

N4 Collooney to Castlebaldwin, Proposed Road Development

APPENDIX NO. 12.1

NATURA IMPACT STATEMENT TO INFORM APPROPRIATE ASSESSMENT

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Document Control

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1 Introduction

Ecofact Environmental Consultants Ltd. has been commissioned by Sligo County Council to prepare a Natura Impact Statement (NIS) to inform the Appropriate Assessment process. The preparation of the NIS follows the iterative process of Appropriate Assessment, whereby an initial Screening Assessment to inform the Appropriate Assessment for the *Proposed Road Development* was prepared and progressed to Natura Impact Statement.

The proposed N4 realignment is a *Proposed Road Development*, as defined in the Roads Act, and consists predominately of a Type 2 Dual Carriageway cross section with a Standard Single Carriageway tie in south of Castlebaldwin. It extends from the townlands of Collooney/Toberbride south of Collooney to the townland of Cloghoge Lower south of Castlebaldwin village. It will involve construction of a new Greenfield route with some online upgrades to the existing network. Figure 1 shows the N4 Collooney to Castlebaldwin Realignment, which is the subject of this Natura Impact Statement (NIS) and includes the location of the Natura 2000 sites within close proximity of the *Proposed Road Development*. The preparation of this NIS follows the Habitats Directive as transposed into Irish law (in this case pursuant to Section 177T (4) of the Planning and Development Act, 2000 as amended in light of the definition of proposed development as including development under section 51 of the Roads Act, 1993 as contained in section 177R of the said Act as amended). The guidance published by the National Parks and Wildlife Service (NPWS, 2010 '*Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities*') is also followed. The methodology utilised in the preparation of this document is outlined in detail in Chapter 2 of this report.

The screening process has identified the likely impacts upon a European Site (i.e. a Natura 2000 site) of a project or plan, either alone or in combination with other projects or plans, and considers whether these impacts are likely to be significant. This process aims to determine whether or not an Appropriate Assessment is required. The Screening Assessment for the proposed realignment concluded that the development could potentially have direct impacts on the wintering bird populations of the Lough Arrow SPA and adverse effects on the qualifying interests and conservation objectives of the Unshin River cSAC, the Lough Arrow cSAC and the Lough Arrow SPA Natura 2000 sites. The requirement for the current NIS also takes account of the direction from An Bord Pleanála (Ref: 21.JN002) on the 11th July 2012 which identifies the requirement for a NIS on the basis that the *Proposed Road Development*, by reason of its size and scale, and its location with regard to the hydrological and hydrogeological relationship with the Unshin River cSAC and the Lough Arrow cSAC and SPA sites, would be likely to have significant effects on these European sites.

The current document is a NIS which provides information for the Appropriate Assessment of the proposed N4 Collooney to Castlebaldwin Road Development (as set out in Chapter 4 of the EIS). This Natura Impact Statement (NIS) assesses whether the proposed project, alone or in combination with other projects or plans, will not, beyond reasonable scientific doubt, have adverse effects on the integrity of a Natura 2000 site; and includes any mitigation measures necessary to avoid, reduce or offset negative effects. The integrity of a site relates to its conservation objectives with regard to the conservation status of the qualifying interests and conservation interests for which the site is designated. This NIS for the current proposal has been carried out with particular reference to the Unshin River candidate Special Areas of Conservation (cSAC), Lough Arrow candidate Special Area of Conservation (cSAC) and Special Protection Area (SPA), as all the watercourses within the proposed route drain into these designated sites. Effects upon the conservation objectives and qualifying interests (including habitats and species) within the affected designated areas are considered. These sites are of European Importance and have been designated in accordance with the requirements of the EU Habitats Directive (1992) and the EU Birds Directive (2009). The character and qualifying interests of the Unshin River cSAC and Lough Arrow cSAC and SPA are identified and the overall impacts and relative significance of the N4 Realignment on the conservation objectives of these Natura 2000 sites are evaluated.

1.1 Legislative Context

The current document in the context of a *Proposed Road Development* takes account of Section 57 of the Planning and Development (Amendment) Act, 2010, which inserted Part XAB into the Planning and Development Act, 2000. The context of Appropriate Assessment is with regard to Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora - '*The Habitats Directive*' which was originally transposed into Irish law by the '*European Community (Natural Habitats) Regulations 1997*' (S.I. No. 94/1997). The most recent transposition of this legislation is the European Communities (Birds and Natural

Habitats) Regulations 2011 (S.I. No. 477 of 2011); with cognisance of the Planning and Development (Amendment) Act, (2010). The Birds Directive (2009/147/EC) which is now included in the former Regulations seeks to protect birds of special importance by the designation of Special Protection Areas (SPAs), whereas the Habitats Directive does the same for habitats and other species groups within Special Areas of Conservation (SACs), which are currently designated as candidate Special Areas of Conservation (cSAC) in Ireland. Under current legislation, both SPA and cSAC sites are designated as 'European Sites' in Ireland; irrespective of the status of their formal inclusion at a Community level. It is the responsibility of each member state to designate SPAs and SACs, both of which will form part of Natura 2000, a network of protected areas throughout the European Union. Article 6, paragraphs 3 and 4 of the EC 'Habitats' Directive (1992) state that:

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

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 the site concerned 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.

In addition the European Court of Justice in Case C-127/02 (the "Waddenzee Ruling") has made a relevant ruling in relation to Appropriate Assessment:

"Any plan or project not directly connected with or necessary to the management of the site is to be subject to an appropriate assessment of its implications for the site in view of the site's conservation objectives if it cannot be excluded, on the basis of objective information, that it will have a significant effect on that site, either individually or in combination with other plans or projects" and that the plan or project may only be authorised "where no reasonable scientific doubt remains as to the absence of such effects".


1.2 Consultation

Consultation for the current proposal has been undertaken with the Department of Arts, Heritage and the Gaeltacht; specifically with the National Parks and Wildlife Service (NPWS). The Screening Assessment for the *Proposed Road Development* was submitted to An Bord Pleanála by Sligo County Council for review; following this a direction was issued by An Bord Pleanála (ref: 21.JN0002; 11th July, 2012) requesting that a Natura Impact Statement be prepared for the *Proposed Road Development*, having regard to the potential for significant effects on European Sites.

Figure 1: The location of the proposed N4 Collooney to Castlebaldwin Realignment.

Proposed N4 Collooney to Castlebaldwin Realignment



<p>Proposed N4 Realignment</p>	<p>Figure 1</p>	<p>Date: 17.9.2013</p>	
<p>Proposed N4 Collooney to Castlebaldwin Realignment</p>			

2 METHODOLOGY

2.1 Desk study

During the Screening assessment to inform the Appropriate Assessment process, a desktop study was undertaken to identify the extent and scope of the potentially affected designated Natura 2000 sites within the current study area in relation to the proposed N4 Collooney to Castlebaldwin Realignment. The desktop study identified the designated Natura 2000 sites within a 15km radius of the study area.

Further desk study research included publically available information from statutory bodies including the National Parks and Wildlife Service, the Environmental Protection Agency, WFD Ireland, the National Biodiversity Data Centre and Sligo County Council. The desk study included data gathering with regard to ecological interests and current and historical water quality and hydrological data within the Ballysadare / Unshin River catchment, which includes Lough Arrow at the upstream end. Local and national bodies with information relating to ecological conservation interests within the study area were also consulted or reviewed, these included the Irish Wildlife Trust; the Botanical Society of the British Isles; Birdwatch Ireland; Bat Conservation Ireland; and Butterfly Ireland. Relevant chapters of the current Environmental Impact Statement (EIS) prepared for the *Proposed Road Development* have been reviewed, these included:

- Chapter 4 Description of the *Proposed Road Development*; and
- Chapter 14 Hydrological & Hydro-geological Impact Assessment with regard to potential impacts affecting water-dependant qualifying interests, as well as water quality related mitigation measures.

2.2 Ecological surveys

Ecological field surveys of the *Proposed Road Development* were carried out by Ecofact Environmental Consultants Ltd (2005-2013) for the purposes of the preparation for the ecology section of the Environmental Impact Statement. These surveys included bird surveys and aquatic ecological assessments with reference to the conservation interests of the Unshin River cSAC and the Lough Arrow cSAC and SPA complex; with particular regard to the potential for qualifying interests of these sites to occur within the study area (i.e. Annex I bird species and Annex II species such as Atlantic salmon and otter). The connection between the *Proposed Road Development* site and the designated Natura 2000 sites within the study area and pathways for impacts were also examined.

2.3 Appropriate Assessment Methodology

This Natura Impact Statement follows the guidance published by the National Parks and Wildlife Service (NPWS, 2010) '*Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities*'. The Appropriate Assessment process set out by the NPWS is a staged approach which proceeds according to the requirements of the proposal and the evaluation of potential impacts, as described below:

- *Stage One: Screening / Test of Significance* - The process which identifies the likely impacts upon a Natura 2000 site of a project or plan, either alone or in combination with other projects or plans, and considers whether these impacts are likely to be significant;
- *Stage Two: Appropriate Assessment* - The consideration of the impact of the project or plan on the integrity of the Natura 2000 site, either alone or in combination with other projects or plans, with respect to the site's structure and function and its conservation objectives. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts;
- *Stage Three: Assessment of Alternative Solutions* - The process which examines alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the integrity of the Natura 2000 site; and
- *Stage Four: Assessment Where Adverse Impacts Remain* - An assessment of compensatory measures where, in the light of an assessment of Imperative Reasons of Overriding Public Interest (IROPI), it is deemed that the project or plan should proceed.

The safeguards set out in Article 6(3) and (4) of the Habitats Directive are triggered not by certainty but by the possibility of significant effects. Thus, in line with the precautionary principle, it is unacceptable to fail to undertake an appropriate assessment on the basis that it is not certain that there are significant effects.

2.3.1 Screening for Appropriate Assessment

Screening for Appropriate Assessment is the process of determining whether or not Appropriate Assessment is required. Following the guidelines set out by NPWS (2010) Appropriate Assessment Stage 1: Screening is the process that addresses and records the reasoning and conclusions in relation to the first two tests of Article 6(3); i.e. whether a plan or project can be excluded from Appropriate Assessment requirements because it is directly connected with or necessary to the management of the site; and the potential effects of a project or plan, either alone or in combination with other projects or plans, on a Natura 2000 site in view of its conservation objectives, and considering whether these effects will be significant. According to NPWS (2010), screening is the process that addresses and records the reasoning and conclusions in relation to the first two tests of Article 6(3) of the EU Habitats Directive:

- Whether a plan or project is directly connected to or necessary for the management of the site; and
- Whether a plan or project, alone or in combination with other plans and projects, is likely to have significant effects on a Natura 2000 site or sites in view of its conservation objectives.

As concluded in the Screening Assessment, the proposed N4 Collooney to Castlebaldwin Realignment does not fulfil the first test of the Screening exercise i.e. the proposed works are not directly connected to or necessary for the management of any Natura 2000 site. The Screening Assessment therefore determines whether the proposed project, alone or in combination with other plans and projects, is likely to have significant effects on the Natura 2000 sites within the study area. The Screening Assessment completed for the proposed N4 Collooney to Castlebaldwin Realignment concluded that due to the uncertainty of effects and the likelihood of significant impacts on Natura 2000 sites (taking account of direction from An Bord Pleanála) a Natura Impact Statement was required to inform the Appropriate Assessment.

2.3.2 Natura Impact Statement to inform the Appropriate Assessment

The Natura Impact Statement (NIS) considers whether the plan or project, alone or in combination with other projects or plans, will not, beyond reasonable scientific doubt, have adverse effects on the integrity of a Natura 2000 site; and includes any mitigation measures necessary to avoid, reduce or offset negative effects. The NIS provides the basis for the Appropriate Assessment, which is undertaken by the competent authority (in this case An Bord Pleanála). This NIS comprises a scientific examination of the plan / project and the relevant Natura 2000 sites; to identify and characterise any possible implications for the site in view of the site's conservation objectives, structure and function, taking account of any and/or all direct, indirect, cumulative and in combination effects. The requirements for Appropriate Assessment derive directly from Article 6(3) of the EU Habitats Directive (1992).

Direct and indirect impacts in isolation or in combination with other plans and projects on the identified Natura 2000 sites in view of the sites conservation objectives have been examined. Case law of the European Court of Justice (ECJ) has established that Appropriate Assessment must be based on best scientific knowledge in the field. The conservation objectives for Natura sites (cSACs and SPAs) are determined under Article 4 of the Habitats Directive and are intended to ensure that the relevant qualifying interests i.e. Annex I habitats and Annex II species present within the designated site, for which that site has been selected, are maintained at, or where appropriate, restored to, favourable conservation status.

The current report comprises a Natura Impact Statement which will be used to inform the Appropriate Assessment process. This provides a description of the project and the receiving environment. The conservation objectives of Natura 2000 sites potentially affected by the *Proposed Road Development* are listed and potential impacts outlined with respect to the integrity of the Natura 2000 site. Mitigation measures have been proposed for the protection of the conservation interests and the avoidance of impacts to the Natura 2000 sites located in close proximity to the *Proposed Road Development*.

3 Identification of Natura 2000 sites potentially affected

3.1 Description of the proposed project

The project is a *Proposed Road Development* as defined in the Roads Act and consists predominately of a Type 2 Dual Carriageway cross section with a Standard Single Carriageway tie in section to the south of Castlebaldwin. It extends from the townlands of Collooney/Toberbride south of Collooney to the townland of Cloghoge Lower south of Castlebaldwin village. The proposed route does not pass within any designated conservation site. However, there are hydrological connections between the watercourses the proposed road crosses and designated Natura 2000 conservation sites, the Unshin River cSAC and the Lough Arrow cSAC and SPA.

3.2 Identification of relevant Natura 2000 sites

3.2.1 Screening of Natura 2000 sites within 15km of the study area

Designated Natura 2000 sites which are located within a 15km radius of the proposed N4 Collooney to Castlebaldwin Realignment in Co. Sligo were included in the screening assessment following the guidance published by the NPWS (2010). Furthermore, any additional sites beyond this radius which are identified to lie within the zone of influence of the *Proposed Road Development* were also included. It is often but not exclusively the case that the greater the distance the less likely it is that a Natura 2000 site may be affected by the proposal. Exceptions primarily occur via hydrological or hydrogeological pathways where impacts can be transported over longer distances.

3.2.1.1 Unshin River cSAC (site code: 001898)

The Unshin River cSAC (site code: 001898) runs parallel and to the east of the existing N4, from Lough Arrow to Ballysadare Bay. The cSAC boundary is within 300m of the east side of the existing N4 where the proposed realignment rejoins it at Doorly. This area was surveyed and it was found that the pasture fields nearest the road contained no protected habitats or species associated with the cSAC designation. A number of the link roads adjoin this cSAC; however, the cSAC site boundary is approximately 40m from the *Proposed Road Development* at its nearest point (at Lackagh). The Unshin River is notable as an example of a pristine river corridor that has not been drained and retains natural habitats along its margins. The Unshin is protected under the Habitats Directive (Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora). The Unshin River cSAC is designated for its Annex I habitats floating river vegetation [3260] and alluvial wet woodlands [91E0]. The site is also selected for the Annex II species Atlantic salmon (*Salmo salar*) [1106] and Otter (*Lutra lutra*) [1355].

Evaluation: The proposed realignment crosses a number of watercourses that drain into the Unshin River cSAC. This gives rise to at least the potential for impacts on water quality or transport of invasive species to this Natura 2000 designation that may affect the water dependent conservation interests of the site.

3.2.1.2 Bricklieve Mountains and Keishcorran cSAC (site code: 001656)

Bricklieve Mountains and Keishcorran cSAC (site code: 001656) is located approximately 1.05km south-west from the proposed route at Cloghoge Lower. It covers an upland area of limestone outcrop with a wide variety of habitats and high floral diversity. This cSAC is designated for the conservation of Annex I habitats: Turloughs [3180]; Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco Brometalia*) (*important orchid sites) [6210]; Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*) [6510]; Calcareous and calcshist screes of the montane to alpine levels (*Thlaspietea rotundifolii*) [8120]. Annex II species listed as qualifying interests of the site include Marsh fritillary (*Euphydryas aurinia*) [1065] and White-clawed crayfish (*Austropotamobius pallipes*) [1092].

Evaluation: According to the Hydrogeological Impact Assessment prepared for the EIS, this Natura 2000 site is not connected via hydrological or hydrogeological pathways to the proposed N4 realignment. There are no

pathways for direct, indirect or cumulative impacts affecting this designated site with regard to the habitats or species listed as conservation interests of this site. There is no aspect of the proposed works which may result in adverse effects on this designated site.

3.2.1.3 Lough Arrow cSAC (site code: 001673)

Lough Arrow cSAC (site code: 001673) is located approximately 350m south-east from the proposed route at its closest point, due south of Castlebaldwin Village. The site is a spring-fed lake designated for the Annex I habitat hard oligo-mesotrophic waters [3140], with the Annex II species Otter [1355] also being recorded at the site.

Evaluation: The proposed realignment crosses two streams which join to the south of Castlebaldwin and drain into Lough Arrow cSAC. This gives rise to at least the potential for impacts on water quality or transport of invasive species to this Natura 2000 designation that may affect the water dependent conservation interests of the site.

3.2.1.4 Lough Arrow SPA (site code: 004050)

Lough Arrow SPA (site code: 004050) is located approximately 700m to the south of the *Proposed Road Development*, due east of Castlebaldwin village. This site is designated as a SPA for the conservation of Little grebe (*Tachybaptus ruficollis*) [A004], Tufted duck (*Aythya fuligula*) [A061] and wetlands & waterbirds [A999]; the Whooper swan [A038] which is also listed on Annex I of the EU Birds Directive (2009) occurs on the lake and is listed in the Natura 2000 Standard Data Form for this site.

Evaluation: The proposed realignment crosses the Drumderry Stream and a tributary of the Drumderry Stream, which drains into Lough Arrow SPA. This gives rise to at least the potential for impacts on water quality or transport of invasive species to this Natura 2000 designation that may affect the water dependent conservation interests of the site.

3.2.1.5 Union Wood cSAC (site code: 000638)

Union Wood cSAC (site code: 000638) is located approximately 1.9km north from the proposed route at its closest point. The site is designated for its Annex I habitat old oak woodland [91A0]. Union Wood is important as it is one of the largest remaining oak woodlands in the region. The wood is situated on acidic soils with the ground flora typical of an acidic wood. The site also contains an area of heath at Union Rock.

Evaluation: This Natura 2000 site is located at a distance of 1.9km from the *Proposed Road Development* and there is no aspect of the proposed works which may result in adverse effects on this designated site, where there are no pathways for direct, indirect or cumulative impacts arising from the proposal which could potentially affect the oak woodland habitats for which this site is designated.

3.2.1.6 Ballysadare Bay cSAC (site code: 004129)

Ballysadare Bay cSAC (site code: 004129) is the southerly of three inlets of the larger Sligo Bay which is situated approximately 4.5 km north of the proposed route. The Bay is underlain by sedimentary rocks of limestone, sandstone and shale. It is designated for estuaries [1130], extensive intertidal sand and mudflats [1140], shifting dunes with marram [2120], dune grassland [2130], humid dune slacks [2190] and shifting dunes [2110], all of which are Annex I listed habitats. The Bay also supports a colony of Common seals (*Phoca vitulina*) [1365] and the rare snail [1014], *Vertigo angustior*, with both species listed on Annex II of the EU Habitats Directive.

Evaluation: The Unshin River catchment which dominates the current study area meets the sea at Ballysadare Bay. This Natura 2000 site is located approximately 4.5km north of the *Proposed Road Development* over land and approximately 12 river kilometres downstream of the nearest watercourse crossing within the Unshin catchment affected by the *Proposed Road Development*. There are no direct, indirect or cumulative impacts arising from the *Proposed Road Development* which would have the potential to adversely affect the coastal and intertidal habitats / fauna listed as qualifying interests of this Natura 2000 site.

3.2.1.7 Ballysadare Bay SPA (site code: 004129)

Ballysadare Bay SPA (site code: 004129) is located approximately 4.6km from the *Proposed Road Development* as the Ballysadare Bay cSAC, by land and via the hydrological connection. This site is designated as a SPA for

the conservation of Whooper swan [A038], Bar-tailed godwit [A157] and Golden plover [A140] that are listed on Annex I of the EU Birds Directive. The site is also noted for Light-bellied Brent goose (*Branta bernicla hrota*) [A046], Grey plover (*Pluvialis squatarola*) [A141], Dunlin (*Calidris alpina*) [A149], Redshank (*Tringa totanus*) [A162] and wetlands & waterbirds [A999].

Evaluation: The Unshin River catchment which dominates the current study area meets the sea at Ballysadare Bay. This Natura 2000 site is located approximately 4.6km north of the *Proposed Road Development* over land and approximately 12.5 river kilometres downstream of the nearest watercourse crossing within the Unshin catchment affected by the *Proposed Road Development*. There are no direct, indirect or cumulative impacts identified which would have the potential to affect the Annex I bird species or their wetland habitats within this Natura 2000 site arising from the *Proposed Road Development*.

3.2.1.8 Templehouse and Cloonacleigha Loughs cSAC (site code: 000636)

Templehouse and Cloonacleigha Loughs cSAC (site code: 000636) is located approximately 7km west from the proposed route. Both cSACs are hard water lakes situated on Carboniferous limestone that are interconnected by the Owenmore River. The site is designated as a cSAC for its Annex I habitats of hard water lake [3140], floating river vegetation habitats [3260], purple moor-grass meadows [6410], alluvial wet woodlands [91E0] and degraded raised bog [7120].

Evaluation: Taking account of the distance between the *Proposed Road Development* and due to insignificant hydrological or hydrogeological connections to this Natura 2000 site with the proposed N4 realignment there is no aspect of the *Proposed Road Development* which may result in a significant effect on this site, either individually or in combination with other plans or projects.

3.2.1.9 Lough Gill cSAC (site code: 001976)

Lough Gill cSAC (site code: 001976) is located approximately 7km north-east from the proposed route. The site is a large natural eutrophic lake [3150], representing a habitat listed on Annex I of the EU Habitats Directive. The site is also selected as a cSAC for its alluvial wet woodlands [91E0] and old oak woodlands [91A0], both listed on Annex I of the EU Habitats Directive. The site is also selected for Sea lamprey (*Petromyzon marinus*) [1095], River lamprey (*Lampetra fluviatilis*) [1099], Brook lamprey (*Lampetra planeri*) [1096], White-clawed crayfish [1092], Atlantic salmon [1106] and Otter [1355] that are listed on Annex II of the same directive.

Evaluation: Taking account of the distance between the *Proposed Road Development* and due to insignificant hydrological or hydrogeological connections to this Natura 2000 site with the proposed N4 realignment there is no aspect of the *Proposed Road Development* which may result in a significant effect on this site, either individually or in combination with other plans or projects.

3.2.1.10 Cummeen Strand/Drumcliff Bay cSAC (site code: 000627)

Cummeen Strand/Drumcliff Bay cSAC (site code: 000627) is located approximately 11km north of the proposed route from its closest point. This large coastal site is mainly underlain by Carboniferous limestone, although acidic rocks are also found on the Rosses Point peninsula. The site is designated for its estuaries [1130], intertidal sand and mud flats [1140], Juniper of heaths or calcareous grasslands [5130], hard-water springs depositing lime [7220], shifting dunes [2110], dune grassland [2130] and shifting dunes with marram [2120], which are listed on Annex I of the EU Habitats Directive. In addition, the site is selected for Common seal [1365] and the rare snail [1014], Vertigo angustior, with both species listed on Annex II of the EU Habitats Directive.

Evaluation: Taking account of the distance between the *Proposed Road Development* and due to insignificant hydrological or hydrogeological connections to this Natura 2000 site with the proposed N4 realignment there is no aspect of the *Proposed Road Development* which may result in a significant effect on this site, either individually or in combination with other plans or projects.

3.2.1.11 Cummeen Strand SPA (site codes: 004035)

Cummeen Strand SPA (site codes: 004035) is located at the same distance from the *Proposed Road Development* as the Cummeen Strand/Drumcliff Bay cSAC, by land and via the hydrological connection. This site is designated as a SPA for the conservation of Golden plover [A140] and Bar-tailed godwit [A157] that are listed on Annex I of the EU Birds Directive. The site is also noted for Light-bellied Brent goose (*Branta bernicla*

hrota) [A046], Oystercatcher (*Haematopus ostralegus*), Redshank (*Tringa totanus*) [A162] and wetlands & waterbirds [A999].

Evaluation: Taking account of the distance between the *Proposed Road Development* and due to insignificant hydrological or hydrogeological connections to this Natura 2000 site with the proposed N4 realignment there is no aspect of the *Proposed Road Development* which may result in a significant effect on this site, either individually or in combination with other plans or projects.

3.2.1.12 Lough Gara SPA (site code: 004048)

Lough Gara SPA (site code: 004048) is situated approximately 12.4km south-west from the proposed route. The SPA is a shallow, medium sized mesotrophic lake overlying Carboniferous limestone and shale, and Devonian sandstone. This SPA is of high ornithological importance and is designated for high numbers of Whooper swan [A038], Greenland White-fronted goose (*Anser albifrons flavirostris*) [A395] and Golden plover [A140], all listed on Annex I of the EU Birds Directive.

Evaluation: Taking account of the distance between the *Proposed Road Development* and due to insignificant hydrological or hydrogeological connections to this Natura 2000 site with the proposed N4 realignment there is no aspect of the *Proposed Road Development* which may result in a significant effect on this site, either individually or in combination with other plans or projects.

3.2.1.13 Ox Mountains Bogs cSAC (site code: 002006)

Ox Mountains Bogs cSAC (site code: 002006) is located approximately 14km west of the proposed route. The site is designated for its extensive areas of blanket bog [7130], wet heathland [4010], natural dystrophic lakes and ponds [3160], oligotrophic lakes [3110] and depressions on peat substrates [7150] that are all listed on Annex I of the EU Habitats Directive. The site is also selected for the rare snail [1013], *Vertigo geyeri*, listed on Annex II of the EU Habitats Directive.

Evaluation: This Natura 2000 site is not connected via hydrological or hydrogeological pathways to the proposed N4 realignment. There is no aspect of the *Proposed Road Development* which may result in a significant effect on this site, either individually or in combination with other plans or projects.

3.2.1.14 Flughany Bog cSAC (site code: 000497)

Flughany Bog cSAC (site code: 000497) is a raised bog that is situated approximately 14km south-west of the proposed route. This site is designated for its degraded raised bog [7120], active raised bog [7110] and depressions on peat substrates [7150], all of which are listed on Annex I of the EU Habitats Directive.

Evaluation: This Natura 2000 site is not connected via hydrological or hydrogeological pathways to the proposed N4 realignment. There is no aspect of the *Proposed Road Development* which may result in a significant effect on this site, either individually or in combination with other plans or projects.

3.2.1.15 River Moy cSAC (site code: 002298)

River Moy cSAC (site code: 002298) is located approximately 14km to the west of the *Proposed Road Development*. The site is a candidate SAC selected for degraded raised bog [7120], alluvial wet woodlands [91E0], old oak woodlands [91A0], depressions on peat substrates [7150] and active raised bog [7110], all habitats of which are listed on Annex I of the E.U. Habitats Directive. The site is selected for the following species listed on Annex II of the same directive – Atlantic salmon [1106], Otter [1355], Sea lamprey [1095], Brook lamprey [1096] and White-clawed Crayfish [1092].

Evaluation: Taking account of the distance between the *Proposed Road Development* and due to insignificant hydrological or hydrogeological connections to this Natura 2000 site with the proposed N4 realignment there is no potential for the *Proposed Road Development* to have a significant effect on this site, either individually or in combination with other plans or projects.

Table 1: Summary of Screening for Natura 2000 Sites within 15km of the proposed N4 Collooney to Castlebaldwin Realignment in Co. Sligo.

Site Name	Distance from the Proposed Road Development	Evaluation of potential for significant effects
Unshin River cSAC (site code: 001898)	40m	The <i>Proposed Road Development</i> may indirectly affect this designated site, as a number of watercourses within the proposed route drain into the designated site. It was therefore not possible to exclude at Screening stage that the <i>Proposed Road Development</i> may result in a significant effect on this site, either individually or in combination with other plans or projects.
Bricklieve Mountains and Keishcorran cSAC (site code: 001656)	1.05km	There are no hydrological or geographical pathways or connections by which the <i>Proposed Road Development</i> may result in a significant effect on this site, either individually or in combination with other plans or projects.
Lough Arrow cSAC (site code: 001673)	350m	The <i>Proposed Road Development</i> may indirectly affect this designated site, as the Drumderry Stream and its tributary, within the proposed route, drains into the designated site. It was therefore not possible to exclude at Screening stage that the <i>Proposed Road Development</i> may result in a significant effect on this site, either individually or in combination with other plans or projects.
Lough Arrow SPA (site code: 004050)	700m	The <i>Proposed Road Development</i> may indirectly affect this designated site, as the Drumderry Stream and its tributary, within the proposed route, drains into the designated site. It was therefore not possible to exclude at Screening stage that the <i>Proposed Road Development</i> may result in a significant effect on this site, either individually or in combination with other plans or projects.
Union Wood cSAC (site code: 000638)	1.9km	There are no hydrological or geographical pathways or connections by which the <i>Proposed Road Development</i> may result in a significant effect on this site, either individually or in combination with other plans or projects.
Ballysadare Bay cSAC (site code: 000622)	4.5km	There are no hydrological or geographical pathways or connections by which the <i>Proposed Road Development</i> may result in a significant effect on this site, either individually or in combination with other plans or projects.
Ballysadare Bay SPA (site code: 004129)	4.6km	There are no hydrological or geographical pathways or connections by which the <i>Proposed Road Development</i> may result in a significant effect on this site, either individually or in combination with other plans or projects.
Templehouse and Cloonacleigha Loughs cSAC (site code: 000636)	7km	There are no hydrological or geographical pathways or connections by which the <i>Proposed Road Development</i> may result in a significant effect on this site, either individually or in combination with other plans or projects.
Lough Gill cSAC (site code: 001976)	7km	There are no hydrological or geographical pathways or connections by which the <i>Proposed Road Development</i> may result in a significant effect on this site, either individually or in combination with other plans or projects.
Cummeen Strand/Drumcliff Bay cSAC (site code: 000627)	11km	There are no hydrological or geographical pathways or connections by which the <i>Proposed Road Development</i> may result in a significant effect on this site, either individually or in combination with other plans or projects.
Cummeen Strand SPA (site code: 004035)	11km	There are no hydrological or geographical pathways or connections by which the <i>Proposed Road Development</i> may result in a significant effect on this site, either individually or in combination with other plans or projects.
Lough Gara SPA (site code: 004048)	12.4km	There are no hydrological or geographical pathways or connections by which the <i>Proposed Road Development</i> may result in a significant effect on this site, either individually or in combination with other plans or projects.
Ox Mountains Bogs cSAC (site code: 002006)	14km	There are no hydrological or geographical pathways or connections by which the <i>Proposed Road Development</i> may result in a significant effect on this site, either individually or in combination with other plans or projects.
Flughany Bog cSAC (site code: 000497)	14km	There are no hydrological or geographical pathways or connections by which the <i>Proposed Road Development</i> may result in a significant effect on this site, either individually or in combination with other plans or projects.
River Moy cSAC (site code: 000497)	14km	There are no hydrological or geographical pathways or connections by which the

Site Name	Distance from the Proposed Road Development	Evaluation of potential for significant effects
002298)		<i>Proposed Road Development</i> may result in a significant effect on this site, either individually or in combination with other plans or projects.

Figure 2: Special Areas of Conservation (SAC) within 15 km of the proposed N4 Collooney to Castlebaldwin Realignment.

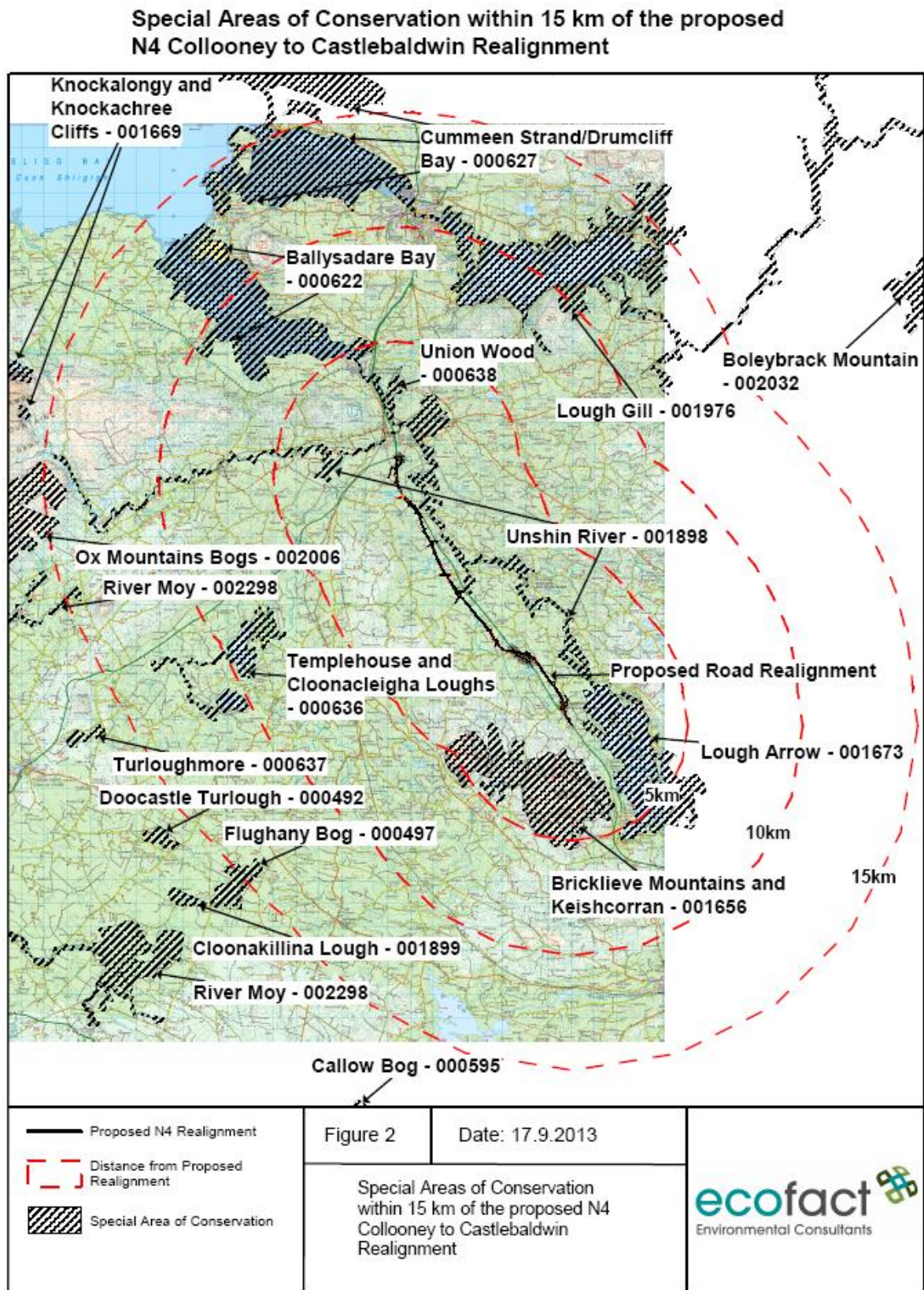
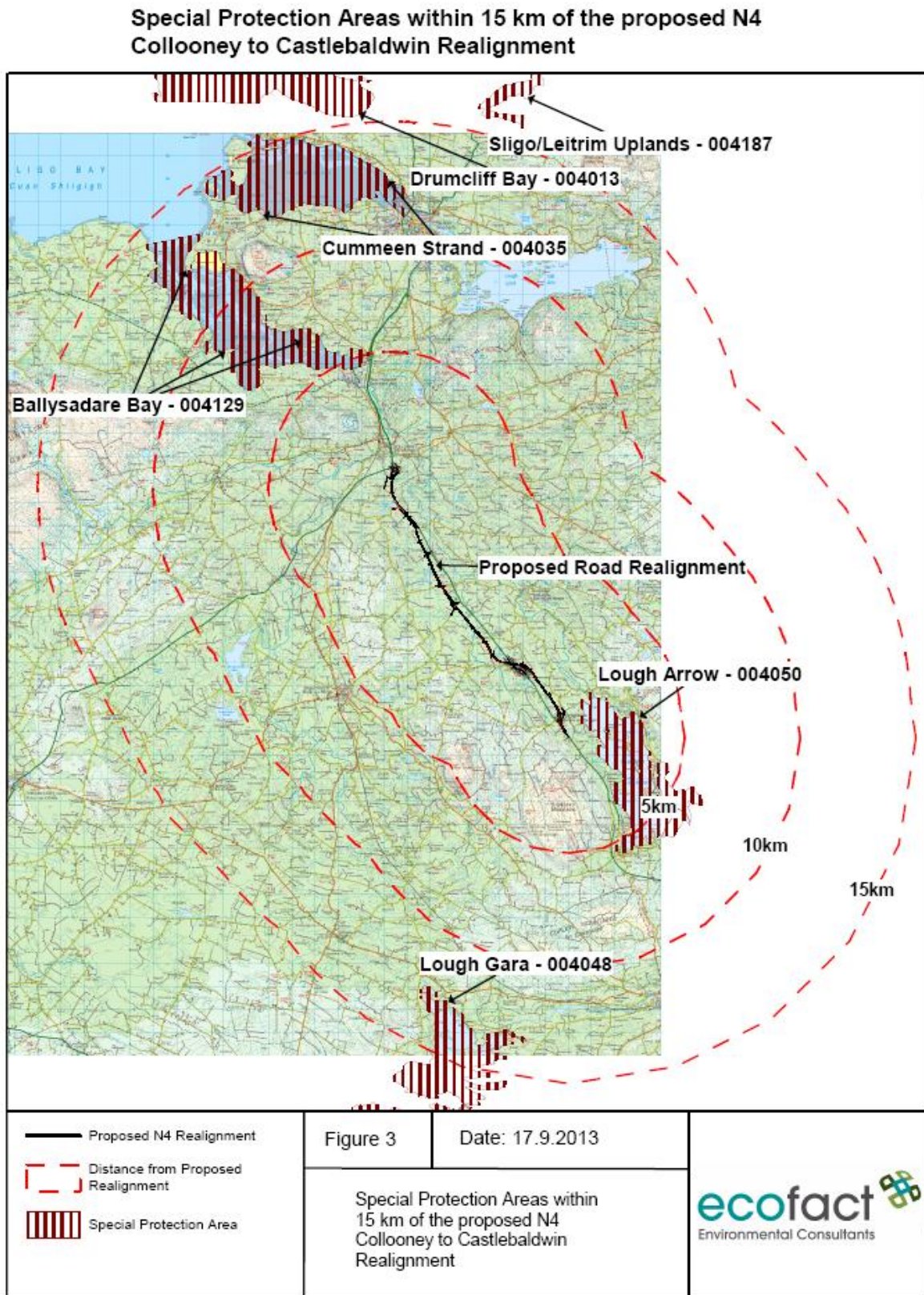


Figure 3: Special Protection Areas (SPA) within 15 km of the proposed N4 Collooney to Castlebaldwin realignment



3.3 Description of Natura 2000 sites potentially affected by the *Proposed Road Development*

3.3.1 Unshin River cSAC

The Unshin River cSAC runs parallel and to the east of the existing N4, from Lough Arrow to Ballysadare Bay. The proposed road crosses a number of watercourses which drain into the Unshin River. The cSAC boundary is in close proximity to the east side of the existing N4 where the *Proposed Road Development* rejoins it at Doorly; a number of link roads also adjoin this cSAC (c. 40m at the tie in of the L-55016-0 to the existing N4 at Knocknagroagh Td.); however the main road corridor (national primary element) is approximately 190m away from the cSAC boundary at its nearest point, at the Turnalaydan Stream. The cSAC is also indirectly connected to the *Proposed Road Development* by the crossing of the Drumfin River approximately 2 km upstream of its confluence with the Unshin River. This site has therefore been identified as being hydrologically connected to the proposed N4 Collooney to Castlebaldwin Realignment.

The site is notable as an example of a pristine river corridor that has not been drained and retains natural habitats along its margins. The Unshin is protected under the Habitats Directive, as transposed into Irish legislation under the EC (Birds and Habitats) Regulations (2011). It contains the Annex I habitats floating river vegetation and alluvial wet woodlands. The Unshin and its tributaries form a very important system for the Annex II species Atlantic Salmon and is the most important salmon producing river in Co. Sligo. The site is also selected for otters, another Annex II listed species of the EU Habitats Directive. The cSAC boundary is adjacent to the east side of the existing N4 where the proposed realignment rejoins it at Doorly. The likely presence of these conservation interests within the designated Unshin River cSAC potentially affected by the *Proposed Road Development* is outlined in Table 2.

Table 2: *Qualifying Interests of the Unshin River cSAC.*

Natura Code	Qualifying interest
91E0	Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae)
3260	Rivers with floating vegetation often dominated by Water-crowfoot
1106	Atlantic salmon (<i>Salmo salar</i>)
1355	Otter (<i>Lutra lutra</i>)

3.3.2 Lough Arrow cSAC

Lough Arrow cSAC lies approximately 0.5km south-east from the proposed route at its closest point. The road crosses a tributary of the Drumderry Stream, which drains into Lough Arrow downstream. This site has also been identified as being hydrologically connected to the proposed N4 via this minor watercourse.

The Lough Arrow cSAC is a large limestone lake that conforms to a type listed on Annex I of the EU Habitats Directive. The lake is sheltered on three sides by hills and is the source of the Unshin River. Lough Arrow is unusual in being a largely spring-fed, mesotrophic natural lake which has changed little in the last 40 years. The shores of the lake are for the most part stony; several bays occur in which Common Club-rush (*Scirpus lacustris*) and Common Reed (*Phragmites australis*) are found in abundance. In places the reedbeds extend out into the lake and Bogbean (*Menyanthes trifoliata*) and Yellow Iris (*Iris pseudacorus*) occur. The lakeshore vegetation which includes sedges (*Carex* spp.); Water Mint (*Mentha aquatica*); and Water Horsetail (*Equisetum fluviatile*); grades into areas of mossy boulders and woodland. The lakes support a diverse submerged aquatic flora. The Annex I listed habitat '[3140] hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp.' is the sole qualifying interest of the site. The likely presence of the conservation interests within the designated Lough Arrow cSAC potentially affected by the *Proposed Road Development* is outlined in Table 3.

Table 3: *Qualifying Interests of the Lough Arrow cSAC.*

Natura Code	Qualifying interest
3140	Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> spp.

3.3.3 Lough Arrow SPA

The Lough Arrow SPA is designated for the conservation of internationally important populations of Little grebe (*Tachybaptus ruficollis*) [A004] and Tufted duck (*Aythya fuligula*) [A061] and also for the presence of wetlands and waterbirds [A999] within the lake. Whooper swan [A038], listed on Annex I of the EU Birds Directive is listed on the Natura 2000 Standard Data Form for the site. Lough Arrow supports moderate numbers of wintering waterfowl. Diving ducks are well represented with Pochard (*Fuligule milouin*) and Goldeneye (*Bucephala clangula*) occurring in numbers of regional importance. High numbers of other species have been recorded, including Coot (*Fulica atra*) and Mallard (*Anas platyrhynchos*). The Lough Arrow SPA is located approximately 700m to the south of the proposed development, due east of Castlebaldwin village. The likely presence of these conservation interests within the designated Lough Arrow SPA and the potential for adverse effects arising from the *Proposed Road Development* is outlined in Table 4.

Table 4: *Qualifying Interests of the Lough Arrow SPA, and records of these interests from the study area.*

Natura Code	Qualifying interest
A004	Little grebe (<i>Tachybaptus ruficollis</i>)
A061	Tufted duck (<i>Aythya fuligula</i>)
A999	Wetlands & Waterbirds

3.4 Assessment of potential impacts affecting the Natura 2000 sites

3.4.1 Assessment of potential direct impacts affecting the Natura 2000 sites

The proposed N4 *Proposed Road Development* does not overlap with the boundaries of any Natura 2000 site. The closest designated site to the *Proposed Road Development* is the Unshin River cSAC, which comes to within approximately 40m of the Proposed Road Development at its closest point. There will therefore be no direct habitat loss affecting any designated Natura 2000 site including the Unshin River cSAC, Lough Arrow cSAC or Lough Arrow SPA.

3.4.2 Assessment of potential indirect impacts affecting the Natura 2000 sites

The *Proposed Road Development* crosses a number of watercourses which drain into the Unshin River and Lough Arrow; both of which are identified as cSAC sites. The crossing of the watercourses within the surface water catchment of these designated sites, in addition to proximity to the Unshin River cSAC, gives rise to the potential for indirect impacts affecting the Unshin River cSAC and Lough Arrow cSAC and SPA complex with the following pathways for impacts identified:

- Potential adverse effects on the aquatic environment arising from suspended solid laden runoff or releases of other polluting substance during the construction phase;
- Potential adverse effects arising from the introduction, spread, or acceleration of spread of invasive, non-native species into the designated sites via the affected watercourse during the construction phase;
- Potential adverse effects on the aquatic environment arising from watercourses receiving untreated road runoff or be at risk from any accidental spills on the new road during the operational phase in the absence of an effective drainage design system.

The qualifying interests of the Unshin River cSAC and the Lough Arrow cSAC and Lough Arrow SPA Natura 2000 sites are predominantly water dependant; therefore water quality has been identified as a key indicator of conservation value for these sites. Water quality impacts have the potential to affect the conservation status of the Annex I habitats and Annex II species for which the cSAC sites are designated and the wetland habitats

and waterbirds, including wintering waterbirds for which the SPA is designated. The scale of water quality impacts arising from the *Proposed Road Development* are identified as being potentially significant in the absence of appropriate design/mitigation measures.

Aquatic habitats and the riparian corridor of the Unshin River cSAC and Lough Arrow cSAC and SPA are significantly at risk with regard to invasive non-native species. Road works and construction projects such as the current proposal are acknowledged pathways for the spread of these species and therefore these must be considered. It is possible (in the absence of mitigation measures designed to avoid the spread of invasive species) that other invasive species could potentially be introduced into the study area and spread downstream into the designated sites.

The potential for indirect effects arising from air quality impacts were assessed in the Air Quality Chapter of the EIS for the *Proposed Road Development* (Section 9.4.4 of Chapter 9). Of the designated Natura 2000 sites identified within the study area, only the River Unshin cSAC lies within 200m of the proposed development and was subject to air quality assessment. The *Proposed Road Development* is closest to the Unshin River cSAC at Doorly (the boundary of the cSAC is c. 110m from the *Proposed Road Development* at c. Ch.2,500), Knocknagroagh (the boundary of the cSAC is c. 50m from the *Proposed Road Development* at c. Ch. 4,000) and Drumfin (the boundary of the cSAC is c. 80m from the *Proposed Road Development* at c. Ch. 6,500). Dispersion modelling and prediction was carried out at typical traffic speeds at both of these locations. The predicted annual average NO_x level in the Unshin River cSAC near Doorly is below the limit value of 30 µg/m³ for the “do minimum” scenario in 2017 and 2032, with NO_x concentrations reaching 46% of this limit in 2017 and 30% in 2032. Levels with the *Proposed Road Development* in place are similar reaching 46% of the limit value for the “do something” scenario in 2017 and 30% of the limit value in 2032. The predicted annual average NO_x levels at the Unshin River cSAC near Doorly are below the limit value of 30 µg/m³ for the “do something” scenario in both the opening and design years. The impact of the *Proposed Road Development* leads to an increase in NO_x concentrations of at most 0.07 µg/m³ within the Unshin River cSAC; at no stage are the prescribed air quality limits exceeded. These values are considered to be not significant and no mitigation measures are prescribed.

Due to the proximity of the Lough Arrow SPA to the proposed N4 corridor there is the potential for adverse effects on wintering bird populations utilising this designated waterbody; particularly in relation to larger wintering birds such as Whooper Swan and geese. Potential pathways for impacts affecting wintering birds are identified with regard to collisions with vehicles on the new road during the operational phase of the *Proposed Road Development* and increased disturbance during the construction phase of the works with large machinery operating on the site.

3.4.3 Assessment of potential cumulative impacts affecting the Natura 2000 sites

Cumulative impacts or effects are changes in the environment that result from numerous human-induced, small-scale alterations. Cumulative impacts can be thought of as occurring through two main pathways: first, through persistent additions or losses of the same materials or resource, and second, through the compounding effects as a result of the coming together of two or more effects (Bowers-Marriott, 1997). As part of the Screening for an Appropriate Assessment, in addition to the proposed works, other relevant projects and plans in the region were considered at this stage. This step aims to identify at this stage any possible significant in-combination or cumulative effects/impacts of the *Proposed Road Development* with other such plans and projects on the Natura 2000 sites.

From a review of the publically available planning files for proposed projects or development within the proposed route corridor there are no known proposals which would have the potential to give rise to in-combination impacts affecting the designated Natura 2000 sites within the study area with regard to the *Proposed Road Development*. Furthermore, any development within the study area which is subject to Planning Permission and which would have the potential for adverse effects on a designated Natura 2000 site will be required to have its own Screening Assessment to inform the Appropriate Assessment process.

A separate Screening Assessment has been undertaken for the Sligo County Development Plan (2011-2017) which has concluded that the Plan has been formulated to ensure that uses, developments and effects arising from permissions based upon the Plan (either individually or in combination with other plans or projects) shall not give rise to significant effects on the integrity of any Natura 2000 sites. There are therefore no in-combination effects potentially giving rise to cumulative impacts on the Natura 2000 sites identified with regard to the current proposal. There are no Conservation Management Plans for the designated Natura 2000 sites identified as being potentially affected by the *Proposed Road Development*.

Background water quality pressures in the Unshin River and Lough Arrow have been identified as a potential cumulative impact with respect to potential water quality impacts arising from the *Proposed Road Development*; where further impacts arising during the construction phase may result in significant cumulative impacts on water quality in the Unshin River and Lough Arrow due to poor assimilation capacity. The Castlebaldwin and Environs WWTP discharges to Lough Arrow and gives rise to the potential for cumulative impacts on water quality within the study area with regard to the *Proposed Road Development*.

3.5 Summary of findings leading to potential for adverse effects

From the Screening Report to inform the Appropriate Assessment the following has been concluded:

- **Is the development in a nature conservation site?** No, the N4 Collooney to Castlebaldwin realignment in Co. Sligo is not within any designated Natura 2000 site.
- **Is the development in the surface water catchment of a nature conservation site (or part of such a site)?** Yes, a number of watercourses the proposed route crosses drain into the Unshin River cSAC and Lough Arrow cSAC and SPA.
- **Are the qualifying habitats and species of the site water dependant?** Yes, aquatic and water-dependant Annex I habitats and Annex II species (Habitats Directive) and Annex 1 (Birds Directive) species are listed as qualifying interests of the sites.
- **Is there a WFD sub-basin management plan for the site or its protected habitats/species?** There is no sub-basin management plan for the Unshin River cSAC and Lough Arrow cSAC and SPA.
- **Does this plan cover all potential receptors (habitats/species)?** No, therefore the Screening process must conclude that further impact assessment is required.

According to NPWS (2010), the Appropriate Assessment Screening exercise can either identify that an Appropriate Assessment is not required; or that there is no potential for significant effects (i.e. Appropriate Assessment is not required); or that significant effects are certain, likely or uncertain (i.e. the project must either proceed to Stage 2 (AA) or be rejected). From the examination of the information available it has been concluded that the proposed N4 Collooney to Castlebaldwin Realignment in Co. Sligo has the potential for indirect impacts affecting the Unshin River cSAC and Lough Arrow cSAC and SPA; with particular reference to the sensitive aquatic receptors located directly downstream of the works area, which comprise the key conservation interests of designated sites.

The potential for indirect impacts affecting the Unshin River cSAC and Lough Arrow cSAC and Lough Arrow SPA has been identified with particular reference to the water-dependant qualifying interests of these sites which occur directly downstream of the *Proposed Road Development*. Water quality has been identified as a key indicator of conservation value for these Natura 2000 sites. The potential exists for indirect water quality impacts affecting the Unshin River cSAC and Lough Arrow cSAC and SPA during the construction and operation of the *Proposed Road Development*. There are also potential indirect impacts associated with the importation and / or spread of non-native invasive species.

It is considered that the *Proposed Road Development* gives rise to the potential for significant adverse effects on the qualifying interests and conservation objectives of the Unshin River cSAC, the Lough Arrow cSAC and the Lough Arrow SPA Natura 2000 sites. The significance of these impacts is evaluated as being uncertain. Based on the information provided, the current Natura Impact Statement, as part of the Appropriate Assessment process has been prepared; with regard to the potential for direct, indirect, cumulative and in combination impacts affecting the Natura 2000 network arising from the N4 Collooney to Castlebaldwin *Proposed Road Development*.

4 STAGE 2: NIS TO INFORM APPROPRIATE ASSESSMENT

At this stage the impact of a project or plan alone and in combination with other projects or plans on the integrity of the Natura 2000 sites is considered with respect to the conservation objectives of the sites and to their structure and function (NPWS, 2010). This Natura Impact Statement provides information to aid the competent authority in making the Appropriate Assessment. It provides a description of the proposed N4 Collooney to Castlebaldwin Realignment in Co. Sligo with regard to the potential for impacts affecting the Unshin River cSAC and Lough Arrow cSAC and SPA. The conservation objectives of these designated sites are identified, where those potentially affected by the proposed project are listed and potential impacts outlined.

4.1 Description of Natura 2000 Sites potentially affected

The conservation interests of the Unshin River cSAC and Lough Arrow cSAC and SPA include both Annex I Habitats and Annex II species listed on the EU Habitats Directive, as well as Annex I species listed on the EU Birds Directive. An overview of these designated sites is provided in Section 3.3. The qualifying interests of these designated sites are presented in Tables 2, 3 and 4.

At a national level the conservation status of qualifying interests for which the Unshin River cSAC and Lough Arrow cSAC and SPA has been designated have been provided in the NPWS Conservation Status Report (2008) *'The status of EU Protected Habitats and Species in Ireland'*. In the absence of a completed Conservation Management Plan for these Natura 2000 sites, the conservation objectives for the Unshin River cSAC, the Lough Arrow cSAC and the Lough Arrow SPA are identified individually as follows:

- **Unshin River cSAC Conservation Objectives (NPWS, 2011a):** 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.e. [1106] *Salmo salar* (only in fresh water); [1355] *Lutra lutra*; Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation; and [3260] *Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*).
- **Lough Arrow cSAC Conservation Objectives (NPWS, 2011b):** To maintain or restore the favourable conservation condition of the Annex I habitat(s) for which the SAC has been selected i.e. [3140] Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp.
- **Lough Arrow SPA Conservation Objectives (NPWS, 2011c):** To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA i.e. *Tachybaptus ruficollis* [wintering]; *Aythya fuligula* [wintering]; and Wetlands.

Water quality has been identified as a key indicator of conservation value for both the Unshin River cSAC and Lough Arrow cSAC and SPA. Deleterious impacts on water quality can directly interfere with the structure and function of the designated sites; where the conservation objectives of the sites are focussed on maintaining the qualifying interests and special conservation interests they support at favourable conservation status.

4.1.1 SAC Qualifying Interests: Annex I Habitats

The Unshin River cSAC is one of the last undrained limestone rivers in Ireland. It is selected for its alluvial wet woodlands, which are listed as priority habitats on Annex I of the EU Habitats Directive. The site is also selected for the Annex I habitat floating river vegetation, listed on the same directive.

These habitats do not occur within the current proposed realignment. At its nearest point the river is approximately 300 m from the proposed road corridor, however along most of the route the road is more than 1 km away from the Unshin River. However, the proposed road crosses a number of tributaries that drain into the Unshin River. The pathways identified by which these habitats within the Unshin River cSAC could potentially be affected by the proposed realignment would be through pollution during both the construction and operation of the proposed road and the water-borne spread of invasive, non-native plant species.

In the absence of a specific conservation status assessment for these habitats within the Unshin River cSAC the national conservation status assessment (NPWS, 2008) is taken into account. Therefore the evaluation of the

alluvial wet woodland priority Annex I habitat takes account of the overall national conservation status i.e. 'Bad'; where the range is identified as 'Good'; with the reference area 'Bad'; structure and functions 'Bad'; and future prospects 'Bad'. Similarly, the conservation status of the floating river vegetation Annex I habitat takes account of the overall national conservation status i.e. 'Bad'; where the range is identified as 'Good'; with the reference area 'Good'; structure and functions 'Bad'; and future prospects 'Bad'.

Lough Arrow cSAC is a large limestone lake that is largely spring-fed. The site is selected as an SAC for the Annex I habitat hard oligo-mesotrophic waters, listed on the EU Habitats Directive. This habitat does not lie within the current proposed realignment, with the site boundary lying approximately 1 km from the proposed route at its closest point. However, the proposed realignment crosses the Drumderry Stream south of Castlebaldwin which drains into Lough Arrow. The pathways identified by which this habitat within Lough Arrow could be affected by the proposed realignment would again be through pollution during both the construction and operation of the proposed road in the absence of an effective drainage design and the water-borne spread of invasive, non-native plant species.

In the absence of a conservation status assessment for this habitat within Lough Arrow the conservation status of the hard oligo-mesotrophic water Annex I habitat takes account of the overall national conservation status i.e. 'Bad'; where the range is identified as 'Good'; with the reference area 'Good'; structure and functions 'Bad'; and future prospects 'Bad'.

4.1.2 SAC Qualifying interests: Annex II Species

Annex II species listed as conservation interests of the Unshin River cSAC and Lough Arrow cSAC are identified as being water-dependant and primarily aquatic; these are the Atlantic Salmon *Salmo salar* and the Otter *Lutra lutra*.

4.1.2.1 Atlantic salmon (*Salmo salar*)

The Atlantic salmon is listed under Annexes II and V of the EU Habitats Directive and Appendix III of the Berne Convention and is a qualifying interest of the Unshin River cSAC. The Unshin River and its tributaries is the most important salmon producing river in Co. Sligo, with the Ballysadare catchment being of international importance to salmon. Poor water quality will affect the conservation status of salmon in the Unshin River; this species requires clean water (Q4) for spawning and early life stages. Salmonid fish would be particularly vulnerable to run-off pollutants at the egg and early juvenile stages. These stages are present in the mid winter to late spring period. The conservation status of this species within the Unshin River cSAC is not currently available. The conservation status for this species is evaluated as being overall 'Bad' at a national level (NPWS, 2008).

4.1.2.2 Otter (*Lutra lutra*)

The otter is listed under Annex II of the EU Habitats Directive and under Annex II of the Berne Convention. It is also a legally protected species under the Wildlife Act, 1976 (and Wildlife (Amendment) Act, 2000). This species is listed as one of the qualifying interests of the Unshin River cSAC and Lough Arrow cSAC. The conservation status of this species is dependent on fish stocks, which are ultimately dependent on water quality. The conservation status of this species within the Unshin River cSAC and Lough Arrow cSAC is not currently available; however, the national conservation status is evaluated as being 'Inadequate'.

Otter are found throughout Ireland and tend to occupy linear territories along watercourses. River and wetland drainage and clearance of riparian vegetation are the main causes of otter habitat destruction in Ireland.

4.1.3 SPA Special Conservation Interests: Bird species & Wetlands (Birds Directive, 2009)

4.1.3.1 Little Grebe (*Tachybaptus ruficollis*)

The Little Grebe [A004] is Amber-listed in Ireland due to a contraction in the breeding range. The European population is regarded as Secure by Bird Life International. Breeding sites are relatively widely scattered with slightly higher densities in the northeast of Ireland. Pairs are highly territorial, nesting mostly on floating plant material hidden in dense vegetation at the margins of shallow, freshwater rivers, streams, loughs and ponds.

4.1.3.2 Tufted Duck (*Aythya fuligula*)

Tufted Duck [A061] is a resident and winter visitor to Ireland. The species is Amber-listed in Ireland for its localised wintering range. Their breeding habitat is close to marshes and lakes with plenty of vegetation to conceal the nest. They are also found on coastal lagoons, the seashore, and sheltered ponds. The European population has been evaluated as Declining due to several key populations undergoing moderate ongoing declines.

Wetlands are identified as a special conservation interest within the Lough Arrow SPA site, supporting the Annex I bird species for which the site is designated. The wetlands within this SPA correspond to the lake itself i.e. the Annex I hard oligo-mesotrophic waters designated within the Lough Arrow cSAC, and also the reed fringe and associated wetlands supporting Little Grebe and Tufted Duck.

4.1.3.3 Other notable Annex I species (Birds Directive, 2009) in the study area

Protected birds found along the Unshin River include Whooper swan (*Cygnus cygnus*) [A038] and Kingfisher (*Alcedo atthis*) [A229], with both species listed on Annex I of the EU Birds Directive. The whooper swan is also identified as being of interest within the Lough Arrow SPA complex, although is not specifically listed as a special conservation interest of this SPA site.

The Kingfisher is listed under Annex I of the Birds Directive and Annex II of the Berne Convention. The conservation status of this species is dependent on fish stocks and aquatic insects, which are ultimately dependent on water quality. The conservation status of this species within the Unshin River cSAC is not currently available; however, they are amber listed in 'Birds of Conservation Concern in Ireland'. This species is widespread and fairly common on fish-rich rivers and lakes in Ireland.

Whooper swan is listed under Annex I of the Birds Directive and Annex II of the Berne Convention. The Whooper swan is a winter visitor to wetlands throughout Ireland, especially north and west of a line between Limerick and Dublin, from breeding grounds in Iceland. They generally arrive in October and leave to return to their breeding grounds in late March/early April. They winter mostly on lowland open farmland around inland wetlands, regularly seen while feeding on grasslands and stubble. Whooper swans usually feed during the daylight hours and leave the feeding sites at dusk to congregate at evening roosts.

Only a single Whooper swan was recorded on one occasion during the current study. Three Whooper Swans were recorded on two occasions on Loughymeenaghan. This number is also insignificant and it is noteworthy that the proposed new road corridor is located further away from Loughymeenaghan than the existing N4 road. The new road and the existing road are equidistant from the Lough Arrow SPA.

4.2 Impact Prediction

As part of the Natura Impact Statement the impact of the project proposal affecting the *integrity* of a Natura 2000 site is considered with respect to the conservation objectives of the site. Integrity is defined as: '*the coherence of the site's ecological structure and function, across its whole area, or the habitats, complex of habitats and/or populations of species for which the site is or will be classified*'. Therefore the integrity of a site is principally related to the structure and function of the site with regard to its qualifying interests. The conservation status of these qualifying interests comprises the primary conservation objectives for all designated Natura 2000 sites. Favourable conservation status is defined for Annex I habitats and Annex II species in the Habitat Directive (1992):

- Article 1 (e) Conservation status of a natural habitat means the sum of the influences acting on a natural habitat and its typical species that may affect its long-term natural distribution, structure and functions as well as the long-term survival of its typical species within the territory referred to in Article 2.

The conservative status of a natural habitat will be taken as 'favourable' when: its natural range and areas it covers within that range are stable or increasing, and the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future.

- Article 1 (i) 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.

4.2.1 Impacts potentially affecting Annex I Habitats within cSAC sites

4.2.1.1 Construction phase impacts

No Annex I habitats listed as qualifying interests of the Unshin River cSAC and Lough Arrow cSAC will be directly affected by the construction phase of the *Proposed Road Development*. This is because the *Proposed Road Development* will be constructed outside of the designated site boundaries.

During the construction phase of the proposed realignment there is the potential for indirect water quality impacts affecting the Annex I listed habitats for Unshin River cSAC and Lough Arrow cSAC. This is due to the proposed realignment crossing a number of watercourses which drain into Unshin River and Lough Arrow. Water quality within the Unshin River and Lough Arrow has been identified as a key indicator of conservation value for the designated sites. Water quality impacts have the potential to affect the conservation status of the Annex I habitats for which the sites are designated and may be significant.

Suspended sediment due to runoff of soil from construction areas, or due to disturbance of fine sub-surface sediments in the course of instream construction and excavation, may potentially have a significant impact on these aquatic habitats. The potential also exists for a range of serious pollutants to enter watercourses during new road construction that may have a significant impact on these aquatic habitats further downstream. For example uncured concrete and grouts; wash down water from site vehicles, fuels, lubricants and hydraulic fluids and from waste from on site toilet and wash facilities would have deleterious effects on plants if allowed to enter watercourses. Pollution by suspended solids and substances associated with the construction process would be a potential problem at all points where the new road is constructed close to or over watercourses, particularly where this involves instream works, construction of culverts or river diversion.

The potential spread of invasive, non-native species has been identified as a pathway for the transmission of indirect impacts affecting Annex I habitats listed as qualifying interests of the Unshin River cSAC and Lough Arrow cSAC. The requirement for fill material or machinery employed within the site during the construction phase may potentially result in the importation of non-native species such as Japanese knotweed, Himalayan balsam, Himalayan knotweed, *Gunnera* sp. or Giant hogweed – all of which are recognised as having significant impacts on the ecological diversity and naturalness within riparian corridors. The proposed works affecting the watercourses within the study area gives rise to the potential for the transportation of fragments of invasive species downstream into the Unshin River cSAC and Lough Arrow cSAC; however, it is noted that non-native invasive species were not recorded at the crossing points of these watercourses during the surveys to inform this impact assessment. The risk of this impact is evaluated as being in line with current trends – where road side works and low-level movement of soil and sub-soil material within the Ballysadare / Unshin River catchment gives rise to the potential for the spread of invasive species on an ongoing basis.

Stringent and robust mitigation measures are proposed for the avoidance of impacts affecting water quality during the construction phase of the *Proposed Road Development* in order to protect the water-dependant Annex I habitats of the Unshin River and Lough Arrow.

4.2.1.2 Operational phase impacts

No Annex I habitat listed as qualifying interests of the Unshin River cSAC and Lough Arrow cSAC will be directly affected by the operational phase of the *Proposed Road Development*. This is because the *Proposed Road Development* will be constructed outside of the designated site boundaries and no Annex I habitats were identified within the development site contiguous with those within the cSAC designation.

In the absence of an effective drainage design system, there is potential for indirect water quality impacts affecting Annex I habitats within the Unshin River and Lough Arrow during the operation phase of the *Proposed Road Development*. This is due to the proposed realignment crossing a number of watercourses which drain into Unshin River and Lough Arrow. Water quality within the Unshin River cSAC and Lough Arrow cSAC has been identified as a key indicator of conservation value for the designated sites. Water quality impacts have the potential to affect the conservation status of the Annex I habitats for which the sites are

designated and may be significant. The main potential impact on these aquatic habitats associated with the operational phase of the proposed realignment would be the pollution of rivers/streams from storm water run-off from the road. Storm water run-off from roads is composed of rainwater and contaminants, which are mobilised from the surface and boundaries of the road corridor.

In relation to potential operational phase impacts affecting the river itself mitigation measures have been proposed with cognisance of the sensitivity of the Unshin River cSAC and Lough Arrow cSAC Annex I habitats.

4.2.2 Impacts potentially affecting Annex II Species within cSAC sites

4.2.2.1 Construction phase impacts

The *Proposed Road Development* does not lie within or directly adjacent to any designated European Site and there is therefore no potential for direct impacts affecting the Annex II qualifying interests of the cSAC sites identified. However, there is potential for indirect water quality impacts to occur during construction. This is due to the proposed realignment crossing a number of watercourses which drain into the Unshin River and Lough Arrow. As the species listed on Annex II of the EU Habitats Directive for which both the Unshin River cSAC and Lough Arrow cSAC is designated are water dependant, water quality has been identified as a key indicator of conservation value for this site. Water quality impacts have the potential to affect the conservation status of the Annex II species for which the sites are designated and may be significant.

Water quality impacts arising during the construction phase of the *Proposed Road Development* would have the potential to affect salmon, a species requiring clean water at good ecological status i.e. Q4. Suspended sediment due to runoff of soil from construction areas, or due to disturbance of fine sub-surface sediments in the course of instream construction and excavation, can have severe negative impacts on all life stages of salmonid fish. Suspended solids in small quantities may have a serious effect on the spawning sites of salmonids (O'Connor & Andrew, 1998; Turnpenny & Williams R., 1980; Shackle et al, 1999). The effects of suspended solids are a function of concentration and exposure duration. The main mechanism used by adult fish to deal with elevated concentrations of suspended solids is to move away from the area. However, this action is not possible for ova and larval salmonids and restrictions on instream/riparian working times will be necessary in some areas.

The potential exists for a range of serious pollutants to enter watercourses during new road construction that may have a significant impact on the Annex II species further downstream. For example uncured concrete and grouts; wash down water from site vehicles, fuels, lubricants and hydraulic fluids and from waste from on site toilet and wash facilities would have deleterious effects on fish if allowed to enter watercourses. Impact of pollution by substances associated with the construction process would be less in areas where no salmonid population exists for a considerable distance downstream. Pollution by substances associated with the construction process would be a potential problem at all points where the new road is constructed close to or over watercourses, particularly where this involves instream works, construction of culverts or river diversion.

Otters are known to utilise both the Unshin River and Lough Arrow. The conservation status of this species within the designated sites is dependent on fish stocks, which are ultimately dependent on water quality. There is the potential for pollution of the waterbodies during the construction phase to affect otter populations indirectly, where this may impact on the fisheries potential of both the Unshin River and Lough Arrow system.

4.2.2.2 Operational phase impacts

As the *Proposed Road Development* lies outside of any European Site, there is no potential for direct impacts arising that may adversely affect Annex II species within a Natura 2000 site boundary. However, there is potential for indirect water quality impacts to occur during the operational phase. This is due to the proposed realignment crossing a number of watercourses which drain into the Unshin River and Lough Arrow. As the species listed on Annex II of the EU Habitats Directive for which both the Unshin River cSAC and Lough Arrow cSAC is designated are water dependant, water quality has been identified as a key indicator of conservation value for this site. Water quality impacts have the potential to affect the conservation status of the Annex II species for which the sites are designated and may be significant.

The main potential impact on water quality and fisheries associated with the operational phase of the proposed realignment would be the pollution of rivers/streams from storm water run-off from the road. Storm

water run-off from roads is composed of rainwater and contaminants, which are mobilised from the surface and boundaries of the road corridor.

There are significant differences between the sources that contribute to routine discharges and accidental discharges. Accidental spillages can consist of almost any polluting substance, and their impact would vary from incident to incident. More than 30 potential polluting substances have been identified in highway runoff. The effects of these may range from aesthetic nuisance, to causing biochemical and ecological deterioration of the receiving body of water.

Salmonid fish would be particularly vulnerable to run-off pollutants at the egg and early juvenile stages. These stages are present in the mid winter to late spring period. There is the potential for pollution of the waterbodies during the operational phase to affect other populations indirectly, where this may impact on the fisheries potential of both the Unshin River and Lough Arrow system.

A detailed drainage design (set out in chapter 4 of the EIS) and Erosion and Sediment Control Plan (Appendix 4.5 of the EIS) have been included in the project proposal for implementation to ensure the long-term operation of the *Proposed Road Development* will not impact on the qualifying interests of the Unshin River cSAC and Lough Arrow cSAC. The management of surface water run-off from the new road surface will effectively ameliorate the potential for impacts affecting water quality within the Unshin River and Lough Arrow. Mitigation measures outlining the required parameters within which the *Proposed Road Development* must operate are provided.

4.2.3 Impacts potentially affecting Special Conservation interests within SPA sites

4.2.3.1 Construction phase impacts

There is no potential for direct impacts affecting the special conservation interests of the Lough Arrow SPA during the construction phase, as the *Proposed Road Development* is not located within or directly adjacent to this site. There is the potential for indirect water quality impacts to occur during construction. This is due to the proposed realignment crossing a number of watercourses which drain into Unshin River and Lough Arrow. As the species listed on Annex I of the EU Birds Directive (2009) for which both the Unshin River cSAC and Lough Arrow SPA is designated are water dependant, water quality has been identified as a key indicator of conservation value for this site. Water quality impacts have the potential to affect the conservation status of the Annex I species for which the sites are designated and may be significant.

Suspended sediment due to runoff of soil from construction areas, or due to disturbance of fine sub-surface sediments in the course of instream construction and excavation, can have severe negative impacts on invertebrate and plant life and on all life stages of fish species. The potential exists for a range of serious pollutants to enter watercourses during new road construction that may have a significant impact on the special conservation interests of this site; particularly with regard to the Wetland habitats supporting the Annex I bird species. For example uncured concrete and grouts; wash down water from site vehicles, fuels, lubricants and hydraulic fluids and from waste from on site toilet and wash facilities would have deleterious effects on fish, plants and invertebrates if allowed to enter watercourses. Such impacts, potentially affecting the aquatic habitats of Lough Arrow would have the potential to adversely affect the Annex I special conservation interests of the SPA, where both Little Grebe and Tufted Duck are dependent on aquatic invertebrate and fish communities within the lake.

Whooper swans are known to utilise both the Unshin River and Lough Arrow, with Kingfishers also known to be supported by the Unshin River. The conservation status of these species within the designated sites is dependent on fish stocks, aquatic insects and vegetation that are ultimately dependent on water quality. There is the potential for pollution of the waterbodies during the construction phase to indirectly affect Whooper swan and Kingfisher populations; where this may impact on the fisheries, aquatic insect and vegetation within both the Unshin River and Lough Arrow system.

Based on bird survey work carried out during the period October 2011 to March 2012, the study area (route corridor to 500m each side) is rated as being sub-optimal and insignificant for wintering birds in terms of roosting and daytime feeding. Significant numbers of wintering birds were not recorded using Lough Corran and Boathole Loughs; the main focus of the study. Only a single Whooper swan was recorded on one occasion during the current study. Three Whooper Swans were recorded on two occasions on Loughymeenaghan. This number is also insignificant and it is noteworthy that the proposed new road corridor is located further away from Loughymeenaghan than the existing N4 road. The new road and the existing road are equidistant from

the Lough Arrow SPA. It is concluded therefore that the proposed realignment will not have any significant impact on wintering birds, such as Whooper Swans. There are no breeding sites for Kingfisher on the watercourses affected by the *Proposed Road Development*, and there will be no significant impact on this species.

Effective mitigation of water quality impacts potentially arising during the construction phase will avoid impacts affecting the population density or future prospects of these species.

4.2.3.2 Operational phase impacts

The *Proposed Road Development* does not occur within or directly adjacent to any SPA site and there are no direct impacts identified during the operation phase. There is, however, the potential for indirect water quality impacts to occur during the operational phase. This is due to the proposed realignment crossing minor watercourses which drain into Lough Arrow SPA. As the Annex I bird species listed as special conservation interests for the site are water dependant; water quality has been identified as a key indicator of conservation value for this site. Water quality impacts have the potential to affect the conservation status of the Annex I species and also Wetland habitats for which the site has been designated and may be significant. The main potential impact on water quality associated with the operational phase of the proposed realignment would be the pollution of rivers/streams from surface water run-off from the road. Surface water run-off from roads is composed of rainwater and contaminants, which are mobilised from the surface and boundaries of the road corridor.

Mitigation measures outlining the required parameters within which the *Proposed Road Development* must operate are provided. A detailed drainage design has been included in the proposal to ensure the long-term operation of the *Proposed Road Development* will not impact on the qualifying interests of the Lough Arrow SPA.

There is potential for indirect impacts during the operational phase of the *Proposed Road Development* with regard to Whooper swans, an Annex I species listed on the Natura 2000 data form for the Lough Arrow SPA site. The potential for increased collision risk for swans commuting between feeding and roosting sites was examined in the wintering bird's survey within the current study. Likewise there is a potential for displacement of this species from roosting or daytime feeding sites if such sites were located near the *Proposed Road Development*. The wintering bird's survey determined that this species would not be adversely affected by the *Proposed Road Development*, where important feeding habitats and flight lines do not occur within the proposed road alignment.

4.3 Mitigation measures

The construction of the proposed N4 Collooney to Castlebaldwin Realignment in Co. Sligo, in close proximity to the Unshin River cSAC and Lough Arrow cSAC and SPA requires the incorporation of effective mitigation measures into the proposal. The most significant potential impacts arising from the *Proposed Road Development* have been identified in relation to construction and operational phase impacts affecting water-dependant qualifying interests of the Unshin River cSAC and Lough Arrow cSAC and SPA. These may arise via indirect water quality impacts and spread of invasive, non-native species into the designated sites downstream affecting the Unshin River and Lough Arrow waterbodies. Therefore the proposed measures are principally aimed at avoiding impacts to the aquatic environment.

4.3.1 Design stage mitigations

The current Natura Impact Statement for the N4 Collooney to Castlebaldwin road development, Co. Sligo is based on the road design made available by Sligo County Council and takes account of the proposed drainage design for the development which constitutes significant design stage mitigation. As the *Proposed Road Development* requires works on a National Road, all elements of the development, including culvert design, realignments and construction methodologies are compliant with the relevant National Roads Authority (NRA) standards and guidelines, with regard to the potential adverse effects identified. The proposed drainage design for the route is set out in detail in Chapter 4 of the Environmental Impact Statement.

All design elements interacting with the aquatic environment; including watercourse crossings; management of surface water; and management of hydrological regimes within the study area take account of the ecological requirements and mitigations prescribed for the protection of the Unshin River cSAC and Lough Arrow cSAC and SPA.

4.3.2 Construction phase mitigations

The effective protection of water quality and the management of invasive, non-native species within the proposed realignment during construction and operation phases will significantly reduce the significance of impacts potentially affecting the Unshin River cSAC and Lough Arrow cSAC and SPA. Mitigations for avoidance, reduction and remediation of impacts are prescribed below. The implementation of these mitigations for the protection of the designated Natura 2000 sites and their qualifying interests inform the conclusion evaluation of the NIS.

Pollution control measures are required when working in and near the watercourses affected by the *Proposed Road Development* to prevent the transport of deleterious substances to the Unshin River and Lough Arrow, both of which are Natura 2000 sites designated for water-dependant qualifying interests.

As a mitigation measure for the protection of water quality and the avoidance of impacts affecting the Unshin River cSAC and Lough Arrow cSAC and SPA downstream, an Erosion and Sediment Control Plan has been prepared at EIS stage (Appendix 4.5 of the EIS). This report details the construction elements of the *Proposed Road Development* with particular regard to instream works, concrete works and drainage works. The provision of such a plan ensures commitments and management regulations are in place to enable the contractor to manage water quality protection measures on the site. The plan includes monitoring of water quality within the affected watercourses during the proposed works and the supervision of the works by an Environmental Assurance Officer (EAO) to be employed as a representative of the Local Authority with a 'stop works' authority in the event of breaches of environmental / water quality measures. The EAO will also liaise directly, during the construction period, with the National Parks and Wildlife Service and the Inland Fisheries Ireland with regard to the implementation of mitigation measures for the protection of sensitive water quality receptors that are set out in the Erosion and Sediment Control Plan (Appendix 4.5 of the EIS).

Good site management practices will be implemented to reduce risks of spills, including regular monitoring and inspection of storage vessels, ensuring plant is properly maintained and serviced etc. A supply of materials suitable for absorbing / containing spillages and sealing leaks will be maintained on site.

The timing of instream works will be subject to seasonal restriction to avoid the Salmon spawning season (October to March); with further restrictions proposed to the end of May in order to limit the potential for suspended solids and siltation impacts on salmonid ova. Taking account of the presence of Annex II listed Brook lamprey within the watercourses affected by the proposed works (with reference to Article 10 of the EU Habitats Directive) it is proposed that the timing restrictions include the lamprey spawning season. The window for instream works, that is, works within the aquatic environment, should be undertaken during the period July to September inclusive.

Any plant or equipment that may have worked in environments where invasive species are present (including but not restricted to zebra mussel *Dreissena polymorpha*, curly waterweed *Lagarosiphon major*, Japanese knotweed *Fallopia japonica*, Indian balsam *Impatiens glandulifera*, giant hogweed *Heracleum mantegazzianum*, rhododendron *Rhododendron ponticum*, New Zealand flatworm *Arthurdendyus triangulata*), shall be suitably cleaned by high pressure hose before being used in the N4 Collooney to Castlebaldwin site to prevent the spread of invasive species. Water used for this washing process shall always be intercepted and prevented from draining back into watercourses.

The source of any soil or fill material imported to site will be checked in advance at the source by a qualified ecologist to ensure that invasive, non-native species are not imported into this location, in direct proximity to the Unshin River cSAC and Lough Arrow cSAC and SPA.

4.3.3 Operational phase mitigations

In order to protect surface water quality during operation stage, mitigations in relation to surface water treatment are proposed. Mitigations are detailed in Chapter 4 Section 4.8.2 of the EIS (Description of the *Proposed Road Development*) stipulating that the principle of Sustainable Drainage Systems (SUDS) has been applied as far as is reasonably practicable for the *Proposed Road Development*. This principle seeks to minimise the environmental impact of the drainage system through quality and quantity control within a system which attempts to mimic the processes that occur in nature, additionally it is foreseen that the drainage design developed in this manner will blend in more harmoniously within the existing landscape considering the biodiversity values of the surrounding environment. Petrol interceptors, grit traps and containment facilities are to be constructed at each outfall point along the *Proposed Road Development* to mitigate for the risk of pollution from road runoff and accidental spillages. All drainage outfalls are designed to be served by suitably

sized constructed wetlands / interceptor ponds to reduce run-off rates to Greenfield (based on QBAR) rates. Operational phase mitigations, including detailed mitigations for the protection of water quality in the Unshin River and Lough Arrow cSAC's, are also set out in the Hydrological & Hydrogeological Assessment, Chapter 14 of the EIS. The proposed attenuation balancing ponds are designed to accommodate a 100-year return period flow and are designed to have adequate storage to allow a permissible outlet flow similar to the maximum existing flow from the catchment in accordance with UK Highways Agency publication Vegetative Treatment Systems For Highway Runoff HA103/06 and UK Highways Agency (2009) Surface and Sub-surface Drainage Systems for Highways HD33/06.

4.4 Impacts potentially affecting the conservation objectives of the cSAC and SPA

European and national legislation places a collective obligation on Ireland and its citizens to maintain at favourable conservation status areas designated as candidate Special Areas of Conservation, Special Areas of Conservation and Special Protection Areas. The Government and its agencies (i.e. the NPWS, local authorities and other statutory bodies) are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites. According to the EU Habitats Directive (1992), favourable conservation status of a habitat is 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”. The favourable conservation status of a species is 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 or 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”.

The provisions of Article 6 of the ‘Habitats’ Directive 92/43/EC (2000) defines ‘integrity’ as the ‘*coherence of the site’s ecological structure and function, across its whole area, or the habitats, complex of habitats and/or population of species for which the site is or will be classified*’.

Water quality has been identified as a key indicator of conservation value for the Unshin River cSAC and Lough Arrow cSAC and SPA. Deleterious impacts on water quality may potentially indirectly interfere with the structure and function of these designated sites affecting their integrity, where the conservation objectives of the sites are focussed on maintaining the conservation interests (Annex I habitats, Annex II species and Annex I bird species) at favourable conservation status. Water quality impacts have the potential to affect the range, distribution, population density and structure and function of these water dependant conservation interests. Indirect impacts potentially affecting the relevant qualifying interests also include adverse effects arising from the introduction/dispersion of alien invasive species. In the absence of mitigation, including mitigation by design in the form of effective drainage design, the *Proposed Road Development* is considered to have the potential to give rise to water quality impacts potentially affecting the integrity of the Unshin River cSAC and Lough Arrow cSAC and SPA complex.

With regard to the Annex I species listed as special conservation interests of the Lough Arrow SPA (Little Grebe and Tufted Duck) it is evaluated that the proposed realignment will not have any potential for adverse effects on the conservation status of these species, or on the conservation objectives of this Natura 2000 site.

Project specific mitigation measures for the protection of designated European Sites have been provided for in the design of the *Proposed Road Development*, in addition to measures prescribed in the EIS and this NIS for the avoidance of impacts potentially affecting the conservation objectives of the European Sites within the study area.

4.5 Natura Impact Statement Conclusions

The N4 Collooney to Castlebaldwin *Proposed Road Development*, Co. Sligo comprises the construction of a Type 2 Dual Carriageway cross section with a Standard Single Carriageway tie in section south of Castlebaldwin. It extends from the townlands of Collooney/Toberbride, due south of Collooney, to the townland of Cloghoge Lower, due south of Castlebaldwin village. It will involve construction of a new greenfield route with some online upgrades to the existing network.

The *Proposed Road Development* does not cross or directly impact on any designated European Site (i.e. Natura 2000 site). However, there are hydrological connections between the watercourses crossed by the proposed route and designated Natura 2000 conservation sites, where the *Proposed Road Development* lies within the catchment of the Unshin River cSAC and the Lough Arrow cSAC and SPA. As the watercourses drain into these sites, there would be the potential for indirect effects on these designated areas.

The Unshin River cSAC is selected for alluvial wet woodlands (priority habitat) and floating river vegetation both of which are listed on Annex I of the E.U. Habitats Directive (1992). The Lough Arrow cSAC is selected for the Annex I listed habitat '*Hard oligo-mesotrophic waters [3140]*' and is classified as being oligo-mesotrophic by the EPA. Pathways for impacts affecting these Annex I habitats are indirect impacts associated with the potential spread of invasive, non-native species during the construction phase and impacts on water quality through pollution during both the construction and operational phases of the realignment. Annex II species listed as conservation interests of the Unshin River cSAC are Atlantic salmon and Otter; both of which occur within the Unshin River downstream of the influent tributaries which are crossed by the *Proposed Road Development*. The watercourses crossed by the *Proposed Road Development*, upstream of these designated waterbodies gives rise to the potential for downstream water quality impacts potentially affecting these water-dependant qualifying interests, in the absence of mitigation.

Annex II species and Annex I bird species for which the Lough Arrow cSAC and SPA are designated are limited to four water-dependant species; Atlantic salmon and Otter for the cSAC and Tufted Duck and Little Grebe for the SPA, in addition to wetland habitats which are also listed as a conservation interest of the SPA. As these conservation interests are water dependant, water quality has been identified as a key indicator of conservation value for these species. Water quality impacts during the construction and operational phase have the potential to indirectly affect the conservation status of these species for which the sites are designated, in the absence of mitigation.

Effective measures to mitigate potential impacts have been provided by design and avoidance. Design stage mitigation measures, with specific reference to operational stage water quality protection, have been included in the project proposal. The detailed drainage design for the *Proposed Road Development* is presented in the EIS in Chapter 4 (Description of the Proposed Road Development) and expanded upon in Chapter 14 of the EIS (Hydrological and Hydrogeological Impact Assessment). The scope of these mitigations with reference to the potential for adverse effects on the qualifying interests of the Natura 2000 sites within the study area have been discussed in the mitigation section of this report. Details of mitigation proposals for the protection of water quality and aquatic conservation interests during the construction stage are set out in the Erosion and Sediment Control Plan, which is included in the EIS reporting (Appendix 4.5) and which will effectively limit any potential water quality impacts to the local context, thus avoiding the potential for downstream water quality impacts within the designated Natura 2000 sites. The incorporation of these measures into the *Proposed Road Development* design and their subsequent implementation on site will ensure that there will be no significant effects, either individually or in combination with other plans or projects affecting the conservation interests or conservation objectives of the Unshin River cSAC or the Lough Arrow cSAC and SPA complex, i.e. the integrity of these Natura 2000 sites. It is therefore concluded that the Proposed Road Development will not, beyond reasonable scientific doubt, adversely affect the integrity of any European Site (Natura 2000 site) whether directly, indirectly or cumulatively.

5 Plates



Plate 1 Lough Corran (November 2011).



Plate 2 Whooper Swan on Lough Corran at dawn (January 2012).



Plate 3 Drumfin River immediately upstream of existing N4 Bridge.



Plate 4 Lough Corran River immediately downstream of the existing N4.



Plate 5 The 'Swallow Hole' complex, November 2009.



Plate 6 Lough Arrow (November 2011).



Plate 7 Whooper Swans grazing beside Lough Arrow (February 2012).



Plate 8 Whooper Swans (*ad hoc* sighting) near Lough Arrow (February 2012).



Plate 9 Japanese knotweed *Fallopia japonica* at the boundary of Lough Arrow SPA at Ballinafad.

6 APPENDIX 12.1.1 NPWS Natura 2000 site synopses

SITE NAME: UNSHIN RIVER cSAC

SITE CODE: 001898

The Unshin River runs from Lough Arrow north to Ballysadare Bay, Co. Sligo. This site consists of a pristine unmanaged, undrained river and its marginal vegetation. Other rivers included within the site are the Owenboy/Owenbeg and a number of smaller tributaries. To protect the river, natural and semi-natural habitats adjacent to its course have been included; many of these are interesting in their own right. The site is a candidate SAC selected for alluvial wet woodlands, a priority habitat on Annex I of the E.U. Habitats Directive. The site is also selected as a candidate SAC for floating river vegetation, also listed on Annex I of the E.U. Habitats Directive. The site is also selected for the following species listed on Annex II of the same directive – Atlantic Salmon and Otter.

The Unshin River flows across a number of geological boundaries between sandstone, shale's and limestone. This results in unusual physio-chemical qualities which in turn are reflected in the rich and varied plant and animal populations. The river supports an excellent example of floating river vegetation, a habitat listed on Annex I of the E.U. Habitats Directive. The diversity of aquatic macrophytes is exceptional and to an extent the unusual combinations and richness of species can be accounted for by the good quality water being discharged from Lough Arrow upstream. The lake also imparts a stabilising influence on the flow regime and provides a source of lacustrine species (e.g. Long-stalked Pondweed, *Potamogeton praelongus*). Plant species present which indicate base-rich conditions include Lesser Waterparsnip (*Berula erecta*), Blunt-fruited Water-starwort (*Callitriche obtusangula*), Fanleaved Water Crowfoot (*Ranunculus circinatus*) and the internationally rare River Water-dropwort (*Oenanthe fluviatilis*), while Lesser Marshwort (*Apium inundatum*), normally associated with more acidic peat pools, also occurs. Fen and floating mire communities are represented by Bogbean (*Menyanthes trifoliata*), Cowbane (*Cicuta virosa*), Yellow Loosestrife (*Lysimachia vulgaris*) and Water Avens (*Geum rivale*). A rare and unusual alga *Nostoc parmelioides* is also present. Additional interest is gained by the inclusion of marginal woodlands and extensive wetland areas within the site. These latter contain the Red Data Book plant Swamp Meadow-grass (*Poa palustris*).

The Unshin and its tributaries form a very important system for Atlantic Salmon, a species that is listed on Annex II of the E.U. Habitats Directive. The Owenboy/Owenbeg River is the principle spawning and nursery tributary for the system's salmon fishery. The Unshin and its tributaries is the most important salmon producing river in Co. Sligo. The system also supports a good population of trout. Two notable bird species which occur along the river are Whooper Swan, which feeds in the wet grasslands that flank the river, and Kingfisher. Both are listed on Annex I of the E.U. Birds Directive.

The trophic status of the river increases downstream indicating that some enrichment is taking place, however, the quality of the Unshin River and particularly its aquatic macrophyte communities make it rare in both an Irish and European context.

SITE NAME: LOUGH ARROW cSAC

SITE CODE: 001673

Lough Arrow in Co. Sligo is a large limestone lake that conforms to a type listed on Annex I of the EU Habitats Directive. The lake is sheltered on three sides by hills and is the source of the Unshin River. Lough Arrow is unusual in being a mesotrophic natural lake which has changed little in the last 40 years. It is largely spring-fed and very sheltered for its size, and, as such, is hydrologically different from most lakes. The shores of the lake are for the most part stony; several bays occur in which Common Club-rush (*Scirpus lacustris*) and Common Reed (*Phragmites australis*) are found in abundance. In places the reedbeds extend out into the lake and Bogbean (*Menyanthes trifoliata*) and Yellow Iris (*Iris pseudacorus*) occur. The lakeshore vegetation, which includes sedges (*Carex* spp.), Water Mint (*Mentha aquatica*) and Water Horsetail (*Equisetum fluviatile*), grades into areas of mossy boulders and woodland. The lakes support a diverse submerged aquatic flora. An area of wet woodland in the north-west of the site is dominated by willows (*Salix* spp.) and some Alder (*Alnus glutinosa*). The ground flora is composed of Yellow Iris, Common Reed, rushes (*Juncus* spp.), Marsh-marigold (*Caltha palustris*), sedges and Common Marsh-bedstraw (*Galium palustre*).

Areas of dry woodland to the north and south of the lake are included in the site. The dominant species here are Ash (*Fraxinus excelsior*), Blackthorn (*Prunus spinosa*), Hawthorn (*Crataegus monogyna*) and Sycamore (*Acer pseudoplatanus*). The ground flora includes Herb-Robert (*Geranium robertianum*), Bramble (*Rubus fruticosus* agg.), Great Wood-rush (*Luzula sylvatica*), Cleavers (*Galium aparine*), Primrose (*Primula vulgaris*), and a variety of fern, moss and liverwort species.

The wooded islands and some areas along the shore are used by nesting Tufted Duck, while the reedbeds are also used by nesting wildfowl. In winter the lake is frequented by flocks of Tufted Duck (226), Coot (325), Little Grebe (35), Wigeon (87), Mallard (27), Pochard (36) and Goldeneye (49) - (data for 2 counts over 1 season, 1984/85 - 1986/87). Lough Arrow supports the highest density of breeding Great Crested Grebe, Merganser and Tufted Duck of any of the large lakes in western Ireland. The lake is notable for its Brown Trout and Eel populations, both of which are fished. Otter, a Red Data Book species which is legally protected under the 1976 Wildlife Act and is listed on Annex II of the EU Habitats Directive, has been recorded at the site. Lough Arrow and its environs incorporate a variety of habitats; including the Habitats Directive Annex I listed habitat, hard water lake, and supports important numbers of birds. The diversity of lakeshore vegetation and the presence of protected species, in particular Otter, adds to the conservation significance of the site.

SITE NAME: LOUGH ARROW SPA

SITE CODE: 004050

Lough Arrow is a large limestone lake sheltered on three sides by hills. It has a small catchment and is fed largely by springs on the lake bed. Average depth is 9 m, to a maximum of 33 m. The lake is classified as a mesotrophic system. There is a well developed submerged aquatic flora, with a notable charophyte community which includes the Red Data Book species *Chara curta*. The shores of the lake are for the most part stony, though several bays occur in which Common Club-rush (*Scirpus lacustris*) and Common Reed (*Phragmites australis*) are found in abundance. In places the reedbeds extend out into the lake and Bogbean (*Menyanthes trifoliata*) and Yellow Iris (*Iris pseudacorus*) occur.

Lough Arrow supports moderate numbers of wintering waterfowl. Diving ducks are well represented, with Tufted Duck (301), Pochard (111) and Goldeneye (132) occurring in numbers of regional importance (figures given refer to the 1997/98 season only). High numbers of other species have been recorded, including Little Grebe (194) and Coot (187), as well as small numbers of Whooper Swan (11) and Mallard (65). The site has been poorly monitored in recent years and regular monitoring may show that some of the species have populations of national importance.

Lough Arrow is an excellent site for breeding Great Crested Grebe, with the population being of national importance (23 pairs). The grebes breed within the swamp vegetation. A range of duck species breed on the lake, including the rare Common Scoter (12 individuals in 1999 - breeding proved), Tufted Duck (c. 50 pairs) and Red-breasted Merganser (26 pairs). Common Gull (84 individuals in 1993) and Lesser Black-backed Gull (110 individuals in 1993) breed on islands in the lake. Lough Arrow is an important game fishery, with good stocks of Brown Trout and Eels. There are no apparent significant threats to the bird populations and the entire site is a Wildfowl Sanctuary. Agricultural intensification within the catchment could have detrimental effects on water quality, which could affect some of the bird species. Feral Mink are a potential threat to nesting birds.

Lough Arrow SPA is at least of regional importance for wintering waterfowl but more regular monitoring of the bird populations is required. It is a prime site for nesting Great Crested Grebe. A range of nesting ducks is found on the lake in summer, including the very rare Common Scoter.