

Housing Development, St. Evin's Park
development, Monasterevin, Co. Kildare

Development
Infill Housing Development, St.
Evin's Park Monasterevin, Co.
Kildare
Screening Report for Habitats
Appropriate Assessment

on behalf of Kildare County Council

September 2023

Contents

| | Page |
|---|--------------|
| 1.0 Introduction..... | 1 |
| 2.0 Process | 1 |
| 3.0 Stages of the Appropriate Assessment..... | 2 |
| 4.0 Description of the Project..... | 3 |
| 5.0 Sources for Information on Natura 2000 sites to Inform Screening Process | 5 |
| 5.1 Nature Conservation Sites and Available Information..... | 5 |
| 6.0 Features of the Development that Could Impact on Natura 2000 Sites | 6 |
| 6.1 Brief Description of the Natura 2000 Sites | 6 |
| 116.2 Conservation Objectives | 8 |
| 6.3 Relevant SAC Description | 8 |
| 7.0 Likely Impact to the Natura 2000 Sites | 10 |
| 7.1 SAC Sites..... | 12 |
| 8.0 Screening Conclusions | 21 |
| Appendices..... | |

Appendices

Appendix 1.

Location of Development Site

Appendix 2

Natura 2000 Sites within a 15km radius of the proposed development site

Appendix 3

Photographic record

Appendix 4

Site Synopsis River Barrow and River Nore SAC

1.0 Introduction

Kildare County Council is proposing to develop an Infill Housing Development, at St. Evin's Park, Monasterevin, Co. Kildare. The project at St. Evin's Park, Monasterevin involves the building of 15 new residential units, 4 one bed roomed apartments, 8 two bed roomed houses and 3 three bed roomed houses, which will include SUDs and making good works to neighbouring park area, additional road and car parking, connection to exist drainage/utilities, an upgrade to the grey water drainage system and other ancillary site works.

Pursuant to proper planning and development Kildare County Council in the Monasterevin Local Area Plan particular attention should be given to the requirement for Appropriate Assessment Screening and where necessary ensures all proposals/projects are screened to avoid significant impacts on Natura 2000 sites in accordance with Article 6 of the Habitats Directive.

The purpose of this assessment is to determine, the appropriateness, or otherwise, of the proposed project in the context of the conservation objectives of sites which are protected for their natural habitats and species under European legislation, termed Natura 2000 sites.

2.0 Process

Ireland became a signatory to the EU Birds Directive in 1979 and the Habitats Directive in 1992. Arising from this legislation was the obligation to establish the Natura 2000 network: nominated sites of highest biodiversity importance for rare and threatened habitats and species across the EU. In Ireland, the Natura 2000 network of European sites comprises Special Areas of Conservation (SACs, including candidate SACs), and Special Protection Areas (SPAs, including proposed SPAs).

SACs are selected for the conservation of Annex I habitats (including priority types which are in danger of disappearance) and Annex II species (other than birds). SPAs are selected for the protection of Annex I birds and other regularly occurring migratory birds and their habitats. The annexed habitats and species for which each site is selected correspond to the qualifying interests of the sites; from these the conservation objectives of the site are derived.

The requirements for an Appropriate Assessments (AA) are fully set out in the EU Habitats Directive 92/43/EEC. Articles 6(3) and 6(4) of this Directive state:

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

6.4. If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted.

Where a site that is impacted upon by a proposed development hosts a priority natural habitat type and/or a priority species, the only considerations which may be raised are those relating to 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.

The Department of the Environment, Heritage, and Local Government (DoEHLG) issued guidance on Appropriate Assessment (*Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities*) in December 2009 which provided advice on the information required in an Appropriate Assessment. Guidance from DoEHLG published in February 2010 stated that it is the responsibility of the competent authority (or consent authority) to undertake the Appropriate Assessment. The assessments may be based on information submitted by the proponent of the plan or project, in the form of a Natura Impact Statement. This Natura Impact Statement must be prepared by an ecological specialist with input from other relevant disciplines as required experts, e.g. engineers, planning specialists, hydrologists.

This screening assessment has been prepared in accordance with the current guidance (NPWS, 2009, Revised February 2010).

3.0 Stages of the Appropriate Assessment

This document has been prepared in accordance with the European Commission Environment DG document "Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC", referred to as the "EC Article 6 Guidance Document". The guidance document provides a non-mandatory methodology for carrying out assessments required under Article 6(3) and (4) of the Habitats Directive and is viewed as an interpretation of the EU Commission's document "Managing Natura 2000 sites: The Provisions of Article 6 of the Habitats Directive 92/43/EEC", referred to as "MN2000". In addition, "Appropriate Assessment Guidance for Planning Authorities" was published by the Department of the Environment, Heritage and Local Government in December 2009 (DEHLG, 2009) and amended in March 2010. Cognisance has been taken of this document in carrying out this screening assessment.

The Habitats Directive promotes a hierarchy of avoidance, mitigation and compensatory measures. In the first instance, the plan should aim to avoid any negative impacts on European sites by identifying possible impacts early in the plan-making and writing the plan in order to avoid such impacts. Following that, mitigation measures should be applied, if necessary, during the AA process to the point where no adverse impacts on the site(s) remain. If the plan is still likely to result in adverse effects, and no further practicable mitigation is possible, then it is rejected. If no alternative solutions are identified and the plan is required for imperative reasons of overriding public interest (IROPI test) under Article 6(4) of the Habitats Directive, then compensation measures are required for any remaining adverse effect.

Screening Phase

This section of the screening process describes the Natura 2000 sites within a 15km radius of the proposed development. A 15km buffer zone has been chosen

as a precautionary measure, to ensure that all potentially affected Natura 2000 sites are included in the screening process. This is in line with "Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities", produced by the Department of the Environment, Heritage and Local Government.

The integrity of a Natura 2000 site (referred to in Article 6.3 of the EU Habitats Directive) is determined based on the conservation status of the qualifying features of the SAC. The qualifying features for each site have been obtained through a review of online documentation relating to each Natura 2000 site available from the NPWS.

There is a European site located 1km from the proposed development site in Monasterevin, the River Barrow which is a constituent River of the River Barrow and Nore SAC. One other European site is located at approximately 15km from the proposed development site just within the 15km radius of the site this is the Pollardstown Fen Special Area of Conservation (SAC) is the nearest European site at circa 15km from the proposed development site. Table 1 lists the Natura 2000 sites within *circa* 15km of the proposed site at St. Evin's Park Monasterevin.

4.0 Description of the Project and whether is it required for proper management of a European Site

The project as outlined is not required for the proper management of a European Site i.e an SAC or SPA site.

The project at St. Evin's Park, Monasterevin involves the building of 15 new residential units, 4 one bed roomed apartments, 8 two bed roomed houses and 3 three bed roomed houses, which will include SUDs and making good works to neighbouring park area, additional road and car parking, connection to exist drainage/utilities, an upgrade to the grey water drainage system and other ancillary site works."

Roofs will discharge to permeable paving which will slowly discharge to the surface water network. Bio-retention swales will intercept overland flows from the road and discharge into an online constructed wetlands which has been sized for up to a 1:100-year storm event + 30% climate change + 10% for urban creep, this will then connect to the public surface water network.

Site location map is included as Appendix 2.

The design of the proposed development considers best environmental engineering design to ensure least impact to the environment.

Please see the civil drawings for the site, included with this planning application.

Building Foundations will not exceed 2200mm in depth.

Construction of foundations of pathways, and fencing structures will not exceed 500mm in depth.

Landscaping will only use clean uncontaminated topsoils or topsoils excavated from within the site.

Planting schemes will not include any known invasive alien species as defined by Invasive Species Ireland.

Some surplus soil which will not be required for site landscaping will be removed from the site.

All surplus cut soil from the site to a licenced soil disposal site conveyed by a licenced contractor to a designated disposal site.

General Site Construction Environmental Measures Consistent with Best Practice, Standards, Design and Controls

The developer will outline a Construction Environmental Management Plan in consultation with the competent authority Kildare Co. Council for the development which will describe the methodology to be used on site to ensure best environmental management of the site including maintenance of local water quality, avoidance of potential run-off occur on site and the protection of flora and fauna. The CEMP will be informed by the best practice guidelines as outlined in this section of the screening statement.

Best Quality Environmental Management of Site

The Wildlife Act (1976) and the Wildlife Amendment Act 2000 states that the removal of hedgerows or marginal vegetation should not occur from 1st of March through August 31st.

The proposed development will not occur outside the existing boundary of the St. Evin's Park Estate i.e, treeline, hedgerows, and boundaries will be maintained where possible.

Limiting Silt or Fines run-off During Construction

Silt deposition to grey water drains of potential concern as a result of on-site disturbance. Such release of silt into the storm drain system may impact local water quality and all effort must be made to prevent such an eventuality. It is therefore very important to keep any potential silt or fines losses from the site to a minimum, during construction, see details below.

Oil spill from machinery during construction is also a concern which must be designed out, see details below.

Environmental Measures to minimise impact of Construction and use of Machinery on Site

The following measures are critical for preserving local water quality.

1. Fuels, oils, greases and hydraulic fluids must be stored in bunded compounds well away from local watercourses off site. Refuelling of machinery, etc., should be carried out in bunded areas or off site.
2. Runoff from the above should only be routed to the local drainage system via suitably designed and sited settlement ponds/filter channels.
3. Sediment/silt traps are to be located at appropriate locations of the site to deal with any potential run-off from construction process.

4. All drainage and sediment/silt traps should be in place before any site works occur.

The risk of surface water becoming polluted in the first place in this area should be minimised by,

Minimising run-off

No plant washings on site

No chemical or fuel storage will be carried out on site.

MINIMISE erosion of exposed soils

The most obvious way to minimise erosion is to minimise the amount of soil exposed.

Design measures to prevent any water pollution post construction.

The proposed housing units will be linked to the existing foul water system and hence to the Monasterevin Wastewater Treatment Plant. The proposed development is within the loading capacity of the Monasterevin Wastewater Treatment Plant.

Impact to the physico-chemical quality of the water is expected to be minimal once construction is complete as all sewage water from the site will be treated to tertiary level and is within the load capacity of the Monasterevin WWTP.

A full infiltration system will be incorporated into the design of the buildings and associated pathways. Roofs will discharge to permeable paving which will slowly discharge to the surface water network. Bio-retention swales will intercept overland flows from the road and discharge into an online constructed wetlands which has been sized for up to a 1:100-year storm event + 30% climate change + 10% for urban creep, this will then connect to the public surface water network.

This protocol for water management on site is an example of the "grey to green" surface water treatment philosophy. This will improve the Water Quality of the grey water leaving the site.

5.0 Sources for Information on Natura 2000 sites to Inform Screening Process

5.1 Nature Conservation Sites and Available Information

Data and information about European sites, and other nature conservation sites, were acquired from www.npws.ie. This includes site boundaries, site synopses, lists of qualifying interests (SACs) and special conservation interests (SPAs), and conservation objectives (European sites).

European sites have site specific conservation objectives, and the associated supporting documents were sourced from the NPWS website.

- National Biodiversity Data Centre.
- EISs, NISs and other reports for projects in the general area, including previous Natura 2000 Screening Reports in Monasterevin area and Monasterevin Green Infrastructure Report held by Kildare County Council.
- Kildare County Development Plan.
- Monasterevin Green Infrastructure Report Kildare County Council
- Monasterevin Local Area Plan Kildare County Council
- Geological Survey of Ireland Website

- **REFERENCES**

- Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities. Department of the Environment, Heritage and Local Government, 2009.
- Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC, European Commission Environment DG, 2000.
- Fossitt, J. A. (2000) A Guide to the Habitats of Ireland. The Heritage Council, Ireland.
- Managing Natura 2000 sites: The Provisions of Article 6 of the Habitats Directive 92/43/EEC: European Commission, 2000

6.0 Features of the Development that Could Impact on Natura 2000 Sites

6.1 Brief Description of the Natura 2000 Sites

Pollardstown Fen SAC

Pollardstown Fen SAC is located *circa* 14.8km from the proposed St. Evin's Park development in Monasterevin. Pollardstown Fen SAC is a ground water dependent ecosystem and disruption to site hydrology is understood to be the most significant threat to this site. However, there is no direct groundwater hydrological link between the site of the proposed St. Evin's Park Development and the SAC due to the significant distance, sub-surface topography and surface geomorphology isolating the sites from one another. Therefore, it is envisaged there will be no hydrological disruption to the integrity of the SACs or the habitats or species for which they are designated and no significant impacts to habitats or species likely to occur as a result of the proposed development. There will be no direct loss of habitat or species due to site works located at such a significant distance from this site.

River Barrow and River Nore SAC

The area of the proposed development lies within the catchment of the Barrow River in Monasterevin therefore a detailed description of the River Barrow and Nore SAC and any possibility of impact to the River Barrow and Nore SAC is discussed in more detail in the following sections below.

Receiving Environment-Terrestrial Habitats of the development site

The site at present predominantly supports a mature housing estate development associated roads managed amenity grassland habitat.

The site is delineated by Hedgerow/Treeline bounding the mainline railway track and by amenity grassland and associated Estate Roads.

The hedgerow treeline supports a significant quantity of native species i.e. Hazel, with lesser Grey Willow, Hawthorn, Elder and some Ash which is suffering Ash dieback. There are no invasive species recorded from the site.

The proposed development site area is not part of any designated conservation area. No habitats at the study area conform to those listed under Annex I of the EU Habitats Directive, and no species of flora which is rare or protected in Ireland (i.e. listed in the Flora Protection Order 2015 or the Irish Red data list) was noted or has been previously recorded in this area.

The ecological value of the site was assessed for the most part as low and moderate local value, i.e. comprised principally of modified habitats with low species diversity and low wildlife value with the hedgerow/treeline adjacent to the railway providing some semi-natural habitat or habitat of higher local importance for wildlife.

The proposed St. Evin's Park Park Housing Development is located at least 1 kilometre from nearest SAC

Site visits were carried out in July and August 2023.

The habitats of the site have been recorded as part of the overall assessment of the site habitat follows (Fossitt 2000).

Annexed Habitats

Annexed habitats do not occur in the area of proposed works.

Table 1. Natura 2000 sites within 15km of Proposed Disused stone structure House Redevelopment.

| Site Name (code) | Qualifying Interests Habitats and Species | Minimum Distance from Disused stone structure redevelopment(km) |
|---|---|---|
| River Barrow and River Nore SAC Site Code 002162 | Annex I - priority habitat - Alluvial wet woodlands - Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, <i>Alnion incanae</i> , <i>Salicion albae</i>) (91E0) - Petrifying springs - Petrifying springs with tufa formation (Cratoneurion) (7220) Annex I- habitats - Old oak woodlands - Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in British Isles (91A0) - Floating river vegetation - Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation (3260) - Estuary - (1130) - Tidal mudflats - <i>Spartina</i> swards (<i>Spartinion maritimae</i>) (1320) - <i>Salicornia</i> mudflats - <i>Salicornia</i> and other annuals colonizing mud and sand (1310) - Atlantic salt meadows - (<i>Glaucopuccinellietalia maritimae</i>) (1330) - Mediterranean salt meadows (<i>Juncetalia maritimi</i>) (1410) - Dry heath - European dry heaths (4030) - Eutrophic tall herbs - Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels (6430) Annex II- species - Sea Lamprey <i>Petromyzon marinus</i> (1095) - River Lamprey <i>Lampetra fluviatilis</i> (1099) - Brook Lamprey <i>Lampetra planeri</i> (1096) - Freshwater Pearl Mussel <i>Margaritifera margaritifera</i> (1029) - Nore Freshwater Pearl Mussel <i>Margaritifera durrovensis</i> (1990) - Crayfish <i>Austropotamobius pallipes</i> (1092) - Twaite Shad <i>Alosa fallax</i> (1103) - Atlantic Salmon <i>Salmo salar</i> (1106) - Otter <i>Lutra lutra</i> (1355) - Desmoulin's Whorl Snail <i>Vertigo moulinsiana</i> (1016) - Killarney Fern <i>Trichomanes speciosum</i> (1421) | 1 c km |

| Site Name (code) | Qualifying Interests Habitats and Species | Minimum Distance from Disused stone structure redevelopment(km) |
|--|--|--|
| Pollardstown Fen SAC Site Code 000396 | Annex I - priority habitat - Calcareous fens with Cladium mariscus and species of the Caricion davalliana [7210] - Petrifying springs with tufa formation (Cratoneurion) [7220] - Alkaline fens [7230] Annex II- species - Vertigo geyeri [1013] - Vertigo angustior [1014] - Vertigo moulinsiana [1016] - Calcareous fens with Cladium mariscus and species of the Caricion davalliana [7210] - Petrifying springs with tufa formation (Cratoneurion) [7220] - Alkaline fens [7230] | 14.8 km |

6.2 Conservation Objectives

A Natura 2000 site's conservation objectives are defined by DAHG and are, "intended to ensure that the relevant Annex I habitats and Annex II species present on a site are maintained in a favourable condition" (DEHLG, 2010). The DEHLG guidelines state that, "The Conservation Objectives derive from the qualifying interests, the Natura 2000 standard data form, and the management plan for the site, with summary information also available in the site synopsis." Whilst the Natura 2000 standard data forms and site synopses do present details of the qualifying features of Natura 2000 sites, and list the generic threats to those features, they do not define the conservation objectives of the site.

For the purposes of this assessment, information on the conservation objectives for the sites has been gained from consultation with NPWS relating to the Border Regional Planning Guidelines and NPWS generic Conservation Objectives for Natura 2000 Sites where no Management Plan is yet available.

Generic conservation objectives for SPAs are as follows:

- To maintain the bird species of special conservation interest for which the SPA has been listed, at favourable conservation status.

Generic conservation objectives for SACs are as follows:

- To maintain Annex, I habitats and Annex II species for which the SAC has been selected at favourable conservation status;
- To maintain the extent species richness and biodiversity of the entire site; and
- To establish effective liaison and co-operation with landowners, legal users and relevant authorities.

The favourable conservation status of a species can be described as being achieved when: population data on the species concerned indicate that it is maintaining itself, and the natural range of the species is neither being reduced nor 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.

Favourable conservation status of a habitat can be described as being achieved when: its natural range, and area it covers within that range, is stable or increasing, and the ecological factors that are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and the conservation status of its typical species is favourable as defined below.

7.0 Likely Impact to the Natura 2000 Sites in particular the River Barrow and Nore SAC.

The possible impacts that might arise from the proposed development have been examined in the context of the factors that could potentially affect the integrity of the Natura 2000 sites. As part of the screening stage process the proximity and qualifying interests of the Natura 2000 sites in the wider hinterland of the proposed infill housing development at St. Evin's Park, Monasterevin were considered. In assessing the sites that could potentially be impacted by the proposed development a source-pathway-receptor model was used. All sites potentially impacted were considered in relation to the size and nature of the

proposed development and the sensitivity of the receptors in the wider locality. If a Natura 2000 site of particular significance/relevance exists beyond a nominal screening area this was also included in the screening appraisal. Accordingly, all potential pathways for impact on designated sites were included in this screening exercise both within and outside a nominal 15km zone which was chosen to display the location and discuss sites most proximate to the proposed development. Table 2 summarises the location and qualifying interests of designated sites in the area.

The European Site which may potentially be impacted due to its proximity to the area of the proposed development is the River Barrow and Nore SAC, this will be further elaborated on in the following sections. Pollardstown Fen has previously been screened out as it lacks ecological or hydrological connection to the proposed development site.

IDENTIFICATION AND DESCRIPTION OF ANY INDIVIDUAL AND CUMULATIVE IMPACTS LIKELY

An assessment of the impact of the proposed development and in particular its associated wastewater management as it may impact on aquatic habitats and species of qualifying interest for the Barrow and Nore SAC site has been carried out.

The River Water quality in the Barrow at Monasterevin has been recorded as Q4 upstream and downstream of Monasterevin EPA monitoring 2004-2016 at Pass Bridge upstream Ford East of Fisherstown House downstream and whilst some impairment is evident at Q4, primarily because of eutrophication, the ecological conditions at such locations are considered to be acceptable for salmonids, lamprey species, otters, and the habitat floating river vegetation. The status Q4 is marginal for freshwater pearl mussels, which favour highly oligotrophic systems.

Any impact to the water quality of the Barrow River due to construction development will be Insignificant due to environmental design measures incorporated into the project to limit any run-off of fines from development site during development. There is also no open watercourse adjacent to the proposed development which limits very significantly any potential pathway of transport of pollutants for, the site to the Barrow River which is therefore highly unlikely to occur.

Currently the Monasterevin Wastewater Treatment Plant operates under licence D0177-01, Monasterevin, in County Kildare

The agglomeration is served by a wastewater treatment plant with a Plant Capacity PE of 9,000.

Monasterevin WWTP capacity and its current loading are as follows:

Design capacity 9000 population equivalent

The overall compliance of the final effluent with the Emission Limit Values (ELVs) is compliant set in the wastewater discharge licence.

Irish Waters annual report for 2021 to EPA on discharges to the River Barrow from Monasterevin WWTP shows as follows: found that the WWTP was compliant for all parameters Total Phosphorous, Orthophosphorous, BOD, SS Ammonia.

The above indicates that Monasterevin WWTP is not a significant contributor to endangerment of the annexed aquatic habitats or species of qualifying interest of the site as the water quality from the plant is considered to be acceptable for salmonids, lamprey species, otters, and the habitat floating river vegetation. The status is marginal for freshwater pearl mussels, which favour highly oligotrophic watercourses, but this species is not known from the stretch of river near Monasterevin. As all wastewater from the site will be directed to the fully compliant water treatment plant and the additional load will be within the capacity of the plant, which is designed for tertiary level treatment, for 9000 PE, it is considered that there will be no adverse impact to annexed aquatic habitats of qualifying interest for the site as a result of the proposed development.

Any impact to the water quality of the Barrow River due to construction development will be insignificant due to environmental design measures incorporated into the project to limit any run-off of fines from development site during development and the fact that the site does not bound any open watercourse linking to the main channel of the Barrow River.

The following publications have been consulted:

- EPA online water quality maps
- Current EPA Licence for Monasterevin WWTP
- Monasterevin LAP 2016-2022
- Annual Environmental Report on Monasterevin WWTP 2021 (Irish Water/Uisce Eireann)

Table 2 Nature and Significance of any potential impacts on the qualifying interests of the Natura site arising from the implementation of the project.

| Qualifying Interest | Level of Protection | Relevant | Likelihood of Impact | Cause of Impact |
|--|--|-----------------|---|------------------------|
| Alluvial wet woodland (code: 91E0) | Habitats Directive Annex 1 Priority | no | none | N/A |
| Old sessile oak woods with Ilex and Blechnum in British Isles [91A0] | Habitats Directive Annex 1 | no | none | N/A |
| Floating river vegetation (code: 3260) | Habitats Directive Annex 1 | no | Insignificant due to the distance to any local watercourses and environmental design measures in the project to limit any run-off from development site and the capacity of the on-site WWTP to treat waste water from the site and the | N/A |
| Estuary (code: 1130) | Habitats Directive Annex 1 | no | none | N/A |
| Salicornia mudflats (code: 1310) | Habitats Directive Annex 1 | no | none | N/A |

| | | | | |
|---|--|---|--|-----|
| Spartina swards (Spartinion maritimae) [1320] | Habitats Directive Annex 1 | no | none | N/A |
| Mudflats and sandflats not covered by seawater at low tide [1140] | Habitats Directive Annex 1 | no | none | N/A |
| Atlantic salt meadows (code: 1330) | Habitats Directive Annex 1 | no | none | N/A |
| Mediterranean salt meadows (code: 1410) | Habitats Directive Annex 1 | no | none | N/A |
| Killarney Fern (<i>Trichomanes speciosum</i>) | Habitats Directive Annex 2 and 4 and Flora protection Order 1999 | no | none | N/A |
| Freshwater pearl mussel (<i>Margaritifera margaritifera</i>) [1029] | Habitats Directive Annex 2 | No juvenile mussel beds occur within 10km upstream/downstream of site | Insignificant due to the distance to known population areas and environmental design measures in the project to limit any run-off from development site and the capacity of the WWTP to treat wastewater from the site | N/A |
| White-clawed crayfish (<i>Austropotamobius pallipes</i>) [1092] | Habitats Directive Annex 2 and 5 | no | none | N/A |
| Sea lamprey (<i>Petromyzon marinus</i>) [1095] | Habitats Directive Annex 2 | no | none | N/A |

| | | | | |
|--|----------------------------------|---|--|----------------------------|
| Brook lamprey (<i>Lampetra planeri</i>) [1096] | Habitats Directive Annex 2 | No juvenile mussel beds occur within 10km upstream/downstream of site | Insignificant due to environmental design measures in the project to limit any run-off from development site and the capacity of the on site WWTP to treat waste water from the site | Potential run-off of fines |
| River lamprey (<i>Lampetra fluviatilis</i>) [1099] | Habitats Directive Annex 2 and 5 | no | none | N/A |
| Allis shad (<i>Alosa alosa</i>) [1102] | Habitats Directive Annex 2 and 5 | no | none | N/A |
| Twaite shad (<i>Alosa fallax fallax</i>) [1103] | Habitats Directive Annex 2 and 5 | no | none | N/A |
| Salmon (<i>Salmo salar</i>) [1106] | Habitats Directive Annex 2 and 5 | yes | Insignificant due to environmental design measures in the project to limit any run-off from development site and the capacity of the on site WWTP to treat waste water from the site | Potential run-off of fines |
| Otter (<i>Lutra lutra</i>) [1355] | Habitats Directive Annex 4 | yes | Insignificant due infrequency of otters in this | Disturbance of habitat |

| | | | | |
|--|--|--|--|--|
| | | | <p>area of catchment</p> <p>No otter holts or signs observed at proposed development site,</p> | |
|--|--|--|--|--|

D ASSESSMENT OF THE SIGNIFICANCE OF THE IMPACTS IDENTIFIED ABOVE ON SITE INTEGRITY;

Nature and significance of any potential impacts on the qualifying interests of the Natura Site arising from the implementation of the project.

Ecological Effects

Flora

The site is not located directly adjacent to the Barrow River but at a remove of circa 1km from the main channel.

The proposed development site does not support plant communities or habitat for which the SAC has been designated i.e., its does not support habitat or flora of qualifying interest for the site. The fact that the wastewater exiting the It can therefore be concluded that no direct negative outcome to flora or plant communities for which the European Site the Barrow SAC has been designated will occur as a result of any proposed site works.

Fauna

Otters (*L. Lutra*)

Otters (*L. Lutra*) utilise areas of the main channel of the Barrow River. However, the area of the proposed development is at a remove of circa 1kn from the river channel and is not directly adjacent to any open watercourse. The suburban habitat removed from open water areas is not suitable habitat for otter and otter signs (spraints) were not noted at the site.

No breeding holt is present in the vicinity of the proposed works.

There will be no impact to otters at the site as a result of the proposed development.

Kingfisher (*Alcedo atthis*)

In the Assessment of the distribution and abundance of Kingfisher *Alcedo atthis* and other riparian birds on six SAC river systems in Ireland Sinéad Cummins, Jennifer Fisher, Ruth Gaj McKeever, Laura McNaghten & Olivia Crowe National Parks and Wildlife Service and BirdWatch Ireland June 2010 the occurrence of Kingfisher was noted as possible for the Monasterevin stretch of the Barrow River.

The proposed development site however does not contain any area of burrows of this species and suitable nesting habitat i.e., banks composed of soft clay material does not occur at the site therefore direct or indirect impact to this species is not expected to occur as a result of proposed site works.

Freshwater Pearl Mussel (*Margaritifera margaritifera*) Brook Lamprey (*Lampetra planeri*) and Atlantic Salmon (*Salmo salar*).

The river Barrow in Monasterevin may support populations of annexed aquatic species utilising the catchment for which the site has been designated (supporting documentation for SAC NPWS website).

However, no juvenile population of freshwater pearl mussels occurs within 10km of the development site.

As the freshwater pearl mussel is not a species associated with the river here no direct disturbance to riverbed habitat and its associated biota will occur.

Also, no direct impact to the hydrological regime of any area of the river catchment associated with freshwater pearl mussel will occur as a result of the proposed development works.

In the Barrow River Catchment, the occurrence of pearl mussels is rare but some have been found in Co. Carlow. A report from the NPWS indicates that FWPM have been found in the following tributaries of the River Barrow (John Lucey; EPA river monitoring, post 2003; Moorkens and Costello 2004):

- Aughavaud (River Code 14/A/04);
- Aughnabrisky (River Code 14/A/05);
- Ballymurphy; and Mountain (14/M/01) (Ross, 2006).

All these rivers are upstream of the main channel of the Barrow and therefore are not hydrologically linked to the proposed development site.

Impact to the physico-chemical quality of the water is expected to be minimal as a result of works.

Moreover, the project is designed to minimise any input of fines from the site during the construction phase and input of fines during the operational phase is expected to be negligible see Environmental design features, in project design as listed in section General Site Construction Environmental Measures Consistent with Best Practice, Standards, Design and Controls above.

A full infiltration system is incorporated into the design of the buildings and associated pathways. Roofs will discharge to permeable paving which will slowly discharge to the surface water network. Bio-retention swales will intercept overland flows from the road and discharge into an online constructed wetlands

which has been sized for up to a 1:100-year storm event + 30% climate change + 10% for urban creep, this will then connect to the public surface water network.

This protocol for water management on site is an example of the "grey to green" surface water treatment philosophy. This will improve the Water Quality of the grey water leaving the site and will prevent any deleterious impact to water quality in the local area.

The fact that all wastewater from the site will be directed to the fully compliant water treatment plant and the additional load will be within the capacity of the plant, which is designed for tertiary level treatment, for 9000 PE, it is considered that there will be no adverse impact to local water quality.

Therefore, it is considered that freshwater pearl mussels will not be adversely impacted by the proposed development.

The other main species of concern are Lamprey species and Atlantic salmon.

Lamprey species have not been recoded within 15km either upstream or downstream of Monasterevin see, James J. King (2006) The status and distribution of lamprey in the River Barrow SAC. Irish Wildlife Manuals No. 21. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

Any silt deposition down-stream is of potential concern as a result of onsite disturbance during the site development process to land upslope and adjacent to the watercourse. Such release of silt/fines into the river system may impact water quality and spawning beds down stream and all effort must be made to prevent such an eventuality. Any potential input of fines into the system may have a moderate negative impact on spawning of Salmon and Lamprey species.

The construction phase of the work does not entail any in stream work and all fisheries guidelines for best practise during site works are designed into this project to prevent impact to adjacent watercourses see General Site Construction Environmental Measures Consistent with Best Practice, Standards, Design and Controls above. The fact that the site is not adjacent to any open watercourse will further reduce any potential for direct pollution.

The impact to the physico-chemical quality of the water is expected to be minimal once construction is complete as all sewage water from the site will be linked up to fully compliant Monasterevin Wastewater Treatment Plant a tertiary Sewage Treatment System and the size of the development falls within the capacity of this system.

As mentioned in General Site Construction Environmental Measures Consistent with Best Practice, Standards, Design and Controls measures will be taken site and will ensure no addition of particulates to the stream water occurs once the development has been completed.

Therefore, impact to the designated aquatic species for which the SAC is designated will not be significant.

Are there other projects or plans that together with the project of plan being assessed could affect the site (provide details)?-Cumulative Impact

The site is located within a sub-urban area of Monasterevin Town which is zoned amenity and residential and forms part of the greater urban fabric of

Monasterevin Town. The main threat to qualifying interests is the impact to water quality. The Monasterevin WWTP is fully compliant and within capacity at the moment and the further development of the proposed housing is adequately catered for without resulting risk of adverse impact to water quality and the aquatic adjacent European Site the River Barrow and Nore SAC.

A requirement of the AA process is to take into consideration any cumulative impacts as a result of other plans in the area. It is considered that because of the small scope and scale of the proposed development and the fact that it is highly unlikely to lead to any adverse impact to any Natura 2000 sites within a 15km radius of the site, no cumulative impact will result from the proposed development in combination with any other proposals in the Monasterevin area.

Is the Project or Plan directly connected with or necessary to the management of the Natura 2000 site (if so provide details)?

No

IDENTIFICATION AND DESCRIPTION OF ANY INDIVIDUAL AND CUMULATIVE IMPACTS LIKELY TO RESULT.

An assessment of the impact of the proposed development and its associated surface and wastewater management as it may impact on aquatic habitats and species of qualifying interest for the Barrow and Nore SAC site has been carried out. The SAC is located over circa 1 km from the proposed development site i.e. the main channel of the Barrow River, a constituent river of the River Barrow and Nore SAC.

Any impact to the water quality of the River Barrow and River Nore due to construction development will be insignificant due to environmental design measures incorporated into the project to limit any run-off of fines from development site during development and the distance from the site i.e. greater than 1km.

At present the foul wastewater from the proposed development will be directed to the Monasterevin Town Wastewater Treatment Plant WWTP with a Plant Capacity PE of 9000, the treatment type is 3P - Tertiary P removal.

The annual mean hydraulic loading is less than the peak Treatment Plant Capacity.

Currently the Monasterevin Wastewater Treatment Plant operates under licence at Monasterevin, in County Kildare

There is spare capacity in the plant, and it is not expected that water quality will vary from the current status due to this spare capacity.

The WWTP discharge was compliant with the ELV's set in the wastewater discharge licence.

As all wastewater from the site will be directed to the main waste water treatment plant and the additional housing population falls within the capacity of the plant it is considered that there will be no accruing deleterious impact to annexed aquatic habitats of qualifying interest for the site as a result of the proposed development.

Any impact to the water quality of local surface water drainage network due to construction development will be insignificant due to environmental design measures incorporated into the project to limit any run-off of fines from development site during development. It is envisaged that the construction of a new proprietary grey water management for the site will improve the run-off water quality from the proposed development site.

A full infiltration system with bioswales will be incorporated into the design of the buildings and associated pathways and adjacent green areas. This will improve the Water Quality of the grey water leaving the site.

The following publications have been consulted:

- EPA online water quality maps
- Current EPA Licence for Monasterevin WWTP
- Monasterevin LAP
- Annual Environmental Report on Monasterevin WWTP 2020 (Irish Water/Uisce Eirean)

7.1 SAC Sites Impact Conclusions

The nearest SAC within the 15km distance from the proposed development site lies at a distance of circa 1km from the proposed development site at St. Evin's Park, Monasterevin, the River Barrow and Nore SAC. There is expected to be no direct loss of habitat to this SAC and all surface water and foul water on site are adequately treated and therefore no impact is envisaged to the adjacent river aquatic habitat as a result of this development.

It is also highly improbable that a project of this nature and scale will have any measurable impact on the qualifying interests of Pollardstown Fen SAC as there is no hydrological or habitat linkage between this site and the proposed development site.

For the considered European sites there will be no reduction in habitat area of qualifying interest, no disturbance to key species or habitats, no reduction in species density or no changes in key indicators of conservation value.

Table 1 summarises the location and qualifying interests of designated sites in the within a 15km radius of the proposed development site.

Table 2 outlines a screening matrix for potential impacts to the SAC sites.

Table 3 outlines the summary of conclusions of the AA screening process.

| | Reduction in Habitat Area of Habitat of Qualifying Interest | Disturbance to Key Habitats or Species | Habitat or Species Fragmentation | Reduction in Species Density | Changes in Key Indicators of Conservation Value |
|---------------------|--|---|---|-------------------------------------|--|
| Site Name | Possible Potential Impacts | Possible Potential Impacts | Possible Potential Impacts | Possible Potential Impacts | Possible Potential Impacts |
| Barrow and Nore SAC | No | No | No | No | No |
| Pollardstown Fen | No | No | No | No | No |

Table 3 Summary of conclusions of the AA screening process.

8.0 Screening Conclusions

The likely impacts that will arise from the proposed development of works have been examined in the context of the key environmental factors that could potentially affect the integrity of the Natura 2000 network, e.g., disturbance, habitat loss, etc. and the results of the Screening Assessment, as presented in Tables 2. The tables indicate “no” for sites where no negative impact is anticipated on the conservation objectives or on the overall integrity of the site.

Conclusion of screening stage

In conclusion, to determine the potential impacts, if any, of the proposed development to nearby Natura 2000 sites, a screening process for AA was undertaken. The proposed development is within 15km of 6 Natura 2000 sites.

It is considered that the proposed development does not include any element that has the potential to significantly alter the favourable conservation objectives associated with the species and habitats, or interfere with the key relationships that define the structure or function, either alone or in combination with other impacts, of the Natura 2000 sites considered in this document provided that the following is carried out:

The proposed development is completed as described in section 4.

The programme of measures consistent with best practice, standards, design and controls as outlined in section 4 are implemented.

It has been objectively concluded during the screening process that none of these sites are likely to be significantly impacted by the proposed Monasterevin Town St. Evin's Park Infill Housing Development and these are:

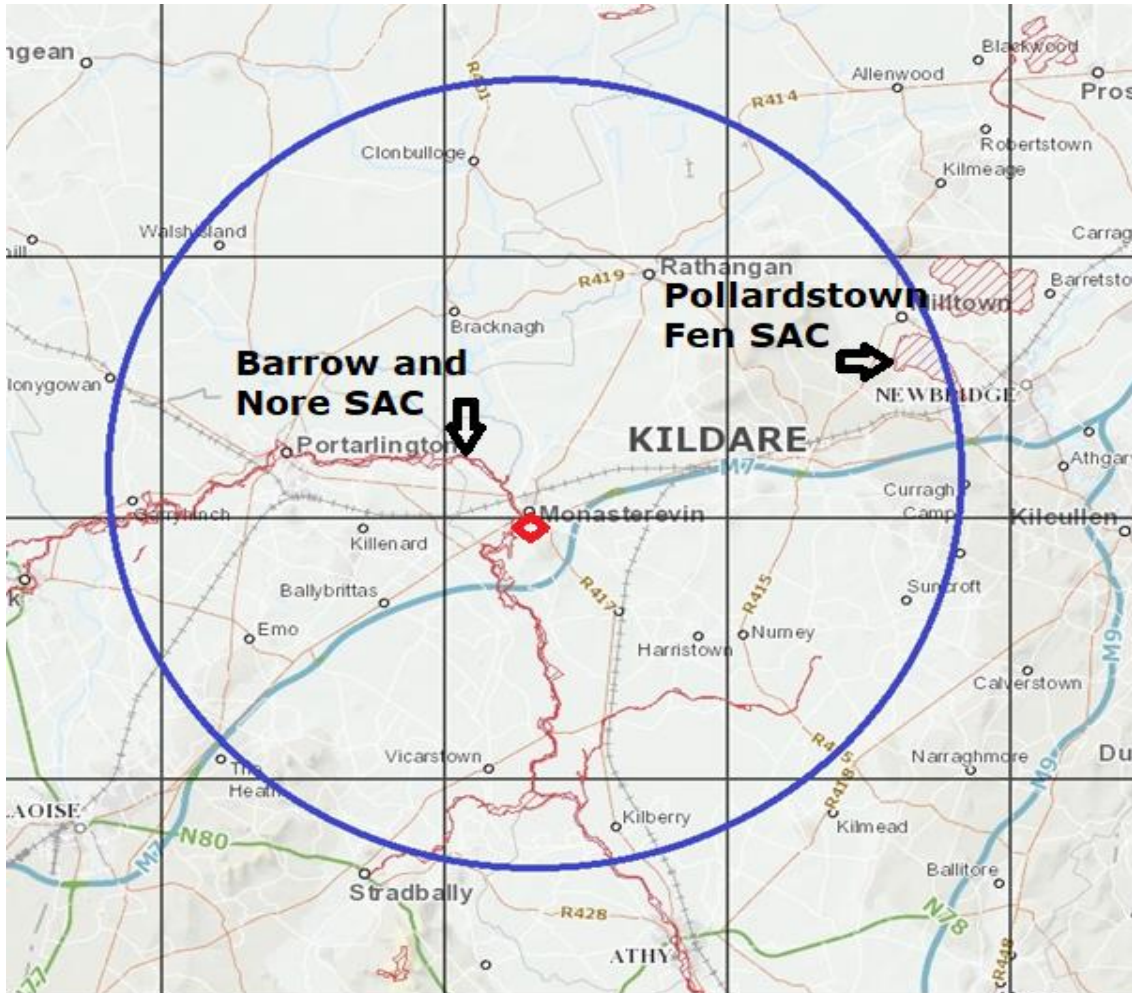
- River Barrow and River Nore SAC Site Code 002162
- Pollardstown Fen SAC Site Code 000396

Appendix 1 Site Location Map St. Evin's Park Infill Development



Appendix 2

Natura 2000 Sites within a 15km radius of the proposed development site



Appendix 3

Photographic Record of Proposed Infill Housing Development, St. Evin's Park Monasterevin

View 1



View 2



View 3



View 4



Appendix 4 Site Synopsis River Barrow and River Nore SAC

Site Name: River Barrow and River Nore SAC

Site Code: 002162

This site consists of the freshwater stretches of the Barrow and Nore River catchments as far upstream as the Slieve Bloom Mountains, and it also includes the tidal elements and estuary as far downstream as Creadun Head in Waterford. The site passes through eight counties – Offaly, Kildare, Laois, Carlow, Kilkenny, Tipperary, Wexford and Waterford. Major towns along the edge of the site include Mountmellick, Portarlinton, Monasterevin, Stradbally, Athy, Carlow, Leighlinbridge, Graiguenamanagh, New Ross, Inistioge, Thomastown, Callan, Bennettsbridge, Kilkenny and Durrow. The larger of the many tributaries include the Lerr, Fushoge, Mountain, Aughavaud, Owenass, Boherbaun and Stradbally Rivers of the Barrow, and the Delour, Dinin, Erkina, Owveg, Munster, Arrigle and King's Rivers on the Nore.

Both rivers rise in the Old Red Sandstone of the Slieve Bloom Mountains before passing through a band of Carboniferous shales and sandstones. The Nore, for a large part of its course, traverses limestone plains and then Old Red Sandstone for a short stretch below Thomastown. Before joining the Barrow it runs over intrusive rocks poor in silica. The upper reaches of the Barrow also run through limestone. The middle reaches and many of the eastern tributaries, sourced in the Blackstairs Mountains, run through Leinster Granite. The southern end, like the Nore runs over intrusive rocks poor in silica. Waterford Harbour is a deep valley excavated by glacial floodwaters when the sea level was lower than today. The coast shelves quite rapidly along much of the shore.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[1130] Estuaries

[1140] Tidal Mudflats and Sandflats

[1170] Reefs

[1310] *Salicornia* Mud

[1330] Atlantic Salt Meadows

[1410] Mediterranean Salt Meadows

[3260] Floating River Vegetation

[4030] Dry Heath

[6430] Hydrophilous Tall Herb Communities

[7220] Petrifying Springs*

[91A0] Old Oak Woodlands

[91E0] Alluvial Forests*

[1016] Desmoulin's Whorl Snail (*Vertigo moulinsiana*)

[1029] Freshwater Pearl Mussel (*Margaritifera margaritifera*)

[1092] White-clawed Crayfish (*Austropotamobius pallipes*)

[1095] Sea Lamprey (*Petromyzon marinus*)

[1096] Brook Lamprey (*Lampetra planeri*)

- [1099] River Lamprey (*Lampetra fluviatilis*)
- [1103] Twaite Shad (*Alosa fallax*)
- [1106] Atlantic Salmon (*Salmo salar*)
- [1355] Otter (*Lutra lutra*)
- [1421] Killarney Fern (*Trichomanes speciosum*)
- [1990] Nore Freshwater Pearl Mussel (*Margaritifera durrovensis*)

Good examples of alluvial forest (a priority habitat on Annex I of the E.U. Habitats Directive) are seen at Rathsnagadan, Murphy's of the River, in Abbeyleix estate and along other shorter stretches of both the tidal and freshwater elements of the site. Typical species seen include Almond Willow (*Salix triandra*), White Willow (*S. alba*), Rusty Willow (*S. cinerea* subsp. *oleifolia*), Crack Willow (*S. fragilis*) and Osier (*S. viminalis*), along with Iris (*Iris pseudacorus*), Hemlock Water-dropwort (*Oenanthe crocata*), Wild Angelica (*Angelica sylvestris*), Thin-spiked Wood-sedge (*Carex strigosa*), Pendulous Sedge (*C. pendula*), Meadowsweet (*Filipendula ulmaria*), Common Valerian (*Valeriana officinalis*) and the Red Data Book species Nettle-leaved Bellflower (*Campanula trachelium*).

A good example of petrifying springs with tufa formations occurs at Dysart Wood along the Nore. This is a rare habitat in Ireland and one listed with priority status on Annex I of the E.U. Habitats Directive. These hard water springs are characterised by lime encrustations, often associated with small waterfalls. A rich bryophyte flora is typical of the habitat and two diagnostic species, *Palustriella commutata* and *Eucladium verticillatum*, have been recorded.

The best examples of old oak woodlands are seen in the ancient Park Hill woodland in the estate at Abbeyleix; at Kyleadahir, on the Delour, Forest Wood House, Kylecorragh and Brownstown Woods on the Nore; and at Cloghristic Wood, Drummond Wood and Borris Demesne on the Barrow, though other patches occur throughout the site. Abbeyleix Woods is a large tract of mixed deciduous woodland which is one of the only remaining true ancient woodlands in Ireland. Historical records show that Park Hill has been continuously wooded since the 16th century and has the most complete written record of any woodland in the country. It supports a variety of woodland habitats and an exceptional diversity of species including 22 native trees, 44 bryophytes and 92 lichens. It also contains eight indicator species of ancient woodlands. Park Hill is also the site of two rare plants, Nettle-leaved Bellflower and the moss *Leucodon sciuroides*. The rare Myxomycete fungus, *Licea minima* has been recorded from woodland at Abbeyleix.

Oak woodland covers parts of the valley side south of Woodstock and is well developed at Brownsford where the Nore takes several sharp bends. The steep valley side is covered by oak (*Quercus* spp.), Holly (*Ilex aquifolium*), Hazel (*Corylus avellana*) and Downy Birch (*Betula pubescens*), with some Beech (*Fagus sylvatica*) and Ash (*Fraxinus excelsior*). All the trees are regenerating through a cover of Bramble (*Rubus fruticosus* agg.), Foxglove (*Digitalis purpurea*), Great Wood-rush (*Luzula sylvatica*) and Broad Buckler-fern (*Dryopteris dilatata*). On the steeply sloping banks of the River Nore, about 5 km west of New Ross, in Co. Kilkenny, Kylecorragh Woods form a prominent feature in the landscape. This is an excellent example of relatively undisturbed, relict oak woodland with a very good tree canopy. The wood is quite damp and there is a rich and varied ground flora. At Brownstown, a small, mature oak dominated woodland occurs on a steep slope. There is younger woodland to the north and east of it. Regeneration throughout is evident. The understorey is similar to the woods at Brownsford. The ground flora of this woodland is

developed on acidic, brown earth type soil and comprises a thick carpet of Bilberry (*Vaccinium myrtillus*), Heather (*Calluna vulgaris*), Hard Fern (*Blechnum spicant*), Common Cow-wheat (*Melampyrum pratense*) and Bracken (*Pteridium aquilinum*).

Borris Demesne contains a very good example of a semi-natural broadleaved woodland in very good condition. There is quite a high degree of natural re-generation of oak and Ash through the woodland. At the northern end of the estate oak species predominate.

Drummond Wood, also on the Barrow, consists of three blocks of deciduous woods situated on steep slopes above the river. The deciduous trees are mostly oak species. The woods have a well-established understorey of Holly, and the herb layer is varied, with Bramble abundant. The whitebeam *Sorbus devoniensis* has also been recorded here.

Eutrophic tall herb vegetation occurs in association with the various areas of alluvial forest and elsewhere where the floodplain of the river is intact. Characteristic species of the habitat include Meadowsweet, Purple Loosestrife (*Lythrum salicaria*), Marsh Ragwort (*Senecio aquaticus*), Ground Ivy (*Glechoma hederacea*) and Hedge Bindweed (*Calystegia sepium*). Indian Balsam (*Impatiens glandulifera*), an introduced and invasive species, is abundant in places. Floating river vegetation is well represented in the Barrow and in the many tributaries of the site. In the Barrow the species found include water-starworts (*Callitriche* spp.), Canadian Pondweed (*Elodea canadensis*), Bulbous Rush (*Juncus bulbosus*), water-milfoils (*Myriophyllum* spp.), the pondweed *Potamogeton x nitens*, Broad-leaved Pondweed (*P. natans*), Fennel Pondweed (*P. pectinatus*), Perfoliated Pondweed (*P. perfoliatus*) and crowfoots (*Ranunculus* spp.). The water quality of the Barrow has improved since the vegetation survey was carried out (EPA, 1996).

Dry heath at the site occurs in pockets along the steep valley sides of the rivers especially in the Barrow Valley and along the Barrow tributaries where they occur in the foothills of the Blackstairs Mountains. The dry heath vegetation along the slopes of the river bank consists of Bracken and Gorse (*Ulex europaeus*) with patches of acidic grassland vegetation.

Additional typical species include Heath Bedstraw (*Galium saxatile*), Foxglove, Common Sorrel (*Rumex acetosa*) and Creeping Bent (*Agrostis stolonifera*). On the steep slopes above New Ross the Red Data Book species Greater Broomrape (*Orobanche rapum-genistae*) has been recorded. Where rocky outcrops are shown on the maps Bilberry and Great Wood-rush are present. At Ballyhack a small area of dry heath is interspersed with patches of lowland dry grassland. These support a number of clover species, including the legally protected Clustered Clover (*Trifolium glomeratum*) - a species known from only one other site in Ireland. This grassland community is especially well developed on the west side of the mud-capped walls by the road. On the east of the cliffs a group of rock-dwelling species occur, i.e. English Stonecrop (*Sedum anglicum*), Sheep's-bit (*Jasione montana*) and Wild Madder (*Rubia peregrina*). These rocks also support good lichen and moss assemblages with *Ramalina subfarinacea* and *Hedwigia ciliata*.

Dry heath at the site generally grades into wet woodland or wet swamp vegetation lower down the slopes on the river bank. Close to the Blackstairs Mountains, in the foothills associated with the Aughnabriskey, Aughavaud and Mountain Rivers there are small patches of wet heath dominated by Purple Moor-grass (*Molinia caerulea*) with Heather, Tormentil (*Potentilla erecta*), Carnation Sedge (*Carex panicea*) and Bell Heather (*Erica cinerea*).

Salt meadows occur at the southern section of the site in old meadows where the embankment has been breached, along the tidal stretches of in-flowing rivers below Stokestown House, in a narrow band on the channel side of Common Reed (*Phragmites australis*) beds and in narrow fragmented strips along the open shoreline. In the larger areas

of salt meadow, notably at Carrickcloney, Ballinlaw Ferry and Rochestown on the west bank; Fisherstown, Alderton and Great Island to Dunbrody on the east bank, the Atlantic and Mediterranean sub types are generally intermixed. At the upper edge of the salt meadow in the narrow ecotonal areas bordering the grasslands where there is significant percolation of salt water, the legally protected species Borrer's Saltmarsh-grass (*Puccinellia fasciculata*) and Meadow Barley (*Hordeum secalinum*) are found. The very rare and also legally protected Divided Sedge (*Carex divisa*) is also found. Sea Rush (*Juncus maritimus*) is also present. Other plants recorded and associated with salt meadows include Sea Aster (*Aster tripolium*), Thrift (*Armeria maritima*), Sea Couch (*Elymus pycnanthus*), Spear-leaved Orache (*Atriplex prostrata*), Lesser Sea-spurrey (*Spergularia marina*), Sea Arrowgrass (*Triglochin maritima*) and Sea Plantain (*Plantago maritima*).

Glassworts (*Salicornia* spp.) and other annuals colonising mud and sand are found in the creeks of the saltmarshes and at the seaward edges of them. The habitat also occurs in small amounts on some stretches of the shore free of stones.

The estuary and the other E.U. Habitats Directive Annex I habitats within it form a large component of the site. Extensive areas of intertidal flats, comprised of substrates ranging from fine, silty mud to coarse sand with pebbles/stones are present. Good quality intertidal sand and mudflats have developed on a linear shelf on the western side of Waterford Harbour, extending for over 6 km from north to south between Passage East and Creadaun Head, and in places are over 1 km wide. The sediments are mostly firm sands, though grade into muddy sands towards the upper shore. They have a typical macro-invertebrate fauna, characterised by polychaetes and bivalves. Common species include *Arenicola marina*, *Nephtys hombergii*, *Scoloplos armiger*, *Lanice conchilega* and *Cerastoderma edule*. An extensive area of honey-comb worm biogenic reef occurs adjacent to Duncannon, Co. Wexford on the eastern shore of the estuary. It is formed by the polychaete worm *Sabellaria alveolata*. This intertidal *Sabellaria alveolata* reef is formed as a sheet of interlocking tubes over a considerable area of exposed bedrock. This polychaete species constructs tubes, composed of aggregated sand grains, in tightly packed masses with a distinctive honeycomb-like appearance. These can be up to 25cm proud of the substrate and form hummocks, sheets or more massive formations. A range of species are reported from these reefs including: *Enteromorpha* sp.; *Ulva* sp.; *Fucus vesiculosus*; *Fucus serratus*; *Polysiphonia* sp.; *Chondrus crispus*; *Palmaria palmate*; *Coralinus officinalis*; *Nemertea* sp.; *Actinia equine*; *Patella vulgate*; *Littorina littorea*; *Littorina obtusata* and *Mytilus edulis*.

The western shore of the harbour is generally stony and backed by low cliffs of glacial drift. At Woodstown there is a sandy beach, now much influenced by recreation pressure and erosion. Behind it a lagoonal marsh has been impounded which runs westwards from Gaultiere Lodge along the course of a slow stream. An extensive reedbed occurs here. At the edges is a tall fen dominated by sedges (*Carex* spp.), Meadowsweet, willowherbs (*Epilobium* spp.) and rushes (*Juncus* spp.). Wet woodland also occurs.

The dunes which fringe the strand at Duncannon are dominated by Marram (*Ammophila arenaria*) towards the sea. Other species present include Wild Clary/Sage (*Salvia verbenaca*), a rare Red Data Book species. The rocks around Duncannon ford have a rich flora of seaweeds typical of a moderately exposed shore and the cliffs themselves support a number of coastal species on ledges, including Thrift, Rock Samphire (*Crithmum maritimum*) and Buck's-horn Plantain (*Plantago coronopus*).

Other habitats which occur throughout the site include wet grassland, marsh, reedswamp, improved grassland, arable land, quarries, coniferous plantations, deciduous woodland, scrub and ponds.

Seventeen Red Data Book plant species have been recorded within the site, most in the recent past. These are Killarney Fern (*Trichomanes speciosum*), Divided Sedge, Clustered Clover, Basil Thyme (*Acinos arvensis*), Red Hemp-nettle (*Galeopsis angustifolia*), Borrer's Saltmarsh-grass, Meadow Barley, Opposite-leaved Pondweed (*Groenlandia densa*), Meadow Saffron/Autumn Crocus (*Colchicum autumnale*), Wild Clary/Sage, Nettle-leaved Bellflower, Saw-wort (*Serratula tinctoria*), Bird Cherry (*Prunus padus*), Blue Fleabane (*Erigeron acer*), Fly Orchid (*Ophrys insectifera*), Ivy Broomrape (*Orobanche hederæ*) and Greater Broomrape. Of these, the first nine are protected under the Flora (Protection) Order, 2015. Divided Sedge was thought to be extinct but has been found in a few locations in the site since 1990. In addition plants which do not have a very wide distribution in the country are found in the site including Thin-spiked Wood-sedge, Field Garlic (*Allium oleraceum*) and Summer Snowflake. Six rare lichens, indicators of ancient woodland, are found including *Lobaria laetevirens* and *L. pulmonaria*. The rare moss *Leucodon sciuroides* also occurs.

The site is very important for the presence of a number of E.U. Habitats Directive Annex II animal species including Freshwater Pearl Mussel (both *Margaritifera margaritifera* and *M. m. durrovensis*), White-clawed Crayfish, Salmon, Twaite Shad, three lamprey species – Sea Lamprey, Brook Lamprey and River Lamprey, the tiny whorl snail *Vertigo moulinsiana* and Otter. This is the only site in the world for the hard water form of the Freshwater Pearl Mussel, *M. m. durrovensis*, and one of only a handful of spawning grounds in the country for Twaite Shad. The freshwater stretches of the River Nore main channel is a designated salmonid river. The Barrow/Nore is mainly a grilse fishery though spring salmon fishing is good in the vicinity of Thomastown and Inistioge on the Nore. The upper stretches of the Barrow and Nore, particularly the Owenass River, are very important for spawning.

The site supports many other important animal species. Those which are listed in the Irish Red Data Book include Daubenton's Bat, Badger, Irish Hare and Common Frog. The rare Red Data Book fish species Smelt (*Osmerus eperlanus*) occurs in estuarine stretches of the site. In addition to the Freshwater Pearl Mussel, the site also supports two other freshwater mussel species, *Anodonta anatina* and *A. cygnea*.

Three rare invertebrates have been recorded in alluvial woodland at Murphy's of the River. These are: *Neoscia obliqua* (Order Diptera: Syrphidae), *Tetanocera freyi* (Order Diptera: Sciomyzidae) and *Dictya umbrarum* (Order Diptera: Sciomyzidae). The rare invertebrate, *Mitostoma chrysomelas* (Order Arachnida), occurs in the old oak woodland at Abbeyleix and only two other sites in the country. Two flies (Order Diptera) *Chrysogaster virescens* and *Hybomitra muhlfeldi* also occur at this woodland.

The site is of ornithological importance for a number of E.U. Birds Directive Annex I species, including Greenland White-fronted Goose, Whooper Swan, Bewick's Swan, Bar-tailed Godwit, Peregrine and Kingfisher. Nationally important numbers of Golden Plover and Bar-tailed Godwit are found during the winter. Wintering flocks of migratory birds are seen in Shanahoe Marsh and the Curragh and Goul Marsh, both in Co. Laois, and also along the Barrow Estuary in Waterford Harbour. There is also an extensive autumnal roosting site in the reedbeds of the Barrow Estuary used by Swallows before they leave the country. The old oak woodland at Abbeyleix has a typical bird fauna including Jay, Long-eared Owl and Raven. The reedbed at Woodstown supports populations of typical waterbirds including Mallard, Snipe, Sedge Warbler and Water Rail. Land use at the site consists mainly of

agricultural activities – mostly intensive in nature and principally grazing and silage production. Slurry is spread over much of the area. Arable crops are also grown. The spreading of slurry and fertiliser poses a threat to the water quality of the salmonid river and to the populations of E.U. Habitats Directive Annex II animal species within the site. Many of the woodlands along the rivers belong to old estates and support many non-native species. Little active woodland management occurs. Fishing is a main tourist attraction along stretches of the main rivers and their tributaries and there are a number of Angler Associations, some with a number of beats. Fishing stands and styles have been erected in places. Both commercial and leisure fishing takes place on the rivers. There is net fishing in the estuary and a mussel bed also. Other recreational activities such as boating, golfing and walking, particularly along the Barrow towpath, are also popular. There is a golf course on the banks of the Nore at Mount Juliet and GAA pitches on the banks at Inistioge and Thomastown. There are active and disused sand and gravel pits throughout the site. Several industrial developments, which discharge into the river, border the site. New Ross is an important shipping port. Shipping to and from Waterford and Belview ports also passes through the estuary.

The main threats to the site and current damaging activities include high inputs of nutrients into the river system from agricultural run-off and several sewage plants, over-grazing within the woodland areas, and invasion by non-native species, for example Cherry Laurel (*Prunus laurocerasus*) and Rhododendron (*Rhododendron ponticum*). The water quality of the site remains vulnerable. Good quality water is necessary to maintain the populations of the Annex II animal species listed above. Good quality is dependent on controlling fertilisation of the grasslands, particularly along the Nore. It also requires that sewage be properly treated before discharge. Drainage activities in the catchment can lead to flash floods which can damage the many Annex II species present. Capital and maintenance dredging within the lower reaches of the system pose a threat to migrating fish species such as lamprey and shad. Land reclamation also poses a threat to the salt meadows and the populations of legally protected species therein.

Overall, the site is of considerable conservation significance for the occurrence of good examples of habitats and of populations of plant and animal species that are listed on Annexes I and II of the E.U. Habitats Directive. Furthermore it is of high conservation value for the populations of bird species that use it. The occurrence of several Red Data Book plant species including three rare plants in the salt meadows and the population of the hard water form of the Freshwater Pearl Mussel, which is limited to a 10 km stretch of the Nore, add further interest to this site.