# N4-N15 Sligo Urban Improvement Scheme

Sligo County Council

## Appropriate Assessment Screening & Natura Impact Statement

32106101_NIS | Final

April 2017

An Roinn Iompair Turasóireachta agus Spóirt
Department of Transport, Tourism and Sport

Bonneagar Iompair Éireann
Transport Infrastructure Ireland

Land of Heart's Desire
Sligo County Council

# N4-N15 Sligo Urban Improvement Scheme

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## Contents

# 1. Introduction

Sligo County Council ("SCC") commissioned Jacobs Engineering Ireland Ltd. ("Jacobs") to prepare an Appropriate Assessment Screening Statement (AASS) and a Natura Impact Statement (NIS) for the proposed N4-N15 Sligo Urban Improvement Scheme ("the proposed development").

## 1.1 Legal Context

The requirements of the EC Habitats Directive 92/43/EEC ("the Habitats Directive") relating to the consent of the proposed development (i.e. development under Section 51 of the Roads Acts 1993 to 2015 as amended) are transposed in Ireland through the Planning and Development Act 2000 as amended and the Planning and Development Regulations 2001 as amended.

Under Section 177U (1) of the Planning Acts, a Screening for Appropriate Assessment (AA) of the proposed development "*shall be carried out by the competent authority* (in this case, An Bord Pleanála: (ABP)) "*to assess in view of best scientific knowledge, if that proposed development, individually or in combination with another plans or projects, will have a significant effect (s) on any European sites."*

Under Section 177U (5) of the Planning Acts, "The competent authority shall determine that an appropriate assessment of a draft Land use plan or a proposed development, as the case may be, is required if it cannot be excluded, on the basis of objective information, that the draft Land use plan or proposed development, individually or in combination with other plans or projects, will have a significant effect on a European site".

Under Section 177T (2) of the Planning Acts, the NIS "*shall include a report of a scientific examination of evidence and data, carried out by competent persons to identify and classify any implications for one or more than one European sites in view of the conservation objectives of the site or sites*."

## 1.2 Role of the Competent Authority

An AA is required following Screening for AA, if it could not be excluded on the basis of objective information, that the proposed development, individually or in combination with other plans or projects, would have a significant effect(s) on any European sites. In this case, ABP would be the competent authority and make the determination on the AA as per the Planning Acts, and as informed by an NIS. The alternative scenario, where following Screening for AA, significant effects on European sites *can* be excluded, is not relevant in the context of this NIS.

## 1.3 Overview of the Programme

If the consent being sought were to be granted, construction of the proposed development could commence in 2017, subject to the relevant consents, permissions and funding being in place.

# 2. Methodology

## 2.1 Introduction

The requirement to carry out an AA to assess effects to European sites from a project comes from Article 6(3) of the Habitats Directive. European sites (formerly 'Natura 2000 sites'[1]) comprise Special Areas of Conservation (SACs) designated for non-bird habitats and species, and Special Protection Areas (SPAs) designated for bird habitats and species.

Screening for AA is required to determine whether an AA is required to assess the potential for a project or plan to have adverse effects on the integrity of European sites. Article 6(3) of the Habitats Directive states:

"*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*."

## 2.2 Relevant Guidance

The methodology draws on, and has evolved from EC guidance (EC, 2001), Irish governmental guidance (Department of Environment, Heritage and Local Government, 2010), recommendations from international AA practitioners (Levett-Therivel, 2009; Chvojková *et al*., 2013), and unpublished recommendations of the National Parks and Wildlife Service (NPWS) at the *Advanced Appropriate Assessment Workshop* hosted by the Chartered Institute of Ecology and Environmental Management at Dublin Port Centre, 17th April 2015. However, some aspects of this guidance are no longer applicable given developments in legislation and case law since their publication. Further details can be found in Appendix A.

The Zone of Influence (ZoI) for the purpose of this NIS is the term used to define the spatial area over which effects are likely to be significant, due to the particular sensitivity and mobility of different features. The Zone of influence can vary for different Qualifying Interests (QI) of the European sites. Guidance on interpreting the ZoI for the proposed development has been drawn from Transport Infrastructure Ireland's (TII) (formerly the National Roads Authority (NRA)) *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (NRA, 2009a) , which define it *as an "'effect area' over which [biophysical] changes are likely to occur"*. The need to identify receptor-specific ZoIs in AA is supported by Irish Governmental guidance (DEHLG, 2010). Guidance on the specific distances adopted as ZoIs have been drawn from various published studies as per the sources in Appendix B.

The mobility of a particular QI will determine if they could move beyond European site boundaries into the ZoI. The ranging distance or "extent of spatial sensitivity" is considered alongside the ZoI to determine the potential for significant effects to occur. Guidance on determining ZoIs has been drawn from various published studies as per the sources as detailed in Appendix B of this NIS.

## 2.3 Screening for AA

Screening for AA essentially comprises answering two questions, in response to the wording of article 6(3) of the Habitats Directive.

**Q1: Is the project directly to or necessary for the management of the site?**

If the answer to this question is yes, then no further assessment is required. In the case of the proposed development, the answer is no, and the requirement for Screening is triggered.

[1] "European site" replaced the term "Natura 2000 site" under the EU (Environmental Impact Assessment and Habitats) Regulations 2011 S.I. No. 473 of 2011 and is applied in the context of Appropriate Assessment in this NIS.

**Q2: Are there likely significant effects to European sites?**

Screening determines whether AA is required by determining if it can be excluded, on the basis of objective information, that the project or plan, either alone or in combination with other projects / plans, will result in LSEs on any European sites. Under article 6(3) of the Habitats Directive, conservation objectives are only described in relation to AA. However the determination of whether effects to European sites could be considered LSEs is facilitated by analysing the attributes and targets in conservation objectives.

### 2.3.1 Steps in Screening

Screening for AA involves the following steps (adapted from EC, 2001):

1. Determine if the project is directly connected with or necessary to the management of the site (In the case of the proposed development it is not);

2. Describe the project (refer to Section 3);

3. Describe the baseline environment (refer to Section 4);

4. Identify, using scientific analysis, potential source-pathway-receptor linkages between the project and European sites, with reference to receptor and effect-specific ZoIs supported by best scientific knowledge (refer to Section 2.2 and Appendix B); and

5. Conclude if it can be excluded that linkages give rise to LSEs (refer to Section 5.3).

### 2.3.2 The Source-Pathway-Receptor Model

A standard 'source-pathway-receptor' conceptual model can be used to identify a preliminary list of European sites (i.e. those which *it may not* be possible to exclude LSEs). This conceptual model is a standard tool in environmental assessment. In order for an effect to occur, all three elements of this mechanism must be in place. The absence or removal of one of the elements of the mechanism means there is no likelihood for the effect to occur. An example of this model is provided below:

- Source (s) – e.g. Sheet piling during road construction;
- Pathway (s) – e.g. Vibration; and
- Receptor (s) – e.g. Underground otter *Lutra lutra* resting site at risk of collapse (where such otter populations could be part of designated QI populations of a SAC).

The model is focused solely on the QI's for which sites are designated as per the latest Conservation Objectives (CO) from the NPWS website referenced in this NIS where relevant.

### 2.3.3 The Interpretation of 'Likely'

Irish case law has established that "likelihood" or "probability" is the appropriate probability test regarding the interpretation of a LSE[2]. However, the 'precautionary principle' prevails (UNESCO, 2005; see Appendix A) where "reasonable scientific doubt" cannot be ruled out.

## 2.4 Appropriate Assessment Process

In accordance with article 6 (3) of the Habitats Directive, which is transposed by the Irish planning legislature:

*"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*

[2] Rossmore Properties Ltd. and Killross Properties Ltd. v ABP and Others [2014]; (Para 6, p. 8).

*that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public."*

LSEs from the project (i.e. the proposed development), including any in-combination effects, are assessed to determine whether they could adversely affect the "integrity" of any European site(s), with respect to its conservation objectives. The European Court of Justice (ECJ) established (Case C-258/11[3]) that duration of effects is a key consideration in interpreting effects to "integrity", and effects to site integrity must be "lasting". Where adverse effects to integrity are identified (or there is reasonable scientific doubt as to their absence), mitigation measures are proposed to reduce adverse effects below the threshold where they could affect site integrity. This is all documented within the NIS, which informs the AA determination of the competent authority.

European Commission (EC, 2001) and Irish departmental guidance (DEHLG 2010) divide the provisions of Article 6 into four 'stages' in the AA process.

- **Stage One: Screening** - Screening determines whether AA can be excluded, on the basis of objective information, that the project or plan, either alone or in combination with other projects / plans, will not result in significant effects.
- **Stage Two: Appropriate Assessment** - If 'screened-in' the effect of the project / plan on the integrity of the European site(s), with respect to the site structure and function and its conservation objectives either alone or in combination with other projects or plans is assessed. Where there are adverse effects identified, mitigation measures are proposed as appropriate to avoid or remove adverse effects. The AA process is documented within a Natura Impact Statement (NIS) to facilitate an informed assessment of the plan / project.
- **Stage Three: Assessment of Alternative Solutions** - The process of examining alternative ways to complete the plan / project and avoid adverse effects to the integrity of any European sites is likely to have been incorporated into Screening and AA. However, if adverse effects remain after mitigation, alternatives will be revisited at this stage.
- **Stage Four: Imperative Reasons of Over-Riding Public Interest (IROPI)** - In the unlikely event where an Assessment of Alternatives was required, and only if this failed to identify any alternatives which would not adversely affect European sites, Imperative Reasons of Over-Riding Public Interest (IROPI) could potentially be enacted, whereby compensatory measures are implemented to maintain the coherence of the European site network in the face of adverse effects to site integrity. If a plan / project is to be authorised on the basis of IROPI, an application a 'statement of case' is required to serve as the basis for an IROPI decision. Referral to the relevant Minister is also required, in advance of informing or obtaining the opinion of the European Commission. IROPI is highly unlikely to be required.

## 2.5 Consultation

A meeting was held on site with the National Parks and Wildlife Service (NPWS) and Sligo County Council (SCC) on the 16th November 2016. Both the District Conservation Officer for Sligo and the Divisional Ecologist for the region were in attendance. The length of the proposed development was walked and different aspects of the design and construction methods were discussed in relation to potential impacts on QI species and habitats associated with Cummeen Strand / Drumcliff Bay cSAC and Cummeen Strand SPA. Following on from the site visit a meeting was held in SCC offices to cover all ecological surveys that were undertaken of the scheme and discuss any other issues in relation to potential impacts on the cSAC / SPA. Some aspects discussed included embedded mitigation, best practice construction methods in relation to pollution control and key activities such as the potential for an ecological clerk of works (ECoW) to conduct site visits at construction stage.

[3] Judgment Of The European Court (Third Chamber) on 11 April 2013 in Case C-258/11 (REQUEST for a preliminary ruling under Article 267 TFEU from the Supreme Court (Ireland)) in relation to Peter Sweetman, Ireland, Attorney General, Minister for the Environment, Heritage and Local Government v An Bord Pleanála, para 46 (and others).

## 2.6 Desktop Survey Sources

Published references used in this report, including government publications, are included in Section 8. Website resources are named within the text, along with unpublished reports such as planning reports, and case references. Websites were accessed throughout 2015 and 2016. The baseline environment as it related to European sites was analysed using the key sources below:

- Mapping of European site boundaries from NPWS (available online at www.npws.ie);
- Mapping of QI habitats for Cummeen Strand / Drumcliff Bay SAC (627) and Cummeen Strand SPA (4035) in NPWS Conservation Objective mapping (NPWS; 2013c);
- Additional records for QI species obtained from the NPWS Research Branch in April 2015;
- Ordnance Survey Ireland mapping and aerial photography (available online from www.osi.ie) and Google Maps (available online at maps.google.ie);
- Land zonings and land-use plans available from the Department of the Environment, Community and Local Government (DECLG; available online at www.myplan.ie);
- National conservation status assessments of QI's from NPWS conservation status assessments for habitats and non-bird species (NPWS, 2013a and b) and the European Topic Centre (2015) for birds;
- Soil, geology, hydrogeology, water quality, and point pollution data (available online from www.gsi.ie and www.epa.ie), as well as mapping for monitoring stations of groundwater level and quality;
- AA Screening Statement for the 'N4 Traffic Improvement Scheme – Hughes Bridge Widening' produced by Scott Cawley Ltd. ecological consultants in 2012 for the area adjacent to the proposed development footprint;
- Report entitled '*Environmental Appraisal Report – Hughes Bridge Widening'* produced by Arup Ltd. consulting engineers in 2012 for the area adjacent to the proposed development footprint;
- Report informed by desktop surveys in addition to field surveys in 2003 and 2004 entitled '*N15 Re-alignment Sligo to Bunduff Bridge Constraints Study: Ecological Report'* , produced by Cotton in 2004 for the proposed development footprint and wider area;
- *'N4/N15 Sligo Urban Road Improvement – Environmental Impact Statement'* produced by Ryan Hanley consulting engineers in 2011 (unpublished) covering the proposed development footprint and wider area;
- Irish Wetland Bird Survey Data (IWeBS): annual peaks 2004-2014 for QIs within Cummeen Strand SPA; and
- Unpublished low tide count data for a single season (2010-2011) for relevant areas within as well as the wider Sligo harbour outside the ZoI.

## 2.7 Field Survey Methodology

### 2.7.1 Survey Dates and Types

A suite of additional terrestrial and aquatic surveys were undertaken between May 2015 and March 2016 by Jacobs (and Ecofact Ltd. working on behalf of Jacobs) to inform the screening for AA and the NIS. Relevant surveys are summarised in Table 2.1.

The survey areas shown in Table 2.1 were determined with reference to the Description of the Proposed Development (Section 3) which informed the potential ZoIs of different effects from the proposed development, given the varying spatial sensitivities / ranging distances of different species and habitats (Appendix B).

Table 2.1: Ecology surveys informing the Screening for AA / NIS (Surveys by Jacobs Engineering Ltd. unless otherwise noted)

| Surveys of Species / Habitats which could be QIs of European sites | Field Survey Area (m beyond boundary) | Survey Date(s) |
|---|---|---|
| Habitat survey of terrestrial and intertidal areas, to include invasive species therein, within the ZoI of LSEs. | 50m beyond boundary | 13th-14th May 2015 and 31st August -1st September 2015 |
| Habitat survey for ground-water-dependent habitats within the ZoI of LSEs. | 250m beyond boundary | |
| Habitat suitability assessment for QI narrow-mouthed whorl snail *Vertigo angustior* of the Cummeen strand / Drumcliff Bay SAC within the ZoI of LSEs. | 250m beyond boundary | |
| Habitat suitability assessment for marsh fritillary butterfly *Euphydryas aurinia* within the ZoI of LSEs. | 50m beyond boundary | |
| Breeding bird surveys within ZoI of the proposed development. | Up to 1 km (refer to species-specific distances in Appendix B) | 13th-14th May and 1st September 2015 |
| Wintering bird surveys to map and count localized high tide roosts and count low-tide feeding birds within the ZoI of LSEs. | 500m beyond boundary | 1st September, 20th October, 18th November 2015 and January 14th-15th 2016 |
| Otter surveys, focusing particularly on potential underground or above ground breeding or resting sites within the ZoI of LSEs. | 150m beyond boundary for resting sites; 300m for watercourse crossing points | 20th October, 18th November 2015 and January 14th-15th 2016 |
| *Aquatic ecology and lamprey habitat assessment* by Ecofact Ltd. in the Copper River and Garavogue estuary within the ZoI of LSEs, focusing on potential spawning or juvenile habitats ( and migratory corridors) for Atlantic salmon *Salmo salar* sea lamprey *Petromyzon marinus*, river lamprey *Lampetra fluviatilis*, and brook lamprey *Lampetra planeri* of the Lough Gill SAC and Cummeen Strand / Drumcliff Bay SAC, within the ZoI of LSEs. | Copper River from estuary to N16 road bridge 1.1 km upstream, and the Garavogue estuary on the fringe of the proposed development where temporary vehicle movements may be required during construction (note: this area extends beyond the zone of influence per se, with the objective of understanding the aquatic communities upstream, potentially capable of moving downstream through the site) | 25th March 2016 |
| Macroinvertebrate kick / sweep sampling (and incidental fish recording) in the Copper River within the ZoI of LSEs | Three locations on the Copper River: 10m downstream of the proposed development / Copper River Bridge; 10m upstream of the proposed development / Copper River Bridge; and approximately 400m upstream of the Copper River Bridge | 25th March 2016 |

The distribution and condition of any potential QIs of European sites were recorded. The Cummeen Strand / Drumcliff Bay SAC and Cummeen Strand SPA (which are adjacent to the proposed development) and Lough Gill SAC (which is a short distance upstream of the proposed development) were a particular, but not exclusive, focus of the field survey programme. Where NPWS CO mapping was available within the ZoI, NPWS mapping

was verified. An iterative process of assessment did not identify the need for further survey work for other sites considered in this report.

### 2.7.2 Field Survey Methodologies

Survey areas differed for different QI species and habitats, given the varying potential sensitivity to LSEs of different QI features, and the varying ranging distances / extents of spatial sensitivity of mobile species. As recommended by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2016), professionally accredited or published studies were used to determine ZoIs. The scientific references which supported the delineation of each survey area / ZoI are provided in Appendix B.

The habitat and species surveys were conducted on the 13th and 14th May, and 1st and 2nd September 2015 to identify all potential QIs of European sites of relevance to the Screening and NIS. Terrestrial surveys focused in particular on the coastal habitats along the Garavogue estuary, to verify NPWS CO mapping for the Cummeen Strand / Drumcliff Bay SAC (NPWS, 2013c) and assess the potential presence of additional localised examples of QI habitats not mapped by the NPWS (e.g. QI petrifying springs). As will be discussed in Section 3, instream works would be required only in the Copper River (during a proposed culvert replacement), and in a local area of the Garavogue estuary where temporary movement of machinery will be required. For this reason, the aquatic ecology surveys conducted by Ecofact Ltd. focused in particular on the Copper River, and the relevant areas of the Garavogue estuary.

Breeding bird surveys on the mornings of the 13th and 14th May 2015 employed the Common Birds census method (Gilbert *et al*., 1998) to map breeding bird behaviour and potential breeding territories within 100m (as a minimum) increasing to 150m for Kingfisher.' Windscreen' searches by car were additionally conducted to identify if there was any potential breeding or roosting habitat in the wider areas up to 1 km for highly sensitive potential QI bird species such as merlin *Falco columbarius* and white-tailed sea eagle *Haliaeetus albicilla*.

Winter bird surveys were carried out between September 2015 and January 2016. Survey dates, tide, and weather data is provided in Table 2.2. Surveys were carried out within the ZoI of likely significant disturbance effects, estimated to be up to 500m from the proposed development as per the published studies in Appendix B. Surveys focused in particular on the Cummeen Strand SPA to identify low tide feeding sites and high tide roosts within the SPA, in the context of the existing NPWS CO bird mapping for the SPA (NPWS, 2013d). Surveys were undertaken in accordance with the Wetland Bird Survey (WeBS) and Low Tide Count Survey methodologies in Gilbert *et al*., (1998).

Table 2.2: Wintering bird survey dates and times (winter 2015 / 2016) Garavogue estuary within the ZOI

| Date | Tide | Tide Height | Tide Time | Survey Time | Weather |
|---|---|---|---|---|---|
| 01/09/2015 | Low | 0.10m | 14h07 | 13h30-14h30 | Overcast, mild breezy with light showers |
| 02/09/2015 | High | 4.30m | 09h07 | 08h30-09h30 | Overcast, calm, mild |
| 20/10/2015 | High | 3.3m | 11h33 | 11h00-12h00 | Slight breeze, cloudy, some sunny spells visibility 500 m-2 km |
| 20/10/2015 | Low | 1.3m | 17h16 | 16h30-17h00 | Cloudy, moderate breeze, light showers, visibility good – 500 m |
| 18/11/2015 | High | 3.5m | 10h09 | 11h00-12hr00 | Windy force 4-5 occasional gusts. Rain part of survey visibility good – 500 m |

| Date | Tide | Tide Height | Tide Time | Survey Time | Weather |
|---|---|---|---|---|---|
| 18/11/2015 | Low | 1.10m | 16h01 | 15h15-16h15 | Windy force 3 sunny, dry (raining prior to survey). |
| 14/01/2016 | Low | 0.5m | 14h35 | 12h00-13h00 | Cold, calm, light rain |
| 15/01/2016 | High | 4.10m | 09h31 | 08h30-09h30 | Cold, calm, dry |

Otter surveys for underground or above-ground breeding or resting sites were conducted within 150m of the proposed development. This is the distance within which intrusive groundworks may be reasonably assumed to potentially affect such sites following the rationale to licencing of disturbing works by the NRA (2006). Information on the characteristics of otter holts in the Irish context was obtained from O'Sullivan (1993) and Sleeman and Moore (2005). Habitat suitability surveys for marsh fritillary comprised searching for the larval food plant devil's-bit-scabious *Succisa pratensis* within the footprint of the proposed development and, if present, categorizing habitat based on suitability from optimal ("Good Condition") through intermediate categories to "Unsuitable" (Fowles, 2003).

Habitat suitability surveys for narrow-mouthed whorl snail *Vertigo angustior,* which is a QI of the Cummeen Strand / Drumcliff Bay SAC, were conducted during surveys for ground water dependent habitats. Surveys searched for suitable habitats as per the NPWS Irish Wildlife Manual (Moorkens & Killeen, 2011); namely dune grassland, fen, marsh, salt marsh and flood plain habitats, and transitional ranker habitats between these habitats and terrestrial zones.

No surveys were required for white-clawed crayfish *Austropotamobius pallipes* because there was no freshwater habitat within the area over which LSEs could occur (i.e. there was no freshwater habitat within the footprint of the proposed development).

NPWS CO mapping for the Cummeen Strand / Drumcliff Bay SPA indicated there were no QI common seal *Phoca vitulina* haul-out sites located within the potential ZoI of LSEs from the proposed development (estimated to be 500m; Appendix B).Potential marine mammal haul-out sites were also assessed during the wintering bird, and spring / summer habitat surveys.

The following text from Ecofact Ltd.'s *Aquatic ecology and lamprey habitat assessment* report describes the field survey methodology:

- *"A walkover habitat assessment was undertaken on the 25th March 2016 to establish the character of the Copper River at the proposed development site and environs, and the portion of the Garavogue estuary (near Salmon Point) over which machinery may track, during construction of the retaining wall for the proposed development.*
- *A river habitat assessment was carried out using methodology given in the Environment Agency's 'River Habitat Survey in Britain and Ireland Field Survey Guidance Manual 2003' (Environment Agency, 2003).*
- *Habitat suitability for salmonids was assessed with reference to the leaflet 'The Evaluation of habitat for Salmon and Trout' (DANI Advisory leaflet No. 1) and 'Ecology of the Atlantic Salmon' (Hendry & Cragg-Hine, 2003).*
- *An opinion of lamprey habitats was formed for the lower reaches of the Copper River and at Salmon Point with reference to Ecology of the River, Brook and Sea Lamprey by Maitland (2003).*
- *Qualitative sampling of benthic (or bottom dwelling) macroinvertebrates was undertaken at three locations on the Copper River: 10m downstream of the N4 Bridge, 10m upstream of the N4 Bridge and approximately 400m upstream of the N4 Bridge. Macroinvertebrates were sampled at these sites using kick / sweep sampling (Toner et al., 2005).*
- *Any fish captured during sampling were noted and identified with reference to the 'Key to British Freshwater Fish with notes on their ecology and distribution' by Maitland (2004)."*

# 3. Description of Proposed Development

The boundary of the proposed development is centred on the existing N4-N15 carriageway, approximately 1 km northwest of Sligo city centre (Figure 1). The proposed development comprises a c. 670 m improvement section that passes adjacent to the Garavogue Estuary and the Garavogue River, and over the Copper River. The proposed development footprint encompasses:

- The shoreline along Garavogue estuary;
- A large abandoned rank grassland field not subject to any current land management;
- Existing roadside grass verges; small areas of existing ornamental plantings in roadside gardens and existing rock armour embankments along the Copper River and the Garavogue River / estuary; and
- The site compound located on existing hardstanding on nearby industrial yard on Ballast Quay.

The development consists of the upgrade of a 670 m section of the existing N4-N15 to three lanes, in both directions, along the N4-N15 between Hughes Bridge and a point just north of the R291 Rosses Point Road junction and associated upgrade works to the junctions with the R870 Markievicz Road, N16 Duck St and R291 to accommodate changes in alignment. The N4-N15 vertical alignment will be raised between N16 Duck St and R291 Rosses Point Road junctions to increase the outfall level of drainage and will include the demolition of most of the existing Copper River Bridge and the construction of a replacement structure.

Existing footpaths will be upgraded to provide cycling and pedestrian facilities. Boundary treatment will replace existing boundary walls affected by the works to construct the proposed development.

Whilst the boundary of the proposed development overlaps the Cummeen Strand / Drumcliff SAC and Cummeen Strand SPA (i.e. the 'red-line' in Figure 1), there is no overlap of the permanent footprint of the proposed road and ancillary infrastructure with designated QI habitats (Figure 2). However, machinery will require temporary access across the intertidal habitats in the foreshore, outside the proposed development boundary, within QI habitats of these European sites during the construction of proposed retaining walls.

There are no freshwater watercourses within the proposed development footprint, or within more than one hundred metres of it (note that the section of Copper River within the development footprint is tidal). Excluding the partial demolition of the Copper River Bridge and part of an existing shoreside footpath structure, there will be no demolition of any structures. There will be no abstraction from groundwater. Although some light fittings will be replaced, there will be no increase in lighting relative to the existing.

### 3.1.1 Mitigation by Design

The potential effects from the proposed development have been assessed with the following mitigation by design in place ("embedded mitigation"). As this mitigation is inherent in the design, there is no uncertainty regarding its implementation.

**Avoidance of European sites within proposed development footprint**

The proposed development was designed to avoid habitat loss of QI habitats in the adjacent Cummeen Strand / Drumcliff Bay SAC and Cummeen Strand SPA. Temporary movement of machinery will be required across QI habitat of the SAC, and QI wetland habitat of the SPA during the construction of proposed retaining walls, however there will be no lasting damage or removal of any QI habitat within any European sites.

**Pollution Control**

The mitigation inherent in the operational surface water treatment system is outlined below. Furthermore a preliminary Erosion and Sedimentation Control Plan (pESCP) has been has been developed and is included in Appendix C of this NIS. This details specific pollution prevention measures to be employed during construction and will be binding on the appointed contractor and actively monitored by SCC and the appointed ECoW. No additional measures are required to mitigate the significance of potential pollution effects. The following measures were incorporated into the design:

- In accordance with the Highways Agency Water Risk Assessment Tool (HAWRAT), water quality in operational carriage-way run-off is predicted to ‘pass’, for both soluble (heavy metals) and sediment-bound pollutants without attenuation and treatment;
- Petrol interceptors will be provided at all outfall locations between the carriageway drainage outfall and watercourse;
- Although an Accidental Spillage Risk Assessment concluded there is a low risk of an accidental spillage incident (0.5%); a penstock, handstop, or an orifice that can be manually closed in the event of accidental spillage will be provided in the attenuation/treatment pond. The penstock can, if lowered in time potentially retain 100% of spilled material; and
- All drainage outfalls will be flapped to prevent tidal ingress.

# 4. Baseline Environment (Screening Step 2)

## 4.1 Area for Baseline

The relevant baseline to the assessment is primarily the ZoI. This is the area within which effects from the proposed development (described in Section 3) could be significant, in the context of Conservation Objectives of European sites. This area was equivalent to the field survey areas identified in Table 2.1. For clarity and completeness, baseline information was provided on European sites or their QIs beyond the area within which LSEs could arise (e.g. for slightly more distant European sites).

## 4.2 Surface Water

The area of Garavogue estuary in the vicinity of the proposed development is co-designated as the Cummeen Strand / Drumcliff Bay SAC and Cummeen Strand SPA (Figure 1). Both the Copper and Garavogue Rivers are tidal at this location. The Copper River rises on the shore of the Lough Gill SAC (Site Code 1976) upstream of the proposed development, and flows downstream, under the proposed development to discharge into the Cummeen Strand SAC / SPA within the Garavogue estuary.

Pollution during operation has been scoped out of this assessment due to the absence of likely significant effects resulting from the 'embedded mitigation' inherent in the design (see section 3.1.1). However construction-phase run-off of silt, stored fuels or other toxic materials cannot be mitigated through 'embedded mitigation'. A description of the existing condition and potential resilience of aquatic habitats in receiving waters is relevant to the prediction of effects from pollution during construction.

The proposed development is located adjacent to Garavogue Estuary. The high tide water mark is largely coincident with the boundary of the Cummeen Strand / Drumcliff Bay SAC and the Cummeen Strand SPA. The estuary adjoins the proposed development and is fed by the Garavogue River which adjoins the site boundary to the south and the Copper River which flows under the proposed development in the northern part of the site (Figure 1). In their *Aquatic Ecological and Lamprey Assessment* report Ecofact Ltd. reported the following, regarding the existing condition and water quality status of the Copper River, and adjacent intertidal areas of the Garavogue estuary at Salmon Point:

- *"From the visual survey, the Copper River [within the environs of the proposed development] was found to be a small highly modified stream that flows through an urban area. The part of the river within the boundary of the proposed development (the Copper River Bridge) and the stretch to approximately 200 m upstream of here was considered to be affected by tidal fluctuations, as indicated by the presence of Enteromorpha and luxuriant instream filamentous algae.*
- *There was little / no physical instream diversity or habitat heterogeneity along this stretch of the Copper River and the riparian areas do not provide shading. From approximately 0.5 km to 1 km upstream of the N4 Bridge, the Copper River is a sluggish watercourse of varying width and indiscernible depth, appearing to have been realigned in the past, probably to facilitate development within Sligo IT campus.*
- *Overall macroinvertebrate diversity was low at the two [intertidal] sites examined downstream and upstream of the N4 [Copper River] Bridge. The macroinvertebrate community in this part of the river was dominated by pollution tolerant brackish species. The macroinvertebrate assemblage in this reach of the river included the ubiquitous amphipods Corophium volutator and Gammarus sp. The lower reaches of the Copper River are not suitable with regard to assigning a Q-rating using the EPA biological water quality rating system as it is not a truly aquatic stretch of river.*
- *[Another site was surveyed] in a riffled part of the Copper River upstream of the tidal influence. Macroinvertebrates recorded here were dominated by pollution tolerant (Group C) Gammarus sp., and Baetis rhodani. Very tolerant (Group D) indicators were well represented and included the leech Glossiphonia complanata and the Bladder Snail Physa fontinalis. There was a paucity of less sensitive (Group B) macroinvertebrates recorded, and limited to cased caddisfly larvae of Limnephilidae. Group A (pollution sensitive) indicators were not recorded. Using the EPA freshwater biological water quality rating system (Toner et al., 2003), biological water quality at this site was rated 'Q3, Moderately Polluted' corresponding to Water Framework Directive 'Poor' status.*

- *The intertidal habitat in Sligo at Salmon Point was mainly a mixed muddy substrate".*

Photograph 4.1 : Copper River Bridge, upstream side

Photograph 4.2 : Copper River; upstream of existing Copper River Bridge

The next nearest watercourse to the proposed development is the Carton Stream 0.4 km to the north. There were no watercourses connecting the proposed development to the Shannon Eighter River or any other watercourses. At the time of writing:

- The water quality of the Garavogue estuary upstream and downstream of the outfall for the proposed development was "unpolluted" according to the EPA's online database;
- The Water Framework Directive status of the Garavogue Estuary was "Good";
- According to the EPA, the Garavogue River had a Q value of 4 ("Good" quality) in the lowest freshwater reach 0.5 m upstream of the site (data from 2009); and
- According to the Natura Standard Data forms for Cummeen Strand SAC (NPWS, 2014), which is also designated for QI wetland birds in the Cummeen Strand SPA, the conservation status of both estuary and mudflat habitats was "Good".

Lough Gill SAC is designated for aquatic species and habitats located 3.3 km east, and upstream of the proposed development. The Copper River rises on the shore of Lough Gill, but there is no direct hydrological link between the proposed development and the site (i.e. the SAC is upstream of the proposed development).

## 4.3 Ground Water and Geology

According to the Geological Survey of Ireland (GSI), the bedrock underlying the proposed development is of limestone and calcareous shale; and the underlying aquifer is locally important, the vulnerability of which ranges from “High” close to the Garavogue River to “Moderate” on the margins of the proposed development.

All groundwater bodies in the vicinity of the proposed development are of good quality according to the EPA’s Water Framework Directive 2007-2012 monitoring programme. Although of good quality, the groundwater in the vicinity of the proposed development was possibly at risk of not achieving good status according to the EPA.

## 4.4 Distribution of Potential QIs within the ZoI of the Proposed Development

### 4.4.1 Habitats

Within the terrestrial areas surveyed, and specifically in relation to the Cummeen Strand / Drumcliff Bay SAC adjoining the proposed development, the surveys recently carried out indicated that:

- There were no QI terrestrial habitats (e.g. dunes or Juniper formations); and
- There were no QI ground-water dependent habitats (e.g. petrifying springs).

In the relevant CO mapping (NPWS, 2013c), the above QI habitats of the Cummeen Strand / Drumcliff Bay SAC are not recorded within at least several kilometres of the proposed development.

Within the particular intertidal areas of the Garavogue estuary, partially within the footprint of temporary machinery access requirements during construction, the fisheries and habitat surveys informing this assessment recorded that:

- NPWS CO mapping for Cummeen Strand / Drumcliff Bay cSAC indicates QI mudflat and sandflat habitat adjoins the proposed development to the west and overlaps with QI estuary habitat over the same area. This has been mapped by the NPWS as estuarine mixed sediment to sandy mud with *Hediste diversicolor* and oligochaetes community complex (NPWS, 2013c).
- However, habitat and fisheries surveys in the vicinity of the proposed development indicate that the habitat immediately adjacent to the proposed development (where movement of machinery is likely to be required) comprised coarse gravel, small cobbles, bed rock and scattered stable bounders (see Photograph 4.3, Photograph 4.4, and Figure 2); with frequent channel wrack *Pelvetia canaliculata* and bladder wrack *Fucus vesiculosus* seaweeds, amongst sparse thin mixed sediments.
- Fine muddy sediments are present further out in the estuary and to the southwest of the proposed development. This part of the estuary is therefore unlikely to support significant benthic communities associated with QI mudflat habitat.
- Furthermore, keystone marine communities present within the cSAC including Zostera-dominated and Mytilidae-dominated communities are not present within the ZoI of the proposed development, as indicated by habitat surveys and the NPWS CO mapping (NPWS, 2013c). Surveys therefore indicate this habitat, which has been previously mapped as QI mudflat and sandflat habitat, is not in fact QI mudflat and sandflat habitat; the area does nevertheless qualify as QI estuary habitat.
- A narrow zone along the tide line, partially within the proposed development footprint comprised a mosaic of ‘lower saltmarsh’ and ‘upper salt marsh’ with some fit to Annex 1 habitat saltmarsh types. However none of these saltmarsh habitats were QI habitats of the Cummeen Strand / Drumcliff Bay SAC, and they are therefore not mapped in Figure 2 to avoid confusion. Furthermore, this habitat will not be impacted by the proposed development.

Despite the above survey findings indicating the area immediately adjacent to the scheme may not comprise QI mudflats and sandflats it does comprise QI estuary habitat. The CO objectives for QI estuary and QI mudflats and sandflats are the same (NPWS, 2013c). To maintain the favourable conservation condition of these QI habitats, which is defined by a list of targets and attributes:

- Target 1: *The permanent habitat area is stable or increasing, subject to natural processes.*

- Target 2: *Maintain the extent of the Zostera-dominated community and Mytilidaedominated community complex, subject to natural processes.*
- Target 3: *Conserve the high quality of the Zostera-dominated community, subject to natural processes.*
- Target 4: *Conserve the high quality of the Mytilidae-dominated community complex, subject to natural processes.*
- Target 5: *Conserve the following community types in a natural condition: Intertidal fine sand with Peringia ulvae and Pygospio elegans community complex; Estuarine mixed sediment to sandy mud with Hediste diversicolor and oligochaetes community complex; Fine sand with crustaceans and Scolelepis (Scolelepis) squamata community complex; Fine sand with Angulus spp. and Nephtys spp. community complex.*

Photograph 4.3: Mixed Sediment / Rocky Shore within Cummeen Strand SAC

Photograph 4.4: Mixed Sediment / Rocky Shore within Cummeen Strand SAC (close up of substrate)

The nearest known terrestrial QI habitat of any European site was the priority QI alluvial woodland habitats on the shores of Lough Gill SAC located at least 1.5 km to the east, and upstream of the proposed development.

### 4.4.2 Invasive species

The invasive species Japanese knotweed *Fallopia japonica* and hybrid bluebell *Hyacinthoides x massartiana* were both recorded within the footprint of the proposed development (Figure 2).

A small number of hybrid bluebell plants were recorded from the north-western corner of the proposed development footprint. The plants were near amenity grassland beside a stone wall on the Garavogue shoreline. A number of stands of Japanese knotweed were recorded within the proposed development footprint. Several stands were found along the hedged boundary of the existing N4-N15 road with the rank grassland field to the east. Another stand was found near the hybrid bluebell plants on the shoreline to the west. Other stands were recorded in the wider area c. 50 m from the proposed development, and outside the predicted ZoI. No other invasive species were recorded. Neither of these species could affect the estuarine QI habitats adjacent to the proposed development, as they would not become established within the tidal zone.

No construction will take place within any area affected by Japanese knotweed until it has been successfully treated or removed. Treatment of Japanese knotweed by stem injection by SCC has commenced in October 2016. This multi-annual treatment is being managed by SCC and undertaken as part of TII's wider invasive species treatment programme across the national road network. It is estimated that successful treatment will take up to four years. In the event that construction is required to commence earlier than four years within the infested area, or in the event that any invasive species material remains after treatment, the material will be removed under an advance works contract (which shall be subject to a separate invasive species management plan). In any event, specialist with relevant expertise in the area of invasive species will verify the removal of all knotweed-related material prior to any construction commencing.

### 4.4.3 Birds

During the breeding season surveys, a total of 18 potentially breeding species, and non-breeding waterfowl species were recorded. None of these were QI populations, and there was no suitable habitat for any QI

breeding bird populations. A total of 18 species were recorded during the wintering bird survey. Only two of these species were from QI populations of the Cummeen Strand SPA (see Table 4.1).

Table 4.1: QI Bird Populations of the Cummeen Strand SPA recorded within 500 m of proposed development

| Common Name | Latin Name | Peak Count (2015/2016) | % Cummeen Strand SPA Population[1] | Habitat Usage | |
|---|---|---|---|---|---|
| | | | | Feeding | Roosting |
| Oystercatcher | *Haemotopus ostralegus* | 4 | <1% | ✓ | ✓(1) |
| Redshank | *Tringa totanus* | 3 | <1% | ✓ | ✓(2) |

Both QI species of the Cummeen Strand SPA were recorded in very small numbers relative to numbers recorded by Birdwatch Ireland in IWeBS data from 2009 to 2014 in the any of the four adjacent subsites. Table 4.2 compares the population sizes of the two Cummeen Strand SPA QI species from the survey area / ZoI, with those in adjacent areas of the bay (i.e. adjacent IWeBS subsites). A direct comparison with the single season of data from the NPWS low tide data cannot be made, as the NPWS count area included areas both within and outside the survey area / ZoI.

Table 4.2: Cummeen Strand SPA QI populations recorded in survey area relative to other parts of SPA

| Common name | Survey Are/ZoI (Peak 2015/2016) | Cummeen Strand and East Gibraltar (mean 2009-2014) | Cartron Marsh (mean 2009-2014) | Sligo Docks (mean 2009-2014) | Port-Finisklin (peak 2008/2009) |
|---|---|---|---|---|---|
| Oystercatcher | 4 | 423 | 18 | 15 | 76 |
| Redshank | 3 | 169 | 70 | 32 | 127 |

The low numbers of QI populations within the survey area / ZoI reflects the mixed sediment / rock substrate in the vicinity of the proposed development (Photograph 4.3 and Photograph 4.4) compared to the extensive mudflat further out in the estuary and in the adjacent bay. The existing disturbance from dog walkers around an existing path skirting the estuary near the proposed development also reduces its potential value to wintering birds.

### 4.4.4 Marsh Fritillary

Although there are records for the species within the 10 km grid squares in which the proposed development is located, site surveys found there to be no potential habitat for the species within the footprint or within at least 200 m of it. The larval food plant devil's bit scabious was absent from the survey area / ZoI. There is no potential for mobile QI populations of marsh fritillary from any European sites to be present in the environs of the proposed development.

### 4.4.5 Narrow-Mouthed Whorl Snail

There was no suitable habitat for whorl snails within the proposed development footprint based on the known requirements in Moorkens and Killeen (2011). There could be some limited suboptimal habitat for QI narrow-mouthed whorl snails within / adjacent the Cummeen Strand / Drumcliff Bay SAC in the transitional grassland habitat at Salmon Point, which grades from saltmarsh into dry scrub. However, there are no historical records for the species here, and none were recorded by Moorkens in *Vertigo* surveys conducted in March 2009 to inform a previous road development at this location (as part of the unpublished EIS, produced by Ryan Hanley Consulting Engineers and referenced in Section 2.6). A previously unknown population of this species was recorded during the 2009 survey, but this was several kilometres to the north and would not be affected by the proposed development. Furthermore, there are no works proposed on Salmon Point.

### 4.4.6 Otter

Field surveys recorded otter footprints within 50 m of the proposed development along the Garavogue estuary shoreline. However, importantly, 150 m is the approximate distance from intrusive works, within which collapse of breeding or resting sites could result, and no otter holts were recorded within 150 m of the proposed development. A historical record of an otter holt from a previous assessment by Scott Cawley in 2012, was located 500 m to the north. Resurvey of this area in 2015 and 2016 found the area had been partially cleared, and the holt could not be found. The local ranger of the NPWS had no records indicating otter road kills in the area, when contacted in 2015.

### 4.4.7 Fish

Ecofact Ltd.'s *Aquatic Ecological and Lamprey Assessment* report concluded that:

- *"The stretch of the Copper River affected by the proposed development is not considered an important area for juvenile lampreys or salmonids as the ecological requirements of these fauna are not present in this part of the river.*
- *Juvenile lampreys require a substrate composed of silt, or silt and sand. The substrate in the environs of the Copper River Bridge comprises rock and compacted clay so is not suitable for juvenile lampreys, and none were found during sweep sampling.*
- *Salmonids were not recorded in the Copper River in the environs of the Copper River Bridge. Salmon fry and parr occupy shallow, fast-flowing water with a moderately coarse substrate with cover (Symons & Heland 1978). Deep or slow-moving water, particularly when associated with a sand or silt substrate, does not support resident juvenile salmonids. The fact that the Copper River is affected by the tide precludes the presence of juvenile Salmon in the lower reaches of the river as the channel is flooded during times of high tide.*
- *Moreover, Atlantic salmon require very good water quality, and water quality in the lower reaches of the Copper River is considered unsuitable / suboptimal for juvenile Salmon, given its apparent unsatisfactory condition.*
- *The Copper River is not important with regard to the migration of any species".*

### 4.4.8 Marine Mammals

The NPWS' CO mapping for the Cummeen Strand / Drumcliff Bay SAC (NPWS, 2013c) indicates there are no known terrestrial haul-out sites for QI common seal within 5 km of the proposed development. This is supported by site observations.

# 5. AA Screening Assessment

## 5.1 Use of Distance in Screening of Sites

The proximity of European sites (and more importantly their QIs) to the proposed development is of primary importance in identifying source-pathway-receptor links which could result in LSEs. Irish departmental guidance on AA states [***emphasis added***]:

"*A distance of 15 km is currently recommended in the case of plans, and derives from UK guidance. For projects,* ***the distance could be much less than 15 km, and in some cases less than 100 m, but this must be evaluated on a case-by-case basis with reference to the nature, size and location of the project****, and the* ***sensitivities of the ecological receptors****, and the potential for in combination effects"* (DEHLG, 2010; p.32, para 1).

Using a precautionary approach, the following scientifically-supported distance criteria were used to identify a preliminary list of all European sites that could be affected by the proposed development:

- Any SACs within 10 km of the proposed development were listed because highly mobile QI species can move up to 10 km from SACs according to best scientific knowledge (specifically QI otter territories and marsh fritillary dispersal may extend this far according to best scientific knowledge (O'Neill, 2008, cited in Reid *et al*., 2013; Zimmerman *et al*., 2011); and
- Any SPAs within 20 km of the proposed development were listed because some highly mobile QI bird populations specifically certain goose species) can range up to 20 km from SPAs, according to best scientific knowledge (SNH, 2013).

## 5.2 Source-Pathway Receptor Links

### 5.2.1 Links with Potential for LSEs

As will be confirmed in the screening exercise that follows in Section 5, potential source-pathway receptor link could result in LSEs on European sites (during construction only):

- Overland run-off or controlled discharge of contaminated surface water to the Copper River, Garavogue River and / or Garavogue estuary during construction, potentially affecting estuarine species and habitats; and
- Disturbance to or displacement of QI winter bird species.

### 5.2.2 Links with no Potential for LSEs

As will be confirmed in the screening exercise that follows in Section 5, the following potential source-pathway receptor links were not considered further as they could not result in LSEs on European sites:

- The invasive species recorded in the study area could not affect the estuarine QI habitats adjacent to the proposed development, as they would not become established within the tidal zone. On this basis, this NIS does not further assess, or mitigate, effects to European sites from the spread of invasive species. In addition there are existing regulatory regimes whose binding implementation will mitigate the potential risks of the spread of invasive species outside the study area.
- Water pollution effects during operation of the proposed development – excluded due to the attenuation and treatment system inherent in the design.
- The proposed development (excluding impacts from contaminated surface water) does not undermine any of the targets (see section 4.4.1) for maintaining favourable conservation status of QI habitats within the cSAC. For example there are no keystone communities within the ZoI of the proposed development and there will be no loss of QI habitat. Temporary movement of machinery across the cSAC will be required, however, there is no potential for LSE arising from this.

- Instream works in the Copper River culvert affecting QI lamprey or Atlantic salmon populations – Ecofact Ltd.'s *Aquatic Ecological and Lamprey Assessment* recorded no juvenile lamprey or salmonids in sweep sampling; concluded the Copper River is not an important area for juvenile lampreys or salmonids; and concluded that the Garavogue estuary by Salmon Point is not suitable for juvenile lamprey due to its transitional nature;
- Temporary over-pumping of the Copper River during bridge construction works affecting migratory QI fish – excluded because the above aquatic ecology report concluded that the Copper River is not used by lamprey or Atlantic salmon for migration, feeding, or spawning; and
- There will be no significant air pollution impacts arising from operation of the proposed development. The Annual Average Daily Traffic is predicted to increase by 10% from 25,679 in 2015 to 28,278 by 2032 with the proposed development in place. The impact of the proposed scheme is predicted to lead to an increase in NOx concentrations within the Cummeen Strand pNHA / SAC / SPA, and Lough Gill SAC / pNHA of a maximum of 1.01µg/$m^3$. This is below the 2 µg/$m^3$ change triggering an ecological assessment in accordance with the *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (NRA, 2009). On this basis, no significant air quality impacts are predicted.

## 5.3 Screening Tables

### 5.3.1 Screening of LSEs on (SACs)

The SACs on which LSEs could not be excluded as a result of the proposed development are presented in Table 5.1. The assessment of LSEs in Table 5.1 has taken account of the in-combination assessment in Section 5.4 and the relevant source-pathway-receptor identified in Section 5.2.

Table 5.1: Identification of SACs for which LSE could not be excluded, using preliminary list of all sites within 10 km.

| Site and Code | Distance from Proposed Development | Qualifying Interests | Potential Source-~Pathway-Receptor Link? | Potential for adverse effects |
|---|---|---|---|---|
| Cummeen Strand / Drumcliff Bay SAC (627) | 0 m | Estuaries | Yes – Pollutants generated during construction could enter watercourses via overland run-off, or controlled discharge of contaminated surface water. Pollutants could enter the Copper River, Garavogue River and/or Garavogue estuary during construction, potentially affecting estuarine water quality and/or benthic communities, present. The NPWS have ranked pollution as a threat of high importance to this habitat (NPWS, 2013a). In combination with existing or proposed plans or projects (Section 5.4), the construction of the proposed development could result in LSEs on QI *estuary* habitat. | Yes |
| | | Mudflats and sandflats | No – This habitat was not found within the SAC in the immediate vicinity of the proposed development. No LSEs in combination with existing or proposed plans or projects (Section 5.4). | No |
| | | River lamprey | Yes – Pollutants generated during construction could enter overland run-off, or controlled discharge of contaminated surface water. Pollutants could enter the Garavogue River and / or Garavogue estuary during construction, potentially affecting water quality and lamprey populations present. The NPWS have ranked pollution as a threat of medium importance to this species (NPWS, 2013b). In combination with existing or proposed plans or projects (Section 5.4), the construction of the proposed development could result in LSEs on QI estuary habitats. | Yes |
| | | Sea lamprey | Yes – Pollutants generated during construction could enter overland run-off, or controlled discharge of contaminated surface water. Pollutants could enter the Garavogue River and/or Garavogue estuary during construction, potentially affecting water quality and lamprey populations present. The NPWS have ranked pollution as a threat of medium importance to this species (NPWS, 2013b). In combination with existing or proposed plans or projects (Section 5.4), the construction of the proposed development could result in LSEs on QI estuary habitats. | Yes |
| | | Embryonic shifting dunes | No – This habitat does not occur within the vicinity of the proposed development. As a terrestrial habitat, there is no potential for pollution effects by hydrological pathways. No LSEs in combination with existing or proposed plans or projects (Section 5.4). | No |

| Site and Code | Distance from Proposed Development | Qualifying Interests | Potential Source-~Pathway-Receptor Link? | Potential for adverse effects |
|---|---|---|---|---|
| | | Fixed dunes | No – This habitat does not occur within the vicinity of the proposed development. As a terrestrial habitat, there is no potential for pollution effects by hydrological pathways. No LSEs in combination with existing or proposed plans or projects (Section 5.4). | No |
| | | *Juniperus communis* communities | No – No source-pathway-receptor linkages identified. This habitat does not occur within the vicinity of the proposed development. As a terrestrial habitat, there is no potential for pollution effects by hydrological pathways. No LSEs in combination with existing or proposed plans or projects (Section 5.4). | No |
| | | Petrifying springs | No – No source-pathway-receptor linkages identified. This habitat does not occur within the vicinity of the proposed development, or within 250 m of it (i.e. the distance within which intrusive works could result in effects to groundwater dependent habitats, according to guidance from the Scottish Environmental Protection Agency (SEPA, 2014). No LSEs in combination with existing or proposed plans or projects (Section 5.4). | No |
| | | Shifting dunes with *Ammophila arenaria* | No – No source-pathway-receptor linkages identified. This habitat does not occur within the vicinity of the proposed development. As a terrestrial habitat, there is no potential for pollution effects by hydrological pathways. No LSEs in combination with existing or proposed plans or projects (Section 5.4). | No |
| | | Common Seal | No – Although the species does feed in the Garavogue estuary within the vicinity of the proposed development, there are no haul-out areas within at least 500 m of the proposed development. There is no potential for LSEs arising by pollution pathways because pollution is not a threat of medium or high importance to the species (NPWS, 2013a), and because the existing water quality in the Garavogue estuary is “unpolluted”. No LSEs in combination with existing or proposed plans or projects (Section 5.4). | No |
| | | Narrow-mouthed whorl snail | No – No source-pathway-receptor linkages identified. This species does not occur within the vicinity of the proposed development. The nearest known population is several kilometres to the north in terrestrial habitats not at risk of pollution effects. No LSEs in combination with existing or proposed plans or projects (Section 5.4). | No |

| Site and Code | Distance from Proposed Development | Qualifying Interests | Potential Source-~Pathway-Receptor Link? | Potential for adverse effects |
|---|---|---|---|---|
| Lough Gill SAC (1976) | 0.4 km (upstream) | Otter | No –. The Copper River was excluded as a potential commuting route for the species due to the absence of field evidence over numerous site visits. There is a low probability that otter use of the Copper River Bridge culvert to access the Garavogue estuary, due to the existing trash screen and the length of the existing culvert. There were no otter breeding or resting sites (or potential habitat for same) in the urbanised environs of the scheme. Temporary disturbance or displacement to small numbers of feeding/commuting animals will not result in LSEs on QI populations associated with Lough Gill upstream, taking account of existing or proposed projects or plans (Section 5.4). | Yes |
| | | Alluvial forests* | No – No source-pathway-receptor linkages identified. Desktop and field surveys have the shown the QI is not within the ZoI of any LSEs. The nearest QI habitat is upstream on the Lough Gill shoreline, outside the ZoI of LSEs. | No |
| | | Natural eutrophic lakes | No – No source-pathway-receptor linkages identified. Desktop and field surveys have the shown the QI is not within the ZoI of any LSEs, taking account of existing or proposed projects or plans (Section 5.4). The nearest QI habitat is upstream on the Lough Gill shoreline, outside the ZoI of LSEs. | No |
| | | Old sessile oak woods | No – No source-pathway-receptor linkages identified. Desktop and field surveys have the shown the QI is not within the ZoI of any LSEs, taking account of existing or proposed projects or plans (Section 5.4). The nearest QI habitat is upstream around the Lough Gill shoreline, outside the ZoI of LSEs. | No |
| | | Atlantic salmon | No - No source-pathway-receptor linkages identified. The SAC is upstream of the proposed development. The potential for migratory populations to use the Copper River to move between the estuary and the freshwater SAC has been ruled out following desk and field surveys (section 4.4.7). These surveys also concluded there is no juvenile or spawning lamprey habitat in the Copper River or Garavogue Estuary within the zone of influence of the proposed development No LSEs, taking account of existing or proposed projects or plans (Section 5.4) | No |

| Site and Code | Distance from Proposed Development | Qualifying Interests | Potential Source-~Pathway-Receptor Link? | Potential for adverse effects |
|---|---|---|---|---|
| | | River Lamprey | No - No source-pathway-receptor linkages identified. The SAC is upstream of the proposed development. The potential for migratory populations to use the Copper River to move between the estuary and the freshwater SAC has been ruled out following desk and field surveys (section 4.4.7). These surveys also concluded there is no juvenile or spawning lamprey habitat in the Copper River or Garavogue Estuary within the zone of influence of the proposed development. No LSEs, taking account of existing or proposed projects or plans (Section 5.4). | No |
| | | Sea lamprey | No - No source-pathway-receptor linkages identified. The SAC is upstream of the proposed development. The potential for migratory populations to use the Copper River to move between the estuary and the freshwater SAC has been ruled out following desk and field surveys (section 4.4.7). These surveys also concluded there is no juvenile or spawning lamprey habitat in the Copper River or Garavogue Estuary within the zone of influence of the proposed development No LSEs, taking account of existing or proposed projects or plans (Section 5.4). | No |
| | | White-clawed crayfish | No – No source-pathway-receptor linkages identified. Desktop and field surveys have the shown the QI is not within the ZoI of any LSEs, taking account of existing or proposed projects or plans (Section 5.4) The nearest potential QI populations are in upstream freshwater outside the ZoI of LSEs. | No |
| All other SACs were scoped out, because they are not within the ZoI of any likely significant effects, including in-combination effects. | | | | |

### 5.3.2 Screening of LSEs on SPAs

The SPAs on which LSEs could not be excluded as a result of the proposed development are presented in Table 5.2. The assessment of LSEs has taken account of the in-combination assessment in 5.4 and the relevant source-pathway-receptor identified in Section 5.2.

Table 5.2: Identification of SPAs for which LSE could not be excluded, from preliminary list of all SPAs within 20 km

| Site and Code | Distance from Proposed Development | Qualifying Interests | Potential Source-~Pathway-Receptor Link? | Feature/site scoped into assessment? |
|---|---|---|---|---|
| Cummeen Strand SPA / (4035) | 0 m | Redshank | Yes – Disturbance of roosting and/or feeding birds would arise during construction should it occur during the non-breeding season (i.e. October to April), and could result in LSEs, in-combination with other plans or projects (Section 5.4). | Yes |
| | | Light-bellied brent goose *Branta bernicla hrota* | No – No source-pathway-receptor linkages identified either alone or in combination with other plans or projects. Desktop and field surveys have the shown the QI is not within the ZoI of any LSEs. As there are no source-pathway-receptor linkages identified, there is no potential for in-combination effects. | No |
| | | Oystercatcher | Yes – Disturbance of roosting and/or feeding birds would arise during construction should it occur during the non-breeding season (i.e. October to April), and could result in LSEs, in-combination with other plans or projects (Section 5.4). | Yes |
| | | Wetlands | Yes – Pollutants generated during construction could enter overland run-off, or controlled discharge of contaminated surface water could enter the Garavogue River and/or Garavogue estuary. Pollutants could affect water quality and bird invertebrate prey present. In combination with existing or proposed plans or projects (Section 5.4), the construction of the proposed development could result in LSEs on QI wetland habitat. | Yes |
| Sligo / Leitrim Uplands SPA (4187) | 6 km | Chough | No – No source-pathway-receptor linkages identified either alone or in combination with other plans or projects. Desktop and field surveys have the shown the QI is not within the ZoI of any LSEs. As there are no source-pathway-receptor linkages identified, there is no potential for in-combination effects. | No |
| | | Peregrine falcon | No – No source-pathway-receptor linkages identified either alone or in combination with other plans or projects. Desktop and field surveys have the shown the QI is not within the ZoI of any LSEs. As there are no source-pathway-receptor linkages identified, there is no potential for in-combination effects. | No |

| Site and Code | Distance from Proposed Development | Qualifying Interests | Potential Source-~Pathway-Receptor Link? | Feature/site scoped into assessment? |
|---|---|---|---|---|
| Ballintemple and Ballygilgan SPA (4234) | 13 km | Barnacle goose *Branta leucopsis* | No – No source-pathway-receptor linkages identified either alone or in combination with other plans or projects. Desktop and field surveys have the shown the QI is not within the ZoI of any LSEs, even though the proposed development is within the core foraging range of this species (20 km; Appendix B). As there are no source-pathway-receptor linkages identified, there is no potential for in-combination effects. | No |
| Ardboline Island and Horse Island SPA (4135) | 14 km | Barnacle goose | No – No source-pathway-receptor linkages identified either alone or in combination with other plans or projects. Desktop and field surveys have the shown the QI is not within the ZoI of any LSEs. As there are no source-pathway-receptor linkages identified, there is no potential for in-combination effects. | No |
| All other sites are scoped out, because they are not within the ZoI of any significant effects, including in-combination effects. | | | | |

## 5.4 In-combination Assessment

It is possible that effects from a project alone may not significantly affect a European site, but that significant effects are triggered by in-combination effects.

### 5.4.1 Methodology

The in-combination assessment should include approved but uncompleted, or proposed (but not yet approved) plans and projects (DEHG, 2010) and consider both natural and anthropogenic factors (Levett-Therivel, 2009). The potential for "synergistic" effects should also be considered (i.e. when the combined effect of two projects is greater than the sum of the individual effects). DEHG guidance recommends delineating the assessment boundary.

The study area for the in-combination assessment was defined separately for each receptor, using the ZoIs defined for effects from the proposed development. For instance, the potential ZoI from the proposed development to groundwater-dependent habitats was 250 m, and the in-combination assessment study area for these habitats was also 250 m. For wintering bird disturbance, the ZoI was 500 m for the proposed development alone, and therefore this was the distance used for the in-combination assessment. The in-combination assessment identified the types of effects known to threaten the QIs for which source-pathway-receptors were identified (5.2.1), before assessing whether any existing or proposed projects or plans could give rise to these threats.

The cumulative assessment identified any existing or proposed projects or plans that could give rise to the types of effects known to threaten the conservation status of the OI species or habitats (see Table 5.12: Known threats of Key Ecological Receptors to inform the cumulative impact assessment). Existing or proposed projects were identified using online data sources such as county development plans and SCC's planning portal (eplanning.ie/sligo). Furthermore, SCC was consulted on this. There are no known proposals for development within the ZoI. There are two road projects under active consideration by SCC at present namely:

- N16 Sligo to County Boundary Realignment; and
- N4 Collooney / Castlebaldwin.

Table 5.3: Known threats of Qis to inform the in-combination assessment

| Ecological Feature Type | Known Threats | Conservation Status (Site-level) |
|---|---|---|
| Cummeen Strand SAC (QI mudflats and estuaries) and Cummeen Strand SPA QI wetland habitat | Grazing, coastal defences forestry, aquaculture, fertilisation, outdoor recreation, golf courses, erosion, urbanization, industry, fertilization, leisure fishing | Good |
| Redshank from Cummeen Strand SPA | Aquaculture, fertilisation, urbanisation, reclamation, industry pollution, roads, shipping lanes | Excellent |
| Oystercatcher from Cummeen Strand SPA | Aquaculture, fertilisation, urbanisation, reclamation, industry pollution, roads, shipping lanes | Excellent |

For individual European sites, activities with positive and negative impacts were reviewed from the relevant Natura Standard Data Forms. For European protected habitats and non-bird species, existing pressures and potential future threats were obtained from the national conservation status assessments (NPWS, 2013 a) and b). Threats to bird species were identified using the Bird Atlas 2007-2011 (Balmer *et al*., 2013) and the online resources of Bird life International (www.birdlife.org). Information on land zonings, land-use plans, and were sourced from the Department of the Environment, Community and Local Government available online (www.myplan.ie).

### 5.4.2 Pollution Effects

The potential significance of in-combination pollution effects will depend to a significant degree on the assimilative capacity of the receiving waters. Assimilative capacity may be defined as *"the long-term mass removal capacity per unit area by wetlands, of pollutants including nutrients that is transformed and absorbed into the system with no significant ecosystem changes in internal structure or function or in downstream output"* (Richardson and Qian, 1999). The water quality of the Garavogue estuary upstream and downstream of the proposed outfall for the proposed development is "unpolluted" according to the EPA. The Water Framework Directive status is "Good". There are no dumping at sea sites within 4 km according to the EPA. According to the Natura Standard Data forms for Cummeen Strand SAC (NPWS, 2014), – co-designated as QI wetland bird in the Cummeen Strand SPA – the conservation status of both estuary and mudflat habitats in the receiving environment is "Good". Any proposed transport or industrial projects with significant potential for pollution effects will be subjected to a Screening for AA as a minimum (and potentially an Environmental Impact Statement subject to the scale of the proposed development), in addition to licencing and monitoring of industrial discharges by the bodies such as the EPA. These regulatory processes will impose appropriate protective water pollution mitigation.

### 5.4.3 Habitat Loss Effects

Existing or proposed projects were identified using online data sources such as county development plans and SCC's planning portal (eplanning.ie/sligo) and SCC was also consulted. There are no proposed developments likely to result in QI habitat loss of the Cummeen Strand / Drumcliff Bay SAC or Cummeen Strand SPA within the vicinity of the proposed development. None of the intertidal area within the Cummeen Strand / Drumcliff Bay SAC / Cummeen strand SPA is zoned for development in the *Sligo and Environs Development Plan 2010-2016* and none was predicted to be lost to future urbanization at the time of writing.

### 5.4.4 Wintering Bird Disturbance Effects

A fisherman was observed once, over the course of at least ten survey days, line-fishing from the north of Hughes Bridge in September 2015. The fishing was in close proximity to the existing human traffic along the bridge to which local birds are likely to be habituated. There is frequent use of a path along the northern shore of the estuary by pedestrians and dog walkers, and the author observed small numbers of ducks and waders being 'flushed' here in response to disturbance from walkers throughout winter 2015 / 2016. The NPWS recorded an absence of any significant bird disturbance regime in their disturbance assessment of the two bird count sectors overlapping the ZoI (NPWS, 2013d).

There are no known proposals for recreational development of the shoreline in the online planning portal of SCC. The planning permission for a promenade along the southern shoreline dating from 2006 has since expired. There are no 'green corridor', or 'playground' objectives along the Garavogue estuary shoreline in the Sligo and Environs Plan. Bird disturbance could act in combination with the proposed development, should the 'open space' zoning of the southern and eastern shoreline be used to develop public parks and playgrounds. However, any such development would be subject to screening for AA, and if necessary AA, triggering the need for mitigation (e.g. bunds or visual barriers to the estuary), to prevent adverse effects from bird disturbance. There are also a suite of specific policies relating to the standards of assessments, and protection applicable to designated sites in both the Sligo Environs and Sligo County development plan 2011-2017.

### 5.4.5 Climate Change

According to the International Panel on Climate Changes' *Special Report on Emission Scenarios* (Nakicenovic *et al*., 2000), sea level is rising at about 4 mm $yr^{-1}$ under certain scenarios. On this basis, it is likely that saltmarsh habitat in the Garavogue estuary will be lost in the medium-long-term, and replaced by estuary habitat, due to the change in inundation regime. There is therefore likely to be an increase in QI estuary habitat of the Cummeen Strand / Drumcliff Bay SPA over time, due to in climate change.

## 5.5 Summary of AA Screening Results

The European sites and specific QIs for which LSEs could not be excluded are presented in Table 5.4.

Table 5.4: European sites (and specific Qis) for which LSEs could not be excluded

| Site and Code | Distance from Proposed Development | QIs for which LSEs could not be excluded |
|---|---|---|
| Cummeen Strand / Drumcliff Bay SAC (627) | 0m | Estuaries |
| | | River lamprey |
| | | Sea lamprey |
| Cummeen Strand SPA (4035) | 0m | Redshank |
| | | Oystercatcher |
| | | Wetlands |

# 6. Natura Impact Statement

## 6.1 Introduction

Section 5 outlined the AA Screening process and detailed the LSEs from the proposed development. This section (the NIS) outlines the potential effects and proposed mitigation for the proposed development. The NIS draws on the baseline data as outlined in Section 4 above.

## 6.2 Steps in AA

Irish departmental guidance (DEHLG, 2010) follows much of the guidance from the European Commission (2001) in distinguishing the following five steps in AA which have been adapted as the basis for this NIS:

- Step 1 – Information Required (including scoping);
- Step 2 – Conservation Objectives;
- Step 3 – Prediction of Effects (including Article 10 considerations);
- Step 4 – Mitigation Measures; and
- Step 5 – Conclusion.

## 6.3 Step 1 – Information Required

### 6.3.1 Information Required on the Proposed Development

Detailed information is required on the proposed development, the relevant European sites, and the relevant QIs within those sites to complete the NIS. The following sections have had regard for the recommended information checklists in the European Commission guidance on AA (EC, 2001).

The relevant aspects of the proposed development to the assessment of adverse effects to European site integrity were summarised in Section 3 above.

The proposed development's physical interaction with European sites was analysed by overlaying proposed infrastructure on aerial photographs, European site boundaries, and the known distribution of QIs based on NPWS CO mapping as verified by dedicated habitat and aquatic assessments described in Section 2.7. Information on the characteristics of existing or proposed projects or plans with the potential to act in-combination with the proposed development has been described in Section 5.4. This comprehensive information was reviewed during the production of the NIS, and no additional projects or plans of relevance to the assessment have been identified since that time.

### 6.3.2 Information Required on Relevant European Sites

Mapping of relevant European sites and the known distribution of relevant QIs are presented in Figure 2.

The reasons for designation of all European sites potentially affected (i.e. the relevant QIs) have been provided (Section 5.3). A summary of the importance of each site is provided in Sections 6.2.3 and 6.2.3. The discursive summary was sourced from relevant NPWS' Natura Standard Data Forms, and/or site synopses to place QIs in the particular context of their own European site(s) (Section 6.2.2).

Table 6.1 and Table 6.2 then provide the following key information applicable to specific QIs 'scoped-in' due to the potential for LSEs identified in Section 5:

- Conservation status of the European site for which the relevant QI is designated in the form of the simple Natura Standard Data Form descriptors ("Excellent", "Good" or "Average / Reduced");
- Overall national conservation status of each relevant QI from latest conservation assessments (NPWS, 2013a and b; European Topic Centre, 2015);

- Existing pressures and future threats of medium or high importance for relevant QI habitats and non-bird species in the Irish context (NPWS, 2013a and b), and threats to relevant QI birds identified by Bird Life International, and the BTO Bird Atlas 2007-2011 (Balmer *et al*., 2013); and
- Key environmental conditions supporting relevant QIs derived from NPWS conservation status assessments and professional judgement, to comprehensively understand the potential interaction of the proposed development with QIs.

### 6.3.3 Cummeen Strand / Drumcliff Bay SAC

The Site Synopsis for Cummeen Strand SAC (NPWS, 2013g) was assessed for relevant information on the European site, in the context of the proposed development located as it is in Sligo Town. The following selected excerpts exclude detailed information on QI sand-dune, petrifying spring or other QIs for which LSEs were excluded:

> *"This large coastal site extends from Cullamore in the north-west to Killaspug in the south-west, and from Sligo town in the south-east to Drumcliff village in the northeast. It encompasses two large, shallow bays, Drumcliff Bay and Sligo Harbour, and both Ardboline and Horse Island. Sand dunes and sand hills at Rosses Point, Killaspug, Yellow Strand and Coney Island are included, as are grasslands at Ballintemple and Ballygilgan (Lissadell), along with a variety of other habitats such as woodland, saltmarsh, sandy beaches, boulder beaches, shingle, fen, freshwater marshes, rocky sea cliffs and lakes".*
>
> *The dominant habitats on the site are estuaries and intertidal sand and mud flats. Sligo Harbour receives the waters of the Garavogue River, which flows from Lough Gill, while Drumcliff Bay receives the Drumcliff River which flows from Glencar Lough. At low tide extensive areas of intertidal flats are exposed in both of these sheltered estuarine bays. The intertidal flats support a diverse macrofauna, with invertebrate species such as lugworm (Arenicola marina), common cockle (Cerastoderma edule), sand mason worm (Lanice conchilega), Baltic tellinspire shell (Hydrobia ulvae) and common mussel (Mytilus edulis) being frequent. Of particular note is the presence of the eelgrasses Zostera noltii and Z. angustifolia beds in both bays. Areas of saltmarsh fringe both bays in places.*
>
> *At least five species listed on Annex II of the E.U. Habitats Directive are found within this site. Drumcliff Bay is important for the presence of a breeding population of Common Seal. Ardboline and Horse Islands on the western side of the site are also important as haul-out areas for this species.*
>
> *Sea Lamprey and River Lamprey have been recorded in the Garavogue River, and River Lamprey are also known from further upstream in the tributaries of Lough Gill. The Marsh Fritillary butterfly is found at Rosses Point".*

#### 6.3.3.1 Data Availability

The NPWS have mapped all COs for the SAC. However, the absence of a particular QI from NPWS maps was not assumed to provide evidence for the absence of any QI. All NPWS mapping was verified with site walkovers as per the surveys detailed in Section 2.7. There were no significant additional data sets to the NPWS mapping.

#### 6.3.3.2 Condition of Relevant QIs

The conservation status of relevant QIs at national and site level, key conditions underpinning favourable conservation status and threats to key conditions are presented in Table 6.1. This information ensures the analysis does not overlook subtle or far-field effect pathways.

Table 6.1: Cummeen Strand / Drumcliff Bay SAC: conservation status key condition and treat to relevant QIs

| Relevant QI | National Conservation Status | Site-Level Status (NPWS, 2014d) | Key conditions supporting favourable conservation status | Primary threats to key conditions | Mapping for QI in COs |
|---|---|---|---|---|---|
| Estuaries | Unfavourable (Inadequate) | Good | Supply of riverine freshwater. Unimpeded tidal flow. Shelter from open coasts. Diversity of invertebrate communities | Aquaculture, recreational fishing, housing development, sewage outflow, industrialisation, roads, ports/marinas, water pollution, reclamation of land, drainage, dredging, invasive species | Yes |
| *Lampetra fluviatilis* (River Lamprey) | Favourable | Reduced | Riverine habitat. Water quality. Riverbed breeding gravels and silt nursery substrate. Unhindered migratory channels | Pollution, barriers to upstream migration, canalisation | No |
| *Petromyzon marinus (Sea Lamprey)* | Unfavourable (Bad) | Reduced | Riverine habitat. Water quality. Riverbed breeding gravels and silt nursery substrate. Unhindered migratory channels | Pollution, barriers to upstream migration, canalisation | Yes |

### 6.3.4 Cummeen Strand SPA

The Site Synopsis for Cummeen Strand SPA (NPWS, 2002) was assessed for relevant information as described above for the SAC. The following selected excerpts exclude detailed information on non-QI birds or birds for which LSEs were excluded:

> *"Cummeen Strand is a large shallow bay stretching from Sligo town westwards to Coney Island. It is one of three estuarine bays within Sligo Bay, with Drumcliff Bay to the north and Ballysadare Bay to the south. The Garavogue River flows into the bay and forms a permanent channel. At low tide, extensive sand and mud flats are exposed. These support a diverse macro-invertebrate fauna which provide the main food supply for the wintering waterfowl".*

#### 6.3.4.1 Data Availability

The following additional data to the NPWS mapping already identified as a key desktop source in Section 2.6 were of specific relevance to the NIS in the context of the Cummeen Strand SPA:

- Winter bird surveys carried out between September 2015 and January 2016 within the ZoI;
- Irish Wetland Bird Survey Data (IWeBS): annual peaks 2004-2014; and
- Unpublished low tide count data for a single season (2010-2011) for relevant areas within as well as the wider Sligo harbour outside the ZoI.

#### 6.3.4.2 Condition of Relevant QIs

The conservation status of relevant QIs at national and site level, key conditions underpinning favourable conservation status and threats to key conditions are presented in Table 6.2.

Table 6.2: Cummeen Strand SPA: conservation status key condition and treat to relevant QIs

| Relevant QI | National Conservation Status | Site-Level Status (NPWS, 2014d) | Key conditions supporting site integrity | Primary threats to key conditions | Mapping for QI in COs |
|---|---|---|---|---|---|
| Oystercatcher (non-breeding) | Favourable (Moderate to Good) | Excellent | Invertebrate food availability (intertidal / pasture). Flooding regime of coastal grasslands. Undisturbed coastal roosting sites close to feeding areas. | Aquaculture, fertilisation, urbanisation, reclamation, industry pollution, roads, shipping lanes. | Yes |
| Redshank (non-breeding) | Favourable (Good) | Excellent | Invertebrate food availability (intertidal / pasture). Flooding regime of coastal grasslands. Undisturbed coastal roosting sites close to feeding areas. | Aquaculture, fertilisation, urbanisation, reclamation, industry pollution, roads, shipping lanes. | Yes |
| Wetlands | Not assessed | Not assessed | Hydrological regime maintaining freshwater and / or saltwater inputs. | Discharges, urbanization, industry, fertilization, habitat loss from reclamation. | Yes |

## 6.5 Step 2 – Conservation Objectives

There were detailed COs available for both European sites for which LSEs could not be excluded.

### 6.5.1 Cummeen Strand / Drumcliff Bay SAC

The CO attributes for the relevant QIs of the SAC for which LSEs could not be excluded, were taken from the latest CO version available from the NPWS at the time of writing (Version 1; NPWS, 2013h). These are presented in Graphic 6.3, Graphic 6.4 and Graphic 6.5, to inform the assessment of adverse effects to site integrity.

Graphic 6.3: CO Attributes and Targets for Estuaries (Relevant QIs of Cummeen Strand / Drumcliff Bay SAC)

**Conservation Objectives for : Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC [000627]**

**1130 Estuaries**

**To maintain the favourable conservation condition of Estuaries in Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC, which is defined by the following list of attributes and targets:**

| Attribute | Measure | Target | Notes |
|---|---|---|---|
| Habitat area | Hectares | The permanent habitat area is stable or increasing, subject to natural processes. See map 3 | Habitat area was estimated as 1258ha using OSi data and the defined Transitional Water Body area under the Water Framework Directive |
| Community extent | Hectares | Maintain the extent of the *Zostera*-dominated community and the Mytilidae-dominated community complex, subject to natural processes. See map 5 | Based on intertidal surveys undertaken in 2007 and 2010 (ASU, 2007, 2012) and subtidal survey in 2010 (Aquafact, 2011). See marine supporting document for further information |
| Community structure: *Zostera* density | Shoots/m² | Conserve the high quality of the *Zostera*-dominated community, subject to natural processes | Estimated during intertidal surveys undertaken in 2007 and 2010 (ASU, 2007, 2012). See marine supporting document for further details |
| Community structure: *Mytilus edulis* density | Individuals/m² | Conserve the high quality of the Mytilidae-dominated community complex, subject to natural processes | Estimated during intertidal surveys undertaken in 2007 and 2010 (ASU, 2007, 2012) and subtidal survey in 2010 (Aquafact, 2011). See marine supporting document for further details |
| Community distribution | Hectares | Conserve the following community types in a natural condition: Intertidal fine sand with *Peringia ulvae* and *Pygospio elegans* community complex; Estuarine mixed sediment to sandy mud with *Hediste diversicolor* and oligochaetes community complex; Fine sand with *Angulus* spp. and *Nephtys* spp. community complex; Sand to mixed sediment with amphipods community; Intertidal reef community. See map 5 | Based on intertidal and subtidal surveys undertaken in 2007 and 2010 (ASU, 2007, 2012; Aquafact, 2011) and an intertidal walkover undertaken in 2013. See marine supporting document for further information |

Graphic 6.4: CO Attributes and Targets for River Lamprey (Relevant QIs of Cummeen Strand / Drumcliff Bay SAC)

**Conservation Objectives for : Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC [000627]**

**1099 River Lamprey *Lampetra fluviatilis***

**To maintain the favourable conservation condition of River Lamprey in Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC, which is defined by the following list of attributes and targets:**

| Attribute | Measure | Target | Notes |
|---|---|---|---|
| Distribution: extent of anadromy | % of estuary accessible | No barriers for migratory life stages of lamprey moving from freshwater to marine habitats and vice versa | This SAC only covers marine/estuarine habitat and it is not anticipated that it contains suitable spawning or nursery habitat. Migrating adult lamprey pass through the site en route to/from the Garavogue River, which flows out of Lough Gill. Lough Gill SAC (site code: 1976), which is adjacent to this SAC, encompasses the freshwater elements of river lamprey habitat. Potential barriers for migrating lamprey include anthropogenic physical barriers and chemical barriers e.g. oxygen depletion or discharge of noxious pollutants |

Graphic 6.5: CO Attributes and Targets for Sea Lamprey (Relevant QIs of Cummeen Strand / Drumcliff Bay SAC)

**Conservation Objectives for : Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC [000627]**

**1095 Sea Lamprey *Petromyzon marinus***

**To restore the favourable conservation condition of Sea Lamprey in Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC, which is defined by the following list of attributes and targets:**

| Attribute | Measure | Target | Notes |
|---|---|---|---|
| Distribution: extent of anadromy | % of estuary accessible | No barriers for migratory life stages of lamprey moving from freshwater to marine habitats and vice versa | This SAC only covers marine/estuarine habitat and it is not anticipated that it contains suitable spawning or nursery habitat. Migrating adult lamprey pass through the site en route to/from the Garavogue River, which flows out of Lough Gill. Lough Gill SAC (site code: 1976), which is adjacent to this SAC, encompasses the freshwater elements of sea lamprey habitat. Potential barriers for migrating lamprey include anthropogenic physical barriers and chemical barriers e.g. oxygen depletion or discharge of noxious pollutants |

### 6.5.2 Cummeen Strand SPA

The CO attributes for the relevant QIs of the SPA for which LSEs could not be excluded, were taken from the latest CO version available from the NPWS at the time of writing (Version 1; NPWS, 2013i). These are presented in Table 6.6, Table 6.7, and Table 6.8 to inform the assessment of adverse effects to site integrity.

Table 6.6: CO Attributes and Targets for Redshank (Relevant QIs of Cummeen Strand SPA)

| Conservation Objectives for : Cummeen Strand SPA [004035] | | | |
|---|---|---|---|
| **A162** | **Redshank *Tringa totanus*** | | |
| **To maintain the favourable conservation condition of Redshank in Cummeen Strand SPA, which is defined by the following list of attributes and targets:** | | | |
| **Attribute** | **Measure** | **Target** | **Notes** |
| Population trend | Percentage change | Long term population trend stable or increasing | Population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing and intensity of use of areas by redshank, other than that occurring from natural patterns of variation | Waterbird distribution from the 2010/2011 waterbird survey programme is discussed in part five of the conservation objectives supporting document |

Table 6.7: CO Attributes and Targets for Oystercatcher (Relevant QIs of Cummeen Strand SPA)

| Conservation Objectives for : Cummeen Strand SPA [004035] | | | |
|---|---|---|---|
| **A130** | **Oystercatcher *Haematopus ostralegus*** | | |
| **To maintain the favourable conservation condition of Oystercatcher in Cummeen Strand SPA, which is defined by the following list of attributes and targets:** | | | |
| **Attribute** | **Measure** | **Target** | **Notes** |
| Population trend | Percentage change | Long term population trend stable or increasing | Population trends are presented in part four of the conservation objectives supporting document |
| Distribution | Range, timing and intensity of use of areas | No significant decrease in the range, timing and intensity of use of areas by oystercatcher, other than that occurring from natural patterns of variation | Waterbird distribution from the 2010/2011 waterbird survey programme is discussed in part four of the conservation objectives supporting document |

Table 6.8: CO Attributes and Targets for Wetlands (Relevant QIs of Cummeen Strand SPA)

| Conservation Objectives for : Cummeen Strand SPA [004035] | | | |
|---|---|---|---|
| **A999** | **Wetlands** | | |
| **To maintain the favourable conservation condition of wetland habitat in Cummeen Strand SPA as a resource for the regularly occurring migratory waterbirds that utilise it. This is defined by the following attribute and target:** | | | |
| **Attribute** | **Measure** | **Target** | **Notes** |
| Habitat area | Hectares | The permanent area occupied by the wetland habitat should be stable and not significantly less than 1732 hectares, other than that occurring from natural patterns of variation | The wetland habitat area was estimated as 1732ha using OSi data and relevant orthophotographs. For further information see part three of the conservation objectives supporting document |

## 6.7 Step 3 – Prediction of Effects

### 6.7.1 Cummeen Strand / Drumcliff Bay SAC

The predicted effects from the proposed development on the Cummeen Strand / Drumcliff Bay SAC and Cummeen Strand SPA are presented in Table 6.9 and Table 6.10. The in-combination assessment referenced in the table below can be found in Section 5.4.

The prediction of effects excludes assessment of any source-pathway receptor links which were scoped out at Screening stage, including the potential for migratory barriers to Atlantic salmon and lamprey during instream works to the Copper River (refer to Section 5.2.2).

Table 6.9: Predicted Pollution Effects on Cummeen Strand / Drumcliff Bay SAC

| QIs for Which LSEs not excluded (*Priority habitat) | Pathway (s) and relevant CO Attributes | Predicted Effects on Integrity (Construction) | Predicted Effects on Integrity (Operation) |
|---|---|---|---|
| Estuaries | **Pollution**<br>*CO Attributes affected:*<br>*Community extent*<br>*Community structure (Density of Mytilus edulis)* | *Pollutants generated during construction could enter the SAC indirectly via the Copper River or directly overland into the Garavogue estuary. In combination with existing or proposed plans or projects (Section 5.4), pollution or siltation could interfere with the objective to maintain Favourable Conservation Status (FCS) for Estuary habitat, specifically by altering community structure through reducing abundance of M.edulis or altering its distribution.*<br><br>***Adverse effects on integrity of Cummeen Strand / Drumcliff Bay SAC in combination with other projects / plans, in the absence of mitigation*** | The design of the proposed development includes: - Petrol interceptors at all outfall locations between the carriageway drainage outfall and watercourse;<br>- An attenuation treatment pond for one outfall, prior to discharge of run-off to the Copper River; to mitigate it's 'failure' of the HAWRAT model of soluble (heavy metal) pollutants; and<br>- Also, the Accidental Spillage Risk Assessment concluded there is a low risk of an accidental spillage incident (0.5% probability). A penstock, handstop, or an orifice that can be manually closed in the event of accidental spillage will be provided in the attenuation/treatment pond. The penstock can, if lowered in time, potentially retain 100% of spilled material.<br>No pollution effects are predicted during operation.<br><br>*No adverse effects on integrity of SAC in-combination with other projects/plans.* |

| QIs for Which LSEs not excluded (*Priority habitat) | Pathway (s) and relevant CO Attributes | Predicted Effects on Integrity (Construction) | Predicted Effects on Integrity (Operation) |
|---|---|---|---|
| Sea lamprey and River lamprey | **Pollution**<br>*CO Attributes affected:*<br>*None* | *Pollutants generated during construction could enter the SAC indirectly via the Copper River or directly overland into the Garavogue estuary. In combination with existing or proposed plans or projects (*Section *5.4), pollution could affect non-spawning adult lamprey of either species in estuarine areas by reducing water quality. However, the only attribute listed in the CO for both species is "Extent of anadromy", measured as the % of estuary accessible, and pollution is not a threat of high importance according to the NPWS (2013b).*<br><br>*No adverse effects on integrity of SAC in-combination with other projects/ plans.* | No pollution effects are predicted during operation due to inclusion of petrol interceptors and an attenuation pond in the design, and because there is a low risk of accidental spillage (refer to estuaries above).<br><br>*No adverse effects on integrity of SAC in-combination with other projects/plans.* |

Table 6.10: **Predicted Effects on Cummeen Strand SPA**

| QIs for Which LSEs not `excluded | Pathway (s) and relevant CO Attributes | Predicted Effects on Integrity (Construction) | Predicted Effects on Integrity (Operation) |
|---|---|---|---|
| Redshank | **Disturbance**<br><br>*<u>CO Attributes affected:</u>*<br>*Population trend*<br>*Distribution* | *If construction works overlap the non-breeding season (September to April), noise, physical disturbance, and human presence could temporarily displace birds in adjacent intertidal areas. Displacement of birds from a high tide roost could lead to birds vacating the Garavogue estuary to feeding areas elsewhere in the SPA. However this species does not roost at high tide within the ZoI of displacement from construction activity (500 m). Temporary displacement of the small numbers (peak 3 birds) feeding in the rocky estuary nearby could arise, but such birds are likely to resettle and continue to feed in the immediate vicinity, because there is an existing disturbance regime locally associated with light industry, shipping, and traffic to which birds are likely to be habituated. Movement of machinery across the SAC / SPA will be up to 6 vehicle movements per day for 8 weeks on average for setting up / removing shuttering.*<br>*Populations within the site are in "Excellent status", according to the Natura standard data form. Numbers in the SPA have fluctuated consistently between 2004 and 2014, but have increased over the last three years since the population crash of 2010-2012. No lasting decline in population trend or distribution will result from displacement connected with construction of the proposed development. There are no significant in-combination effects that threaten populations locally or in the wider area. The construction of the development will not alter the long-term population trend or* | *There will be no increase in disturbance regime from the operation of the development. The cycleway introduced above the Garavogue estuary shoreline will not displace birds as there is existing pedestrian and dog-walker disturbance along the shoreline to which birds will be accustomed. Although the design of the proposed cycleway leaves the shoreline potentially accessible by future users, this area is a 'dead-end', and better views of the estuary are afforded from the elevated ground along the existing road bridge. No significant increase in users of the shoreline, and no significant change to the existing disturbance regime are predicted.*<br><br>*No adverse effects on integrity of Cummeen Strand SPA in combination with other projects / plans.* |

| QIs for Which LSEs not `excluded | Pathway (s) and relevant CO Attributes | Predicted Effects on Integrity (Construction) | Predicted Effects on Integrity (Operation) |
|---|---|---|---|
| | | *decrease the range or intensity of use of any areas within the SPA. There will be no interference with the objective to maintain FCS.*<br><br>*No adverse effects on integrity of Cummeen Strand SPA in combination with other projects / plans.* | |
| Oystercatcher | **Disturbance**<br>*<u>CO Attributes affected:</u>*<br>*Population trend*<br>*Distribution* | *A single individual of this species roosted at high tide within the ZoI of displacement from construction activity (500 m). Temporary displacement of this individual, and small numbers (peak 4 birds) feeding in the rocky estuary nearby could arise, but such birds are likely to resettle and continue to feed in the immediate vicinity, as per the rationale above for Redshank. Movement of machinery across the SAC / SPA will be up to 6 vehicle movements per day for 8 weeks on average for setting up / removing shuttering. Populations within the site are in "Excellent status", according to the Natura standard data form. Numbers in the SPA have followed similar patterns to redshank, and have similarly increased over the last three years since the population crash of 2010-2012. There are no significant in-combination effects that threaten populations locally or in the wider area. The construction of the development will not alter the long-term population trend or decrease the range or intensity of use of any areas within the SPA. There will be no interference with the objective to maintain FCS.*<br><br>*No adverse effects on integrity of Cummeen Strand SPA in combination with other projects / plans.* | *See rationale under redshank above.*<br><br>*No adverse effects on integrity of Cummeen Strand SPA in combination with other projects / plans.* |

| QIs for Which LSEs not `excluded | Pathway (s) and relevant CO Attributes | Predicted Effects on Integrity (Construction) | Predicted Effects on Integrity (Operation) |
|---|---|---|---|
| Wetlands | **Pollution**<br>*<u>CO Attributes affected:</u>*<br>*None* | *Pollutants generated during construction could enter the SPA indirectly via the Copper River or directly overland into the Garavogue estuary. The only CO attribute for this CO is wetland area. There will be no reduction in wetland area. Therefore construction of the development will not interfere with the objective to maintain FCS.*<br><br>*No adverse effects on integrity of Cummeen Strand SPA in combination with other projects/plans.* | The design of the proposed development includes: --<br>- Petrol interceptors at all outfall locations between the carriageway drainage outfall and watercourse; and<br>- An attenuation treatment pond for one outfall, prior to discharge of run-off to the Copper River; to address the findings of the HAWRAT assessment for soluble (heavy metal) pollutants.<br>Also, the Accidental Spillage Risk Assessment concluded there is a low risk of an accidental spillage incident (0.5% probability). A penstock, handstop, or an outfall that can be readily blocked in the event of accidental spillage will be provided in the attenuation/treatment pond. The penstock can, if lowered in time, potentially retain 100% of spilled material.<br>No pollution effects are predicted during operation.<br><br>*No adverse effects on integrity of SPA in-combination with other projects / plans.* |

## 6.8 Step 4 – Mitigation Measures

### 6.8.1 Mitigation Inherent in the Design

As described in Section 3.1.1, mitigation by design has already been incorporated into the preferred option selection by virtue of:

- Designing the proposed development to avoid any loss of QI habitat of European sites; and
- Designing the operational surface water attenuation and treatment design to avoid any significant effects from road run-off on the water quality of receiving waters in the Garavogue estuary and Copper River during road operation.

### 6.8.2 Pollution Mitigation during Construction

This mitigation measure is required to avoid adverse effects to QI Estuary habitat of the Cummeen Strand / Drumcliff Bay SAC.

To avoid the pollution of watercourses during the construction phase all construction works will be completed in line with the recommendations of the following guidelines:

- 'Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes' (NRA, 2005);
- CIRIA C649 Control of Water Pollution from Linear Construction Projects: Site Guide (Murnane *et al*., 2006);
- 'Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors' (CIRIA, 2001);
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (IFI, 2016); and
- UK Environment Agency:
  - PPG5 Pollution Prevention Guidelines Works and Maintenance in / or near Water;
  - PPG21 Incident Response Planning;
  - PPG22 Dealing with Spills; and
  - PPG26 Drums and Intermediate Bulk Containers.

A preliminary Erosion and Sedimentation Control Plan (pESCP) has been developed for the proposed development and is detailed in Appendix C of this NIS. This details specific pollution prevention measures to be employed during construction and will be binding on the appointed contractor and actively monitored by SCC and the appointed ECoW.

An updated and detailed ESCP will be drafted by the appointed contractor. The contractor will prepare the dESCP prior to commencing the construction works and it will form part of the contractor's Environmental Operating Plan (EOP) for the construction of the proposed development. To prevent or reduce the amount of sediment released into watercourses, the ESCP will include the following measures to be implemented by the contractor:

- Constructing structures during periods of low flow (typically during summer months) to reduce the risk of scour and erosion around a structure or to the disturbed river bed;
- Provision of measures to prevent the release of sediment concentrations over baseline conditions to during the construction works will include but not be limited to silt fences, silt curtains, settlement lagoons and filter materials;
- Provision of measures to prevent the displacement and subsequent erosion and release of large volumes of soft sediment, particularly from works to the Copper River. These measures will include but not be limited to an over pump regime, silt curtains, settlement lagoons, filter materials and stockpile seeding;

- Temporary construction surface drainage and sediment control measures will be in place before earthworks commence;
- Provision of exclusion zones and barriers (sediment fences) between earthworks, stockpiles and temporary surfaces and watercourses to prevent sediment washing into the watercourses;
- Measures will be provided to ensure that all works associated with the Copper River Bridge construction are protected against the 1:100 year return period flood event to ensure that there is no hydraulic connectivity between the temporary works and the Copper River during construction;
- Limiting the extent of vegetation clearance and thereby minimising the potential release of sediment from bare ground following clearance;
- Precast concrete will be used in preference to pouring concrete where possible;
- Where required, pouring of concrete will be carried out in the dry and allowed to cure for 48 hours before re-flooding. Pumped concrete will be monitored to ensure no accidental discharge. Mixer washings and excess concrete will not be discharged to surface water;
- No storage of hydrocarbons or any toxic chemicals will occur within 50 m of any watercourse. Fuel storage tanks will be bunded to a capacity at least 110% of the volume of the storage tank. Re-fuelling of plant will not occur within 50 m of any watercourse and only in bunded refuelling areas. Emergency procedures and spillage kits will be available and construction staff will be familiar with emergency procedures; and
- The contractor shall ensure that the construction methodologies used will ensure no wastes will be discharged to the watercourses.

The contractor shall consult with SCC, the NPWS and IFI in relation to the dESCP and shall include their requirements in this regard. The IFI will be notified prior to any instream works including advanced works.

Following consultation with the NPWS and to ensure that intertidal habitats are protected during construction the following is proposed:

- The contractor will develop a method statement in relation to the movement of machinery in the SAC / SPA. This will include the use of timber bogmats in intertidal habitats to enable construction machinery to safely move across the SAC / SPA while limiting impacts on these intertidal habitats. These provide an effective method of ensuring heavy plant and equipment can traverse soft or boggy terrain without being impeded or causing excessive damage to the habitats underfoot.

### 6.8.3 Monitoring during Construction Works

An ecological clerk of works (ECoW) will be appointed during the construction phase to:

- review the contractor's method statements (including the dESCP) relating to environmental protection (e.g. relating to pollution control, movement of machinery across the SAC / SPA);

- site visit at the start of construction phase (and once every two months thereafter) to ensure all elements of environmental protection outlined in method statements are adhered to; and

- supervise pilling works/movement of machinery across SAC / SPA (at the start of these works) to ensure timber bogmats are in place and tracking of machinery is kept as close as possible to the shore.

### 6.8.4 Inland Fisheries Ireland Mitigation

Although no LSEs were identified on any QI fish of European sites, IFI have requested best-practice culvert design in accordance with *Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters* (IFI, 2016). This would improve potential fish passage conditions up the Copper River Bridge in future. Accordingly, a method statement for instream works will be agreed with IFI. As per IFI's requirements, and the NRA Guidelines for crossing of watercourses during construction, the culvert will be designed:

- Without trash screens or with types of screen which permit fish passage;
- With the level of the culvert bottom (invert) about 500 mm below the level of the natural stream bed;
- With a constant slope throughout its length which does not exceed 1%; and

- With a grade allowing the upstream invert to remain drowned (by back-watering) under low-flow conditions, to a depth suitable for the easy passage of the largest species frequenting the stream.

### 6.8.5 Implementation

All mitigation measures proposed would be binding on the Contractor (s) procured to construct the road and would be actively monitored by SCC under the contract.

# 7. NIS Conclusion

Following implementation of the proposed mitigation, the construction and operation of the proposed development would have no adverse effects on the integrity of any European sites, either alone or in-combination with other plans or projects.

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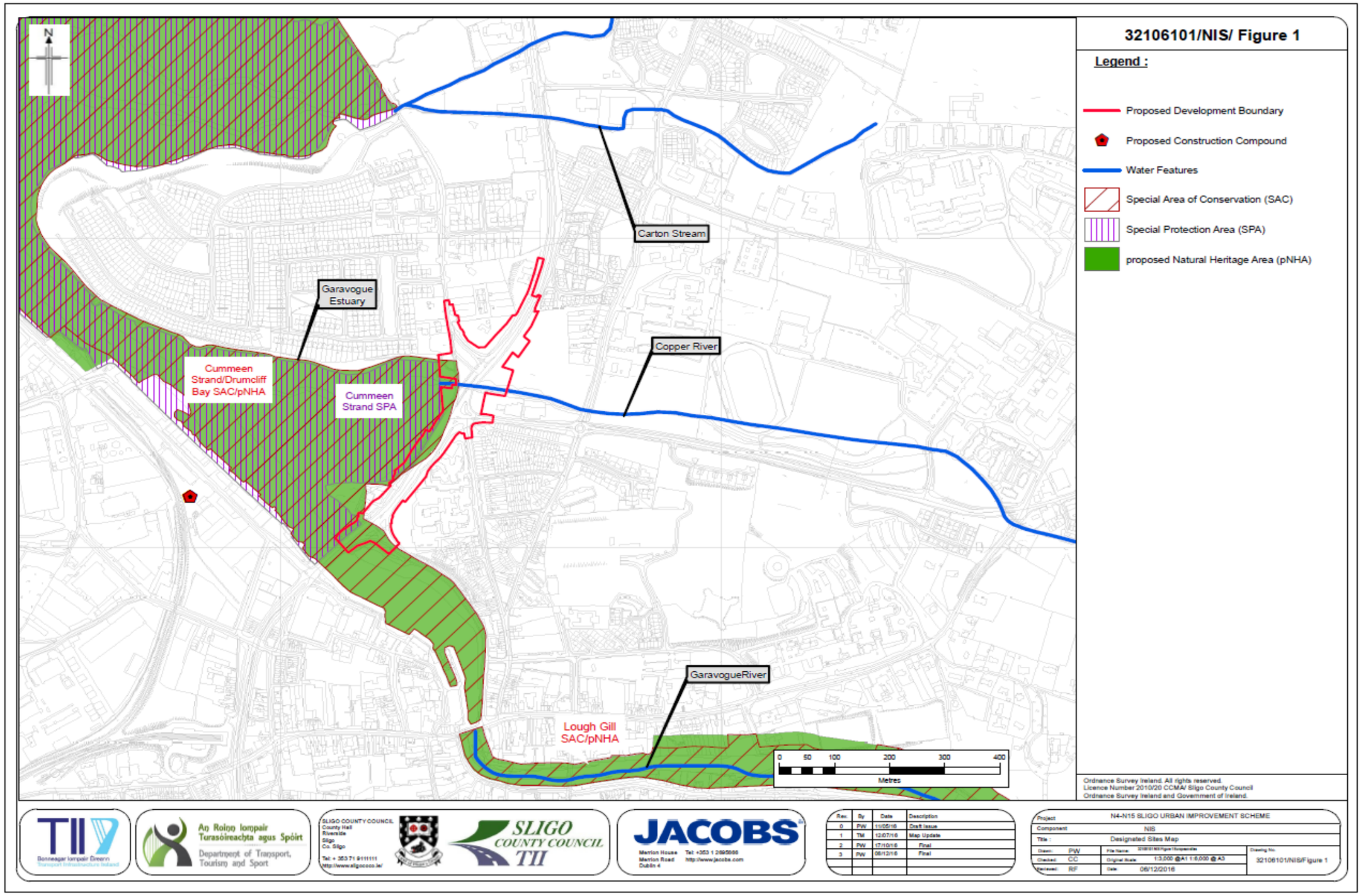
# Figures and Appendices

## Figure 1: European sites


N
Carton Stream
Garavogue Estuary
Copper River
Cummeen Strand/Drumcliff Bay SAC/pNHA
Cummeen Strand SPA
GaravogueRiver
Lough Gill SAC/pNHA
0 50 100 200 300 400
Metres
32106101/NIS/ Figure 1
Legend :
Proposed Development Boundary
Proposed Construction Compound
Water Features
Special Area of Conservation (SAC)
Special Protection Area (SPA)
proposed Natural Heritage Area (pNHA)
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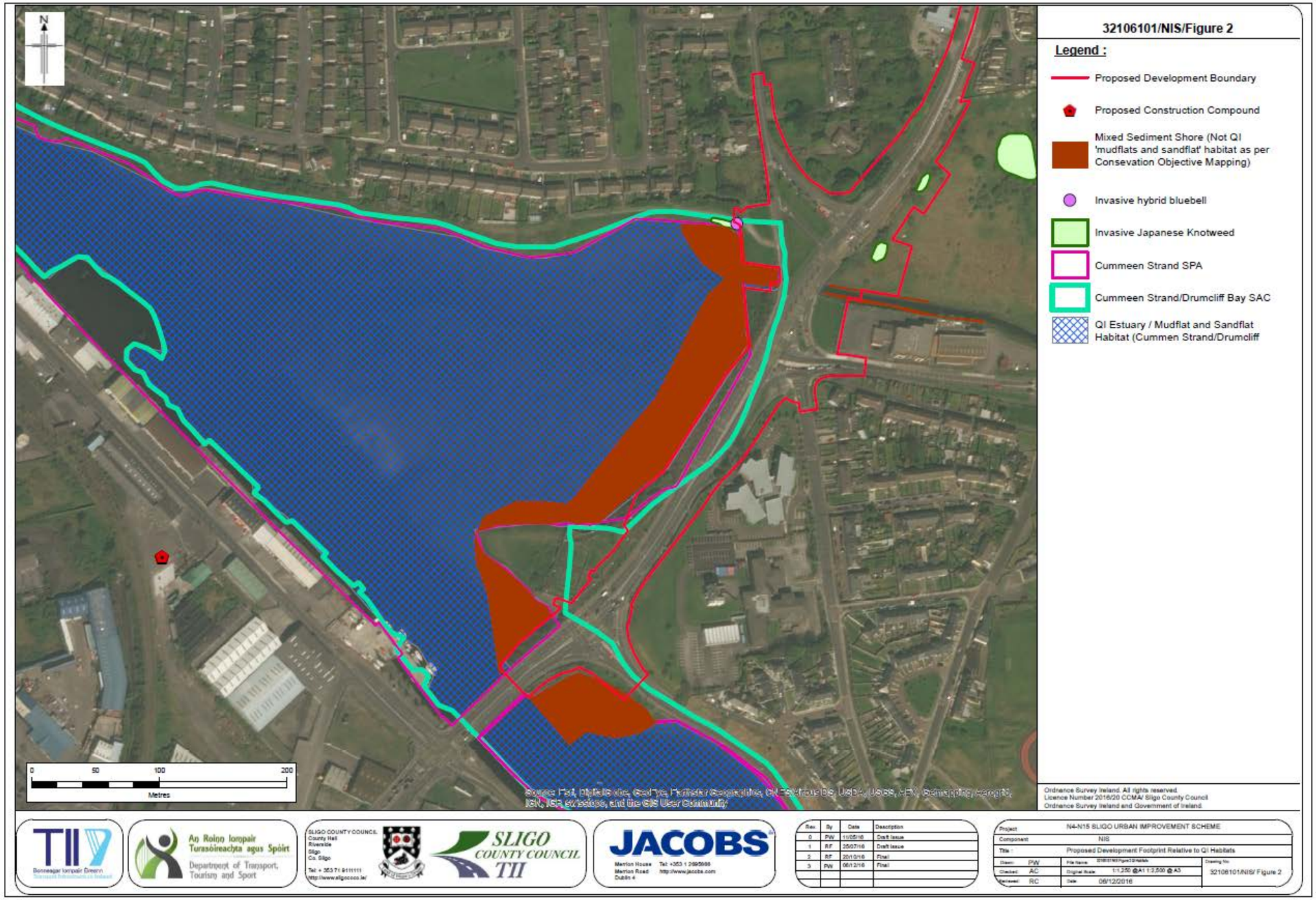
Rev. | By | Date | Description
0 | PW | 11/05/16 | Draft Issue
1 | TM | 12/07/16 | Map Update
2 | PW | 17/10/16 | Final
3 | PW | 06/12/16 | Final
Project: N4-N15 SLIGO URBAN IMPROVEMENT SCHEME
Component: NIS
Title: Designated Sites Map
Drawn: PW
Checked: CC
Reviewed: RF
Original Scale: 1:3,000 @A1 1:6,000 @ A3
Date: 06/12/2016
Drawing No: 32106101/NIS/Figure 1

## Figure 2: Distribution of Qualifying Interests


N
32106101/NIS/Figure 2
Legend :
Proposed Development Boundary
Proposed Construction Compound
Mixed Sediment Shore (Not QI 'mudflats and sandflat' habitat as per Consevation Objective Mapping)
Invasive hybrid bluebell
Invasive Japanese Knotweed
Cummeen Strand SPA
Cummeen Strand/Drumcliff Bay SAC
QI Estuary / Mudflat and Sandflat Habitat (Cummen Strand/Drumcliff
0
50
100
200
Metres
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
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Department of Transport, Tourism and Sport
SLIGO COUNTY COUNCIL
County Hall
Riverside
Sligo
Co. Sligo
SLIGO COUNTY COUNCIL
TII
JACOBS
Merrion House
Merrion Road
Dublin 4
Rev. By Date Description
0 PW 11/05/16 Draft Issue
1 RF 25/07/16 Draft Issue
2 RF 20/10/16 Final
3 PW 06/12/16 Final
Project N4-N15 SLIGO URBAN IMPROVEMENT SCHEME
Component NIS
Title : Proposed Development Footprint Relative to QI Habitats
Drawn: PW
Checked: AC
Approved: RC
Original Scale: 1:1,250 @A1 1:2,500 @ A3
Date: 06/12/2016
Drawing No: 32106101/NIS/ Figure 2

# Appendix A. Specific Application of Guidance

## A.1 European Commission and DEHLG Guidance

The following principles, adapted from both EC (2001) and DEHLG guidance (2010) were adopted in this NIS:

- All European sites overlapping or adjacent to the proposed development are described. Other European sites are described on a case-by-case basis subject to the predicted effects from the proposed development and the sensitivities of specific QIs concerned;
- Any effect to the conservation objectives of a site is considered significant;
- Indicators help determine if there are effects to conservation objectives (e.g. if duration of fragmentation , disturbance, or population trend change); and
- Plans or projects that are completed, approved but uncompleted, or proposed (but not yet approved) are considered in the in-combination assessment.

The following non-exhaustive list of specific requirements may conflict with current law and/or NPWS requirements and were not applied in this NIS. Asterisked items (*) appear in both EC and DEHLG guidelines:

- Reference to Screening and AA as stages one and two of the AA process*;
- Suggestion, by virtue of the inclusion of % of habitat loss as a significance indicator that some habitat loss of QIs may not constitute a significant effect to European site(s)*;
- Prohibition on mitigation in Screening*; and
- Significance of effects can often be resolved by consulting the relevant nature conservation body.

## A.2 International and National Workshops on AA

Four International AA workshops have been organized by private and public practitioners. There were no outputs from the 2011 workshop in Pilsen (Czech Republic) or Dublin in 2012, but recommendations were published online for the Oxford (Levett-Therivel, 2009), and Mikolov workshops (Chvojková, 2013). The Oxford recommendations applied to plans only, but the following were considered equally applicable to projects:

- If effect significance is ambiguous, final assessment should be underpinned by expert consensus;
- Use of fixed distances to guide screening can be a useful starting point but distances should relate to site integrity and be substantiated by evidence or reasoning, where clear evidence is not available;
- The in-combination assessment should consider both natural and anthropogenic factors, and both proposed and consented plans and;
- Monitoring of mitigation measures should only be proposed where an effective management response can be identified to ensure adverse effects can be avoided [author's note - i.e. adaptive management].

The following unpublished recommendation of the NPWS at the Advanced Appropriate Assessment Workshop hosted by the Chartered Institute of Ecology and Environmental Management at Dublin Port Centre, 17th April 2015 was also incorporated into the NIS:

- The NPWS within the Department of Arts, Heritage and the Gaeltacht provide observations but do not undertake the analysis required to undertake or complete the appropriate assessment.

## A.3 The Precautionary Principle

The Precautionary Principle has been defined by the United Nations Educational, Scientific and Cultural Organisation (UNESCO, 2005) as:

*When human activities may lead to morally unacceptable harm [to the environment] that is scientifically plausible but uncertain, actions shall be taken to avoid or diminish that harm. The judgement of plausibility should be grounded in scientific analysis.*

The Precautionary Principle prevails in Screening, because the potential for effects must be excluded on the basis of objective information. However, international AA practitioners (Levett-Therivel, 2009) have cautioned that: "*reasonableness should be commensurate with the level of risk to the integrity of the site and the level of uncertainty concerned.*

## A.4 Defining "Significant" Effects

In accordance with EC and Department guidance (Appendix B), significance was defined by any effect to the conservation objectives of a site. Such effects were assessed with reference to significance indicators such as the duration of fragmentation, disturbance, or population density.

# Appendix B. Zones of Influence

A pathway for potentially significant effects between sources and receptors can be described an effect area, or 'zone of influence' (ZoI). The ZoI was of primary importance in:

- Informing the limit of the study area for field and desktop studies of the baseline environment; and
- Determining which European sites could be significantly affected.

The distance over which effects may be significant will vary by source and receptor. Scientifically-supported analyses have informed the identification of the distances used in the assessment. The number of zones identified has been reduced by grouping QIs into 'guilds' based on shared ecological dependencies and sensitivities. For instance, pollution may affect two different species (e.g. larvae of brook lamprey *Lampetra planeri* and river lamprey *Lampetra fluviatilis*) over a similar area because they share a similar ecological niche (i.e. muddy riverbanks into which larvae burrow), and because pollution is a threat of medium importance to both species (NPWS, 2013a). Some effects have large potential zones of influence e.g. wetland bird disturbance can extend up to 500m. The mobility of a particular QI will determine if they could move beyond European site boundaries into the ZoI. The ranging distance or 'extent of spatial sensitivity' is read with the ZoI to determine the potential for significant effects to occur.

## B.1 ZoI for Pollution Effects

The proximity of European sites, and more importantly their QIs, to the proposed development is of primary importance in identifying source-pathway-receptor models which could result in significant effects. In the case of, for instance, measures disturbing breeding fauna via physical vibration, increasing the distance between the disturbance source and the animal will eventually lower the magnitude of the disturbance effect to a level where it is imperceptible to the animal, and the source-pathway-receptor link no longer results in a significant effect.

The use of distance to determine potentially significant pollution effects is more complex. For instance, the potential ZoI of a fuel spill incident into a coastal stream during construction will depend on numerous unpredictable factors including but not restricted to the volume of fuel spilt; the type of fuel spilt; the time of year; the type, abundance, and physical condition of mobile aquatic populations within the plume at the time; the assimilative capacity of the receiving watercourse at the time, and in coastal areas the stage of tidal cycle. Modelling could be undertaken to estimate the effect area for change in water-borne pollutants. However, the magnitude of effects would vary over the same distance for different aquatic species in accordance with their sensitivity to pollutants, such that a single ZoI would be inaccurate. In addition, in the case of silt, particles may be remobilised throughout a catchment several times over extended period of time, meaning the ZoI will vary in time as well as space. An arbitrary and highly precautionary fixed distance ZoI could be applied, but this distance would not be scientifically supported and could necessitate lengthy analysis of distant receptors in the impact assessment.

## B.2 ZoI for Other Effects

QIs may be limited to the European site boundary, as in the case of habitats and plant species or may range far beyond the site boundary in the case of bird and other mobile QI animal species. Scientifically supported data on maximum dispersal or foraging ranges was used to identify the potential ranging behaviour of mobile fauna species. As recommended by international AA practitioners (Levett-Therivel, 2009), professional judgement was be required where specific distances were not available in the literature (e.g. for distance over which vibration could significantly affect white-clawed crayfish *Austropotamobius pallipes*).

The ZoI applied in the Screening for AA and NIS are presented in the Table overleaf.

| QIs | | Examples | Potential source (s) of effect from proposed development | Potential effect pathways | ZoI (m beyond proposed development) | Rationale |
|---|---|---|---|---|---|---|
| QIs sensitive to pollution | Various | Various. | Discharge of silt, oil, or other contaminants into surface water | Pollution during construction or operation. | Not determined based on rationale above. | Worst-case assumptions have informed the development of design and mitigation features so the determination of ZoI is not required. |
| QI habitats and flora | Terrestrial habitats or plant species. *(no significant water dependency)* | Limestone pavements lowland meadows, Killarney fern *Trichomanes speciosum* | Vegetation clearance, access routes | Habitat loss | 50m | Only habitat loss in footprint will pose risk of significant effect. However, precautionary ZoI of 50m to account for any additional land take / access required (e.g. construction compound). |
| | Ground-water dependent habitats / species | Alluvial woodlands, dune slacks, peatlands, lagoons, whorl snails (three *Vertigo* species), turloughs. | Earthworks, piling, access routes. | Interference with groundwater supply or quality | 250m | Radius within which further survey of groundwater-dependent habitats recommended where foundations or burrow pits proposed (SEPA, 2014). |
| QI Otter | Otter crossing points | N/A | Replacement of Copper River culvert | Altered or decreased routes for safe crossing of roads | 300m upstream and downstream of watercourses from works | Radius within which surveys recommended to detect otter crossing points in the UK design Manual for Roads and Bridges (Highways Agency, 2001). |
| | Otter underground breeding or resting sites | N/A | Vegetation clearance, earthworks, piling, access routes, instream works | Direct disturbance or vibration causing chamber collapse | 150m | Distance to underground otter sites within which disturbing works are likely to require licencing (NRA, 2006b). |

| QIs | | Examples | Potential source (s) of effect from proposed development | Potential effect pathways | ZoI (m beyond proposed development) | Rationale |
|---|---|---|---|---|---|---|
| Marine mammals | Marine mammals using terrestrial 'haul-out' sites | Common seal *Phoca vitulina* | Piling and construction operations | Noise and human presence causing disturbance to haul-out sites | 500m | Precautionary based on professional judgement given characteristics of development. |
| Birds | Breeding Birds (highly sensitive species) | Chough , white-tailed sea eagle | Vegetation clearance, noise and physical human presence | Disturbance to breeding sites | 100m up to a maximum of 1000m. | Worst-case, upper limit of disturbance to white-tailed sea eagle, from all Irish species study by Whitfield *et al*., (2008). |
| | Non-breeding birds | Wading birds, gulls, duck, geese, swans | Noise and physical human presence, and machinery in intertidal habitats. | Noise and human presence causing disturbance to feeding and roosting sites | 500m | Precautionary based on published distances for anthropogenic disturbance to wintering wetland species (Madsen, 1985; Smit & Visser, 1993; Rees *et al.,* 2005). |
| Marsh fritillary | N/A. | N/A | Vegetation clearance, access routes | Direct injury or loss of habitat | 50m | As outlined above for habitats. Indirect barrier effects to dispersal will not apply as the existing road already poses a barrier and the proposed road widening will not significantly increase the barrier. |
| Aquatic species | In estuarine habitats / life cycle stage | Sea and river lamprey, Atlantic salmon | Instream works, tracking of machinery over intertidal areas | Direct injury or loss of habitat | 0m | Works will only be undertaken within the footprint. |
| | In estuarine habitats / life cycle stage | Sea and river lamprey, Atlantic salmon | Over-pumping or from changes to culvert design | Migratory barriers | Any sites upstream with spawning populations | Based on species' lifecycles. |

| QIs | | Examples | Potential source (s) of effect from proposed development | Potential effect pathways | ZoI (m beyond proposed development) | Rationale |
|---|---|---|---|---|---|---|
| | Species sensitive to underwater noise disturbance | Atlantic salmon, marine mammals | Instream works for Copper River culvert replacement. | Vibration causing injury or displacement. | At least 100m from any significant populations. | Precautionary based on professional judgement given characteristics of development. |
| | Species or habitats sensitive to siltation[4] | Freshwater pearl mussel, Atlantic salmon (spawning / juveniles in freshwater). | Instream works for Copper River culvert replacement. | Smothering of juvenile fish, gravel spawning beds, or mussel beds. | Any populations downstream of siltation event, in freshwater, within the same river catchment. | Professional judgement based on habitat where instream works are to be undertaken (Copper River only) Mitigation inherent in design has excluded risk of pollution. |

[4] All species and habitats for whom siltation (Threat J02.11) was ranked as a medium or high threat by the NPWS (2013)

## B.3 Spatial sensitivities of Highly mobile species

The tables overleaf identify the spatial sensitivities (or ranging distances) of certain highly mobile species. These distances are read with the zones of influence to assess the potential for QIs to be significantly affected.

**Non-bird fauna species: Ranging Distance or 'spatial extents of sensitivity' for relevant QIs to the NIS**

| QI Feature (s) | Sensitivity Extent and Potential Mobility | Scientific Rationale |
|---|---|---|
| Otter breeding or resting sites | QI is highly mobile and territories can extend 10 km from designated areas. | 10 km is likely maximum ranging of Irish otters outside SACs (O'Neill, 2008, cited in Reid *et al*., 2013). |
| Marsh fritillary individuals or their habitat | QI is highly mobile and butterflies could establish metapopulations up to 10 km beyond designated areas, as this corresponds to their potential dispersal range. | 10 km is maximum dispersal range of Irish populations of the species (Seale, 2010) and Zimmerman *et al*., (2011). |
| Atlantic salmon, Lamprey spp. (river, brook, sea), Freshwater Pearl Mussel | QIs are highly mobile, but spawning grounds are not.; effects only where spawning habitats within footprint of works. | No habitat loss / damage predicted beyond this area. |
| | Silt is highly mobile and can be dispersed throughout a river catchment. | Once released, silt could be remobilised over time potentially reaching any downstream gravels or mussel beds within the same river catchment. |

**Non-breeding bird species: ranging distance or 'spatial extents of sensitivity' for relevant QIs to the NIS**

| Wintering Bird QI (s) | Sensitivity Extent and Potential Mobility | Scientific Rationale |
|---|---|---|
| Wading Birds | Up to **5 km** for birds feeding at inland sites | Professional judgement, expert opinion from consultation exercise, and preliminary oystercatcher resighting data from Birdwatch Ireland from Dublin Bay |
| Barnacle Goose | **15-20 km** from core designated areas | SNH, 2013 |
| Greenland white-fronted goose | **8 km** from core designated areas | SNH, 2013 |
| Greylag goose | **12 km** from designated roosts/feeding sites. | Bell 1988 and Hearn, personal communication cited in JNCC (2007) |
| Light-belled goose | **15 km** from designated roosts/feeding sites. | Benson (2009) |
| Whooper Swan | **5 km** from core designated areas | SNH, 2013 |

# Appendix C. Preliminary Erosion and Sediment Control Plan

# N4-N15 Sligo Urban Improvement Scheme

Sligo County Council

## Preliminary Erosion and Sediment Control Plan

32106101_NIS_pESCP | Final

April 2017

# N4-N15 Sligo Urban Improvement Scheme

| | |
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## Contents

# 1. Introduction & Need for the Proposed Road Development

## 1.1 Overview

Sligo County Council (SCC) has developed proposals for the improvement of a section of the N4 and N15 national road corridor on the north-western extents of Sligo City; see full details in Chapter 1 of Volume 2 of the N4-N15 Sligo Urban Improvement Scheme (UIS) Environmental Assessment Report (EAR).

During construction of the proposed development there is the potential for sediment loading and associated anthropogenic polluting substances entering the watercourses in the study area including the Garavogue River/Estuary and the Copper River. The purpose of this preliminary Erosion and Sediment Control Plan (pESCP) is to describe the mitigation, control, monitoring and emergency measures that will be implemented during the construction of the proposed development in relation to erosion and sediment control.

This pESCP is intended to be a working document and will be updated by the contractor to form the detailed Erosion and Sediment Control Plan (dESCP) which will form part of the contractors Environmental Operating Plan (EOP) for the construction of the proposed development.

## 1.2 Principal Objectives of Erosion and Sediment Control

The principal objectives of erosion and sediment control as outlined in the Construction Industry Research and Information Association (CIRIA) C648 Control of Water Pollution from Linear Construction Projects: Technical Guide (Murnane *et al*. 2006) are:

- *Minimise erosion and potential for soiled water to be generated by minimising runoff;*
- *Install drainage and runoff controls before starting site clearance and earthworks;*
- *Minimise the area of exposed ground;*
- *Prevent natural clean runoff entering the works area / site;*
- *Provide appropriate control and containment measures on site;*
- *Monitor and maintain erosion and sediment controls throughout the project; and*
- *Establish vegetation as soon as practicable on all areas that have been exposed.*

## 1.3 Contract Procurement

The contract procurement for the construction of the proposed development is expected to be a traditional Employer-designed contract with permanent on-site Employer supervision throughout to monitor compliance with the NIS, EAR, EOP, dESCP and any other planning or environmental mitigation commitments given during the statutory planning process. Although this plan is preliminary it should be considered a demonstration of the level of control which is required.

The dESCP will be more detailed and may incorporate alternative details provided it can be demonstrated that it provides the same performance criteria (or higher) than those outlined in this preliminary plan.

## 1.4 Content of the Plan

This pESCP contains the following information:

- *Details of the characteristic of the site;*
- *Details of the Source - Pathway - Receptor relationship;*
- *Erosion and sediment control measures;*
- *Details of monitoring and auditing requirements; and*

- *Details on emergency procedures.*

## 1.5 Consultation

In October 2015, a number of interested parties including National Parks and Wildlife Service (NPWS) and Inland Fisheries Ireland (IFI) were contacted for any additional information that they would be able to provide relevant to the proposed development, including any environmental issues or other factors that they felt should be considered as the environmental assessment was developed.

Consultation feedback was received from IFI and NPWS as outlined in Section 5.2.2.2 in Volume 2 of the EAR. Any recommendations from this consultation that related to the construction phase of the proposed development have been incorporated into this pESCP.

The NPWS and IFI will be informed when works are about to commence on site, prior to works taking place in the Copper River and in the vicinity of the Garavogue River / Estuary and / or as outlined within this pESCP. Such advance notice will be issued as soon as practicable to ensure that these organisations are provided with sufficient time to allow inspection of the proposed control measures that are to be put in place.

# 2. Site Characteristics

## 2.1 Surface Water Features

The proposed development lies within the Western River Basin District (WRBD), Hydrometric Area (HA) 35 within the Garavogue and the Transitional and Coastal Water Management Units. The catchment of this HA is drained by the Garavogue River with all associated watercourses entering the Garavogue Estuary to the west.

The Garavogue River and Estuary is the main surface water feature that could be impacted by the proposed development as shown in Figure 6.1 of Volume 3 of the EAR. The Garavogue River and Estuary form part of the Cummeen Strand / Drumcliff Bay (Sligo Bay) SAC / pNHA and Cummeen Strand SPA. The Cummeen Strand SPA and Cummeen Strand / Drumcliff Bay SAC are located immediately adjacent to the proposed development and part of the SPA / SAC is located within the footprint of the proposed development. However, this footprint also includes existing hardstanding of the N4 national road and rock armour. The Cummeen Strand / Drumcliff Bay (Sligo Bay) SAC which includes the Garavogue River and Estuary is designated for River and Sea Lamprey. Any impact associated with increased sediment and silt release during construction could potentially impact the designated features of this watercourse.

In addition, the Copper River is a minor watercourse that could be impacted by the proposed development. This watercourse lies to the north of the Garavogue River. It discharges to the Garavogue Estuary and is connected to the Garavogue River some 3 km upstream in the townland of Hazelwood Demesne.

Drinking water is not abstracted from within the study area. Further detailed descriptions of the watercourses are provided in Chapter 6; Surface Water in Volume 2 of the EAR.

The watercourses in the study area are detailed in Table 2.1 below and shown in Figure 6.1 of Volume 3 of the EAR.

Table 2.1 Summary of Water Features in the Study Area

| No. | Water Feature Name | Location of Water Features |
|---|---|---|
| WF1 | Garavogue River | Located south of the proposed development. The Garavogue River discharges the waters of Lough Gill to the Garavogue Estuary. |
| WF2 | Garavogue Estuary | Located west of the proposed development. |
| WF3 | Copper River | Located north of the Garavogue River and flows to join the Garavogue Estuary. |

## 2.2 Water Quality

The current Water Framework Directive (WFD) status of the Garavogue River and its estuary is “good” and neither water body is classed as a heavily modified. The Environmental Protection Agency (EPA) also assesses the water quality of rivers and streams across Ireland using a biological assessment method. The EPA assigns biological river quality (biotic index) ratings from Q5 – Q1 to watercourse sections. Q5 denotes a watercourse with good water quality and high community diversity, whereas Q1 denotes very low community diversity and a bad water quality. The nearest monitoring station to the study area is some 600 m upstream on the Garavogue River and the status is Good (Q4).

In addition to regular monitoring carried out by the EPA, baseline water quality monitoring was undertaken for the proposed development in May and November 2015 at various locations along the Copper River and the Garavogue Estuary as shown in Figure 6.1 of Volume 3 of the EAR. Where available, these results are compared to the standards in the European Communities Environmental Objective (Surface Water) Regulations, S.I. 272 of 2009. Physico-chemical analysis results for the water samples show few exceedances of the guideline limits and there is no indication of pollution within the watercourses. Suspended solids results are all under the 25 mg/l annual average for salmonid waters S.I. No. 293/1988: European Communities (Quality of Salmonid Waters) Regulations, 1988.

Further detail on surface water quality is provided in Chapter 6: Surface Water in Volume 2 of the EAR.

## 2.3 Flooding

Sligo City is one of the areas under assessment in the Western RBD Catchment Flood Risk Assessment and Management Study (CFRAMS) and is therefore considered to be potentially at risk from flooding.

The Western River Basin District Flood Risk review undertaken as part of the CFRAM study indicated that there is limited evidence of frequent fluvial flooding in the Sligo area but there is evidence of tidal flood risk. The report references that the Sligo River (Copper River) is more prone to flooding than the Garavogue River. A Flood Risk Assessment (FRA), in line with the Guidelines for Planning Authorities (GPA) 20: The Planning System and Flood Risk Management (OPW, 2009), has been conducted for the proposed development. Further detail on flooding is provided in Chapter 6; Surface Water in Volume 2 and Appendix 6.1; Detailed Flood Risk Assessment in Volume 4 of the EAR.

## 2.4 Existing Surface Topography and Existing/Potential Drainage ways

Overland or sheet flow is water flowing over the ground that has yet to enter a drainage channel or similar. It usually occurs as a result of an intense period of rainfall, which exceeds the infiltration capacity of the ground. Typically, sheet flow occurs on sloping land where the ground surface is relatively impermeable as a result of either natural conditions such as soil type or geology, or as a result of development which places a large area of impervious material over the ground surface (i.e. paving or roads).

The topography of the study area is relatively flat given that most of the study area of the proposed development is on existing hard standing which would be of low permeability. There is a slight section of elevated ground in the vicinity of Salmon Point and the road then gently slopes downwards as it moves north. Currently, runoff from the N4-N15 carriageway is discharged through a kerb and gully system to a number of outfalls (providing no treatment or attenuation) directly to the Copper River and the Garavogue Estuary.

There will be a limited increase in impermeable area due to the proposed development. The proposed drainage network will be split into three separate catchments and will outfall at three locations. Two outfalls will discharge to the Copper River and eventually into the Garavogue Estuary and the third will discharge directly to the Garavogue Estuary. Petrol interceptors will be provided at the outfalls between the carriageway drainage outfall and watercourse within each drainage network.

During the proposed construction works the following potential drainage ways have been identified:

- *Any runoff/spills associated with the construction work within the footprint of the proposed development would potentially make its way to the Garavogue River and Estuary or Copper River through sheet flow or through the existing road drainage or drainage measures proposed as part of the construction works;*
- *Any runoff/spills associated with the works within estuary for the installation for the sheet piling/retaining wall would make its way to the Garavogue Estuary through sheet flow; and*
- *Any runoff/spill associated with the works within the Copper River for the bridge works would make its way to the Copper River and Garavogue Estuary through sheet flow.*

## 2.5 Soils

The following information is taken from Chapter 7: Geology, Soils and Hydrogeology of Volume 2 of the EAR and further information on soils and geology are contained within that chapter.

Table 2.2 shows the runoff potential for the different soil classes as indicated in CIRIA C648.

Table 2.2 Soil Classes and Runoff Potential (source: CIRIA C648)

| No. | General Description | Runoff Potential |
|---|---|---|
| 1 | Well-drained, sandy, loamy or earthy peat soils | Very low |

| No. | General Description | Runoff Potential |
|---|---|---|
| 2 | Very permeable soils (e.g. gravel, sand with shallow groundwater or rock) | Low |
| 3 | Very fine sands, silts and clays. Permeable soils with shallow groundwater in low-lying areas | Moderate |
| 4 | Clayey or loamy soils | High |
| 5 | Wet uplands, shallow, rocky soils on steep slopes, peats with impermeable layers at shallow depth | Very High |

The ground investigation encountered **limestone, made ground and glacial till** at the site.

**Glencar Limestone** bedrock found in the study area (which comprised of a dark fine limestone interbedded with calcareous shales) was encountered at 5.4mbgl. A Dartry Limestone formation (dark fine-grained Cherty Limestone) was encountered south of the study area, approximately 200 m to the south of the southern extent of the road alterations.

The EPA Map Viewer indicates that the entire study area is underlain by **made ground.** Made ground (comprised of sandy gravelly clay, with rubble or cobbles) was encountered ranging in depth from 1.6 mbgl to 2.3 mbgl. Asphalt and concrete was also encountered in one trial pit.

The majority of the study area is underlain by urban deposits, with a small area of till mapped to the northern part of the route between Ash Lane and the N15 Duck Street. Superficial geology is shown to be absent in a small area north-west of St. John's Hospital adjacent to Ballytivnan Road. **Glacial till** (comprised of sandy gravelly clays, locally with silt or cobbles) was encountered across the study area beneath the made ground ranging in thickness from 1 m to 3.6 m.

The runoff potential is likely to range from moderate to high within the study area due to the existing nature.

# 3. Source- Pathway – Receptors

### 3.1.1 Construction Area Units

The proposed development extends over a distance of approximately 670 m. Given the relatively short length of the proposed development it is anticipated that the construction works will be delivered in one working zone but this will be determined by the contractor during Phase 5 of the NRA Project Management Guidelines (PMG) and detailed in their dESCP.

### 3.1.2 Potential Sources of Pollution (including sediment and silt)

The potential pollution sources are outlined below.

**Earthworks** - The most significant area of concern regarding erosion and sediment control on any road construction project is soil and subsoil which are exposed during earthworks operations. These surfaces could be exposed during:

- *The initial site clearance works;*
- *Demolition works of the existing road or structures, including structural material and surrounding backfill;*
- *Works on the bridge structure over the Copper River;*
- *Construction works include retaining walls within and adjacent to watercourses including the Garavogue Estuary;*
- *Excavations including those associated with the provision of drainage works;*
- *Reconstructive and resurfacing works; and*
- *Stockpiling of acceptable, unacceptable and import earthworks material for use, reuse or removal offsite.*

The material to be excavated during the earthworks will include topsoil, made ground and glacial till. Approximately 8,000 $m^3$ of material will be excavated as part of the site clearance works. It is anticipated that none of the excavated material will be acceptable for reuse. During construction any excavated materials will be segregated where possible and stored in designated storage area(s) outside of any exclusion zones around water courses.

**Transportation** - There will be a requirement for transportation of plant, personnel and material during the proposed development. This can result in material build-up on the public road system and subsequent sediment laden runoff from the road.

The contractor will be permitted to haul on the National and Regional Road Network on specified routes on the national and regional road network, subject to agreement with Sligo County Council.

Without the prior agreement of the Local Authority the contractor will not be permitted to haul along other local roads in the vicinity of Sligo town. Haulage along other local roads as necessary between the location of the source of the material and the permitted routes will be subject to prior agreement with the relevant Local Authority. If the contractor proposes to use the local road network he/she should be required to assess the environmental impact of same in advance of any agreement.

**Watercourse Crossings** – There is one watercourse crossings of the Copper River at ch. 450-460 associated with this proposed development. The Copper River ultimately discharges to the Garavogue Estuary.

**Structures & Concrete** – There are a number of new structures required for the proposed development as detailed below in Table 3.1, full details of which are provided in Chapter 2 of the EAR. Concrete, grout and other cement-based products which would typically be used in the construction of structures are highly alkaline and corrosive and can have detrimental effect upon water quality if released so these require consideration.

Table 3.1 Proposed Structures within Study Area

| Watercourse | Structure Type | Description |
|---|---|---|
| Ch. 70-170 (northbound) Salmon Point | Retaining Wall | New retaining wall to retain widened road carriageway and minimise impact on adjacent designated area. |
| Ch. 250-330 (northbound) Salmon Point | Retaining Wall | New retaining wall to retain widened road carriageway and minimise impact on adjacent designated area. |
| Ch. 460 | Bridge | Existing twin culverts spanning Copper River to be replaced by concrete box structure. Masonry arch section to be retained. |
| Ch. 295-225 (southbound) | Retaining Wall | Existing retaining wall reconstructed at back of widened verge to minimise impact on HSE facility. |
| R291 (mainline ch. 550-565) | Retaining Wall | Existing retaining wall reconstructed at back of verge to provide adequate sightlines on approach to junction. |

**Construction Compounds including machinery re-fuelling/lubrication, Laydown and Material Storage –** Construction compounds are a potential source of pollution due to storage of fuels and stockpiles and other material storage and potential vandalism. The construction compound will potentially be located within an area of existing hardstanding (the Valet Depot) on Ballast Quay approx. c.300 m to the south-west of the proposed development. This is located approx. c.50 m from the Garavogue Estuary (at its closest point). The exact location and construction arrangements will be determined by the contractor in advance of the construction phase, with the agreement of the Local Authority.

### 3.1.3 Potential Pathways of Pollution

The potential pathway link is the flow path from an area of exposed ground or the works area to adjacent watercourses. This might include for example runoff from the works area which subsequently has a route via the ground topography or an existing drainage system to enter into adjacent watercourses. Additionally, there is the potential for pathways to be exacerbated with the removal of the cut-off wall or cofferdam from the Copper River after the construction of the replacement Copper River Bridge.

### 3.1.4 Potential Receptors of Pollution

The key receptor in terms of pollution, erosion and sediment control are:

- *The Garavogue River and Estuary which form part of Cummeen Strand SPA, the Cummeen Strand / Drumcliff Bay cSAC and pNHA - it is noted that part of the SAC and the pNHA fall within the existing road boundary, see Figure 5.1-6.1 of Volume 3 of the EAR;*
- *The Copper River which lies to the north of the Garavogue River and discharges to the Garavogue Estuary, see Figure 6.1 of Volume 3 of the EAR; and*
- *Aquatic ecology and fisheries particularly associated with the Garavogue River and Estuary and Copper River, see Chapter 5 of Volume 2 of the EAR.*

# 4. Erosion and Sediment Control Measures

## 4.1 Principal Avoidance Measures

The protection of watercourses from pollution by construction works is achieved by avoidance in the first instance. In this regard, the following avoidance measures will be implemented during the construction phase:

- *Site clearance works of excavated material will not be carried out over large areas in advance resulting in these areas being exposed for long periods of time.*
- *The earthworks construction period will be as short as possible to minimise the length of time that open ground is exposed.*
- *Transportation and journey lengths will be minimised to reduce the opportunity for material to be spilled on the road that could enter the water system via road runoff.*
- *Having an efficient earthworks operation that allows material to be removed and replaced will fill in the minimum amount of time thus reducing the ingress of water into the construction works and reducing the amount of dewatering required.*

## 4.2 Principal Control Measures

All construction works will be completed in line with the recommendations of the following guidelines:

- *'Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes' (NRA, 2005);*
- *CIRIA C648 Control of Water Pollution from Linear Construction Projects: Technical Guide (Murnane et al., 2006);*
- *CIRIA C649 Control of Water Pollution from Linear Construction Projects: Site Guide (Murnane et al., 2006);*
- *'Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors' (CIRIA, 2001);*
- *IFI Guidelines on Protection of Fisheries during Construction Works in and adjacent to Waters" (IFI, 2016); and*
- *UK Environment Agency:*
    - *PPG5 Pollution Prevention Guidelines Works and Maintenance in / or near Water;*
    - *PPG21 Incident Response Planning;*
    - *PPG22 Dealing with Spills; and*
    - *PPG26 Drums and Intermediate Bulk Containers.*

This section outlines the principal control measures that will be provided for the proposed development. The control measures for specific construction tasks and in relation to particular features such watercourse crossings are outlined in Section 4.3 to 4.9.

The Local Authority shall employ an Environmental Assurance Officer (EAO) during of the construction works and will form part of the Employer's Site Representative Team. The EAO shall have suitable environmental qualifications and report directly to the Local Authority. The Local Authority will ensure that the EAO is delegated sufficient powers under the construction contract so that he/she will be able to instruct the contractor to stop works and to direct the carrying out of emergency mitigation/clean-up operations. The EAO will also be responsible for consultation with environmental bodies including the NPWS and IFI. The EAO shall be responsible for carrying out regular Audits of the Contractor's EOP on behalf of the Local Authority.

Before works commence on site the Contractor will need to prepare an EOP in accordance with the Guidelines for the Creation and Maintenance of an EOP (National Roads Authority, 2007). Responsible personnel and communication lines should be established and documented in the EOP prior to the commencement of on-site works. The EOP will be implemented and maintained by the Contractor as a system of documenting compliance with environmental commitments and requirements during the construction of the proposed development.

The Contractor will be required to prepare the dESCP for the proposed works. The Plan will be based on and build upon the measures to prevent or reduce the amount of sediment and silt released into watercourses outlined in this pESCP.

The Contractor shall consult with the NPWS and IFI in relation to the control measures in the dESCP.

The Contractor's detailed method statements shall account for the requirements of the dESCP.

The Contractor should ensure that all sub-contractors and site supervisors are aware of the environmental commitments made in relation to the proposed development.

The proposed development has the potential to impact Garavogue Estuary which forms part of the Cummeen Strand/Drumcliff Bay SAC/pNHA and SPA so the timing of these works will be discussed with the IFI and the NPWS, in advance of the works.

The Copper River has habitat for salmonids but the fish stock status of the river is uncertain. The river is also tidal at this point. As a result there is no seasonal restriction on instream works in the Copper River.

## 4.3 Measures for the Construction Compound(s)

The construction compounds are expected to be sited within an area of existing hardstanding (the Valet Depot) on Ballast Quay. This will minimise damage to areas outside the boundary of the proposed development during construction. The following text describes the control measures that will be put in place for this or any other construction compound(s):

- *The construction compounds will be located c.50 m from the Garavogue River / Estuary and the Copper River.*
- *The main construction compounds will be located on dry land and set back from waterbodies, and outside of any ecologically sensitive areas.*
- *The impermeable area within compounds will be minimised to limit surface runoff.*
- *Any watercourses that occur in areas of land that will be used for storage facilities will be fenced off at a minimum distance of 5 m. In addition, measures will be implemented to ensure that silt laden or contaminated surface water runoff from the compound does not discharge directly to the watercourse.*
- *Storage of fuels, other hydrocarbons and other chemicals within the construction compounds will not be permitted within 50 m of a waterbody.*
- *All surface water runoff will be intercepted and directed to treatment systems for the removal of pollutants prior to discharge.*
- *All compounds will have security to deter vandalism, theft and unauthorised access.*

## 4.4 Measures for Transportation

The following principal controls will be put in place by the contractor with regard to transportation:

- *Construction will be managed by the contractor so as to minimise journey lengths.*
- *Where any excavated material is "wet" and presents a risk of splashing over the top of the trucks, the capacity of the trucks will be limited to 75% of the height of the lowest side of the truck.*
- *HGVs shall be covered, treated or secured to prevent the escape of materials.*

- *HGVs leaving and entering the site will do so via a stabilised construction entrances.*
- *Wheel washing systems will be installed at the exit of the construction compound(s) and all trucks leaving the compound will be required to pass through this facility.*
- *Road cleaning will be carried out at least daily to ensure that there is no build-up of sediment on public roads.*

## 4.5 Measures for Stockpiling

The following measures will be put in place by the contractor with regard to stockpiling of material:

- *Temporary stockpiles will be located away from drains and watercourses. Stockpiles will not be located within c.50 m of sensitive watercourse (i.e. the Garavogue River/ Estuary and Copper River).*
- *Management of stockpiles to prevent siltation of watercourse systems through runoff during rainstorms will be required with the final measures to be determined by the contractor, these may include the following:*
    - *Providing silt fences or straw barriers at the toe of the stockpile to mitigate runoff during rain events.*
    - *Surrounding stockpiles with cut-off ditches to contain runoff.*
    - *Directing any runoff to the site drainage system and to the settlement pond (or other) treatment systems.*
    - *Providing earth bunds or another form of diversion to keep runoff from entering the stockpile area.*

## 4.6 Measures for the Vegetation/Topsoil Strip

Topsoil stripping will be minimal during construction of the proposed devolvement; however the following measures will be put in place by the contractor where vegetation/topsoil stripping occurs:

- *Topsoil stripping in proximity to the Garavogue Estuary / River and Copper River will be undertaken as far as practicable in dry weather conditions.*
- *Measures such as silt fence shall be used to prevent siltation of watercourse systems through runoff during rainstorms.*

## 4.7 Measures for Earthworks

The following measures will be put in place by the contractor during the earthworks:

- *Before earthworks commence the temporary site drainage, erosion control and sediment control measures must be in place and functioning.*
- *As far as is practicable, where treatment measures (e.g. settlement ponds) are being provided they shall be located at the locations identified for the operational stage attenuation/treatment systems at each of the proposed road drainage outfalls.*
- *Runoff from the earthworks will be directed to the temporary site drainage system and to the settlement pond (or other) treatment system.*
- *Provision of exclusion zones and barriers (sediment fences, interceptor drains) between earthworks and watercourses to prevent sediment washing into the watercourses, the contractor will be required to confirm these locations in the dESCP.*
- *Where dewatering is necessary water will be directed to the temporary site drainage system and to the settlement pond (or other) treatment system.*
- *In the unlikely event of intercepting contaminated groundwater, the contaminated groundwater will removed off site to a suitably licenced facility.*

## 4.8 Measures for Working in or Near Watercourses

The proposed development will require the installation of a replacement road bridge structure over the Copper River. Three drainage outfalls will be required, two within the Copper River and another which will discharge to the Garavogue Estuary. In addition, an attenuation / treatment pond will be constructed adjacent the Copper River, the provision of which is based on the findings of the cumulative assessment undertaken under the HAWRAT assessment, see Section 6.6 and 6.7 of Volume 2 of the EAR.

The following sections outline the control measures that will be put in place to protect these waterbodies and any designated / protected features from pollution events or sediment and silt during construction.

### 4.8.1 Copper River – Construction of the Replacement Bridge & Provision of Ponds/Outfalls

The Copper River is a minor surface water feature within the study area which lies to the north of the Garavogue River. The proposed development will require the installation of a replacement bridge structure over the Copper River. In addition, there is a requirement to provide an attenuation / treatment pond and associated direct outfalls A2 and A3 to the Copper River, see Figure 2.9 of Volume 3 of the EAR. The following control measures will be implemented during the construction of the proposed development:

- *Works within and adjacent to watercourses will only be conducted during forecast low flow periods or when the tide is out.*
- *Operation of machinery in-stream should be kept to an absolute minimum. All construction machinery operating in-stream should be mechanically sound to avoid leaks of oils, hydraulic fluid, etc. Machinery should be cleaned and checked prior to commencement of in-stream works.*
- *The design of the culverts, outfalls and ponds and the construction method statements for their installation shall be agreed with IFI prior to construction.*
- *The area of disturbance of the watercourse bed and bank will be the absolute minimum required for the installation of the culvert/outfall.*
- *Any dewatering flows directed to the construction drainage system and to the settlement pond (or other) treatment system.*

In addition, the following text describes measures that are specific to the Copper River.

Before works commence on site drainage, the detailed erosion control and sediment control measures must be in place and functioning.

The construction of the bridge and outfalls, A2 and A3, in the Copper River will be undertaken in the dry to avoid sediment entering the river. To facilitate the construction of the bridge a temporary dam will be installed to at the connection to the Garavogue Estuary and upstream of the Copper River works to ensure that there is no hydraulic activity between the temporary works area and the watercourse (the Copper River and Garavogue Estuary) during construction. An impermeable material will be used and the water from the Cooper River will be overpumped to the Garavogue Estuary. The barrier should be sufficient to deal with high tide and the 1 in 200 year coastal / 1 in 100 year fluvial flood event the pump and associated equipment should be sized to deal with high flow in the Cooper River.

There is likely to be some level of water ingress therefore water entering the works areas. This water will be removed using a second water pump and directed to the temporary site drainage system and to the settlement pond (or other) treatment system prior to discharge.

The dam will be removed carefully (at low tide) and prior to removal a silt curtain / fence will be installed around the perimeter of the dam to prevent any disturbed material from entering the Copper River and Garavogue Estuary. This will remain in place post removal until the area has been stabilised.

The river banks, above and below the crossing, should not be disturbed unless directly associated with the bridge/road structure. The extent of bank-side interference and vegetation removal should be agreed, identified, documented and demarcated with appropriate fencing in advance of undertaking any construction works.

### 4.8.2 Garavogue River & Estuary – Retaining Walls & Provision of an Outfall

The Garavogue River / Estuary is a main surface water feature situated adjacent to the study area. Works will include the construction of a retaining wall on existing rock armour along the existing Garavogue Estuary shoreline to retain the widened road carriageway and prevent encroachment onto the designated shoreline.

The principal control measures described in the above section will be applicable to construction works adjacent to the Garavogue Estuary.

Before works commence on site drainage, a detailed erosion control and sediment control measures must be in place and functioning.

To facilitate the construction of the retaining wall adjacent to the Garavogue Estuary, works will be undertaken in the dry and during low tide where possible. Timber bog mats will be deployed in intertidal habitats to enable construction machinery to safely move across the cSAC / SPA while limiting impacts on these intertidal habitats. Buffer areas with silt curtains will be used to prevent direct runoff from the works area to the adjacent watercourse.

During the construction of outfall A1 in the Garavogue River, works will be undertaken in the dry to avoid sediment entering the river. To facilitate this construction a small cofferdam will be constructed using an impermeable material. There is still likely to be some level of water ingress therefore water entering the cofferdam. This water will be removed using a water pump and directed to the temporary site drainage system and to the settlement pond (or other) treatment system prior to discharge. The cofferdam will be removed carefully at low tide and prior to removal a silt curtain will be installed around the perimeter of the cofferdam to prevent any disturbed material from entering the Garavogue River.

## 4.9 Measures for Concrete Works

The use and management of concrete in or close to watercourses must be carefully controlled to avoid spillage. The following control measures will be employed to reduce the risks associated with concreting works near or within watercourses:

- *Only precast concrete pipes / units will be used in the installation of the culverts.*
- *Pouring of concrete should be carried out in the dry and allowed to cure for 48 hours before re-flooding.*
- *Pumped concrete will be monitored to ensure no accidental discharge into the watercourse.*
- *Mixer washings and excess concrete will not be discharged to surface water.*
- *Cement will be stored temporarily on site within the contractors' compounds.*
- *Hydrophilic grout and quick-setting mixes or rapid hardener additives shall be used to promote the early set of concrete surfaces exposed to water.*
- *Care will be exercised when slewing concrete skips or mobile concrete pumps over or near surface waters.*
- *Placing of concrete in or near watercourses will be carried out only under the supervision of the EAO.*
- *Any concrete spills will be contained immediately.*
- *Concrete waste and wash-down water will be contained and managed on site to prevent pollution of surface watercourses.*
- *On-site concrete batching and mixing activities will not be allowed within 50 m of the Garavogue River and Estuary and Copper River.*
- *Washout from lorries, with the exception of the chute, will not be permitted on site.*
- *Chute washout will be carried out at designated locations only. These washout locations will be signposted. The concrete plant and all delivery drivers will be informed of their location both within the order information and upon arrival on site.*

- *The designated chute washout locations will be on an impermeable surface and treatment facilities will be provided, including adequately sized settlement tanks.*
- *The water from the settlement tanks shall be pH corrected prior to discharge or alternatively disposed of as waste in accordance with the contractor's Waste Management Plan (WMP) included in the EOP.*

# 5. Monitoring and Audit

## 5.1 Introduction

A monitoring programme will be required at the pre-construction and construction stage.

This pESCP will be developed by the Contractor into the dESCP and will form part of the EOP. The dESCP will be sent to the IFI for approval. In addition, consultation on the dESCP will be carried out with the NPWS. The minimum requirements shall include all of the controls, measures, mitigation and monitoring described in this document. The monitoring of all aspects of the EOP, including the dESCP, will be carried out by the Contractor as the responsible party. The responsibilities of the Employer will be discharged by the Employer's Site Representative Team and in particular the EAO.

## 5.2 Monitoring and Audit

### 5.2.1 General

**Pre-construction Monitoring**

Pre-construction water quality monitoring will be undertaken by the contractor once every two weeks for a four month period, prior to the commencement of the construction works. Samples will be taken for total suspended solids (TSS), turbidity, pH, temperature, dissolved oxygen (DO) and hydrocarbons up and downstream of the Copper River Bridge to build upon the baseline monitoring carried out at the EAR stage and in order to further establish the baseline water quality conditions prior to the construction phase. Samples for turbidity, pH, DO and temperature will be taken in situ; samples for TSS and hydrocarbons will be sent to an accredited laboratory for analysis.

**Construction Monitoring**

Weekly during construction the contractor will monitor the levels of TSS, turbidity, pH, temperature, DO and hydrocarbons at the same locations up and down stream once a week for the duration of the following works:

- *Site clearance works, earthworks movements and stockpiling;*
- *Excavations including those associated with the provision of drainage works;*
- *Construction of the Copper River Bridge; and*
- *Construction works within and adjacent to watercourse.*

The construction monitoring results will be compared with those results established in pre-construction monitoring. In the event of an elevation above pre-construction levels an investigation will be undertaken by the contractor and remediation measure will be put in place in agreement with SCC.

In addition, daily visual inspections of the surface drainage and sediment control measures and the watercourses will be undertaken by the contractor. Indicators that water pollution may have occurred include the following:

- *Change in water colour;*
- *Change in water transparency;*
- *Increases in the level of silt in the water;*
- *Oily sheen to water surface;*
- *Floating detritus; or*
- *Scums and foams.*

These inspections shall be recorded. In the event that such indicators are observed, works will cease, sampling will be immediately undertaken as described for the weekly monitoring and an investigation of the potential cause will be undertaken by the contractor in consultation with SCC.

Where the works are identified as the source causing the exceedance the following will apply:

- *Contact will be made with SCC or their site representative;*
- *SCC will liaise with the NPWS and IFI on the issue;*
- *Works capable of generating sediment and all discharges shall be stopped immediately; and*
- *The contractor will be required to take immediate action to implement measures to ensure that such discharges do not re-occur.*

The above monitoring will alert the contractor to any detrimental effects that particular construction activities may be having on water quality in order that appropriate remedial action can be taken as quickly as possible; and allow the Contractor to demonstrate the success of the mitigation measures employed in maintaining any sediment release within the trigger value established.

### 5.2.2 Contractor

The procedures, monitoring and audit regime outlined in this section shall be used by the contractor to ensure and demonstrate the effective operation of the avoidance, control and mitigation measures for sediment and silt control. It will help the contractor to target any issues that may arise.

The following are the main procedures that will be followed:

- *The contractor will undertake a full day training course for key site staff (at a minimum the site foreman, project manager and site agent) immediately before works commence on site on the EOP, and in particular the dESCP.*
- *Environmental Checklists shall be prepared for each operation. Responsibility or completion of these checklists will be assigned to individual members of the contractor's staff. The following operations will also require an Approval-to-Work before operations can commence. These must be counter signed by the EAO:*
    - *Any in-stream works;*
    - *Placing of concrete in or within 50 m of watercourse;*
    - *Completion of sediment removal facilities prior to initial discharge to watercourse; and*
    - *Restart of works following any pollution incident.*
- *All environmental monitoring and checklists shall be recorded and added to the EOP on a daily basis.*
- *The EOP shall assign particular responsibility and monitoring duties to particular named staff and the Site Agent/Manager shall ensure that this is implemented in full. Training for each member of staff on their specific area of responsibility shall be carried out before the commencement of that operation. A record of all training carried out shall be maintained in the EOP and a further copy issued to the EAO.*
- *Monitoring shall be undertaken as described in Section 5.2.1.*
- *All mitigation/control measures shall be inspected daily by designated contractor staff and maintenance and repairs carried out immediately.*

### 5.2.3 Environmental Assurance Officer (EAO)

Separate from the on-going and detailed monitoring carried out by the contractor as part of the EOP; the EAO shall carry out the inspection / monitoring regime described below on behalf of the employer. The results will be stored in the EAO's monitoring file and will be available for inspection/audit by the client, NPWS or IFI staff. All inspections / monitoring / results will be recorded on standard forms.

- *Inspect the Principal Control Measures on a weekly basis. Report findings to the Contractor.*
- *Inspect surface water treatment measures (ponds, silt fences, sandbags etc.) on a weekly basis and obtain turbidity readings.*
- *Inspect all outfalls to watercourses on a weekly basis and obtain turbidity readings. Where excavation, pumping out or concreting works are on-going in the vicinity obtain turbidity readings three times per day.*
- *Weekly visual inspection of watercourses to which there is a discharge from the works and those where there is construction works in the vicinity.*
- *Wheel wash facilities shall be inspected on a weekly basis.*
- *Stockpiles shall be monitored on a daily basis while being filled or emptied, and otherwise on a weekly basis.*
- *Control measures for works at or near water bodies shall be inspected on a weekly basis.*
- *Concrete operations at or near watercourses shall be supervised and designated chute washing point facilities shall be inspected on a weekly basis.*
- *All site compounds shall be inspected on a weekly basis.*
- *The contractor's EOP monitoring results shall be audited on a bi-weekly.*
- *Any and all exceedance of the investigatory level for turbidity shall be reported to the NPWS and IFI and shall be investigated thoroughly by the EAO and the contractor.*
- *Where the EAO considers that the risk of a sediment release is high, he/she shall inform the contractor and request protective action to be taken. Where the contractor does not take immediate action the EAO shall instruct the contractor to take action and this shall be reported to the Contract Manager and the Client.*
- *The EAO will be delegated powers under the contract sufficient for these instructions to be issued and for an instruction to stop works or carry out emergency works.*

# 6. Emergency Procedures

## 6.1 Introduction

Prior to commencing the works, the Contractor shall prepare an Emergency Response Plan (ERP) based on a thorough risk assessment. The ERP shall detail the procedures to be undertaken in the event of the release of any sediment into a watercourse, serious spillage of chemical, fuel or other hazardous wastes (e.g. concrete), non-compliance incident with any permit or licence, or other such risks that could lead to a pollution incident, including flood risks.

## 6.2 Resources and Training

Relevant staff shall be trained in the implementation of the ERP and the use of any spill kit / control equipment, as necessary. The contractor shall provide a list of all such staff to the Employer's Site Representative detailing the name, contact number and training received, and the date of the training.

The Contractor shall provide a full list, including the exact locations, of all pollution control plant and equipment to the Employer's Site Representative. All such plant and equipment shall be maintained in place and in working order for the duration of the works.

The following training measures will be carried out to prepare site personnel for pollution / impact control:

- *Training to raise environmental awareness and pollution control awareness during inductions and toolbox talks.*
- *Comprehensive training in emergency response and spill management for key personnel.*
- *Training of an emergency response team to carryout both reactive and proactive mitigation on pollution control. This team will carry out other duties but their primary role will be environmental response.*
- *Environmental Emergency Response Drills will be carried out at a minimum of every six months.*

## 6.3 Spill Response

The ERP shall include a simplified Spill Response Procedure with the following as a minimum:

- *Instruction to stop work;*
- *Instruction to contain the spill;*
- *Details of spill clean-up material location;*
- *Name and contact details of all responsible staff;*
- *Measures particular to the location and the activity; and*
- *Instruction to contact the EAO (including Name and Contact Details).*

This Spill Response Procedure shall be displayed throughout the site and at all sensitive locations.

Emergency equipment / spill kits to facilitate the implementation of the ERP will be made available in secured locations within the area.

The EAO shall decide on whether or not the NPWS / IFI should be notified and shall also determine if and when works may proceed once corrective actions have been completed.

The main objectives of the ERP are as follows:

- *Identify the personnel required to take control of an environmental incident.*

- *Maintain a state of preparedness to prevent or reduce negative impacts on the environment as a result of an environmental incident on the site.*
- *Provide factual and timely communications to employees, regulatory authorities/prescribed bodies and the public (if required) during an incident.*

**References**


- Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes' (NRA, 2005).
- CIRIA C648 Control of Water Pollution from Linear Construction Projects: Technical Guide (Murnane *et al*., 2006).
- CIRIA C649 Control of Water Pollution from Linear Construction Projects: Site Guide (Murnane *et al*., 2006).
- Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan: National Roads Authority (NRA, 2007).
- Guidelines on Protection of Fisheries during Construction Works in and adjacent to Waters (IFI, 2016).
- N4-N15 Sligo Urban Improvement Scheme Environmental Impact Statement.
- Other EIS's for similar projects.