal vehicles.

A legal agreement is in place between the applicant, Arlum Ltd, and the adjoining owner, Roykeel Ltd, for the construction of the access road from the existing roundabout on the N67, the North-South Link Road and the proposed roundabout where the two proposed roads meet. The applicant is the registered owner of the property described in Folio 121724F which has the benefit of a right of way, wayleave and other easements, which allows access and egress to and from the N67 public road. Subject to the provisions of the legal agreement, the applicant Arlum Ltd has an entitlement to construct the roads and services necessary for development of the proposed development.

Galway County Council (Michael Timmons, Director of Planning and Valerie Loughnane, Senior Planner) confirmed in a meeting with the applicant on 25th January 2018 that there is no planning issue which would prevent the adjoining owner, Roykeel Ltd (or Arlum Ltd acting on their behalf) completing the access road under Phase 1 of the existing Pl Ref 15/1334 planning permission. See Appendix 2-2 of this EIAR for a note of the meeting.

Arlum Ltd (acting on behalf of Roykeel Ltd) have commenced conditions compliance with Galway County Council in relation to all roads related conditions included in the grant of permission associated with ABP Ref PL 07.237219 / GCC Pl Ref P09/1925) which was extended by GCC Pl Ref 15/1334. Under Pl Ref 15/1334, the proposed road network infrastructure was conditioned to include the upgrading of the proposals for the inclusion of dedicated Pedestrian and Cycle Facilities. This detail has been incorporated into the designs, with the details agreed with Galway County Council.



Figure 3.1: Proposed Development in context of Road Network Infrastructure Permitted under GCC PR 09/1925; ABP Ref 07.237219 & 15/1334. Image extracted from Figure 2.2 of Traffic and Transportation Statement

3.2.2.1 Access arrangements for pedestrians

The Contractor will segregate all pedestrian and vehicular traffic on site, including at access points/ entrances. It is proposed that the pedestrian access will be via a new footpath on the new access road off the existing roundabout on the N67, with secured access controlled to the site via a biometric turnstile. The on-site segregated pedestrian access way will include signage to direct pedestrians to the site compound and around the site. Pedestrians and cyclists will also have access through the existing road which links the Coill Clocha Estate with Oranmore. There may be different access points for each of the phases, and the above segregation methods should be applied to all routes. Access routes to be finalised upon agreement of the phasing scheme.

The Contractor will regularly review the Construction and Environmental Management Plan (CMP) to ensure that the pedestrian and vehicular access points are located and maintained appropriately. The most suitable access routes should be picked for each phase to ensure the safety and convenience of its users, and other local residence.

3.2.3 Site Constraints

The castle remains and the surrounding protected exclusion zone provide a focus point to the development, but also, in conjunction with the site geometry around the Special Area of Conservation and Open Space / Recreation & Amenity zoned lands, constrains the developable area of the proposed site with a number of 'pinch points' limiting the site width.

3.3 Proposed Development Construction Operations

The detailed drawings for the proposed development can be seen as Appendix 3-1 to this EIAR. A Construction and Environmental Management Plan (CEMP) can be seen as Appendix 3-2.

3.3.1 Hoarding

The site areas (phases 1 – 4) will be enclosed with a hoarding, details of which are to be agreed with Galway Co. Co. Hoarding panels will be maintained and kept clean for the duration of the project. The Contractor will be responsible for the security of the site. The Contractor will be required to undertake the following:

- Operate a Site Induction Process for all site staff,
- Ensure all site staff will have current 'Safe Pass' cards,
- Install adequate site hoarding to the site boundary,
- Maintain Site Security staff at all times,
- Install access security in the form of turn-styles and gates for staff,
- Separate public pedestrian access from construction vehicular access,
- Ensure restricted access is maintained to the works.

3.3.2 Pedestrian and Cyclist Safety

Until such time as the construction of the first phase is complete, the new access road will not be open to members of the public. However, the general public will have right of way along the roads on the existing N67. When vehicles are entering the site, or leaving the site, these movements should be supervised by road marshals. The construction site gates will be kept closed when not in use and monitored by security. Traffic cones and set-back signage should be put in place to warn and safely direct cyclists around obstructions.

Pedestrians and cyclists will have access through the existing road which links the Coill Clocha Estate with Oranmore.

A network of footpaths throughout the proposed development will provide a high rate of accessibility to the local facilities with the town of Oranmore (See Figure 3.2). The inclusion of these attractive, well designed walking routes will encourage pedestrians to access the local facilities on foot as opposed to taking their personal vehicles. The main pedestrian and cyclist access route to the proposed development from nearby Oranmore village centre will be via the Coill Clocha residential development to the north. Pedestrians shall utilise the existing pedestrian arrangements within the Coill Clocha housing development which will connect to the newly constructed pedestrian pathway along the link road and throughout the proposed development. This will result in a continuous pedestrian route from all locations within the proposed development to Oranmore town centre. A secondary pedestrian and cyclist route is also provided to the south of the link road permitted under PR 15/1334. This allows users to access Oranmore village and the Maree road via the existing Oranhill housing estate.

Pedestrian routes from the proposed development to the Oranmore town centre will be 1.00km in length and will take the average pedestrian 10 min to walk. Amenities in and around the town centre include local primary and secondary schools, shops, restaurant.

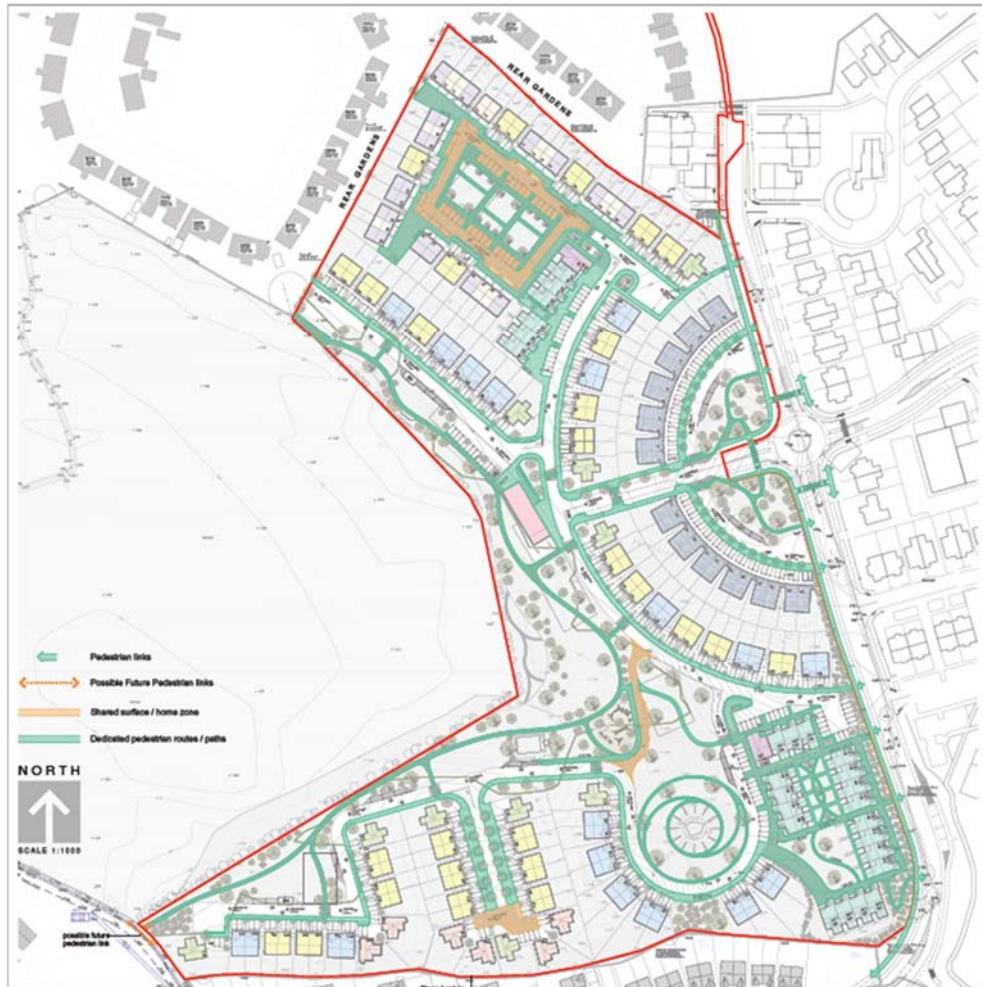


Figure 3.2: Pedestrian Site Access details

3.3.3 Proposed Hours in which Vehicles will Arrive and Depart

In general, the hours in which vehicles will arrive and depart will coincide with the expected site working hours of 8.00am to 7.00pm in the evening from Monday to Friday, and 8:00am to 2:00pm on Saturday. The construction phase of the proposed development is expected to last approximately 3.5 years in total.

3.3.4 Access Arrangements for Vehicles

The access arrangements will be as specified in the statutory publications with reference to the publications “Traffic Management Guidelines” manual and the “Traffic Signs Manual” and as agreed with Galway County Council.

All deliveries and vehicles into site will access the site from the new access road which will be located on the eastern side of the site boundary, just off the N67. As mentioned previously, there may be numerous access routes depending on the phasing but generally as shown on Figure 3.3.

The location of the vehicular entrance and access will be regularly reviewed during the construction to ensure that the pedestrian and vehicular access points are located and maintained appropriately.

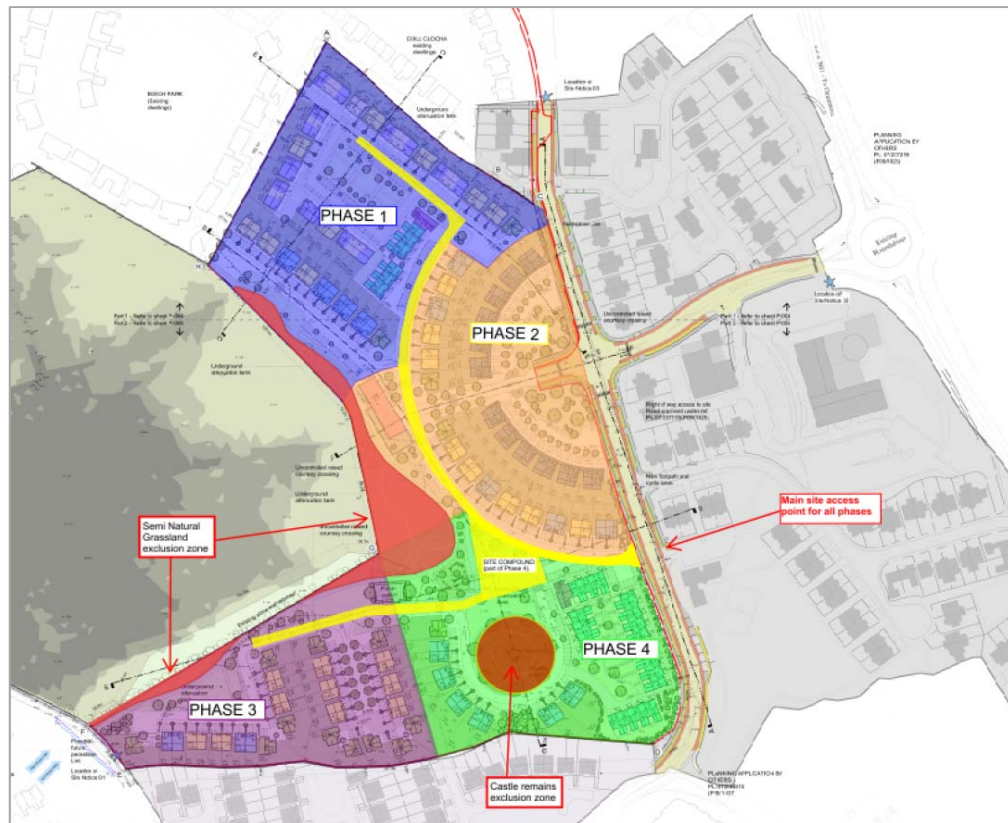


Figure 3.3: Vehicular Site Access details during the construction phase

Access details for pedestrians and cyclists are discussed in Section 3.3.2 above.

3.3.5 Exclusion Zones on Site

There are historic castle tower remains within the development site which are to be protected via a 20m exclusion zone (Figure 3.4). The 20m exclusion zone will be fenced off from the site, and the contractor will not have any storage, plant, or traffic going inside this exclusion zone during the construction period. Suitable fencing will be erected to ensure the remains are protected and preserved during the construction period, and regular checks and inspections will be carried out on this by the contractor and project archaeologist.

The area of land set aside for management as seminatural grassland will form an exclusion zone during the construction phase of the proposal (Figure 3.4). The area will be fenced off during the construction phase of the site and only landscaping works, required for the management of the grassland, be undertaken within this area. There will be no temporary storage of construction materials within this area and no storage of fuels or other potential contaminants. The exclusion of machinery and materials from this area will also avoid compaction of the soils, maintaining a free draining calcareous substrate for seminatural grassland landscaping.

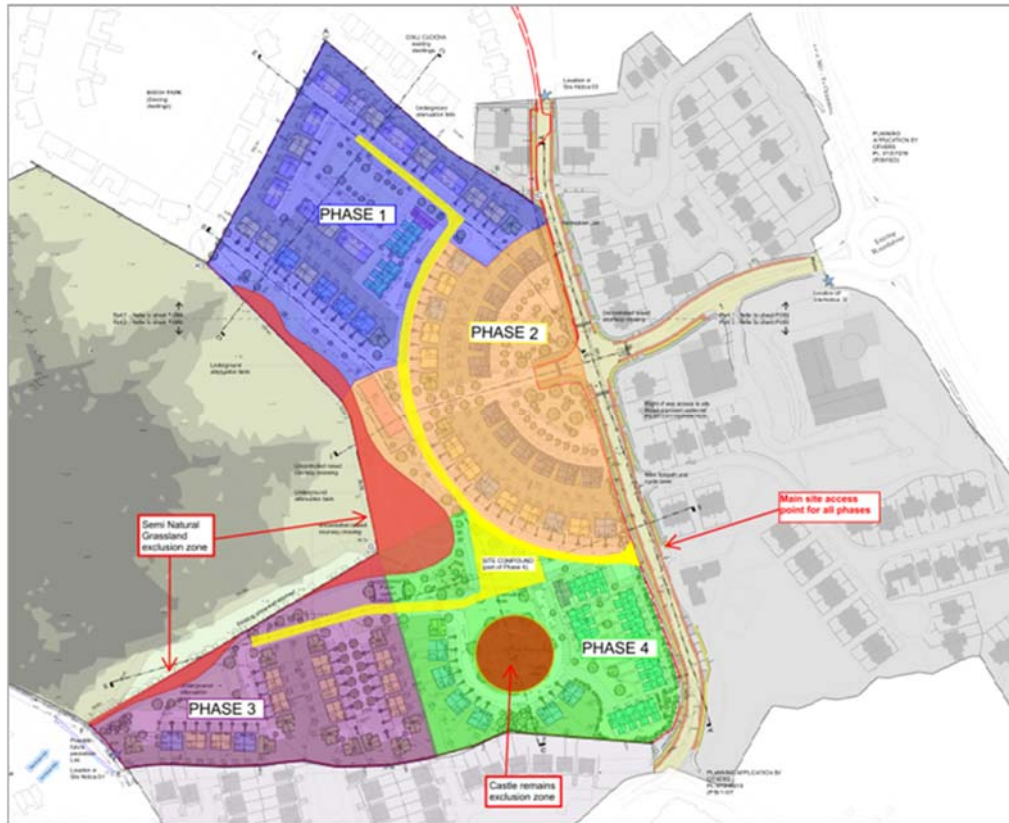


Figure 3.4: Location of exclusion areas marked in red

3.3.6 Size of Vehicles

It is anticipated that there will be numerous types of delivery vehicles used to bring material to and from the site. These include:

- Skip lorries. These will include roll on/roll off skips for major demolition works and standard yard skips for waste.
- Spoil excavation.
- Ready mix concrete lorries.
- Flatbed delivery vehicles for the delivery of various material.

3.3.7 Parking and Loading Arrangements

A “Just in Time” approach will be implemented for the delivery of particular building materials such as concrete formwork and large structural steels. The location of this materials storage facility will be within the site boundary and highlighted within the Construction Management Plan.

Materials will be stored within the boundary of the site. It is proposed to provide on-site car parking spaces for workers during the construction.

3.3.8 Site Compound and Facilities

Site accommodation will be provided including suitable washing and dry room facilities for construction staff, canteen, sanitary facilities, first aid room, office accommodation etc. Access to the compound will be security controlled and all site visitors will be required to sign in on arrival and sign out on departure. The compound will be constructed using a clean permeable stone finish and will be enclosed with security

fencing. Any wastewater will be removed by vacuum tanker using an authorized waste collector.

3.3.9 Phasing

It is anticipated that the development will be completed over 4 separate phases (See Figure 3.4), and the access and egress routes will change for the various phases. As some of the houses will be occupied during the later phases, Traffic Management procedures will be implemented to ensure the safety of the users of the access routes, for both the residential access and the construction access. The construction phase of the proposed development is expected to last approximately 3.5 years in total.

3.3.10 Property Management – Operational Stage

A property management company will be engaged at an early stage of the development to ensure that all property management functions are dealt with for the development and that the running and maintenance costs of the common areas of the development are kept within the agreed annual operational budget.

The property management company will enter into a contract directly with the owners management company for the ongoing management of the built development. This contract will be for a minimum of three years and in the form prescribed by the PSRA.

The property management company will also have the following responsibilities for the apartments within the development once constructed:

- Formation of an owners management company. The company will be a company limited by guarantee having no share capital. All future purchasers will be obliged to become members of the owners management company.
- Preparation of annual service charge budget for the development common areas.
- Fair and equitable apportionment of the annual operational charges in line with the MUD act.
- Engagement of independent legal representation on behalf of the owners management company in keeping with the MUD act, including completion of the developer - owner management company agreement and transfer of common areas.
- Transfer of documentation in line with schedule 3 of the MUD act.
- Estate management.
- Third party contractors procurement and management.
- Owners management company reporting.
- Accounting services.
- Corporate services.
- Insurance management.
- After hours services.
- Staff administration.

The property management company has a number of key responsibilities including compiling the service charge budget for the development for agreement with the owners management company. The service charge budget covers such items as cleaning, landscaping, refuse management, utility bills, insurance, maintenance, and security in accordance with the Multi User Development Act 2011.

The service charge budget also includes an allowance for a sinking fund and this allowance is determined following the review of the building investment fund report prepared by / for the owners management company. The building investment fund

report, once adopted by the owners management company, determines an adequate estimated annual cost provision requirement based on the needs of the development over a 30 year cycle period. The building investment fund report will identify those works which are necessary to maintain, repair and enhance the premises over the 30 year life cycle period, as required by the Multi User Development Act 2011.

In line with the requirements of the Multi User Development Act 2011 the members of the owners management company will determine and agree each year at an AGM of the members the contribution to be made to the sinking fund, having regard to the building investment fund report produced.

On purchase a homeowner pack will be provided for the occupants which will include:

- A Homeowner manual which will provide important information for the purchaser on details of their new property / dwelling. It typically includes details of the property such as the MPRN and GPRN, information in relation to connections with utilities and communication providers, contact details for all relevant suppliers, and user instructions for appliances, devices and system in the dwelling.
- A Residents' pack prepared by the owners management company which will typically provide information on contact details for the managing agent, emergency contact information, information on transport links in the area, and a clear set of regulations and rules associated with the development.

3.3.11 Energy Use

The following are an example of the energy saving measures that are planned for the dwellings to assist in reducing costs for the occupants:

- A BER certificate will be provided for each dwelling in the proposed development which will provide detail of the energy performance of the dwellings. It is proposed to target an A2/A3 rating for the apartments, equating to the following emissions:
 - A2 - 25 to 50 kWh / m² /year with CO₂ emissions c. 10kg CO₂ / m² / year.
 - A3 - 51 to 75 kWh / m² /year with CO₂ emissions c. 10kg CO₂ / m² / year.
- The U-values of the building fabric will be in line with the requirements set out in the regulatory requirements of TGD Part L.
- Thermal bridging at junctions between construction elements and at other locations will be minimised in accordance with TGD Part L.
- The white good package planned for provision in the apartments will be of a very high standard and have a high energy efficiency rating:
 - Oven - A+
 - Fridge / freezer - A+
 - Dishwasher - AAA
 - Washer / dryer – B
- The proposed lighting scheme within the development consists of pole mounted fittings. Each light fitting will be controlled with an individual photoelectric control unit. The operation of the lighting will be on a dawn to dusk profile.

3.4 Site Landscaping

Before completion of the construction phase of each phase of the proposed development, landscaping works will be carried out to improve the visual amenity of

the site. These landscaping works will follow the layout of the landscape plan provided in Drawing 18223-3-100 (Landscape Master Plan) of Appendix 3-3.

There are no landscape designations on the subject site. The site will not impact on any designated views or prospects within the Galway County Development Plan 2015-2022.

3.5 Habitat Management Plan

A habitat management plan has been produced for the site of the proposed development. Full details of the plan are provided in Appendix 3-4. This plan will be implemented through both the construction and operational phases of the development and will form an integral part of the development.

The implementation of a grassland management regime will ensure the long-term viability of the semi-natural calcareous grassland habitat within the landownership boundary. Supplementary planting within existing hedgerows along the west and south of the site and the replacement of the eastern hedge community will ensure that connectivity of linear landscape features will be retained and enhanced. Bird and bat boxes will be provided for additional nesting/roosting habitat on the site. Information signage will be used to help provide a better understanding of the floral diversity in the area and management practices required to maintain the habitat in its optimal quality.

There is a commitment to the implementation of the measures that are set out in the Habitat Management Plan including both the establishment and maintenance of the grasslands. A commitment is also made to monitor the development of the grasslands on an ongoing basis following construction. These measures are an integral part of the planning permission and as such, confer protection on the habitat where currently none exists. The habitat is currently deteriorating in both area and quality due to lack of management. The plan also commits to the planting, management and monitoring of all hedgerow planting and the erection of bird and bat boxes.

3.6 Construction Methodologies

This section describes the construction methodologies that will be used for the proposed housing development. Further details are also provided in the Construction and Environmental Management Plan (CEMP) included as Appendix 3-2 of this EIAR.

3.6.1 Soil Stripping & Temporary Stockpiling

Soil stripping and temporary stockpiling of soils and subsoils will be required around the site as the proposed development progresses. Where these works occur, the following will apply:

- The area where excavations are planned will be surveyed and all existing services will be identified.
- All relevant bodies i.e. ESB, Bord Gáis, Eircom, Galway County Council etc. will be contacted and all drawings for all existing services sought.
- All plant operators and general operatives will be inducted and informed as to the location of any services.
- All plant operators and general operatives will be inducted and informed as to the identification of invasive species.
- A tracked 360-degree excavator will be used to strip the topsoil, and a dumper will be used to move the excavated materials to the temporary stockpile location.

- All excavated material which is not required for future landscaping works or for backfill of excavations will be removed to an authorised waste recovery facility. This will also apply to material which is not suitable for reuse on site.
- All stockpiles will be damped down or covered in a sheet of polythene, as required, which will prevent the creation of nuisance dust, and will also prevent sediment runoff in times of heavy precipitation.
- A silt filtration system will be used as appropriate to prevent contamination of any watercourse.

3.6.2 Temporary Site Compound

One temporary construction compound is proposed for the construction phase of the proposed development, located inside the development site entrance. The proposed temporary compound area incorporates temporary site offices, staff facilities and car-parking areas.

A dedicated waste management area will be located within the compound, with waste to be sorted and collected from site by permitted collectors. Potable drinking water will be supplied via water coolers located within the staff facilities, which will be restocked on a regular basis as required during the construction phase. A supply contract will be set up with a water cooler supply company with water supplies delivered to site as required for the duration of the construction period.

Temporary port-a-loo toilets located within portacabins will be used during the construction phase. Wastewater from staff toilets will be directed to a sealed storage tank, with all wastewater being tankered off site by permitted waste collector to wastewater treatment plants. Power will be supplied by a diesel generator, located within the compound. The construction compound will be used for temporary storage of some construction materials, prior to their delivery to the required area of the site.

3.6.3 Site Roads

The construction methodology for the proposed access road is outlined as follows:

- Excavation will take place until a competent stratum is reached.
- The competent stratum will be overlain with up to 500mm of granular fill.
- A layer of geogrid/geotextile may be required at the surface of the competent stratum.
- A final hard surface layer will be placed over the excavated road to provide a road profile to accommodate construction traffic.
- Prior to completion of the construction works on site, the finished road surface will be applied.

3.6.4 Excavation and Services Installation

Services will be required to each property in the proposed development. Where these are located, the following will apply:

- The area where excavations are planned will be surveyed and all existing services will be identified.
- All relevant bodies i.e. ESB, Bord Gáis, Eircom, Galway County Council etc. will be contacted and all drawings for all existing services sought.
- A traffic management plan will be produced if required for connection works to the existing service network.
- A road opening licence will be obtained where required for connection to existing services.

- All plant operators and general operatives will be inducted and informed as to the location of any services.
- A tracked 360-degree excavator or similar will be used to excavate the trench to the required dimensions.
- All excavated material will be removed to an authorised waste recovery facility or, if suitable, stock piled and reused for backfilling and landscaping where appropriate.
- Once the trench has been excavated the ducting/pipework will then be placed in the trench as per specification.
- Once the service ducts/pipework has been installed couplers will be fitted as required and capped to prevent any dirt etc. entering the ducts/pipes.
- The as built location of the ducting/pipework will be surveyed using a total station/GPS.
- Backfill material will be carefully placed so as not to displace the ducting/pipework within the trench.
- The appropriate warning/marker tape will be installed above the ducts/pipes at the appropriate depths.
- The surface will be reinstated as per original specification or to the requirements of the site layout/Local Authority as appropriate.

3.6.4.1 Existing Underground Services

Any underground services encountered during the works will be surveyed for level and where possible will be left in place. If there is a requirement to move the service, then the appropriate body (ESB, Gas Networks Ireland, etc.) will be contacted, and the appropriate procedure put in place. Back fill around any utility services will be with dead sand/pea shingle where appropriate. All works will be in compliance with required specifications.

3.6.5 House/Building Construction

The buildings will be constructed by the following methodology:

- The area where excavations are planned will be surveyed and all existing services will be identified.
- All relevant bodies i.e. ESB, Bord Gáis, Eircom, Galway County Council etc. will be contacted and all drawings for all existing services sought.
- The area of each building will be marked out using ranging rods or wooden posts and the soil and overburden stripped and removed to nearby storage area for later use in landscaping. Any excess material will be sent to an authorised recovery facility.
- All plant operators and general operatives will be inducted and informed as to the location of any services.
- A tracked 360-degree excavator or similar will be used to excavate the area down to the level indicated by the designer and appropriately shuttered reinforced concrete will be laid over it;
- The block work walls will be built up from the foundation (including a DPC) and the floor slab constructed, having first located any ducts or trenches required by the follow on mechanical and electrical contractors;
- The block work will then be raised to wall plate level and the gables & internal partition walls formed. Scaffold will be erected around the outside of the buildings for this operation;
- Any concrete slabs will be lifted into position using an adequately sized mobile crane;

- The timber roof trusses will then be lifted into position using a telescopic load all or mobile crane depending on site conditions. The roof trusses will then be felted, battened, tiled and sealed against the weather.
- Windows, electrics, plumbing and all other building components and services will be installed in as timely a manner as is possible.
- Each building will be inspected and certified by an engineer at the appropriate stages of construction.

3.6.6 Construction Site Management Incorporated into Project Design

The following measures pertaining to water quality and invasive species have been incorporated into the design phase of the project to avoid effects on sensitive ecological receptors.

3.6.6.1 Prevention Pollution Control Measures

The Construction Industry Research and Information Association (CIRIA) provide guidance on the control and management of water pollution from construction sites ('Control of Water Pollution from Construction Sites, guidance for consultants and contractors', CIRIA, 2001), which provides guidance. This will ensure that surface water arising during the course of construction activities will contain minimum sediment. The following methods and best practice measures will ensure that sediment release and potential for pollution during the construction phase is minimised and reduced to insignificant:

Drainage

The proposed development site does not contain any mapped watercourses and no watercourses were identified within the site during site visits. The Millpot Stream, located to the west of the proposed site, flows west away from the development to Oranmore Bay in excess of 295m downstream. However, the following measures will be put in place to prevent the transportation of silt laden water or pollutants from entering the wider environments including downstream watercourses.

- There will be no release of suspended solids to any watercourse as a direct or indirect result of the proposed works. There is no surface watercourse on the site of the proposed development.
- No watercourse will be interfered with as part of the proposed works. No temporary instream crossings or temporary culverting will take place. Instream works will not take place.
- Any requirement for temporary fills or stockpiles will be damped down or covered with polyethylene sheeting as required to avoid sediment release associated with heavy rainfall.
- Prior to the commencement of earthwork silt fencing will be placed down-gradient of the construction areas where drains or drainage pathways are present. These will be embedded into the local soils to ensure all site water is captured and filtered;
- As construction advances there may be a small requirement to collect and treat surface water within the site. This will be completed using perimeter swales at low points around the construction areas, and if required water will be pumped from the swales into sediment bags prior to overland discharge allowing water to percolate naturally to ground or disperse by diffuse flow into local drainage ditches;
- Discharge onto ground will be via a silt bag which will filter any remaining sediment from the pumped water. The entire discharge area from silt bags will be enclosed by a perimeter of double silt fencing

Hydrocarbons

The use of hydrocarbons during the construction process can result in the potential for pollution and accidental spillage to enter natural watercourses downstream of the site via surface runoff and groundwater. The following measures have been built into the construction design phase of the project.

- On site re-fuelling of machinery will be carried out using a mobile double skinned fuel bowser. The fuel bowser, a double-axel custom-built refuelling trailer will be re-filled off site and will be towed around the site by a 4x4 jeep to where machinery is located. The 4x4 jeep will also carry fuel absorbent material and pads in the event of any accidental spillages. The fuel bowser will be parked on a level area in the construction compound when not in use and only designated trained and competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations;
- Fuels stored on site will be minimised. Any storage areas will be bunded appropriately for the fuel storage volume for the time period of the construction;
- The plant used should be regularly inspected for leaks and fitness for purpose; and,
- Spill kits will be available to deal with accidental spillages.

The following guidelines and documents will inform the detailed planning of the works phase: -

- Good practice guidelines on the control of water pollution from construction sites developed by the Construction Industry Research and Information Association (CIRIA) in particular;
- C532 Control of water pollution from construction sites: guidance for consultants and contractors (Masters-Williams et al, 2001); and
- SP156 Control of water pollution from construction sites - guide to good practice (Murnane et al, 2002).
- Requirements for the protection of fisheries habitat during construction and development works at river sites developed by the ERFB. <http://www.fisheriesireland.ie/Research/recent-publications.html>.

3.6.7 Landscaping works

Prior to completion of works on the development site, the landscaping works will be carried out. The proposed landscaping plan is shown as Drawing 18223-3-100 (Landscape Master Plan) in Appendix 3-3. The finishes include areas of amenity grassland, footpaths and tree planting. This work will be carried out before the completion of each phase in order to ensure that the development will be aesthetically pleasing place for residents to live. These works will involve the use of plant and machinery in order to carry out tasks such as earth moving. Materials which have been stockpiled for the task will be used as much as possible, and material will only be imported where it is required. Solid barriers will be erected around the site boundary for the duration of the construction works.

3.6.8 Invasive Species

The introduction and/or spread of invasive species such as Japanese Knotweed and Himalayan Knotweed for example, could result in the establishment of the species and this may have knock on effects on the surrounding environs.

Appropriate control measures will be incorporated into the design and construction phase of the development to ensure that the relevant measures (outlined in the following section below) will be implemented.

3.6.8.1 Control Measures for the Management of Invasive Species

Invasive species, such as Japanese Knotweed, Himalayan Knotweed, Himalayan Balsam, *Gunnera*, and Giant Hogweed pose a serious threat to biodiversity and the health of native vegetation types. Construction machinery can act as a vector for the spread of these plants. Machinery that has worked at an infected site is likely to cause the spread of such species by transferring their tiny seeds or plant fragments, in soil trapped in their tyre tread for instance. Equally, they can cause the spread of species within a site. The duration of the impact could be short-term or permanent depending on whether or not an eradication effort is made but once established, eradication is time-consuming and expensive. Himalayan Knotweed, for example, propagates vegetatively, forming a new plant from even very small plant fragments. Thus, there is a high risk of causing the spread of this species to other parts of the site. The UK Environment Agency's '*Japanese Knotweed Code of Practice*' provides guidance on managing Japanese Knotweed and Himalayan Knotweed on development sites. A number of control measures have been drawn up and included in the design and construction phase of the proposed works to avoid the introduction and spread of invasive plant species. The following project design elements have been devised to avoid such effects. The following measures address potential effects associated with the construction phase of the development:

- All earthworks machinery will be thoroughly pressure-washed prior to arrival on site and prior to their further use elsewhere.
- Care will be taken not to disturb or cause the movement of invasive species fragments, either intentionally or accidentally.
- There are not believed to be any existing stands of invasive species on site, but should any be found, they will be clearly demarcated by temporary fencing and tracking within them will be strictly avoided. A minimum buffer of seven metres will be applied to avoid disturbance of lateral rhizomes.
- If any excavations must be carried out in areas of Japanese Knotweed, the excavated material will not be moved from the location. The machinery must be thoroughly pressure-washed in a designated area at least 25 metres from any watercourse before moving on to an area that is not yet infected.
- All contractors and staff will be briefed about the presence, identification and significance of Japanese Knotweed before commencement of works.
- Good construction site hygiene will be employed to prevent the spread of these species with vehicles thoroughly washed prior to leaving any site with the potential to have supported invasive species. All plant and equipment employed on the construction site (e.g. excavator, footwear, etc.) will be thoroughly cleaned down using a power washer unit prior to arrival on site to prevent the spread of invasive plant species such as Japanese Knotweed and Rhododendron. All washing must be undertaken in areas with no potential to result in the spread of invasive species.
- When working at locations in proximity to natural watercourses, a suitable barrier will be erected between the watercourse and the stand of invasive species. This will assist in preventing the spread of any invasive species into the watercourse during their removal. There are no watercourses on the proposed development site, but cognizance will be had of any watercourses on neighbouring sites.

- Any material that is imported onto any site will be verified by a suitably qualified ecologist to be free from any invasive species listed on the 'Third Schedule' of Regulations 49 & 50 of Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011). This will be carried out by searching for rhizomes and plant material.
- Any soils or subsoils contaminated with invasive species will sent for disposal to an authorized waste facility.

The treatment and control of invasive alien species will follow guidelines issued by the National Roads Authority – *The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads* (NRA 2010) and the Environment Agency (2013) – *The Knotweed Code of Practice: Managing Japanese Knotweed on Development Sites* (Version 3, amended in 2013).

3.7 Other Site Details

3.7.1 Waste Management

The treatment of waste is to be employed by the contractor or a specialist waste management contractor as a trade package. This contractor is responsible for:

- Ensuring the site is kept clean and safe
- The collection of waste from a central point
- Segregation of waste on site.

The waste management contractor should ensure that all access routes, fire escapes and staircases are swept and kept clear of debris on a regular basis to maintain high standards of health and safety on the project. No fires will be permitted on site.

The Contractor will prepare a Construction Waste Management Plan in accordance with the "Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects" (Department of Environment, Heritage and Local Government, 2006) and ensure that all material is disposed of at an appropriately licensed land fill site. The Contractor will also outline detailed proposals within the Construction Management Plan to accommodate construction traffic.

In order to ensure appropriate segregation of waste on site, a material storage zone will be provided in the compound area. This storage zone will include material recycling areas and facilities. A series of 'way finding' signage will be provided to route staff and deliveries into the site and to designated compound or construction areas, as appropriate.

3.7.2 Dust

Dust prevention measures will be included for control of any site airborne particulate pollution. The Contractor will put in place and monitor dust levels in the vicinity using a Bergerhoff gauge instrument. The minimum criteria to be maintained will be the limit for Environmental Protection Agency (EPA) specification for licensed facilities in Ireland, which is 350mg/m²/day. The Contractor will continuously monitor dust over the variation of weather and material disposal to ensure the limits are not breached throughout the project. Dust suppression systems should be implemented if required based on the continuously monitored dust levels.

Dust control should be achieved by:

- Dampening down the dust at the source
- Sheeting will be used as required for stockpiled materials
- Use of barriers such as debris netting on scaffolding around the building to block dust escaping where the building is within 10m of the site boundary where residential properties exist.
- Site road ways will be maintained in a stoned hard core condition not allowing soil to accumulate which when dry can create dust.
- Wheel wash equipment will be set up at the site exit gate for all construction vehicles to pass through prior to leaving the site thus ensuring that no dirt etc. is transported outside the site onto the roadways.
- Plant and equipment that have the potential to create volumes of dust will have appropriate attachments to allow water source to dampen dust to not allow it to get airborne.
- Plant and equipment that have the potential to create volumes of dust will be located away from sensitive receptors where possible.
- Deploy Road Sweeper as required on External Roads.
- Deployment of dust monitors across the site if required

3.7.3 Noise

The Contractor will be required to monitor base noise levels at the site location before commencement of the project. Noise monitoring will be required throughout all phases of the project. Variation of noise levels from those experienced as part of everyday life in an area can result in extreme disruption. The Contractor will implement measures to eliminate where possible and reduce noise levels where not. Noise levels will be kept below those levels specified in the National Roads Authority – “Guidelines for the Treatment of Noise and Vibration in National Roads Schemes” or such further limits as imposed by Galway County Council. The proposed development will comply with BS 5228 “Noise Control on Construction and open sites Part 1: Code of practice for basic information and procedures for noise control.”

Construction equipment for use outdoors will comply with the European Communities Regulations– Noise Emission by Equipment for Use Outdoors – SI 241 - 2006.

Noise emissions arising from construction phase operations at the proposed development site will not exceed the identified 65 dB $L_{Aeq\ 1\ h}$ criterion at receptors, with a single exception: use of tracked excavators over approximately 15 t in size in immediate proximity to the boundaries adjoining Beech Park and Coill Clocha is likely to give rise to levels which marginally exceed the criterion. This will be avoided through use of excavators which do not exceed 15 t approximately, depending on plant power output and condition.

No other specific mitigation measures are warranted. Several general measures are proposed as follows:

- Construction operations will in general be confined to the period Monday-Friday 0800-1900 h, and Saturday 08:00-14:00 h.
- Plant used onsite during the construction phase will be maintained in a satisfactory condition and in accordance with manufacturer recommendations. In particular, exhaust silencers will be fitted and operating correctly at all times. Defective silencers will be immediately replaced.
- Where it is proposed to operate plant during the period 0700-0800 h, standard ‘beeper’ reversing alarms will be replaced with flat spectrum alarms.
- Erection of solid barriers (hoarding) to site boundary

3.7.4 Road Cleaning and Wheel Washing

The Contractor will make provision for the cleaning by road sweeper etc. of all access routes to and from the site during the course of the works as required. It is intended that cleaning will be undertaken on a daily basis during the excavation works and as required thereafter. A wheel wash facility will be provided on site to clean site traffic leaving the site. Waste water generated at this washing facility will be suitably treated on site and all settled silts disposed offsite to licensed landfill. All road sweeping vehicles will be emptied off site at a suitably licensed facility as per our construction stage environmental waste management document.

3.7.5 Water Supply

Water will be supplied on site by water tankers for general use. Potable water will be provided in the form of bottled water for staff use.

3.7.6 Wastewater Management

Portable toilets will be provided for the working on the construction site. Wastewater arising on-site from these toilets is stored in a sealed tank located within the portable toilets, and these will be emptied periodically (as required) by permitted waste contractors and transported to municipal wastewater treatment plants for treatment.

Any sewage or greywater generated during the operational phase of the proposed development will be directed to the local municipal wastewater treatment plants for treatment via the sewage collection network.

3.7.7 Aggregates

The aggregates required for the construction of the proposed development will be sourced, as much as is possible and practicable, from quarries and suppliers located as near as possible to the proposed development. This will reduce the potential for any negative impacts associated with the haulage of the materials to the site of the proposed development. Existing soils and subsoils located on the site will be used where possible to reduce the amount of such materials required for import onto the site.

3.7.8 Construction Traffic/Plant

The following mitigation measures will be implemented in relation to construction traffic and plant/machinery:

- All vehicles to switch off engines when not in use – no idling vehicles
- Effective vehicle cleaning and wheel washing on leaving site and damping down of haul routes
- No site runoff of water or mud.
- On-road vehicles to comply to set emission standards.
- All non-road mobile machinery (NRMM) to be fitted with appropriate exhaust system and be regularly serviced.
- Hard surfacing and effective cleaning of haul routes and appropriate speed limit around site

3.8 Operational Phase

The proposed development will require periodic maintenance throughout the operational phase. The operation of a residential development is not a recognized source of environmental emissions or nuisance and so there will be no adverse effects associated with its operation.

It is proposed that the development will drain via gravity to 5 no. soakaways proposed on site. Water draining to soakaways will pass through silt traps and hydrocarbon interceptors prior to reaching each soakaway. No surface water from roofs or paved surfaces will be discharge from the site, other than via the soakaways to ground. The proposed on-site foul sewers will discharge by gravity to a pumping station to the west of the site, and the foul waste will discharge from this pumping station via pumped rising main to the adjacent public (Irish Water) foul sewer network.

3.9 Decommissioning Phase

It is not intended that the proposed buildings will be removed, as permanent planning permission is being sought for this development. The proposed development will form an integral part of the local housing needs. Therefore, it is intended that the proposed development will be retained as permanent, and will not be decommissioned.

Appendix 4

Construction Environmental Management Plan (CEMP)

Construction & Environmental Management Plan

**Residential Development,
Moneyduff,
Oranmore,
Co. Galway**

March 2019

Construction & Environmental Management Plan
Residential Development, Moneyduff, Oranmore, Co. Galway

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1.0 Scope

2.0 Introduction

3.0 Site Access and Vehicles

4.0 Construction Methodologies

5.0 Environmental Issues

6.0 Mitigating Impacts on adjoining Properties: Control & Monitoring of Noise Dust and Vibration

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	AA			28/03/2019	1

It is anticipated that the development will be completed over 4 phases. The development also includes a one storey creche facility, associated car parking, surface water attenuation, landscaping and all associated site development works.

We have prepared this report to describe the proposed construction measures anticipated for the development, the impact to the site/surrounds and the proposed mitigation measures to be put in place to safeguard the development works. This report will be read in conjunction with the additional reports submitted by the design team in support of the application.

2.0 Introduction

The Proposed Moneyduff residential Development site, which is approximately 8.7 hectares, is located just outside Oranmore (approximately 500m from the town). The works will be completed over 4 phases, which will run for an overall length of approximately 42 months. Phase 1 will have 71 units, Phase 2 will have 52 units (+creche), Phase 3 will have 35 units, and Phase 4 will have 54 units.

2.1 Site Location

To the west of the development site is the site of a proposed hotel and 161 dwelling housing development which is not yet constructed. To the south of the development site is the site of another proposed 61 dwelling housing development, and to the north of the development site are existing housing developments, Beech Park and Coill Clocha. An agreement is in place between the applicant, Arlum Ltd, and the adjoining owner, for the construction of the access road from the existing roundabout (to the East of the site), the north-south road and the proposed roundabout where the two proposed roads meet. There are historic castle tower remains (GA 095-084) within the development site which are to be protected via an exclusion zone and will be incorporated within the public open space.



Figure 2: Oranmore town aerial image (Site shown in red).

3.0 Site Access and Vehicles

3.1 Hoarding

The site areas (phases 1 – 4) will be enclosed with a hoarding, details of which are to be agreed with Galway Co. Co. Hoarding panels will be maintained and kept clean for the duration of the project. The Contractor will be responsible for the security of the site. The Contractor will be required to undertake the following:

- Operate a Site Induction Process for all site staff,
- Ensure all site staff shall have current ‘Safe Pass’ cards,
- Install adequate site hoarding to the site boundary,
- Maintain Site Security staff at all times,
- Install access security in the form of turn-styles and gates for staff,
- Separate public pedestrian access from construction vehicular access,
- Ensure restricted access is maintained to the works.

3.2 Access Arrangements for Pedestrians

The Contractor will segregate all pedestrian and vehicular traffic on site, including at access points/ entrances. It is proposed that the pedestrian access will be via the new access road on the South-East of the site, with secured access controlled to the site via a biometric turnstile. The on-site segregated pedestrian access way will include signage to direct pedestrians to the site compound and around the site.

3.3 Pedestrian and Cyclist Safety

Until such time as the construction of the first phase is complete, the new main access road (which runs parallel to the N67) will not be open to members of the public. However, the general public will have right of way along the roads and pathways on the existing N67. When vehicles are entering the site, or leaving the site, these movements will be supervised by road marshals. The construction site gates will be kept closed when not in use and monitored by security. Traffic cones and set-back signage will be put in place to warn and safely direct cyclists around obstructions.

3.4 Proposed Hours in which Vehicles Will Arrive and Depart

In general, the hours in which vehicles will arrive and depart will coincide with the expected site working hours of 8.00am to 7.00pm Monday to Friday, and 8.00am to 2.00pm on Saturdays.

3.5 Access Arrangements for Vehicles

The Contractor will submit a Traffic Management Plan (TMP) to Galway County Council Traffic Division prior to commencement of the works. The TMP defines the physical and legal limitations within which a person or persons can carry out development works that affect the existing nature of public roads, footpaths and the surrounding environment for a duration of time. The TMP is to be formulated in the style as specified in the statutory publications with reference to the publications “Traffic Management Guidelines” manual and the “Traffic Signs Manual”. The TMP will address the access routes which will be applicable to each of the phases.



Figure 4: Indicative Access Route

All deliveries and vehicles into site will access the site from the new access road which will be located on the eastern side of the site boundary, just off the N67 as per Figure 4 above.

The location of the vehicular entrance and access will be regularly reviewed during the construction to ensure that the pedestrian and vehicular access points are located and maintained appropriately.

3.6 Exclusion Zones on site

There are historic castle tower remains within the development site which are to be protected via a 20m exclusion zone. The 20m exclusion zone shall be fenced off from the site, and the contractor will not have any storage, plant, or traffic going inside this exclusion zone during the construction period. Suitable fencing will be erected to ensure the remains are protected and preserved during the construction period, and regular checks and inspections will be carried out on this by the contractor.

Similarly, the designated seminatural grassland area will become an exclusion zone. The area to be managed for seminatural grassland, will be fenced off during the construction phase of the site and only landscaping works, required for the management of the grassland, be undertaken within this area. There will be no temporary storage of construction materials within this area and no storage of fuels or other potential contaminants. The exclusion of machinery and materials from this area will also avoid compaction of the soils, maintaining a free draining calcareous substrate for seminatural grassland landscaping.

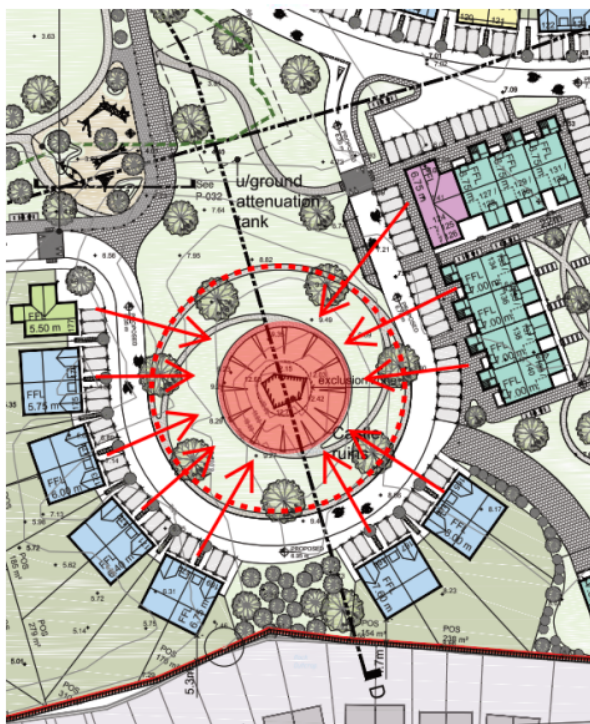


Figure 5: Focus on housing towards

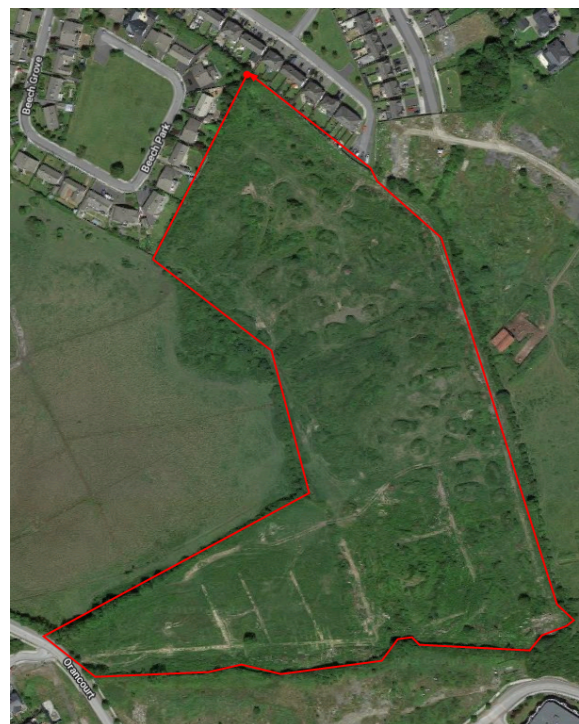


Figure 6 : Aerial photography of the site

3.7 Size of Vehicles

It is anticipated that there will be numerous types of delivery vehicles used to bring material to and from the site. These include:

Skip lorries. These will include roll on/roll off skips and standard yard skips for waste.

Spoil excavation.

Ready mix concrete lorries.

Flatbed delivery vehicles for the delivery of various material.

The appointed Contractor is to outline the projected vehicle movements during the course of the works.

3.8 Parking and Loading Arrangements

The Contractor will implement a delivery procedure to ensure that the surrounding area is not overrun with site and delivery vehicles.

A “Just in Time” approach will be required for the delivery of particular building materials such as concrete formwork and large structural steels.

Vehicles will be pulled into the site for unloading wherever possible.

Materials will be stored within the boundary of the site. However, these will not be stored within the designated area for seminatural grassland. There will be no temporary storage of construction materials within this area and no storage of fuels or other potential contaminants. The exclusion of machinery and materials from this area will also avoid compaction of the soils, maintaining a free draining calcareous substrate for seminatural grassland landscaping.

It is proposed to provide on-site car parking spaces during the construction.

3.9 Site Compound and Facilities

The Contractor shall provide site accommodation including suitable washing and dry room facilities for construction staff, canteen, sanitary facilities, first aid room, office accommodation etc. Access to the compound will be security controlled and all site visitors will be required to sign in on arrival and sign out on departure. The compound shall be constructed using a clean permeable stone finish and will be enclosed with security fencing.

3.10 Phasing

It is anticipated that the development will be completed over 4 separate phases. These access and egress routes will be addressed in more detail in the TMP (Traffic Management Plan), and the TMP will also address the issue of the site access routes running in tandem with the completed phases and its residence. As some of the houses will be occupied during the later phases, Traffic Management procedures will be implemented to ensure the safety of the users of the access routes, for both the residential access and the construction access.

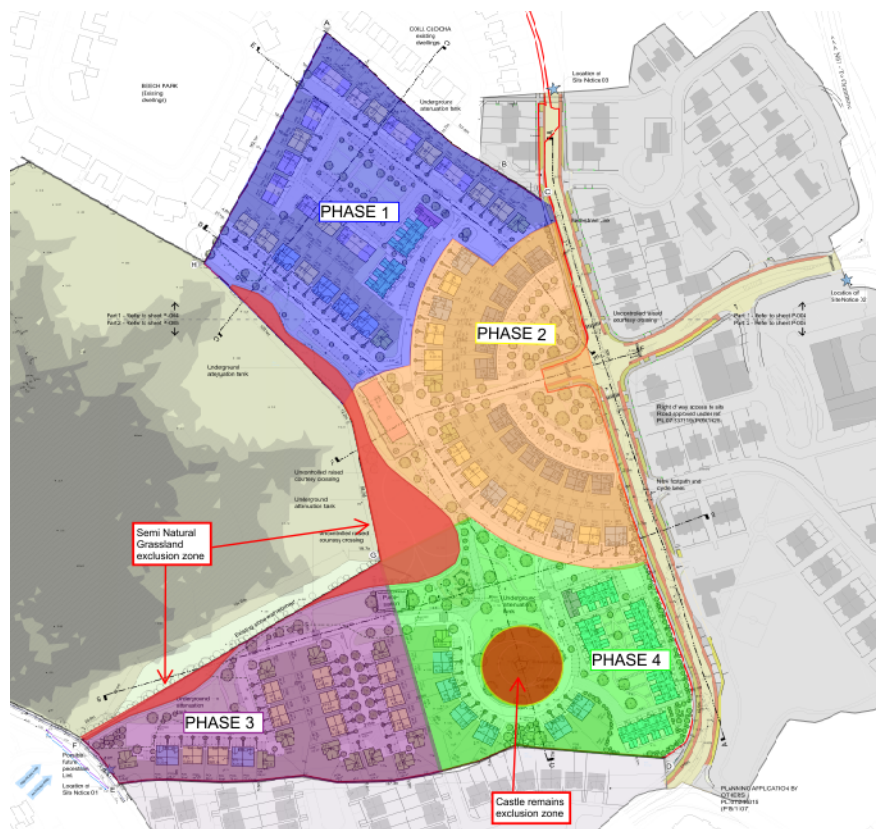


Figure 7: Phasing Plan

4.0 Construction Methodologies

This section describes the construction methodologies that will be used for the proposed housing development.

4.1 Soil Stripping & Temporary Stockpiling

During site preparation works, where topsoil is stripped prior to excavation, this material should be retained on site for use in landscaping within the seminatural grassland management areas. This material will be used for grading of the site, making it easy to manage and will contain a local seed bank for natural revegetation. Soil stripping and temporary stockpiling of soils and subsoils will be required around the site as the proposed development progresses. Where these works occur, the following will apply:

- The area where excavations are planned will be surveyed and all existing services will be identified.
- All relevant bodies i.e. ESB, Bord Gáis, Eircom, Galway County Council etc. will be contacted and all drawings for all existing services sought.
- All plant operators and general operatives will be inducted and informed as to the location of any services.
- All plant operators and general operatives will be inducted and informed as to the identification of invasive species.
- A tracked 360-degree excavator will be used to strip the topsoil, and a dumper will be used to move the excavated materials to the temporary stockpile location.
- All excavated material which is not required for future landscaping works or for backfill of excavations will be removed to an authorised waste recovery facility. This will also apply to material which is not suitable for reuse on site.
- All stockpiles will be damped down or covered in a sheet of polythene, as required, which will prevent the creation of nuisance dust, and will also prevent sediment runoff in times of heavy precipitation.
- A silt filtration system will be used as appropriate to prevent contamination of any watercourse.

4.2 Temporary Site Compound

One temporary construction compound is proposed for the construction phase of the proposed development, located in the Phase 4 area. The proposed temporary compound area incorporates temporary site offices, staff facilities and car-parking areas.

A dedicated waste management area will be located within the compound, with waste to be sorted and collected from site by permitted collectors. Potable drinking water will be supplied via water coolers located within the staff facilities, which will be restocked on a regular basis as required during the construction phase. A supply contract will be set up with a water cooler supply company with water supplies delivered to site as required for the duration of the construction period.

Temporary port-a-loo toilets located within portacabins will be used during the construction phase. Wastewater from staff toilets will be directed to a sealed storage tank, with all wastewater being tankered off site by permitted waste collector to wastewater treatment plants. Power will be supplied by a diesel generator, located within the compound. The construction compound will be used for temporary storage of some construction materials, prior to their delivery to the required area of the site.

4.3 Site Roads

The construction methodology for the proposed access road is outlined as follows:

- Excavation will take place until a competent stratum is reached.
- The competent stratum will be overlain with up to 500mm of granular fill.
- A layer of geogrid/geotextile may be required at the surface of the competent stratum.
- A final surface layer will be placed over the excavated road to provide a road profile to accommodate construction traffic.
- Prior to completion of the construction works on site, the finished road surface will be applied.

4.4 Excavation and Services Installation

Services will be required to each property in the proposed development. Where these are located, the following will apply:

- The area where excavations are planned will be surveyed and all existing services will be identified.
- All relevant bodies i.e. ESB, Bord Gáis, Eircom, Galway County Council etc. will be contacted and all drawings for all existing services sought.
- A traffic management plan will be produced if required for connection works to the existing service network.
- A road opening licence will be obtained where required for connection to existing services.
- All plant operators and general operatives will be inducted and informed as to the location of any services.
- A tracked 360-degree excavator or similar will be used to excavate the trench to the required dimensions.
- All excavated material will be removed to an authorised waste recovery facility or, if suitable, stock piled and reused for backfilling and landscaping where appropriate.
- Once the trench has been excavated the ducting/pipework will then be placed in the trench as per specification.
- Once the service ducts/pipework has been installed couplers will be fitted as required and capped to prevent any dirt etc. entering the ducts/pipes.
- The as built location of the ducting/pipework will be surveyed using a total station/GPS.
- Backfill material will be carefully placed so as not to displace the ducting/pipework within the trench.
- The appropriate warning/marker tape will be installed above the ducts/pipes at the appropriate depths.
- The surface will be reinstated as per original specification or to the requirements of the site layout/Local Authority as appropriate.

4.4.1 Existing Underground Services

Any underground services encountered during the works will be surveyed for level and where possible will be left in place. If there is a requirement to move the service, then the appropriate body (ESB, Gas Networks Ireland, etc.) will be contacted, and the appropriate procedure put in place. Back fill around any utility services will be with dead sand/pea shingle where appropriate. All works will be in compliance with required specifications.

4.5 House/Building Construction

The buildings will be constructed by the following methodology:

- The area where excavations are planned will be surveyed and all existing services will be identified.
- All relevant bodies i.e. ESB, Bord Gáis, Eircom, Galway County Council etc. will be contacted and all drawings for all existing services sought.
- The area of each building will be marked out using ranging rods or wooden posts and the soil and overburden stripped and removed to nearby storage area for later use in landscaping. Any excess material will be sent to an authorised recovery facility.
- All plant operators and general operatives will be inducted and informed as to the location of any services.
- A tracked 360-degree excavator or similar will be used to excavate the area down to the level indicated by the designer and appropriately shuttered reinforced concrete will be laid over it;
- The block work walls will be built up from the foundation (including a DPC) and the floor slab constructed, having first located any ducts or trenches required by the follow on mechanical and electrical contractors;
- The block work will then be raised to wall plate level and the gables & internal partition walls formed. Scaffold will be erected around the outside of the buildings for this operation;
- Any concrete slabs will be lifted into position using an adequately sized mobile crane;
- The timber roof trusses will then be lifted into position using a telescopic load all or mobile crane depending on site conditions. The roof trusses will then be felted, battened, tiled and sealed against the weather.
- Windows, electrics, plumbing and all other building components and services will be installed in as timely a manner as is possible.
- Each building will be inspected and certified by an engineer at the appropriate stages of construction.

4.6 Construction Site Management Incorporated into Project Design

The following measures pertaining to water quality and invasive species have been incorporated into the design phase of the project to avoid effects on sensitive ecological receptors.

4.6.1 Prevention Pollution Control Measures

The Construction Industry Research and Information Association (CIRIA) provide guidance on the control and management of water pollution from construction sites ('Control of Water Pollution from Construction Sites, guidance for consultants and contractors', CIRIA, 2001), which provides guidance. This will ensure that surface water arising during the course of construction activities will contain minimum sediment. The following methods and best practice measures will ensure that sediment release and potential for pollution during the construction phase is minimised and reduced to insignificant:

Drainage

The proposed development site does not contain any mapped watercourses and no watercourses were identified within the site during site visits. The Millpot Stream, located to the west of the proposed site, flows west away from the development to Oranmore Bay in excess of 295m downstream. However, the following measures will be put in place to prevent the transportation of silt laden water or pollutants from entering the wider environments including downstream watercourses.

- There will be no release of suspended solids to any watercourse as a direct or indirect result of the proposed works. There is no surface watercourse on the site of the proposed development.
- No watercourse will be interfered with as part of the proposed works. No temporary instream crossings or temporary culverting will take place. Instream works will not take place.
- Any requirement for temporary fills or stockpiles will be damped down or covered with polyethylene sheeting as required to avoid sediment release associated with heavy rainfall.
- Prior to the commencement of earthwork silt fencing will be placed down-gradient of the construction areas where drains or drainage pathways are present. These will be embedded into the local soils to ensure all site water is captured and filtered;

- As construction advances there may be a small requirement to collect and treat surface water within the site. This will be completed using perimeter swales at low points around the construction areas, and if required water will be pumped from the swales into sediment bags prior to overland discharge allowing water to percolate naturally to ground or disperse by diffuse flow into local drainage ditches;
- Discharge onto ground will be via a silt bag which will filter any remaining sediment from the pumped water. The entire discharge area from silt bags will be enclosed by a perimeter of double silt fencing

Hydrocarbons

The use of hydrocarbons during the construction process can result in the potential for pollution and accidental spillage to enter natural watercourses downstream of the site via surface runoff and groundwater. The following measures have been built into the construction design phase of the project.

- On site re-fuelling of machinery will be carried out using a mobile double skinned fuel bowser. The fuel bowser, a double-axel custom-built refuelling trailer will be re-filled off site and will be towed around the site by a 4x4 jeep to where machinery is located. The 4x4 jeep will also carry fuel absorbent material and pads in the event of any accidental spillages. The fuel bowser will be parked on a level area in the construction compound when not in use and only designated trained and competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations;
- Fuels stored on site will be minimised. Any storage areas will be bunded appropriately for the fuel storage volume for the time period of the construction;
- The plant used should be regularly inspected for leaks and fitness for purpose; and,

The following guidelines and documents will inform the detailed planning of the works phase:

-

- Good practice guidelines on the control of water pollution from construction sites developed by the Construction Industry Research and Information Association (CIRIA) in particular;
- C532 Control of water pollution from construction sites: guidance for consultants and contractors (Masters-Williams et al, 2001); and

- SP156 Control of water pollution from construction sites - guide to good practice (Murnane et al, 2002).
- Requirements for the protection of fisheries habitat during construction and development works at river sites developed by the ERFB.
<http://www.fisheriesireland.ie/Research/recent-publications.html>.

4.7 Landscaping works

Prior to completion of works on the development site, the landscaping works will be carried out. The proposed landscaping plan is shown as Drawing 18223_3_100 REV E (Landscape Master Plan) in Appendix 3-1. The finishes include areas of designated seminatural grassland, amenity grassland, footpaths and tree planting. This work will be carried out before the completion of each phase in order to ensure that the development will be aesthetically pleasing place for residents to live. These works will involve the use of plant and machinery in order to carry out tasks such as earth moving. Materials which have been stockpiled for the task will be used as much as possible, and material will only be imported where it is required. During site preparation works, where topsoil is stripped prior to excavation, this material will be retained on site for use in landscaping within the seminatural grassland management areas. This material will be used for grading of the site, making is easy to manage and will contain a local seed bank for natural revegetation.

4.8 Invasive Species

The introduction and/or spread of invasive species such as Japanese Knotweed and Himalayan Knotweed for example, could result in the establishment of the species and this may have knock on effects on the surrounding environs.

Appropriate control measures will be incorporated into the design and construction phase of the development to ensure that the relevant measures (outlined in the following section below) will be implemented.

4.8.1 Control Measures for the Management of Invasive Species

Invasive species, such as Japanese Knotweed, Himalayan Knotweed, Himalayan Balsam, *Gunnera*, and Giant Hogweed pose a serious threat to biodiversity and the health of native vegetation types. Construction machinery can act as a vector for the spread of these plants. Machinery that has worked at an infected site is likely to cause the spread of such species by transferring their tiny seeds or plant fragments, in soil trapped in their tyre tread for instance. Equally, they can cause the spread of species within a site. The duration of the impact could be short-term or permanent depending on whether or not an eradication effort is made but once established, eradication is time-consuming and expensive. Himalayan Knotweed, for example,

propagates vegetatively, forming a new plant from even very small plant fragments. Thus, there is a high risk of causing the spread of this species to other parts of the site. The UK Environment Agency's *'Japanese Knotweed Code of Practice'* provides guidance on managing Japanese Knotweed and Himalayan Knotweed on development sites. A number of control measures have been drawn up and included in the design and construction phase of the proposed works to avoid the introduction and spread of invasive plant species. The following project design elements have been devised to avoid such effects. The following measures address potential effects associated with the construction phase of the development:

- All earthworks machinery will be thoroughly pressure-washed prior to arrival on site and prior to their further use elsewhere.
- Care will be taken not to disturb or cause the movement of invasive species fragments, either intentionally or accidentally.
- There are not believed to be any existing stands of invasive species on site, but should any be found, they will be clearly demarcated by temporary fencing and tracking within them will be strictly avoided. A minimum buffer of seven metres will be applied to avoid disturbance of lateral rhizomes.
- If any excavations must be carried out in areas of Japanese Knotweed, the excavated material will not be moved from the location. The machinery must be thoroughly pressure-washed in a designated area at least 25 metres from any watercourse before moving on to an area that is not yet infected.
- All contractors and staff will be briefed about the presence, identification and significance of Japanese Knotweed before commencement of works.
- Good construction site hygiene will be employed to prevent the spread of these species with vehicles thoroughly washed prior to leaving any site with the potential to have supported invasive species. All plant and equipment employed on the construction site (e.g. excavator, footwear, etc.) will be thoroughly cleaned down using a power washer unit prior to arrival on site to prevent the spread of invasive plant species such as Japanese Knotweed and Rhododendron. All washing must be undertaken in areas with no potential to result in the spread of invasive species.
- When working at locations in proximity to natural watercourses, a suitable barrier will be erected between the watercourse and the stand of invasive species. This will assist in preventing the spread of any invasive species into the watercourse during their removal. There are no watercourses on the proposed development site, but cognizance will be had of any watercourses on neighbouring sites.

- Any material that is imported onto any site will be verified by a suitably qualified ecologist to be free from any invasive species listed on the 'Third Schedule' of Regulations 49 & 50 of Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011). This will be carried out by searching for rhizomes and plant material.
- Any soils or subsoils contaminated with invasive species will sent for disposal to an authorized waste facility.

The treatment and control of invasive alien species will follow guidelines issued by the National Roads Authority – *The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads* (NRA 2010) and the Environment Agency (2013) – *The Knotweed Code of Practice: Managing Japanese Knotweed on Development Sites* (Version 3, amended in 2013).

5.0 Environmental Issues

5.1 Waste Management

The treatment of waste is to be employed by the contractor or a specialist waste management contractor as a trade package. This contractor is responsible for:

- Ensuring the site is kept clean and safe
- The collection of waste from a central point
- Segregation of waste on site.

The waste management contractor will ensure that all access routes, fire escapes and staircases are swept and kept clear of debris on a regular basis to maintain high standards of health and safety on the project.

The Contractor will prepare a Construction Waste Management Plan in accordance with the “Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects” (Department of Environment, Heritage and Local Government, 2006) and ensure that all material is disposed of at an appropriately licensed land fill site. The Contractor will also outline detailed proposals within the Traffic Management Plan to accommodate construction traffic.

In order to ensure appropriate segregation of waste on site, a material storage zone will be provided in the compound area. This storage zone will include material recycling areas and facilities. A series of ‘way finding’ signage will be provided to route staff and deliveries into the site and to designated compound or construction areas, as appropriate.

5.2 Dust

Dust prevention measures shall be included for control of any site airborne particulate pollution. The Contractor shall put in place and monitor dust levels in the vicinity using a Bergerhoff gauge instrument. The minimum criteria to be maintained shall be the limit for Environmental Protection Agency (EPA) specification for licensed facilities in Ireland, which is 350mg/m²/day. The Contractor shall continuously monitor dust over the variation of weather and material disposal to ensure the limits are not breached throughout the project. Dust suppression systems will be implemented if required based on the continuously monitored dust levels.

5.3 Noise

The Contractor will be required to monitor base noise levels at the site location before commencement of the project. Noise monitoring will be required throughout all phases of the project. Variation of noise levels from those experienced as part of everyday life in an area can result in extreme disruption. The Contractor shall implement measures to eliminate where possible and reduce noise levels where not. Noise levels shall be kept below those levels specified in the National Roads Authority – “Guidelines for the Treatment of Noise and Vibration in National Roads Schemes” or such further limits as imposed by Galway County Council. The proposed development shall comply with BS 5228 “Noise Control on Construction and open sites Part 1: Code of practice for basic information and procedures for noise control.”

Construction equipment for use outdoors shall comply with the European Communities Regulations– Noise Emission by Equipment for Use Outdoors – SI 241 - 2006.

5.4 Vibration

If work activities have the potential to result in vibration, the appointed contractor shall source vibration monitoring equipment immediately from a specialist company who specialise in monitoring equipment.

5.5 Harmful materials

Harmful materials shall be stored on site for use in connection with the construction works only. These materials shall be stored in a controlled manner. Where on site fuelling facilities are used, there shall be a bunded filling area using a double bunded steel tank at a minimum. No materials to be stored in the designated seminatural grassland area or within the castle remains exclusion zone.

5.6 Road Cleaning and Wheel Washing

The Contractor will make provision for the cleaning by road sweeper etc. of all access routes to and from the site during the course of the works as required. It is intended that cleaning shall be undertaken on a daily basis during the excavation works and as required thereafter. A wheel wash facility will be provided on site to clean site traffic leaving the site. Waste water generated at this washing facility will be suitably treated on site and all settled silts disposed offsite to licensed landfill. All road sweeping vehicles will be emptied off site at a suitably licensed facility as per our construction stage environmental waste management document.

6.0 Mitigating Impacts on adjoining Properties: Control & Monitoring of Noise Dust and Vibration

In conjunction with the above mentioned Environmental Factors, the following mitigation measures will be taken to minimise impact on adjoining properties:

6.1 Noise:

To mitigate the impact on adjoining properties, the appointed contractor shall;

- Consider alternative methods of work which will eliminate or reduce exposure.
- Choose appropriate equipment, emitting the least possible noise levels.
- Provide operatives with adequate information, instruction and training on the equipment being used.
- Consider noise reduction by technical means.
- Organise work to reduce by limiting duration and intensity or exposure, and appropriate work schedules with rest periods.
- Plant and machinery selection will ensure that noise controls are fitted and that the machinery is serviced regularly to ensure they are fit for use.

Random monitoring (if required) shall be undertaken at the site boundary, by the use of a Sound Level Meter which has the capabilities to store data and produce records and issued to the appropriate parties upon request.

6.2 Dust:

Dust control will be achieved by:

- Dampening down the dust at the source
- By the use of barriers such as debris netting on scaffolding around the building to block dust escaping where the building is within 10m of the site boundary where residential properties exist.
- Site road ways will be maintained in a stoned hard core condition not allowing soil to accumulate which when dry can create dust.

- Wheel wash equipment will be set up at the site exit gate for all construction vehicles to pass through prior to leaving the site thus ensuring that no dirt etc. is transported outside the site onto the roadways.
- Plant and equipment that have the potential to create volumes of dust will have appropriate attachments to allow water source to dampen dust to not allow it to get airborne.
- Deploy Road Sweeper as required on External Roads.

6.3 Vibration:

If work activities have the potential to result in vibration, the appointed contractor shall source vibration monitoring equipment immediately from a specialist company who specialise in monitoring equipment. All heavy vibration works will be kept outside the exclusion zones for the historic castle and seminatural grassland management area.

6.4 Mitigation Measures

6.4.1 Site Planning

- Erect solid barriers to site boundary.
- No fires
- Plan site layout – machinery and dust causing activities will be located away from sensitive receptors.
- All site personnel to be fully trained
- Hard surface site haul routes
- Put in place dust monitors across site if required

6.4.2 Construction traffic / Plant

- All vehicles to switch off engines when not in use – no idling vehicles
- Effective vehicle cleaning and wheel washing on leaving site and damping down of haul routes
- No site runoff of water or mud.

- On-road vehicles to comply to set emission standards.
- All non-road mobile machinery (NRMM) to be fitted with appropriate exhaust system and be regularly serviced.
- Hard surfacing and effective cleaning of haul routes and appropriate speed limit around site

6.4.3 Site Activities

- Minimise dust generating activities
- Use water as dust suppressant where applicable
- Cover, or fence stockpiles to prevent wind whipping
- Debris netting to be erected to perimeter scaffolding if within 10m of neighbouring residential buildings

Appendix 5

Habitat Management Plan

Habitat Management Plan

Moneyduff Strategic Housing Development
Co. Galway



Planning & Environmental Consultants

DOCUMENT DETAILS

Client: Arlum Ltd.

Project title: Moneyduff Strategic Housing
Development

Project Number: 181044

Document Title: Habitat Management Plan

Doc. File Name: HMP F – 2019.04.02 – 181044

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1 INTRODUCTION

McCarthy Keville O’Sullivan (MKO) was commissioned to prepare a Habitat Management Plan (HMP) for a dedicated Biodiversity Enhancement Area proposed as part of the Moneyduff Strategic Housing Development, located in Oranmore, Co. Galway. This HMP focuses on habitats and species of conservation importance and outlines measures for enhancement, management and monitoring. These measures will be implemented as part of the overall Operational Management Plan for the development.

2 BACKGROUND

This report describes the biodiversity management and enhancement measures to be implemented within the land ownership boundary for the proposed development lands, Moneyduff, Oranmore, Co. Galway. This document has been prepared to take into consideration the Landscape Management Plan, which has also been informed in consultation with the project ecologists. The site location is provided in Figure 1.1.

The proposal is for the construction of a housing estate comprising 212 residential houses, amenity areas a creche and associated parking facilities. The proposed development will consist of the following:

- 1) Construction of 212 no. residential units comprising:
 - 34 no. House Type A (four-bed semi-detached unit)
 - 54 no. House Type B (three-bed semi-detached unit)
 - 10 no. House Type C (four-bed detached)
 - 16 no. House Type D (three-bed terraced unit)
 - 24 no. House Type E (four-bed semi-detached unit with attic conversion)
 - 6 no. House Type F (four-bed detached unit)
 - 50 no. House Type G (25 no. two-bed ground floor duplexes and 25 no. two-bed plus study first/second floor duplexes)
 - 6 no. House Type H (two-bed apartments)
 - 12 no. house Type J (two-bed terrace)
- 2) Development of a crèche facility (206 sqm) and associated outdoor play areas and car parking.
- 3) Provision of new vehicular and pedestrian site access from the North-South Oranmore Distributor Road (the route of which was permitted under An Bord Pleanála Reference PL 07.237219, which was extended under Pl Ref 15/1334).
- 4) Provision of shared communal and private open space, site landscaping, car parking, site services and all associated site development works.

The proposal layout is provided in drawing number 2325-P-003.

The project design includes an assigned construction footprint within which, all development works will be undertaken. Also included within the site boundary is a dedicated Biodiversity Enhancement Area (see Figure 4.1), in which semi-natural dry calcareous and neutral grassland will be managed. No development works will be permitted within this area. Furthermore, this enhancement area will be actively managed to enhance biodiversity. Measures to achieve this is the subject of this HMP.

The habitats on site currently comprise of scrub, dry calcareous and neutral grassland, hedgerows, stone walls and other stonework, spoil and bare ground and wet grassland.

Although this Biodiversity Management Plan (BMP) for the proposal has been designed to secure the management of semi-natural dry calcareous and neutral grassland within the western portion of the land ownership boundary, the plan also provides additional measures for enhancing biodiversity to help maintain connectivity between habitats within the site and the wider landscape. The plan provides for the erection of public information signage to inform the public of the species to be found within the site as well as the ongoing management measures being implemented. The lands within the ownership boundary will also continue to be accessible to the public.

The plan considers the national Biodiversity Action Plan (BAP) 2017-2021 priorities, which although relate to broader strategies, aims to prevent biodiversity degradation and provide enhancement where opportunities exist. There is currently no formal county Biodiversity Action Plan for Co Galway. However, a draft Galway County Biodiversity & Natural Heritage Plan 2017 – 2022 is available and was reviewed as part of this assessment. The HMP provide a framework for ensuring compliance with the following County Development Plan (CDP) and Oranmore Local Area Plan 2012-2022 Policies and Objectives:

County Development Plan

- Policy NHB 1 – Natural Heritage and Biodiversity
- Objective NHB 2 – Biodiversity and Ecological Networks
- Objective NHB 11 – Trees, Parkland/Woodland, Stonewalls and Hedgerows

Oranmore Local Area Plan 2012-2022

- Policy NH 1 – Natural Heritage, Landscape and Environment
- Objective NH 5 – Biodiversity & Ecological Networks
- Objective NH 9 – Trees and Hedgerows
- Objective NH 11 – Summer Botanical Survey for Lands at Moneyduff

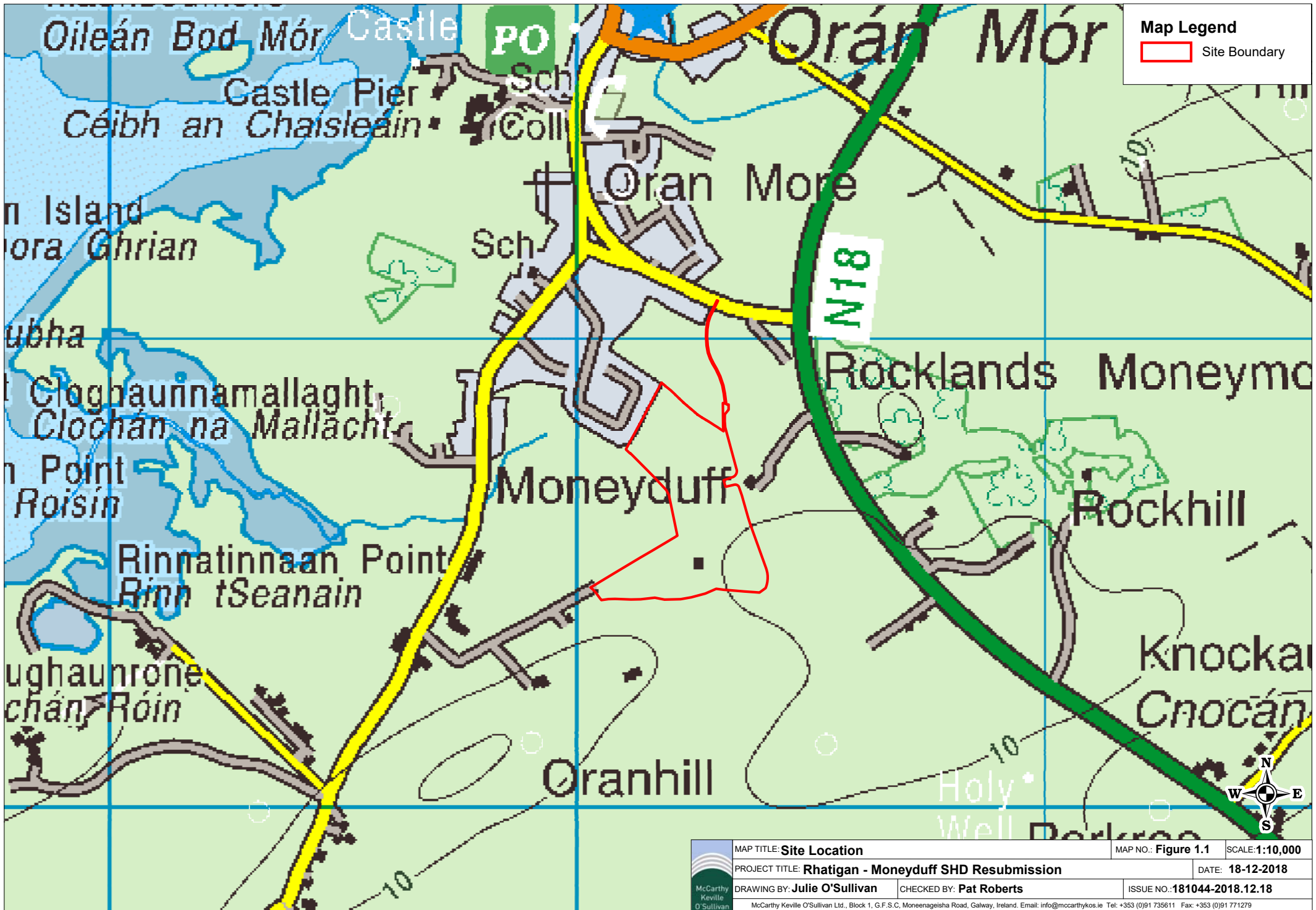
The main habitats/features identified for future management/ enhancement include:

- Semi-natural dry calcareous and neutral grassland,
- Hedgerows,
- Stone walls.

In addition to the above, public education, awareness and engagement will also be a key component of the management plan as public buy-in will ensure the long-term overall success of the plan. These measures will be implemented as part of the overall Operational Management Plan for the development.

2.1 Statement of Authority

This report has been prepared by David McNicholas (B.Sc, M.Sc, MCIEEM) of McCarthy Keville O’Sullivan Ltd. David is a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and has over 8 years professional ecological consultancy experience. Detailed botanical surveys of the site were undertaken by Dr. Pamela Boyle (B.Sc, Msc, PhD) and James Owens (B.Sc, M.Sc,). This report has been reviewed by Pat Roberts (B.Sc. Environmental Science, MCIEEM) who has over 12 years’ experience in management and ecological assessment.



Oileán Bod Mór Castle

PO

Orán Mór

Castle Pier
 Céibh an Chaisleain

Sch
 Coll

Oran More

n Island
 ora Ghrian

Sch

N18

ubha

Cloghaunnamallacht
 Clochán na Mallacht

Rocklands Moneymo

n Point
 Roisín

Moneyduff

Rockhill

Rinnatinnaan Point
 Rinn tSeanain

ughauróne
 chán, Róin

Oranhill

Knocka
 Cnocán

Holy
 Well



3 ECOLOGICAL BASELINE

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

The field surveys were conducted in September 2016 and mid-August 2017 which is within an adequate survey period for grassland habitat (May – June/Aug – Sept) (O'Neill *et al*, 2013). Therefore, it is concluded that the habitats and species that could potentially be impacted by the proposed development were adequately assessed during the survey period and a thorough and comprehensive ecological assessment was achieved. Seasonal factors that affect distribution patterns and habits of species were taken into account when conducting the surveys. The potential of the site to support certain populations (in particular those of conservation importance that may not have been recorded during the field survey due to their seasonal absence or nocturnal/cryptic nature) was assessed.

A total of six habitats were recorded within and directly adjacent to the site of the proposed development (Table 3.1)

Table 3.1 - Habitats recorded within the proposed development boundary (Fossitt, 2000).

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

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

The larger eastern section of the site was found to be predominantly overgrown by **Scrub (WS1)** species including blackthorn (*Prunus spinosa*), bramble (*Rubus fruticosus* agg.) and bracken (*Pteridium aquilinum*) with some ash (*Fraxinus excelsior*), willow (*Salix* spp.), whitebeam (*Sorbus aria*) and alder (*Alnus glutinosa*) trees becoming established across the site. Plate 3.1 provides an example of scrub habitat within the site.

Interspersed throughout the areas of scrub were grassland habitats classified as **Dry Calcareous and Neutral Grassland (GS1)** on thin soils with some bare limestone rock visible in parts. Common species included common knapweed (*Centaurea nigra*), oxeye daisy (*Leucanthemum vulgare*), selfheal (*Prunella vulgaris*), red clover (*Trifolium pretense*), crested dog's-tail (*Cynosurus cristatus*) and sweet vernal-grass

(*Anthoxanthum odoratum*). This habitat corresponds to the Annex I habitat “Semi-natural dry grasslands (*Festuco-Brometalia*) [6210]” (O’Neill et al., 2013). This community type is characterised by a wide variety of grasses and herbs, in which there is a moderate representation of calcicolous species (i.e. species with a preference for calcium rich soils). Details of the vegetation composition are provided in Appendix 5-2 of this EIAR. Nine discreet mappable areas of this habitat type were identified within the site from the 2016 and 2017 surveys period. This equates to approximately 0.89 hectares or 10.3% of the development area. The areas mapped during the site visits range from 0.003 – 0.33 hectares in size. The 2017 survey found that all the areas classified in 2016 still correspond to Annex I habitat and found that an additional three areas also conformed to this Annex I quality habitat. Similar habitat also occurred interspersed within the areas of scrub. Plate 3.2 & Plate 3.3 provide examples of semi – natural dry grassland to the east and south east of the site with surrounding encroaching scrub. The southwestern portion of the site comprises a mosaic of *Wet Grassland (GS4)* and *Dry Calcareous and Neutral Grassland (GS1)* and is grazed by horses and cattle.

A small area within the northern part of the site, that will form part of the site access road, comprises *Spoil and Bare Ground (ED2)*.



Plate 3.1: Example of scrub habitat within the site.



Plate 3.2: Example of semi – natural dry grassland in the eastern and south eastern sections of the site with surrounding encroaching scrub.



Plate 3.3: Example of scrub encroaching on semi – natural dry grassland habitat to the east of the site.

In addition to the habitats recorded within the site boundary, as provided in Table 3.1, habitats in the wider area comprised of *Buildings and Artificial Surfaces (BL3)* to the south and north, *Semi-improved Agricultural Grassland (GA1)* to the east, *Hedgerows (WL1)*, *Treelines (WL2)* and *Rich Fen (PF1)* to the west.



Plate 3.4: Example of Buildings and Artificial Surfaces (BL3) surrounding the north of the site



Plate 3.5: Example of Buildings and Artificial Surfaces (BL3) surrounding the south and southwest of the site

An Alkaline fen (**Rich Fen PF1**) habitat is present adjacent to the western boundary of the site and within the boundary of Galway Bay Complex SAC (Plate 3.6 and Plate 3.7). This fen was the subject of dedicated botanical surveys. This habitat has been degraded

by artificial drainage (Plate 3.7) but still supports Annex I Alkaline Fen (7230) habitat. A thin strip of wet grassland (GS4) surrounds the fen and buffers it from the site of the proposed development (Plate 3.6). Sections of this grassland correspond to the Annex I habitat Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinia caerulea*) (6410). There is a network of drainage ditches (FW4) (Plate 3.7) within the fen. These provide hydrological connectivity with Galway Bay to the west.



Plate 3.6: Photo of Fen (PF1), left of photo, and wet grassland (GS4), right, bordering the west of the development boundary.



Plate 3.7 Photo of drainage within the Fen (PF1), outside the west of the development boundary.

3.1.1 Significance of Habitats

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

The surveys found that the site supports discontinuous sections of EU Habitats Directive Annex I habitat – *Semi-natural dry grasslands and scrubland facies on*

calcareous substrates (Festuco – Brometalia). These were dispersed throughout the site, primarily within fields in the eastern, northeastern and southeastern sections of the development boundary. The total combined area of Annex I habitat covers a small proportion of the site, 0.89 hectares or 10.3% of the development area (8.7ha). These areas occur in disjointed patches which are threatened by scrub encroachment. Given the nature and extent of scrub encroachment surrounding the smaller areas, they are not considered to be 'viable areas' of Annex I habitat (NRA, 2009b) and are continually decreasing in size through lack of management. The habitat patches are assigned **Local Importance (Higher Value)** because of their fragmentation and degradation through scrub encroachment.

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

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

4 MANAGEMENT AND ENHANCEMENT MEASURES

The following subsections describe the habitat management measures that will be undertaken at the proposed development lands at Moneyduff, Oranmore, Co. Galway. The measures are practical and easy to maintain for the future. This is important in achieving cost effective and relevant management actions. Given the floristically diverse semi-natural dry calcareous and neutral grassland habitat recorded within the land ownership boundary, management options are focused on the management and enhancement of grassland habitat as well as maintaining public access/walking paths around the margins of this managed amenity space. The plan also focuses on hedgerow management and enhancement options.

4.1 Construction Phase Measures

As shown in the landscaping plan for the proposed housing development (see Figure 18223 – 3 – 100) and in Figure 4.1, a large strip of the western portion of the site has been set aside for semi-natural dry calcareous and neutral grassland management, in addition to other green spaces for local amenity use. As this area already contains a suitable substrate and profile for semi-natural dry calcareous and neutral grassland management and enhancement, the following measures will be implemented during the construction phase of the development for the protection of the area adjacent to the development footprint:

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

4.2 Grassland Management and Enhancement

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

4.2.1 Semi-Natural Dry Calcareous and Neutral Grassland Management

In general, the objectives for management within the grassland areas are to increase botanical diversity (especially wildflowers), reduce the dominance of grasses in the sward and preventing scrub establishment. A number of case studies have been reviewed in order to determine the best management approach. However, grassland creation and management will vary from site to site and thus require site specific

management measures. In addition, each management plan may require alteration as the project progresses depending on revegetation success, species composition or the presence of undesirable species (overabundance of *Rumex* or *Cirsium* spp).

The main targets are to:

- Maintain low soil Phosphate index and appropriate pH through retaining the existing substrate and soil within the site,
- Achieve increases in abundance of calcareous grassland indicator species,
- Achieve cover of wildflowers between 20% and 90%, with 50-60% flowering in May-August,
- Keep bare ground to between 1% and 5%,
- Keep undesired species cover below 5% (United Utilities, 2011).

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

4.2.1.1 Mowing regime

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

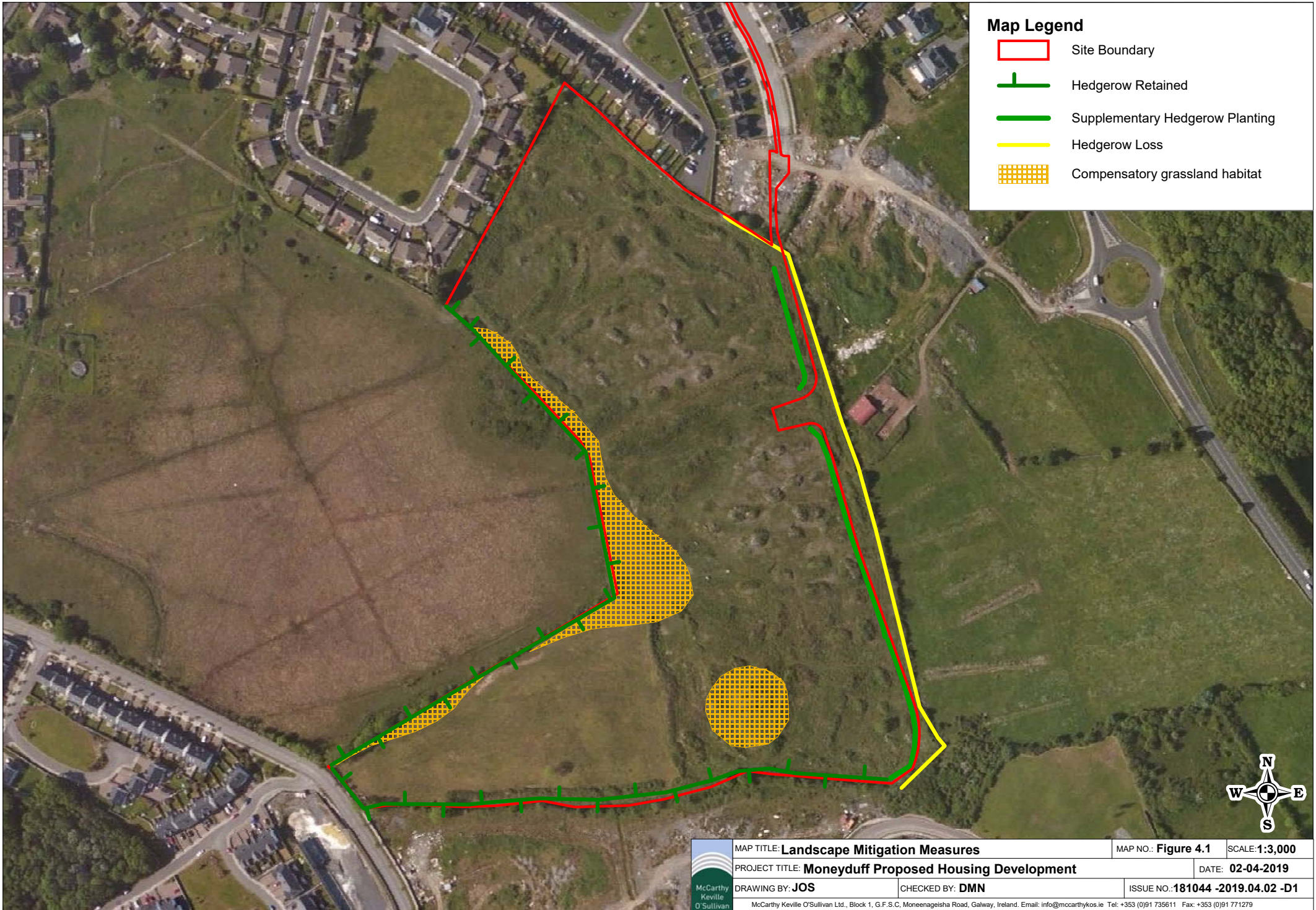
- Cutting will not take place before characteristic annual, biennial or short-lived perennial plant species which depend on seed production have set seed (for example yellow rattle (*Rhinanthus minor*). Sustained early grass cutting is known to reduce species richness in such grasslands (Smith 1994).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

4.2.2 Facilitating Community Access to the Grassland





In order to maintain a managed appearance of the site for the local community, a narrow strip, approximately 1 metre wide, will be mown along each side of the public footpaths bordering the grassland (see Plate 4.1). In addition, a single mown path can be mown through the grassland to facilitate easy public access through the meadow, thereby allowing amenity access/participation and ensuring public buy-in. In addition, this will avoid tramping of the grassland and ensure localised access through the feature.



Plate 4.1 Mown path through grassland to facilitate local community access and avoid tramping (Source: Albert Bridge, (2019)).



Map Legend

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

	MAP TITLE: Landscape Mitigation Measures	MAP NO.: Figure 4.1	SCALE: 1:3,000
	PROJECT TITLE: Moneyduff Proposed Housing Development	DATE: 02-04-2019	
	DRAWING BY: JOS	CHECKED BY: DMN	ISSUE NO.: 181044 -2019.04.02 -D1
	<small>McCarthy Keville O'Sullivan Ltd., Block 1, G.F.S.C. Moneenageisha Road, Galway, Ireland. Email: info@mccarthynos.ie Tel: +353 (0)91 735611 Fax: +353 (0)91 771279</small>		

INDICATIVE PLANTING SCHEDULES / SPECIES LISTS

PARKLAND TREE PLANTING

Species	Specification
(Ah) Aesculus hippocastanum	18-20cm girth / clearstem / rootball or airpot
(Cd) Cedrus deodara	1-2m high / rootball or airpot
(Cj) Cedrus libani	1-2m high / rootball or airpot
(F) Fagus sylvatica	18-20cm girth / clearstem / rootball or airpot
(Qp) Quercus petraea	18-20cm girth / clearstem / rootball or airpot

STREET TREE PLANTING

Species	Specification
(Bp) Betula pendula	8-10cm girth / clearstem / rootball or airpot
(Pc) Pyrus calleryana 'Chanticleer'	8-10cm girth / clearstem / rootball or airpot
(Sa) Sorbus aria	8-10cm girth / clearstem / rootball or airpot
(Sd) Sorbus aucuparia	8-10cm girth / clearstem / rootball or airpot
(Tc) Tilia cordata 'Greenspire'	8-10cm girth / clearstem / rootball or airpot

CLIPPED HEDGING

Species	Specification	Quantity
Fagus sylvatica	1+2 bareroot transplants / 60-90cm	6 per lin.m
Carpinus betulus	1+2 bareroot transplants / 60-90cm	6 per lin.m

LOW HEIGHT SHRUB MIX - indicative schedule;

Species	Spec	Density
Cotoneaster decorus	2l pot	3/sqm
Crocsmia lucifer	2l pot	3/sqm
Hypericum hidcote	2l pot	3/sqm
Lavandula angustifolia	2l pot	3/sqm
Prunus laurocerasus 'Zabeliana'	2l pot	2/sqm
Rosa 'Flower Carpet (White)'	2l pot	3/sqm
Slipa tenuislims 'Tony Tails'	2l pot	4/sqm
Viburnum davidii	2l pot	3/sqm

NATIVE WOODLAND TREE & UNDERSTORY PLANTING

Species	Specification
(Ag) Alnus glutinosa	10-12cm girth / clearstem / rootball or airpot
(Bp) Betula pubescens	10-12cm girth / clearstem / rootball or airpot
(Ps) Pinus sylvestris	1m high rootball / airpot
(Qp) Quercus petraea	10-12cm girth / clearstem / rootball or airpot
(U) Ulmus lobel	10-12cm girth / clearstem / rootballed or airpot
Corylus avellana	1+ 2 br transplant / 60-90cm
Ilex aquifolium	3l pots / 20-30cm

NATIVE HEDGEROW SUPPLEMENTAL PLANTING

Species	Specification
Crataegus monogyna	1+ 2 br transplant / 60-90cm
Fuomyous europaeus	1+ 2 br transplant / 60-90cm
Prunus glandus	1+ 2 br transplant / 60-90cm
Prunus spinosa	1+ 2 br transplant / 60-90cm
Quercus petraea	6-8cm girth / feathered / bare-root
Sambucus nigra	1+ 2 br transplant / 60-90cm
Rosa canina	1+ 2 br transplant / 60-90cm
Viburnum opulus	1+ 2 br transplant / 60-90cm



Raised pedestrian crossing points

Note: All street trees semi mature clearstem with minimum canopy height of 2m maintaining sightlines.

Existing boundary vegetation and drystone walling to be retained where present and supplemented with native hedgerow species where gaps occur. (refer to schedule).



Proposed area of open grassland adjoining SAC to be allowed to naturally regenerate & where appropriate supplemental native wildflower & grass seeding may occur. (Dashed line indicates mown pedestrian pathways with cellular grass reinforcement system).



0.9m wide mown margin where calcareous grassland adjoins tarmac path

Pumping station with 1.5m high stone clad wall with hedging around outside perimeter

Existing standing drystone wall to be retained.

Proposed area of open grassland adjoining SAC to be left to naturally regenerate.

Public parkland open space for passive recreation with specimen parkland and native tree planting

Homezone shared surface area incorporating communal garden

LEGEND

- Specimen Parkland Trees
- Large Species Street Trees
- Small Species Street Trees
- Medium Street Tree in grille / planter
- Native Woodland & Parkland Trees
- Native Woodland Understory Trees & Shrubs
- Existing boundary vegetation retained (locations indicative).
- Low Height ornamental shrub mix
- Medium height ornamental shrub mix
- 1.2m high clipped formal hedging
- Grass Lawn (Public Open Space)
- Private Garden Space
- Proposed Compensatory Calcareous Grassland
- Pedestrian Priority Homezone / Shared Surface Permeable Paving Setts
- Footpaths & Layby Permeable Paving Setts
- Brushed Concrete or Tarmac Footpaths
- Timber edged gravel footpath
- Brushed Concrete or Tarmac Parking Bays
- Cycle Racks
- Bollards
- Line of R&A zoning
- Site Boundary

Public parkland open space for passive recreation with specimen parkland and native tree planting

Hierarchy of street tree planting (small)
Hierarchy of street tree planting (large)
Hierarchy of street tree planting (medium)

Archaeological protection zone around ruins - voids to be filled with topsoil to make safe loose rocks with upper surfaces left exposed before seeding with wildflower meadow grass and minimally invasive timber edge gravel pathways installed.

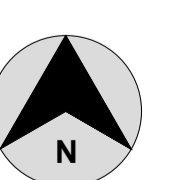
Native woodland canopy & understory planting

Native woodland canopy & understory planting



REV	DATE	AMENDMENT
C	22.02.19	CALCAREOUS GRASSLAND
B	18.12.18	CRECHE
A	14.06.18	LAYOUT

CUNNANE STRATTON REYNOLDS
LAND PLANNING & DESIGN
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EMAIL: galwayinfo@cstratplan.ie



PROJECT: MONEYDUFF ORANMORE CO. GALWAY	DATE: FEBRUARY 2018
DRAWING: LANDSCAPE MASTER PLAN (PLANNING DRAWING ONLY)	SCALE: 1:500 @ A0
	DRAWN: CHECKED: KM KM
	DRAWING NO: 18223-3-100

4.2.3 Schedule of Actions

The following table sets out all the actions that will be undertaken in order to ensure that the appropriate grassland management is undertaken as described above. It sets out the objectives of all the actions and also gives a description of the timeline for the actions to be undertaken. The table also assigns responsibility for ensuring that each action is undertaken.

Table 4.1. - Schedule of Objectives and Actions for Semi-Natural Dry Calcareous and Neutral Grassland Management

No.	Objective	Target	Action	Timeline	Responsibility
Construction Phase					
01	Fence off areas identified for grassland management	<ul style="list-style-type: none"> Avoid significant alterations to the existing substrate composition. Do not allow storage of construction materials or vehicles within this area to avoid compaction. 	<ul style="list-style-type: none"> Site supervision by an appropriately qualified Ecological Clerk of Works (EcOW). 	Construction phase	Moneyduff development company
02	Scrub clearance	<ul style="list-style-type: none"> As the lands within the HMP grassland areas are currently dominated by scrub (predominantly blackthorn, bramble and bracken), this scrub material should be removed during initial site clearance to allow for simple regrading and grassland establishment. 	<ul style="list-style-type: none"> Scrub removal during initial site clearance. Scrub clearance will be undertaken outside the bird nesting season (1st March – 31st August). 	Construction phase	Moneyduff development company
03	Reuse of topsoil on site.	<ul style="list-style-type: none"> Strip topsoil from areas of existing semi-natural calcareous grassland and storage for reuse on site within areas subject to the Habitat Management Plan. The reuse of topsoil from within the site will allow the natural seedbank to establish a semi-natural grassland using seeds of local genetic origin. As the existing soil profile on site is thin and free draining, the lands within 	<ul style="list-style-type: none"> The stripping of topsoil should be supervised by an appropriately qualified Ecological Clerk of Works (EcOW) to ensure only the best source material is used. Minor regrading within HMP area (to allow for future mowing of the semi-natural grassland within the HMP area). 	Construction phase	Moneyduff development company

		the HMP areas will also match this characterisation.			
Operational Phase – Post Construction					
01	To establish semi-natural dry calcareous and neutral grassland	<ul style="list-style-type: none"> Monitor and manage revegetation success, species composition or the presence of undesirable species (overabundance of <i>Rumex</i> or <i>Cirsium</i> spp). 	<ul style="list-style-type: none"> Establish fixed point relevés (GPS tracked) for monitoring over subsequent years; examining extent of grassland, sward composition and structure. Make suggestions for alterations to management if/where required. 	Post-construction: Year 1	MKO Moneyduff development company
02	To maintain semi-natural dry calcareous and neutral grassland.	<ul style="list-style-type: none"> Manage grassland through annual mowing and grass removal. 	<ul style="list-style-type: none"> No fertilizers or herbicides will be applied in the Biodiversity Enhancement Area. The grassland will be seasonally mown post flowering of orchids (late summer - autumn). Grass cut each year will be removed and not left to decay on site. 	Annually	Moneyduff development company
03	To monitor the effectiveness of habitat enhancement & management measures.	<ul style="list-style-type: none"> Monitor grassland rehabilitation through fixed quadrats 	<ul style="list-style-type: none"> Establish fixed point relevés (GPS tracked) & monitor over subsequent years; examining extent of grassland & sward composition. Evaluate the effectiveness of the habitat enhancement measures, 	Years 1,2,3,5 & 10	Moneyduff development company MKO

MKO: McCarthy Keville O'Sullivan

4.3 Hedgerow Enhancement and Retention of Stone Walls

4.3.1 Hedgerow enhancement

The hedge along the eastern boundary that will be lost to facilitate the change in ground levels associated with the proposed development at this location will be mitigated by replacing it with a new hedge that will mark the eastern boundary of the development throughout the operation of the scheme.

Additional planting will be undertaken to enhance existing hedgerows and thus increase ecological connectivity as well as providing additional screening for the proposal. Planting will use native species found in the wider area. Tables 4.2 to 4.4 provide a summary of the species to be used on site for planting as described in the Landscape Management Plan. The planting of predominantly native species will benefit local wildlife by providing additional feeding and breeding habitat. Species such as burnet rose, oak, hawthorn or guelder rose will provide winter berries/ fruit that will support a wide variety of wintering birds and small mammals.

The areas of hedge to be lost and replanted are shown in Figure 4.1 along with those areas to be retained and replaced.

Table 4.1 Recommended Tree Planting Species

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

Table 4.2 Naturalised Hedge Planting

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

Table 4.3 Shrub & Herbaceous Planting within the development

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

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

4.3.2 Stone Wall Retention

Stone walls along the entire western boundary of the site will be retained as part of the overall plan. This is shown clearly within the Landscaping Plan for the site (see Figure [see Figure 18223 – 3 - 100]).

4.3.3 Consideration of Policies and Objectives of local development and conservation plans

The measures included in Sections 4.3.1 and 4.3.2 will maintain compliance with the following Policies and Objectives of local area plans:

Galway County Development Plan 2010-2016:

Objective NHB 2 – Biodiversity and Ecological Networks

Galway BAP 2014 - 2020

Policy No 13 - promote the retention of hedgerows, recognising their importance as wildlife corridors. Promote the retention of dry-stone walls.

4.4 Public Information Signage

The project has been designed to maintain/ facilitate public access to the grassland. As public access will be facilitated through the proposed grassland management area by mown paths, this will aim to minimise trampling of vegetation. The erection of educational signage, to inform the local community of the biodiversity management practices being implemented on site, would be of particular benefit for community engagement. Such signage will consider the following topics:

- The biodiversity benefits of grassland management, including maintaining floral diversity, pollinator benefits etc,
- Provide a list of plant species known to occur in the area such as yellow rattle (*Rhinanthus minor*), as well as some interesting facts for each species,
- Additional information about other mammal species to be found in the wider area, including birds, bats and terrestrial mammals.

Plate 4.2 provides an example of suitable public information signage.



Plate 4.2. Example of information signage to be erected on site

4.5 Faunal habitat enhancement measures

In order to enhance the habitat within the land ownership boundary for wildlife, the following general wildlife enhancement measures are proposed:

Bat boxes

Ten new bat boxes will be provided along the tree line habitat. This will provide greater potential for the establishment of roosting bats in the area. Bat boxes will be similar to the general purpose Schwegler 2F type and placed at a minimum height of 3m on mature trees with a variety of different aspects. This will increase the likelihood of bat boxes being used at different times of the year. An appropriately qualified ecologist should advise on the locations at which bat boxes should be erected. An example of a suitable Schwegler 2F type bat box is provided in Plate 4.3.



Plate 4.3 Example of Schwegler 2F type bat box suitable for roosting bat species within woodland habitat

Bird boxes

Bird boxes will be erected within the treeline habitat to facilitate common and widespread species such as blue tit and robin.. An appropriately qualified ecologist should advise on the locations at which bird boxes should be erected. Examples of suitable bird boxes are shown here in plate 4.4.



Plate 4.4. blue tit nest box design

5 CONCLUSION

The implementation of the grassland management regime will ensure the long-term viability of the semi-natural calcareous grassland habitat within the landownership boundary. The supplementary planting within existing hedgerows along the west and south of the site and the replacement of the eastern hedge community ensure that connectivity of linear landscape features will be retained and enhanced. Bird and bat boxes will provide additional nesting/roosting habitat on the site. Information signage will help to provide a better understanding of the floral diversity in the area and management practices required to maintain the habitat in its optimal quality.

There is a commitment to the implementation of the measures that are set out in this plan including both the establishment and maintenance of the grasslands. A commitment is also made to monitor the development of the grasslands on an ongoing basis following construction. These measures are an integral part of the planning permission and as such, confer protection on the habitat where currently none exists. The habitat is currently deteriorating in both area and quality due to lack of management. The plan also commits to the planting, management and monitoring of all hedgerow planting and the erection of bird and bat boxes.

6 REFERENCES

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Appendix 6

Annex I Grassland Habitat Assessment

Appendix 5-2 Botanical Study Data

Proposed Housing Development
Moneyduff, Oranmore,
Co. Galway



Planning & Environmental Consultants

DOCUMENT DETAILS

Client: Arlum Ltd

Project title: Proposed Housing development
Moneyduff, Oranmore
Co. Galway

Project Number: 181044

Document Title: Botanical Study Data

Doc. File Name: 181044 - Botanical Study Data –
2019.04.02 – F

Prepared By: McCarthy Keville O’Sullivan Ltd.
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Document Issue:

Rev	Status	Issue Date	Document File Name	Author(s)	Approved By:
001	Final	02.04.2019	181044 - Botanical Study Data – 2019.04.02 – F	JO	PR

BOTANICAL STUDY – MONEYDUFF 2017

Relevé 01 Grid Ref 138410 223486

Scientific Name	Common name	Percentage Cover
<i>Rhinanthus minor</i>	Yellow rattle	1
* <i>Daucus carota</i>	Wild carrot	5
<i>Senecio jacobea</i>	Common ragwort	2
<i>Centaurea nigra</i>	Common knapweed	10
<i>Euphrasia sp.</i>	Eyebright	5
* <i>Leontodon hispidus</i>	Rough hawkbit	10
<i>Fragaria vesca</i>	Wild strawberry	3
** <i>Dactylorhiza sp.</i>	Orchid	+
<i>Leucanthemum vulgare</i>	Ox-eye daisy	10
<i>Lathyrus pratensis</i>	Meadow vetchling	2
** <i>Anthyllis vulneraria</i>	Kidney vetch	15
<i>Hypericum sp.</i>	St. John's wort	3
* <i>Thymus polytrichus</i>	Wild thyme	+
<i>Bromus hordeaceus</i>	Soft brome	+
<i>Saxifraga sp.</i>	Saxifrage	+
<i>Corylus avellana</i>	Hazel	1
<i>Potentilla erecta</i>	Tormentil	+
<i>Prunella vulgaris</i>	Selfheal	+
<i>Plantago lanceolata</i>	Ribwort plantain	+
<i>Anthoxanthum odoratum</i>	Sweet vernal-grass	3
<i>Vicia sepium</i>	Bush vetch	1
<i>Holcus lanatus</i>	Yorkshire fog	1
<i>Tussilago farfara</i>	Coltsfoot	1
<i>Centaureum pulchellum</i>	Lesser centaury	+
* <i>Pilosella officinarum</i>	Mouse-ear hawkweed	+
<i>Festuca rubra</i>	Red fescue	+
<i>Taraxacum officinale</i> agg.	Dandelion	1
<i>Rubus fruticosus</i> agg.	Bramble	10
* <i>Carex flacca</i>	Glaucous sedge	15
<i>Trifolium pratense</i>	Red clover	5
* <i>Homalothecium lutescens</i>		7
Bare rock		10

*Denotes Positive indicator species of Annex I habitat [6210]

** Denotes high quality indicator species of Annex I habitat [6210]

Relevé 02 Grid Ref 138396 223513

Scientific Name	Common name	Percentage Cover
<i>Rhinanthus minor</i>	Yellow rattle	+
* <i>Daucus carota</i>	Wild carrot	5
<i>Arrhenatherum elatius</i>	False oat-grass	5
<i>Senecio jacobea</i>	Common ragwort	3
<i>Centaurea nigra</i>	Common knapweed	10
<i>Euphrasia sp.</i>	Eyebright	2
* <i>Leontodon hispidus</i>	Rough hawkbit	5
<i>Carex panicea</i>	Carnation sedge	3
* <i>Lotus corniculatus</i>	Bird's-foot trefoil	10
<i>Dactylis glomerata</i>	Cock's-foot grass	2

Scientific Name	Common name	Percentage Cover
<i>Hypochaeris radicata</i>	Cat's ear	15
<i>Potentilla sterilis</i>	Barren strawberry	5
** <i>Linum catharticum</i>	Fairy flax	+
<i>Leucanthemum vulgare</i>	Ox-eye daisy	3
** <i>Anthyllis vulneraria</i>	Kidney vetch	5
<i>Hypericum sp.</i>	St. John's wort	1
<i>Filipendula ulmaria</i>	Meadowsweet	+
* <i>Helictotrichon pubescens</i>	Downy oat-grass	+
<i>Potentilla erecta</i>	Tormentil	+
<i>Prunella vulgaris</i>	Selfheal	5
<i>Plantago lanceolata</i>	Ribwort plantain	20
<i>Anthoxanthum odoratum</i>	Sweet vernal-grass	1
<i>Holcus lanatus</i>	Yorkshire fog	1
<i>Centaureum pulchellum</i>	Lesser centaury	+
<i>Rubus fruticosus agg.</i>	Bramble	7
* <i>Carex flacca</i>	Glaucous sedge	5
<i>Trifolium pratense</i>	Red clover	5
<i>Cynosurus cirstatus</i>	Crested dog's-tail	+
<i>Agrostis capillaris</i>	Common bent	1
* <i>Homalothecium lutescens</i>		2
Bare rock		2

*Denotes Positive indicator species of Annex I habitat [6210]

** Denotes high quality indicator species of Annex I habitat [6210]

Relevé 03 Grid Ref 138355 223533

Scientific Name	Common name	Percentage Cover
<i>Rhinanthus minor</i>	Yellow rattle	+
<i>Cirsium arvense</i>	Creeping thistle	+
<i>Senecio jacobea</i>	Common ragwort	1
<i>Centaurea nigra</i>	Common knapweed	25
* <i>Lotus corniculatus</i>	Bird's-foot trefoil	20
<i>Dactylis glomerata</i>	Cock's-foot grass	2
<i>Euphrasia sp.</i>	Eyebright	+
* <i>Leontodon hispidus</i>	Rough hawkbit	5
<i>Filipendula ulmaria</i>	Meadowsweet	5
<i>Ranunculus repens</i>	Creeping buttercup	5
** <i>Dactylorhiza sp.</i>	Orchid	1
** <i>Linum catharticum</i>	Fairy flax	1
<i>Bromus hordeaceus</i>	Soft brome	+
<i>Saxifraga sp.</i>	Saxifrage	+
<i>Hypochaeris radicata</i>	Cat's ear	10
<i>Potentilla erecta</i>	Tormentil	+
<i>Prunella vulgaris</i>	Selfheal	3
<i>Plantago lanceolata</i>	Ribwort plantain	3
<i>Anthoxanthum odoratum</i>	Sweet vernal-grass	10
<i>Holcus lanatus</i>	Yorkshire fog	5
<i>Rubus fruticosus agg.</i>	Bramble	15
* <i>Carex flacca</i>	Glaucous sedge	10
<i>Trifolium pratense</i>	Red clover	5
* <i>Homalothecium lutescens</i>		+

*Denotes Positive indicator species of Annex I habitat [6210]

** Denotes high quality indicator species of Annex I habitat [6210]

Relevé 04 Grid Ref 138378 223504

Scientific Name	Common name	Percentage Cover
<i>Rhinanthus minor</i>	Yellow rattle	+
* <i>Daucus carota</i>	Wild carrot	1
<i>Centaurea nigra</i>	Common knapweed	40
** <i>Briza media</i>	Quaking grass	+
<i>Euphrasia sp.</i>	Eyebright	1
* <i>Leontodon hispidus</i>	Rough hawkbit	5
<i>Leontodon autumnalis</i>	Autumn hawkbit	+
* <i>Lotus corniculatus</i>	Bird's-foot trefoil	3
<i>Filipendula ulmaria</i>	Meadowsweet	2
<i>Ranunculus repens</i>	Creeping buttercup	5
<i>Dactylis glomerata</i>	Cock's-foot grass	1
** <i>Linum catharticum</i>	Fairy flax	+
** <i>Anthyllis vulneraria</i>	Kidney vetch	1
<i>Potentilla erecta</i>	Tormentil	+
<i>Prunella vulgaris</i>	Selfheal	5
<i>Plantago lanceolata</i>	Ribwort plantain	15
<i>Holcus lanatus</i>	Yorkshire fog	5
<i>Rubus fruticosus agg.</i>	Bramble	15
* <i>Carex flacca</i>	Glaucous sedge	15
<i>Trifolium pratense</i>	Red clover	3
<i>Trifolium repens</i>	White clover	3
<i>Cynosurus cristatus</i>	Crested dog's-tail	1
<i>Vicia cracca</i>	Tufted vetch	1

*Denotes Positive indicator species of Annex I habitat [6210]

** Denotes high quality indicator species of Annex I habitat [6210]

Relevé 05 138302 223622

Scientific Name	Common name	Percentage Cover
<i>Rhinanthus minor</i>	Yellow rattle	+
* <i>Daucus carota</i>	Wild carrot	55
<i>Leucanthemum vulgare</i>	Ox-eye daisy	1
<i>Lathyrus pratensis</i>	Meadow vetchling	+
<i>Campanula rotundifolia</i>	Harebell	2
** <i>Briza media</i>	Quaking grass	2
<i>Euphrasia sp.</i>	Eyebright	1
* <i>Leontodon hispidus</i>	Rough hawkbit	10
<i>Centaureum pulchellum</i>	Lesser centaury	+
<i>Dactylis glomerata</i>	Cock's-foot grass	2
** <i>Linum catharticum</i>	Fairy flax	+
** <i>Anthyllis vulneraria</i>	Kidney vetch	3
<i>Hypochaeris radicata</i>	Cat's ear	55
<i>Potentilla erecta</i>	Tormentil	1
<i>Plantago lanceolata</i>	Ribwort plantain	+
* <i>Carex flacca</i>	Glaucous sedge	15
<i>Trifolium pratense</i>	Red clover	1
<i>Succisa pratensis</i>	Devil's-bit scabious	+
<i>Cynosurus cristatus</i>	Crested dog's-tail	3

*Denotes Positive indicator species of Annex I habitat [6210]

** Denotes high quality indicator species of Annex I habitat [6210]

Relevé 06 Grid Ref 138213 223821

Scientific Name	Common name	Percentage Cover
<i>Rhinanthus minor</i>	Yellow rattle	+
* <i>Daucus carota</i>	Wild carrot	1
<i>Centaurea nigra</i>	Common knapweed	20
** <i>Briza media</i>	Quaking grass	5
<i>Festuca rubra</i>	Red fescue	1
* <i>Leontodon hispidus</i>	Rough hawkbit	10
* <i>Lotus corniculatus</i>	Bird's-foot trefoil	5
** <i>Dactylorhiza sp.</i>	Orchid	+
** <i>Linum catharticum</i>	Fairy flax	+
<i>Potentilla erecta</i>	Tormentil	1
<i>Hypochaeris radicata</i>	Cat's ear	40
<i>Agrostis capillaris</i>	Common bent	1
<i>Prunella vulgaris</i>	Selfheal	1
<i>Rubus fruticosus agg.</i>	Bramble	10
* <i>Carex flacca</i>	Glaucous sedge	10
<i>Succisa pratensis</i>	Devil's-bit scabious	+

*Denotes Positive indicator species of Annex I habitat [6210]

** Denotes high quality indicator species of Annex I habitat [6210]

Relevé 07 Grid Ref 138220 223720

Scientific Name	Common name	Percentage Cover
<i>Pteridium aquilinum</i>	Bracken	1
* <i>Daucus carota</i>	Wild carrot	2
<i>Centaurea nigra</i>	Common knapweed	40
** <i>Briza media</i>	Quaking grass	3
<i>Senecio jacobea</i>	Common ragwort	1
<i>Holcus lanatus</i>	Yorkshire fog	8
<i>Festuca rubra</i>	Red fescue	3
* <i>Leontodon hispidus</i>	Rough hawkbit	5
* <i>Lotus corniculatus</i>	Bird's-foot trefoil	25
* <i>Galium verum</i>	Lady's bedstraw	3
** <i>Anthyllis vulneraria</i>	Kidney vetch	+
** <i>Dactylorhiza sp.</i>	Orchid	+
<i>Anthoxanthum odoratum</i>	Sweet vernal-grass	15
<i>Hypochaeris radicata</i>	Cat's ear	10
<i>Plantago lanceolata</i>	Ribwort plantain	2
<i>Agrostis capillaris</i>	Common bent	5
<i>Trifolium pratense</i>	Red clover	1
<i>Potentilla erecta</i>	Tormentil	2
<i>Achellia millefolium</i>	Yarrow	1
* <i>Carex flacca</i>	Glaucous sedge	5
<i>Succisa pratensis</i>	Devil's-bit scabious	3

*Denotes Positive indicator species of Annex I habitat [6210]

** Denotes high quality indicator species of Annex I habitat [6210]

Relevé 08 138207 223794

Scientific Name	Common name	Percentage Cover
<i>Rhinanthus minor</i>	Yellow rattle	+
* <i>Daucus carota</i>	Wild carrot	1
<i>Centaurea nigra</i>	Common knapweed	5

Scientific Name	Common name	Percentage Cover
**Briza media	Quaking grass	1
<i>Bromus hordeaceus</i>	Soft brome	1
<i>Anthoxanthum odoratum</i>	Sweet vernal-grass	2
<i>Festuca rubra</i>	Red fescue	2
*Leontodon hispidus	Rough hawkbit	10
*Lotus corniculatus	Bird's-foot trefoil	10
<i>Leucanthemum vulgare</i>	Ox-eye daisy	1
**Dactylorhiza sp.	Orchid	1
**Linum catharticum	Fairy flax	+
<i>Potentilla erecta</i>	Tormentil	+
<i>Hypochaeris radicata</i>	Cat's ear	45
<i>Holcus lanatus</i>	Yorkshire fog	2
<i>Centaureum pulchellum</i>	Lesser centaury	+
<i>Poa trivialis</i>	Rough meadow-grass	2
<i>Lathyrus pratensis</i>	Meadow vetchling	+
<i>Plantago lanceolata</i>	Ribwort plantain	3
<i>Trifolium pratense</i>	Red clover	2
<i>Rubus fruticosus agg.</i>	Bramble	+
*Carex flacca	Glaucous sedge	15
Bare Rock		8

**Denotes Positive indicator species of Annex I habitat [6210]*

*** Denotes high quality indicator species of Annex I habitat [6210]*

Appendix 7

Fen Assessment

Annex I Habitat Assessment of Fen

Proposed Housing Development
Moneyduff, Oranmore,
Co. Galway



Planning & Environmental Consultants

DOCUMENT DETAILS

Client: Arlum Ltd

Project title: Proposed Housing development
Moneyduff, Oranmore
Co. Galway

Project Number: 181044

Document Title: Annex I Habitat Assessment of Fen

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1 INTRODUCTION

1.1 General Introduction

This report has been completed to inform an impact assessment of a Proposed Housing development at Moneyduff, Oranmore, Co. Galway. The report will provide an assessment of habitat adjacent to the proposed development, within the Galway Bat Complex SAC, which was identified as rich fen and flush. The assessment will evaluate whether the fen habitats conforms to habitats listed under Annex I of Directive 92/43/EEC (Habitats Directive) at Moneyduff, Oranmore, Co. Galway.

The habitat assessment is based on field visits by a suitably qualified ecologist James Owens (B.Sc. (Env.), M.Sc.). The surveyor has extensive experience in vegetation classification and survey techniques and has conducted detailed habitat assessment for a number of developments.

1.2 Best Practice and Guidance

The habitat assessment surveys described in this report have been undertaken with reference to the following guidelines and resources:

- Foss, P.J. & Crushell, P. 2008. Guidelines for a National Fen Survey of Ireland. Report submitted to National Parks & Wildlife Service, Dublin.
- European Commission (2008) Management of Natura 2000 habitats *Alkaline fens* 7230. Directive 92/42/EEC on the conservation of natural habitats and wild fauna and flora. Technical Report 2008 20/24.
- European Commission (2013) *Interpretation Manual of European Union Habitats – EU27*.
- Review of online web-mappers: Geological Survey of Ireland (GSI)
- NPWS (2013) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.1. Unpublished Report, National Parks & Wildlife Services. Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.
- National Roads Authority (2009) *Guidelines for assessment of ecological impacts of national road schemes (Revision 2, June 2009)*, Dublin, Ireland.
- Perrin, P.M., J.R., Barron, Roche, J.R. and O’Hanrahan, B. (2014) Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland. Report submitted to National Parks & Wildlife Service, Dublin.
- O’Neill, F.H., Martin, J.R., Devaney, F.M. & Perrin, P.M. (2013) The Irish semi-natural grasslands survey 2007-2012. Irish Wildlife Manuals, No. 78. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Ireland.
- Martin, J.R., O’Neill, F.H. & Daly, O.H. (2018) The monitoring and assessment of three EU Habitats Directive Annex I grassland habitats. Irish Wildlife Manuals, No. 102. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.

2 SURVEY METHODOLOGY

2.1 Annex I Surveys

A detailed assessment of the fen habitat was conducted by McCarthy Keville O’Sullivan following site visits undertaken on the 13/12/2018 and 09/04/2019. The survey followed the methodology and assessment criteria outlined in Foss & Crushell (2008) (Fen). Habitats were identified in accordance with the Heritage Council’s *‘Guide to Habitats in Ireland’* (Fossitt, 2000). Habitat mapping was undertaken with regard to guidance set out in *‘Best Practice Guidance for Habitat Survey and Mapping’* (Smith *et al.*, 2011). Grassland habitat identified during the fen survey was assessed following methodologies outlined in O’Neil *et al.* (2013) and Martin *et al.* (2018). Plant nomenclature for vascular plants follows New Flora of the British Isles (Stace, 2010), whilst mosses and liverworts follows Mosses and Liverworts of Britain and Ireland - a field guide (British Bryological Society, 2010). The results of the survey are shown in Figure 2.1.

2.1.1 Rich Fen and Flush

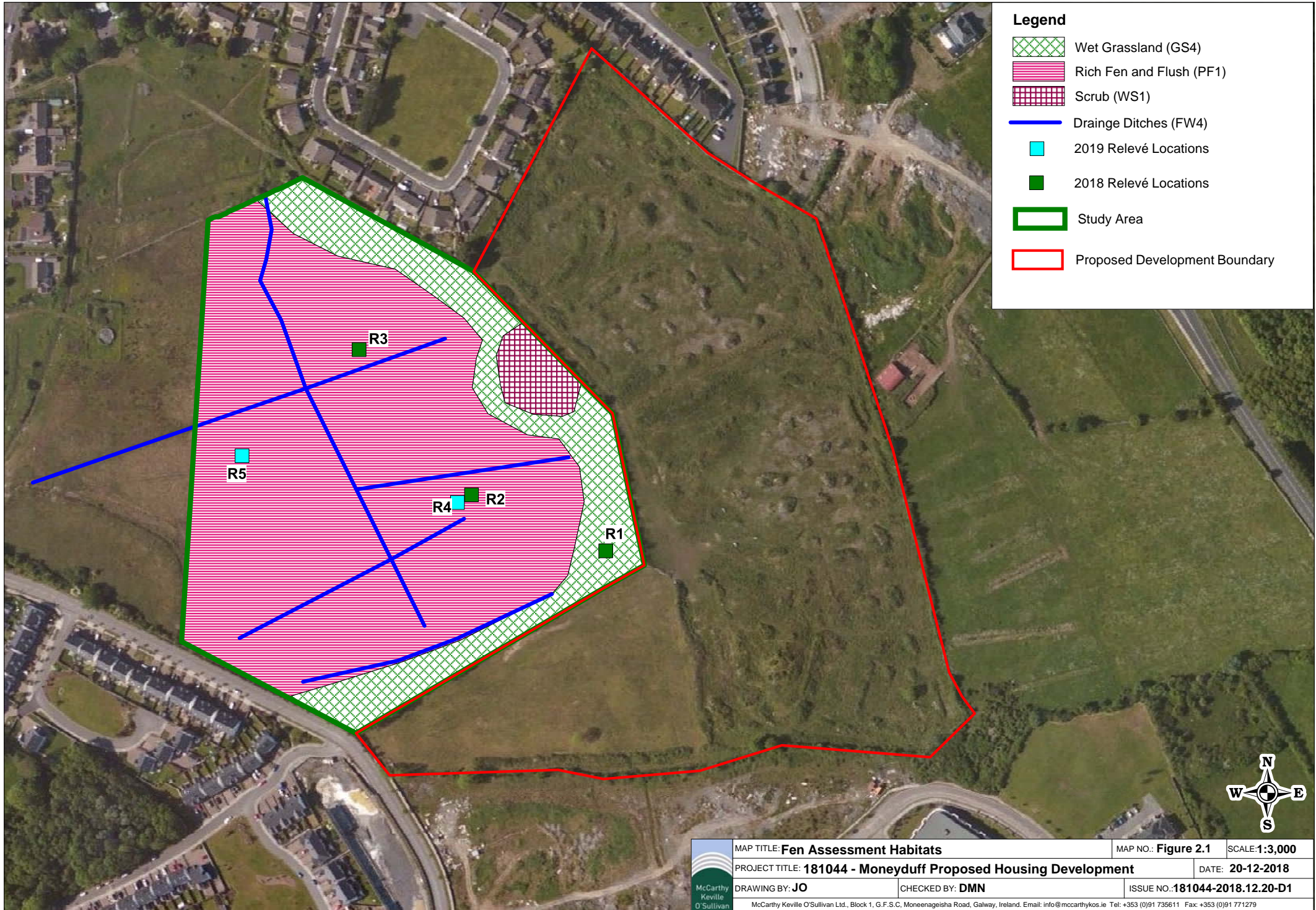
Survey methods follow methodology developed by Foss & Crushell (2008). A relevé measuring 2m x 2m was devised at each sampling location to estimate cover abundance of plant species present within each relevé. Three stops/relevés were recorded at the site.

2.1.1.1 Conservation Status (Foss & Crushell, 2008)









The survey methods outlined by Foss & Crushell (2008) for determining the conservation value of sites have been applied to the fen assessment undertaken at Moneyduff. The methods employ a ranking scheme and a conservation value score system to determine conservation value for each site. Conservation scores are assessed (scores ranked 0 to 5 for each category) under the following categories: Naturalness, Non-recreatability, Potential Value, Typicality, Education Value, Size, Diversity, Fen Value, Rarity of Species, Rarity of Habitats, Viability, Recorded History, Management Needs, Intrinsic Appeal and Expert Opinion. An example of the conservation value score system is presented in Table 2.2. Site rating is based on the ecological and site evaluation criteria presented in Table 2.3. This is a modified version of the ecological evaluation criteria developed by the NRA (NRA, 2009). Positive indicator species lists were also derived from NPWS Article 17 Report (2013) and Perrin *et al.* (2014).

Table 2.1: The Conservation value score system and ranking scheme applied to sites by Foss & Crushell (2008).

Site Conservation Status	Score Value	Ranking Code
International value	40 - 75	A
National value	30 - 75	B
County Value	25 - 29	C+
High local value	20 - 24	C
Moderate local value	11 - 19	D
Low local value	0 - 10	E



Legend

-  Wet Grassland (GS4)
-  Rich Fen and Flush (PF1)
-  Scrub (WS1)
-  Drainage Ditches (FW4)
-  2019 Relevé Locations
-  2018 Relevé Locations
-  Study Area
-  Proposed Development Boundary



	MAP TITLE: Fen Assessment Habitats	MAP NO.: Figure 2.1	SCALE: 1:3,000
	PROJECT TITLE: 181044 - Moneyduff Proposed Housing Development		DATE: 20-12-2018
	DRAWING BY: JO	CHECKED BY: DMN	ISSUE NO.: 181044-2018.12.20-D1
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Table 2.2: Site ranking criteria used by Foss & Crushell (2008) (National Fen Survey of Ireland).

Ranking	Ecological Valuation: Examples
A	<p>International Important</p> <ul style="list-style-type: none"> - Sites designated (or qualifying for designation) as SAC* or SPA* under the EU Habitats or Birds Directives. - Undesignated sites containing good examples of Annex I priority habitats under the EU Habitats Directive. - Major salmon river fisheries. - Major salmonid (salmon, trout or char) lake fisheries.
B	<p>National Important</p> <ul style="list-style-type: none"> - Sites or waters designated or proposed as an NHA* or statutory Nature Reserves. - Undesignated sites containing good examples of Annex I habitats (under EU Habitats Directive). - Undesignated sites containing significant numbers of resident or regularly occurring populations of Annex II species under the EU Habitats Directive or Annex I species under the EU Birds Directive or species protected under the Wildlife (Amendment) Act 2000. - Major trout river fisheries. - Water bodies with major amenity fishery value. - Commercially important coarse fisheries.
C+	<p>County Value</p> <ul style="list-style-type: none"> - Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or significant populations of species which are rare in the county. - Small water bodies with known salmonid populations or with good potential salmonid habitat. - Sites containing resident or regularly occurring populations of Annex II species under the EU Habitats Directive or Annex I species under the EU Birds Directive. - Large water bodies with some coarse fisheries value.
C	<p>High Value, local important</p> <ul style="list-style-type: none"> - Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or significant populations of locally rare species. - Small water bodies with known salmonid populations or with good potential salmonid habitat. - Sites containing any resident or regularly occurring populations of Annex II species under the EU Habitats Directive or Annex I species under the EU Birds Directive. - Large water bodies with some coarse fisheries value.
D	<p>Moderate value, locally important</p> <ul style="list-style-type: none"> - Sites containing some semi-natural habitat or locally important for wildlife. - Small water bodies with some coarse fisheries value or some potential salmonid habitat. - Any water body with unpolluted water (Q-value rating 4-5).
E	<p>Low value, locally important</p> <ul style="list-style-type: none"> - Sites containing some remnant semi-natural habitat or locally important for wildlife, but where disturbance has significantly altered habitat and/or continues to threaten future survival of the site.

3 RESULTS

3.1 Rich Fen and Flush

The study area was visited on the 14th of December 2018 and on the 9th of April 2019. The survey followed the methodology and assessment criteria outlined by Foss & Crushell (2008) for determining the conservation value of fens. The habitats identified within the study area included Rich fen and flush (PF1), Wet grassland (GS4) and blackthorn Scrub (WS1) and are shown in Figure 3.1. The fen (PF1) was found to conform to the Annex I Habitat Alkaline fens [7230] and graded into Wet grassland (GS4) along its east and south-east edges, which conformed to the Annex I habitat *Molinia* meadows [6410].

3.1.1 Relevé Survey

Table 3.1 Species Recorded from Relevé 01

Scientific Name	Common name	Percentage Cover/Abundance
<i>Filipendula ulmaria</i>	Meadowsweet	2
<i>Succisa pratensis</i>	Devil's-bit scabious	2
<i>Trifolium pratense</i>	Red clover	1
<i>Plantago lanceolata</i>	Ribwort plantain	5
<i>Festuca rubra</i>	Red fescue	5
<i>Centaurea nigra</i>	Knapweed	1
<i>Taraxacum officinale</i> agg.	Dandelion	+
<i>Juncus inflexus</i>	Hard rush	1
<i>Carex flacca</i>	Glaucous sedge	5
<i>Holcus lanatus</i>	Yorkshire fog	10
<i>Potentilla erecta</i>	Tormentil	+
<i>Carex panicea</i>	Carnation sedge	10
<i>Lotus corniculatus</i>	Bird's-foot trefoil	+
<i>Carex viridula</i>	Green sedge	10
<i>Cirsium palustre</i>	Marsh thistle	+
<i>Lythrum salicaria</i>	Purple loosestrife	+
<i>Agrostis capilaris</i>	Common bent	10
<i>Juncus articulatus</i>	Jointed rush	+
<i>Calliergonella cuspidatum</i>		5
Grid reference	E138188 N223583	

Table 3.2 Species Recorded from Relevé 02

Scientific Name	Common name	Percentage Cover/Abundance
<i>Carex panicea</i>	Carnation sedge	2
<i>Carex flacca</i>	Glaucous sedge	+
<i>Potentilla erecta</i>	Tormentil	+
<i>Hypericum pulchrum</i>	Slender St-John's wort	+
<i>Erica tetralix</i>	Cross-leaved heath	+
<i>Molinia caerulea</i>	Purple moor-grass	75
<i>Juncus articulatus</i>	Jointed rush	1
<i>Succisa pratensis</i>	Devil's-bit scabious	+
<i>Schoenus nigricans</i>	Black bog-rush	25
<i>Calliergonella cuspidatum</i>		3

Scientific Name	Common name	Percentage Cover/Abundance
<i>Fissidens adianthoides</i>		+
<i>Campylium stellatum</i>		2
<i>Palustriella commutata</i>		2
Grid reference	E138102 N223619	

Table 3.3 Species Recorded from Relevé 03

Scientific Name	Common name	Percentage Cover/Abundance
<i>Carex panicea</i>	Carnation sedge	1
<i>Carex flacca</i>	Glaucous sedge	+
<i>Dactylorhiza sp.</i>	Orchid	+
<i>Carex viridula</i>	Green sedge	5
<i>Carex pulicaris</i>	Flea sedge	+
<i>Molinia caerulea</i>	Purple moor-grass	65
<i>Schoenus nigricans</i>	Black bog-rush	15
<i>Juncus articulatus</i>	Jointed rush	+
<i>Succisa pratensis</i>	Devil's-bit scabious	+
<i>Erica tetralix</i>	Cross-leaved heath	2
<i>Juncus conglomeratus</i>	Compact rush	+
<i>Potentilla erecta</i>	Tormentil	+
<i>Lolium perenne</i>	Perennial ryegrass	1
<i>Lythrum salicaria</i>	Purple loosestrife	+
<i>Calliergonella cuspidatum</i>		5
<i>Hylocomium splendens</i>		5
<i>Pseudoscleropodium purum</i>		10
<i>Aulacomnium palustre</i>		1
<i>Campylium stellatum</i>		+
Grid reference	E138030 N223712	

Table 3.4 Species Recorded from Relevé 04

Scientific Name	Common name	Percentage Cover/Abundance
<i>Carex panicea</i>	Carnation sedge	1
<i>Carex viridula</i>	Green sedge	10
<i>Phragmites australis</i>	Common reed	+
<i>Erica tetralix</i>	Cross-leaved heath	+
<i>Molinia caerulea</i>	Purple moor-grass	70
<i>Juncus effusus</i>	Soft rush	2
<i>Succisa pratensis</i>	Devil's-bit scabious	1
<i>Schoenus nigricans</i>	Black bog-rush	15
<i>Calliergonella cuspidatum</i>		1
<i>Scorpidium scorpioides</i>		2
<i>Campylium stellatum</i>		3
<i>Pseudoscleropodium purum</i>		5
<i>Palustriella commutata</i>		2
Grid reference	E 138093 N 223614	

Table 3.5 Species Recorded from Relevé 05

Scientific Name	Common name	Percentage Cover/Abundance
<i>Carex panicea</i>	Carnation sedge	+

Scientific Name	Common name	Percentage Cover/Abundance
<i>Festuca rubra</i>	Red fescue	5
<i>Eriophorum sp.</i>	Cotton-grass	1
<i>Carex viridula</i>	Green sedge	5
<i>Molinia caerulea</i>	Purple moor-grass	80
<i>Schoenus nigricans</i>	Black bog-rush	15
<i>Succisa pratensis</i>	Devil's-bit scabious	+
<i>Erica tetralix</i>	Cross-leaved heath	1
<i>Potentilla erecta</i>	Tormentil	+
<i>Calliergonella cuspidatum</i>		1
<i>Pseudoscleropodium purum</i>		3
<i>Palustriella commutata</i>		3
<i>Scorpidium scorpioides</i>		1
<i>Fissidens adianthoides</i>		+
<i>Campylium stellatum</i>		3
Grid reference	E 137955 N 223644	

Relevé 1 was taken within a fringe of heavily grazed wet grassland which buffers the entire fen from the proposed development site (Plate 3.1). This area is transitional between the fen and drier grassland within the proposed development site. The area of wet grassland corresponds to the Annex I grassland habitat *Molinia* meadows on calcareous, peaty or clayey-silt laden soils (*Molinion caeruleae*) [6410]. Although this habitat is not a Qualifying Interest for the Galway Bay Complex SAC, it is known to form mosaics with fen and flush habitats at other sites such as Lough Corrib SAC. Seven positive indicator species were recorded for 6410 habitat within the relevé as per Martin et al. (2018). Although no the high quality indicator species were recorded within the relevé, meadow thistle (*Cirsium dissectum*), was recorded within the surrounding area.



Plate 3.1 Relevé1 Wet grassland (GS4)

Relevés 2 and 4 were broadly representative of most of the fen within the centre and south of the study area (Plate 3.2 and Plate 3.3). Vegetation height was relatively high, between 40-50cm, and was dominated by tussocks of purple moor-grass (*Molinia caerulea*) and to a lesser extent black bog-rush (*Schoenus nigricans*). Bryophyte cover was relatively low (10-12%) with

the following brown moss indicator species for alkaline fen recorded; *Fissidens adianthoides*, *Campylium stellatum*, *Scorpidium scorpioides* and *Palustriella commutata*. Other species recorded in the surrounding area but not considered indicator species in Article 17 reporting included bog asphodel (*Narthecium ossifragum*) and bog myrtle (*Myrica gale*). Ground conditions were soft underfoot but not quaking with some standing surface water and the area. Past grazing by livestock was also evident. Hydrological conditions were deemed favourable to support Rich fen and flush habitat (PF1). The fen habitat conforms to Annex I Alkaline fens [7230] habitat.



Plate 3.2 Relevé 2 Rich fen and flush (PF1)



Plate 3.3 Relevé 4 Rich fen and flush (PF1)

Relevé 3 was broadly representative of degraded parts of the fen associated with drains, particularly the northern part of the study area (Plate 3.4). This area had been grazed and Vegetation height was relatively short, approximately 15-20cm, and was dominated by small tussocks of purple moor-grass (*Molinia caerulea*) and to a lesser extent black bog-rush

(*Schoenus nigricans*) and sedges (*Carex panicea*, *Carex viridula*). Bryophyte cover was approximately 20% and dominated by *Pseudoscleropodium purum*, *Calliergonella cuspidatum* and *Hylocomium splendens*. The only positive brown moss indicator species recorded for Alkaline fen was *Campylium stellatum*. Ground conditions were mainly solid underfoot with only a small area of standing water. Two large drains dissect the surrounding area which has led to drying out of part of the fen and hydrological conditions were deemed unfavourable to support Rich fen and flush habitat (PF1). Although degraded, this area still corresponds to the Annex I Alkaline fens [7230] habitat due to the presence of a number of indicator species including black bog-rush, green sedge, flea sedge (*Carex pulicaris*), devil's-bit scabious (*Succisa pratensis*), orchid (*Dactylorhiza* sp), *Calliergonella cuspidatum* and the brown moss *Campylium stellatum*.



Plate 3.4 Relevé 3 Rich fen and flush (PF1)

Relevé 5 was also located in an area degraded fen associated with drains, within the western part of the study area (Plate 3.5). The area had been grazed but vegetation height was taller than Relevé 3 at approximately 30-40cm and was dominated by tussocks of purple moor-grass (*Molinia caerulea*) and to a lesser extent black bog-rush (*Schoenus nigricans*). Bryophyte cover was approximately 10% and dominated by *Pseudoscleropodium purum*, *Campylium stellatum* and *Palustriella commutata*. The positive brown moss indicator species *Scorpidium scorpioides* for Alkaline fen was also recorded. Ground conditions were relatively solid underfoot with some standing water and some drying out has occurred with a large drain located approximately 10m north of the relevé. Although some drying has occurred, hydrological conditions were still deemed favourable to support Rich fen and flush habitat (PF1). The fen habitat conforms to Annex I Alkaline fens [7230] habitat.



Plate 3.5 Relevé 5 Rich fen and flush (PF1)

3.1.2 Site Conservation Status (Foss & Crushell (2008))

Conservation value scores and ranking system to determine conservation value of the survey area have been assessed (scores ranked 0 to 5 for each category) in line with methods outlined in Section 2.1.2.1. The results of these are presented in Table 3.6.

Table 3.6 Conservation value scores and ranking scheme applied to Moneyduff, Co. Galway.

Site Conservation Status	Score Value	Ranking Code
Lislaughtera	40-75 (score of 51)	A

Applying the conservation value score system and ranking scheme used by Foss & Crushell (2008), the study area has a site conservation status that corresponds to category **A: International importance** (refer to Table 2.3).

4 DISCUSSION AND CONCLUSIONS

The fen habitat conforms to the Annex I habitat Alkaline fens [7230]. The fen contains a number of drainage ditches, with two large drains in the northern half of the fen. The relevé taken in this northern area indicates that the fen has partially dried out with negative indicator species such as perennial ryegrass being recorded. There was also poor brown moss diversity in this area. More brown mosses were recorded in the southern part of the fen which was much wetter and in better ecological condition. Despite the degraded nature of part of the fen its concluded that the conservation status of the site is of *International Importance*. The fen graded into a strip of wet grassland which conformed to the Annex I habitat *Molinia* meadows [6410] along its eastern and south-eastern edges. This habitat is not a Qualifying Interest for the Galway Bay Complex SAC and an assessment of the quality of the Annex I habitat could not be undertaken given that it is outside the optimal survey season for grasslands. However, as the *Molinia*

meadow habitat is an integral part of the adjacent fen, the conservation status of the habitat is classified as *International Importance* on a precautionary basis.

5 REFERENCES

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Appendix 8

EIAR Chapter 7: Hydrology

7 WATER

7.1 Introduction

7.1.1 Background & Objectives

Hydro-Environmental Services (HES) was engaged by McCarthy Keville O’Sullivan (MKO), on behalf of Arlum Ltd, to carry out an assessment of the potential impacts of a proposed housing development at Moneyduff, Oranmore Co. Galway on water aspects (hydrology and hydrogeology) of the receiving environment.

The objectives of the assessment are:

- Produce a baseline study of the existing water environment (surface water and groundwater including connectivity with local designated sites) in the area of the proposed development site;
- Identify likely negative impacts of the Proposed Development on surface water and groundwater during construction, operational and decommissioning phases of the development;
- Identify mitigation measures to avoid, remediate or reduce significant negative impacts; and,
- Assess significant residual impacts and cumulative impacts of the Proposed Development along with other local residential and infrastructural developments.

7.1.2 Statement of Authority

Hydro-Environmental Services (HES) are a specialist hydrological, hydrogeological and environmental practice which delivers a range of water and environmental management consultancy services to the private and public sectors across Ireland and Northern Ireland. HES was established in 2005, and our office is located in Dungarvan, County Waterford.

Our core areas of expertise and experience include upland hydrology and windfarm drainage design. We routinely complete impact assessments for hydrology and hydrogeology for a large variety of project types.

This chapter of the EIAR was prepared by Michael Gill.

Michael Gill (BA, BAI, Dip Geol., MSc, MIEI) is an Environmental Engineer with over 17 years’ environmental consultancy experience in Ireland. Michael has completed numerous hydrological and hydrogeological impact assessments of residential and infrastructure developments in Ireland. In addition, he has substantial experience in surface water drainage design and SUDs design, and surface water/groundwater interactions.

7.1.3 Relevant Legislation

The EIAR is carried out in accordance with the follow Irish legislation:

- S.I. No. 349 of 1989: European Communities (Environmental Impact Assessment) Regulations, and subsequent Amendments (S.I. No. 84 of 1995, S.I. No. 352 of 1998, S.I. No. 93 of 1999, S.I. No. 450 of 2000 and S.I. No. 538 of 2001), S.I. No. 30 of 2000, the Planning and Development Act, and S.I. 600 of 2001 Planning and Development Regulations and subsequent Amendments. These instruments implement EU Directive 85/373/EEC and subsequent amendments, on the assessment of the effects of certain public and private projects on the environment;
- Directives 2011/92/EU and 2014/52/EU on the assessment of the effects of certain public and private projects on the environment, including Circular Letter PL 1/2017: Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive);
- Planning and Development Act, 2000, as amended;
- S.I. No. 94 of 1997: European Communities (Natural Habitats) Regulations, resulting from EU Directives 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive) and 79/409/EEC on the conservation of wild birds (the Birds Directive);
- S.I. No. 293 of 1988: Quality of Salmon Water Regulations, resulting from EU Directive 78/659/EEC on the Quality of Fresh Waters Needing Protection or Improvement in order to Support Fish Life;
- S.I. No. 272 of 2009: European Communities Environmental Objectives (Surface Waters) Regulations 2009 and S.I. No. 722 of 2003 European Communities (Water Policy) Regulations which implement EU Water Framework Directive (2000/60/EC) and provide for implementation of 'daughter' Groundwater Directive (2006/118/EC). Since 2000 water management in the EU has been directed by the Water Framework Directive (WFD). The key objectives of the WFD are that all water bodies in member states achieve (or retain) at least 'good' status by 2015. Water bodies comprise both surface and groundwater bodies, and the achievement of 'Good' status for these depends also on the achievement of 'good' status by dependent ecosystems. Phases of characterisation, risk assessment, monitoring and the design of programmes of measures to achieve the objectives of the WFD have either been completed or are ongoing. In 2015 it will fully replace a number of existing water related directives, which are successively being repealed, while implementation of other Directives (such as the Habitats Directive 92/43/EEC) will form part of the achievement of implementation of the objectives of the WFD;
- S.I. No. 41 of 1999: Protection of Groundwater Regulations, resulting from EU Directive 80/68/EEC on the protection of groundwater against pollution caused by certain dangerous substances (the Groundwater Directive);
- S.I. No. 249 of 1989: Quality of Surface Water Intended for Abstraction (Drinking Water), resulting from EU Directive 75/440/EEC concerning the quality required of surface water intended for the abstraction of drinking water in the Member States (repealed by 2000/60/EC in 2007);
- S.I. No. 439 of 2000: Quality of Water intended for Human Consumption Regulations and S.I. No. 278 of 2007 European Communities (Drinking Water No. 2) Regulations, arising from EU Directive 98/83/EC on the quality of water intended for human consumption (the Drinking Water Directive) and WFD 2000/60/EC (the Water Framework Directive);

- S.I. No. 272 of 2009: European Communities Environmental Objectives (Surface Waters) Regulations 2009;
- S.I. No. 9 of 2010: European Communities Environmental Objectives (Groundwater) Regulations 2010; and,
- S.I. No. 296 of 2009: European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009.

7.1.4 Relevant Guidance

The water section of the EIA is carried out in accordance with guidance contained in the following:

- Guidance on the preparation of the EIA Report (Directive 2011/92/EU as amended by 2014/52/EU);
- Environmental Protection Agency (2017): Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports;
- Environmental Protection Agency (September 2015): Draft - Advice Notes on Current Practice (in the preparation on Environmental Impact Statements);
- Environmental Protection Agency (September 2015): Draft – Revised Guidelines on the Information to be Contained in Environmental Impact Statements;
- Environmental Protection Agency (2003): Advice Notes on Current Practice (in the preparation on Environmental Impact Statements);
- Environmental Protection Agency (2002): Guidelines on the Information to be Contained in Environmental Impact Statements;
- Institute of Geologists Ireland (2013): Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements;
- National Roads Authority (2005): Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes;
- Eastern Regional Fisheries Board (not dated): Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites;
- PPG1 - General Guide to Prevention of Pollution (UK Guidance Note);
- PPG5 – Works or Maintenance in or Near Watercourses (UK Guidance Note);
- CIRIA (Construction Industry Research and Information Association) 2006: Guidance on 'Control of Water Pollution from Linear Construction Projects' (CIRIA Report No. C648, 2006); and,
- CIRIA 2006: Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors. CIRIA C532. London, 2006.

7.2 Methodology

7.2.1 Desk Study

A desk study of the Proposed Development study area was largely completed prior to the undertaking of field mapping and walkover assessments. The desk study involved collecting all relevant geological, hydrological, hydrogeological and meteorological data for the area. This included consultation with the following:

- Environmental Protection Agency database (www.epa.ie);
- Environmental Protection Agency River Catchment Mapper (www.catchments.ie);
- Geological Survey of Ireland - Groundwater Database (www.gsi.ie);
- Met Eireann Meteorological Databases (www.met.ie);
- National Parks & Wildlife Services Public Map Viewer (www.npws.ie);
- Water Framework Directive Map Viewer (www.catchments.ie);
- Bedrock Geology 1:100,000 Scale Map Series, Sheet 14 (Geology of Galway Bay). Geological Survey of Ireland (GSI, 2004);
- Geological Survey of Ireland - Groundwater Body Characterisation Reports;
- OPW Indicative Flood Maps (www.floodinfo.ie);
- Environmental Protection Agency – “Hydrotool” Map Viewer (www.epa.ie);
- CFRAM Preliminary Flood Risk Assessment (PFRA) maps (www.cfram.ie);
- and,
- Department of Environment, Community and Local Government on-line mapping viewer (www.myplan.ie).

7.2.2 Site Investigations

A walkover survey, including detailed drainage mapping, was undertaken by HES on 05th January 2018.

The hydrological walkover survey involved:

- Walkover survey and hydrological mapping of the proposed site the surrounding area were undertaken whereby water flow directions and drainage patterns were recorded; and,
- A flood risk assessment for the proposed development footprint area.

7.2.3 Impact Assessment Methodology

Please refer to Chapter 1 of the EIAR for details on the impact assessment methodology (EPA, 2002, 2003, 2015 and 2017). In addition to the above methodology, the sensitivity of the water environment receptors was assessed on completion of the desk study and baseline study. Levels of sensitivity which are defined in Table 7.1 are then used to assess the potential effect that the Proposed Development may have on them.

Table 7.1 Receptor Sensitivity Criteria (Adapted from www.sepa.org.uk)

Sensitivity of Receptor	
Not sensitive	Receptor is of low environmental importance (e.g. surface water quality classified by EPA as A3 waters or seriously polluted), fish sporadically present or restricted). Heavily engineered or artificially modified and may dry up during summer months. Environmental equilibrium is stable and is resilient to changes which are considerably greater than natural fluctuations, without detriment to its present character. No abstractions for public or private water supplies. GSI groundwater vulnerability “Low” – “Medium” classification and “Poor” aquifer importance.
Sensitive	Receptor is of medium environmental importance or of regional value. Surface water quality classified by EPA as A2. Salmonid species may be present and may be locally important for fisheries. Abstractions for private water supplies. Environmental equilibrium copes well with all natural fluctuations but cannot absorb some changes greater than this without altering part of its present character. GSI groundwater vulnerability “High” classification and “Locally” important aquifer.
Very sensitive	Receptor is of high environmental importance or of national or international value i.e. NHA or SAC. Surface water quality classified by EPA as A1 and salmonid spawning grounds present. Abstractions for public drinking water supply. GSI groundwater vulnerability “Extreme” classification and “Regionally” important aquifer

7.3 Receiving Environment

7.3.1 Site Description & Topography

The Proposed Development site is located in the townland of Moneyduff in Oranmore, Co. Galway. The total study area is approximately 8.642ha (~0.09km²) in area.

The proposed site is used for rough grazing of horses and contains a number of areas where stone material has grassed over in the past.

The elevation of the site ranges between approximately 3.4 and 12.8m OD (metres above Ordnance Datum). The overall local topography generally slopes from east to west with stone mounds creating artificial high points around the site. The dominant land use on the bordering land is residential housing to the north, an environmental reserve to the west and an empty site and further residential uses to the south and greenfield site to the east.

The Proposed Development site does not contain field drains or natural watercourses and it is likely that much of the rainfall that falls on the site drains through the soils. The Millplot Stream drains the land immediately to the west of the site.

7.3.2 Water Balance

Long term rainfall and evaporation data was sourced from Met Éireann. The 30-year annual average rainfall (1981 - 2010) recorded at Athenry station, located northeast of the Proposed Development site, are presented in Table 7.2 below. This is the closest station to the proposed development site.

(Please note that these rainfall data are used for baseline characterisation purposes only and are not used for assessing runoff volumes pre/post development or for drainage design).

Table 7.2 Local Average long-term Rainfall Data (mm) at Athenry

Station		X-Coord		Y-Coord		Ht (MAOD)		Opened		Closed		
Athenry		08°47'08" W		53°17'21" N		40		1945		N/A		
Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Total
117	88	95	72	75	80	87	108	100	129	120	123	1,193

The closest synoptic station where the average potential evapotranspiration (PE) is recorded is at Claremorris station, approximately 51km north of the site. The long-term average PE for this station is 408mm/yr. This value is used as a best estimate of the site PE. Actual Evaporation (AE) at the site is estimated as 388mm/yr (which is $0.95 \times PE$).

The effective rainfall (ER) represents the water available for runoff and groundwater recharge. The ER for the site is calculated as follows:

$$\begin{aligned} \text{Effective rainfall (ER)} &= \text{AAR} - \text{AE} \\ &= 1,193\text{mm/yr} - 388\text{mm/yr} \\ \text{ER} &= 805\text{mm/yr} \end{aligned}$$

Based on groundwater recharge coefficient estimates (85%) from the GSI (www.gsi.ie) an estimate of 684mm/year average annual recharge is given for the study area. This means that the hydrology of the study area is characterised by low surface water runoff rates and high groundwater recharge rates. The site is also relatively close to the coast, and all drainage from the site will ultimately end up in Oranmore Bay Galway Bay.

Therefore, annual recharge and runoff rates for the site are estimated to be 684mm/yr and 121mm/yr respectively. The large coverage of well-draining mineral soils and relatively flat ground means recharge rates are likely to be towards the higher end of the GSI range.

7.3.3 Regional & Local Hydrology

On a regional scale, the site is located within Hydrometric Area 29. The site is located in the Galway Bay South East catchment and Carrowmoneash (Oranmore)_SC_010 sub-catchment under the Water Framework Directive (WFD). A regional hydrology map is shown as Figure 7.1.

The Millplot Stream flows west from the land to the west of the proposed site, and continues west, discharging into Oranmore Bay ~340 downstream. The Proposed Development site does not contain any mapped watercourses.

A local hydrology map is shown as Figure 7.2.

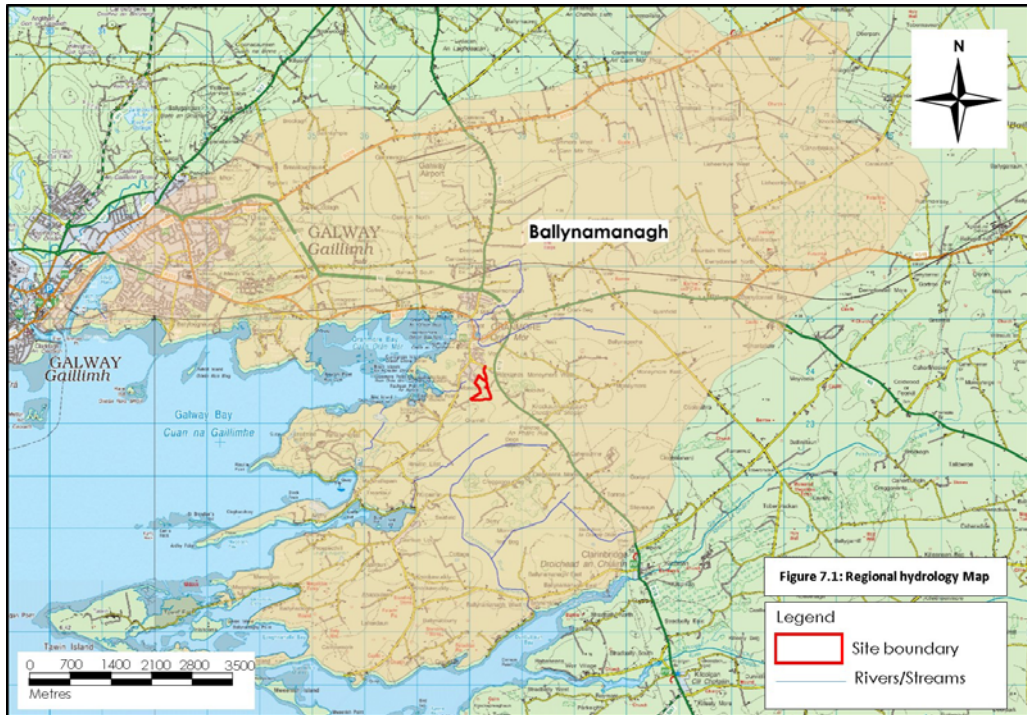


Figure 7.1 Regional Hydrology

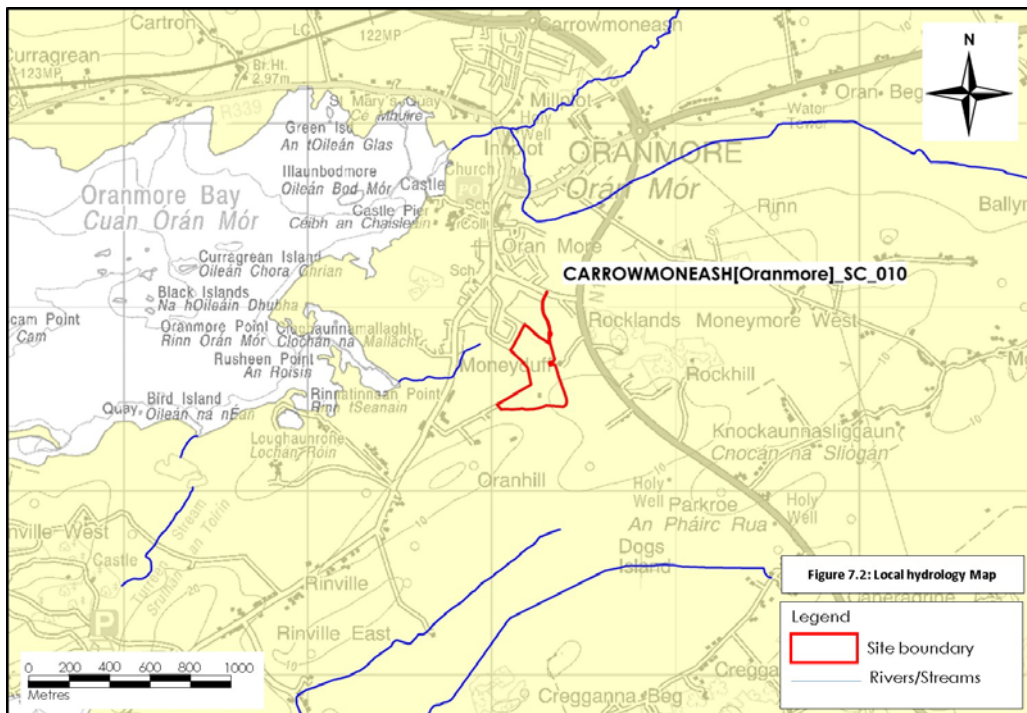


Figure 7.2 Local Hydrology

7.3.4 Site Drainage

In the field to the west of the proposed development site, the soil was poorly drained and wet underfoot. This field is influenced by the Millplot Stream and artificial drainage channels that cross the site. The Millplot Stream and field drains all drain to a single culvert under the road on the site's western boundary. All channel banks showed evidence of scouring from machinery shovels suggesting they are actively maintained. There was evidence of seaweed on the banks of the Millplot Stream and a

nearby field drain indicating a tidal influence on both. High tides occurred in Galway bay area in the days preceding the site inspection (January 2018).

The Millplot Stream enters this area on the northern boundary from a neighbouring construction site. On the day of the site visit, the stream showed adequate capacity to manage flow within its channel. The stream channel is approximately 3m wide and the height varied from 0.7m to 1.2m, with a bank full width of 4-5m.

A possible spring was observed on the northern boundary of this property. This is consistent with the historic 25" OS map that indicates a spring in this part of the site.

The Proposed Development site is separated from the western, flood-affected land by a stone wall. Generally, the fields within the proposed site were better drained and firmer underfoot than the western field, but still contained some waterlogged areas.

Mounds of existing rock-based fill appear to influence the direction of runoff to some degree in this area of the site, with higher land to the east and lower land to the west. Ultimately the natural topography of the land, underlying the existing artificial fill, follows the same slope from east to west.

No field drains or channels were observed in this area and the surrounding residential land on the northern boundary of these fields, and land and road on the southern boundary are significantly higher (~1.3m on northern side and ~2m on southern side) than the proposed development site.

The lower parts of this area, on the eastern side of the stone wall that separates it from the larger western field, is where ponding was observed.

In the proposed development site, there are no relevant surface water features. In addition, there was no evidence of tidal influences such as the seaweed debris line seen in the western field. As such, the most relevant source of flooding in this section of the site is pluvial/surface runoff.

7.3.5 Flood Risk Identification

To identify those areas as being at risk of flooding OPW's indicative river and coastal flood map (www.floodmaps.ie), CFRAM Preliminary Flood Risk Assessment (PFRA) maps (www.cfram.ie), Department of Environment, Community and Local Government on-line planning mapping (www.myplan.ie) and historical mapping (*i.e.* 6" and 25" base maps) were consulted.

There is no identifiable map text on local available historical 6" or 25" mapping for the study area that identify lands that are "prone to flooding".

There are no recurring flood incidents within the study area boundary according to the OPW's flood mapping. There are no areas within the study area mapped as "Benefiting Lands". Benefiting lands are defined as a dataset prepared by the Office of Public Works identifying land that might benefit from the implementation of Arterial (Major) Drainage Schemes (under the Arterial Drainage Act 1945) and indicating areas of land subject to flooding or poor drainage.

The OPW PFRA map for the area, Map no. 210 (www.cfram.ie/pfra/interactive-mapping/), indicates that there are areas of the proposed site, on the western boundary, within the indicative 200-year coastal flood zone (*i.e.* Flood Zone A) and 1000-year coastal flood zone (*i.e.* Flood Zone B). Land to the west of the proposed site

is located within the indicative Flood Zone A. The PFRA mapping reflects the close proximity of the site to Oranmore Bay and the fact that the topography of the land between Oranmore Bay and the proposed development site is relatively flat.

No areas within the proposed site are located in the indicative 100-year fluvial or pluvial flood zones (Flood Zone A) or the 1000-year fluvial or pluvial flood zone (Flood Zone B).

Where complete the Catchment Flood Risk Assessment and Management (CFRAM) OPW Flood Risk Assessment Maps are now the primary reference for flood risk planning in Ireland and supersede the PFRA maps. CFRAM mapping has been completed for the area of the proposed site.

The CFRAM mapping shows that the proposed development site is outside the 10-year Tidal Flood Extent. Large sections of the land to the west of the proposed development site are located within the 10-year Tidal Flood Extent but owing to higher land within the development site, the flood extent does not encompass this land to the east. Furthermore, no areas within the proposed development site are located in the 200-year flood level (Flood Zone A) or the 1000-year flood level (Flood Zone B). As such, the entire proposed development site is located in Flood Zone C.

Refer to attached Appendix 7-1 which includes a Stage 2 Flood Risk Assessment for the proposed development site.

7.3.6 Surface Water Hydrochemistry

Q-rating status data is not available for the Millplot Stream as no EPA monitoring points exist on this watercourse. No watercourses or field drains exist within the Proposed Development site to determine surface water hydrochemistry.

7.3.7 Hydrogeology

Dinantian Pure Bedded Limestones (DPBL), which are mapped to underlie the Proposed Development site are classified by the GSI (www.gsi.ie) as a Regionally Important Aquifer – Karstified (conduit). A bedrock aquifer map is shown as Figure 7.3.

This bedrock type has typically high transmissivity and low storativity with lower gradients closer to the coast.

Groundwater flow occurs along fissures, faults, joints and bedding planes. Rapid groundwater flow velocities indicate a large proportion of groundwater flow occurs in enlarged conduit systems (GSI, 2004).

Groundwater flow directions are generally to the west but as flow pathways are often determined by discrete conduits, actual flow directions will not necessarily be perpendicular to the assumed water table contours (GSI, 2004).

There is a high degree of interaction between surface water and groundwater. Prior to drainage, streams sank underground via the sinks within turloughs, approximately 5-15 km from the coast, before being discharged as springs on the coast (GSI, 2004).

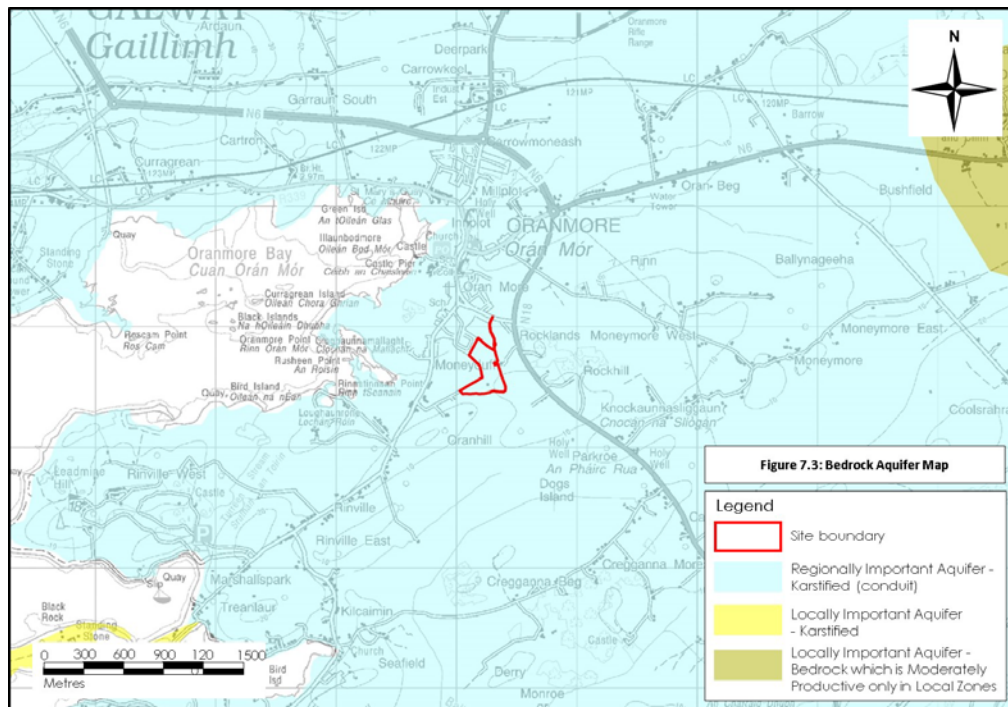


Figure 7.3 Bedrock Aquifer Map

7.3.8 Groundwater Vulnerability

The vulnerability rating of the aquifer within the overall site is classified as “Extreme (X –rock at/near surface)”.

Due to the relatively high permeability nature of the bedded limestone bedrock aquifer underlying the site and the highly karstified nature of the bedrock, there is a higher potential for groundwater dispersion and movement within the aquifer and aquifer vulnerability should be considered in the mitigation measures for the site.

7.3.9 Groundwater Hydrochemistry

There are no groundwater quality data for the proposed development site and groundwater sampling would generally not be undertaken for this type of development in terms of EIAR reporting as groundwater quality impacts would not be anticipated. There are also no proposed discharges to ground. The WFD status for the local groundwater body in terms of water quality is Good and therefore this is assumed to be the baseline condition for groundwater in the area of the proposed development.

Based on data from GSI publication Calcareous/Non calcareous classification of bedrock in the Republic of Ireland (WFD,2004), alkalinity for this bedrock type generally ranges from 9.6 – 990mg/L while electrical conductivity and hardness were reported to have mean values of 691µS/cm and 339mg/L respectively.

7.3.10 Water Framework Directive Water Body Status & Objectives

Local Groundwater Body and Surface Water Body status and risk result are available from (www.catchments.ie).

The proposed development site predominately drains to the underlying subsoil and aquifer. The Millplot stream drains the land immediately to the west of the site.

The River Water Quality Status (2010 – 2015) for the Millplot Stream is rated as “Unassigned” and has a risk result of “Review”.

7.3.11 Groundwater Body Status

Local Groundwater Body (GWB) status information are available (www.catchments.ie). Refer to Figure 7.4 for the location and extent of local groundwater body.

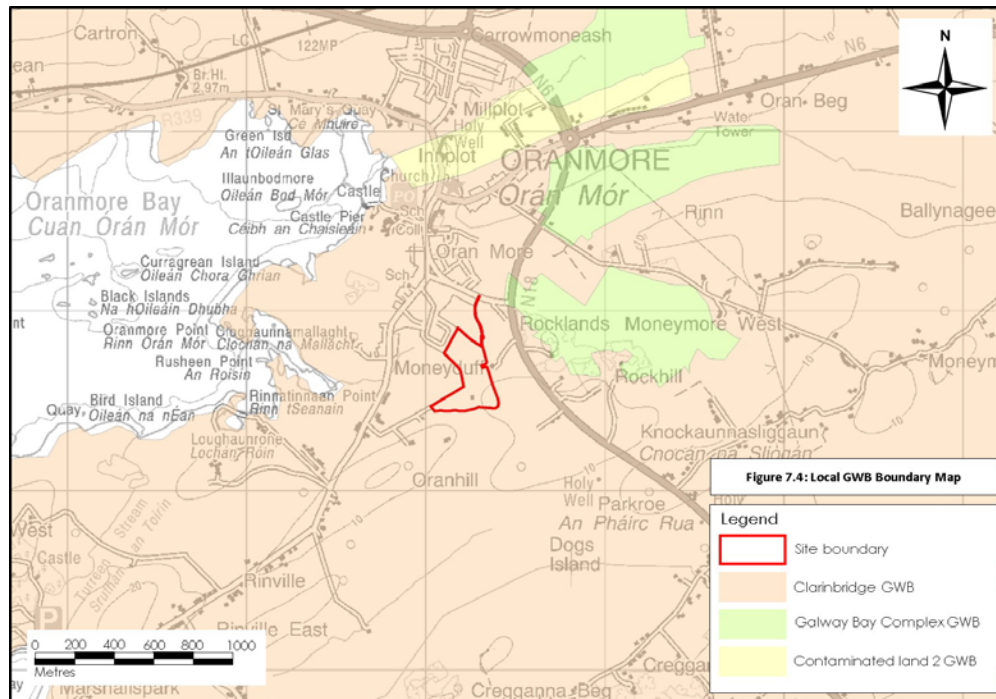


Figure 7.4 Groundwater Bodies

The Clarinbridge GWB (IE_WE_G_0008) which underlies the Proposed Development site is assigned an ‘At Risk’ status based on the quantitative status and chemical status of the GWB.

7.3.12 Designated Sites & Habitats

Designated sites include National Heritage Areas (NHAs), Proposed National Heritage Areas (pNHAs), Special Areas of Conservation (SACs), candidate Special Areas of Conservation (cSAC) and Special Protection Areas (SPAs).

Immediately to the west of the proposed site is the Galway Bay Complex SAC (Code: 000268), and three additional isolated pockets of the Galway Bay Complex SAC also exists to the east of the proposed development site, on the eastern side of the N18. The Millplot Stream which flows through the land to the west of the site, enters the Inner Galway Bay SPA (Code: 004031) approximately 340m downstream of the proposed site. The Cregganna Marsh SPA/NHA is located south of the proposed Development site. A designated sites map is attached as Figure 7.5.

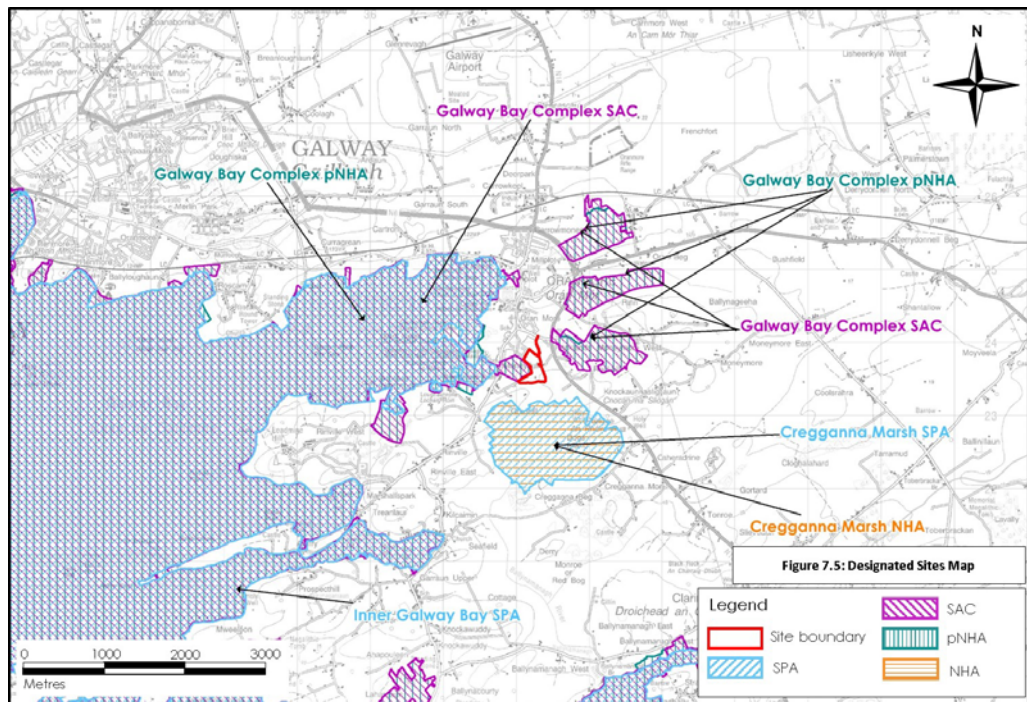


Figure 7.5 Designated Sites

7.3.13 Water Resources

There are no groundwater protection zones mapped within the proposed development site or study area. There are no mapped private well locations (GSI database to accuracy of <50m) within 2km, which were obtained from the GSI well database (www.gsi.ie).

No groundwater wells would be expected in the area, given the proximity to the sea. Notwithstanding this, an assessment of groundwater resources relative to the proposed development is completed below.

7.3.14 Receptor Sensitivity

Due to the nature of residential developments, being near surface construction activities, impacts on groundwater are generally negligible and surface water is generally the main sensitive receptor assessed during impact assessments. The primary risk to groundwater at the site would be from cementitious materials, hydrocarbon spillage and leakages. No interruption of existing groundwater drainage pathways below the site are anticipated due to the shallow nature of excavations within the development. The above are common potential impacts on all construction sites (such as road works and industrial sites). All potential contamination sources are to be carefully managed at the site during the construction and operational phases of the development and mitigation measures are proposed below to deal with these potential minor impacts.

Based on criteria set out in Table 7.1 above, the Regionally Important Karstified Aquifer (*i.e.* Limestone) at the site can be classed as Sensitive to pollution. Also, any contaminants which may be accidentally released on-site may also discharge to local surface water drainage and the Millplot stream, and then on into Galway Bay.

The lands to the west of the proposed site are located within the Galway Bay Complex SAC (Code: 000268) and the Millplot Stream flows into the Inner Galway Bay SPA

(Code: 004031) approximately 340m downstream of the proposed site. Three isolated pockets of the Galway Bay SAC also exist to the east of the site, east of the N18.

Comprehensive surface water mitigation and controls are outlined below to ensure protection of all downstream receiving waters during construction and operational phases of the development. Mitigation measures will ensure that surface runoff from the developed areas of the site will be of a high quality and will therefore not impact on the quality of downstream surface water bodies. Any introduced drainage works at the development site will mimic the existing hydrological regime, and discharge will be to ground via soakaways, thereby avoiding changes to surface water flow volumes leaving the site.

7.3.15 Proposed Site infrastructure and Drainage Management

It is proposed that the development will drain via gravity to 5 no. soakaways proposed on site. Water draining to soakaways will pass through silt traps and hydrocarbon interceptors prior to reaching each soakaway. No surface water from roofs or paved surfaces will be discharge from the site, other than via the soakaways to ground.

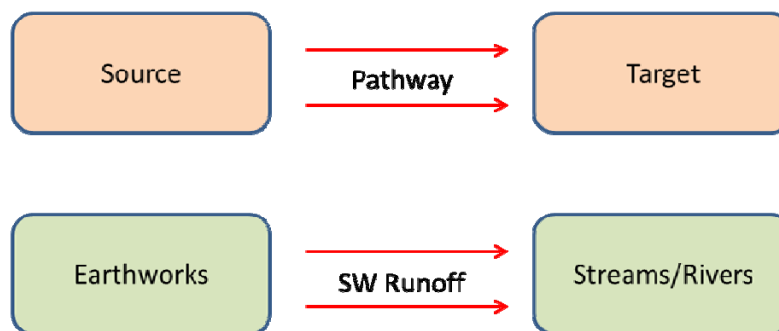
Water supply to the site will be via connection to the adjacent public (Irish Water) watermain.

The proposed on-site foul sewers will discharge by gravity to a pumping station to the west of the site, and the foul waste will discharge from this pumping station via pumped rising main to the adjacent public (Irish Water) foul sewer network.

7.4 Potential Impacts and Mitigation Measures

7.4.1 Overview of Impact Assessment Process

The conventional source-pathway-target model (see below, top) was applied to assess potential impacts on downstream environmental receptors (see below, bottom as an example) as a result of the proposed housing development.



Where potential impacts are identified, the classification of impacts in the assessment follows the descriptors provided in the Glossary of Impacts contained in the following guidance documents produced by the Environmental Protection Agency (EPA):

- Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2017);
- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA, 2003);
- Guidelines on the Information to be contained in Environmental Impact Statements (EPA, 2002).

The description process clearly and consistently identifies the key aspects of any potential impact source, namely its character, magnitude, duration, likelihood and whether it is of a direct or indirect nature.

In order to provide an understanding of the stepwise impact assessment process applied below (Section 7.4.2 and 7.4.3), we have firstly presented below a summary guide that defines the steps (1 to 7) taken in each element of the impact assessment process. The guide also provides definitions and descriptions of the assessment process and shows how the source-pathway-target model and the EPA impact descriptors are combined.

Using this defined approach, this impact assessment process is then applied to the development construction and operational activities which have the potential to generate a source of significant adverse impact on the geological and hydrological/hydrogeological (including water quality) environments.

Step 1	Identification and Description of Potential Impact Source This section presents and describes the activity that brings about the potential impact or the potential source of pollution. The significance of effects is briefly described.	
Step 2	Pathway / Mechanism:	The route by which a potential source of impact can transfer or migrate to an identified receptor. In terms of housing developments, surface water and groundwater flows are the primary pathways, or for example, excavation or soil erosion are physical mechanisms by which a potential impact is generated.
Step 3	Receptor:	A receptor is a part of the natural environment which could potentially be impacted upon, <i>e.g.</i> human health, plant / animal species, aquatic habitats, soils/geology, water resources, water sources. The potential impact can only arise as a result of a source and pathway being present.
Step 4	Pre-mitigation Impact:	Impact descriptors which describe the magnitude, likelihood, duration and direct or indirect nature of the potential impact before mitigation is put in place.
Step 5	Proposed Mitigation Measures:	Control measures that will be put in place to prevent or reduce all identified significant adverse impacts. In relation to housing developments, these measures are generally provided in two types: (1) mitigation by avoidance, and (2) mitigation by engineering design.
Step 6	Post Mitigation Residual Impact:	Impact descriptors which describe the magnitude, likelihood, duration and direct or indirect nature of the potential impacts after mitigation is put in place.
Step 7	Significance of Effects:	Describes the likely significant post mitigation effects of the identified potential impact source on the receiving environment.

7.4.2 Construction Phase Potential Impacts

7.4.2.1 Earthworks (Removal of Vegetation Cover, Excavations and Stock Piling) Resulting in Suspended Solids Entrainment in Surface Waters

Construction phase activities including site levelling, service trench construction, levelling/construction and building foundation excavation will require earthworks resulting in removal of vegetation cover and excavation of any minor local pockets of organic soil/subsoils, and bedrock. Such excavations will be relatively shallow and temporary. The main risk will be from surface water runoff from bare soil and soil storage areas during construction works.

The site is relatively unique in that there are no adjacent natural or man-made watercourses and surface water generally percolates to ground. However, the construction activities can result in the release of suspended solids to local drainage features and could result in an increase in the suspended sediment load, resulting in increased turbidity which in turn could affect the water quality and fish stocks of downstream water bodies, Oranmore Bay/Galway Bay. This potential impact cannot directly or indirectly effect areas of the Galway Bay SAC east of the N18.

Pathways: Drainage and surface water discharge routes.

Receptors: Down-gradient transitional and water dependent ecosystems.

Pre-Mitigation Impact

Indirect, negative, significant, temporary, likely impact.

Proposed Mitigation Measures

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

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

Mitigation by Design:

A summary of surface water controls that can be employed during the earthworks and construction phase are as follows:

- Source controls:
 - Interceptor drains, vee-drains, diversion drains, flume pipes, erosion and velocity control measures such as use of sand bags, oyster bags filled with gravel, filter fabrics, and other similar/equivalent or appropriate systems.
 - Small working areas, covering stockpiles, weathering off stockpiles, cessation of works in certain areas or other similar/equivalent or appropriate measures.
- In-Line controls:
 - Interceptor drains, vee-drains, oversized swales, erosion and velocity control measures such as check dams, sand bags, oyster bags, straw bales, flow limiters, weirs, baffles, silt bags, silt fences, sedimats, filter fabrics, and collection sumps, temporary sumps/attenuation lagoons, sediment traps, pumping systems, settlement ponds, temporary pumping chambers, or other similar/equivalent or appropriate systems.
- Treatment systems:
 - Temporary sumps and attenuation ponds, temporary storage lagoons, sediment traps, and settlement ponds, and proprietary settlement systems such as Siltbuster, and/or other similar/equivalent or appropriate systems.

Silt Fences:

Silt fences will be placed up-gradient of all drains where construction is proposed. Silt fences are effective at removing heavy settleable solids. This will act to prevent entry to watercourses of sand and gravel sized sediment, released from excavation of mineral sub-soils of glacial and glacio-fluvial origin, and entrained in surface water runoff. Inspection and maintenance of these structures during construction phase is critical to their functioning to stated purpose. They will remain in place throughout the entire construction phase.

Silt Bags:

Silt bags will be used where small to medium volumes of water need to be pumped from excavations or swales. As water is pumped through the bag, most of the sediment is retained by the geotextile fabric allowing filtered water to pass through. Silt bags will be used with natural vegetation filters.

Residual Impact

Indirect, negative, slight, temporary, medium probability impact on downstream surface waters.

Significance of Effects

No significant impacts on surface water quality are expected due to site excavation work. There is limited hydraulic connectivity between the site and watercourses and mitigation measures will be employed on a precautionary basis.

7.4.2.2 Potential Surface Water Quality Impacts from Shallow Excavation Dewatering

Some groundwater seepages will likely occur in foundation excavations and especially where more permeable weathered bedrock are encountered. Dewatering will create additional volumes of water to be treated by the runoff management system. Inflows will likely require management and treatment to reduce suspended sediments. No contaminated land was noted at the site and therefore historical pollution sources are not anticipated. Such works will be temporary.

Pathway: Overland flow and site drainage network.

Receptor: Down-gradient surface water bodies.

Pre-Mitigation Impact

Indirect, negative, moderate, temporary, medium probability impact to surface water quality.

Impact Assessment

Management of excavation seepages and subsequent treatment prior to discharge into the site drainage network will be undertaken as follows:

- Appropriate interceptor drainage, to prevent upslope surface runoff from entering excavations will be put in place if required;
- The interceptor drainage will be discharged to the site constructed drainage system or onto natural vegetated surfaces and not directly to surface waters;
- If required, pumping of excavation inflows will prevent build-up of water in the excavation;
- The pumped water volumes will be discharged via volume and sediment attenuation ponds adjacent to excavation areas, or via silt bags;
- There will be no direct discharge to the on-site main drains, and therefore no risk of hydraulic loading or contamination will occur; and,
- Daily monitoring of excavations by a suitably qualified person will occur during the construction phase. If high levels of seepage inflow occur, excavation work should immediately be stopped and a geotechnical assessment undertaken.

The temporary nature of such works (if they are required), and also the limited shallow depth of any such requirement will not affect the local hydrological regime, the level of the water table, nor the throughflow of shallow or deeper groundwater flow below the development site.

Residual Impact

Indirect, negative, slight, temporary, low probability impact on downstream surface waters.

No impact on groundwater levels or groundwater quality.

Significance of Effects

No significant impacts on surface water quality, groundwater levels or groundwater quality are expected due to excavation dewatering.

7.4.2.3 Potential Release of Hydrocarbons during Construction Stage

Accidental spillage during refuelling of construction plant with petroleum hydrocarbons is a significant pollution risk to groundwater, surface water and associated ecosystems, and to terrestrial ecology. The accumulation of small spills of fuels and lubricants during routine plant use can also be a pollution risk.

Hydrocarbon has a high toxicity to humans, and all flora and fauna, including fish, and is persistent in the environment. It is also a nutrient supply for adapted micro-organisms, which can rapidly deplete dissolved oxygen in waters, resulting in death of aquatic organisms.

Pathway: Groundwater flowpaths and site drainage network.

Receptor: Groundwater and surface water.

Pre-Mitigation Impact

Indirect, negative, slight, short term, likely impact to local groundwater quality.

Indirect, negative, significant, short term, unlikely impact to surface water quality.

Proposed Mitigation Measures:

Mitigation by Design:

- On site re-fuelling of machinery will be carried out using a mobile double skinned fuel bowser. The fuel bowser, a double-axel custom-built refuelling trailer will be re-filled off site and will be towed around the site by a 4x4 jeep to where machinery is located. The 4x4 jeep will also carry fuel absorbent material and pads in the event of any accidental spillages. The fuel bowser will be parked on a level area in the construction compound when not in use and only designated trained and competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations;
- Fuels stored on site will be minimised. Any storage areas will be bunded appropriately for the fuel storage volume for the time period of the construction;
- The plant used should be regularly inspected for leaks and fitness for purpose; and,
- An emergency plan for the construction phase to deal with accidental spillages will be contained within Environmental Management Plan. Spill kits will be available to deal with accidental spillages.

Residual Impact

Indirect, negative, imperceptible, temporary, unlikely impact on groundwater and surface water.

Significance of Effects

No significant effects on surface water or groundwater quality are anticipated.

7.4.2.4 Groundwater and Surface Water Contamination from Wastewater Disposal

Release of effluent from on-site wastewater systems has the potential to impact on groundwater and surface waters.

Pathway: Groundwater flowpaths and site drainage network.

Receptor: Down-gradient well supplies, groundwater quality and surface water quality.

Pre-mitigation Impact

Indirect, negative, significant, temporary, unlikely impact to surface water quality.

Indirect, negative, slight, temporary, unlikely impact to local groundwater.

Proposed Mitigation Measures

Mitigation by Avoidance:

- A self-contained port-a-loo with an integrated waste holding tank will be used at the site compounds, maintained by the providing contractor, and removed from site on completion of the construction works;
- No wastewater will be discharged on-site during either the construction or operational phase.

Residual Impact

No impact.

Significance of Effects

No significant effects on surface water or groundwater quality are anticipated.

7.4.2.5 Release of Cement-Based Products

Concrete and other cement-based products are highly alkaline and corrosive and can have significant negative impacts on water quality. They generate very fine, highly alkaline silt (pH 11.5) that can physically damage fish by burning their skin and blocking their gills. A pH range of $\geq 6 \leq 9$ is set in S.I. No. 293 of 1988 Quality of Salmonid Water Regulations, with artificial variations not in excess of ± 0.5 of a pH unit. Entry of cement based products into the site drainage system, into surface water runoff, and hence to surface watercourses or directly into watercourses represents a risk to the aquatic environment.

Pathway: Site drainage network.

Receptor: Surface water and transitional water hydrochemistry.

Pre-Mitigation Impact

Indirect, negative, moderate, short term, likely impact to surface water.

Proposed Mitigation Measures

Mitigation by Avoidance:

- No batching of wet-cement products will occur on site. Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place;
- No washing out of any plant used in concrete transport or concreting operations will be allowed on-site;
- Where concrete is delivered on site, only the chute need be cleaned, using the smallest volume of water possible. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water is to be tanked and removed from the site to a suitable, non-polluting, discharge location;
- Use weather forecasting to plan dry days for pouring concrete; and,
- Ensure pour site is free of standing water and plastic covers will be ready in case of sudden rainfall event.

Residual Impact

Negative, Indirect, imperceptible, short term, likely impact.

Significance of Effects

No significant effects on surface water quality are anticipated.

7.4.2.6 Potential Impacts on Hydrologically Connected Designated Sites

The lands to the west of the proposed site are located within the Galway Bay Complex SAC (Code: 000268) and the Millplot Stream flows into the Inner Galway Bay SPA (Code: 004031) approximately 340m downstream of the proposed site. Three isolated pockets of the Galway Bay SAC are also located to the east of the N18 (refer to Figure 7.5). A hydrogeological conceptual site model (CSM) is presented as Figure 7.6. this shows the interpreted shallow and deep groundwater flowpaths below the development site. This CSM has been used to assess impact on the SAC east and west of the site.

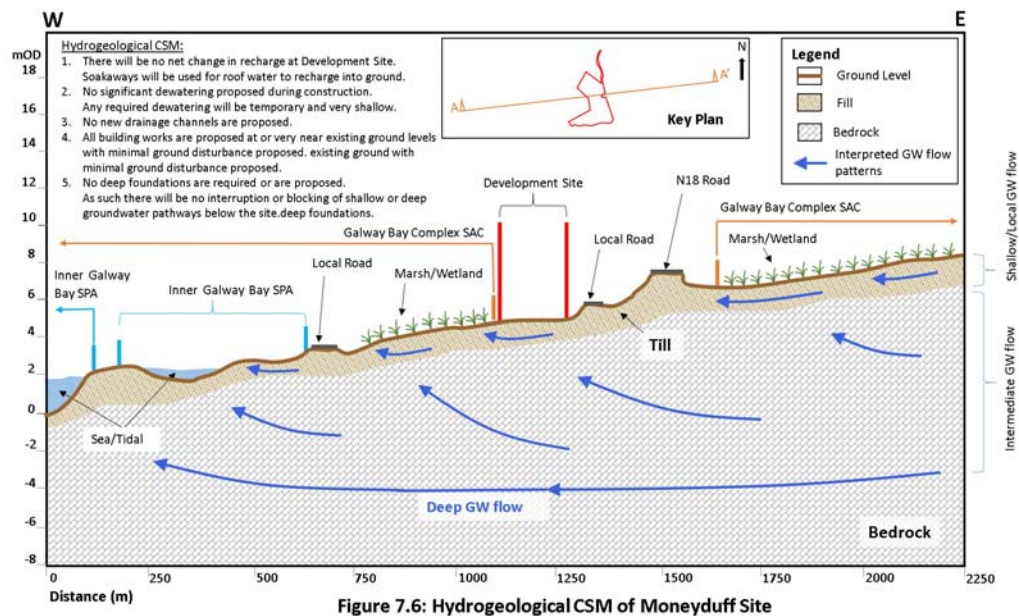


Figure 7.6 Hydrogeological Conceptual Site Model

Possible effects during the construction phase include water quality impacts which could be significant if mitigation is not put in place.

There will be no impacts on the local hydrological regime during the construction phase for the following reasons:

- There will be no net change in recharge at Development Site. Soakaways will be used for roof water to recharge into ground.
- No significant dewatering is proposed during construction. Any pumping required will be temporary and at a very shallow depth.
- No new drainage channels are proposed.
- All building works are proposed at or very near existing ground levels with minimal ground disturbance proposed.
- No deep foundations are required or are proposed. As such there will be no interruption or blocking of shallow or deep groundwater pathways below the site.

Groundwater flowpaths will be maintained as any excavation proposed will be shallow, and any required dewatering during construction will also be shallow and temporary in nature. Groundwater flowpaths from east to west below the site will be unaltered by the proposed development. There will be no direct or indirect impacts on the existing fens to the east of the N18 (which are part of the Galway Bay SAC).

For similar reasons as outlined above there will be no effect on the hydrological regime, water levels or water quality at the Cregganna Marsh SPA/NHA located to the south of the proposed Development site

Pathway: Surface water and groundwater flowpaths.

Receptor: Down-gradient water quality and hydrological regime of designated sites.

Pre-Mitigation Impact

Indirect, negative, moderate, long term, likely impact to surface water and groundwater quality.

No impacts on groundwater levels or existing hydrological regime or flowpaths.

Proposed Mitigation Measures

The proposed mitigation measures for protection of surface water quality which will include on site drainage control measures (i.e. silt fences, silt bags etc) will ensure that the quality of runoff from proposed development areas will be very high. As outlined above controls will also be put in place to manage risks associated with hydrocarbons/chemicals and cement based products used during construction phase.

All surface water arising on site will drain via soakaways to ground, with no proposed outfall. Groundwater quality risks are reduced during the operational phase by use of hydrocarbon interceptors and silt traps prior to discharge to the soakaways.

Residual Impact

No impacts on water quality or downstream designated sites are anticipated.

No impacts on groundwater levels or existing hydrological regime or groundwater flowpaths relating to the Galway Bay SAC and Cregganna Marsh SPA/NHA.

Significance of Effects

No significant impacts on groundwater or surface water quality and downstream designated sites are anticipated.

No significant impacts on groundwater levels, existing hydrological regime, or groundwater flowpaths relating to upstream or downstream areas of the Galway Bay SAC, or Cregganna Marsh SPA/NHA.

7.4.3 Operational Phase Impacts

7.4.3.1 Potential Increased Downstream Flood Risk due to Increased Hardstanding Area

Replacement of the greenfield surface with hardstand surfaces will result in an increased risk of pluvial flooding due to low permeability surfaces which will inhibit any downward percolation of rainwater.

All surface water arising on site will drain via soakaways to ground, with no proposed outfall.

Pathway: Site surface water drainage network.

Receptor: Groundwater aquifer.

Pre-Mitigation Impact

Direct, negative, slight, long term, low probability impact.

Proposed Mitigation Measures

The risk of pluvial flooding is minimised by using soakaways for drainage management.

Water quality risks are reduced by use of hydrocarbon interceptors and silt traps.

Residual Impact

Direct, negative, imperceptible, long term, low probability impact in relation to flood risk.

Direct, negative, imperceptible, long term, low probability impact in relation to groundwater quality.

Significance of Effects

No significant impacts in terms of flooding or water quality are expected due to the proposed development.

7.4.3.2 Potential Impacts on Hydrologically Connected Designated Sites

The lands to the west of the proposed site are located within the Galway Bay Complex SAC (Code: 000268) and the Millplot Stream flows into the Inner Galway Bay SPA (Code: 004031) approximately 340m downstream of the proposed site. Three isolated pockets of the Galway Bay SAC are also located to the east of the N18 (refer to Figure 7.5). A hydrogeological conceptual site model (CSM) is presented as Figure 7.6. this shows the interpreted shallow and deep groundwater flowpaths below the development site. This CSM has been used to assess impact on the SAC east and west of the site.

Possible effects during the operational phase continue to include water quality impacts which could be significant if ongoing mitigation is not put in place.

There will be no impacts on the local hydrological regime during the operational phase of the development for the following reasons:

- There will be no net change in recharge at Development Site. Soakaways will be used for roof water to recharge into ground.
- No dewatering will occur during the operational phase of the development.
- No new drainage channels are proposed.
- All building works will be complete and will have been installed at or very near existing ground levels with minimal ground disturbance having occurred.
- No deep foundations will have been installed. As such there will be no interruption or blocking of shallow or deep groundwater pathways below the site during the operational phase.

Groundwater flowpaths will be maintained during the operational phase as any excavation proposed will be shallow. Groundwater flowpaths during the operational phase from east to west below the site will be unaltered by the proposed development. During the operational phase there will be no direct or indirect impacts on the existing fens to the east of the N18 (which are part of the Galway Bay SAC).

During the operational phase, and for similar reasons as outlined above there will be no effect on the hydrological regime, water levels or water quality at the Cregganna Marsh SPA/NHA located to the south of the proposed Development site

Pathway: Surface water and groundwater flowpaths.

Receptor: Down-gradient water quality and hydrological regime of designated sites.

Pre-Mitigation Impact

Indirect, negative, moderate, long term, likely impact to surface water and groundwater quality.

No impacts on groundwater levels or existing hydrological regime or flowpaths.

Proposed Mitigation Measures

During the operational phase all surface water arising on site will drain via soakaways to ground, with no proposed outfall. Groundwater quality risks are reduced during the operational phase by use of hydrocarbon interceptors and silt traps prior to discharge to the soakaways.

Residual Impact

No impacts on water quality or downstream designated sites are anticipated.

No impacts on groundwater levels or existing hydrological regime or groundwater flowpaths relating to the Galway Bay SAC and Cregganna Marsh SPA/NHA.

Significance of Effects

No significant impacts on groundwater or surface water quality and downstream designated sites are anticipated.

No significant impacts on groundwater levels, existing hydrological regime, or groundwater flowpaths relating to upstream or downstream areas of the Galway Bay SAC, or Cregganna Marsh SPA/NHA.

7.4.4 Assessment of Potential Health Effects

Potential health effects are associated with negative impacts on public and private water supplies and potential flooding. There are no mapped public supply group water scheme groundwater protection zones in the area of the proposed housing site.

The proposed site design and mitigation measures outlined in the previous subsections ensures that the potential for impacts on the water environment are not significant

The flood risk assessment for the development has also shown that the risk of the proposed housing development contributing to downstream flooding is also very low, and also that the risk of inundation of the houses within the site post construction is very low due to the proposed design floor levels and site layout.

7.4.5 Do Nothing Scenario

Current land use (grassing/agriculture/scrub) will continue. Surface water drainage and infiltration to ground will continue as is occurring currently with no impact on either surface or groundwater.

7.4.6 Worst Case Scenario

Contamination of surface water streams during the construction and operational phases, which in turn could affect the ecology and quality of the downstream water bodies such as Millplot stream and Galway Bay. Also, potentially localised groundwater contamination may occur. However, measures will be put in place to prevent this from happening.

7.4.7 Cumulative Impacts

There are four other proposed housing developments in the locality¹.

No significant cumulative impacts on the water environment are anticipated during the construction or operation phases as long as mitigation measures outlined are put in place.

7.4.8 Conclusion

The site is naturally separated from any local watercourses, and this setback distance means that there is limited potential for impact on water quality or the downstream designated sites.

Notwithstanding this, during each phase of the proposed housing development at Moneyduff (construction and operation) a number of activities will take place on the proposed development site, some of which will have the potential to affect the hydrological regime or water quality at the site or its vicinity. These potential impacts generally arise from sediment input from runoff and other pollutants such as hydrocarbons and cement based compounds, with the former having the most potential for impact during the construction phase.

Surface water drainage measures, pollution control and other preventative measures have been incorporated into the project design to minimise significant adverse impacts on water quality and downstream designated sites.

The surface water drainage plan will focus on silt management using silt fences, and silt bags, and to control runoff rates. The key surface water control measure is that there will be no direct discharge of development runoff into local watercourses. This will be achieved by avoidance methods and design methods (*i.e.* surface water drainage to soakaways).

Preventative measures during construction include fuel and concrete management and a waste management plan which will all be incorporated into the Construction and Environmental Management Plan (Refer to Appendix 3-2).

Overall the proposal presents no significant impacts to surface water and groundwater quality provided the proposed mitigation measures are implemented.

There will be no net impact on the local hydrological regime, groundwater levels, or groundwater flowpaths during the construction and operational phase of the proposed development. There will be no direct or indirect hydrological impacts on the

¹ **Residential Development Oranhill – Pl Ref 15/1107 / ABP Ref PL 07.246315**

Thomas Considine, Patrick Sweeney and Ronnie Greene applied to Galway County Council for planning permission for development of 68 two storey houses and associated works. An Bord Pleanála granted permission for the development following a third party appeal on the 25th July 2018 subject to 17 no. conditions. The site adjoins the proposed development to the south.

Residential Development Oranhill – Pl Ref 09/1925/ ABP PL 07.237219

James Cannon applied for permission to Galway County Council for development of a proposed hotel and 161 no. units. The development was granted by An Bord Pleanála. The permission was extended by Roykeel Ltd, Brian and Fidelma Loughran under Pl Ref 15/1334. The site adjoins the proposed development to the east.

Residential Development Moneyduff – Pl Ref 09/2055 / ABP PL 07.237409

Pat and Liam Malone applied to Galway County Council for permission for 38 no. dwelling units and associated works. An Bord Pleanála granted permission following a third party appeal on 22/05/2018 subject to 13 no. conditions. The permission was extended under Pl Ref 17/980. The site is located approximately 130m to the north west of the proposed development.

Residential Development Frenchfort – Pl Ref 17/1268

Ardstone Homes applied to Galway County Council for permission to construct 86 no. units and associated works. Galway County Council issued notification of their decision to grant the development subject to 19 conditions on 7th June 2018. The site is located approximately 1km north of the proposed development.

fens (which form part of the Galway Bay SAC) east of the N18. There will be no direct or indirect hydrological impacts on the Cregganna Marsh SPA/NHA. No significant cumulative impacts on groundwater or designated sites are anticipated.

Appendix 9

Target and Attributes Assessment of SCIs and QIs

1 ASSESSMENT OF IMPACT ON TARGETS AND ATTRIBUTES QIS AND SCIS OF EU DESIGNATED SITES

1.1 Impact of the Proposed Development on the SCIs of Inner Galway Bay SPA.

Table 1.1: Impact of the proposed development on the conservation objectives of reproducing SCIs of Inner Galway Bay SPA.

To maintain the favourable conservation condition of sandwich tern in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:			
Attributes	Measure	Target	Assessment
Breeding population abundance: apparently occupied nests (AONs)	Number	No significant decline	Typical sandwich tern breeding sites are located on low-lying offshore islands or islets in bays or brackish lagoons on spits or remote mainland dunes (Cramp, 1985). There is no suitable breeding habitat for this species within 300m of the development site.
Productivity rate: fledged young per breeding pair	Mean Number	No significant decline	There will be no impact on the population abundance, productivity rate or distribution of breeding colonies as a result of the proposal.
Distribution: breeding colonies	Number; location; area (hectares)	No significant decline	The proposed development is set back from Inner Galway Bay SPA by 340m. The minimum approach distance to pedestrian disturbance by Charadriiformes is 42.2m and 22.3m whilst nesting (Livezey et al., 2016).
Disturbance at breeding site	Level of impact	Human activities should occur at levels that do not adversely affect the breeding sandwich tern population	There will be no impact on the population abundance or distribution of breeding colonies as a result of the proposal.
Prey biomass available	Kilogrammes	No significant decline	Key prey items of this species include fish, crustaceans, insects and rag worms. There will be no deterioration in water quality of Inner Galway Bay and thus no impact on prey biomass availability. Mitigation measures outlined in the CEMP, ensure that any potential pathways for surface water pollution to this QI are robustly blocked. Construction best practice measures have been

To maintain the favourable conservation condition of sandwich tern in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:

Attributes	Measure	Target	Assessment
			<p>implemented into the construction phase of the development, as described in section 2.2 of the NIS and in the accompanying Construction Environmental Management Plan (CEMP).</p> <p>Operational services, including all foul water will be connected to the local public sewer. All surface water runoff will enter appropriately designed petrol interceptors prior to discharge to specified percolation areas.</p>
Barriers to connectivity	Number; location; shape; area (hectares)	No significant increase	There will be no barriers to connectivity as a result of the proposed development.

Table 1.2: Impact of the proposed development on the conservation objectives of Common Tern

To maintain the favourable conservation condition of common tern in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:			
Attributes	Measure	Target	Assessment
Breeding population abundance: apparently occupied nests (AONs)	Number	No significant decline	Common tern breeding colonies can be sited in both coastal and inland areas using a wide variety of habitats including sandy, rocky or well-vegetated islands in estuaries, lakes and rivers. This species can also use man-made substrates (Del Hoyo et al., 1996).
Productivity rate: fledged young per breeding pair	Mean Number	No significant decline	There is no suitable breeding habitat for this species within 340m of the development site. According to the site synopsis for Inner Galway Bay the tern colonies are located in Green Island and Mutton Island with "98 pairs in 1995 on Green Island and 46 pairs in 2001 on Mutton Island".
Distribution: breeding colonies	Number; location; area (hectares)	No significant decline	Green Island is located in Galway Bay, in excess of 1.5km north-west of the development site and Mutton island is in excess of 8km west of the proposed development. There will be no disturbance to the breeding site as a result of the proposal. The proposed development is set back from Inner Galway Bay SPA by 340m. The mean flight initiation distance of this species is 20.5m in response to pedestrian disturbance (Weston et al., 2012).
Disturbance at breeding site	Level of impact	Human activities should occur at levels that do not adversely affect the breeding tern population	<p>The minimum approach distance to pedestrian disturbance by Charadriiformes is 42.2m and 22.3m whilst nesting (Livezey et al., 2016).</p> <p>There will be no impact on the population abundance or distribution of breeding colonies as a result of the proposal. There will be no disturbance as a result of the proposal.</p>
Prey biomass available	Kilogrammes	No significant decline	<p>There will be no deterioration in water quality of inner Galway Bay and thus no impact on prey biomass availability.</p> <p>Mitigation measures outlined in the CEMP, ensure that any potential pathways for surface water pollution to this QI are robustly blocked. Construction best practice measures have been implemented into the construction phase of the development, as described in section 2.2 of the NIS and in the accompanying Construction Environmental Management Plan (CEMP).</p>

To maintain the favourable conservation condition of common tern in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:

Attributes	Measure	Target	Assessment
			Operational services, including all foul water will be connected to the local public sewer. All surface water runoff will enter appropriately designed petrol interceptors prior to discharge to specified percolation areas.
Barriers to connectivity	Number; location; shape; area (hectares)	No significant increase	There will be no barriers to connectivity as a result of the proposed development.

Table 1.3: Impact of the proposed development on the conservation objectives of cormorant

To maintain the favourable conservation condition of Cormorant in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:			
Attributes	Measure	Target	Assessment
Breeding population abundance: apparently occupied nests (AONs)	Number	No significant decline	According to the site-specific conservation objectives (NPWS, 2013), a recent survey of Deer Island (conducted in 2010) estimated 128 AONs at this colony, which represents an approximate decline of 38% since 1985. Deer Island is not in close proximity to the site. There will be no impact on the breeding population of Cormorant due to the proposal. The mean flight initiation distance of this species is 23.5m, in response to motorized vehicles, and 74m, in response to pedestrian disturbance in non-nesting birds (Guay et al., 2014).
Productivity rate	Mean Number	No significant decline	
Distribution: breeding colonies	Number; location; area (hectares)	No significant decline	
Prey biomass available	Kilogrammes	No significant decline	There will be no deterioration in water quality of inner Galway Bay and thus no impact on prey biomass availability. Mitigation measures outlined in the CEMP, ensure that any potential pathways for surface water pollution to this QI are robustly blocked. Construction best practice measures have been implemented into the construction phase of the development, as described in section 2.2 of the NIS and in the accompanying Construction Environmental Management Plan (CEMP). Operational services, including all foul water will be connected to the local public sewer. All surface water runoff will enter appropriately designed petrol interceptors prior to discharge to specified percolation areas.
Barriers to connectivity	Number; location; shape; area (hectares)	No significant increase	There will be no barriers to connectivity as a result of the proposed development.
Disturbance at breeding site	Level of impact	Human activities should occur at levels that do not adversely affect the breeding	There will be no effects on the population in terms of disturbance. According to the site synopsis the cormorant colony is located on Deer Island "A large Cormorant colony occurs on Deer Island - this had 200 pairs in 1985 and 300 pairs in 198."

To maintain the favourable conservation condition of Cormorant in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:

Attributes	Measure	Target	Assessment
		cormorant population	<p>The proposed development is set back from Galway Bay SPA by 340m. Mean flight initiation distance of 23.5m, in response to motorized vehicle, and 74m, in response to pedestrian disturbance in non-nesting birds (Guay et al., 2014).</p> <p>The development is entirely outside the boundary of the SPA and there will be no reduction in the area used by this species as a result of the proposed development. The habitats within the proposed development site are not of significance to this species. There will be no impact on the population or distribution of the population as a result of the proposal.</p>
Population trend	Percentage change	Long term population trend stable or increasing	
Distribution	Number and range of areas used by waterbirds	No significant decrease in the numbers or range of areas used by cormorant, other than that occurring from natural patterns of variation	

Table 1.4: Impact of the proposed development on the conservation objectives of Great Northern Diver

To maintain the favourable conservation condition of Great Northern Diver in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:			
Attributes	Measure	Target	Assessment
Population Trend	Percentage Change	Long term population trend stable or increasing	There will be no impact on the population or distribution of great northern diver within Inner Galway Bay SPA as a result of the proposed development.
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by great northern diver, other than that occurring from natural patterns of variation.	<p>The development is entirely outside the boundary of the SPA and there will be no reduction in the area used by this species as a result of the proposed development. The habitats within the proposed development site are not of significance to this species. There will be no effects on the population in terms of disturbance. The proposed development is set back from Galway Bay SPA by 340m. Mean flight initiation distance of 76.8m in response to human recreational activity (Jiang and Møller, 2017).</p> <p>A study of the disturbance response of great northern diver to boat traffic in Inner Galway Bay, found that Great Northern Divers in the area around Galway harbour do not show any significant response to normal ship and boat traffic with no Great Northern Divers flushed by the survey boat, even though the boat passed within 10 to 20 m of some birds (Gittings et al. 2015).</p>

Table 1.5: Impact of the proposed development on the conservation objectives of Grey Heron.

To maintain the favourable conservation condition of Grey Heron in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:			
Attributes	Measure	Target	Assessment
Population Trend	Percentage Change	Long term population trend stable or increasing	There will be no impact on the population or distribution of grey heron within Inner Galway Bay SPA as a result of the proposed development.
Distribution	Number and range of areas used by waterbirds	No significant decrease in the range, timing or intensity of use of areas by grey heron, other than that occurring from natural patterns of variation.	<p>The development is entirely outside the boundary of the SPA and there will be no reduction in the area used by this species as a result of the proposed development. The habitats within the proposed development site are not of significance to this species.</p> <p>There will be no effects on the population in terms of disturbance. The proposed development is set back from Galway Bay SPA by 340m. Mean flight initiation distance of this species is 47.36m in response to pedestrian disturbance (Møller & Erritzøe, 2010).</p>

Table 1.6: Impact of the proposed development on the conservation objectives of Light-bellied Brent Goose.

To maintain the favourable conservation condition of Light-bellied Brent Goose in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:			
Attributes	Measure	Target	Assessment
Population Trend	Percentage Change	Long term population trend stable or increasing	There will be no impact on the population or distribution of light-bellied Brent geese within Inner Galway Bay SPA as a result of the proposed development.
Distribution	Number and range of areas used by waterbirds	No significant decrease in the range, timing and intensity of use of areas by light-bellied brent goose, other than that occurring from natural patterns of variation.	<p>The development is entirely outside the boundary of the SPA and there will be no reduction in the area used by this species as a result of the proposed development. The habitats within the proposed development site are not of significance to this species.</p> <p>There will be no effects on the population in terms of disturbance. The proposed development is set back from Galway Bay SPA by 340m. Mean flight initiation distance of 105m in response to pedestrian disturbance (Smit & Visser, 1993); other studies have found a minimum flight distance of 23.5m in response to pedestrian disturbance (Møller & Erritzøe, 2010).</p>

Table 1.7: Impact of the proposed development on the conservation objectives of Wigeon.

To maintain the favourable conservation condition of Wigeon in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:			
Attributes	Measure	Target	Assessment
Population Trend	Percentage Change	Long term population trend stable or increasing	There will be no impact on the population or distribution of wigeon within Inner Galway Bay SPA as a result of the proposed development.
Distribution	Number, range, timing and intensity of areas used by waterbirds	No significant decrease in the range, timing or intensity of use of areas by wigeon, other than that occurring from natural patterns of variation	<p>The development is entirely outside the boundary of the SPA and there will be no reduction in the area used by this species as a result of the proposed development. The habitats within the proposed development site are not of significance to this species.</p> <p>There will be no effects on the population in terms of disturbance. The proposed development is set back from Galway Bay SPA by 340m. A review of the available literature found disturbance distances of 91m in response to human activity (Holloway, 1997).</p>

Table 1.8: Impact of the proposed development on the conservation objectives of Teal.

To maintain the favourable conservation condition of Teal in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:			
Attributes	Measure	Target	Assessment
Population Trend	Percentage Change	Long term population trend stable or increasing	There will be no impact on the population or distribution of teal within Inner Galway Bay SPA as a result of the proposed development.
Distribution	Number and range of areas used by waterbirds	No significant decrease in the range, timing or intensity of use of areas by teal, other than that occurring from natural patterns of variation.	<p>The development is entirely outside the boundary of the SPA and there will be no reduction in the area used by this species as a result of the proposed development. The habitats within the proposed development site are not of significance to this species.</p> <p>There will be no effects on the population in terms of disturbance. The proposed development is set back from Galway Bay SPA by 340m. A review of the available literature found disturbances distances of 58m in response to pedestrian disturbance (Møller, 2008b) and 39.23m in response to pedestrian disturbance (Møller & Erritzøe, 2010).</p>

Table 1.9: Impact of the proposed development on the conservation objectives of Shoveler.

To maintain the favourable conservation condition of Shoveler in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:			
Attributes	Measure	Target	Assessment
Population Trend	Percentage Change	Long term population trend stable or increasing	There will be no impact on the population or distribution of shoveler within Inner Galway Bay SPA as a result of the proposed development.
Distribution	Number and range of areas used by waterbirds	No significant decrease in the range, timing or intensity of use of areas by Shoveler, other than that occurring from natural patterns of variation.	<p>The development is entirely outside the boundary of the SPA and there will be no reduction in the area used by this species as a result of the proposed development. The habitats within the proposed development site are not of significance to this species.</p> <p>There will be no effects on the population in terms of disturbance. The proposed development is set back from Galway Bay SPA by 340m. A review of the available literature found a flush distance of 100m in response to vehicles and walking (Pease, 2005).</p>

Table 1.10: Impact of the proposed development on the conservation objectives of Red-breasted Merganser.

To maintain the favourable conservation condition of Red-breasted Merganser in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:			
Attributes	Measure	Target	Assessment
Population Trend	Percentage Change	Long term population trend stable or increasing	There will be no impact on the population or distribution of red-breasted merganser within Inner Galway Bay SPA as a result of the proposed development.
Distribution	Number and range of areas used by waterbirds	No significant decrease in the range, timing or intensity of use of areas by red-breasted merganser, other than that occurring from natural patterns of variation.	<p>The development is entirely outside the boundary of the SPA and there will be no reduction in the area used by this species as a result of the proposed development. The habitats within the proposed development site are not of significance to this species.</p> <p>There will be no effects on the population in terms of disturbance. The proposed development is set back from Galway Bay SPA by 340m. A review of the available literature found a flush distance of 28m in response to human recreational activity (Knapton, 2000).</p>

Table 1.11: Impact of the proposed development on the conservation objectives of Ringed Plover.

To maintain the favourable conservation condition of Ringed Plover in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:			
Attributes	Measure	Target	Assessment
Population Trend	Percentage Change	Long term population trend stable or increasing	There will be no impact on the population or distribution of ringed plover within Inner Galway Bay SPA as a result of the proposed development.
Distribution	Number and range of areas used by waterbirds	No significant decrease in the range, timing or intensity of use of areas by ringed plover, other than that occurring from natural patterns of variation.	<p>The development is entirely outside the boundary of the SPA and there will be no reduction in the area used by this species as a result of the proposed development. The habitats within the proposed development site are not of significance to this species.</p> <p>There will be no effects on the population in terms of disturbance. The proposed development is set back from Galway Bay SPA by 340m. A review of the available literature found that the mean flight initiation distance is 22.5m in response to pedestrian disturbance (Møller, 2008b); other studies have found a distance of 121m in response to pedestrian disturbance (Smit & Visser, 1993).</p>

Table 1.12: Impact of the proposed development on the conservation objectives of Golden Plover.

To maintain the favourable conservation condition of Golden Plover in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:			
Attributes	Measure	Target	Assessment
Population Trend	Percentage Change	Long term population trend stable or increasing	There will be no impact on the population or distribution of golden plover within Inner Galway Bay SPA as a result of the proposed development.
Distribution	Number, range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by golden plover, other than that occurring from natural patterns of variation.	<p>The development is entirely outside the boundary of the SPA and there will be no reduction in the area used by this species as a result of the proposed development. The habitats within the proposed development site are not of significance to this species.</p> <p>There will be no effects on the population in terms of disturbance. The proposed development is set back from Galway Bay SPA by 340m. A review of the available literature found that the minimum approach distance to pedestrian disturbance is 42.2m (Livezey et al., 2016).</p>

Table 1.13: Impact of the proposed development on the conservation objectives of Lapwing.

To maintain the favourable conservation condition of Lapwing in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:			
Attributes	Measure	Target	Assessment
Population Trend	Percentage Change	Long term population trend stable or increasing	There will be no impact on the population or distribution of Lapwing within Inner Galway Bay SPA as a result of the proposed development.
Distribution	Number, range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by Lapwing, other than that occurring from natural patterns of variation.	<p>The development is entirely outside the boundary of the SPA and there will be no reduction in the area used by this species as a result of the proposed development. The habitats within the proposed development site are not of significance to this species.</p> <p>There will be no effects on the population in terms of disturbance. The proposed development is set back from Galway Bay SPA by 340m. A review of the available literature found that the mean flight initiation distance of Lapwing is 41.32m (Møller, 2008b) in response to pedestrian disturbance.</p>

Table 1.14: Impact of the proposed development on the conservation objectives of Dunlin.

To maintain the favourable conservation condition of Dunlin in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:			
Attributes	Measure	Target	Assessment
Population Trend	Percentage Change	Long term population trend stable or increasing	There will be no impact on the population or distribution of Dunlin within Inner Galway Bay SPA as a result of the proposed development.
Distribution	Number, range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by dunlin, other than that occurring from natural patterns of variation	<p>The development is entirely outside the boundary of the SPA and there will be no reduction in the area used by this species as a result of the proposed development. The habitats within the proposed development site are not of significance to this species.</p> <p>There will be no effects on the population in terms of disturbance. The proposed development is set back from Galway Bay SPA by 340m. A review of the available literature found that the mean flight initiation distance of Dunlin is 163m in response to pedestrian disturbance (Smit & Visser, 1993).</p>

Table 1.15: Impact of the proposed development on the conservation objectives of Bar-tailed Godwit.

To maintain the favourable conservation condition of Bar-tailed Godwit in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:			
Attributes	Measure	Target	Assessment
Population Trend	Percentage Change	Long term population trend stable or increasing	There will be no impact on the population or distribution of bar-tailed godwit within Inner Galway Bay SPA as a result of the proposed development.
Distribution	Number, range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by bar-tailed godwit, other than that occurring from natural patterns of variation	<p>The development is entirely outside the boundary of the SPA and there will be no reduction in the area used by this species as a result of the proposed development. The habitats within the proposed development site are not of significance to this species.</p> <p>There will be no effects on the population in terms of disturbance. The proposed development is set back from Galway Bay SPA by 340m. A review of the available literature found that the mean flight initiation distance of Bar-tailed godwit is 219m in response to pedestrian disturbance (Smit & Visser, 1993). Other studies have found a mean flight initiation distance of 22.1m in response to pedestrian disturbance (Blumstein et al., 2003).</p>

Table 1.16: Impact of the proposed development on the conservation objectives of Curlew.

To maintain the favourable conservation condition of Curlew in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:			
Attributes	Measure	Target	Assessment
Population Trend	Percentage Change	Long term population trend stable or increasing	There will be no impact on the population or distribution of Curlew within Inner Galway Bay SPA as a result of the proposed development.
Distribution	Number, range, timing and intensity of use of areas	There should be no significant decrease in the range, timing or intensity of use of areas by curlew, other than that occurring from natural patterns of variation.	<p>The development is entirely outside the boundary of the SPA and there will be no reduction in the area used by this species as a result of the proposed development. The habitats within the proposed development site are not of significance to this species.</p> <p>There will be no effects on the population in terms of disturbance. The proposed development is set back from Galway Bay SPA by 340m. A review of the available literature found that the mean flight initiation distance of Curlew is 90m in response to dog disturbance, 188m in response to car disturbance and 213m in response to pedestrian disturbance (Smit & Visser, 1993).</p>

Table 1.17: Impact of the proposed development on the conservation objectives of Redshank.

To maintain the favourable conservation condition of Redshank in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:			
Attributes	Measure	Target	Assessment
Population Trend	Percentage Change	Long term population trend stable or increasing	There will be no impact on the population or distribution of Turnstone within Inner Galway Bay SPA as a result of the proposed development.
Distribution	Number, range, timing and intensity of use of area	There should be no significant decrease in the range, timing or intensity of use of areas by redshank, other than that occurring from natural patterns of variation.	<p>The development is entirely outside the boundary of the SPA and there will be no reduction in the area used by this species as a result of the proposed development. The habitats within the proposed development site are not of significance to this species.</p> <p>There will be no effects on the population in terms of disturbance. The proposed development is set back from Galway Bay SPA by 340m. A review of the available literature found that the mean flight initiation distance of Redshank in response to pedestrian disturbance as 29.71m (Møller, 2008b) (Møller & Erritzøe, 2010).</p>

Table 1.18: Impact of the proposed development on the conservation objectives of Turnstone.

To maintain the favourable conservation condition of Turnstone in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:			
Attributes	Measure	Target	Assessment
Population Trend	Percentage Change	Long term population trend stable or increasing	There will be no impact on the population or distribution of Turnstone within Inner Galway Bay SPA as a result of the proposed development.
Distribution	Number and range of areas used by waterbirds	There should be no significant decrease in the range, timing or intensity of use of areas by turnstone, other than that occurring from natural patterns of variation.	<p>The development is entirely outside the boundary of the SPA and there will be no reduction in the area used by this species as a result of the proposed development. The habitats within the proposed development site are not of significance to this species.</p> <p>There will be no effects on the population in terms of disturbance. The proposed development is set back from Galway Bay SPA by 340m. A review of the available literature found that the mean flight initiation distance of turnstone in response to pedestrian disturbance is 13.8m at the closest (Blumstein et al., 2005). Other studies found disturbance distances of 29.66m (Glover et al., 2011) and 47m (Smit and Visser, 1993).</p>

Table 1.19: Impact of the proposed development on the conservation objectives of Black-headed Gull.

To maintain the favourable conservation condition of Black-headed Gull in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:			
Attributes	Measure	Target	Assessment
Population Trend	Percentage Change	Long term population trend stable or increasing	There will be no impact on the population or distribution of black-headed gull within Inner Galway Bay SPA as a result of the proposed development.
Distribution	Number and range of areas used by waterbirds.	There should be no significant decrease in the range, timing and intensity of use of areas used by black-headed gull other than that occurring from natural patterns of variation.	<p>The development is entirely outside the boundary of the SPA and there will be no reduction in the area used by this species as a result of the proposed development. The habitats within the proposed development site are not of significance to this species.</p> <p>There will be no effects on the population in terms of disturbance. The proposed development is set back from Galway Bay SPA by 340m. The mean flight initiation distance of Black-headed Gull in response to pedestrian disturbance is 41.20m (Møller & Erritzøe, 2010).</p>

Table 1.20: Impact of the proposed development on the conservation objectives of Common Gull.

To maintain the favourable conservation condition of Common Gull in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:			
Attributes	Measure	Target	Assessment
Population Trend	Percentage Change	Long term population trend stable or increasing	There will be no impact on the population or distribution of common gull within Inner Galway Bay SPA as a result of the proposed development.
Distribution	Number and range of areas used by waterbirds	No significant decrease in the range, timing or intensity of use of areas by the common gull, other than that occurring from natural patterns of variation	<p>The development is entirely outside the boundary of the SPA and there will be no reduction in the area used by this species as a result of the proposed development. The habitats within the proposed development site are not of significance to this species.</p> <p>There will be no effects on the population in terms of disturbance. The proposed development is set back from Galway Bay SPA by 340m. The mean flight initiation distance of Common Gull in response to pedestrian disturbance is 59.8m (Møller & Erritzøe, 2010).</p>

Table 1.21: Impact of the proposed development on the conservation objectives of Wetlands [A999].

To maintain the favourable conservation condition of wetland habitat in Inner Galway Bay SPA as a resource for the regularly occurring migratory waterbirds that utilise it. This is defined by the following attribute and targets:

Attributes	Measure	Target	Assessment
Habitat Area	Hectares	The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 13,267ha, other than that occurring from natural patterns of variation.	<p>According to the site-specific conservation objective documents (NPWS, 2013), the wetland habitat area was estimated as 13,267ha.</p> <p>The footprint of the proposed development is outside the boundary of Inner Galway Bay SPA and therefore there will be no direct loss of wetland habitat as a result of the proposal.</p> <p>Indirect habitat loss as a result of deterioration in water quality was considered. Mitigation measures outlined in the CEMP, ensure that any potential pathways for surface water pollution to this QI are robustly blocked. Construction best practice measures have been implemented into the construction phase of the development, as described in section 2.2 of the NIS and in the accompanying Construction Environmental Management Plan (CEMP).</p> <p>Operational services, including all foul water will be connected to the local public sewer. All surface water runoff will enter appropriately designed petrol interceptors prior to discharge to specified percolation areas.</p> <p>There will be no direct or indirect loss of <i>Wetland</i> habitat due to the proposal, and therefore no decline in distribution.</p>

1.2 Impact of the Proposed Development on the SCIs of Galway Bay Complex SAC

1.2.1 *Salicornia* Mud [1310]

Information on this habitat was gained from the NPWS (2013) *The Status of EU Protected Habitats and Species in Ireland* Habitat Assessments Volume 2. Version 1.1. Unpublished Report, National Parks & Wildlife Services. Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland; hereafter referred to as the NPWS Article 17 report.

'Salicornia and other annuals colonising mud and sand (1310)' is a pioneer saltmarsh community that may occur on muddy sediment seaward of established saltmarsh, or form patches within other saltmarsh communities where the elevation is suitable and there is regular tidal inundation.

The Interpretation Manual of EU Habitats (Commission of the European Communities 2003) defines Salicornia and other annuals colonising mud and sand (1310) as annuals belonging mainly to the genus Salicornia that colonise periodically inundated muds and sands of marine or interior salt marshes and belong to the phytosociological classes: Thero-Salicornietea, Frankenieta pulverulentae and Sagineta maritima. Only vegetation from the first and third class is known in the Republic of Ireland. There are several sub-types listed and four British National Vegetation Classification plant communities (Rodwell 2000) are listed: "SM7 Arthrocnemum perenne stands", "SM8 Annual Salicornia saltmarsh", "SM9 Suaeda maritima saltmarsh" and "SM27 Ephemeral saltmarsh vegetation with Sagina maritima". In Ireland, three sub-types are recognised: (1) Salicornia type (2) Suaeda type and (3) the much rarer Sagina type. Mono-specific swards of Salicornia spp. growing on muddy sediments are the most common plant community belonging to this Annex I habitat type found in Ireland

The plant community "SM7 Arthrocnemum perenne stands" is characteristic of a different Annex I saltmarsh community; Mediterranean and thermo-Atlantic Halophilous scrubs (1420). This habitat has a very restricted distribution and area, and is not considered part of the 1310 Salicornia flats habitat.

As this habitat is dominated by annuals it can be ephemeral or transient in nature and is highly susceptible to erosion. Its distribution can vary considerably from year to year and it can move in response to changing conditions, e.g. in estuaries with shifting river channels.

The range and area of this habitat in Ireland has been assessed as **favourable** in the NPWS Article 17 Report.

The specific structures and functions (including species) and the future prospects for the habitat have both been assessed as **inadequate (declining)**. On the basis of the above, the overall assessment of conservation status is **inadequate (declining)**.

Pressures:

- Invasive non-native species (**high importance**)
- Erosion (**medium importance**)

- Silting up **(medium importance)**
- Intensive cattle grazing **(high importance)**
- Diffuse pollution to surface waters due to household sewage and waste waters **(high importance)**
- Reclamation of land from sea, estuary or marsh **(medium importance)**
- Dykes, embankments, artificial beaches, general **(medium importance)**
- Walking, horseriding and non-motorised vehicles **(medium importance)**
- Intensive sheep grazing **(low importance)**
- Species composition change (succession) **(medium importance)**

Threats:

- Invasive non-native species **(high importance)**
- Erosion **(medium importance)**
- Silting up **(medium importance)**
- Intensive cattle grazing **(high importance)**
- Diffuse pollution to surface waters due to household sewage and waste waters **(medium importance)**
- Reclamation of land from sea, estuary or marsh **(medium importance)**
- Dykes, embankments, artificial beaches, general **(medium importance)**
- Walking, horseriding and non-motorised vehicles **(medium importance)**
- Intensive sheep grazing **(low importance)**
- Changes in abiotic conditions **(high importance)**
- Species composition change (succession) **(medium importance)**

Targets and attributes for the conservation of this habitat are available in the detailed Conservation Objectives for Galway Bay Complex SAC. These have been reviewed and considered in relation to the current development in Table 1.22.

Table 1.22: Impact of the proposed development on *Salicornia* and other annuals colonising mud and sand [1310] conservation objectives.

To maintain the favourable conservation condition of <i>Salicornia</i> and other annuals colonising mud and sand [1310] in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:			
Attributes	Measure	Target	Assessment
Habitat Area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession.	According to the site-specific conservation objectives (NPWS, 2013) the full extent this habitat within Galway Bay Complex SAC is unknown and further unsurveyed areas may be present within the SAC.
Habitat distribution	Occurrence	No decline, or change in distribution, subject to natural processes	<p>'<i>Salicornia</i> and other annuals colonising mud and sand [1310]' is a pioneer saltmarsh community that may occur on muddy sediment seaward of established saltmarsh, or form patches within other saltmarsh communities where the elevation is suitable and there is regular tidal inundation.</p> <p>This habitat does not occur within, or immediately adjacent to the site. The proposed development site is in excess of 500m east of any mudflat habitat, that could have the potential to support <i>Salicornia</i> habitat within Galway Bay Complex SAC. There will be no direct loss of <i>Salicornia</i> habitat due to the proposal, and therefore no decline in distribution.</p>
Physical structure: sediment supply.	Presence/absence of physical barriers.	Maintain/restore the natural circulation of sediment and organic matter, without any physical obstructions.	This habitat is generally found in the lower zone of the saltmarsh. The proposed development site is in excess of 500m east of any mudflat habitat, that could have the potential to support <i>Salicornia</i> [1310] habitat within Galway Bay Complex SAC.
Physical structure: creeks and pans	Occurrence	Maintain, or where necessary restore, creek and pan structure, subject to natural processes, including erosion and succession.	The natural processes that maintain the physical structures of this habitat including regular tidal inundation, flooding, sediment circulation and accretion will not be affected by the proposed development, as there will be no alteration of the flood regime or physical barriers affecting flooding.
Physical structure: Flooding Regime	Hectares flooded; frequency	Maintain natural tidal regime.	
Vegetation composition: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.	There will be no impact on the vegetation composition or structure of this habitat. According to the saltmarsh monitoring project (McCorry and Ryle, 2006) anthropogenic factors which may influence vegetation structure and composition include reclamation, drainage, pollution, vehicle tracks, peat-cutting, turf cutting, poaching and overuse, none of which will occur as a result of the

To maintain the favourable conservation condition of *Salicornia* and other annuals colonising mud and sand [1310] in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:

Attributes	Measure	Target	Assessment
Vegetation structure: Height	Centimetres	Maintain structural variation within the sward.	proposed development. The proposed development site is in excess of 500m east of any mudflat habitat and there will be no direct access to this habitat.
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of area outside creeks vegetated	
Vegetation composition: typical species and sub-communities	Percentage cover	Maintain the range of species-poor communities with typical species listed in SMP (McCorry and Ryle, 2009)	
Vegetation structure: negative indicator species – <i>Spartina anglica</i>	Hectares	There is currently no common cordgrass (<i>Spartina anglica</i>) in this SAC. Prevent establishment of cordgrass.	According to the site-specific conservation objectives (NPWS, 2013) there is currently no common cordgrass in this SAC. There will be no introduction of cordgrass to the SAC, as a result of the proposed development.

1.2.2 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330]

Information on this habitat was gained from the NPWS Article 17 report (NPWS, 2013). The habitat account in that document reads as follows:

*Atlantic salt meadows generally occupy the widest part of the saltmarsh gradient. They also contain a distinctive topography with an intricate network of creeks and salt pans occurring on the medium to large sized saltmarshes. Atlantic salt meadows contain several distinctive zones that are related to elevation and submergence frequency. The lowest part along the tidal zone is generally dominated by common saltmarsh-grass (*Puccinellia maritima*) with species like glasswort (*Salicornia spp.*), annual sea-blite (*Suaeda maritima*) and lax-flowered sea-lavender (*Limonium humile*) also important. The invasive common cordgrass (*Spartina anglica*) can be locally abundant in this habitat. The mid marsh zones are generally characterised by thrift (*Armeria maritima*) and or sea plantain (*Plantago maritima*). This zone is generally transitional to an upper marsh herbaceous community with red fescue (*Festuca rubra*), saltmarsh rush (*Juncus gerardii*) and creeping bent (*Agrostis stolonifera*). This habitat is also important for other wildlife including wintering waders and wildfow. Atlantic salt meadows are distributed around most of the coastline of Ireland. The intricate topography of the Irish coastline with many inlets has created an abundance of sites that are sheltered and allow muddy sediments to accumulate, leading to the development of saltmarsh.*

Both the range and area of this habitat in Ireland has been assessed as **favourable** in the NPWS Article 17 Report.

The specific structures and functions (including species) and future prospects for the habitat have both been assessed as **inadequate (stable)** On the basis of the above, the overall assessment of conservation status is **inadequate** with the overall trend assessed as **stable**.

The main pressures and threats identified in the Article 17 report are listed below:

Pressures:

- Intensive cattle grazing (**high importance**)
- Intensive sheep grazing (**medium importance**)
- Paths, tracks, cycling tracks (**high importance**)
- Disposal of household/recreational facility waste (**low importance**)
- Other industrial/commercial area (**low importance**)
- Reclamation of land from sea, estuary or marsh (**low importance**)
- Polderisation (**low importance**)
- Modification of hydrographic functioning, general (**low importance**)
- Erosion (**medium importance**)
- Invasive non-native species (**medium importance**)

Threats:

- Intensive cattle grazing (**high importance**)
- Intensive sheep grazing (**medium importance**)
- Paths, tracks, cycling tracks (**high importance**)
- Disposal of household/recreational facility waste (**low importance**)

- Disposal of industrial waste (**low importance**)
- Reclamation of land from sea, estuary or marsh (**low importance**)
- Polderisation (**low importance**)
- Modification of hydrographic functioning, general (**low importance**)
- Erosion (**medium importance**)
- Invasive non-native species (**medium importance**)

Targets and attributes for the conservation of this habitat are available in the detailed Conservation Objectives for Galway Bay Complex SAC. These have been reviewed and considered in relation to the current development in Table 1.23.

Table 1.23: Impact of the proposed development on *Atlantic salt meadows (Glauco-Puccinellietalia maritimae)* conservation objectives.

To restore the favourable conservation condition of Atlantic Salt Meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330] in Galway Bay Complex SAC, which is defined by the following list of attributes and targets			
Attributes	Measure	Target	Assessment
Habitat Area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession.	According to the site-specific conservation objectives (NPWS, 2013) the full extent this habitat within Galway Bay Complex SAC is unknown and further unsurveyed areas may be present within the SAC.
Habitat distribution	Occurrence	No decline, or change in distribution, subject to natural processes	<p>Atlantic salt meadows generally occupy the widest part of the saltmarsh gradient. They also contain a distinctive topography with an intricate network of creeks and salt pans occurring on the medium to large sized saltmarshes. Atlantic salt meadows contain several distinctive zones that are related to elevation and submergence frequency.</p> <p>This habitat does not occur within, or immediately adjacent to the site. The saltmarsh Monitoring Project mapped 12.36ha of potential Atlantic saltmarsh/Mediterranean Salt Meadow habitat in 2009, in excess of 285m west of the proposed development site.</p> <p>There will be no direct loss of <i>Atlantic Salt Meadow</i> habitat due to the proposal, and therefore no decline in distribution.</p>
Physical structure: sediment supply.	Presence/absence of physical barriers.	Maintain/restore the natural circulation of sediment and organic matter, without any physical obstructions.	The processes that maintain the physical structures of this habitat including regular tidal inundation, flooding, sediment circulation and accretion will not be affected by the proposed development, as there will be no alteration of the flood regime or physical barrier affecting flooding.
Physical structure: creeks and pans	Occurrence	Maintain, or where necessary restore, creek and pan structure, subject to natural processes, including erosion and succession.	
Physical structure: Flooding Regime	Hectares flooded; frequency	Maintain natural tidal regime.	

To restore the favourable conservation condition of Atlantic Salt Meadows (*Glauco-Puccinellietalia maritimae*) [1330] in Galway Bay Complex SAC, which is defined by the following list of attributes and targets

Attributes	Measure	Target	Assessment
Vegetation composition: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.	There will be no impact on the vegetation composition or structure of this habitat. According to the saltmarsh monitoring project (McCorry and Ryle, 2006) anthropogenic factors which may influence vegetation structure and composition include reclamation, drainage, pollution, vehicle tracks, peat-cutting, turf cutting, poaching and overuse, none of which will occur as a result of the proposed development. The proposed development site is in excess of 285m east of this habitat and there will be no direct access to this habitat.
Vegetation structure: Height	Centimetres	Maintain structural variation within the sward.	
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of area outside creeks vegetated	
Vegetation composition: typical species and sub-communities	Percentage cover	Maintain the range of species-poor communities with typical species listed in SMP (McCorry and Ryle, 2009)	
Vegetation structure: negative indicator species – <i>Spartina anglica</i>	Hectares	There is currently no common cordgrass (<i>Spartina anglica</i>) in this SAC. Prevent establishment of cordgrass.	
			According to the site-specific conservation objectives (NPWS, 2013) there is currently no common cordgrass in this SAC. There will be no introduction of cordgrass to the SAC, as a result of the proposed development.

1.2.3 Mediterranean salt meadows (*Juncetalia maritimae*) [1410]

Information on this habitat was gained from the NPWS Article 17 report (NPWS, 2013). The habitat account in that document reads as follows:

*Mediterranean salt meadows occupy the upper zone of saltmarshes and usually occur adjacent to the boundary with terrestrial habitats. They are widespread on the Irish coastline, however they are not as extensive as Atlantic salt meadows. The habitat is distinguished from Atlantic salt meadows by the presence of rushes such as sea rush (*Juncus maritimus*) and/or sharp rush (*J. acutus*), along with a range of species typically found in Atlantic salt meadows; including sea aster (*Aster tripolium*), sea purslane (*Atriplex portulacoides*), sea-milkwort (*Glaux maritima*), saltmarsh rush (*J. gerardii*), parsley water-dropwort (*Oenanthe lachenalii*), sea plantain (*Plantago maritima*) and common saltmarsh grass (*Puccinellia maritima*).*

The range and area of this habitat in Ireland has been assessed as **favourable** in the NPWS Article 17 Report.

The specific structures and functions (including species) and future prospects for the habitat have both been assessed as **inadequate (stable)**. On the basis of the above, the overall assessment of conservation status is **inadequate** with the overall trend assessed as **stable**.

The main pressures and threats identified in the Article 17 report are listed below:

Pressures:

- Intensive cattle grazing (**high importance**)
- Paths, tracks, cycling tracks (**medium importance**)
- Erosion (**low importance**)
- Modification of hydrographic functioning, general (**low importance**)

Threats:

- Intensive cattle grazing (**high importance**)
- Paths, tracks, cycling tracks (**medium importance**)
- Erosion (**low importance**)
- Modification of hydrographic functioning, general (**low importance**)
- Infilling of ditches, dykes, ponds, pools, marshes or pits (**low importance**)

Targets and attributes for the conservation of this habitat are available in the detailed Conservation Objectives for Galway Bay Complex SAC. These have been reviewed and considered in relation to the current development in Table 1.24.

Table 1.24: Impact of the proposed development on Mediterranean salt meadows (*Juncetalia maritimi*) conservation objectives.

To restore the favourable conservation condition of Mediterranean salt meadows (<i>Juncetalia maritimi</i>) in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:			
Attributes	Measure	Target	Assessment
Habitat Area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession.	<p>According to the site-specific conservation objectives (NPWS, 2013) the total estimated area of this habitat within Galway Bay Complex SAC is 19.887ha and further unsurveyed areas may be present within the SAC.</p> <p>Mediterranean salt meadows occupy the upper zone of saltmarshes and usually occur adjacent to the boundary with terrestrial habitats.</p> <p>This habitat does not occur within, or immediately adjacent to the site. The saltmarsh Monitoring Project mapped 12.36ha of potential Atlantic saltmarsh/Mediterranean salt meadow mosaic habitat in 2009, in excess of 285m west of the proposed development site.</p> <p>There will be no direct loss of <i>Mediterranean Salt Meadow</i> habitat due to the proposal, and therefore no decline in distribution.</p> <p>The processes that maintain the physical structures of this habitat including regular tidal inundation, flooding, sediment circulation and accretion will not be affected by the proposed development, as there will be no alteration of the flood regime or physical barriers affecting flooding.</p> <p>There will be no impact on the vegetation composition or structure of this habitat. According to the saltmarsh monitoring project (McCorry and Ryle, 2006) anthropogenic factors which may influence vegetation structure and composition include reclamation, drainage, pollution, vehicle tracks, peat-cutting, turf cutting, poaching and overuse, none of which will occur as a result of the</p>
Habitat distribution	Occurrence	No decline, or change in distribution, subject to natural processes	
Physical structure: sediment supply.	Presence/absence of physical barriers.	Maintain/restore the natural circulation of sediment and organic matter, without any physical obstructions.	
Physical structure: creeks and pans	Occurrence	Maintain, or where necessary restore, creek and pan structure, subject to natural processes, including erosion and succession.	
Physical structure: Flooding Regime	Hectares flooded; frequency	Maintain natural tidal regime.	
Vegetation composition: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.	

To restore the favourable conservation condition of Mediterranean salt meadows (*Juncetalia maritimi*) in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:

Attributes	Measure	Target	Assessment
Vegetation structure: Height	Centimetres	Maintain structural variation within the sward.	proposed development. The proposed development site is in excess of 285m east of this habitat and there will be no direct access to this habitat.
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of area outside creeks vegetated	
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain the range of species-poor communities with typical species listed in SMP (McCorry and Ryle, 2009)	
Vegetation structure: negative indicator species – <i>Spartina anglica</i>	Hectares	There is currently no common cordgrass (<i>Spartina anglica</i>) in this SAC. Prevent establishment of cordgrass.	According to the site-specific conservation objectives (NPWS, 2013) there is currently no common cordgrass in this SAC. There will be no introduction of cordgrass to the SAC, as a result of the proposed development.

1.2.4 Reefs [1170]

Information on this habitat was gained from the NPWS Article 17 report (NPWS, 2013). The habitat account in that document reads as follows:

Reef habitats are widespread marine features with immobile hard substrate available for colonisation by epifauna. Reef habitat in Irish waters ranges from the intertidal to 4500m below the sea surface and more than 400km from the coast.

Intertidal Reefs are familiar and widespread habitats characterised by hard rock washed by the tide. There are a number of factors that influence this habitat type including tidal immersion, influence of freshwater (riverine and rainwater), variation in temperature, desiccation, exposure to waves, stability of substrate, and weathering of substrate. With distance from the intertidal these parameters become less active in influencing the habitat.

Subtidal Reef is most often found in exposed areas with little influence of freshwater. In depths down to 30m along the Atlantic margin there is still a significant penetration of light and swell waves reach the reef. In depths below 30m (or shallower in some coastal areas) insufficient light penetrates to hard rock structures to allow photosynthesis of algae and the habitat usually becomes dominated by fauna.

In the offshore, hard rock structures occur intermittently between soft sediment, mostly along the shelf margin. In depths of several hundred meters no light reaches the bottom and temperatures are usually cool and fairly constant. A significant type of the Reef habitat is that generated by the habitat forming accretions of animals. These Biogenic Reefs increase the structural complexity beyond the surrounding areas and usually result in greater biodiversity. In the inshore these may be formed by the protective structures of worms or in the offshore by stony deep-water coral species.

*Intertidal and subtidal Reefs are frequently dominated by algal species including: *Ulva* spp., *Chaetomorpha* spp., *Fucus* spp., *Laminaria* spp., *Dictyota dichotoma*, *Corallina officinalis*, *Porphyra* spp. *Chondrus crispus*, *Mastocarpus stellatus*, *Delesseria sanguinea*, *Cryptopleura ramosa*, *Lomentaria articulata*, *Polysiphonia* spp., *Ceramium* spp.). Near shore Reef species commonly include the invertebrate species of poriferans (*Scypha ciliata*, *Grantia compressa*, *Halichondria panicea*, *Hymeniacidon perleve*, *Cliona stellata*, *Pachymatisma johnstonia*, *Dysidea fragilis*), cnidarians (*Nemertesia antennina*, *Halecium halecium*, *Anemonia viridis*, *Actinia equina*, *Sagartia elegans*, *Actinothoe sphyrodeta*, *Corynactis viridis*, *Alcyonium digitatum*, *Caryophyllia smithii*, *Metridium* spp.), polychaetes (*Sabellaria alveolata*, *Spirorbis* spp. *Pomatoceros triqueter*), crustaceans (*Balanus* spp., *Semibalanus balanoides*, *Carcinus maenas*, *Cancer pagurus*, *Necora puber*, *Pagurus bernhardus*, *Galathea* spp.), molluscans (*Gibbula* spp, *Littorina* spp., *Nucella lapillus*, *Patella* spp., *Calliostoma zizyphinum*, *Aplysia punctata*, *Mytilus edulis*), bryozoans (*Alcyonidium diaphanum*), echinoderms (*Antedon bifida*, *Echinus esculentus*, *Marthasterias glacialis*, *Holothuria forskali*, *Aslia lefevrei*, *Pawsonia saxicola*), and tunicates (*Botryllus schlosseri*, *Ascidia mentula*, *Dendrodoa grossularia*). A range of fish species are also associated with this habitat including *Pholis gunnellus*, *Lotidae* spp., *Nerophis**

lumbriciformis, *Pollachius* spp., *Conger conger*, *Labridae* spp.). Deepwater Reefs exhibit a range of species including scleractinian corals (*Lophelia pertusa*, *Madrepora oculata*, *Solenosmilia variabilis*, *Flabellum* spp. *Desmophyllum dianthus*), antipatharian black corals (*Cirrhopathes* sp., *Leiopathes* sp., *Parantipathes* sp., *Stichopathes gravieri*), soft corals (*Anthomastus grandiflorus*, *Paragorgia arborea*, *Paramuricea* spp., *Anthothela* spp. and isididaen bamboo corals), sea pens (*Pennatula phosphorea*, *Kophobelemnon* spp.), anemones (*Bolocera* spp), sponges (*Aphrocallistes* spp., *Hexactinellid* spp., *Pheronema* spp.), echinoderms (*Brisingella coronata*, *Pseudarchaster* spp., *Psolus squamatus*, *Cidaris cidaris*, *Koehlermetra porrecta*), crustaceans (*Bathynectes* spp., *Chirostylus* spp., *Chaecon* spp., *Neolithoides* spp.) and fish (*Chimaera monstrosa*, *Lepidion eques*, *Synaphobranchus* spp., *Neocyttus helgae*, *Coryphaenoides rupestris*).

Recent work on Annex I habitats in the inshore has highlighted atypical presentation of species or communities. Mulroy Bay reported a few notable species including the sponges *Dercitus bucklandi*, *Stelletta grubii* and an undescribed species of *Polymastia* and the anthozoan *Parerythropodium coralloides*. Reef habitat in Kilkieran showed some unusual presentations of the sponge and ascidian community, particularly the Gurraig Sound, typified by the presence of the sponges *Esperiopsis fucorum*, *Haliclona simulans*, *Myxilla incrustans*, *Polymastia mamillaris*, *Raspailia* sp. and *Suberites* sp., *Plakortis simplex* and *Tricheurypon viride* and ascidians *Asciella aspersa*, *Ascidia mentula*, *Ciona intestinalis*, *Corella parallelogramma* and *Dendrodoa grossularia*. The occurrence of *Phakellia vermiculata* and *Axinella damicornis* is also notable. Similarly in Kenmare River rare species included the brachiopod *Neocrania anomala* and at Slyne Head the nudibranch *Aldisa zetlandica*. The urchin, *Paracentrotus lividus*, a once typical intertidal Reef species, shows a restricted distribution with few records nationally.

The range and area of this habitat in Ireland has been assessed as **favourable** in the NPWS Article 17 Report.

Both the specific structures and functions (including species) and the future prospects have been assessed as **bad (declining)**. On the basis of the above, the overall assessment of conservation status is **bad** with the overall trend assessed as **declining**.

Pressures:

- Fishing and harvesting aquatic resources (**high importance**)
- Bottom culture (**medium importance**)
- Suspension culture (**medium importance**)
- Pollution to waters (limnic & terrestrial, marine & brackish) (**medium importance**)
- Industrial ports (**low importance**)
- Intensive fish farming, intensification (**low importance**)
- Piers/tourist harbours or recreational piers (**low importance**)
- Fishing harbours (**low importance**)
- Slipways (**low importance**)
- Exploration and extraction of oil or gas (**low importance**)
- Estuarine and coastal dredging (**low importance**)
- Geotechnical survey (**low importance**)

- Nautical sports **(low importance)**
- Hand collection **(low importance)**

Threats:

- Fishing and harvesting aquatic resources **(high importance)**
- Pollution to waters (limnic & terrestrial, marine & brackish) **(medium importance)**
- Bottom culture **(low importance)**
- Suspension culture **(low importance)**
- Industrial ports **(low importance)**
- Intensive fish farming, intensification **(low importance)**
- Piers/tourist harbours or recreational piers **(low importance)**
- Fishing harbours **(low importance)**
- Slipways **(low importance)**
- Exploration and extraction of oil or gas **(low importance)**
- Estuarine and coastal dredging **(low importance)**
- Geotechnical survey **(low importance)**

Targets and attributes for the conservation of this habitat are available in the detailed Conservation Objectives for Galway Bay Complex SAC. These have been reviewed and considered in relation to the current development in Table 1.25.

Table 1.25: Impact of the proposed development on Reefs [1770] conservation objectives.

To maintain the favourable conservation condition of Reefs in Galway Bay Complex SAC			
Attributes	Measure	Target	Assessment
Distribution	Occurrence	The distribution of reefs is stable or increasing, subject to natural processes.	According to the site-specific conservation objectives (NPWS, 2013) the total estimated area of this habitat within Galway Bay Complex SAC is 2,773ha.
Habitat Area	Hectares	Area stable or increasing, subject to natural processes.	<p>This habitat does not occur within, or immediately adjacent to the site. The closest mapped occurrence of this habitat is 560m west of the proposal along the intertidal zone of Galway Bay.</p> <p>Mitigation measures outlined in the CEMP, ensure that any potential pathways for surface water pollution to this QI are robustly blocked. Construction best practice measures have been implemented into the construction phase of the development, as described in section 2.2 of the NIS and in the accompanying Construction Environmental Management Plan (CEMP).</p> <p>Operational services, including all foul water will be connected to the local public sewer. All surface water runoff will enter appropriately designed petrol interceptors prior to discharge to specified percolation areas.</p> <p>There will be no direct or indirect loss of <i>Reef</i> habitat due to the proposal, and therefore no decline in distribution.</p>
Community Extent	Hectares	Maintain the extent of the <i>Mytilus</i> -dominated reef community, subject to natural processes.	According to the Galway Bay Complex SAC Marine supporting document (NPWS, 2013) this intertidal <i>mytilus</i> -dominated reef community occurs on the northern shore of the bay at Roscam. This is a well defined bed as distinct from the accumulations of mussel spatfall commonly seen on hard substrate along the north shore between Salthill and Galway.
Community structure: <i>Mytilus</i> density	Individuals per m ²	Conserve the high quality of the <i>Mytilus</i> -dominated reef community, subject to natural processes.	This habitat does not occur within, or immediately adjacent to the site.
Community structure:	Biological composition	Conserve the following community types in a natural condition: Furoid-dominated	Laminaria-dominated community complex occur subtidally throughout the site.

To maintain the favourable conservation condition of Reefs in Galway Bay Complex SAC

Attributes	Measure	Target	Assessment
		community complex; Laminaria-dominated community complex; and Shallow sponge-dominated community complex.	

1.2.5 Tidal Mudflats [1140]

Information on this habitat was gained from the NPWS Article 17 report (NPWS, 2013). The habitat account in that document reads as follows:

This habitat is found exclusively between the low water and mean high water marks. It is often a subset of the Annex I habitats Large shallow and bay and Estuaries but is not dependent on those habitats for occurrence. The fundamental building block of this habitat is sediment ranging from around 1 micron to 2 millimeters. The finer silt and clay sediments are dominant in mud flats and the larger sand fractions are associated with areas exposed to significant wave energy. The fine sediment of intertidal mudflats is most often associated with rivers. The limit of tidal ingress often coincides with the beginning of flanking mudflat habitats. The competing forces of seaward-flowing freshwater meeting the flooding tide reduces net flow velocity and consequently the carrying capacity for sediment leading to deposition. A range of physical pressures operate in these habitats including dynamic fluctuations in salinity, temperature, and immersion. Small sediment grains can be very closely packed and the consequent minimal exchange of water may lead to oxygen deprivation of underlying sediments. Sandflats associated with larger estuaries are frequently shaped by locally generated or coastal wind-waves. The force required to dislodge sediment is dependent on the mass and cohesion of the material. Smaller lighter fractions are easily removed and become less dominant in areas exposed to wind waves. However, the packing arrangement of larger grained material allows space between grains for accumulations of finer material. This can produce cohesive and extensive flats not susceptible to eroding forces. Due to the relatively low gradient of the sandflat, wave energy is dissipated over a greater surface area. The combination of grain sizes also leads to a high retention of water within the flats producing a fairly stable physical environment with good biological productivity. In areas exposed to large waves with little or no source of riverine material the habitat is often characterized by large grains resulting from erosion or long-shore drift. Without a source of binding fine sediments these coarse sands are susceptible to frequent mobilization. The packing arrangements also allows for a free draining habitat. These coarse beaches are consequently susceptible to not only marine forces but can be mobilized by wind to form coastal habitats. The degree of mobility and harsh physiological conditions poses a significant challenge to marine flora and fauna.

*The type of biological communities found at Mudflats and Sandflats is quite variable across Ireland. Currently, approximately 50% of the national resource of this habitat has been analysed as part of baseline mapping to set Conservation Objectives. The most prevalent community identified through this process was the Mud to Fine Sand community which was often characterised by the presence of the following species *Angulus tenuis*, *Corophium volutator*, *Crangon crangon*, *Eteone longa*, *Hediste diversicolor*, *Peringia ulvae*, *Pygospio elegans*, *Scoloplos armiger*, *Spio martinensis*, *Tharyx sp.*, and *Tubificoides benedii* where 44% of the national resource was within Lower River Shannon SAC. The next most prevalent broad community type recognised at around 40% of the habitat resource was Fine Sand to Sand community and again the largest proportion of the national resource was within Lower River Shannon SAC with typifying species including *Angulus tenuis*, *Bathyporeia pilosa*, *Nephtys cirrosa*, *Pontocrates spp.*, *Scolecopsis mesnili*, *Scolecopsis squamata*, and *Spio martinensis*. The largest contribution of the remaining habitat was identified*

as being Muddy sands/Sandy Muds Community and the most prevalent species included Arenicola marina, Chaetozone gibber, Fabulina fabula, Nephtys hombergii, Nucula nucleus, Owenia fusiformis, and Thyasira flexuosa and the greatest proportion of this community was within Lough Swilly SAC. Occasional intertidal Zostera spp., mixed sediments and coarse sediment characterised by Pisione remota are reported. The bivalve Barnea candida, also known as white piddock, is rarely recorded in Ireland and is found in the intertidal at Bannow Bay SAC.

Mudflats and Sandflats also form a significant resource for various bird and mammal species for feeding, breeding and resting.

The range and area of this habitat in Ireland has been assessed as **favourable** in the NPWS Article 17 Report.

The specific structures and functions (including species) have been assessed as **inadequate** but **improving** and the future prospects for the habitat have been assessed as **favourable**. On the basis of the above, the overall assessment of conservation status is **inadequate** with the overall trend assessed as **improving**.

Pressures:

- Pollution to surface waters (limnic & terrestrial, marine & brackish) **(high importance)**
- Fishing and harvesting aquatic resources **(high importance)**
- Bottom culture **(high importance)**
- Suspension culture **(medium importance)**
- Hand collection **(low importance)**
- Other outdoor sports and leisure activities **(low importance)**
- Nautical sports **(low importance)**

Threats:

- Pollution to surface waters (limnic & terrestrial, marine & brackish) **(high importance)**
- Fishing and harvesting aquatic resources **(low importance)**
- Bottom culture **(low importance)**
- Suspension culture **(low importance)**
- Hand collection **(low importance)**
- Other outdoor sports and leisure activities **(low importance)**
- Nautical sports **(low importance)**

Targets and attributes for the conservation of this habitat are available in the detailed Conservation Objectives for Galway Bay Complex SAC. These have been reviewed and considered in relation to the current development in Table 1.26.

Table 1.26: Impact of the proposed development on Mudflats and Sandflats not covered by water at low tide [1140] conservation objectives.

To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide [1140] in Galway Bay Complex SAC			
Attributes	Measure	Target	Assessment
Habitat Area	Hectares	The permanent habitat area is stable or increasing subject to natural processes.	According to the Conservation objectives supporting document the habitat area was estimated using OSi data as 744ha. The nearest mapped extent of this habitat to the proposed development is in excess of 500m to the west of the site. There will be no direct loss of habitat due to the proposal. There
Community distribution	Hectares	Conserve the following community types in a natural condition: Intertidal sandy mud community complex; and Intertidal sand community complex.	<p>Intertidal sand community complex occurs on the southern shores of Galway Bay at Ballyvaghan Bay, on its eastern shores around Glasheen, Eddy and Mweenish Islands and in the Dunkellin Estuary and on the northern shore at Silverstrand, Rusheen Bay and Blake’s Hill.</p> <p>sandy mud to mixed sediment community complex is recorded extensively in the northern part of Galway Bay from western boundary of the site to Ardfry Point, between Tawin Island and Lackanaloy Creek and Loughnahulla Bay. In the southern part of the bay it occurs from the western boundary eastward into the Dunkellin Estuary and the Doorus Strait. The Galway Bay Complex SAC marine supporting documents highlights that significant anthropogenic disturbance may occur with such intensity and/or frequency as to effectively represent a continuous or ongoing source of disturbance over time and space (e.g. effluent discharge within a given area).</p> <p>There will be no deterioration in water quality as a result of the proposed development.</p> <p>Mitigation measures outlined in the CEMP, ensure that any potential pathways for surface water pollution to this QI are robustly blocked. Construction best practice measures have been implemented into the construction phase of the development, as described in section 2.2 of the NIS and in the accompanying Construction Environmental Management Plan (CEMP).</p> <p>Operational services, including all foul water will be connected to the local public sewer. All surface water runoff will enter appropriately designed petrol interceptors prior to discharge to specified percolation areas.</p>

1.2.6 Perennial Vegetation of Stony Banks [1220]

Information on this habitat was gained from the NPWS Article 17 report (NPWS, 2013). The habitat account in that document reads as follows:

*This habitat occurs along the coast where shingle (cobbles and pebbles) and gravel have accumulated to form elevated ridges or banks above the high tide mark. Most of the rocky material should be less than 250mm in diameter to be considered in this category. The vegetation tends to be dominated by perennial species, typically including *Honckenya peploides*, *Rumex crispus*, *Beta vulgaris* ssp. *maritima*, *Crithmum maritimum* and *Tripleurospermum maritimum*. The rare plants *Crambe maritima* and *Mertensia maritima* are also associated with this community (Fossitt, 2000). Species diversity is determined by the degree of exposure and by substrate stability, coarseness and size. The presence of lichens indicates long term stability.*

The range for this habitat has been assessed as **favourable** and the area **inadequate (stable)** in the NPWS Article 17 Report.

The specific structures and functions (including species) and future prospects have been assessed as **inadequate** but **stable**. On the basis of the above, the overall assessment of conservation status is **inadequate** with the overall trend assessed as **stable**.

The main pressures and threats identified in the Article 17 report are listed below:

Pressures:

- Sand and gravel extraction (**medium importance**)
- Removal of beach materials (**high importance**)
- Pipe lines (**low importance**)
- Disposal of inert materials (**low importance**)
- Walking, horseriding and non-motorized vehicles (**medium importance**)
- Trampling, overuse (**medium importance**)
- Garbage and solid waste (**medium importance**)
- Other forms of pollution (**low importance**)
- Landfill, land reclamation and drying out, general (**low importance**)
- Sea defence or coast protection works, tidal barrages (**high importance**)

Threats:

- Sand and gravel extraction (**medium importance**)
- Removal of beach materials (**medium importance**)
- Pipe lines (**low importance**)
- Disposal of inert materials (**low importance**)
- Walking, horseriding and non-motorized vehicles (**medium importance**)
- Trampling, overuse (**medium importance**)
- Garbage and solid waste (**medium importance**)
- Other forms of pollution (**low importance**)
- Landfill, land reclamation and drying out, general (**low importance**)
- Sea defence or coast protection works, tidal barrages (**high importance**)
- Changes in abiotic conditions (**low importance**)

Targets and attributes for the conservation of this habitat are available in the detailed Conservation Objectives for Galway Bay Complex SAC. These have been reviewed and considered in relation to the current development in Table 1.27.

Table 1.27: Impact of the proposed development on Perennial vegetation of stony banks [1220] conservation objectives.

To maintain the favourable conservation condition of Perennial vegetation of stony banks [1220] in Galway Bay Complex SAC			
Attributes	Measure	Target	Assessment
Habitat Area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession.	Current area unknown within the SAC. This habitat does not occur within, or immediately adjacent to the site. This habitat was not recorded in the most proximal part of the SAC to the proposed development site.
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes.	There will be no direct loss of <i>Perennial vegetation of stony banks</i> habitat due to the proposal, and therefore no decline in distribution.
Physical structure: functionality and sediment supply	Presence/ absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions.	<p>This habitat relies on a continuing supply of shingle sediment which may occur sporadically as a response to storm events rather than continuously. Interference with the natural coastal processes, through offshore extraction or coastal defence structures in particular, can interrupt the supply of sediment and lead to beach starvation.</p> <p>There will be no alteration to the physical processes that govern the functionality and sediment supply of this habitat. There will be no physical barriers impeding flow as a result of the proposal.</p>
Vegetation structure: zonation	Occurrence	Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.	Ecological variation in the vegetation structure of this habitat type depends on stability; the amount of fine material accumulating between the pebbles; climatic conditions; width of the foreshore and past management of the site. The degree of exposure, as well as the coarseness and stability of the substrate determines species diversity. Negative indicators include non-native species indicative of changes in nutrient status and species not considered characteristic of the habitat.
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops.	Maintain the typical vegetated shingle flora including the range of sub-communities within the different zones. Typical species include sea sandwort (<i>Honckenya peploides</i>), sea beet (<i>Beta vulgaris</i> ssp. <i>maritima</i>), rock samphire (<i>Crithmum maritimum</i>), sea mayweed (<i>Tripleurospermum maritimum</i>), yellow-horned poppy (<i>Glaucium flavum</i>) and sea campion (<i>Silene uniflora</i>).	There will be no alternation in the natural processes that determine the vegetation composition as a result of the proposed development.

To maintain the favourable conservation condition of Perennial vegetation of stony banks [1220] in Galway Bay Complex SAC			
Attributes	Measure	Target	Assessment
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover	

1.2.7 Vegetated Sea Cliffs of the Atlantic and Baltic Coasts [1230]

Information on this habitat was gained from the NPWS Article 17 report (NPWS, 2013). The habitat account in that document reads as follows:

The following definition was developed by Barron et al., (2011): "A sea cliff is a steep or vertical slope located on the coast, the base of which is in either the intertidal (littoral) or subtidal (sublittoral) zone. The cliff may be composed of hard rock such as basalt, or of softer substrate such as shale or boulder clay. Hard cliffs are at least 5m high, while soft cliffs are at least 3m high. The cliff top is generally defined by a change to an obvious less steep gradient. In some cases the cliff may grade into the slopes of a hillside located close to the coast. In these cases the cliff is defined as that part of the slope which was formed by processes of coastal erosion, while the cliff top is where there is the distinct break in slope. Both the cliff and the cliff top may be subject to maritime influence in the form of salt spray and exposure to coastal winds. A cliff can ascend in steps with ledges, and the top of the cliff is taken to occur where erosion from wave action is no longer considered to have been a factor in the development of the landform. The cliff base may be marked by a change in gradient at the bottom of the cliff. Where the base is exposed it can be characterised by scree, boulders, a wave-cut platform or sand, among other substrates. During this survey, where cliffs occur within the subtidal zone the base was considered to be the high water mark. A cliff is considered to have reached its end point where it is no longer over 5m high (hard cliffs) or 3m high (soft cliffs), or no longer has a steep slope. To be considered in this study, a cliff had to be a minimum of 100m in length. Sea cliffs may support a range of plant communities such as grassland, heath, scrub and bare rock communities, among others."

The range and area for this habitat has both been assessed as **favourable** in the NPWS Article 17 Report.

The specific structures and functions (including species) and future prospects have been assessed as **inadequate** but **stable**. On the basis of the above, the overall assessment of conservation status is **inadequate** with the overall trend assessed as **stable**.

The main pressures and threats identified in the Article 17 report are listed below:

Pressures:

- Invasive non-native species (**medium importance**)
- Sand and gravel extraction (**medium importance**)
- Sea defence or coast protection works, tidal barrages (**medium importance**)
- Paths, tracks, cycling tracks (**medium importance**)
- Sea-level changes (**low importance**)
- Non-intensive sheep grazing (**low importance**)
- Railway lines, TGV (**low importance**)
- Slipways (**low importance**)
- Piers/tourist harbours or recreational piers (**low importance**)
- Discharges (**low importance**)
- Disposal of household/recreational facility waste (**low importance**)
- Disposal of industrial waste (**low importance**)
- Structures, buildings in the landscape (**low importance**)
- Other urbanisation, industrial and similar activities (**low importance**)
- Diffuse pollution to surface waters due to agricultural and forestry activities (**low importance**)

- Diffuse pollution to surface waters due to household sewage and waste waters (**low importance**)
- Collapse of terrain, landslide (**medium importance**)
- Flooding and rising precipitation (**medium importance**)

Threats:

- Invasive non-native species (**medium importance**)
- Sand and gravel extraction (**low importance**)
- Sea defence or coast protection works, tidal barrages (**medium importance**)
- Paths, tracks, cycling tracks (**medium importance**)
- Sea-level changes (**medium importance**)
- Non-intensive sheep grazing (**low importance**)
- Railway lines, TGV (**low importance**)
- Slipways (**low importance**)
- Piers/tourist harbours or recreational piers (**low importance**)
- Discharges (**low importance**)
- Disposal of household/recreational facility waste (**low importance**)
- Structures, buildings in the landscape (**low importance**)
- Other urbanisation, industrial and similar activities (**low importance**)
- Diffuse pollution to surface waters due to agricultural and forestry activities (**low importance**)
- Diffuse pollution to surface waters due to household sewage and waste waters (**low importance**)
- Collapse of terrain, landslide (**medium importance**)
- Flooding and rising precipitation (**medium importance**)

Whilst no detailed targets and attributes are listed in the detailed Conservation Objectives documents for Galway Bay Complex SAC, targets and attributes for the conservation of this habitat are available in detailed Conservation Objectives for other SACs. These have been reviewed in and considered in relation to the current development and are described below.

All attributes and related targets for this habitat are taken from various SACs and listed in Table 1.28. Some of these targets and attributes relate specifically to other sites and are not necessarily relevant to the Galway Bay Complex SAC but are representative of factors considered in the conservation of the habitat in other areas.

Table 1.28 Targets and attributes associated with site specific conservation objectives for Annex I Habitat, Vegetated Sea Cliffs of the Atlantic and Baltic Coasts [1230]

Attribute	Target	Assessment
Habitat length	Area stable, subject to natural processes, including erosion	There will be no direct loss of this habitat due to the proposal, and therefore no decline in distribution.
Habitat distribution	No Decline, subject to natural processes	
Physical structure: functionality and hydrological regime	No alteration to natural functioning of geomorphological and hydrological processes due to artificial structures	There will be no alteration in the physical process that form this habitat as a result of the proposal.
Vegetation structure: zonation	Maintain range of sea cliff habitat zonation including transitional zones, subject to natural processes including erosion and succession	There will be no alteration in the vegetation composition or structure as a result of the proposal.
Vegetation structure: vegetation height	Maintain structural variation within sward	
Vegetation composition: typical species and sub-communities	Maintain range of sub-communities with typical species listed in the Irish Sea Cliff Survey (Barron <i>et al.</i> 2011)	
Vegetation composition: negative indicator species	Negative indicator species (including non-natives) to represent less than 5% cover	
Vegetation composition: bracken and woody species	Cover of bracken (<i>Pteridium aquilinum</i>) on grassland and/or heath to be less than 10%. Cover of woody species on grassland and/or heath to be less than 20%	

1.2.8 Coastal Lagoons* [1150]

Information on this habitat was gained from the NPWS Article 17 report (NPWS, 2013). The habitat account in that document reads as follows:

*Irish lagoons are defined on biological communities present rather than morphology. Any permanent water body, natural or artificial with salinity > 1 psu and a very restricted tidal prism is considered a lagoon. The great majority have *Ruppia* sp. present. Water bodies separated from the sea by barrier islands are classified as lagoons in some European countries but are not accepted as such in Ireland due to large tidal range and marine biota. Five main morphological types of lagoon are recognised in Ireland: 1. Classic "sedimentary" lagoons found on all parts of the coastline (21 lagoons, 41.4% of habitat area). 2. Artificial lagoons found on all parts of the coastline (30 lagoons, 35.2% of habitat area). 3. "Rock/peat" lagoons on the west coast, similar to lagoons in Scotland, but otherwise rare in Europe (18 lagoons, 20% of habitat area). 4. "Karst" lagoons found in parts of Counties Clare and Galway, and within Europe, possibly unique to Ireland (11 lagoons, 4.5% of habitat area). 5. "Saltmarsh" lagoons (6 lagoons, 1.5% of habitat area).*

The range and area of this habitat in Ireland has been assessed as **favourable** in the NPWS Article 17 Report.

The specific structures and functions (including species) and future prospects for the habitat have both been assessed as **unfavourable (bad)**. On the basis of the above, the overall assessment of conservation status is **bad** with the overall trend assessed as **stable**.

Pressures:

- Pollution to surface waters (limnic & terrestrial, marine & brackish) (**high importance**)
- Erosion (**high importance**)
- Silting up (**medium importance**)
- Fertilisation (**high importance**)
- Reclamation of land from sea, estuary or marsh (**high importance**)
- Accumulation of organic material (**medium importance**)
- Marine and freshwater aquaculture (**low importance**)
- Removal of beach materials (**low importance**)
- Urbanised areas, human habitation (**low importance**)
- Golf course (**low importance**)
- Circuit, track (**low importance**)
- Camping and caravans (**low importance**)
- Invasive non-native species (**low importance**)
- Disposal of household/recreational facility waste (**high importance**)

Threats:

- Pollution to surface waters (limnic & terrestrial, marine & brackish) (**high importance**)
- Modification of hydrographic functioning, general (**high importance**)
- Erosion (**high importance**)
- Silting up (**medium importance**)
- Fertilisation (**high importance**)
- Reclamation of land from sea, estuary or marsh (**high importance**)
- Accumulation of organic material (**medium importance**)

- Marine and freshwater aquaculture **(low importance)**
- Removal of beach materials **(low importance)**
- Urbanised areas, human habitation **(low importance)**
- Golf course **(low importance)**
- Circuit, track **(low importance)**
- Camping and caravans **(low importance)**
- Invasive non-native species **(low importance)**
- Disposal of household/recreational facility waste **(high importance)**

Targets and attributes for the conservation of this habitat are available in the detailed Conservation Objectives for Galway Bay Complex SAC. These have been reviewed and considered in relation to the current development in Table 1.29.

Table 1.29: Impact of the proposed development on Coastal lagoons [1150] conservation objectives.

To restore the favourable conservation condition of Coastal lagoons [1150] in Galway Bay Complex SAC			
Attributes	Measure	Target	Assessment
Habitat Area	Hectares	Area stable, subject to slight natural variation. The favourable reference area is 76.7ha.	The closest mapped lagoon to the proposed development is Turreen Lough (Rinville), which lies 1.7km to the south west. Favourable reference area for mapped lagoon habitat within the SAC is 76.7ha and according to the conservation objectives supporting documents for lagoons there may be more, as yet unmapped, lagoons within this site (NPWS, 2013).
Habitat distribution	Occurrence	No decline, subject to natural processes.	No Lagoon was recorded in the vicinity of the proposed development and there is no potential for habitat loss or decline in distribution
Salinity regime	Practical salinity units (psu)	Median annual salinity and temporal variation within natural ranges.	The salinity regime of lagoons depends on the volume and timing of inflowing and outflowing fresh and seawater. There will be no alteration in flow regime as a result of the proposed development.
Hydrological regime	Metres	Annual water level fluctuations and minima within natural ranges.	Fluctuations in water depth are a natural feature of lagoon hydrology. However, if water levels fluctuate beyond their natural values due to issues such as drainage, the condition of the habitat can deteriorate. No drainage will take place as a result of the proposed development.
Barrier: connectivity between lagoon and sea	Permeability	Appropriate hydrological connections between lagoons and sea, including where necessary, appropriate management	The morphology of the barrier between a lagoon and sea determines how it functions ecologically. Changes to the barrier can be due to natural processes such as storms, but they can also be modified through human intervention. The proposed development will not result in a loss of connectivity between lagoons and sea and no barriers to connectivity will occur as a result of the proposal.
Water quality: Chlorophyll a	µg/L	Annual median chlorophyll a within natural ranges and less than µg/L	This attribute indicates the level of phytoplankton in the water column. Phytoplankton tends to increase in density in response to increasing nutrient levels. Excessive shading from phytoplankton can reduce submergent macrophyte colonisation of the littoral zone of lagoons. There will be no deterioration in water quality due to an increase in nutrient levels as a result of the proposed development.

To restore the favourable conservation condition of Coastal lagoons [1150] in Galway Bay Complex SAC

Attributes	Measure	Target	Assessment
			<p>Mitigation measures outlined in the CEMP, ensure that any potential pathways for surface water pollution to this QI are robustly blocked. Construction best practice measures have been implemented into the construction phase of the development, as described in section 2.2 of the NIS and in the accompanying Construction Environmental Management Plan (CEMP).</p> <p>Operational services, including all foul water will be connected to the local public sewer. All surface water runoff will enter appropriately designed petrol interceptors prior to discharge to specified percolation areas.</p>
Water quality: Molybdate Reactive Phosphorus (MRP)	mg/L	The target for the attribute water quality- Molybdate Reactive Phosphorus (MRP) is: annual median MRP within natural ranges and less than 0.1mg/L.	<p>This limit is required to ensure that excessive shading from phytoplankton does not reduce submergent colonisation of the littoral zone.</p> <p>There will be no deterioration in water quality as a result of the proposal. Mitigation measures outlined in the CEMP, ensure that any potential pathways for surface water pollution to this QI are robustly blocked. Construction best practice measures have been implemented into the construction phase of the development, as described in section 2.2 of the NIS and in the accompanying Construction Environmental Management Plan (CEMP).</p> <p>Operational services, including all foul water will be connected to the local public sewer. All surface water runoff will enter appropriately designed petrol interceptors prior to discharge to specified percolation areas.</p>
Water quality: Dissolved Inorganic Nitrogen (DIN)	mg/L	Annual median DIN within natural ranges and less than 0.15mg/L	<p>There will be no deterioration in water quality as a result of the proposal. Mitigation measures outlined in the CEMP, ensure that any potential pathways for surface water pollution to this QI are robustly blocked. Construction best practice measures have been implemented into the construction phase of the development, as described in section 2.2 of the NIS and in the accompanying Construction Environmental Management Plan (CEMP).</p> <p>Operational services, including all foul water will be connected to the local public sewer. All surface water runoff will enter appropriately designed petrol interceptors prior to discharge to specified percolation areas.</p>

To restore the favourable conservation condition of Coastal lagoons [1150] in Galway Bay Complex SAC

Attributes	Measure	Target	Assessment
Depth of macrophyte colonisation	Metres	Macrophyte colonisation to at least 2m depth	<p>There will be no effects on plant and animal species associated with lagoons, as a result of the proposal, due to the separation distance and the lack of potential for water pollution. Mitigation measures outlined in the CEMP, ensure that any potential pathways for surface water pollution to this QI are robustly blocked. Construction best practice measures have been implemented into the construction phase of the development, as described in section 2.2 of the NIS and in the accompanying Construction Environmental Management Plan (CEMP).</p> <p>Operational services, including all foul water will be connected to the local public sewer. All surface water runoff will enter appropriately designed petrol interceptors prior to discharge to specified percolation areas.</p>
Typical plant species	Number and m ²	Maintain number and extent of listed lagoonal specialists, subject to natural variation	
Typical animal species	Number	Maintain listed lagoon specialists, subject to natural variation	
Negative indicator species	Number and % cover	Negative indicator species absent or under control	<p>Low salinity, shallow water and elevated nutrient levels increase the threat of accelerated encroachment by reedbeds. There will be no alteration to salinity levels, nutrient levels or the hydrological regime of the lagoon as a result of the proposed development.</p> <p>The proposal is separated from the nearest lagoon by 1.7km. There will be no deterioration in water quality as a result of the proposal. Mitigation measures outlined in the CEMP, ensure that any potential pathways for surface water pollution to this QI are robustly blocked. Construction best practice measures have been implemented into the construction phase of the development, as described in section 2.2 of the NIS and in the accompanying Construction Environmental Management Plan (CEMP).</p> <p>Operational services, including all foul water will be connected to the local public sewer. All surface water runoff will enter appropriately designed petrol interceptors prior to discharge to specified percolation areas.</p>

1.2.9 Large Shallow Inlets and Bays [1160]

Information on this habitat was gained from the NPWS Article 17 report (NPWS, 2013). The habitat account in that document reads as follows:

The EU interpretation manual describes Large Shallow Inlets and Bays as indentations of the coast where, in contrast to estuaries, the influence of freshwater is generally limited or reduced. These habitats are typically shallower and more sheltered than open coasts and can report a variety of different habitat forms. They are variously composed of fine sediments to bedrock, intertidally and subtidally, and in Ireland are typified to a large extent by their constituent sub-habitats. They are frequently the vestiges of glacial erosion (Lough Swilly) or deposition (Clew Bay) and occasionally occur at the mouth of rivers where the lower density of freshwater flows over the fully marine benthos and vertical wind-driven mixing of layers is absent or significantly reduced. The shallow and sheltered nature of these habitats results in highly productive and frequently diverse areas in terms of both species and communities.

*Large Shallow Inlets and Bays habitats frequently incorporate a number of constituent Annex I habitats including Sandbank at the mouth of the Lower River Shannon where *Nephtys cirrosa* and *Bathyporeia elegans* characterised the habitat. Sediment and Reef communities constitute the majority of the remaining habitats (including the intertidal Annex I habitat). The three most prevalent sediment communities which account for 70% of the examined habitats of Large Shallow Inlets and Bays include: Fine Sand to Sand community shown usually to express dominance in the following species: *Angulus tenuis*, *Arenicola marina*, *Chaetozone christei*, *Fabulina fabula*, *Iphinoe trispinosa*, *Nephtys cirrosa*, *Pontocrates arenarius*, *Pygospio elegans*, *Scolelepis mesnili*, *Scolelepis squamata*, *Scoloplos armiger*, *Spio martinensis*, and *Spiophanes bombyx*; Muds to Fine Sand Community commonly reporting *Crangon crangon* and *Pygospio elegans*; and Muddy Sands/Sandy Muds Community typified by *Abra alba*, *Chaetozone gibber*, *Donax vittatus*, *Euclymene oerstedii*, *Kurtiella bidentata*, *Lumbrineris gracilis*, *Melinna palmata*, *Nephtys hombergii*, *Nucula nucleus*, *Thyasira flexuosa* and *Owenia fusiformis*.*

*Habitats associated with hard substrates constitute around 20% of the intertidal and subtidal habitat. The typical species for inshore reef habitats is dependent on a number of factors including depth and exposure (described under 1170). Intertidal and subtidal hard ground in Bays and Inlets are frequently dominated by furoid and *Laminaria* algal species. In deeper water the reef habitats tend to be predominantly sponges and anemones with associated polychaetes, molluscs, bryozoans, tunicates, crustaceans and fish species.*

*A very significant proportion of some less frequently encountered species in Ireland have been found within the boundaries of Large Shallow Inlets and Bays including 85% of mapped maërl (*Lithothamnion corallioides* and *Phymatolithon calcareum*) and 70% of mapped eel grass beds (*Zostera marina* and *Z. noltii*), all records of the endemic species *Edwardsia delapiae* in Valentia Harbour, all mapped areas of the reef building polychaete *Sabellaria alveolata*, and the majority of such species as *Neopentadactyla mixta*, *Pachycerianthus multiplicatus*, *Sabella pavonia*, and *Virgularia mirabilis*. *Limaria hians*, commonly known as the gaping file shell forms a "nest" of byssus threads. Where these are sufficiently dense, they form reefs on the sediment; Mulroy Bay is the only known area in Ireland where these bivalves occur.*

This Annex I habitat also forms an important resource for various bird and mammal species (notably Annex II marine mammals) for feeding, breeding and resting.

The range and area of this habitat in Ireland has been assessed as **favourable** in the NPWS Article 17 Report.

The specific structures and functions (including species) have been assessed as **inadequate** but **improving** and the future prospects for the habitat have been assessed as **favourable**. On the basis of the above, the overall assessment of conservation status is **inadequate** with the overall trend assessed as **improving**.

Pressures:

- Fishing and harvesting aquatic resources (**high importance**)
- Bottom culture (**medium importance**)
- Suspension culture (**medium importance**)
- Other outdoor sports and leisure activities (**medium importance**)
- Pollution to waters (limnic & terrestrial, marine & brackish) (**low importance**)
- Nautical sports (**low importance**)
- Hand collection (**low importance**)
- Intensive fish farming, intensification (**low importance**)

Threats:

- Fishing and harvesting aquatic resources (**high importance**)
- Other outdoor sports and leisure activities (**medium importance**)
- Pollution to waters (limnic & terrestrial, marine & brackish) (**low importance**)
- Bottom culture (**low importance**)
- Suspension culture (**low importance**)
- Nautical sports (**low importance**)
- Hand collection (**low importance**)

Targets and attributes for the conservation of this habitat are available in the detailed Conservation Objectives for Galway Bay Complex SAC. These have been reviewed and considered in relation to the current development in Table 1.30.

Table 1.30: Impact of the proposed development on Large shallow inlets and bays [1160] conservation objectives.

To maintain the favourable conservation condition of Large shallow inlets and bays [1160] in Galway Bay Complex SAC			
Attributes	Measure	Target	Assessment
Habitat Area	Hectares	Area stable or increasing, subject to natural processes.	<p>According to the conservation objectives supporting document the habitat area was estimated as 10,825ha using OSI data and the Transitional Water Body area as defined under the Water Framework Directive (NPWS, 2013). The closest mapped extent of this habitat lies in excess of 2.5km west of the proposed development site. Pollution to water is listed as a threat to this habitat.</p> <p>There will be no loss of habitat as a result of deterioration in water quality due to the proposal. Comprehensive water pollution mitigation measures (outlined in Chapter 7 – hydrology and in the CEMP) to ensure protection of all downstream receiving waters during construction and operational phases of the development. The proposed mitigation measures for protection of surface water quality include on site drainage control measures (i.e. silt fences, silt bags etc.) thus ensuring that the quality of runoff from proposed development areas will be very high. As outlined above controls will also be put in place to manage risks associated with hydrocarbons/chemicals and cement based products used during construction phase.</p> <p>Operational services, including all foul water will be connected to the local public sewer. All surface water runoff will enter appropriately designed petrol interceptors prior to discharge to specified percolation areas. These measures are further described in Section 2.2 of this report.</p>
Community Extent	Hectares	Maintain the extent of the <i>Zostera</i> -dominated community complex and the maërl-dominated community, subject to natural processes.	The main causes of decline in <i>Zostera</i> -dominated communities in recent decades are anthropogenic and include land reclamation, coastal development, boating and fishing activity, sewage discharge and agricultural run-off often result in physical disturbance and siltation as well as increased water turbidity and nutrient loading (Spalding et al. 2003).
Community structure: <i>Zostera</i> density	Shoots per m ²	Conserve the high quality of <i>Zostera</i> -dominated communities, subject to natural processes	Maërl communities are very sensitive to substratum loss, smothering, increase in suspended sediment, abrasion and physical disturbance which can prevent light reaching the living maërl and therefore halt photosynthesis (Jones et al., 2000).
Community structure:	Biological composition	Conserve the high quality of the maërl-dominated community, subject to natural processes	As outlined above there will be no deterioration in water quality due to the proposal.

To maintain the favourable conservation condition of Large shallow inlets and bays [1160] in Galway Bay Complex SAC

Attributes	Measure	Target	Assessment
Community distribution	Hectares	Conserve the following community types in a natural condition: Intertidal sandy mud community complex; Intertidal sand community complex; Fine to medium sand with bivalves community complex; Sandy mud to mixed sediment community complex; Mixed sediment dominated by Mytilidae community complex; Shingle; Furoid-dominated community complex; <i>Laminaria</i> -dominated community complex; and Shallow sponge-dominated community complex.	Typical species will vary depending on the depth, substrate and degree of exposure to wave action. There will be no alteration to the physical processes that form these communities. As outlined above there will be no deterioration in water quality due to the proposal.

1.2.10 Alkaline Fens [7230]

Information on this habitat was gained from the NPWS Article 17 report (NPWS, 2013). The habitat account in that document reads as follows:

Alkaline fens are typically base-rich basin or flush fen systems with extensive areas of species-rich small sedge communities of the alliance Caricion davallianae. These fen systems are often a complex mosaic of habitats, with tall sedge beds, reedbeds, wet grasslands, springs and open-water often co-occurring at a given fen site. Alkaline fen habitat can occur beyond peat-forming fen systems, such as in dune slacks and wet grasslands. Based on a phytosociological description of small-sedge vegetation in Ireland, the associations Campylio-Caricetum dioicae, Schoenetum nigicantis and Juncetum subnodulosi correspond with 7230 Alkaline fens. The most extensive areas of alkaline fens in Ireland are thought to occur in lowland basins associated with limestone groundwater bodies with a karstic or poorly productive flow regime. Alkaline fens within flushes in upland and lowland regions, along the fringes of calcareous lakes and within turloughs, dune slacks and machair are thought to be more limited in extent but more widespread.

The range and area of this habitat in Ireland has been assessed as **favourable** and the area assessed as **inadequate** in the NPWS Article 17 Report.

The specific structures and functions (including species) and future prospects for the habitat have both been assessed as **bad (unknown)**. These parameters relate to a decline in the quality of the habitat where it occurs. On the basis of the above, the overall assessment of conservation status is **bad** with the overall trend assessed as **unknown**.

The main pressures and threats identified in the Article 17 report are listed below:

Pressures:

- Water abstractions from groundwater (**high importance**)
- Reclamation of land from sea, estuary or marsh (**high importance**)
- Diffuse groundwater pollution due to agricultural and forestry activities (**high importance**)
- Abandonment of pastoral systems, lack of grazing (**high importance**)
- Water abstractions from surface waters (**medium importance**)
- Infilling of ditches, dykes, ponds, pools, marshes or pits (**medium importance**)
- Invasive non-native species (**medium importance**)
- Diffuse pollution to surface waters due to agricultural and forestry Activities (**medium importance**)
- Peat extraction (**medium importance**)
- Artificial planting on open ground (non-native trees) (**medium importance**)
- Agricultural intensification (**medium importance**)
- Restructuring agricultural land holding (**low importance**)
- Roads, motorways (**low importance**)
- Disposal of household / recreational facility waste (**low importance**)

Threats:

- Water abstractions from groundwater **(high importance)**
- Reclamation of land from sea, estuary or marsh **(high importance)**
- Diffuse groundwater pollution due to agricultural and forestry activities **(high importance)**
- Abandonment of pastoral systems, lack of grazing **(high importance)**
- Changes in abiotic conditions **(medium importance)**
- Water abstractions from surface waters **(medium importance)**
- Infilling of ditches, dykes, ponds, pools, marshes or pits **(medium importance)**
- Invasive non-native species **(medium importance)**
- Diffuse pollution to surface waters due to agricultural and forestry activities **(medium importance)**
- Peat extraction **(medium importance)**
- Artificial planting on open ground (non-native trees) **(medium importance)**
- Agricultural intensification **(medium importance)**
- Restructuring agricultural land holding **(low importance)**
- Roads, motorways **(low importance)**
- Disposal of household / recreational facility waste **(low importance)**
- Disposal of inert materials **(low importance)**

Targets and attributes for the conservation of this habitat are available in the detailed Conservation Objectives for Galway Bay Complex SAC. These have been reviewed and considered in relation to the current development in Table 1.31.

Table 1.32: Impact of the proposed development on Alkaline Fen conservation objectives.

To maintain the favourable conservation condition of Alkaline fens in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:			
Attributes	Measure	Target	Assessment
Habitat Area	Hectares	Area stable or increasing, subject to natural processes	<p>According to the site-specific conservation objectives (NPWS, 2013) the full extent this habitat within Galway Bay Complex SAC is unknown and further areas are likely to occur. Field surveys as part of this study identified 5.5ha of fen, outside the boundary of the proposed development. No fen habitat occurs within the footprint of the development site.</p> <p>There will be no direct loss of fen habitat due to the proposal. The footprint of the proposal is entirely outside of the boundary of the fen habitat and will not encroach on the fen habitat. The stonewalls, treelines and hedgerows along the western and northern boundary will be retained and act as a buffer between the proposal and the alkaline fen. In addition, a grass buffer has been maintained between the proposal and the western boundary of the SAC, in the form of amenity grassland and meadow habitat. This increases the separation between the proposal and the fen.</p>
Habitat distribution	Occurrence	No decline, subject to natural processes	<p>According to the site-specific conservation objectives (NPWS, 2013) the full distribution of this habitat within Galway Bay Complex SAC is unknown and further areas are likely to occur.</p> <p>There will be no direct loss of fen habitat as a result of the proposal and therefore no decline in distribution. The footprint of the proposal is entirely outside of the boundary of the fen habitat and will not encroach on the fen habitat</p>
Hydrological regime	Flow rates, metres	Appropriate natural hydrological regime necessary to support the natural structure and functioning of the habitat	<p>Fens are terrestrial wetlands fed by surface water and/or groundwater, as well as direct input from rainfall. The landscape setting combined with the presence of ground or surface water largely defines the hydrological functioning of a fen (SNH, 2011). Maintenance of groundwater, surface water flows and water table levels within natural ranges is essential for this wetland habitat. There will be no alteration to the natural hydrological regime necessary to support the natural structure and function of the fen.</p> <p>There are no field drains within the proposed development site, and no hydrological connectivity between the site and the fen. There will be no alteration to the flood regime of the fen. According to the flood-risk assessment report (Hydro-Environmental Services, 2018) the PFRA mapping indicates that the fen area west</p>

To maintain the favourable conservation condition of Alkaline fens in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:

Attributes	Measure	Target	Assessment
			<p>of the proposed site located in the coastal Flood Zone A (200-year flood zone) and the coastal Flood Zone B (1000-year flood zone). The site infrastructure and housing layout has been designed to ensure all highly vulnerable infrastructure are located outside the mapped PFRA flood zones.</p> <p>The risk of pluvial flooding associated with the increase in hardstanding is minimised by using soakaways for drainage management. With the application of standard best practice SuDS drainage controls (soakaways) within the proposed site no downstream flooding from storm water runoff resulting from the proposed development is anticipated. No significant impacts in terms of flooding are expected due to the proposed development.</p>
Peat formation	Flood duration	Active peat formation, where appropriate	Peat accumulation in fens is greatest where the ground is permanently waterlogged with little water movement (SNH, 2013). As outlined above there will be no alteration to the water table and hydrological regime of the fen.
Water quality: nutrients	Water chemistry measures	Appropriate water quality to support the natural structure and functioning of the habitat	<p>Comprehensive water pollution mitigation measures (outlined in Chapter 7 – hydrology and in the CEMP) to ensure protection of all downstream receiving waters during construction and operational phases of the development. The proposed mitigation measures for protection of surface water quality include on site drainage control measures (i.e. silt fences, silt bags etc.) thus ensuring that the quality of runoff from proposed development areas will be very high. As outlined above controls will also be put in place to manage risks associated with hydrocarbons/chemicals and cement based products used during construction phase.</p> <p>Operational services, including all foul water will be connected to the local public sewer. All surface water runoff will enter appropriately designed petrol interceptors prior to discharge to specified percolation areas. These measures are further described in Section 2.2 of this report.</p> <p>Alkaline fens are extremely sensitive to changes in groundwater quality. All surface water arising on site will drain via soakaways to ground, with no proposed outfall. Groundwater quality risks are reduced during the operational phase by use of hydrocarbon interceptors and silt traps prior to discharge to the soakaways.</p>

To maintain the favourable conservation condition of Alkaline fens in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:

Attributes	Measure	Target	Assessment
			No impacts on the water quality of the adjacent fen habitat are anticipated as a result of the proposal.
Vegetation composition: typical species	Presence	Maintain vegetation cover of typical species including brown mosses and vascular plant	The vegetation composition in alkaline fens is highly influenced by the water table and nutrient inputs.
Vegetation composition: trees and shrubs	Percentage	Cover of scattered native trees and shrubs less than 10%	As outlined above there will be no alteration to the nutrient input into the fen as Comprehensive water pollution mitigation measures (outlined in Chapter 7 – hydrology and in the CEMP) to ensure protection of this adjacent habitat and water quality of downgradient habitats during construction and operational phases of the development. As outlined above there will be no alteration to the water table and hydrological regime of the fen.
Physical structure: disturbed bare ground	Percentage	Cover of disturbed bare ground less than 10%. Where tufa is present, disturbed bare ground less than 1%	There will be no alteration of the physical structure of the fen habitat associated with the proposed development. The habitat will remain physically separated from the development by walls, treelines and hedgerows. There will be no encroachment into the fen habitat as a result of the proposed development.
Physical structure: drainage	Percentage	Areas showing signs of drainage as a result of drainage ditches or heavy trampling less than 10%	There will be no drainage of the fen habitat or alteration to the hydrological regime associated with the proposed development.

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Appendix 10

Cumulative Assessment – Permitted Development

Permitted Development Surrounding Moneyduff Since Designation of EU Sites

Planning Reference	Development	Development Address	Decision
Moneyduff, Oranmore			
0069477	Dwelling house and septic tank.	Moneyduff, Oranmore	Granted on 03/02/1994
992433	Permission for 1. the demolition of ruin and outhouse 2. provision of 239 residential units together with associated roadworks, ducting, sewers and watermain on reduced site	Oranhill & Moneyduff, Oranmore	Granted on 20/12/2001
041604	Permission for conversion of existing attic storage to habitable room and for construction of a utility extension to rear of dwellings on house no 1 to 6 inclusive on a previously approved residential development pl ref 01 2846	Moneyduff, Oranmore	Granted on 01/06/2004
081744	Permission to extend dwelling house which is a protected structure Reg. No. 923 and to build a new domestic garage to house camper van (Gross floor area Extension 70.90 sqm Garage 41.40 sqm)	Moneyduff, Oranmore	Granted on 27/11/2008
10112	Permission to demolish existing sub-standard dwellinghouse and garage, and to erect new dwellinghouse, domestic garage and all associated services at 15 Beech Park (gross floor space 161.7sqm house 30.36sqm garage)	Moneyduff, Oranmore	Granted on 29/03/2010
151107	Permission for residential development at Oranhill, Oranmore, Co. Galway. The development contains 68 two storey houses consisting of 48 four bed semi-detached, 4 three bedroom semi-detached, 9 four bedroom detached, 4 three bedroom detached and a terrace of 3 three bedroom houses, together with all associated site works and landscaping. Gross floor space of proposed works: 8,265sqm	Moneyduff/Oranhill, Oranmore	Granted on 01/03/2016
17980	<p>Permission for demolition of an existing dwelling house and construction of a residential development of 38 no. dwelling units (total building area 4,423.4sqm) comprising of 8 no. 4 bedroom semi-detached, 20 no. 3 bedroom semi-detached and 10 no. 3 bedroom terraced with all associated site works and services, previous planning reference no. 09/2055.</p> <p>An Bord Pleanála granted permission following a third party appeal on 22/05/2018 subject to 13 no. conditions. The permission was extended under Pl Ref 17/980. The site is</p>	Moneyduff, Oranmore	Granted on 24/08/2017

Planning Reference	Development	Development Address	Decision
	located approximately 130m to the north west of the proposed development.		
Oranhill, Oranmore			
962218	Permission to construct a new dwellinghouse and septic tank.	Oranhill, Oranmore	Granted on 17/02/1997
97894	Permission to construct a dwellinghouse and septic tank.	Oranhill, Oranmore	Granted on 11/11/1997
99888	Permission to construct a dwellinghouse and septic tank.	Oranhill, Oranmore	Granted on 10/05/1999
001957	Permission to demolish existing dwellinghouse and construct 81 no. dwellinghouses and associated services	Oranhill, Oranmore	Granted on 04/12/2001
023202	Permission for construction of dwelling house & domestic garage	Oranhill, Oranmore	Granted on 10/10/2002
036749	Permission for construction of a dwellinghouse and associated services in place of dwellings granted on sites 16-18 including previously granted approved under pl. ref. no. 00/1957.	Oranhill, Oranmore	Granted on 12/02/2004
041973	Permission to construct 70 no. dwellinghouses & associated services.	Oranhill, Oranmore	Granted on 31/01/2005
04305	Permission for the construction of 89 residential units, a creche and all associated roads and services, incorporating part of the north-south Distributor route as contained in the Oranhill Action Plan. The 89 residential units are comprised as follows: 53 terraced units, 8 apartments, 22 semi detached houses and 6 detached houses.	Oranhill, Oranmore	Granted on 22/11/2004
04322	Permission for construction of a fully serviced dwelling house and domestic garage.	Oranhill, Oranmore	Granted on 03/05/2004
08282	Permission for the construction of a 3-bed dwellinghouse attached to existing dwellinghouse and all associated services.	Oranhill, Oranmore	Granted on 07/07/2008
092113	Permission to construct 70 no. dwellinghouses & associated services.	Oranhill, Oranmore	Granted on 20/01/2010
11407	Permission for construction of a new 244m ² medical centre, 106 child creche, 547m ² of office space, 5 no. retail units totalling 276m ² , 5 no. 2 bed townhouses, 10 no. 2 bed apartments, parking for 129 no. cars all in three blocks over a basement along with all ancillary works and services (previous pl. ref. 05/4805)	Oranhill, Oranmore	Granted on 16/05/2011
121233	Extention of duration for permission to construct 70 no. dwellinghouses & associated services, previous planning refernece no. 04/1973 & 09/2113	Oranhill, Oranmore	Granted on 23/11/2012
13638	Permission to demolish existing derelict house and construct two storey residence and associated site development works.	Oranhill, Oranmore	Granted on 08/08/2013
151334	Roykeel Ltd, Brian and Fidelma Loughran for the construction of a residential/commercial	Oranhill, Oranmore	Granted on 21/12/2015

Planning Reference	Development	Development Address	Decision
	development comprised as follows: 1. The completion of the North-South Oranmore distributor road, the route of which was agreed under planning reference 04/305 and for the link of same to the existing roundabout constructed on the N18 for the purpose to serve the North-South distributor road. 2. The modification of part of the development scheme known as 'Coill Clocha' previously approved under pl. ref. 04/305. The site adjoins the proposed development to the east.		
15931	<p>Permission to 1) Construct a residential development consisting of 35 No. dwellings to replace part of a previously permitted development.</p> <p>All proposed development take place on site of a previously approved residential development granted under Planning Reference No. 04/1973 and extensions of duration under reference numbers 09/2113 & 12/1233 which is currently under construction. All proposed dwellings to be accessed of existing estate roads and connected to existing services. 2) Permission is also sought for the setting aside of condition number 15 attached PL. Ref. 04/1973 relating to the provision of a crèche.</p>	Oranhill, Oranmore	Granted on 03/12/2015
1834	Permission to construct a single dwelling over two floors to include new site entrance, connection to existing services and all ancillary works.	Oranhill, Oranmore	Granted on 13/03/2018
1944	<p>Permission for the redevelopment of an existing infill and brownfield site to provide for a mixed-use development comprising of 22 no. residential units and 1 no. commercial unit. Provision for public realm landscaping including shared public open space at ground floor level, carparking spaces, New pedestrian and vehicular access form the Oranhill road with additional pedestrian connectivity to existing estate roads serving Oranhill Avenue and Oranview.</p> <p>Connection to existing public mains water infrastructure, including connection to existing surface water and foul drainage networks, to serve the development, together with all associated site development works and services.</p>	Oranhill, Oranmore	Decision due 12/03/2019. Further information requested.
Renville, Oranmore			
011227	Permission for the construction of 11 no. dwellings and all associated development works.	Renville West, Oranmore	Granted on 05/08/2002

Planning Reference	Development	Development Address	Decision
10492	Permission for the demolition of a substandard dwellinghouse and for the construction of a new dwellinghouse, effluent treatment plant and domestic garage (gross floor space 241.5sqm house 60sqm garage)	Rinville East, Oranmore	Granted on 25/05/2010
151301	Permission (1) to demolish existing derelict dwelling & sheds (2) erect new dwelling house, domestic garage, waste water treatment system, polishing filter and all associated services. Gross floor space of proposed works: 223.30sqm house & 36.50sqm garage	Rinville East, Oranmore	Granted on 16/12/2015
Cregganna Beg			
11553	Permission for the construction of a two-storey dwelling house, treatment plant and percolation area and all associated works (gross floor space 240.12sqm)(previous pl. ref. 06/256)	Cregganna Beg	Granted on 19/07/2011
11959	Permission for the construction of new one and a half storey private dwelling house, sewerage treatment works, percolation area and all associated site development works (gross floor space 177.4sqm) (previous pl. ref. 06/2211)	Cregganna Beg	Granted on 25/08/2011