



Habitats Regulations Assessment

Report of Information to Inform an Appropriate Assessment:

718736-3000-R-017 SAC Watercourses

A5 Western Transport Corridor

April 2017

Produced for

TransportNI

Prepared by



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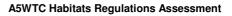
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¹ The Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995, as amended (the Habitats Regulations) indicate that the person or organisation applying for any consent, permission or other authorisation, known as the 'Project Proponent', is responsible for provision of information to support decisions by the 'Competent Authority' on the need for Appropriate Assessment and to allow the Appropriate Assessment to be undertaken. The 'Project Proponent' is taken to mean the project team, including as appropriate: Overseeing Organisation scheme or area staff; design consultants; contractors; Design Build Finance and Operate (DBFO) companies; and managing agents.





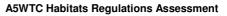
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A5WTC Habitats Regulations Assessment



Information to Inform an Appropriate Assessment: SAC Watercourses

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1 Introduction

- 1.1.1 This document is a Habitats Regulation Assessment (HRA) which contains information to be submitted to the 'Competent Authority' in order to inform the statutory assessments required under the Conservation (Natural Habitats, &c) Regulations (Northern Ireland) 1995 (as amended²), for the proposed A5 Western Transport Corridor (A5WTC) Scheme.
- 1.1.2 These regulations apply to European Natura 2000 sites³, namely Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). The Proposed Scheme would interact with the following sites, namely:
 - River Foyle and Tributaries SAC
 - River Finn (Republic of Ireland) SAC
 - Owenkillew River SAC
 - Tully Bog SAC
 - Lough Swilly (including former Inch Lough and Levels) SPA
 - Lough Foyle (Northern Ireland) SPA (and Ramsar site)
 - Lough Foyle (Republic of Ireland) SPA (and Ramsar site)
 - Lough Neagh and Lough Beg SPA (and Ramsar site)
- 1.1.3 This document (HRA SAC Watercourses) is one of four assessments, and specifically addresses the first three SAC Rivers (River Foyle and Tributaries SAC; River Finn SAC and Owenkillew River SAC).
- 1.1.4 . A further three documents have been produced, namely:
 - HRA Report Tully Bog SAC
 - HRA Report SPAs (for Lough Swilly SPA; Lough Foyle SPA; and Lough Neagh and Lough Beg SPA; and

² As amended by the Conservation (Natural Habitats, etc.) (Amendment) Regulations (Northern Ireland) 2012

³ Natura 2000 sites consist of Special Areas of Conservation (SACs) designated under European Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Flora and Fauna (the 'Habitats Directive') and Special Protection Areas (SPAs) designated under Directive 2009/147/EC, (the codified version of 79/409/EEC as amended) on the conservation of wild birds (the 'Birds Directive.')



- Ramsar Site Assessment Report⁴ (for Lough Foyle Ramsar Sites (NI and RoI); and Lough Neagh and Lough Beg Ramsar Site.
- 1.1.5 This information is currently in draft form for consultation, and is being submitted to Loughs Agency and the Department of Agriculture, Environment, and Rural Affairs (DAERA) as statutory consultee for the designated sites in Northern Ireland, and to the National Parks and Wildlife Service (NPWS) in the Republic of Ireland. The general public are also invited to provide responses relating to the information and findings contained in the report⁵. The information and comments received in response to the consultations will then be considered by TransportNI and the Minister, when undertaking the Appropriate Assessments required in advance of a decision to proceed or not with the Scheme, in accordance with the requirements of the Directive and Regulations.

1.2 Background

- 1.2.1 The A5 Western Transport Corridor (A5WTC) is one of five key transport corridors making up the strategic road network across Northern Ireland. The Department for Infrastructure (DfI) TransportNI (TNI) is promoting the dualling of the A5WTC as part of its improvement programme. This project would significantly improve safety and journey times along this route and, in addition to improving the links between the urban centres in the west of the province, provide a strategic link with international gateways. At the border with the Republic of Ireland it will connect with the N2 route which the Irish Government also has longer term plans to upgrade. It passes through New Buildings, Strabane, Sion Mills, Newtownstewart, Omagh and Aughnacloy.
- 1.2.2 The proposed new A5WTC dual carriageway runs for some 85km between the existing A5 north of New Buildings and the existing A5 south of Aughnacloy. The proposal will ultimately link up with an allied proposal in the Republic of Ireland, however as that proposal has not progressed to any meaningful stage which allows assessment, the current documents provide comprehensive assessments of the foreseeable proposals designed to date.
- 1.2.3 It is anticipated the construction of the proposed scheme will be undertaken in three phases as follows, and shown on Sheets 1 to 24 (Appendix 1):
 - construction of junctions 1-3 (New Buildings Strabane North) and junctions 13-15 (Omagh South – A4,Ballygawley) between 2017 and 2019;
 - construction of junctions 3-13 (Strabane North Omagh South) between 2021 and 2023; and

⁴ Ramsar sites are not referred to under the Directives or their transposition into UK and ROI Regulations. However, Planning Policy Statement 2 (PPS2) in Northern Ireland applies the same level of consideration and protection to them as to Natura 2000 sites.

⁵ The Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (to which the UK is a signatory) requires [at Article 3]:- 'Each Party shall promote environmental education and environmental awareness among the public, especially on how to obtain access to information, to participate in decision-making and to obtain access to justice in environmental matters'.



- construction of junction 15 (A4,Ballygawley) to the A5 south of Aughnacloy between 2026 and 2028.
- 1.2.4 The currently proposed A5WTC Scheme substantially reflects a previous proposal which was promoted in 2010 and for which an Environmental Statement (A5WTC ES 2010) was prepared and published. The environmental studies reported in the A5WTC ES 2010 were informed by a draft Habitats Regulations Assessment (HRA) which recognised and screened⁶ the above European Designated Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) for likely significant effects. A judicial review of the scheme in 2013 found the ES to be robust, but upheld a complaint that the HRA reporting relating to the Habitats Regulations should have been taken to the next level, namely a Stage 2 assessment⁷.
- 1.2.5 Further studies have since been completed to address this need for a more robust habitats regulations assessment, and a new Environmental Statement (A5WTC ES 2016) was prepared and published based on this information.
- 1.2.6 The 2016 Environmental Statement (ES), along with the draft vesting orders and other statutory procedures, were subject to a Public Inquiry from October to December 2016. Accordingly, the production of the current suite of HRA Reports have been programmed to ensure they contain the most up to date information.

1.3 Preparation of the HRA

1.3.1 The primary author of this report is Stuart Ireland B.Sc. (Hons), MCIEEM, CEnv. He is expert in ecological matters and the full spectrum of environmental assessment techniques, methodologies and statutes. Academically, he holds a combined honours degree in Zoology with Marine Zoology from UCNW Bangor, and professionally, is a member of relevant Institutes requiring the highest standards of professional competence and integrity. He is a

⁶ The SACs and SPAs were subject to a screening exercise (Test of Likely Significance (ToLS) to determine if the proposed scheme, with its proposed and committed mitigation measures, would be likely to have a significant effect on the integrity of any of the sites considered. The ToLS process is commonly referred to as Stage 1 of the Habitats Regulations Assessment (HRA) process. When completed, the ToLS concluded the impacts of the proposed scheme (subject to mitigation) would not be likely to have a significant effect upon the integrity of the implicated designated sites in the context of the Habitats or Birds Directives, a conclusion which was agreed with by Northern Ireland Environment Agency (NIEA), the statutory consultee relative to the designated sites in Northern Ireland and the National Parks and Wildlife Service (NPWS) the organisation charged with the implementation of the Habitats and Birds Directives in the ROI.

⁷ The challenge to the consent for the proposed scheme was made in the context that potential impacts upon the River Foyle and Tributaries SAC should have been subject to Stage 2 of the Habitats Regulations Assessment (Appropriate Assessment). This challenge was upheld. The finding was informed by concerns raised by Loughs Agency in responses to the 2010 ES and presented in verbal submissions to the public inquiries held in 2011 concerning the protection of Atlantic salmon (Salmo salar), and clarifications through case law relative to the interpretation of 'likelihood' in the context of screening for likely significant effects as referred to in the Habitats Directive and the Regulations.





Chartered Environmentalist, and a full member of the Chartered Institute of Ecology and Environmental Management.

- 1.3.2 Stuart has practised for 17 years, during which time he has undertaken complex Ecological Impact assessments, Habitats Regulations Assessments for nationally important infrastructure schemes. He has been involved with the A5WTC proposal since its inception in 2008 and is familiar with both the proposal site and the full spectrum of environmental parameters which have influenced the design of the proposal.
- 1.3.3 Stuart has provided ecological advice services for major road schemes, including the Roscommon Way Extension scheme in Essex, ensuring that construction of a flood relief road through a SSSI was undertaken in a manner which preserved the ecological function of the site and its supported species. He has appeared as an Expert Witness on ecological matters and has significant experience in Habitat Regulations Assessments, including working with clients, contractors and Statutory Consultees to design schemes to ensure protection of Natura 2000 sites and their conservation objectives.

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2 The HRA Process

2.1 Objectives

- 2.1.1 The overall aims of the Habitats and Birds Directives are to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives, and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the best examples of them. European and national legislation places a collective obligation on its member states and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation status.
- 2.1.2 The maintenance of habitats and species within Natura 2000 sites at favourable conservation status will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.
- 2.1.3 Favourable conservation status of a site is achieved when:
 - The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
 - The conservation status of its typical species is favourable.
- 2.1.4 The favourable conservation status of a species is achieved when:
 - Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
 - The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
 - There is, and will probably continue to be, a sufficiently large habitat to maintain its Population's on a long-term basis.
- 2.1.5 The Habitats Directive promotes a hierarchy of avoidance, mitigation and compensatory measures. Accordingly, recognition of the importance of the identified designated sites within the Scheme study area and undertaking habitats assessment appraisals has been ongoing, and has occurred iteratively throughout the development of the A5WTC Scheme, and has significantly influenced the Scheme design.
- 2.1.6 In the first instance, the Scheme has aimed to avoid any negative impacts on European sites by identifying possible impacts early in the development of the Scheme, and has avoided sites as much as possible during the corridor and route options appraisal.
- 2.1.7 Following that, mitigation measures have been applied where necessary, with the aim of ensuring that no significant adverse impacts on the Sites remain.



2.1.8 The purpose of this HRA report is to provide information on the likely significant effects of the Scheme on the qualifying features of the respective designated sites, identify the mitigation measures proposed, and to assess whether the mitigation measures will ensure that the favourable conservation status of the each of the Sites is maintained.

2.2 Approach to Habitat Regulations Assessment

- 2.2.1 The gathering and presentation of the information in this document has been informed by the guidance provided in 'Managing Natura 2000 Sites, the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (EC, 2000 & 2001)', and 'Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC'. Further useful guidance is provided by Section 4, Part 1 of Volume 11 of the Design Manual for Roads and Bridges (DMRB) (HD44/09).
- 2.2.2 In accordance with the guidance, a staged approach is taken to the assessment of plans and projects under the Habitat Regulations:

Stage 1: Screening/Test of likely Significance

This is where it is established if an Appropriate Assessment is required and is referred to as 'screening'. Its purpose is to identify the likely impacts upon a Natura 2000 Site of a project or a plan, either alone or in combination with other plans or projects and considers whether these impacts are likely to be significant. It will include:

- A description of the project;
- Identification of relevant Natura 2000 sites potentially affected;
- Identification and description of individual and cumulative impacts likely to result from implementation of the project;
- · Assessment of the significance of the impacts identified above on site integrity; and
- Exclusion of sites where it can be objectively concluded that there will be no significant effects.

Stage 2 : Appropriate Assessment

This stage considers the potential impacts on the structure and function, as well as the conservation objectives of the Natura 2000 Sites that the Proposal may have either alone or in combination with other projects or plans. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts is presented. This stage will include:

- A description of the Natura 2000 sites that will be considered further in the AA;
- A description of significant impacts on the conservation feature of these sites likely to occur from the Plan;





- Mitigation Measures; and
- Conclusions.

Stage 3: Assessment of alternative solutions

This process examines alternative ways of achieving the objectives of the Proposal that avoid adverse impacts on the integrity of the Natura 2000 sites.

Stage 4: Imperative reasons of overriding public interest

This stage is the main reason of exemption from Article 6(4) which examines whether there are imperative reasons of overriding public interest (IROPI), and where no alternative solutions exist, for allowing a plan or project which will have adverse effects on the integrity of a Natura 2000 site to proceed.

2.2.3 This HRA report addresses Stage 1 and Stage 2 of the HRA Process.

Note: For the purposes of this assessment, the term 'likely' is applied within the proper meaning of the term as defined in the corpus of EU environmental law. In that sense, a 'likely' significant effect is deemed herein to be not one which is more likely than not to occur, but rather one with a genuine possibility of occurrence, no matter how small that likelihood may be. That being so, the precautionary principle required in HRA is integrated into the very heart of the assessment methodology and the assessment is thus as robust as possible.

The definition for 'integrity' adopted in this report is that provided in ODPM Circular 06/2005 and Defra Circular 01/2005 - *Biodiversity and Geological conservation – Statutory obligations and their impact within the planning system*, which defines integrity in the context of designated sites as:

The coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified



3 Stage 1 – Screening

3.1.1 As discussed above, the first stage of an HRA assessment is to consider whether a project could cause 'likely significant effect' on the qualifying features of the Natura 2000 site(s), alone or in-combination with other plans/projects. In line with EU Guidance, and the DMRB method of assessment, screening matrices have been completed for each of the potentially affected Natura 2000 sites. Tables 3.1 to 3.3 provide this information and are supported by reference to the A5WTC ES 2010 and the A5WTC ES 2016.

Table 3.1 HRA Screening Matrix for the River Foyle and Tributaries SAC

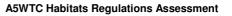
| Table 3.1 Screening Matrix for the River Foyle and Tributaries | | | |
|--|-----------------|--|-------------------------------|
| Project Name: | | A5 Western Transport Corridor (WTC) | |
| Natura 2000 Site under Consideration: | | River Foyle and Tributaries SAC (UK00303320) | |
| Date: | Author (Name | /Organisation): | Verified (Name/Organisation): |
| March 2017 | Stuart Ireland, | Mouchel | Paul Reid, Mouchel |

Description of Project

The proposed 85km A5 Western Transport Corridor (A5 WTC) scheme forms part of a strategically important transport route between Londonderry/Derry in Northern Ireland (NI) and to Dublin in the Republic of Ireland (ROI). The proposed scheme involves replacement of the existing A5 from a point north of New Buildings Londonderry in the north to a point south of Aughnacloy in the south with a dual carriageway along an alignment off-line from the existing road. In NI the existing road passes through New Buildings, Strabane, Sion Mills, Newtownstewart, Omagh and Aughnacloy. The proposed scheme will cross the River Foyle and Tributaries SAC in 2 locations and be close to the designated site in a number of other locations. It is anticipated the proposed scheme will be built in three phases starting with Phase 1 to commence in 2017, Phase 2 in 2021 and Phase 3 in 2026. It is anticipated that each phase will take some 2 to 3 years to construct.

Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:

| Size and scale (road type and probable traffic volume) | The project involves the construction of an 85 km long dual carriageway involving the crossing of large number of watercourses that will run for the entire length of the scheme, with associated drainage and local road improvements. Traffic volumes are anticipated to be a maximum of 23300 AADT (to the nearest 100) by 2040. This may impact on water quality and thus on features of the SAC. |
|--|---|
| Land-take | Some works will take place within the margins of river channels within the SAC, these are the installation of outfalls and associated headwalls (>0.01ha), and erosion protection for bridge foundations |





| Table 3.1 Screening Matrix for the River Foyle and Tributaries | | | | |
|---|--|--|--|--|
| | (>0.04ha). Works are also proposed for the river banks where river crossings are required. There will not be any land-take which directly removes qualifying habitat features. Outside of the SAC, works proposed to culvert and re-align watercourses could have impacts upon species qualifying features of the SAC. | | | |
| Distance from the European Site or key features of the site (from edge of the project assessment corridor) | Works will be required within the SAC in two locations; at the River Mourne close to its confluence with the River Finn and River Foyle to the north-west of Strabane and at the River Derg some 400m west of its confluence with the River Strule and River Mourne. The proposed scheme will also be located within 50m of the SAC west of Magheramason and Strabane. Part of the proposed scheme will be located along or close to watercourses associated with the River Foyle Catchment upstream of the designated site. | | | |
| | In all instances the construction and proximity of the proposed scheme is such that its implementation could involve direct loss of primary or qualifying habitat which are identified in the citation for the SAC. It could also involve loss of such habitat as a result of sedimentation or release of other pollutants associated with construction and discharge of sediments and other traffic related pollutants associated with drainage of run off. From the road once it is open to use. | | | |
| | The construction and implementation of the proposed scheme could also have an impact on Atlantic salmon and otter as the two species identified as primary and qualifying species respectively in the citation for the SAC. | | | |
| Resource requirements (from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts) | The proposed scheme will not involve the winning or uses of resources within the designated site or along watercourses associated with the River Foyle Catchment upstream of the designated site. | | | |
| Emissions (e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution) | The drainage for the proposed scheme involves the discharge of road related run-off and run-off from earthworks within the road corridor boundary to watercourses within the SAC and tributaries of the watercourses within the SAC. The principal watercourses within the SAC comprise the River Foyle, the River Mourne, the River Strule and the River Derg. | | | |
| Excavation requirements (e.g. impacts of local hydrogeology) | The proposed works are likely to have impacts upon the local drainage systems and excavations in close proximity to sensitive watercourses, including construction of major structures. | | | |

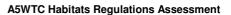


| Table 3.1 Screening Matrix for | or the River Foyle and Tributaries | | |
|--|--|--|--|
| Transportation requirements | Transportation of equipment through the SAC is not required, although works nearby the watercourse will require machinery to be in close proximity. Temporary bridges will be provided across the watercourses for construction traffic to avoid causing significant congestion on the current A5. | | |
| Duration of construction, operation, etc. | It is anticipated that construction of phases 1 and 2 will last for approximately three years in each instance. Phase 3 is located outside of the River Foyle Catchment such that its construction will have no implications for the SAC. | | |
| Other | None | | |
| Description of avoidance and/or mi | tigation measures | | |
| Describe any assumed (plainly information on: | established and uncontroversial) mitigation measures, including | | |
| Nature of proposals | Open span crossings of Mourne and Derg. | | |
| | Box culverts at minor watercourse crossings with salmonid spawning or nursery potential. | | |
| | Treatment of water outfalling from the scheme to reduce pollutants and sediment. | | |
| | Provision of otter passage culverts or ledges. | | |
| | These measures are known to be effective, provided they are correctly implemented. | | |
| Location | 5. Mourne and Derg crossings | | |
| | 6. Throughout the scheme. | | |
| | 7. Throughout the scheme. | | |
| | 8. Where otter use of watercourses has been noted. | | |
| Evidence for effectiveness | 1& 2. CIRIA Construction Guidance Pollution Prevention Guidance (PPG) | | |
| | 3. HAWRAT assessment methodology. | | |
| | 4. DMRB guidance on otter and roads. | | |
| | These measures are known to be effective, provided they are correctly implemented. | | |
| Mechanism for delivery (legal conditions, restrictions or other legally enforceable obligations) | Transport NI will place contractual obligations on contractors to provide all necessary mitigation. Environmental Representatives employed by Transport NI will monitor the proposed scheme | | |





| Table 3.1 Screening Matrix for the River Foyle and Tributaries | | | | |
|--|---|--|--|--|
| | throughout construction. | | | |
| Characteristics of European Site(s) | | | | |
| A brief description of the European | Site should be produced, including information on: | | | |
| Name of European Site and its EU code | River Foyle and Tributaries SAC (UK00303320) | | | |
| Location and distance of the European Site from the proposed works | The River Foyle and Tributaries SAC extends from Magheramason in the north to Newtownstewart following the Rivers Foyle, Mourne and Strule, along the River Finn from the confluence with the Mourne to Clady, and along the River Derg from the confluence with the River Strule up into the headwaters. As a cross boundary river, the designation in the Rivers Foyle and Finn extend only to the border between Northern Ireland and the Republic of Ireland. | | | |
| | The proposed works impinge on the boundary of the SAC watercourses through installation of outfalls and where two bridges span the designated rivers. | | | |
| European Site size | 770.12 ha | | | |
| Key features of the European Site | The primary reasons for selection of the site are: | | | |
| including the primary reasons for selection and any other qualifying interests | Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation. | | | |
| THE ESTS | Atlantic salmon <i>Salmo salar</i> – the river has the largest population of Atlantic salmon in Northern Ireland, with c. 15% of the estimated spawning numbers. The majority of individuals returning are grilse (single wintering salmon) with a smaller number of spring salmon (multi-wintering salmon). Research has shown the presence of genetically distinct salmon in individual sub-catchments. | | | |
| | Qualifying features present, but not a primary reason for site selection: | | | |
| | Otter <i>Lutra lutra</i> – for which the area is considered to support a significant presence. | | | |
| Vulnerability of the European Site – any information available from | The site is particularly vulnerable to deterioration in water quality, which is both a localised and widespread issue within the catchment. | | | |
| the standard data forms or potential effect pathways | Poor water quality, as a result of point-source and diffuse pollution within the catchment, and increased sedimentation can be significant influences on populations of Atlantic salmon and otter, as well as altering the biological composition of the river ecosystem. | | | |
| | There are many potential effect pathways, with discharges into watercourses (construction and operational) and construction | | | |





| Table 3.1 Screening Matrix for | or the River Foyle and Tributaries |
|--|--|
| | activities nearby watercourses evident. It should be noted that due to the nature of the riverine ecosystem, discharges in rivers upstream of the SAC can lead to significant impacts upon the SAC. |
| European Site conservation | Atlantic Salmon: |
| objectives – where these are readily available | Maintain and if possible expand existing population numbers and distribution (preferably through natural recruitment), and improve age structure of population. |
| | Maintain and if possible enhance the extent and quality of suitable Salmon habitat - particularly the chemical and biological quality of the water and the condition of the river channel and substrate. |
| | Water courses of plain to montane levels with the <i>Ranunculus fluitans</i> and <i>Callitricho-Batrachion</i> vegetation: |
| | Maintain and if possible enhance extent and composition of community. |
| | Improve water quality |
| | Improve channel substrate quality by reducing siltation. |
| | Maintain and if feasible enhance the river morphology |
| | Otter: |
| | Maintain and if possible increase population numbers and distribution. |
| | Maintain the extent and quality of suitable Otter habitat, in particular the chemical and biological quality of the water and all associated wetland habitats |

Assessment Criteria

Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site.

Destruction or loss of part of the SAC

Minor land take of river banks for construction of proposed bridge erosion control, and for installation of outfalls and associated headwalls is anticipated.

Potential degradation of the habitat - water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation

There is no anticipated direct loss of habitat extent as a result of construction or water quality deterioration as clear-span structures are provided. Shading may occur on small areas of qualifying habitat at the River Mourne and River Derg crossings. Water quality impacts are considered to be slight in three specific locations and due to the catchments size and ability to absorb minor water quality changes, neutral overall. The potential effects of sedimentation and other waterborne pollutants on features downstream of

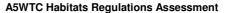




Table 3.1 Screening Matrix for the River Foyle and Tributaries

works cannot be ruled out without significant further investigation.

Potential habitat degradation of the SAC and indirect effects to Atlantic salmon and otter

The scheme could result in the loss, degradation and fragmentation of some habitat relevant to Atlantic salmon and otter. This could give rise to significant effects on the site.

Potential impacts upon Atlantic salmon and otter

The scheme could give rise to significant effects as a result of construction procedures, water quality deterioration or disturbance due to light, noise and vibration. The scheme could increase the mortality of otter.

Initial Assessment

The key characteristics of the site and the details of the European Site should be considered in identifying potential impacts.

Describe any likely changes to the site arising as a result of:

| Reduction of habitat area | No direct loss of qualifying habitats, however there is a low risk of loss of qualifying habitat downstream of works due to sedimentation. Minor loss of marginal, emergent and bankside vegetation is anticipated. |
|---|---|
| Disturbance to key species | Both Atlantic salmon and otter could be subject to disturbance. |
| Habitat or species fragmentation | The scheme could cause a significant effect to species due to fragmentation of otter and salmon habitat. |
| Reduction in species density | The scheme could result in a reduction in species density through pollution/sedimentation of reproductive habitat, and through an increase in road-related otter mortality. |
| Changes in key indicators of conservation value (water quality, etc.) | The scheme could result in changes in water quality a key indicator of conservation value. |
| Climate change | The scheme has the potential to contribute to the problem of climate change by increasing the carrying capacity of the current road network. |

Describe any likely impacts on the European Site as a whole in terms of:

| Interference with the key relationships that define the structure of the site | The scheme could cause fragmentation of otter and fish habitat. |
|---|---|
|---|---|





| Table 3.1 Screening Matrix for the River Foyle and Tributaries | | |
|---|--|--|
| Interference with key relationships that define the function of the site | The scheme could result in a reduction in the density and distribution of Atlantic salmon and otter through habitat severance, loss and decrease in water quality. | |
| Indicate the significance as a result | of the identification of impacts set out above in terms of: | |
| Reduction of habitat area | Negligible reduction in bankside and marginal habitat for otter and salmon. Low risk of qualifying habitat area reduction downstream of works. | |
| Disturbance to key species | There could be a significant effect subject to mitigation. | |
| Habitat or species fragmentation | There could be a significant effect subject to mitigation. | |
| Loss | There could be a significant effect subject to mitigation. | |
| Fragmentation | There could be a significant effect subject to mitigation. | |
| Disruption | There could be a significant effect subject to mitigation. | |
| Change to key elements of the site (e.g. water quality, hydrological regime etc.) | There could be a significant effect subject to mitigation. | |
| Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known | | |
| Outcome of screening stage (delete as appropriate). | Significant Effect Possible on Habitats, Salmon and Otter. Assessment progressed to Stage 2. | |
| Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence). | YES | |



Table 3.2 HRA Screening Matrix for the River Finn SAC

| Table 3.2 (Stage 1) Screening Matrix for River Finn SAC | | | |
|---|-----------------------------|-------------------------------------|-------------------------------|
| Project Name: | | A5 Western Transport Corridor (WTC) | |
| Natura 2000 Site under Consideration: | | River Finn SAC (IE0002301) | |
| Date: | Author (Name/Organisation): | | Verified (Name/Organisation): |
| June 2013 | Stuart Ireland, | Mouchel | Paul Reid, Mouchel |

Description of Project

The proposed 85km A5 Western Transport Corridor (A5 WTC) scheme forms part of a strategically important transport route between Londonderry/Derry in Northern Ireland (NI) and to Dublin in the Republic of Ireland (ROI). The proposed scheme involves replacement of the existing A5 from a point north of New Buildings Londonderry in the north to a point south of Aughnacloy in the south with a dual carriageway along an alignment off-line from the existing road. In NI the existing road passes through New Buildings, Strabane, Sion Mills, Newtownstewart, Omagh and Aughnacloy. The proposed scheme does not cross the River Finn SAC but will be close to the designated site in a number of locations. It is anticipated the proposed scheme will be built in three phases starting with Phase 1 to commence in 2017, Phase 2 in 2021 and Phase 3 in 2026. It is anticipated that each phase will take some 2 to 3 years to construct.

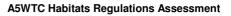
Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:

| Size and scale (road type and probable traffic volume) | The project involves the construction of an 85 km long dual carriageway involving the crossing of large number of watercourses that will run for the entire length of the scheme, with associated drainage and local road improvements. Traffic volumes are anticipated to be a maximum of 23300 AADT (to the nearest 100) by 2040. This may impact on water quality and thus on features of the SAC. |
|---|---|
| Land-take | There are no proposed works to take place within the river channel, however works are proposed for the river banks where drainage outfalls are required. |
| Distance from the European Site or key features of the site (from edge of the project assessment corridor) | The proposed scheme will come within 50m of the River Finn SAC at its closest point. There will also be some construction of drainage outfalls and their associated headwalls on the banks of the river, which while this is the River Foyle & Tributaries SAC at this point, this differentiation is caused by the international border, not by any separation of the river itself. |
| Resource requirements (from the European Site or from | None |



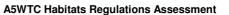


| Table 3.2 (Stage 1) Screening N | Matrix for River Finn SAC | |
|---|--|--|
| areas in proximity to the site, where of relevance to consideration of impacts) | | |
| Emissions (e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution) | The drainage for the proposed scheme involves the discharge of road related run-off and run-off from earthworks within the road corridor boundary to watercourses within the SAC and tributaries of the watercourses within the SAC. | |
| Excavation requirements (e.g. impacts on local hydrogeology) | The proposed works are likely to have impacts upon the local drainage systems and excavations in close proximity to sensitive watercourses, including construction of major structures. | |
| Transportation requirements | Transportation of equipment through the SAC is not required, although works nearby the watercourse will require machinery to be in close proximity | |
| Duration of construction, operation, etc. | It is anticipated that construction of phases 1 and 2 will last for approximately three years in each instance. Phase 3 is located outside of the River Foyle Catchment such that its construction will have no implications for the SAC. | |
| | | |
| Other | None | |
| Description of avoidance and/or | | |
| Description of avoidance and/or Describe any assumed (plai | mitigation measures | |
| Description of avoidance and/or Describe any assumed (plai information on: | nly established and uncontroversial) mitigation measures, including 1. Construction of box culverts at minor watercourse crossings where salmonid interest has been noted. 2. Treatment of water outfalling from the scheme to reduce pollutants and sediment. 3. Provision of otter passage culverts or ledges. These measures are known to be effective, provided they are correctly | |





| Table 3.2 (Stage 1) Screening Matrix for River Finn SAC | | |
|--|--|--|
| | These measures are known to be effective, provided they are correctly implemented. | |
| Mechanism for delivery (legal conditions, restrictions or other legally enforceable obligations) | Transport NI will place contractual obligations on contractors to provide all necessary mitigation. Environmental Representatives employed by Transport NI will monitor the proposed scheme throughout construction. | |
| Characteristics of European Site | e(s) | |
| A brief description of the Europe | ean Site should be produced, including information on: | |
| Name of European Site and its EU code | River Finn SAC (IE002301) | |
| Location and distance of the European Site from the proposed works | The River Finn SAC extends along the River Foyle and River Finn on the Republic of Ireland side of the border from Drumnashear in the north to Cloghfin. The river catchment upstream of Cloghfin into the headwaters falls under this SAC designation. | |
| | The proposed scheme will come within 50m of the River Finn SAC at its closest point. There will also be some construction of drainage outfalls and their associated headwalls on the banks of the river, which while this is the River Foyle & Tributaries SAC at this point, this differentiation is caused by the international border, not by any separation of the river itself. | |
| European Site size | c. 1290 ha | |
| Key features of the European | The primary reasons for selection of the site are: | |
| Site including the primary reasons for selection and any other qualifying interests | Upland blanket bog - occurs throughout much of the upland area along the river margins. The bog habitats contain a variety of bog flora, including the scarce bog moss <i>Sphagnum imbricatum</i> . | |
| | Qualifying features present, but not a primary reason for site selection, include: | |
| | Lowland oligotrophic lakes - there are many small lakes within the site, but of note are Loughs Finn, Belshade and Derg. Typical species are present in the lake margins and Arctic Charr Salvelinus alpinus are present in Lough Finn. | |
| | Northern Atlantic wet heath with <i>Erica tetralix</i> - associated with the blanket bog throughout the site, on shallow peats and better drained slopes. | |
| | Transitional mires - occur at several locations, usually at the interface between bog or lake or stream. The diversity of the mires, including diagnostic species, is good. | |





| Table 3.2 (Stage 1) Screening Matrix for River Finn SAC | | |
|---|--|--|
| | Atlantic salmon <i>Salmo salar</i> - The Finn is important in an international context in that it's populations of spring salmon appear to be stable while declining in many areas of Ireland and Europe. The estimated rod catch from the Finn is c. 500 – 800 spring salmon and 4,000 grilse, annually producing about 40% of the total Foyle count. Otter Lutra lutra. | |
| Vulnerability of the European | The site is particularly vulnerable to deterioration in water quality, which | |
| Site – any information | arises as a result of farming practices within the catchment. | |
| available from the standard data forms on potential effect pathways | Sedimentation and acidification are also considered to be threats to the SAC, in particular the sedimentation of spawning gravels. | |
| | There are many potential effect pathways, with discharges into watercourses (construction and operational) and construction activities nearby watercourses evident. | |
| European Site conservation objectives – where these are readily available | To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected: | |
| | [1106] Salmo salar (only in fresh water) | |
| | [1355] Lutra lutra | |
| | [3110] Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>) | |
| | [4010] Northern Atlantic wet heaths with Erica tetralix | |
| | [7130] Blanket bogs (* if active only) | |
| | [7140] Transition mires and quaking bogs | |

Assessment Criteria

Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site.

Destruction or loss of part of the SAC

There is no direct land take of the SAC.

Potential degradation of Annexe I habitats.

There is no potential for the scheme to affect the Annexe I habitats for which the site receives designation as these are all present upstream in the catchment and distanced from the proposed scheme.

Potential habitat degradation of the SAC and indirect effects to Atlantic salmon and otter

Although the proposed scheme has no direct land take within the SAC, the scheme could result in the loss, degradation and fragmentation of some habitat relevant to Atlantic salmon and otter. This could give rise to significant effects on the site.



Table 3.2 (Stage 1) Screening Matrix for River Finn SAC

Potential impacts upon Atlantic salmon and otter

The scheme could give rise to significant effects as a result of construction procedures, water quality deterioration or disturbance due to light, noise and vibration, although most of these effects would be outside of the SAC itself.

Initial Assessment

The key characteristics of the site and the details of the European Site should be considered in identifying potential impacts.

Describe any likely changes to the site arising as a result of:

| Describe any likely changes to the site ansing | as a result of. | |
|---|---|--|
| Reduction of habitat area | In is not anticipated that there will be any change in the habitat area of the SAC as a result of this project. | |
| Disturbance to key species | Both Atlantic salmon and otter could be subject to disturbance outside of the SAC. | |
| Habitat or species fragmentation | The scheme could cause a significant effect to species due to fragmentation of otter and salmon habitat outside of the SAC. | |
| Reduction in species density | The scheme could result in a reduction in species density through pollution/sedimentation of reproductive habitat outside of the SAC, and through road-related otter mortality. | |
| Changes in key indicators of conservation value (water quality, etc.) | Without mitigation the scheme could result in changes in water quality, a key indicator of conservation value. | |
| Climate change | The scheme has the potential to contribute to the problem of climate change by increasing the carrying capacity of the current road network. | |
| Describe any likely impacts on the European Site as a whole in terms of: | | |
| Interference with the key relationships that define the structure of the site | The scheme could cause fragmentation of otter and fish habitat. | |
| Interference with key relationships that define the function of the site | The scheme could result in a reduction in the density and distribution of Atlantic salmon and otter through habitat severance, loss and decrease in water quality. | |
| Indicate the significance as a result of the identification of impacts set out above in terms of: | | |
| Reduction of habitat area | None | |
| Disturbance to key species | There could be a significant effect subject to mitigation. | |





| Table 3.2 (Stage 1) Screening Matrix for River Finn SAC | | |
|--|--|--|
| Habitat or species fragmentation | There could be a significant effect subject to mitigation. | |
| Loss | There could be a significant effect subject to mitigation. | |
| Fragmentation | There could be a significant effect subject to mitigation. | |
| Disruption | There could be a significant effect subject to mitigation. | |
| Change to key elements of the site (e.g. water quality, hydrological regime etc.) | There could be a significant effect subject to mitigation. | |
| Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known. | | |
| Outcome of screening stage (delete as appropriate). | Significant Effect Possible on Habitats, Salmon and Otter. Assessment progressed to Stage 2. | |
| Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence). | YES | |

Table 3.3 HRA Screening Matrix for the Owenkillew River SAC

| Table 3.3 (Stage 1) Screening Matrix for the Owenkillew River SAC | | |
|---|--|-------------------------------|
| Project Name: A5 Western Transport Corridor (WTC) | | dor (WTC) |
| Natura 2000 Site unde Consideration: | under Owenkillew River SAC (UK0030233) | |
| Date: | Author (Name/Organisation): | Verified (Name/Organisation): |
| June 2013 | Stuart Ireland, Mouchel | Paul Reid, Mouchel |

Description of Project

The proposed 85km A5 Western Transport Corridor (A5 WTC) scheme forms part of a strategically important transport route between Londonderry/Derry in Northern Ireland (NI) and to Dublin in the Republic of Ireland (ROI). The proposed scheme involves replacement of the existing A5 from a point north of New Buildings Londonderry in the north to a point south of Aughnacloy in the south with a dual carriageway along an alignment off-line from the existing road. In NI the existing road passes through New Buildings, Strabane, Sion Mills, Newtownstewart, Omagh and Aughnacloy. The proposed scheme will cross the River Foyle and Tributaries SAC in 2 locations and be close to the designated site in a



Table 3.3 (Stage 1) Screening Matrix for the Owenkillew River SAC

number of other locations. It is anticipated the proposed scheme will be built in three phases starting with Phase 1 to commence in 2017, Phase 2 in 2021 and Phase 3 in 2026. It is anticipated that each phase will take some 2 to 3 years to construct.

Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:

| Size and scale (road type and probable traffic volume) | The project involves the construction of an 85 km long dual carriageway involving the crossing of large number of watercourses that will run for the entire length of the scheme, with associated drainage and local road improvements. Traffic volumes are anticipated to be a maximum of 23300 AADT (to the nearest 100) by 2040. This may impact on water quality and thus on features of the SAC. |
|---|---|
| Land-take | No works are proposed to take place within the SAC. |
| Distance from the European Site or key features of the site (from edge of the project assessment corridor) | The SAC is relatively isolated from the works directly, with the route passing Newtownstewart to the west, approximately 1.8km from its nearest point. |
| Resource requirements (from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts) | None |
| Emissions (e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution) | No discharges or other emissions are likely to have an adverse effect on the SAC due to the distance of the SAC from the proposed scheme. |
| Excavation requirements (e.g. impacts of local hydrogeology) | No adverse effects are likely due to the distance of the SAC from the proposed scheme. |
| Transportation requirements | Transportation of equipment through the SAC is not required as there are no works nearby. |
| Duration of construction, operation, etc. | It is anticipated that construction of phases 1 and 2 will last for approximately three years in each instance. Phase 3 is located outside of the River Foyle Catchment such that its construction will have no implications for the SAC. |
| Other | None |



| Table 3.3 (Stage 1) Screening Matrix for the Owenkillew River SAC | | |
|---|--|--|
| Description of avoidance and/or | mitigation measures | |
| Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on: | | |
| Nature of proposals | Construction of box culverts at minor watercourse crossings where salmonid interest has been noted. | |
| | Treatment of water outfalling from the scheme to reduce pollutants and sediment. | |
| | 3. Provision of otter passage culverts or ledges. | |
| | These measures are known to be effective, provided they are correctly implemented . | |
| Location | 1 & 2. Throughout the scheme. | |
| | 3. Where otter use of watercourses has been recorded. | |
| Evidence for effectiveness | CIRIA Construction Guidance Pollution Prevention Guidance (PPG) | |
| | HAWRAT assessment methodology. | |
| | 3. DMRB guidance on otter and roads. | |
| | These measures are known to be effective, provided they are correctly implemented | |
| Mechanism for delivery (legal conditions, restrictions or other legally enforceable obligations) | Transport NI will place contractual obligations on contractors to provide all necessary mitigation. Environmental Representatives employed by Transport NI will monitor the proposed scheme throughout construction. | |
| Characteristics of European Site | e(s) | |
| A brief description of the Europe | an Site should be produced, including information on: | |
| Name of European Site and its EU code | Owenkillew River SAC (UK0030233) | |
| Location and distance of the European Site from the proposed works | The Owenkillew River SAC extends from the confluence of the river with the River Strule, to the east of Newtownstewart, to the edge of Davagh Forest, near its source. | |
| | The SAC is relatively distanced (circa 1.8km) from the proposed works; however the scheme crosses or comes in close proximity to watercourses upstream and downstream of the SAC. | |
| European Site size | 213.46 ha | |



Table 3.3 (Stage 1) Screening Matrix for the Owenkillew River SAC

Key features of the European Site including the primary reasons for selection and any other qualifying interests The primary reasons for selection of the site are:

Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation – Beds of stream water-crowfoot *Ranunculus penicillatus* spp. *penicillatus* occur throughout its middle and lower reaches, typically in association with intermediate water-starwort *Callitriche hamulata* and large-leaved pondweeds such as broad-leaved pondweed *Potamogeton natans* and shining pondweed *P. lucens*.

Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles – The Owenkillew River is associated with several woodlands which in combination represent one of the best examples of old sessile oak woodland in Northern Ireland.

Freshwater pearl mussel *Margaritifera margaritifera* – the freshwater pearl mussel population, estimated to have reached a minimum of 10,000 individuals, is confined to a 4km reach of undisturbed river channel and is the largest known population surviving in Northern Ireland.

Qualifying features present, but not a primary reason for site selection, include:

Bog woodland;

Atlantic salmon Salmo salar; and

Otter Lutra lutra.

Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways Poor water quality is suspected to be a major influence on freshwater pearl mussel recruitment, affecting both adult and juvenile survival, and availability of host salmonids, required during their parasitic stage, as well as altering the biological composition of the river ecosystem.

Freshwater pearl mussel is susceptible to increased sediment in the water, resulting from harvesting of conifer plantations and diffuse run-off from degenerated peatland in the upper catchment.

The vulnerability of anadromous salmonids to deterioration in water quality is considered to be of importance as decreases in the salmonid population of the Owenkillew River SAC could have implications upon the viability of the freshwater pearl mussel population.

There are many potential effect pathways, with discharges into watercourses (construction and operational) and construction activities nearby watercourses evident. It should be noted that due to the nature of the riverine ecosystem, discharges in rivers upstream and downstream of the SAC can lead to significant impacts upon the SAC.

European Site conservation

Freshwater Pearl Mussel:



Table 3.3 (Stage 1) Screening Matrix for the Owenkillew River SAC

objectives – where these are readily available

- Maintain and if feasible enhance population numbers through natural recruitment.
- Improve age structure of population.
- Improve water quality.
- Improve channel substrate quality by reducing siltation.
- Ensure host fish population is adequate for recruitment.
- Increase the amount of shading through marginal tree cover along those sections of river currently supporting this species.

Water courses of plain to montane levels with the *Ranunculus fluitans* and *Callitricho-Batrachion* vegetation:

- Maintain and if feasible enhance extent and composition of community.
- Improve water quality
- Improve channel substrate quality by reducing siltation.
- Maintain and if feasible enhance the river morphology

Old Sessile Oak woods with *Ilex* and *Blechnum* in the British Isles:

- Maintain and expand the extent of existing oak woodland.
 (There is an area of degraded bog, wetland and damp grassland which have the potential to develop into oak woodland
- Maintain and enhance Oak woodland species diversity and structural diversity.
- Maintain the diversity and quality of habitats associated with the Oak woodland, e.g. fen, swamp, grasslands, scrub, especially where these exhibit natural transition to Oak woodland
- Seek nature conservation management over adjacent forested areas outside the ASSI where there may be potential for woodland rehabilitation.
- Seek nature conservation management over suitable areas immediately outside the ASSI where there may be potential for woodland expansion.

Assessment Criteria

Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site.

Destruction or loss of part of the SAC

There is no direct land take of the SAC as the site is approximately 1.8km from the proposed works.



Table 3.3 (Stage 1) Screening Matrix for the Owenkillew River SAC

Potential degradation of Annexe I habitats.

There is no potential for the scheme to affect the Annexe I habitats for which the site receives designation as the site is distanced from the construction activities of the proposed scheme.

Potential habitat degradation of the SAC and indirect effects to freshwater pearl mussel, Atlantic salmon and otter

It is possible that the scheme will have a potential impact upon the habitat of Atlantic salmon and otter in the wider environment through construction and operation of the proposed scheme.

Potential impacts upon freshwater pearl mussel, Atlantic salmon and otter

The scheme could give rise to significant effects on Atlantic salmon and otter in the wider environment as a result of construction procedures, water quality deterioration or disturbance due to light, noise and vibration.

Initial Assessment

The key characteristics of the site and the details of the European Site should be considered in identifying potential impacts.

Describe any likely changes to the site arising as a result of:

| Reduction of habitat area | There will be no change in the habitat area of the SAC as a result of this project. |
|--|--|
| Disturbance to key species | None within the SAC. |
| Habitat or species fragmentation | The scheme could cause a significant effect to species due to fragmentation of otter and salmon habitat outside of the SAC. |
| Reduction in species density | The scheme could result in a reduction in species density through pollution/sedimentation of reproductive habitat outside of the SAC. |
| Changes in key indicators of conservation value (water quality, etc) | No changes in the physical indicators of conservation value will occur through this project. |
| Climate change | The scheme has the potential to contribute to the problem of climate change by increasing the carrying capacity of the current road network. |

Describe any likely impacts on the European Site as a whole in terms of:

| Interference with the key relationships that define the structure of the site | The project will not have any influence on the structure of the SAC. |
|---|---|
| - | The project has the potential to impact on the conservation status of otter and Atlantic salmon in the wider environment, which could have a resultant impact on the function of the SAC. |



| Table 3.3 (Stage 1) Screening Matrix for the Owenkillew River SAC | | |
|--|--|--|
| Indicate the significance as a result of the identification of impacts set out above in terms of: | | |
| Reduction of habitat area | None | |
| Disturbance to key species | None | |
| Habitat or species fragmentation | There could be a significant effect outside the SAC, subject to mitigation. | |
| Loss | There could be a significant effect outside the SAC, subject to mitigation. | |
| Fragmentation | There could be a significant effect outside the SAC, subject to mitigation. | |
| Disruption | There could be a significant effect outside the SAC, subject to mitigation. | |
| Change to key elements of the site (e.g. water quality, hydrological regime etc) | There could be a significant effect outside the SAC, subject to mitigation. | |
| Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known. | | |
| Outcome of screening stage (delete as appropriate). | Significant Effect Possible on Habitats, Salmon and Otter. Assessment progressed to Stage 2. | |
| Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence). | YES | |

- 3.1.2 Based on the EU guidance, and using the templates provided in Annex 4 of the HD 44/09 guidance to record the findings of the screening process sequentially and transparently in this report, it has been concluded for all three SAC's:
 - that the proposed Scheme is a project which is not connected with or necessary to the management of the implicated SACs;
 - that by virtue of the Schemes' proximity to, hydrological connectivity with, and/or localised crossing of the designated sites and associated watercourses, and given the clarification on interpretation though recent case law, the likelihood of the proposed Scheme having a significant effect on the sites cannot be excluded on the basis of reasonable scientific certainty and information; and
 - that Stage 2 Appropriate Assessments should be undertaken.



4 Stage 2 - Appropriate Assessment

4.1 Introduction

- 4.1.1 As described above, this stage considers the potential impacts on the structure, function, and conservation objectives of the Natura 2000 Sites. Where there is the potential for adverse impacts, an assessment of the potential mitigation of those impacts is presented. The assessment should consider the impacts the Proposal may have either alone or in combination with other projects or plans. This stage includes:
 - A description of the Natura 2000 sites that will be considered in the AA;
 - A description of significant impacts on the conservation feature of these sites likely to occur from the Plan;
 - Mitigation Measures; and
 - Conclusions.

4.2 Scope of the information to inform the Appropriate Assessments.

- 4.2.1 This section describes the data sources and studies undertaken, the methodologies applied and design parameters taken into account, to inform this stage of the HRA process, and follows on from the information presented in the Screening Tables above. This section addresses:
 - Direct and indirect loss of qualifying habitat;
 - Atlantic Salmon;
 - Fresh water pearl Mussel;
 - · Otter; and
 - Assessment of Adverse effects on Site Integrity.

Loss of habitat identified as a primary reason for selection of the SACs or as qualifying features within the SACs

- 4.2.2 The studies and assessments have involved a review of the data relevant to open span bridges, culverts, watercourse diversions and drainage outfalls included in the A5WTC ES 2010 and A5WTC ES 2016, and derived from site surveys undertaken between 2009 and 2013 to establish if the presence of the road-related features will involve the loss of relevant habitat.
- 4.2.3 The assessment has addressed both direct loss of qualifying habitats and indirect loss of qualifying habitats through deterioration in water quality or shading.



Disturbance or harm to Atlantic salmon

Baseline Data sources

- 4.2.4 The following data sources have been relied on:
 - data provided in the 2010 and 2016 ES;
 - data derived from site surveys undertaken between 2012 and 2014 by the Mouchel assessment team at specific locations where the provision of bridges, culverts, watercourse diversions and drainage outfalls will involve construction on watercourses within the wider Foyle Catchment to establish the presence, potential presence or absence of salmonid holding (resting), spawning or nursery habitat in the specific locations;
 - data derived from surveys undertaken by Loughs Agency along sections of watercourses where the proposed bridges, culverts, watercourse diversions and drainage outfalls are located to establish the presence, potential presence or absence of salmonid holding, spawning or nursery habitat in the relevant sections.
- 4.2.5 Where either or both of the two sets of data relating to location-specific and section-related salmonid interest have indicated salmonid presence or potential they have been classified as sections of salmonid watercourse. For the purposes of this initial assessment, and in keeping with a precautionary approach, it has been assumed that all watercourses with salmonid potential are utilised by Atlantic salmon.
- 4.2.6 The location-specific site surveys were undertaken in August and September 2012, July to September 2013 and January 2014. The surveys were conducted in accordance with guidance issued by the former Department of Agriculture for Northern Ireland (Fisheries Division) and agreed with Loughs Agency. The relevant watercourses were surveyed 250m upstream and downstream from each bridge, culvert, watercourse diversion or outfall. The following data was collected:
 - Flow velocity this was taken where possible using an in-stream flow meter with impeller to provide a count or measured by timing a floating object over a known distance, velocity has then been calculated using the count, depth and width measurements – the flow velocity is critical to keep eggs/fry in a spawning/ nursery area well oxygenated,
 - In-stream vegetation presence and extent was estimated looking downstream to the left and right – in-stream vegetation can provide adequate cover in the nursery habitat as shelter from predators,
 - The extent of mature scrubby bank cover where present mature scrubby vegetation can provide cover for nursery areas as well as stability and cover in holding areas,

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Information to Inform an Appropriate Assessment: SAC Watercourses

- The extent of overhanging bank cover where present overhanging tree and scrub cover can enhance the food supply available for fry in nursery areas by way of insects dropping off branches into the water,
- Water depth the depth of the water is important for all three habitat classifications.
 Adequate depth in spawning areas ensures that redds⁸ are covered by water at all times. Shallow water in the nursery area makes the fry less vulnerable to predation not only from larger fish but also rippling of the water surface makes them less easily seen by birds. Deeper water allows adult fish to rest where the minimum energy is required to stay on station,
- Water width this measurement has been used in combination with depth to calculate flow velocity,
- Substrate type this has been measured as a percentage of bedrock, boulder, cobble, gravel, fines, sand, silt and mud a stable substrate in holding areas allows adult fish secure resting areas on a staged ascent/ descent of the river. A stony substrate provides good shelter from predators and creates more territory space allowing it to accommodate more fry in the nursery area. This stable environment also will invariably have more invertebrates living on the stones as a source of food for the fry. The presence and size of gravel is critical for the creation of a redd in salmonid spawning areas whilst the presence of large quantities of finer silt material with gravel can cause compaction of the gravel making redd construction more difficult and reduce oxygen supply to the eggs,
- Gravel depth the depth of gravel and, thereby, the potential depth of a redd exerts a strong influence on spawning in relation to the size and type of fish able to lay eggs in an area.

Information on potential impacts

- 4.2.7 The data collected from the location-specific surveys has been reviewed and each location has been classified relative to its salmonid potential in accordance with the Annex 1 Habitat Classification detailed in the Fisheries Division guidance. Each location has been categorised relative to holding spawning or nursery habitat into one of four grades, grade 1 being optimal habitat and grade 4 indicating an absence of habitat or habitat which is failing. Only locations with classifications of 4 relative to all three holding, spawning or nursery habitat types have been excluded as not being of salmonid interest.
- 4.2.8 Information relating to the nature of the construction activities which will be required to install the proposed bridges, culverts, watercourse diversions and drainage outfalls has been confirmed with by Transport NI's appointed contractors for the proposed scheme. Consideration has also been given to sections of watercourses which will be located within 50m of the proposed working areas and, hence, where the risk of migration of sediments

⁸ A redd is a spawning nest dug in gravels of the stream bed by fish, especially salmon

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over ground, particularly during rainfall, could have an impact on water quality and /or marginal and aquatic habitats. The assessment has involved consideration of the risk taking into account proposed mitigation measures which have been agreed with the contractor advisors and which will be incorporated into a Construction Environment Management Plan (CEMP) and Silt Management Plan (SMP) which contractors will be required to adopt during construction.

- 4.2.9 A construction phase threshold in concentrations of in-stream sediment, measured as Total Suspended Solids (TSS) above background levels, will be determined in accordance with the updated Common Monitoring Standards for Freshwater Fauna (CSMFF)⁹. These Standards will be adhered to during construction for watercourses identified as having Atlantic salmon spawning or nursery interest.
- 4.2.10 The assessments relative to impacts associated with the future use of the proposed scheme have been focused on discharge of sediments from drainage outfalls which could result in the smothering of salmonid habitat, harm to fish as they pass through the relevant section of watercourse and fragmentation associated with obstruction of passage along watercourses.
- 4.2.11 In relation to discharge of sediments and other road related pollutants from the proposed road drainage networks, analysis and calculations have been undertaken to establish if design parameters agreed with NIEA and Loughs Agency, will be likely to be achieved and if water quality relative to sediments and other pollutants, such as metals and hydrocarbons, associated with road related run-off will prove acceptable in the context of the ecological status of the watercourses using the Highways Agency Water Risk Assessment Tool (HAWRAT). The HAWRAT is an assessment tool which is recommended in Volume 11 of the DMRB and which has been agreed with the statutory bodies responsible for water quality throughout the UK. NIEA has agreed it as the appropriate means of assessing the discharge concentrations for the proposed scheme. The outcome from the application of the HAWRAT is that a discharge will either pass or fail in light of the predicted concentrations of sediments and other pollutants and the sensitivity for the receiving watercourse. Where the evaluation has indicated an outfall will fail, appropriate combinations of mitigation measures have been identified and the evaluation has been re-run until the outfall achieves a pass.
- 4.2.12 The proposals have been based on the following design parameters:

Construction

- adoption of the 1 year, 5 minute duration, return period storm event with an additional 20% allowance for climate change;
- adoption of a target limit of 50mg/l end of pipe TSS level at all discharges to watercourses in accordance with NIEA requirements;

⁹ Common Standards for Monitoring: Freshwater Fauna (JNCC October 2015). Updated from 2005.



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- adoption of a 25mg/l maximum uplift against background TSS levels for non-sensitive watercourses, and a maximum uplift in accordance with CSMFF for sensitive watercourses, as agreed with Loughs Agency;
- adoption of the Q90¹⁰ flow rate for receiving watercourses for the purposes of calculating TSS concentrations in receiving watercourses following treatment as agreed with Loughs Agency.

Operation

- adoption of the 1 year, 5 minute duration, return period storm event with an additional 20% allowance for climate change;
- adoption of a maximum of 25mg/l annual average TSS as based on the Common Standards for Monitoring for Freshwater Fauna (JNCC, 2005);
- adoption of the Q90¹¹ flow rate for receiving watercourses for the purposes of calculating TSS concentrations in receiving watercourses following treatment as agreed with Loughs Agency.
- 4.2.13 Evaluation of the 50mg/l discharge threshold at outfalls has involved adoption of the standard TSS value of 139mg/l for untreated road and identification of appropriate combinations of mitigation measures for inclusion in the drainage design to achieve a minimum 57% sediment treatment required to achieve the threshold. The untreated TSS value has been taken from Phase 2 of the Improved Determination of Runoff from Highways Project (Crabtree et al, 2007).
- 4.2.14 The calculations relating to the 25mg/l downstream concentrations have involved use of the local standard annual average rainfall value in combination with the impermeable area of each drainage network to establish an annual volume of water draining through each network to outfall. The standard TSS value of 139mg/l for untreated road runoff adopted for evaluation of the 50mg/l discharge threshold has been applied. The sediment loading has been compared to the receiving annual water flow volume and TSS data for the receiving watercourse. Data for TSS was gained from a combination of Loughs Agency and NIEA Monitoring Stations and surveys undertaken by Mouchel prior to the publication of the A5WTC ES 2010. Where the calculation has indicated a concentration will exceed the instream threshold, appropriate combinations of mitigation measures have been identified and the calculation has been re-run until the outfall achieves a pass.

^{10, 11} The Q90 flow rate is the rate which is exceeded 90% of the time in a watercourse, and is calculated using computer modelling of the watercourse's catchment.



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- 4.2.15 The identification of the specific mitigation measures proposed for each drainage outfall has involved the adoption of the most onerous combination of measures in light of the outcome of all three evaluations.
- 4.2.16 Where more than one outfall discharges into the same reach of a watercourse the combined impacts will be more significant. In these circumstances the outfalls were subject to an aggregate assessment in HAWRAT.
- 4.2.17 To aggregate the outfalls the drained areas were simply added together. The location on the watercourse used for the cumulative assessment was positioned downstream of the last outfall in the reach. For this purpose a reach is defined as a length of watercourse between two confluences, as the available dilution and stream velocity will naturally change at confluences and influence the assessment.
- 4.2.18 Watercourse reaches can vary greatly in length. Therefore, for the assessment of the impacts of soluble pollutants, only outfalls within 1km of each other along the length of a watercourse were aggregated for cumulative assessment. When assessing the combined impact of sediment bound pollutants, outfalls within 100m of one another were assessed. Beyond 100m, the road runoff sediment is likely to be sufficiently diluted with natural sediments so as not to have an adverse impact¹².

Disturbance or harm to freshwater pearl mussel

- 4.2.19 The assessment relating to freshwater pearl mussel has involved reference to current data available from the Centre for Environmental Data and Recording (CEDaR) in the context of the species as a qualifying feature within the Owenkillew River SAC.
- 4.2.20 The location of the species in the context of the SAC relates to a 4km section of the upper reaches of the watercourse. The screening for the SAC recognised there will be no risk of direct impact, the proposed scheme being located many kilometres downstream of the relevant section of the watercourse. Consideration has, however, been given to indirect impacts that could potentially arise as a result of impact on fish in the wider Foyle catchment and a reduction in the potential transport of glochidia¹³ to other areas of suitable habitat within the Owenkillew and wider catchment.

Disturbance or harm to otter

Baseline Data sources

- 4.2.21 The following data sources have been relied on:
 - data provided in the 2010 ES and 2016 ES.

¹² In accordance with DMRB Volume 11 Section 3 Part 10 HD45/09 Annex I

¹³ Glochidia are parasitic larvae of the freshwater pearl mussel (and certain other bivalve molluscs), which attach themselves by hooks or suckers to the gills or fins of fish.



4.2.22 The surveys involved recording of evidence along both banks of each watercourse by experienced otter surveyors following procedures detailed in the Otter Surveys – NIEA Specific Requirements (NIEA, 2013¹⁴). In common with the surveys along watercourses reported in the A5WTC ES 2010, surveys were conducted 250m upstream and downstream from proposed bridges, culverts, watercourse diversions and outfalls. Searches were undertaken for potential holts, runs leading away from the water and otter spraints, with particular note being taken of large collections of spraints which could indicate a more sensitive otter site near-by. Transects were also walked where practical, parallel to the waterways, to detect any potential otter runs leading to den sites. Any potential runs were followed and searched for evidence of use by otter in the form of footprints and spraints.

Information on potential impacts

- 4.2.23 The data derived from the sources described above has been reviewed to establish those watercourses where there will be bridges, culverts, watercourse diversions or drainage outfalls and where the proposed scheme would be in close proximity to watercourses and it has been established they are used by the species.
- 4.2.24 The locations have then been evaluated to determine the nature of the potential impacts on the species including loss of marginal and aquatic habitat, resting places and holts and fragmentation of corridors used by the species leading to potential mortality, injury or loss of access to shelter and resting places as a result of the construction and future use of the proposed scheme.
- 4.2.25 Where the assessment has indicated such impacts would be likely to occur, consideration has then been given to appropriate mitigation measures to safeguard the availability of habitat and passage along corridor used by the species.

4.3 Determination of adverse impact relative to integrity

- 4.3.1 Once potential impacts have been identified, they are considered in relation to the potential to have a negative effect on the integrity of the Natura 2000 sites. The assessment determines whether there is likely to be:
 - a reduction in the coherence of the ecological structure or function of the site, taking into account the whole area of the site, and supporting habitats which are integral to the structure and function of the site, and
 - whether any such reduction would reduce the ability of the site to sustain the qualifying habitat and/or the levels of populations of the species for which it was classified.

¹⁴ Updated guidance was released by NIEA in 2015. The survey methods used to inform this assessment comply with those requirements and are robust.



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- 4.3.2 The DMRB guidance (HD 44/09) provides a suitable checklist to identify interactions and potential effects on the integrity of the site. Completed checklists are provided in Appendix 10.
- 4.3.3 The definition for integrity adopted in this report is that provided in ODPM Circular 06/2005 and Defra Circular 01/2005 *Biodiversity and Geological conservation Statutory obligations and their impact within the planning system*, which defines integrity in the context of designated site as:

The coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified.



5 Description of the proposed scheme

5.1 Alignment and relationship to the SACs

- 5.1.1 The proposed scheme comprises an 85km dual carriageway running between the existing A5 north of New Buildings and the existing A5 south of Aughnacloy. Its location and relationship to the SACs and wider Foyle Catchment is shown in Figures 1-6 in Appendix 2.
- 5.1.2 The proposed dual carriageway initially runs east of the River Foyle and Tributaries SAC and River Finn SAC between Magheramason and the River Mourne at Strabane. As it runs south it crosses two tributaries of the Foyle, the Burn Dennet and the Glenmornan River and a number of small watercourses and drainage channels which feed into the main river channel and the two principal tributaries. It is at its closet to the designated site at Magheramason (some 50m). South of Magheramason and as far as Cloghcor it is generally between 1 and 2km distant from the designated sites. South of Cloghcor the dual carriageway follows the eastern edge of the River Foyle floodplain between 500m and 800m distant from the SACs.
- 5.1.3 The dual carriageway then follows an alignment along the western margin of Strabane crossing the Foyle and Tributaries SAC close to the existing bridge over the Mourne River and running close to the eastern boundary of the River Finn SAC as far as a proposed roundabout (J7) located adjacent to the bank of the river which defines the SAC boundary. The dual carriageway then follows a south-easterly alignment away from the River Finn SAC. It is located on the eastern-facing slopes of the Mourne Valley at a distance varying between 500m and 1.5km from the western margins of the river which define the boundary to the SAC. It crosses a small tributary of the Mourne River as it approaches and passes west of Victoria Bridge some 700m west of the tributary's confluence with the main river and SAC.
- 5.1.4 Approximately mid-way between Victoria Bridge and Newtonstewart the dual carriageway crosses the River Derg, one of the tributaries included in the SAC, some 700m west of the confluence of the River Derg, the Mourne River and the River Strule. As the dual carriageway runs south across the wide Derg Valley it crosses over a south to north flowing tributary of the River Derg west of Wood Hills and then ascends the hills west of Newtownstewart. It passes west of Newtownstewart some 500m west of the settlement limits. At this point the dual carriageway will be approximately 900m west of the Foyle and Tributaries SAC where the River Strule flows to the east of the town and 1.8km west of the Owenkillew River SAC where it extends east from the Owenkillew's confluence with the River Strule. It is the confluence of the two rivers that marks the southernmost limit of the Foyle and Tributaries SAC.
- 5.1.5 Continuing south of Newtonstewart, the dual carriageway will curve to the south-west and descend the eastern facing slopes of the Strule Valley to follow an alignment on the lower valley slopes. It will be 200-300m distant from the River Strule and separated from the margins of the river channel by the existing A5.
- 5.1.6 As the dual carriageway emerges from the valley the river will become markedly more distant from the dual carriageway where the river channel is located in a significant easterly-



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orientated meander. The dual carriageway continues on its south-westerly alignment passing west of Mountjoy and east of Tully Bog to a crossing of the Fairy Water some 400m north-west of its confluence with the River Strule. Throughout this section of the alignment the dual carriageway is located some 1km – 2km from the River Strule and will cross a number of small tributaries of the main river and drainage channels which feed into the tributaries.

- 5.1.7 Once the dual carriageway has crossed the Fairy Water and its wide floodplain, it will follow a wide arc west of Omagh to a new junction (J13) south of the town. It will cross a number of small watercourses which run in an easterly direction through the urban area to the River Strule as it flows through the town. North-west of J13 it will cross the Drumragh River as it meanders west and then south to north to its confluence with the River Strule close to the town centre.
- 5.1.8 South of J13 the dual carriageway generally follows a north to south alignment crossing tributaries of the Camowen River between Doogary Bog and Moylagh, a tributary of the Routing Burn at Moylagh, the Routing Burn north of Newtownsaville and the head of a tributary of the Routing Burn south of Newtownsaville.
- 5.1.9 The proposed scheme will then continue south, descending through the Brougher Ridge and into the Blackwater River Catchment. There is no relationship between these sections of the proposed scheme and watercourses within the Foyle Catchment, parts of which form the focus of the three SACs under consideration.

5.2 Bridges

5.2.1 Open span bridges are proposed where the dual carriageway crosses the seven principal rivers within the Foyle Catchment, namely the Burn Dennet, Glenmornan River, River Mourne, River Derg, Fairy Water, Drumragh River and the Routing Burn. The bridges at the River Mourne and River Derg will span locations where the watercourses are within the Foyle and Tributaries SAC. In both instances the bridge abutments will be located outside of the SAC boundary.

5.3 Culverts and piped watercourses

- 5.3.1 Wherever the proposed scheme crosses watercourses, other than the seven rivers described above, the proposals provide for the introduction of a culvert on the existing line of the watercourse or a culvert which forms part of a diverted section of watercourse. The latter approach is to be adopted where the angle of the crossing would require an overly long culvert or relative levels between the carriageways and existing channel of the watercourse require diversion to achieve appropriate clearances.
- 5.3.2 A total of 104 culverts are proposed along the length of the proposed scheme. These are scheduled in Appendix 2 and indicated in Figures 1-6 in Appendix 1. Selection of the form of culvert to be provided relates to the volumes of flow, context relative to floodplains and status relative to salmonids. Box culverts are proposed were volumes and/or the flooding regime indicates a need. They are also provided where the sections of watercourse have been identified as ones with salmonid presence or potential identified in accordance with the



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data, surveys and criteria described section 4. Those where salmonid potential has informed the selection of box culvert are indicated in the schedule in Appendix 2.

- 5.3.3 The design for culverts provided in light of the salmonid potential of a watercourse allows for a 350mm embedding of the culvert base below existing ground level and import of boulders and clean gravels which have been screened to ensure no invasive species are imported. The boulders and gravels will be substantially filled to the embedded depth to recreate suitable habitat and allow the generation of a narrower channel during periods of lower flow. The channel will not be completely filled to allow for natural recruitment of river bed material and formation of a 'natural' channel.
- 5.3.4 Boulders will also be located upstream and downstream of the culverts to enhance the value of these locations as resting areas prior to and following the passage of fish through the structures. Placement of the boulders and gravels within the culverts and upstream and downstream of them will be undertaken in consultation with Loughs Agency personnel.
- 5.3.5 Construction of all culverts will involve either the introduction of a temporary diversion to maintain flows and passage along the watercourses where the culvert is on line or the completion of construction of the culverts on diverted sections or watercourse in advance of the abandonment of the existing section of watercourse which is being diverted.

5.4 Watercourse diversions

- 5.4.1 A total of 77 watercourse diversions are proposed along watercourses located within the Foyle and Tributaries catchment. They are scheduled in Appendix 3. Their location is indicated in Figures 1-6 in Appendix 1. The schedule in Appendix 3 also indicates those sections of watercourse which have been identified as being of salmonid interest.
- 5.4.2 The construction of all watercourse diversions will involve the completion of construction of the diversions in advance of the abandonment of the existing section of watercourse which is being diverted.

5.5 Drainage and outfalls

- 5.5.1 The drainage strategy for the proposed scheme provides for discharge of road related run-off to existing watercourses. It includes a range of Sustainable Drainage Systems (SuDS) features focused on the interception and reduction in concentrations of sediments and other potentially harmful substances which are either suspended or in soluble form within road related run-off prior to discharge. Measures include the use of grassed surface water channels, attenuation ponds and wetlands. Discharges will be subject to Rivers Agency Consent prior to commencement of construction.
- 5.5.2 The proposals have been based on the design parameters described in 4.2.12.
- 5.5.3 A total of 74 drainage outfalls are proposed to watercourses within the River Foyle Catchment. These are scheduled in Appendix 4. Their location is indicated in Figures 1-6 in Appendix 1. The schedule also indicates the design/mitigation measures which are proposed



- at the various outfalls which have been included to facilitate achievement of the design parameters relative to TSS concentrations and HAWRAT parameters relative to pollutants.
- 5.5.4 Construction of the proposed outfalls will involve localised removal of bankside and marginal vegetation and installation of headwalls, wingwalls and aprons as indicated in the typical outfall detail provided in Figure 7.

5.6 Lighting

5.6.1 The dual carriageway will not be lit other than at the proposed junctions. Lighting will accordingly be located in the vicinity of several watercourses identified as having salmonid interest within the SACs or of tributaries and small watercourses associated with the wider River Foyle Catchment.

5.7 Temporary structures

- 5.7.1 Temporary clear span structures are proposed for crossing the Burn Dennet, Glenmornan, River Derg and the Fairy Water. These structures will be required for the duration of the construction of the appropriate phase (approximately 3 years).
- 5.7.2 During construction smaller existing watercourses will need to be crossed until the mainline of the proposed scheme is structurally complete, at which point the temporary crossing can be removed. Following discussion with Loughs Agency it has been agreed these watercourses will be crossed using single bore pipes placed in stream with suitable cover placed over the pipe.
- 5.7.3 Where a smaller watercourse is to be provided with a pipe culvert in the final design, this culvert will be constructed and used as the crossing during construction of the remainder of the phase.



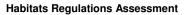
6 The Three SACs

6.1.1 The location, extent and relationship of the three SACs to the proposed scheme is indicated in Figure 1-6 in Appendix 1. Details relating to the habitats and species identified as the primary reason for selection as a Natura 2000 site and qualifying habitats and species are described in Table 6.1 along with comments relative to condition and threats and ecosystem factors. The information has been obtained from the Natura 2000 data forms obtained from the Joint Nature Conservancy Committee (JNCC) website (www.jncc.gov.uk) and the National Parks and Wildlife Service (NPWS) website (www.npws.ie). The Natura 2000 data forms are enclosed in Appendix 8.



Table 6.1 Site Descriptions (from Natura 2000 data forms, and synopsis from NPWS)

| Site Name | Designation & Code | | | Current Conditions and Threats | Key Ecosystem Factors |
|-----------------------------|--------------------|---|---|--|--|
| | | Habitat | Species | | |
| River Foyle and Tributaries | SAC UK0030320 | Primary reason for site selection: Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation. | Primary reason for site selection: Atlantic salmon Salmo salar The river has the largest population of Atlantic salmon in Northern Ireland, with c. 15% of the estimated spawning numbers. The majority of individuals returning are grilse (single wintering salmon), with a smaller number of spring salmon (multi-wintering salmon). Research has shown the presence of genetically distinct salmon in individual subcatchments. Qualifying features, but not a primary reason for site selection: Otter Lutra lutra | The deterioration of water quality is both a local and widespread issue. Point-source pollution from urban centres and farms are an issue in localised areas with diffuse run-off of fertiliser from commercial conifer plantations in the upper catchment and intensive farming practices in the lower catchment providing a more widespread problem. Poor water quality, as a result of the above and increased sedimentation can be significant influences on populations of Atlantic salmon and otter, as well as altering the biological composition of the river ecosystem. | Species present. Population size of species. Vegetation characteristics. |





| Site Name | Designation & Code | Qualifying Features | alifying Features | | Key Ecosystem Factors |
|------------|--------------------|--|---|---|---|
| | | Habitat | Species | | |
| River Finn | SAC IE0002301 | Primary reason for site selection: Upland blanket bog Upland blanket bog occurs throughout much of the upland area along the river margins. The bog habitats contain a variety of bog flora, including the scarce bog moss Sphagnum imbricatum (Sphagnum austinii). Qualifying features, but not a primary reason for site selection: Lowland oligotrophic lakes There are many small lakes within the site, but of note are Loughs Finn, Belshade and Derg. Typical species are present in the lake margins and Arctic Charr Salvelinus alpinus are present in Lough Finn. | Qualifying features, but not a primary reason for site selection: Atlantic salmon The Finn is important in an international context in that its populations of spring salmon appear to be stable while declining in many areas of Ireland and Europe. The estimated rod catch from the Finn is c. 500 – 800 spring salmon and 4,000 grilse, annually producing about 40% of the total Foyle count. Otter Otter are widespread throughout the River Finn system. | result of farming practices within the catchment, in particular the spreading of slurry and as the river is | Species Population size of species Extent and distribution of habitat Species, habitats, structures and characteristics of the site |



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| Northern Atlantic wet heath with Erica tetralix | | |
|---|--|--|
| The wet heaths are associated with the blanket bog throughout the site, on shallow peats and better drained slopes. | | |
| Transitional mires | | |
| Transitional mires occur at several locations, usually at the interface between bog or lake or stream. The diversity of the mires, including diagnostic species, is good. | | |





| Site Name | Designation & Code | Qualifying Features | | Current Conditions and Threats | Key Ecosystem Factors |
|------------------|-----------------------|---|--|---|--|
| | | Habitat | Species | | |
| Owenkillew River | SAC UK0030233 | Primary reason for site selection: Water courses of plain to montane levels with Ranunculion fluitantis and Callitricho-Batrachion vegetation Beds of stream water-crowfoot Ranunculus penicillatus spp. penicillatus occur throughout its middle and lower reaches, typically in association with intermediate water-starwort Callitriche hamulata and large-leaved pondweeds such as broad-leaved pondweed Potamogeton natans and shining pondweed P. lucens. | selection: Freshwater pearl mussel Margaritifera margaritifera The freshwater pearl mussel population, estimated to have reached a minimum of 10,000 individuals, is confined to a 4km reach of undisturbed river channel and is the largest known population surviving in | suspected to be a major influence on freshwater pearl mussel recruitment, affecting both adult and juvenile survival, and availability of host salmonids, required during their parasitic stage, as well as altering the biological composition of the river ecosystem. Freshwater pearl mussel is susceptible to increased sediment in the water, | Species Population size of species Extent Vegetation characteristics Natural processes |



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| Old sessile oak woods with Ilex and Blechnum in the British Isles. |
|--|
| The Owenkillew River is associated with several woodlands which in combination represent one of the best examples of old sessile oak woodland in Northern Ireland. |
| Qualifying features, but not a primary reason for site selection: Bog woodland |



7 Potential impacts and mitigation

7.1 Primary and qualifying habitats

- 7.1.1 Potential impacts associated with the construction and future presence of the proposed scheme and its associated traffic which have been identified comprise:
 - loss of primary or qualifying habitat where construction of the proposed scheme will require removal of habitat within the SACs;
 - loss of primary or qualifying habitat within the SACs as a result of release of sediments or other pollutants, such as oils and petrochemicals, into watercourses within or outside and upstream of the SACs during construction;
 - loss of primary or qualifying habitat within the SACs as a result of the release of sediments or other pollutants associated with road related run-off at drainage outfalls into watercourses within or outside and upstream of the SACs once the proposed scheme is open to use;
 - loss of primary or qualifying habitat where the proposed bridges over the River Mourne and River Derg will shade marginal and aquatic habitats beneath the structures; and
 - accidental spillage resulting in contamination of watercourses within or associated with the SACs and consequent detrimental impact on primary or qualifying habitats.

Removal of habitat within the SACs

- 7.1.2 In case of the River Finn SAC, none of the proposed scheme is located within the SAC boundary which is coincident with the national boundary mid-stream in the River Finn as it flows west of Strabane to its confluence with the River Foyle. That part of the River Finn to the east of the national boundary forms part of the River Foyle and Tributaries SAC. There will, accordingly, be no requirement or authority under the contracts for the removal of primary, qualifying or other riverside, marginal or aquatic habitat within the SAC.
- 7.1.3 In the case of the Owenkillew River SAC, the proposed scheme is located some 1.8km west of the designated site at its closest. There will, accordingly, be no requirement or authority under the contracts for the removal of primary, qualifying or other riverside, marginal or aquatic habitat within the SAC.
- 7.1.4 In the case of the Foyle and Tributaries SAC, the requirement for removal of habitat within the SAC is limited to the removal of bankside vegetation to enable protection to be introduced at the base of the abutment walls required to support the clear-span bridges over the River Mourne and the River Derg and to facilitate the implementation of drainage outfalls into the River Finn west of Strabane. This will involve the permanent loss of some 0.04ha of bankside vegetation in the context of a total 770ha of aquatic, marginal and bankside habitats which constitute the SAC. The bankside vegetation which will be removed is not



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part of the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation which is cited as a primary reason for selection of the SAC.

Release of sediments or other pollutants during construction

- 7.1.5 Potential for loss of primary or qualifying habitats within the SACs as a result of the release of sediments or other pollutants into watercourses within or outside and upstream of the SACs during construction is limited to the Foyle and Tributaries SAC.
- 7.1.6 In the case of the Owenkillew River SAC, the proposed scheme is located some 1.8km west of the designated site at its closest. There is no proposed scheme construction required at any point nearer to the SAC, and no hydrological connection exists which could form a pathway for pollutants from the scheme to enter the Owenkillew (see Figures 1-6, Appendix 1).
- 7.1.7 In case of the River Finn SAC, habitats identified as a primary reason for site selection and qualifying habitats are all located at distance upstream from the point at which construction will be required in proximity to the SAC such that there is no risk of reduction or deterioration in the extent or condition of the habitats.
- 7.1.8 In the case of the Foyle and Tributaries SAC the following locations are those where working areas will be located in or within 50m of the SACs:
 - a 500m long section of the alignment north west of Magheramason;
 - at the proposed crossing of the River Mourne;
 - on the western margin of Strabane where the River Finn flows north to its confluence with the River Mourne; and
 - at the proposed crossing of the River Derg.
- 7.1.9 Of the four locations, that at Magheramason will involve construction of a drainage pond and two drainage outlets onto a small tributary of the River Foyle approximately 50m from the northernmost boundary of the SAC. There is no Ranunculion fluitantis and Callitricho-Batrachion habitat in this location. At the location of the proposed bridge over the River Mourne, surveys have established the presence of small areas of Ranunculion fluitantis and Callitricho-Batrachion habitat which appear to have washed down from further up-stream. It has also been established this location is notable for its unstable substrate, a status which will preclude successful establishment of viable areas of the habitat type. Works in the vicinity of the River Finn will involve construction of 6 drainage outfalls, 4 directly into the river and two into a tributary some 3km from the main river, and the establishment of embankments required to achieve the proposed vertical alignment for the dual carriageway over an 800m length immediately adjacent to the eastern bank of the river. Surveys have demonstrated there is no Ranunculion fluitantis and Callitricho-Batrachion habitat in the river to the west of Strabane. In the case of the River Derg, the proposed location for the bridge over the main river is one where surveys have established the presence of Ranunculion



fluitantis and Callitricho-Batrachion habitat. There will not be a need to remove any areas of qualifying habitat for construction of the River Mourne or River Derg crossings.

- 7.1.10 Construction activity will also occur where bridges, culverts, watercourse diversions and drainage outfalls are proposed on watercourses outside of the SAC but within the River Foyle Catchment. The locations where activity associated with these design components will be required are indicated in Figures 1-6 in Appendix 1. The substantial majority of locations outside of the SACs are in excess of 1km from any of the three SACs. Many are at significantly greater distance.
- 7.1.11 Mitigation measures focused on the avoidance and control of sediments and other construction related pollutants are detailed in the environmental commitments in the ES for the currently proposed scheme. They will be formalised in the contracts for the implementation of the project by way of contract specific Construction Environment Management Plans (CEMPs) and Silt Management Plans (SMPs) which the contractors will be required to prepare and which will include as a minimum management roles and responsibilities, protocols, method statements and mitigation measures as described in the draft CEMP and SMP in Appendices 6 and 7. The draft SMP has been developed in consultation with Loughs Agency.
- 7.1.12 Pollution control measures during construction will be informed by the following guidance:

Pollution Prevention Guidance (PPG) (Joint UK Agencies)

PPG1: General Guide to the prevention of pollution;

PPG2: Above Ground Oil Storage Tanks;

PPG5: Works in, near or liable to affect watercourses;

PPG6: Working at Construction and Demolition Sites;

PPG8: Storage and Disposal of Used Oils;

PPG21: Pollution Incident Response Planning;

PPG26: Storage and Handling of Drums & Intermediate Bulk Containers

Environmental Good Practices – Working on Site C503 (CIRIA, 2000);

Control of Pollution from Construction Sites C532 (CIRIA, 2001);

Control of Water Pollution from Construction Sites - Guide to Good Practice SP156 (CIRIA, 2002);

7.1.13 As only two areas of *Ranunculion fluitantis* and *Callitricho-Batrachion* habitat have been recorded which could potentially be affected by work within or in close proximity to the SAC, the fact that the watercourse crossings at these points (the River Mourne and River Derg) are clear span structures, and taking into account the location of the substantial majority of other working areas associated with watercourses, the risk of sediments or other construction related pollutants having a detrimental effect on primary or qualifying habitat within the SACs is low. It is a risk which is effectively reduced to negligible when the proposed mitigation measures are taken into account.



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Release of sediments or other pollutants associated with road related run-off

- 7.1.14 Potential for loss of primary or qualifying habitats within the SACs as a result of the release of sediments or other pollutants associated with discharge of road related run-off into watercourses within or outside and upstream of the SACs once the proposed scheme is open to use is limited to the Foyle and Tributaries SAC and River Finn SAC.
- 7.1.15 In the case of the Owenkillew River SAC, there are no proposals for discharge of road related run-off into the river or other watercourses within the Owenkillew River Catchment.
- 7.1.16 In the case of the River Finn there are 6 proposed discharges for road related run-off which will issue either directly into the river or into tributaries which in turn flow into the main river. They will discharge at a point where the river is the subject of designation as the River Foyle and Tributaries SAC and River Finn SAC either side of the national boundary which is midstream.
- 7.1.17 In the case of the River Foyle and Tributaries SAC there are 5 proposed discharges for road related run-off which will issue directly into watercourses within the SAC and 65 which will discharge into tributaries/headwaters within the River Foyle Catchment.
- 7.1.18 The results of calculations for discharges to both SACs and their associated catchments relative to the 50mg/l threshold at the point of discharge and 25mg/l for in-stream concentrations relative to the passage of fish are detailed in Appendix 6. The schedule indicates that discharges from all outfalls will meet the design parameters agreed with NIEA and Loughs Agency and recommended in the Water Framework Directive relative to the passage of fish with the proposed mitigation measures detailed in Appendix 6. The outfalls have also been subject to a HAWRAT/EQS assessment as described in 4.2.11. These have demonstrated that all outfalls pass and that the discharges will accordingly be acceptable relative to the ecological sensitivity of the watercourses.

Shading at the River Mourne and River Derg crossings

7.1.19 Taking into account the very small extent of *Ranunculion fluitantis* and *Callitricho-Batrachion* habitat which could potentially be affected by shading at the two crossings, and the adoption of open span structures, which will reduce the intensity of the shading, the risk that this will have a detrimental effect on the habitat in these locations is low. Should deterioration occur in these small areas, the effect on a combination of unstable and good examples of the habitat type in the context of the habitat relative to the designated site as a whole will be slight /negligible and not significant.

Accidental spillage

7.1.20 As with any road, there will be a risk of accidental spillage of a wide range of contaminating materials which could be potentially harmful to habitats and species within the watercourses in and associated with the SACs once construction is completed and traffic begins to use the dual carriageway. Assessments based on the application of Method D - 'Assessment of Pollution Impacts from Spillages' as detailed in HD 45/09 in Volume 11 of the DMRB were undertaken for the proposed scheme described in the A5WTC ES 2010. These



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demonstrated the risk, expressed as the annual probability that a serious pollution incident could occur, would be greater than 1:500 for any single drainage catchment for the proposed dual carriageway. They also demonstrated the risk would be greater than 1:1000 for cumulative spillage associated with occurrences on more than one drainage catchment at any one time.

7.1.21 Measures such as Spillage Control Penstocks will be incorporated into the drainage design at the termination chamber of mainline drainage runs and in advance of discharges to ponds, wetlands or watercourses. These penstocks will be installed to facilitate the isolation of accidental spillages on the main carriageway. The penstocks will be located in the verges of the mainline carriageway and be easily accessible and visible from the mainline carriageway. Appropriate "Pollution Control Valve" signage shall be provided.

7.2 Atlantic salmon

- 7.2.1 The introduction of the proposed scheme into the existing mosaic of terrestrial and aquatic habitats within the River Foyle Catchment has the potential to affect Atlantic salmon as a primary reason for selection of the Foyle and Tributaries SAC and River Finn SAC and qualifying feature of the Owenkillew River SAC both where they are present within in the SACs and in watercourses within the wider catchments.
 - Potential impacts associated with the construction and future presence of the proposed scheme and its associated traffic which have been identified comprise:
 - disturbance or harm associated with construction related noise, vibration and lighting within the SACs and wider catchments;
 - disturbance or harm associated with the construction of bridges, culverts, watercourse diversions and drainage outfalls and other locations where working areas including site compounds will be within 50m of watercourses in the SACs and within the wider catchments;
 - loss of habitat relied on by the species within the SACs and wider catchments;
 - fragmentation as a result of obstruction or prevention of passage for the species along watercourses in the SACs and within the wider catchments once the proposed scheme is open to use;
 - harm to the population of the species associated with the SACs as a result of increased concentrations of TSS and other harmful substances in watercourses associated with discharges from drainage outfalls for the proposed scheme; and
 - disturbance during use as a result of road related lighting.



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Construction related noise, vibration and lighting

Noise and vibration

- 7.2.2 Atlantic salmon are capable of detecting the pressure and particle motion components of sound; levels of anthropogenic noise and vibration may exceed the hearing threshold of Atlantic salmon (Hawkins and Johnstone, 1978). This is due to their physiological makeup and the particle composition of water and soil, which facilitate propagation further than in air (Popper, 2008). The resulting potential impacts can be hearing impairment (Nedwell et al., 2005) or death, either directly from the noise generation or indirectly as a result of hearing impairment. Construction activities associated with the proposed scheme likely to pose such a risk are blasting or piling particularly within watercourses.
- 7.2.3 The proposals do not require blasting or piling within watercourses. The establishment of abutment foundations at the proposed River Mourne and Rive Derg crossings will, however, involve piling close to the top of the bankside slopes at both watercourses. In light of this, discussions have been held with Loughs Agency and appropriate mitigation measures have been identified and agreed.
- 7.2.4 The draft CEMP includes identification of working windows for watercourses with salmonid interest. A working window of May to September has been agreed with Loughs Agency for the Derg crossing, which represents a period outside of the critical salmonid migration periods.
- 7.2.5 In the case of the River Mourne crossing the contractors will be required to utilise Continuous Flight Auger (CFA) piles. In the case of the foundations for the abutment walls at other bridges either CFA or drilled piles will be used. Therefore all piles will be rotary bored piles which do not produce significant vibration.
- 7.2.6 Mitigation to be incorporated in the construction procedure will include a soft -start methodology. The soft-start methodology will involve a gradual increase in force and intensity of drilling, and hence, noise and vibration, over a 30 minute period to allow Atlantic salmon to move outside of the area of influence. The soft-start methodology would be required each time the machinery is started following a 30 minute rest period. Once the piling is in full operation, associated noise and vibration from the machinery will keep fish outside of the area of influence and thus equipment can be switched off. This process will need to be repeated at the start of each day, as overnight working is not proposed for construction works in close proximity to watercourses.

Lighting

7.2.7 Artificial lighting at night has the potential to disrupt and disorientate fish, increase exposure to predation, alter light-sensitive endocrine systems and disrupt crepuscular and nocturnal mating, signalling and dispersal (Rich and Longcore, 2006). With regards to Atlantic salmon, the main impacts resulting from artificial lighting are disruption to migration behaviour (Thorpe et al., 1988; Nemeth and Anderson, 1992) and increased mortality rates due to increased efficiency of predators (Tabor et al., 2004; Kemp and Williams, 2009).



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7.2.8 Night working in the vicinity of watercourses identified as being of salmonid interest will not generally be allowed. However, circumstances may arise which require emergency works outside of daylight hours, in these cases lighting will be positioned/cowled to minimise light spill onto the watercourse and the duration will be kept to a minimum. These approaches will be contractual commitments placed on contractors by Transport NI.

Disturbance or harm associated with construction

Release of sediment or other construction related pollutants into watercourses

- 7.2.9 Construction related to earthworks and structures can involve in the release of sediments and other construction related pollutants into watercourses. In the context of the proposed scheme this could result in loss of spawning and nursery habitat used by Atlantic salmon and direct harm to the species as a result of concentrations of sediments and other pollutants in the water.
- 7.2.10 The risk of release of sediments or other construction related pollutants into watercourses within the SACs or the wider catchments associated with the SACs will be limited to the Foyle and Tributaries SAC and River Finn SAC. There are no works required in or close to the Owenkillew River SAC.
- 7.2.11 In the case of the Foyle and Tributaries SAC and River Finn SAC and their wider catchments the risk will occur where:
 - localised in-stream works and works on the bankside of watercourses will be required for the construction of temporary and permanent bridges, culverts, watercourse diversions and headwalls for drainage outfalls;
 - construction of earthworks to establish the vertical alignment for the proposed scheme is located within 50m of the watercourses;
 - construction of filter drains, ditches, swales, grassed channels and wet and dry ponds is required to attenuate and carry road related run-off to drainage outfalls;
 - site compounds and materials storage areas are located close to watercourses.
- 7.2.12 The installation of rip-rap to protect bridge abutments will require the placing of rock-filled gabion mattresses on the profiled and consolidated banks at the base of bridge abutments. Measures and requirements detailed in Annex 2.4 of the draft CEMP in Appendix 6 of this report will be adhered to minimise potential sediment release into watercourses to negligible levels. Contractors will also be required to ensure imported rock does not contain invasive species of plant.
- 7.2.13 The temporary bridges over the Burn Dennet, Glenmornan, River Derg and Fairy Water will be clear span temporary bridge structures that will be installed at a level which allows for



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flood water to pass underneath, and does not block movement of animals along the watercourse corridor.

- 7.2.14 The installation of culverts and watercourse diversions will result in disturbance to watercourse channels and banksides and could result in consequent release of sediments into the watercourses. The proposed method of construction whereby culverts on diverted sections of watercourse will be completed prior to abandonment of the relevant section of existing channel, and temporary sections of diverted watercourse will be provided along watercourses where culverts are to be constructed on-line, will substantially limit potential release of sediments into waters of salmonid presence or potential.
- 7.2.15 As illustrated in Figure 7 headwalls will generally be of concrete construction. The area which will be subject to disturbance and the volumes of soils which will require to be excavated will be small. Excavated soils will be temporarily set aside a minimum of 3m from the top of the bankside and any not required for reinstatement of the bankside will be removed from site once reinstatement of the bankside profile is completed. The activity is one which will be of short duration.
- 7.2.16 The risk will be greater where outfalls are required on smaller tributaries and headwaters with relatively low volumes of flow. In these locations the works will be programmed for implementation at times of lowest flow between May and September.
- 7.2.17 Spillage of fuels and oils associated with machinery required for earthworks and installation of the structures could result in release of hydrocarbons in all of the above locations. The presence of cement in storage prior to use and release of such contaminants into watercourses as structures are built could result in mortality or harm where the watercourses are used by Atlantic salmon.
- 7.2.18 The Water Framework Directive identifies a requirement for suspended solids levels to be kept below 25mg/l for fish species to thrive. However, Loughs Agency have raised concerns that the risks associated with sediments relative to Atlantic salmon will be greater during construction rather than during use of the proposed scheme upon completion of construction. The Agency's concern particularly relates to the proximity of work activities where sediments will be generated and potentially released into parts of the watercourses where there is spawning and nursery habitat and has stipulated a requirement for a more stringent standard during construction above background levels in such locations.
- 7.2.19 Mitigation measures have accordingly been discussed with Loughs Agency which are focused on the achievement of both thresholds in accordance with the status of the watercourses as ones used for fish passage and ones where salmonid nursery and spawning habitat is present. The measures have been formalised in Section 2 of the draft SMP provided in Appendix 7 and will be a mandatory requirement of the contract-specific SMPs which contractors will be required to prepare agree with TNI and Loughs Agency prior to the commencement of works.



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Loss of supporting habitat

7.2.20 Where bridges, culverts, watercourse diversions and headwalls for drainage outfalls are proposed there will be a permanent loss of habitats other than primary and qualifying habitats which are relied on by Atlantic salmon. These include marginal habitats with overhanging vegetation and reduced flows which are important for fish migration as they provide areas of cover under which to rest. They also provide protection from predators and direct sunlight.

Open span bridges

7.2.21 The proposed open span bridges will involve the permanent loss of the bankside vegetation beneath the open span structures. The loss will include grassy banks, scrub and overhanging trees. In the context of each of the watercourses crossed, the length and scale of the watercourses and extent of salmonid habitat associated with each watercourse, the loss will be negligible. To ensure that in stream vegetation habitat loss is minimised preplanted coir rolls of suitable native emergent and marginal vegetation will be inserted into the rip-rap during construction. In addition, suitable bankside planting will be undertaken where possible. Where open span bridges are installed at major watercourse crossings, there may be an impact from the shade cast by the bridge on in-stream habitats. This shade could reduce the ability of the habitats to thrive, and could result in a minor reduction in primary production within the watercourse.

Culverts

- 7.2.22 The proposed culverts will involve the permanent loss of supporting habitats where the culverts are aligned beneath the proposed dual carriageway and its supporting earthworks. The surveys undertaken during 2012 and 2013 by Mouchel and Loughs Agency have established that a total of 64 culverts will be located on watercourses classified as being of salmonid potential. In line with the precautionary approach adopted during the preparation of this initial information, these are currently assumed to be of importance to Atlantic salmon and will comprise box culverts as described in Table A3.1.
- 7.2.23 The proposed culverts vary in length from 25m to 110m. Most do not exceed 60m. The total length of culvert, and hence the length over which bankside, marginal and in-stream habitat will be permanently lost is some 3.4km. 14 salmonid watercourses have more than one culvert proposed, with 12 of these requiring 2 culverts and 2 requiring 3 culverts.
- 7.2.24 There will be a permanent loss of some 6.8km of marginal and bankside habitat¹⁵ in the context of in excess of 300 kilometres of watercourse where salmonid presence / potential has been established.
- 7.2.25 Proposed mitigation provides for the introduction of bankside planting reflecting that which will be lost within the vested land upstream and downstream of each culvert which will in

¹⁵ Taking the precautionary approach that both banks have suitable habitat for the length lost, i.e.3.4km x 2



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some instances enhance the tree, scrub and grassland habitats as sources of food and shade at resting places.

7.2.26 Initial loss of in-stream habitat, primarily comprising gravels and boulders, will be largely mitigated as a result of the proposals relating to the embedding of culvert bases, introduction of gravels and boulders, provision for natural sedimentation and location of boulders upstream and downstream of the structures.

Watercourse diversions

- 7.2.27 The 55 proposed watercourse diversions of watercourses with salmonid interest will involve the permanent loss of supporting habitats along some 10km of existing sections of watercourse which will be abandoned. The lost habitat will, however, be re-established as part of the construction of the new sections.
- 7.2.28 This will involve the replication of bed and channel characteristics of the watercourses and planting of marginal and bankside habitat which will reinstate the ecological characteristics of the original watercourse along the diversions on which they are located. It will also be a specific requirement of the contracts that construction of the new sections must be completed prior to the closure and abandonment of the diverted section. The de-watering of the abandoned sections will be carried out under supervision of an ecological clerk of works to ensure fish which may be present, including salmon, are safely removed.

Habitat Fragmentation

- 7.2.29 The introduction of bridges and culverts along watercourses associated with the three SACs and used by Atlantic salmon could potentially obstruct or discourage passage of the fish as they seek to return to spawning areas and migrate to sea. The following design and mitigation measures which include advice detailed in River Crossings and Migratory Fish: Design Guidance' (Scottish Executive 2000) have accordingly been incorporated into the proposals:
 - provision of oversized box culverts along watercourses identified as being of importance to salmonids;
 - diversion of watercourses to facilitate the introduction of a shorter culvert, with lower flow velocity downstream and better light penetration, at or close to right angles to the proposed scheme carriageways where the angle of crossing would otherwise be overly long or steep;
 - avoidance of steps in the vertical profile through culverts and along associated diverted watercourses;
 - avoidance of bends in culverts which could initiate the deposition of debris and obstruct passage;
 - adoption of vertical profiles through the culverts relative to length in accordance with Table 5.1 of the guidance; and



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- provision of resting areas upstream and downstream of the culverts.
- 7.2.30 The proposals recognise that during periods of low flow many of the smaller watercourses which feed into the main rivers and principal tributaries and in the upper parts of the catchment have little depth of water. The design proposals described in 5.3.3 and 5.3.4 which require embedding of culvert bases, introduction of gravels and boulders, provision for natural sedimentation and location of boulders upstream and downstream of the structures, make specific provision for these locations but will also be required wherever box culverts are proposed in light of salmonid presence / potential.

Road related lighting

7.2.31 All new lighting will involve the use of full spill cut-off luminaires which will contain the extent of spill within the dual carriageway footprint. Luminaires on the existing Mourne River bridge and associated with the existing A38 approach and bridge linking the existing A5 and Lifford will also be replaced with full spill cut-off units such that the extent of spill associated with the existing bridge will be reduced. This combination of proposals will result in a slight improvement relative to light and the passage of salmon in this location.

7.3 Freshwater pearl mussel

- 7.3.1 Freshwater pearl mussel is cited as a primary reason for selection for the Owenkillew River SAC. The species is not cited either as a primary reason for selection or as a qualifying species for the River Foyle and Tributaries SAC or the River Finn SAC. The screening for the SAC concluded the proposed scheme will not have a direct impact on the population of the species which form the focus of the Owenkillew River SAC's selection, that being located some 20km upstream and east of the proposed alignment.
- 7.3.2 Any impacts that result in a decrease in anadromous 16 salmonid populations (Atlantic salmon and sea trout) could, however, have a significant impact upon the viability of the freshwater pearl mussel population within the SAC. The lifecycle of freshwater pearl mussel is reliant upon the development of glochidia which attach to the gills of host fish, usually juvenile salmonids, to continue development (Skinner et al., 2003). Therefore, a decline in the salmonid population within the Owenkillew River, as a result of construction and operational disturbance to migration, could have an impact upon the future viability and population size of freshwater pearl mussel. The sensitivity of the freshwater pearl mussel population, currently confined to a 4km stretch of undisturbed river channel in the upper reaches and the largest known population surviving in NI, is highlighted in the relative absence of mussels below 10 years in age found in surveys (NIEA, 2005) and data suggesting most individuals are in excess of 50 years old (Beasely et al., 1998).
- 7.3.3 The assessments for salmonid species associated with the Owenkillew which are dependent on the River Foyle, River Mourne and River Strule to its confluence with the Owenkillew River have demonstrated the proposed scheme will not have a significant effect on the

¹⁶ Anadromous fish are those which travel from the sea to freshwater rivers to spawn.



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passage of the fish on which the pearl mussel is dependant or on the habitats which support the fish.

7.4 Otter

- 7.4.1 Potential impacts associated with the construction and future presence of the proposed scheme and its associated traffic which have been identified comprise:
 - disturbance and harm as a result of construction;
 - loss of habitat and a reduction in available food resources;
 - fragmentation associated with obstruction of existing access along watercourses resulting in potential mortality or harm where otters seek to cross carriageways;
 - deterioration in water quality resulting in harm to the species and consequent impacts on supporting habitat.

Disturbance and harm during construction

- 7.4.2 Sources of potential impact during construction include:
 - disturbance as a result of night time working which could result in the species being discouraged from using their natural range with consequent impact on the health of the animals through increased stress and reduced feeding efficiency and separation of breeding males and females which could lead to a reduction in the density and distribution of the species.
 - disturbance to movement along watercourses where work is being undertaken along or close to watercourses
 - disturbance in the vicinity of breeding habitat which could lead otter to abandon cubs or to move them too early and thus place them in danger of death or starvation.
 - open excavations with steep sides in close proximity to watercourses may trap otter and result in death of individuals.
- 7.4.3 Night time working will not be permitted adjacent to watercourses where the presence of otter is confirmed by way of further surveys which will be undertaken in advance of construction.
- 7.4.4 Other mitigation measures which have been identified in light of the identified impacts and which will be included as part of the environmental commitments in the ES for the currently proposed scheme include (see Appendix 7 for further details of NIEA agreed otter mitigation):
 - location of compounds and storage of materials away from watercourses;



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- fencing off of riparian habitat that is to be retained with clear marking to prevent inadvertent access;
- exclusion of otters from works areas near watercourses where use by the species has been established;
- fencing or covering of excavations in excess of 2m depth over-night in the vicinity of watercourses where use by the species has been established;
- provision of a suitable ramp within all uncovered excavations during non-working hours; and
- inclusion of a contractual requirement for contractors to provide details for temporary means of continued passage along relevant watercourses during construction in location specific method statements pending the incorporation of permanent means of passage in the completed works.
- 7.4.5 In common with Atlantic salmon, sediments and other construction related pollutants can result in harm to otter and supporting habitat. In common with Atlantic salmon the mitigation measures proposed to control sediment and other potentially polluting materials, such as fuels, oils and cement will serve to avoid such impacts or limit them such that the effect will be negligible relative to the species and its supporting habitat.

Habitat loss

- 7.4.6 The surveys undertaken prior to the publication of the A5WTC ES2010 identified two holts within the land take for the proposed scheme (River Derg, Ch. 34000; and Fairy Water, Ch. 50000) and three habitat areas as having potential to support breeding otter (Strabane Nature Reserve, Ch. 17500; Beltany Lodge Ch. 41900; and Routing Burn Ch. 71700). In keeping with the findings of the A5WTC ES 2016, the currently proposed scheme will not involve damage and destruction of the habitat at Beltany Lodge but will involve damage and loss of approximately 1ha of identified breeding habitat at the Strabane Nature Reserve. Additional survey work undertaken in 2012 confirmed that otter were not using the site at Routing Burn for resting or breeding and are reported within the 2016 ES.
- 7.4.7 In addition to the holts and breeding habitat identified, the construction of the proposed scheme will involve the loss of localised and small areas of marginal and bankside habitat along some 14 watercourses (see Table A7.1 in Appendix 7) within the wider catchment associated with the SACs where use by otter was confirmed in the 2013 surveys. The extent of riparian habitat lost is not likely to be significant when considering the extent of otter home ranges, which can extend over tens of kilometres (Chanin, 2003), and the fact that the loss is spread out over a number of sites in a wide geographical area. In the context of the extent of the habitats as they are represented throughout the relevant parts of the catchment these localised and small losses will not constitute a material risk to the species by virtue of a material deterioration in the availability and continuity of supporting habitat.



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- 7.4.8 Mitigation measures which have been identified in light of the identified impacts and which will be included amongst the environmental commitments in the ES for the currently proposed scheme are described below (see Appendix 7 for further details of NIEA agreed otter mitigation).
- 7.4.9 With regard to potential breeding sites, a procedure to be followed prior to the commencement of construction activities has been written, which involves monitoring of the woodland for evidence of breeding or nurturing of young (see Appendix . If any evidence of this is found within the woodland, works will be delayed until the cubs have left the den, at which point the mother will move them to a holt closer to the water. Once it has been identified that otter have finished using the site for breeding or nurturing of young, clearance of the site would be permitted under the strict supervision of a suitably qualified Environmental Clerk of Works.
- 7.4.10 Pre-construction update surveys will be carried out to maintain the validity of species data. The presence of any holt which shows signs of current use will be the subject of a location specific mitigation strategy which will be developed in consultation with NIEA and which will be incorporated into a required licence application. Such strategies will include measures to passively and sensitively displace of others from the holts after compensation measures have been implemented to take account of the lost resting place, such as artificial holts.
- 7.4.11 An artificial holt will be created in the vicinity of the River Derg at Ch.34400 and mammal fencing will be installed along the proposed road boundary at this location. However, the artificial holt would be located within the construction site until works are complete and therefore additional mitigation measures would be required to assure otter safety. The artificial holt will consist of a number of chambers (up to 1m²) and will be constructed from breeze blocks or log piles for walls and covered in logs with brash for the ceiling. There will be at least one chamber that has no external opening. There will be at least two concealed entrances, one into the river and one onto the bank.
- 7.4.12 Specific pre-construction surveys will be carried out at Strabane Nature Reserve, Ch.17500, Beltany Lodge Ch.41900 and Routing Burn Ch.71700 to establish whether the woodlands support a breeding site prior to construction. If evidence of breeding activity, or the care of young, is found, no construction works will be carried out at these locations until the cubs have left the den, which can be up to ten weeks. When it can be ascertained that otters are not using the sites for breeding or care of young, vegetation will be cleared as soon as possible. Suitable fencing will then be erected along the remaining woodland edges as screening from construction activities. The results of these surveys will be used to inform any European Protected Species licence application.
- 7.4.13 Vegetation in suspected breeding/resting areas will be cleared under the supervision of a suitably experienced ecologist. Toolbox talks will be provided to site staff which will provide information on where the species may be found and how to avoid impacts. If otters are at risk of injury from the works, site staff would be instructed to cease working and contact the ecological supervisor.



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- 7.4.14 If any additional otter holts are found before or during construction within or near to the works site then an ecologist would be notified immediately and works would cease within at least 30m of the holt. The ecologist would determine if the holt is in current use. For any active holts the NIEA would be contacted. A licence would likely be required before any mitigation or works can be undertaken. If a natal den is found after construction has started then an ecologist would be notified immediately and works would cease within at least 100m of it, whilst the best way to proceed is determined. Finding any type of otter holt or natal den could significantly delay the works whilst mitigation is implemented.
- 7.4.15 Supplementary planting will be undertaken adjacent to the Strabane Nature Reserve site, with circa 1ha of woodland on land adjacent to the northbound carriageway. This planting will be suitable of other breeding habitat, reducing the impact of this habitat loss and ensures the habitat remains a viable breeding area for otter.
- 7.4.16 Mitigation is proposed for the loss of resting sites with the provision of artificial holts at both locations where holts are beneath the footprint of Phase 2 of the proposed scheme. The artificial holts are proposed to be constructed prior to the destruction of the existing holts, which will take place under a NI European Protected Species (EPS) Development Licence. Alternative mitigation has been included for the Fairy Water holt, which involved moving the route alignment by 5m to avoid destruction of the holt. Discussion with Dr Paul Chanin (Pers comm. 2013) indicated that otter would not be significantly affected by the presence of the construction site in this proximity to the holt.
- 7.4.17 Notwithstanding this, proposals have been included in the planting and ecological mitigation measures as confirmed in the environmental commitments in the ES for the currently proposed scheme. These will serve to enhance the marginal and bankside habitats upstream and downstream of the culverts, watercourse diversions and outfalls where the removal of existing habitat will be required. The resultant impact will be at worst slight and not significant relative to the species.
- 7.4.18 The impacts of the proposed scheme in relation to otter prey species are unlikely to have a significant effect on otter as the salmonid population will be safeguarded by the design and mitigation included within the proposed scheme.

Habitat Fragmentation

- 7.4.19 The fragmentation of habitats is a common threat to otter, but of greater concern where associated with roads (Harris et al., 1995; Kruuk, 1995). Death of otter as a result of road death is thought to be the predominant cause of non-natural mortality in the species (Green, 1991; O'Sullivan and FitzGerald, 1995; Philcox et al., 1999; Chanin, 2006), with the number of deaths as a result of road traffic accidents thought to be increasing (Körbel, 1994; Green & Green, 1997).
- 7.4.20 The proposed scheme incorporates tunnels or ledges for otter passage adjacent to culverts across the Foyle catchment, with the requirement for these otter passes determined by the distribution of otter and otter field signs found during the ecological assessments of the proposed scheme. Further to these, all of the major watercourses within the Foyle catchment



- (see paragraphs 5.3.1-5.3.2) have clear-span structures proposed which provide suitable and safe passage across the proposed scheme without forcing otter to cross the road.
- 7.4.21 Forty-four culverts are proposed specifically for otter, a further 22 tunnels or ledges are proposed for other wildlife adjacent to watercourses. Tunnels and ledges associated with watercourse crossings would fulfil the same requirements as dry otter tunnels. There are also 10 bridges over larger watercourses, where passage will be maintained during a 1 in 5 year flood event. In total, there are 76 proposed crossings suitable for use by otter within the Foyle and Blackwater Catchments.
- 7.4.22 As agreed with NIEA, TNI commits to maintaining otter passage, providing either pipes, ledges or redirection to a suitable crossing point. The potential for otter to use existing culverts for safe passage will be investigated, with alternatives identified where use of existing culverts is unlikely to be safe.
- 7.4.23 Tunnels will be 600mm diameter pipes if less than 20m long and 900mm pipes if over this length, with suitable fencing to guide otter into the tunnel entrance, and ensure that otter do not access the mainline at the watercourse crossing point.
- 7.4.24 Otter ledges will be installed with a clearance that is 150mm above the 1 in 25 return period flood level whilst allowing for 600mm of headroom (however where this is not possible with culvert design the headroom can be lowered to 300mm). The ledges will either be pre-cast into the culvert or will be a bolt on design using metal brackets and wooden planks or mezzanine flooring sections. The ledge will be of 500mm width and positioned so as to be accessible from the bank and the water.

Table 7.1 Otter Impact and Mitigation Summary

| Potential Impact | Mitigation Outline | Is mitigation non- controversial Y/N | Residual Impact – Significant Y/N |
|---|---|---|--|
| Disturbance/harm during construction | Works control measures, CEMP, Clerk of Works. | Υ | Ν |
| Loss of habitat/reduction in available food | Works control measures, derogation licencing for certain operations, coordination with NIEA, bankside and other mitigation planting, holt creation. | Y | Z |
| Fragmentation of habitat | Provision of crossing points, tunnels, ledges etc. | Υ | N |





| Deterioration in water quality | During construction – CIRIA and PPG guidance followed, Clerk of Works etc. Operation – drainage | Y | N |
|--------------------------------|---|---|---|
| | design compliant with water quality preservation. | | |

7.5 In-combination Effects

- 7.5.1 The Habitats Directive, NI Regulations and ROI Regulations require consideration to be given to potentially combined effects of a development project and other projects on Natura 2000 sites. Two proposed development projects, which have either been approved in outline or fully approved in accordance with the relevant development consent regime for the form of development proposed, have been considered to date in the context of this requirement for the currently proposed A5WTC:
 - N14/N15 Lifford Link Road; and
 - 3 Rivers mixed use development at Strabane.
- 7.5.2 The focus of the Lifford Link Road scheme is a viaduct crossing from Tyrone to Donegal between J7 on the proposed A5WTC and a new junction on the N15 in Donegal south west of Lifford. The design of the viaduct provides for a clear span over the River Finn and its banks which is designated as the River Finn SAC and River Foyle and Tributaries SAC either side of the national border which is located mid-stream. An Environmental Impact Statement as required by the ROI Regulations has been completed (The N14 / N15 to A5 Link, Environmental Impact Statement/Environmental Statement Non-Technical Summary 2011). The EIS/ES concludes that based on the design and proposed mitigation measures relating to pollution control the proposed scheme will have no impact on otter and Atlantic salmon as species cited as a primary reason for selection of the designated river.
- 7.5.3 The 3 Rivers development proposal lies within the floodplain of the River Foyle at Strabane. Proposals for the mixed use leisure and employment project include re-alignment of the flood defences and culverting of a section of a minor watercourse. The A5WTC does not involve work relative to these areas associated with the river and River Foyle and Tributaries SAC either directly or indirectly, though it does involve the introduction of the proposed open span bridge over the River Mourne, a proposal which is close to but independent to the proposed leisure and employment development. The assessments undertaken relative to the proposed Mourne Bridge have demonstrated, that with the adoption of an open span structure and inclusion of pollution control and noise mitigation measures as part of the contracts for the works, the implementation of the proposed bridge will not have a significant effect on habitats or species of primary or qualifying importance to the SAC. The proposed scheme will accordingly not have any in combination effects with the 3 Rivers development proposal relative to the SAC.
- 7.5.4 There are no other reasonably foreseeable projects that would interact with the A5WTC at this stage.



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7.5.5 Should any further relevant sites be identified as a result of consultation responses to this report, or become the subject of approved development consent prior to completion of the Appropriate Assessments for the A5WTC, they will be subject to evaluation. Further information will then be made available to Transport NI and the Minister for consideration in advance of determination relative to the project and the resulting information will be subject to further consultation prior to the completion of the Appropriate Assessments.



8 Summary and Conclusions

- 8.1.1 The River Foyle Tributaries SAC, River Finn SAC and Owenkillew River SAC have been identified as Natura 2000 sites with a relationship to the proposed A5WTC which requires that they should be considered in the context of the EC Habitats Directive, as transposed by the Conservation (Natural Habitats, &c) Regulations (Northern Ireland) 1995 as amended by the Conservation (Natural Habitats, etc.) (Amendment) Regulations (Northern Ireland) 2012 in Northern Ireland and the European Communities (Natural Habitats) Regulations 1997 (as amended) in the Republic of Ireland
- 8.1.2 The gathering and presentation of the information in this document has been informed by the guidance provided in 'Managing Natura 2000 Sites, the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (EC, 2000 & 2001)', and 'Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC'.
- 8.1.3 Based on the EU guidance, and using the templates provided in Annex 4 of the HD 44/09 guidance to record the findings of the screening process sequentially and transparently in this report, it has been concluded for all three SAC's:
 - that the Proposed Scheme is a project which is not connected with or necessary to the management of the implicated SACs;
 - that by virtue of the Schemes' proximity to, hydrological connectivity with, and/or localised crossing of the designated sites and associated watercourses, and given the clarification on interpretation though recent case law, the likelihood of the proposed Scheme having a significant effect on the sites cannot be excluded on the basis of reasonable scientific certainty and information; and
 - that Stage 2 Appropriate Assessments should be undertaken.
- 8.1.4 This document provides further information to inform Appropriate Assessments for the three SACs. The information is being made available to statutory consultees and for wider public consultation. The information in this report and information received in response to the consultations will be considered by Transport NI and the Minister as Appropriate Assessments are completed in advance of a decision to proceed or not in accordance with the requirements of the Directive and Regulations.

8.1.5 In conclusion:

- The A5WTC has been designed to avoid features related to Natura 2000 sites as far as possible;
- There is a high level of knowledge of the qualifying features (habitats and species) in the study area;
- Best practice mitigation has been included in the scheme design; and





- Based on the best scientific knowledge available, there will not be a significant effect on the conservation objectives of the SACs.
- 8.1.6 The information provided in this report indicates the proposed scheme will not have an impact on the integrity of the three sites either independently or in combination with other projects. A final view, however, cannot be concluded until further evaluation is undertaken in light of responses to the consultations.



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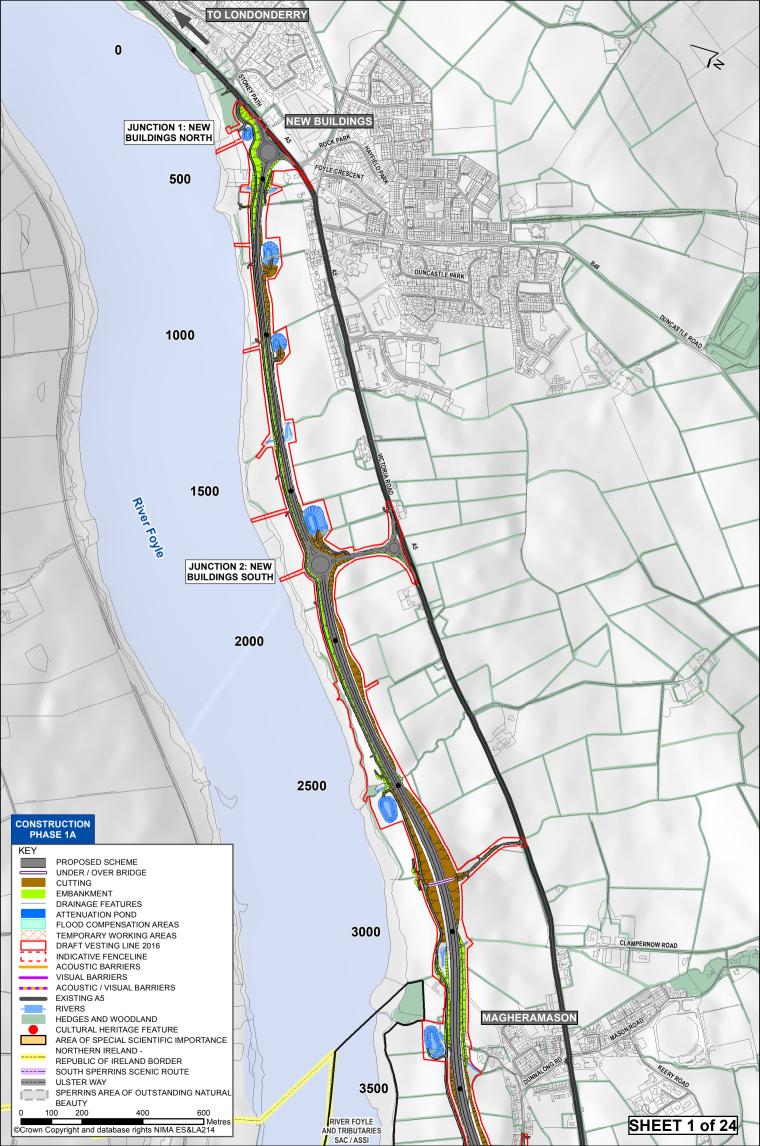
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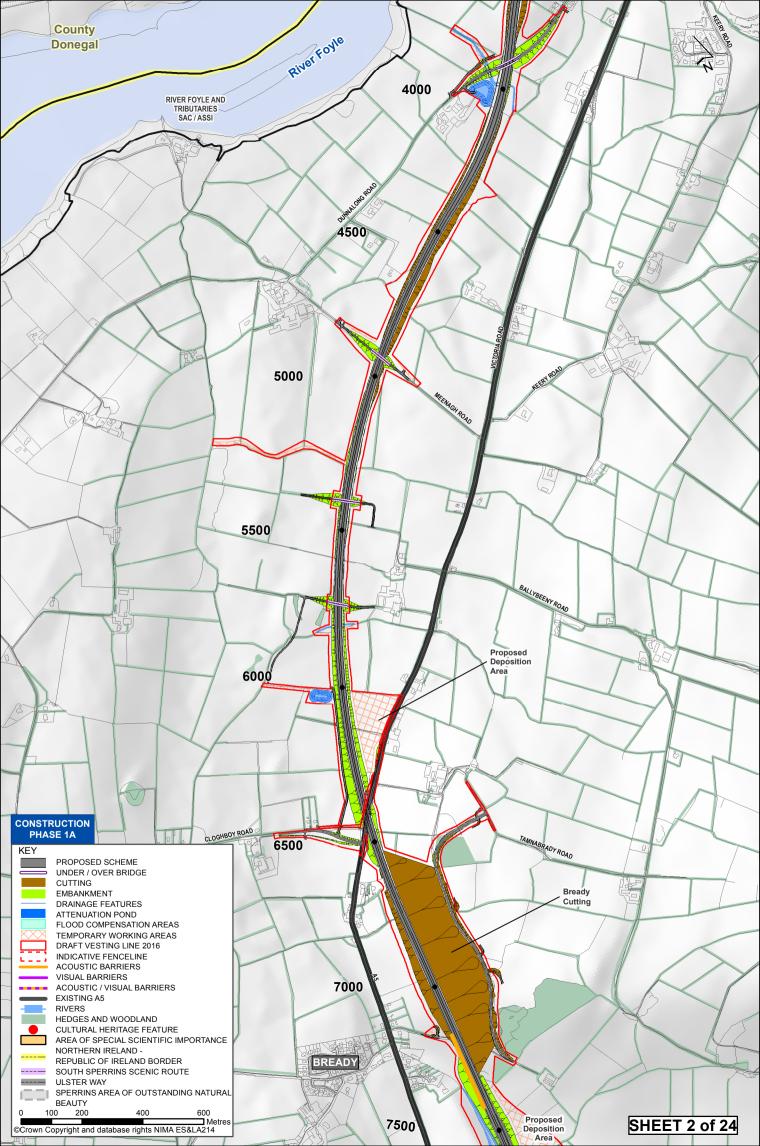


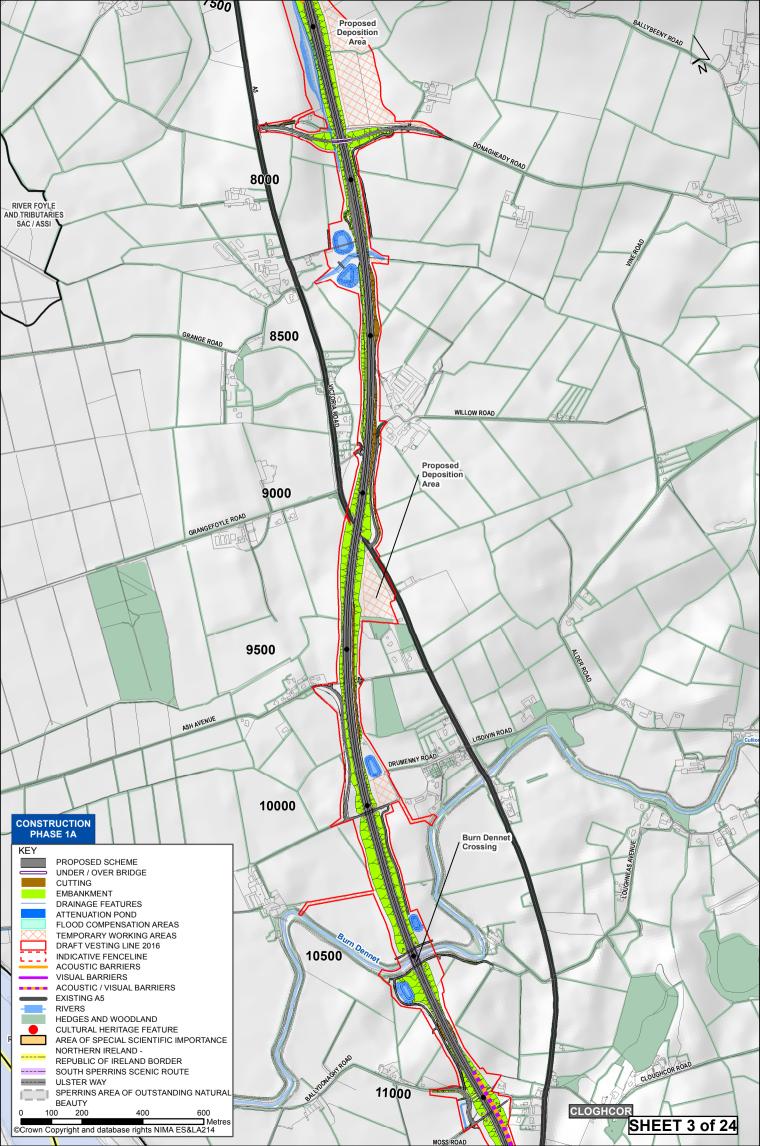
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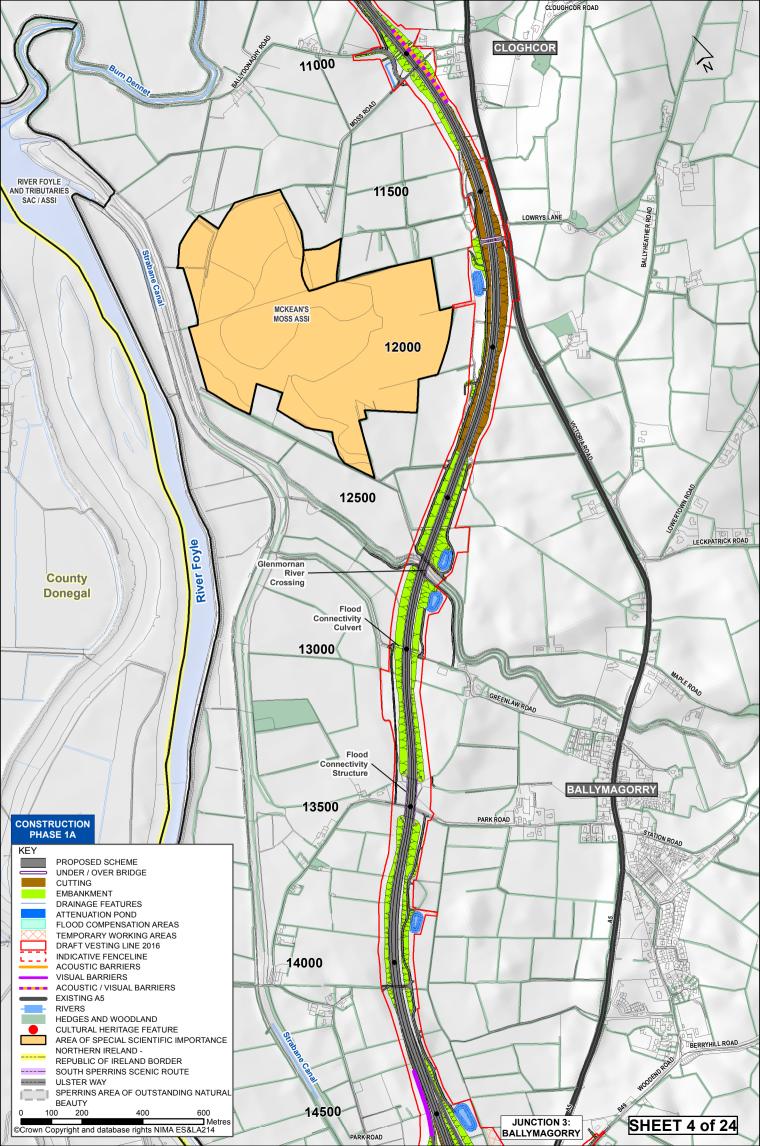
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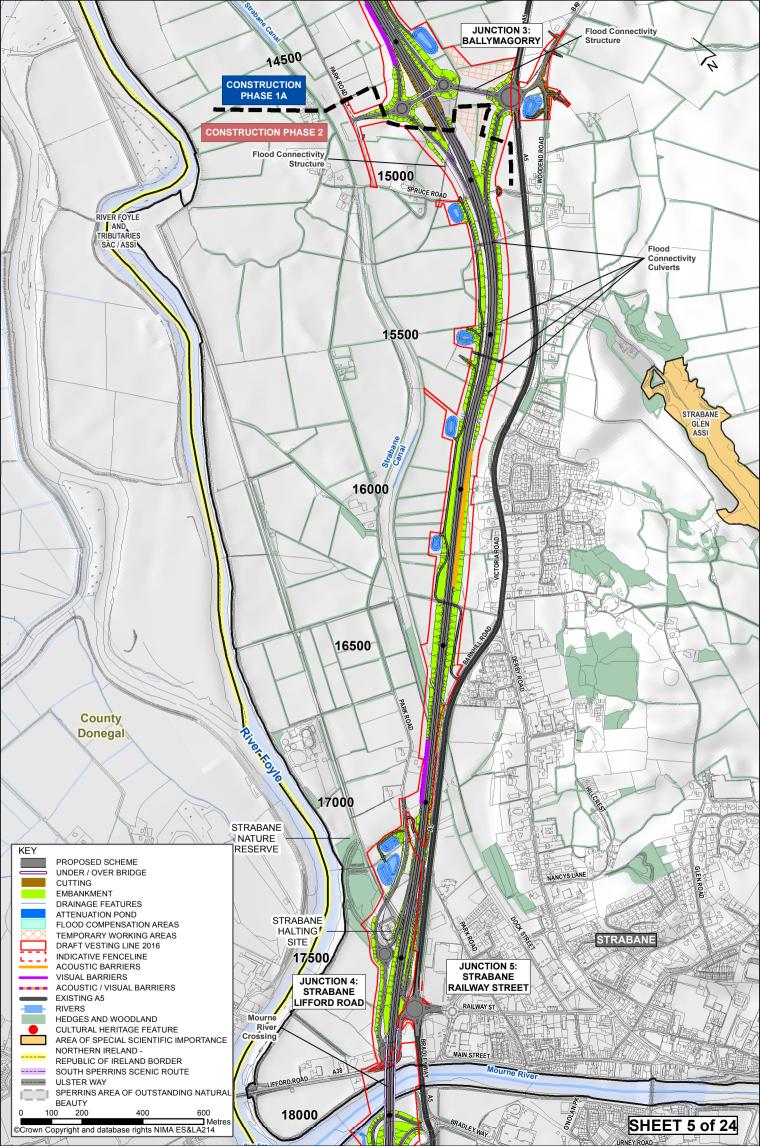
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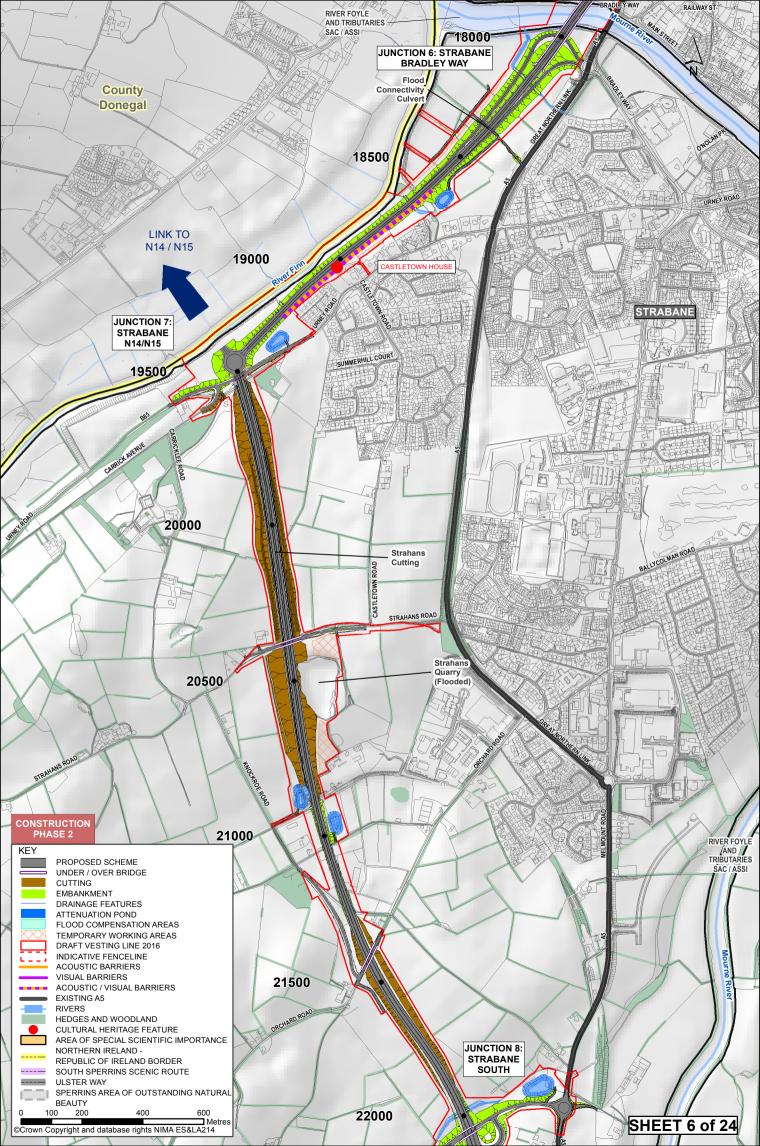


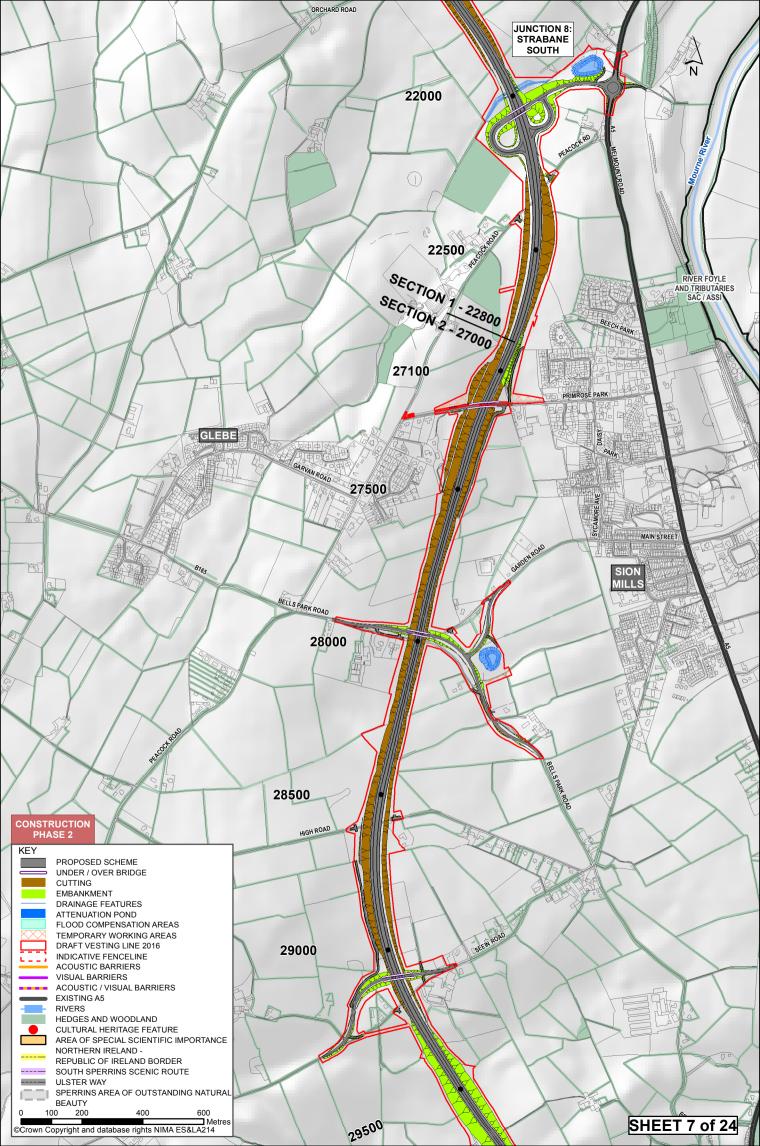


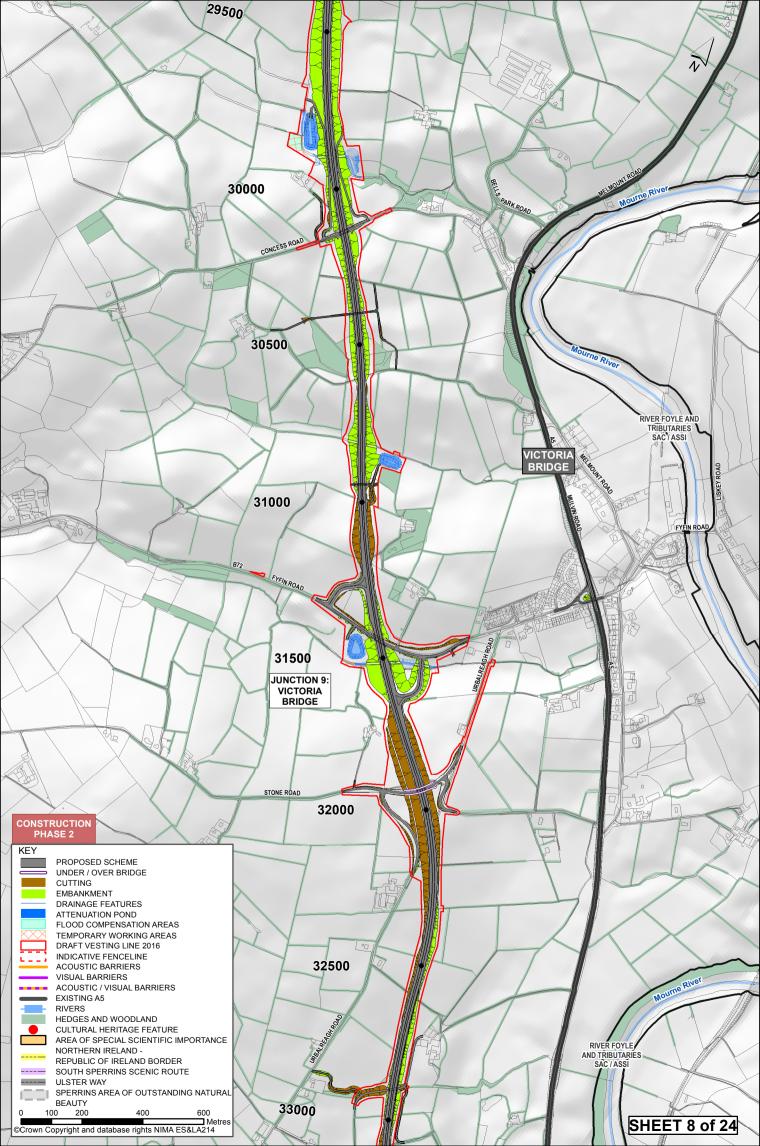


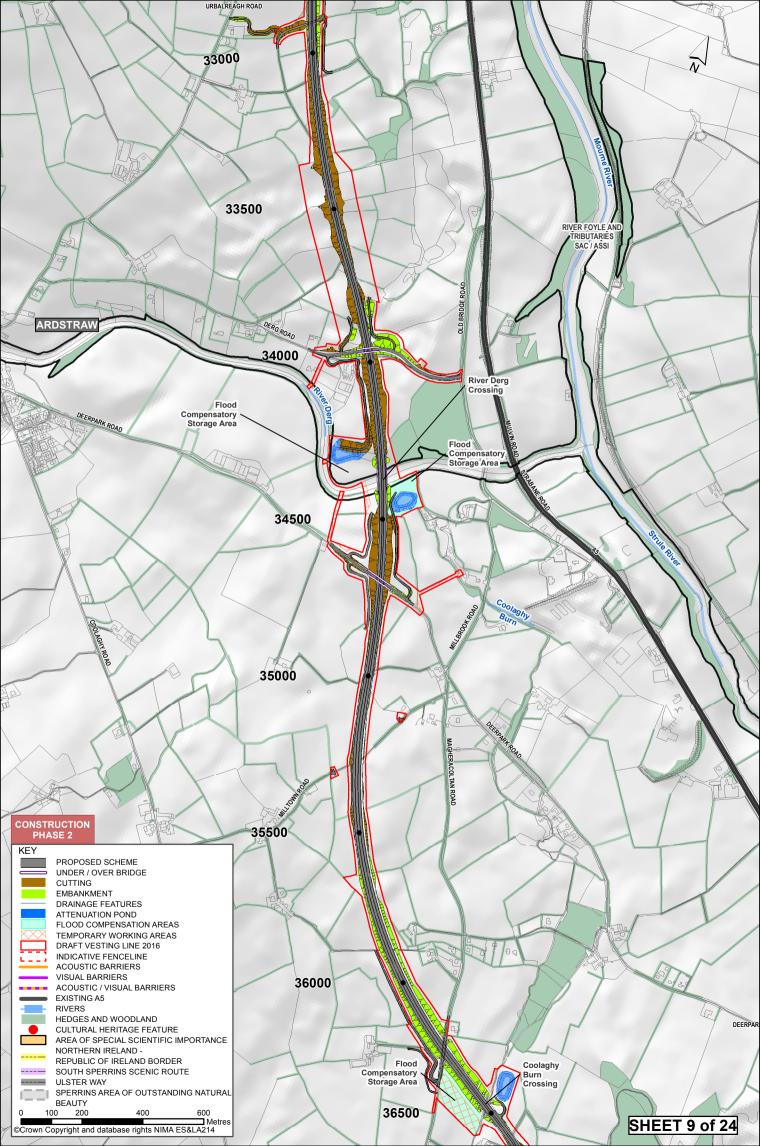


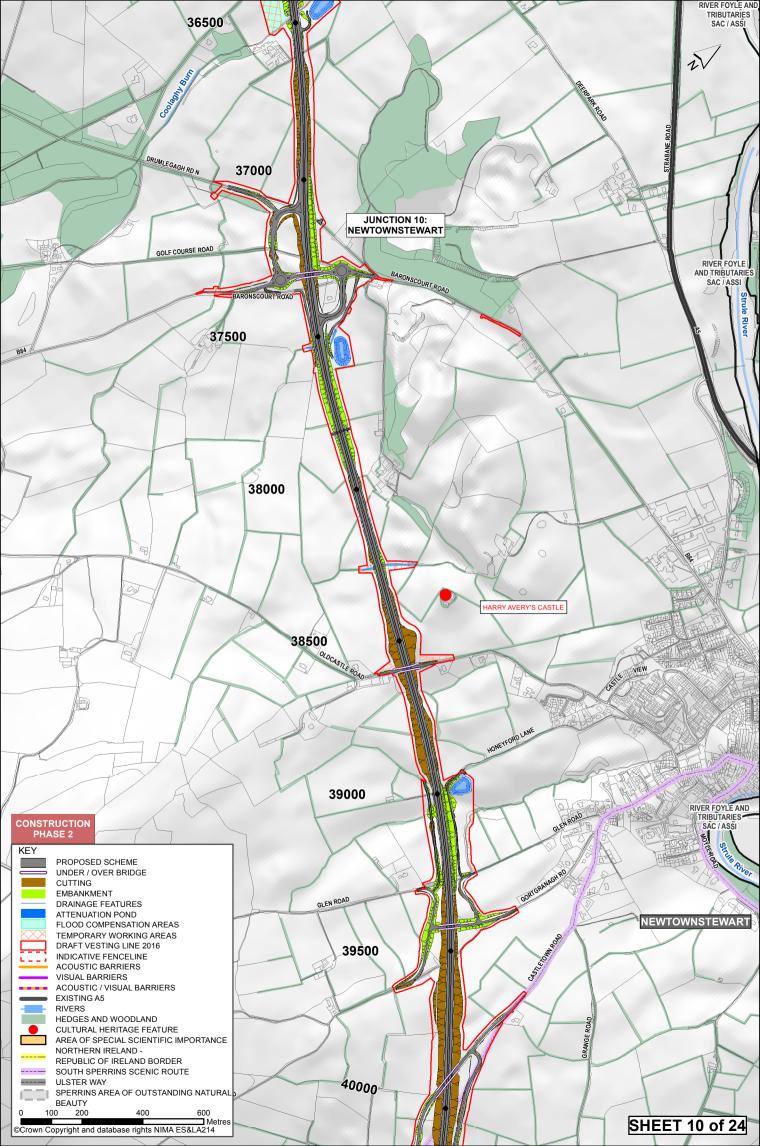


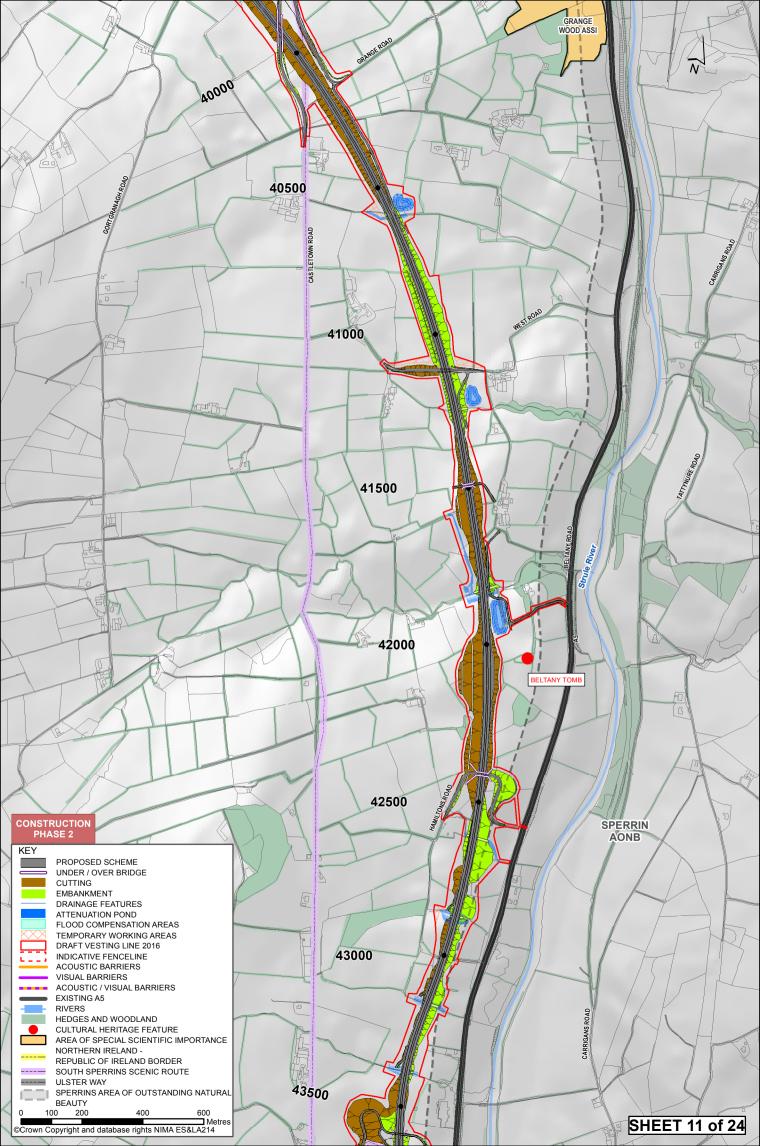


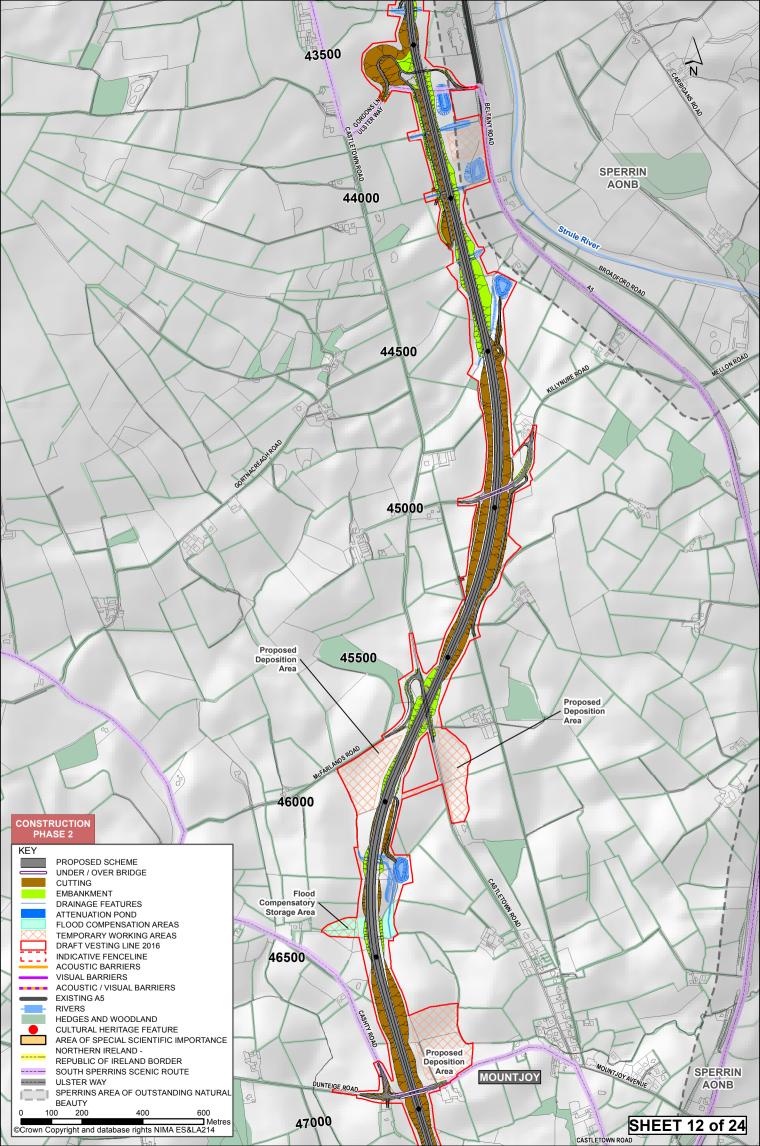


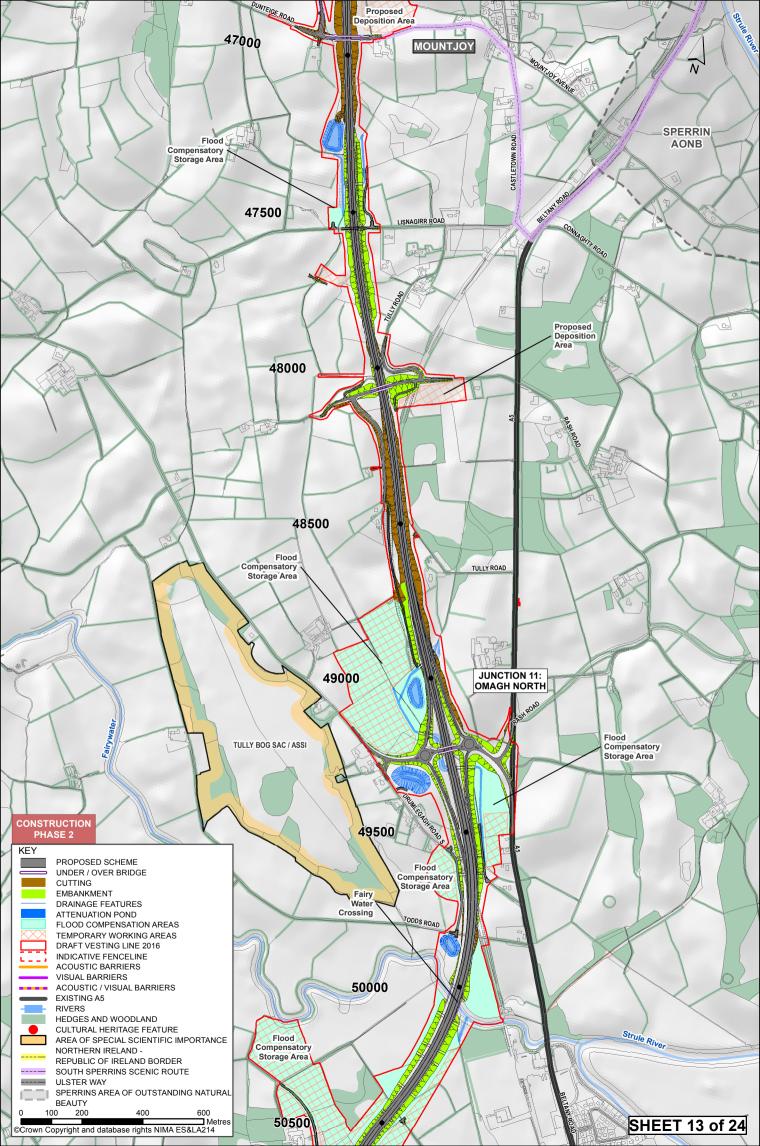


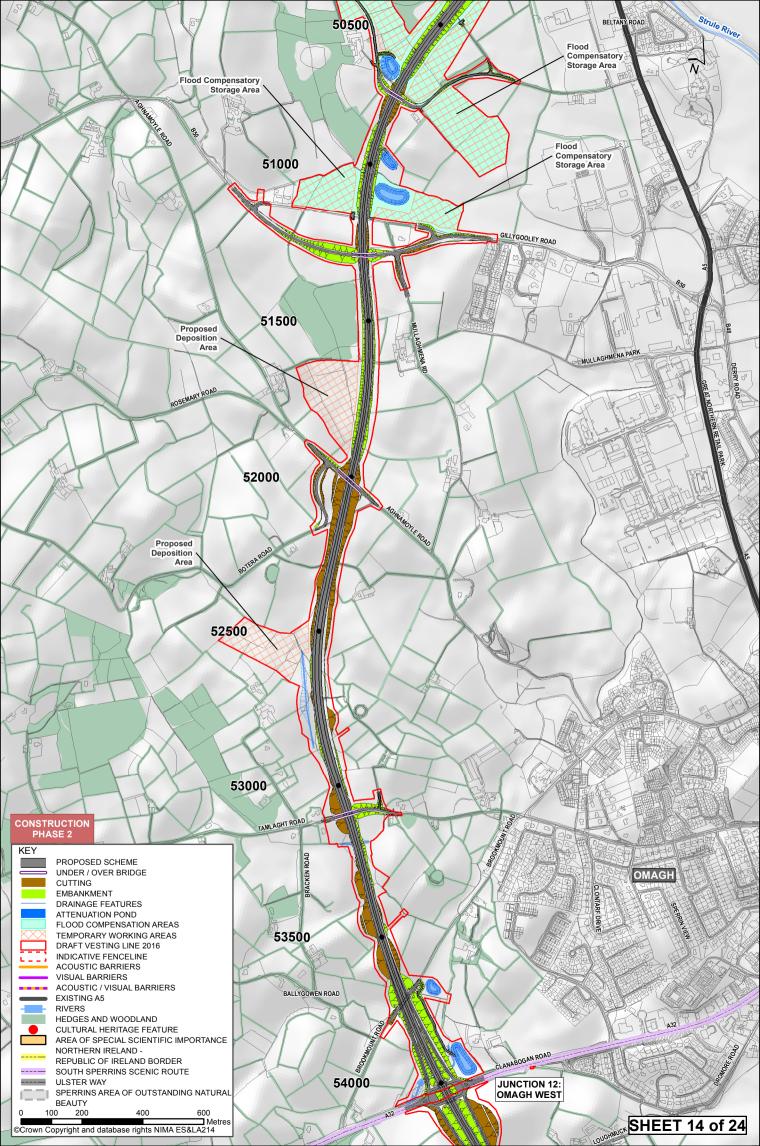


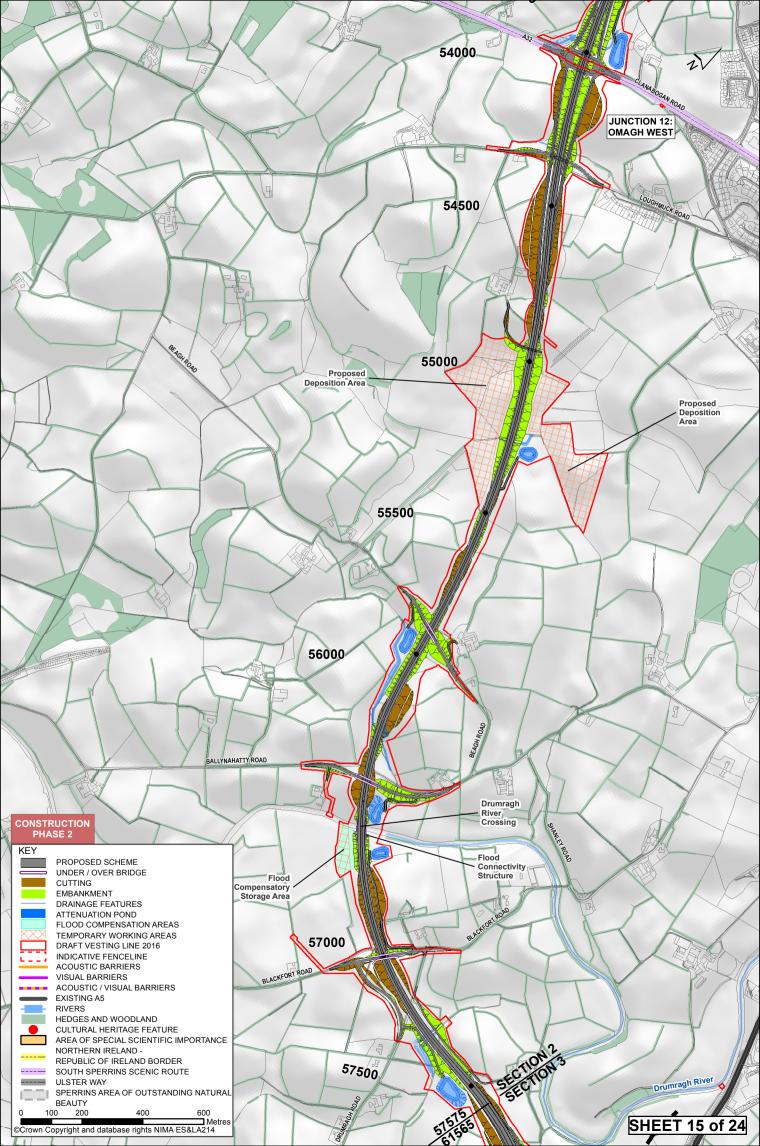


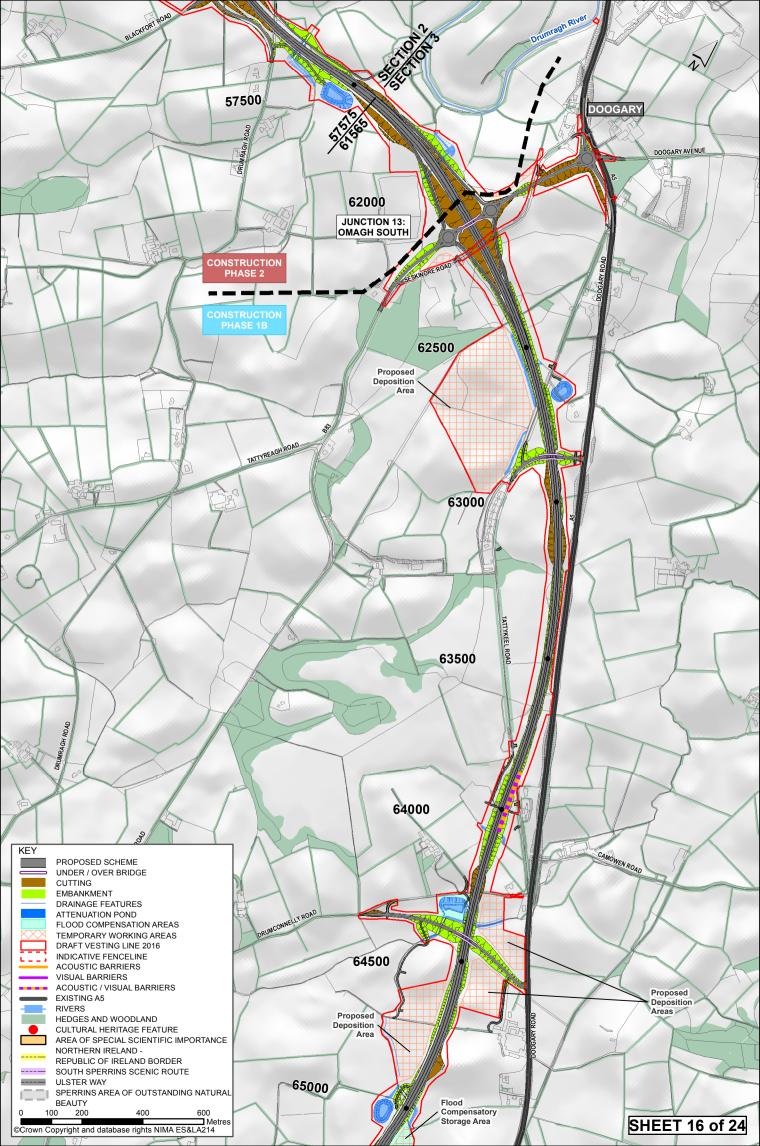


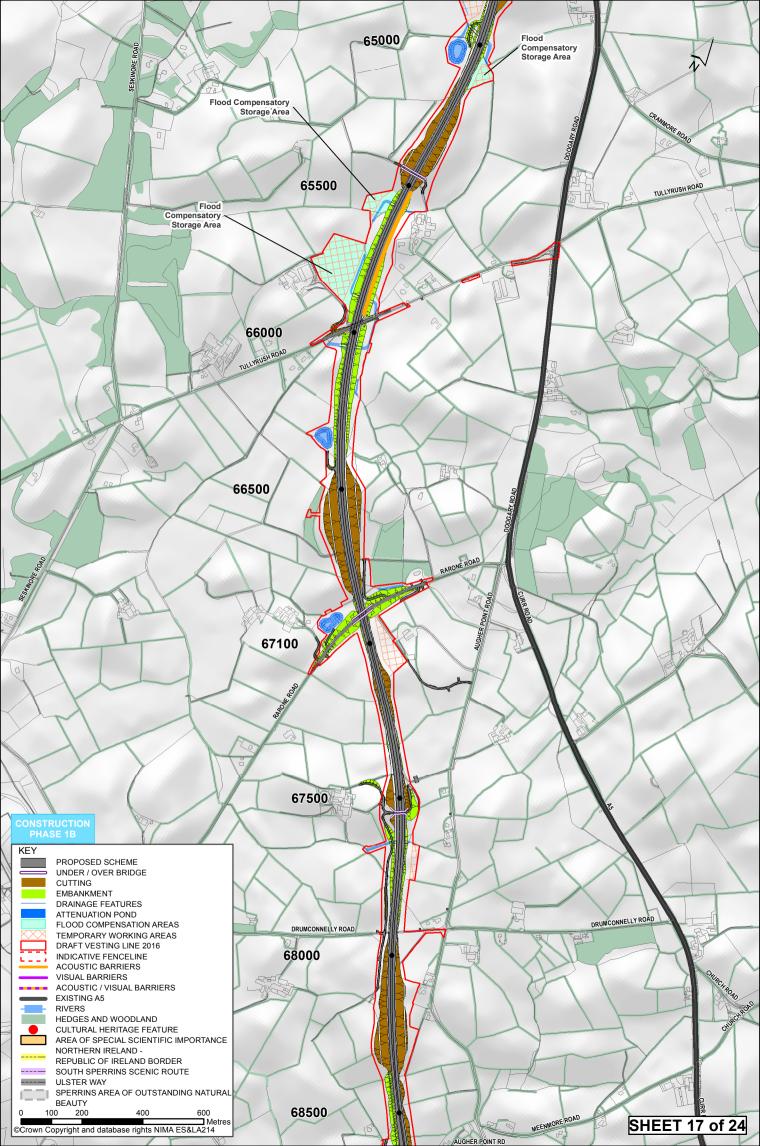


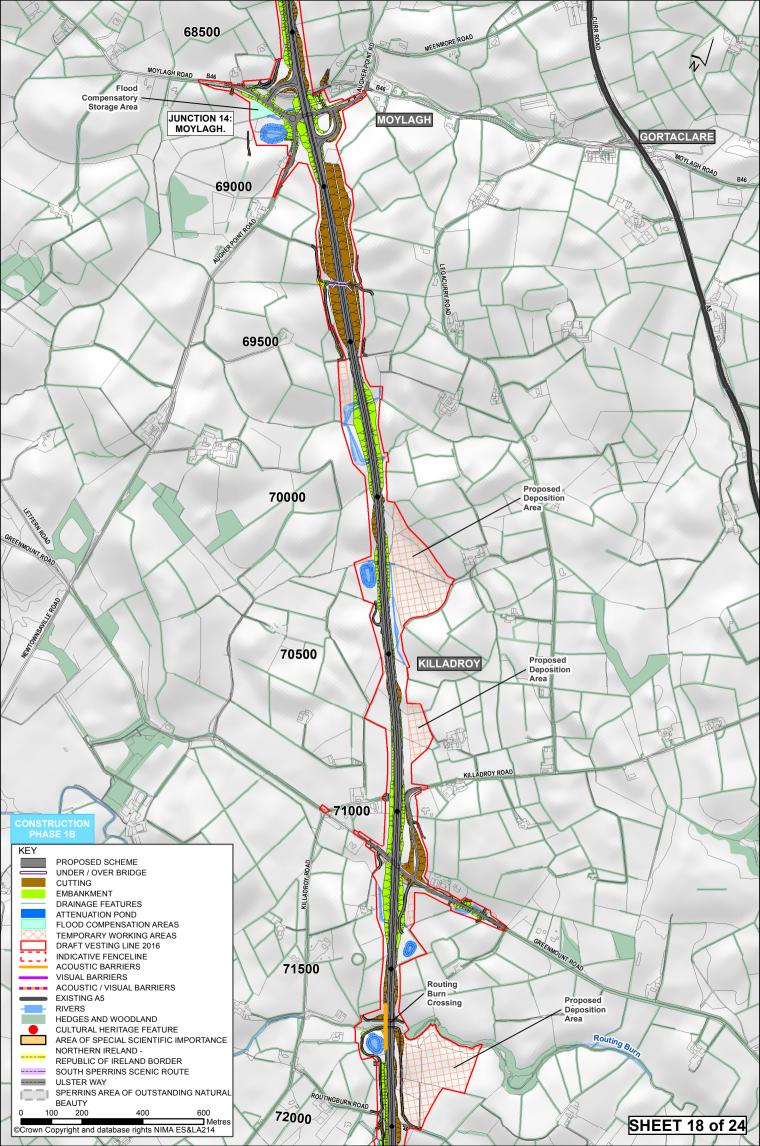


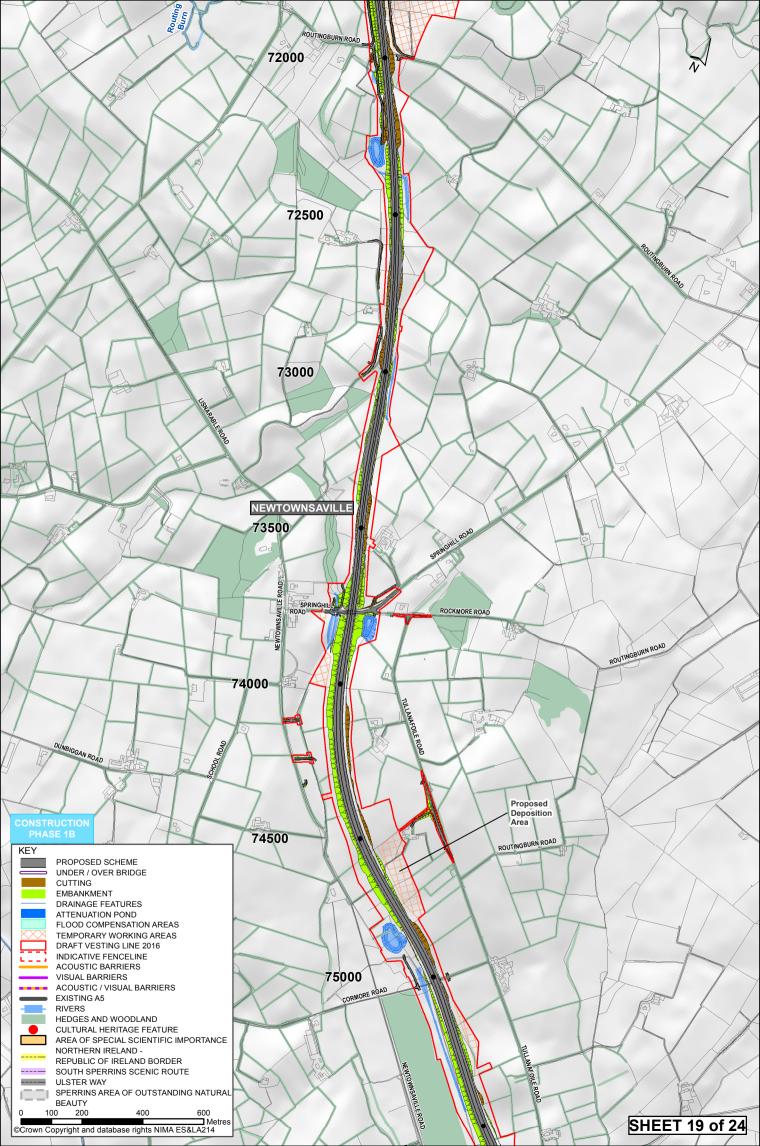


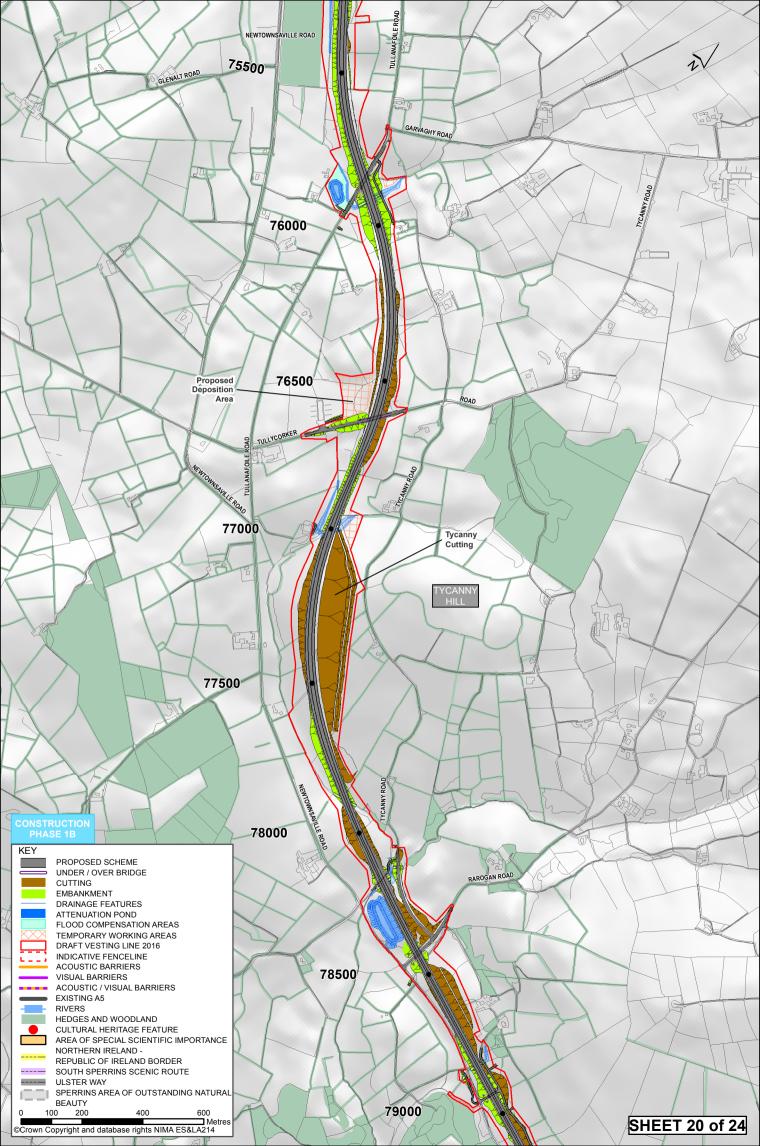


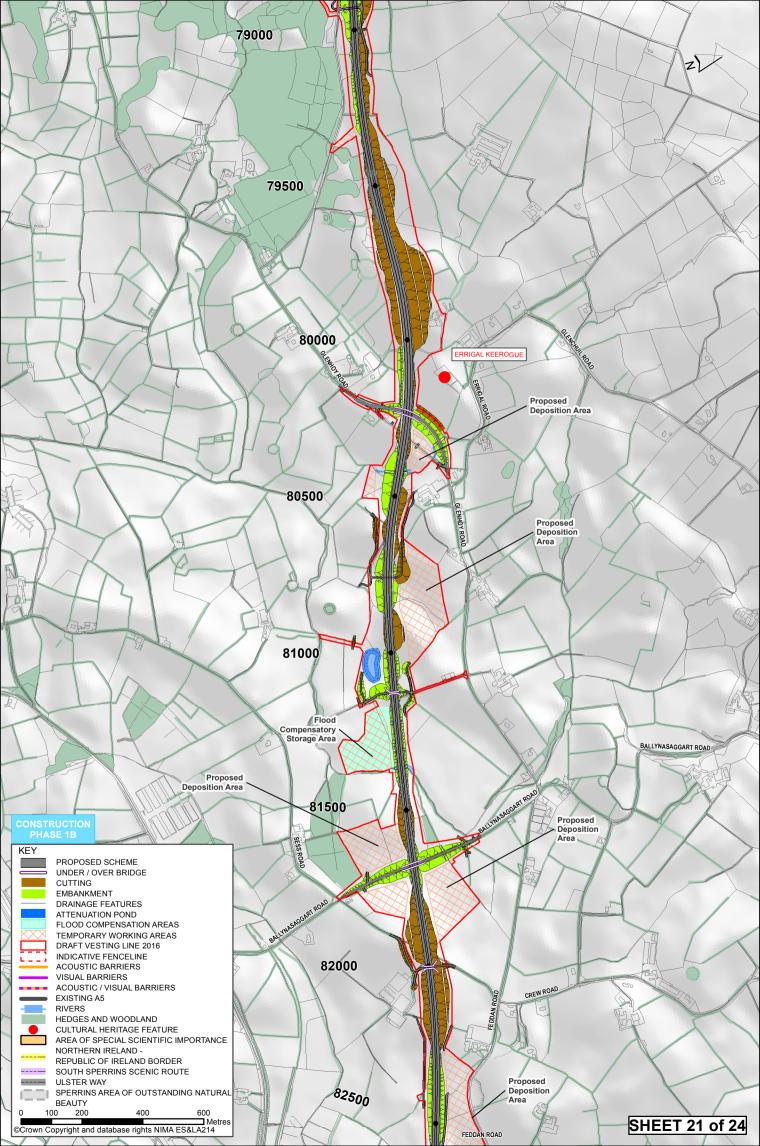


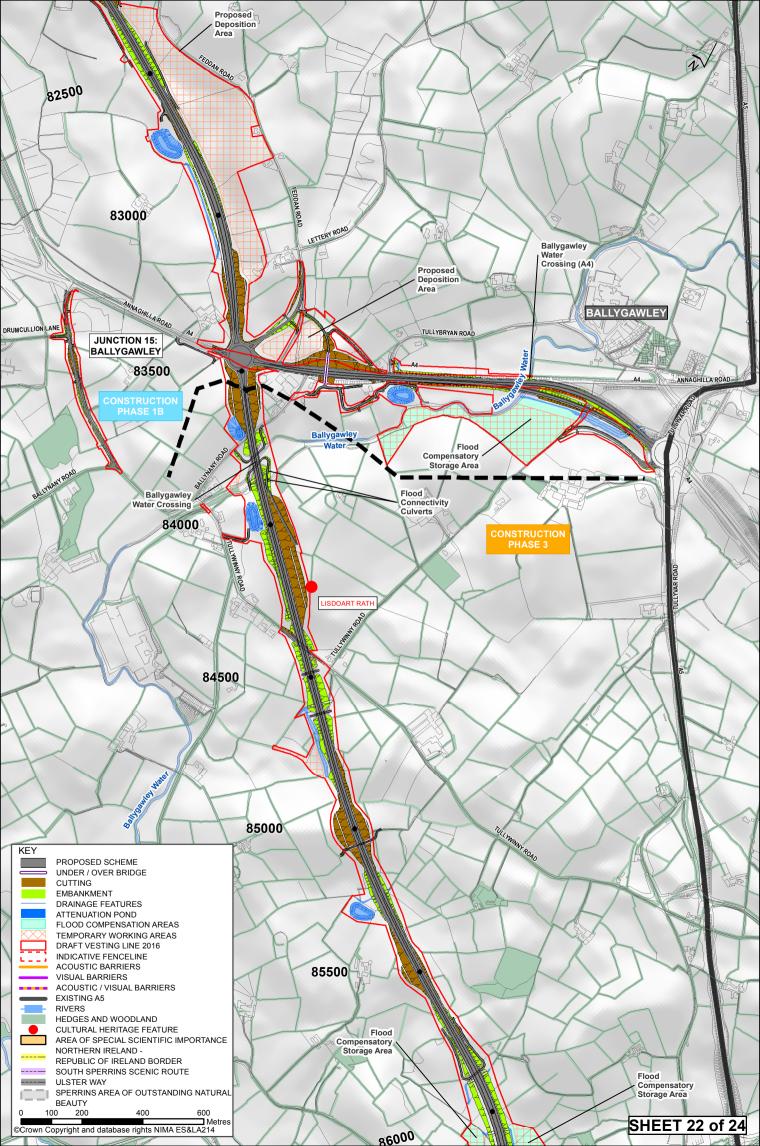


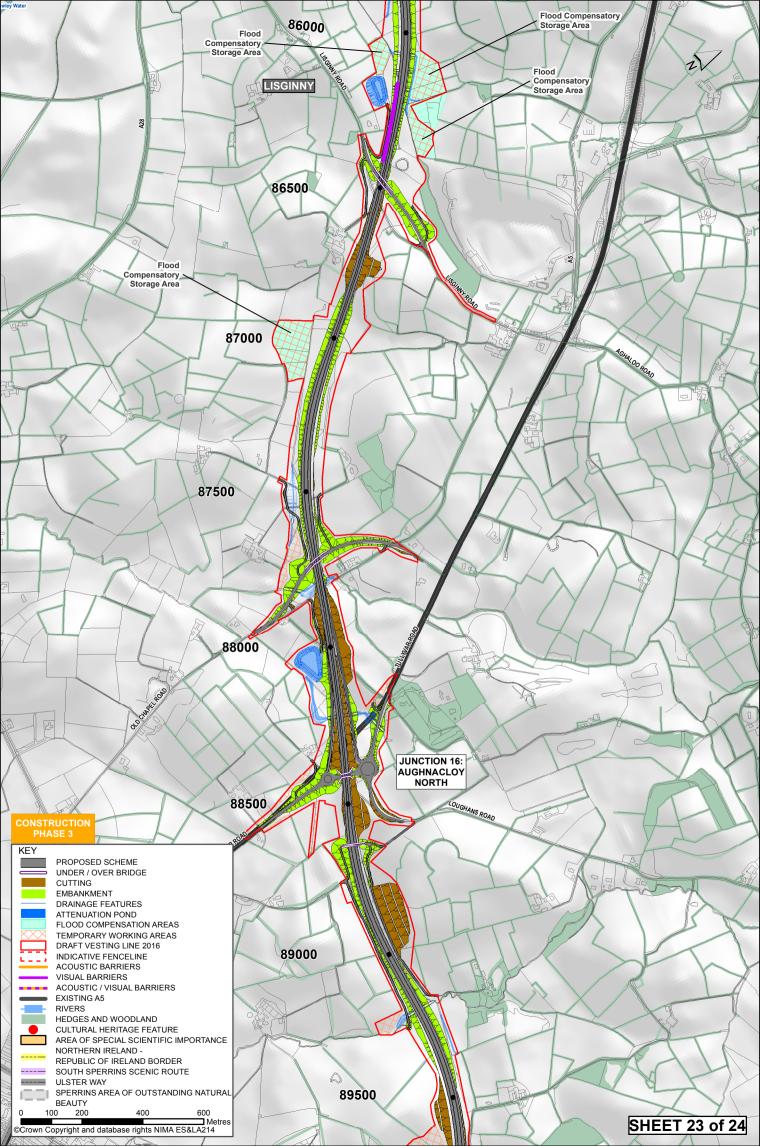


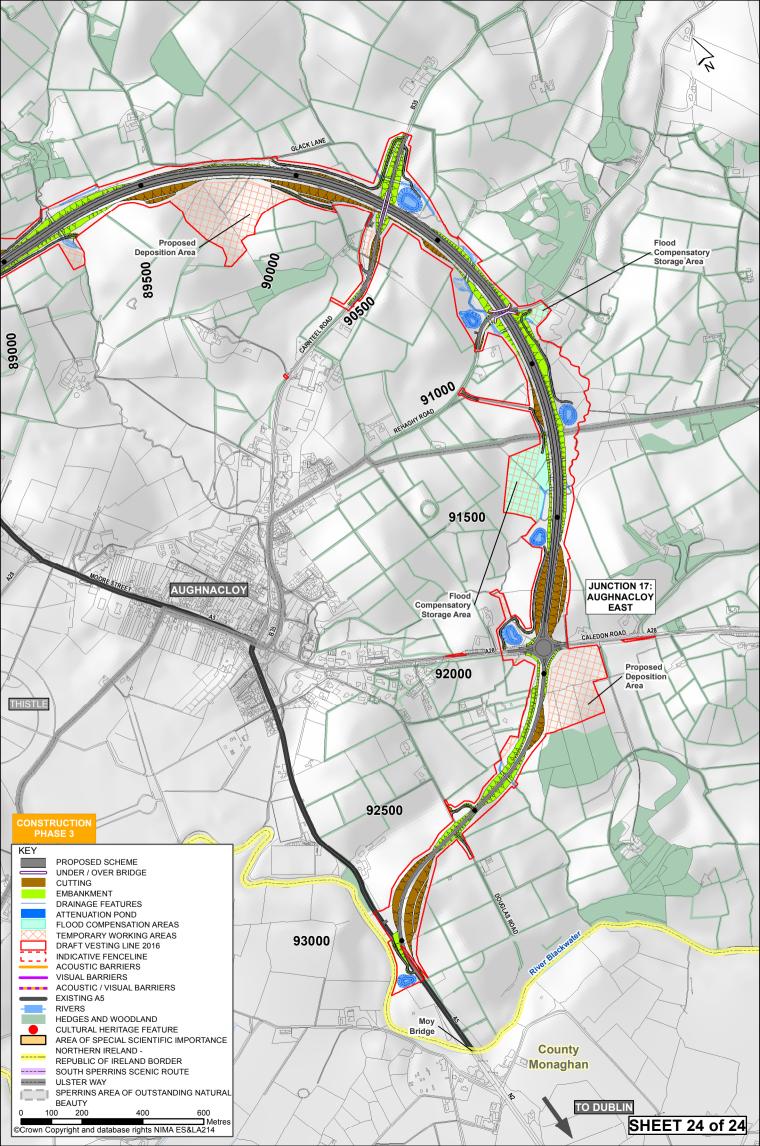


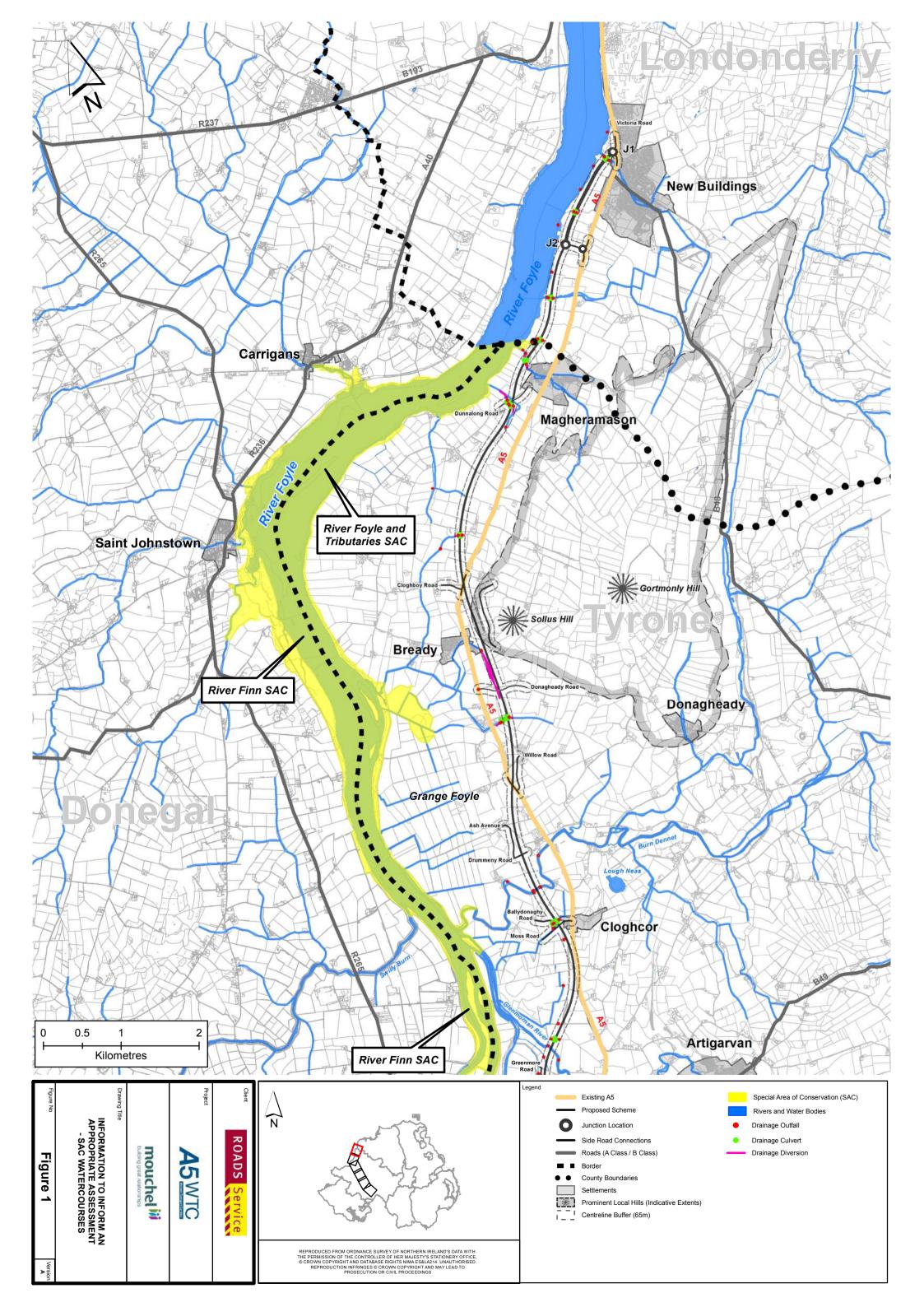


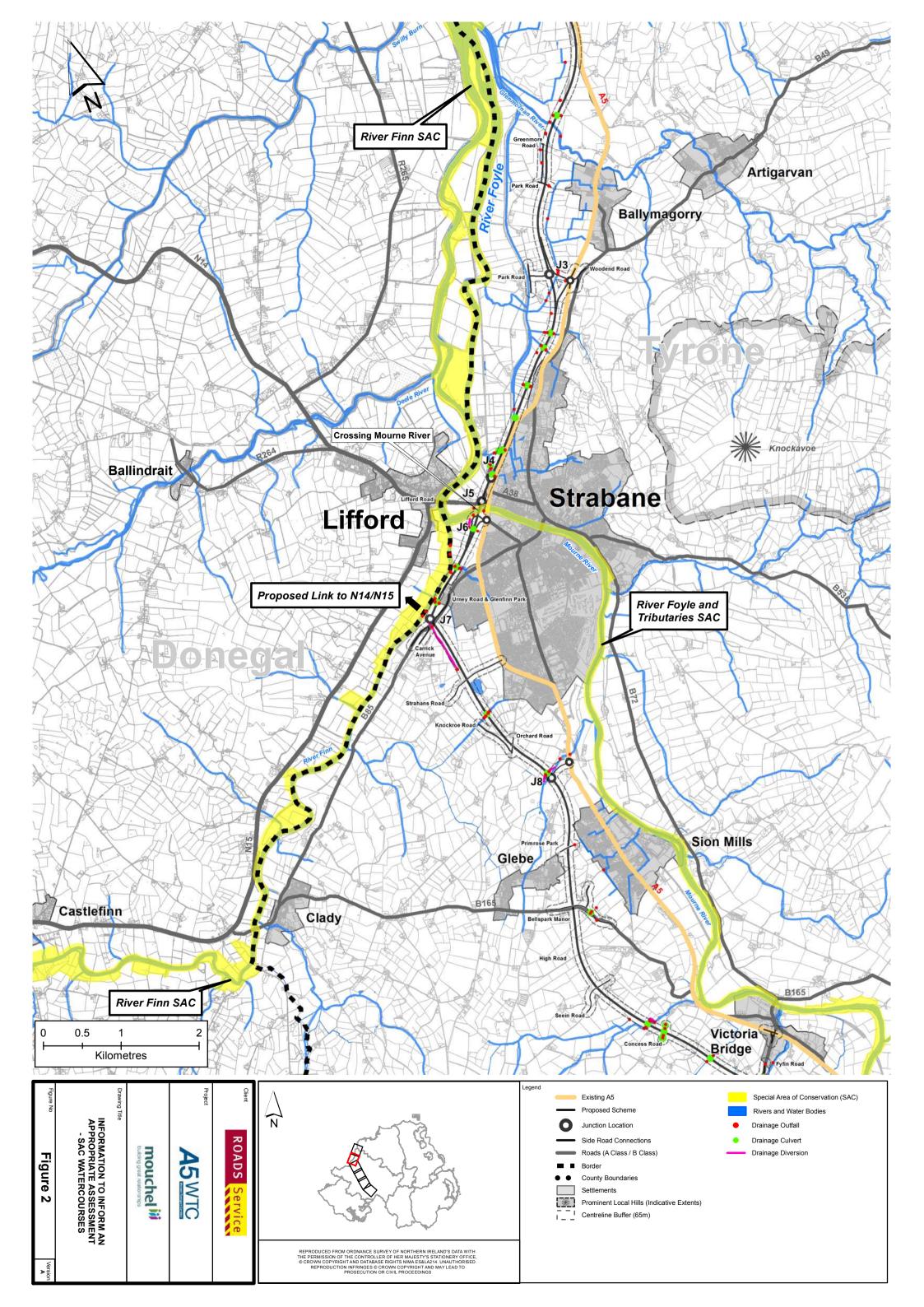


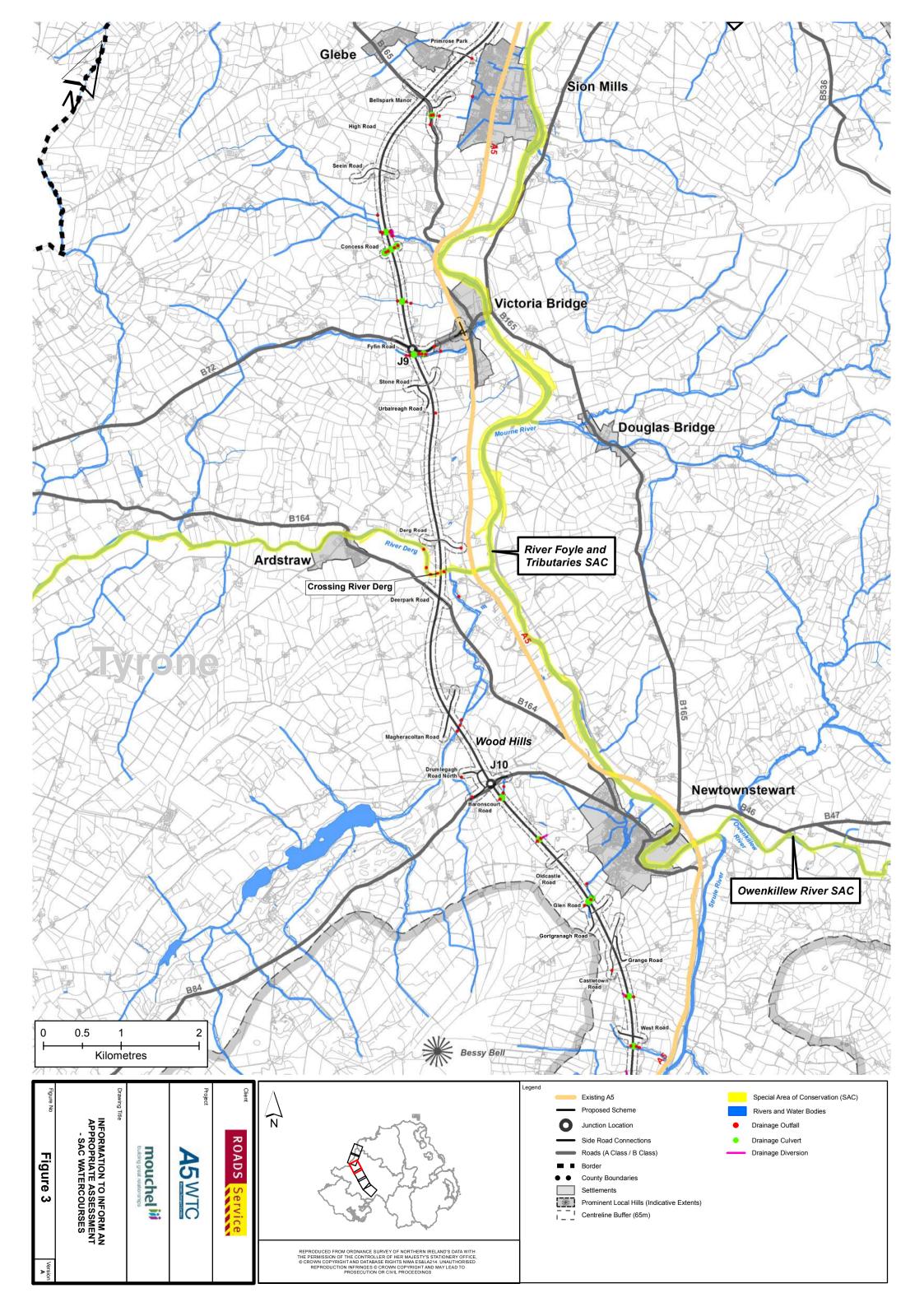


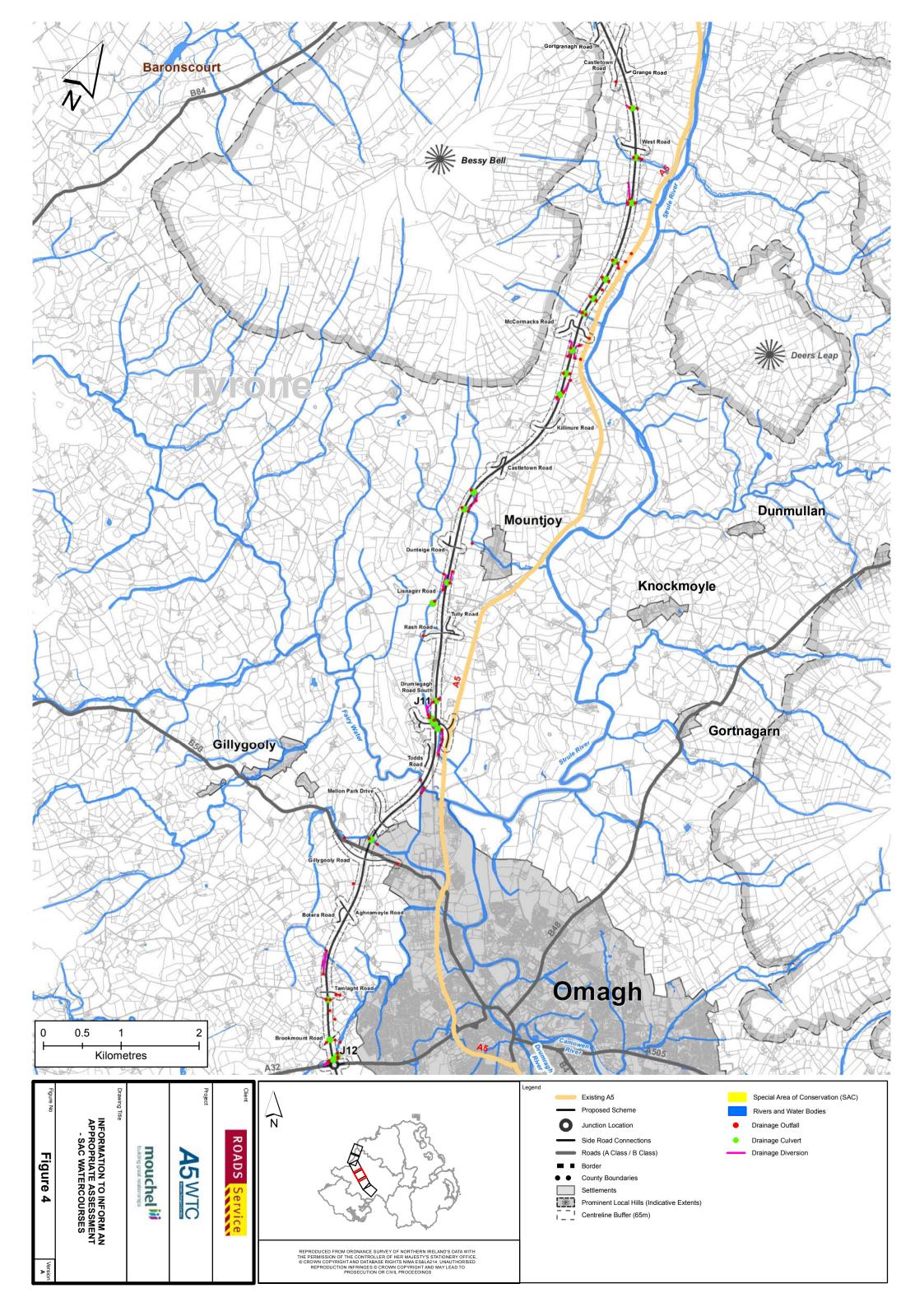


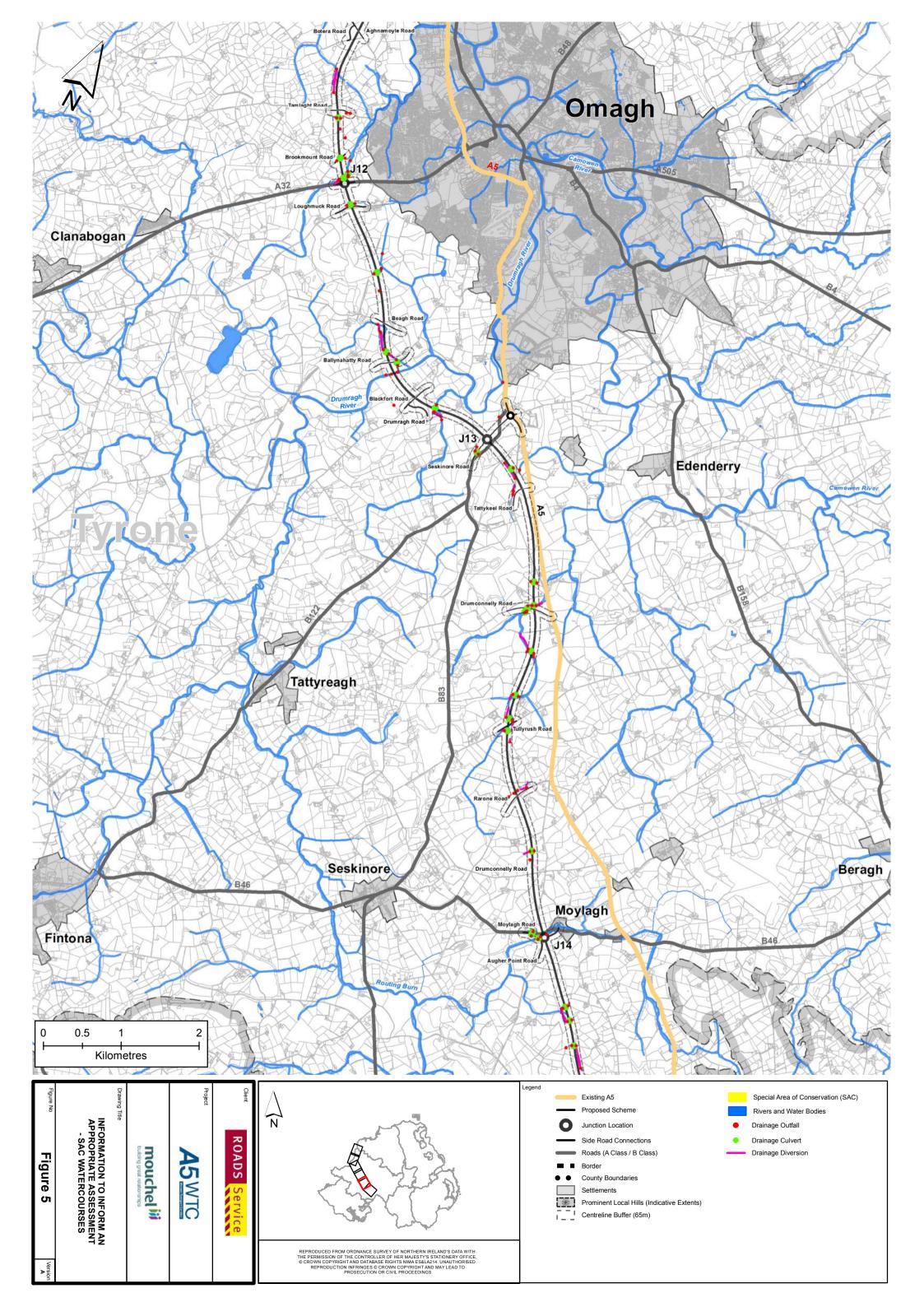


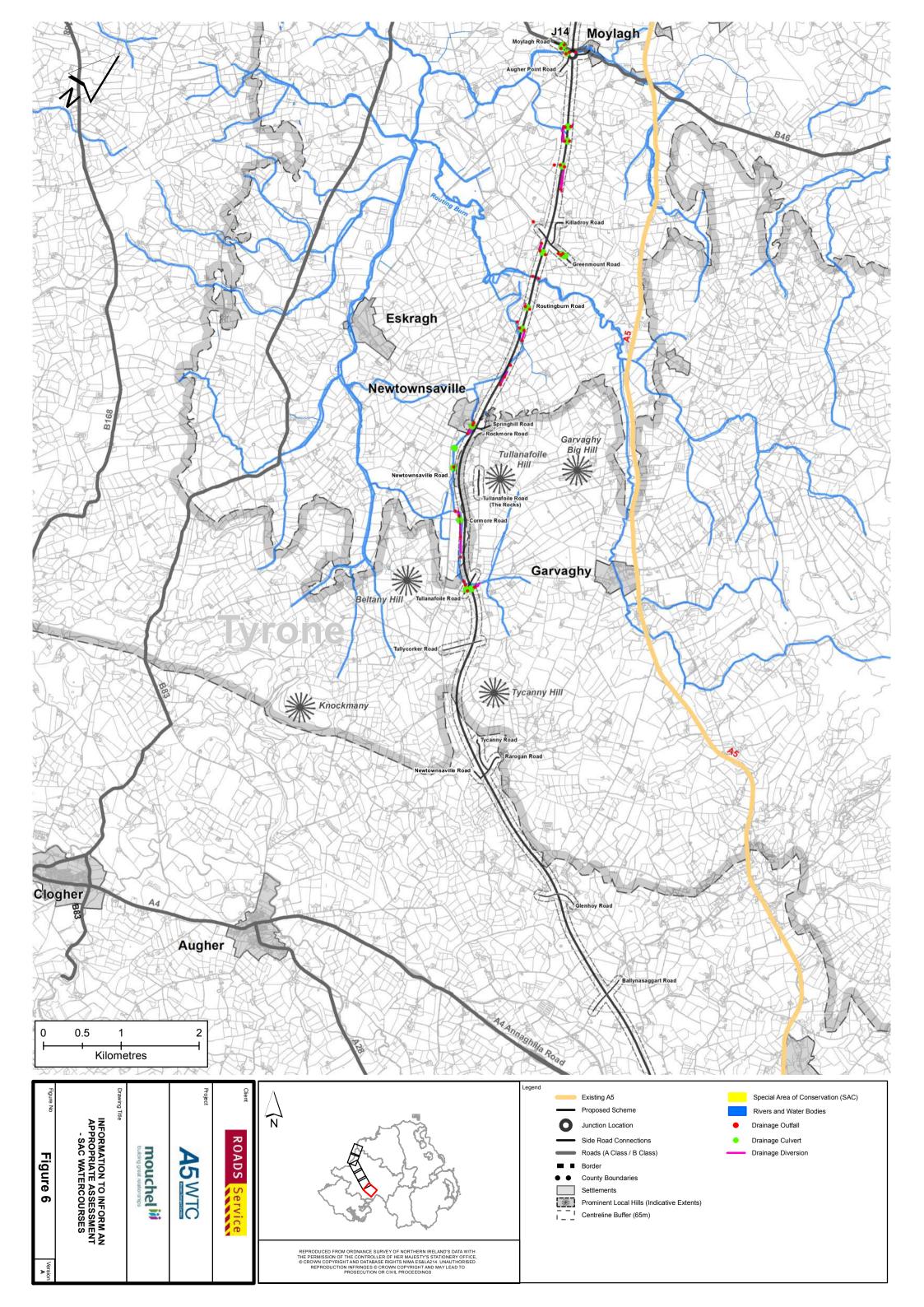


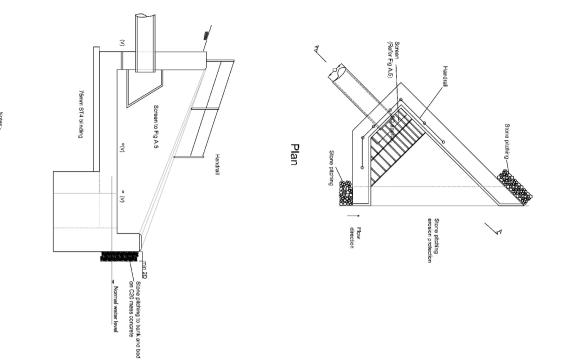








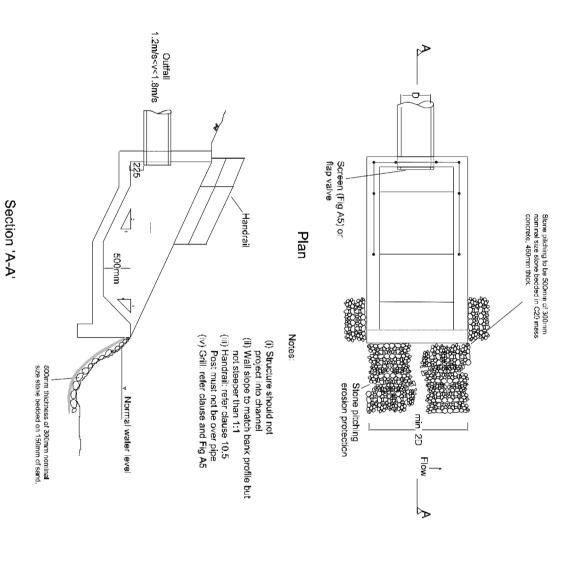




Section 'A-A'

(i) Sucurus should not project into channel
(ii) Wall slope for correspond with Tank profile but
(iii) Hondral Ref. Clause 10.5
(iv) Screen Ref. Chapter 8 and Fig. A5.
(v) Wood Profest Hough wall if nonceauty
(vi) Screen may be replaced by a flap valve.

Figure A1: Typical Outfall Headwall



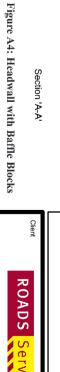
Plan

Screen (Refer Fig A.5)

Flow direction

Stone pitching erasion protection

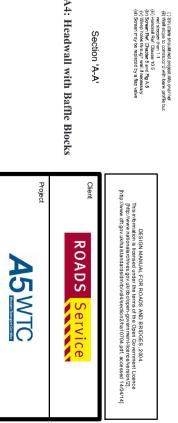
Figure A3: Headwall with Stilling Basin



75mm S⁻⁴ olinding

Stone pitching to bank and bed on C20 mass concrete

Normal water level



mouchel iii

Drawing Title
INFORMATION TO INFORM AN
APPROPRIATE ASSESSMENT
- SAC WATERCOURSES DMRB HEADWALL SCHEMATICS

Figure 7



Information to Inform an Appropriate Assessment: SAC Watercourses

Appendix 2 – Culvert Information

Table A2.1 Salmonid Potential, Watercourse Identification and Crossing Designs

| Watercourse | Culvert ID | Salmonid Potential (Y/N) | Culvert Design | Dimensions | Approx. Chainage |
|----------------------|------------|--------------------------------|-------------------|------------|---------------------|
| New Buildings Stream | S1-PC-01 | Υ | Вох | 1.8 x 2.7 | 540 |
| UD_01 | S1-PC-02 | N | Вох | 2.1 x 2.1 | 1330 |
| Gortin Hall Drain | S1-PC-03 | Υ | Box | 1.8 x 4.5 | 2485 |
| UD_02 | S1-PC-04 | N | Pipe | 1.5m Ø | 3050 |
| UD_02 | S1-PC-32 | N | Pipe | 1.5m Ø | 3125 |
| Blackstone Burn | S1-PC-05 | Υ | Box | 2.1 x 3.9 | 3375 |
| UD_04 | S1-PC-37 | Y | Вох | 1.8 x 1.8 | 3900 |
| UD_04 | S1-PC-06 | Y | Вох | 1.8 x 1.8 | 3980 |
| UD_04 | S1-PC-29 | Y | Вох | 1.8 x 1.8 | 3950 |
| UD_05 | S1-PC-07 | Υ | Вох | 1.5 x 1.5 | 5800 |
| UD_05 | S1-PC-41 | Υ | Box | 1.5 x 1.5 | 5825 |
| UD_07 | S1-PC-08 | Υ | Вох | 2.1 x 3.0 | 8240 |
| UD_07 | S1-PC-38 | Y | Вох | 2.1 x 3.0 | 8250 |
| Ballydonaghy Drain | S1-PC-09 | N | Pipe | 1.8m Ø | 10990 |
| Ballydonaghy Drain | S1-PC-40 | N | Pipe | 1.8m Ø | 10990 |
| FD_04 | S1-PC-10 | N | Pipe | 1.5m Ø | 12600 |
| Strabane Glen Stream | S1-PC-16 | Y | Вох | 2.7 x 3.0 | 15470 |
| Roundhill Drain | S1-PC-17 | N | Вох | 1.8 x 2.4 | 15680 |
| FD_13.b | S1-PC-18 | N | Pipe | 1.8m Ø | 16210 |





| Watercourse | Culvert ID | Salmonid Potential (Y/N) | Culvert Design | Dimensions | Approx. Chainage | |
|------------------|------------|--------------------------------|-------------------|------------|---------------------|--|
| Backfence Drain | S1-PC-19 | N | Pipe | 2.4m Ø | 16650 | |
| Nancy Burn | S1-PC-20A | N | Pipe | 0.6m Ø | 17090 | |
| Nancy Burn | S1-PC-20B | N | Pipe | 1.2m Ø | 17090 | |
| Nancy Burn | S1-PC-20C | N | Pipe | 0.6m Ø | 17090 | |
| Nancy Burn | S1-PC-33 | N | Box | 2.4 x 3.9 | 17130 | |
| Nancy Burn | S1-PC-42 | N | Box | 2.4 x 3.9 | 17200 | |
| Park Road Drain | S1-PC-22 | N | Pipe | 1.5m Ø | 17380 | |
| UD_08 | S1-PC-23 | N | Pipe | 1.8m Ø | 18180 | |
| Urney Road Drain | S1-PC-24 | N | Box | 18720 | | |
| UD_10 | S1-PC-25 | N | Pipe | 1.8m Ø | 19240 | |
| Flushtown | S1-PC-27 | Y | Box 2.1 x 3.6 | | 20900 | |
| UD_12 | S1-PC-28 | Y | Box | 2.1 x 2.1 | 21990 | |
| UD_13.1 | S2-PC-54 | N | Pipe | 0.6m Ø | 28100 | |
| UD_15 | S2-PC-01 | Y | Вох | 2.4 x 5.4 | 29900 | |
| UD_16 | S2-PC-55 | N | Pipe | 1.2m Ø | 30150 | |
| UD_16 | S2-PC-48 | N | Pipe | 1.2m Ø | 30150 | |
| UD_16 | S2-PC-56 | N | Pipe | 1.2m Ø | 30150 | |
| UD_16 | S2-PC-58 | N | Pipe | 1.2m Ø | 30150 | |
| UD_17 | S2-PC-02 | Y | Вох | 1.8 x 2.7 | 30820 | |
| UD_19 | S2-PC-03 | Υ | Вох | 2.1 x 3.3 | 31500 | |





| Watercourse | Culvert ID | Salmonid Potential (Y/N) | Culvert Design | Dimensions | Approx. Chainage | |
|-------------------|------------|--------------------------------|-------------------|------------|---------------------|--|
| UD_19 | S2-PC-49 | Υ | Вох | 2.4 x 3.6 | 31500 | |
| Scotts Mill Layde | S2-PC-07 | N | Pipe | 1.5m Ø | 37500 | |
| UD_21 | S2-PC-08 | N | Box | 1.2 x 2.1 | 38250 | |
| UD_22 | S2-PC-09 | Y | Box | 1.8 x 1.8 | 39250 | |
| UD_22 | S2-PC-60 | Y | Box | 1.8 x 1.8 | 39250 | |
| UD_23 | S2-PC-10 | Y | Box | 1.8 x 1.8 | 40600 | |
| UD_24 | S2-PC-11 | N | Pipe | 1.8m Ø | 41250 | |
| UD_26 | S2-PC-12 | N | Box 1.8 x 3.3 | | 41850 | |
| UD_28 | S2-PC-13 | Y | Box 1.2 x 1.2 | | 42600 | |
| UD_29 | S2-PC-14 | Y | Вох | 1.2 x 1.5 | 42850 | |
| UD_31 | S2-PC-16 | Y | Box 1.5 x 1.5 | | 43150 | |
| UD_32 | S2-PC-17 | Y | Box | 1.8 x 2.4 | 43370 | |
| UD_33 | S2-PC-18 | Y | Box | 1.5 x 1.5 | 43780 | |
| UD_34 | S2-PC-19 | N | Pipe | 1.2m Ø | 43950 | |
| UD_35a | S2-PC-50 | Y | Box | 1.2 x 1.2 | 44200 | |
| UD_36 | S2-PC-20 | Υ | Вох | 1.5 x 1.8 | 44500 | |
| UD_37 | S2-PC-21 | N | Вох | 2.1 x 3.0 | 46200 | |
| UD_39 | S2-PC-22 | Y | Вох | 1.8 x 3.0 | 46440 | |
| UD_40 | S2-PC-47 | Y | Вох | 2.1 x 2.1 | 47350 | |
| UD_43.1 | S2-PC-59 | Υ | Вох | 2.1 x 2.1 | 47700 | |





| Watercourse | Culvert ID | Salmonid Potential (Y/N) | Culvert Design | Dimensions | Approx. Chainage | |
|---------------------|------------|--------------------------------|-------------------|---------------|---------------------|--|
| UD_45 | S2-PC-26 | Υ | Вох | 1.5 x 1.5 | 48950 | |
| Tully Drain | S2-PC-27 | N | Вох | 3.9 x 5.1 | 49180 | |
| Tully Drain | S2-PC-53 | N | Box | 3.9 x 5.1 | 49250 | |
| Tully Drain | S2-PC-28 | N | Box | 3.9 x 5.1 | 49290 | |
| Aghnamoyle Drain | S2-PC-29 | N | Box | 4.5 x 5.1 | 51025 | |
| UD_52 | S2-PC-32 | Y | Box | 1.2 x 1.2 | 53200 | |
| UD_54 | S2-PC-34 | Y | Вох | 1.5 x 1.5 | 53700 | |
| UD_54 | S2-PC-51 | Y | Box | 1.5 x 1.5 | 53700 | |
| Fireagh Lough Drain | S2-PC-57 | Y | Box 2.1 x 3.0 | | 53900 | |
| Fireagh Lough Drain | S2-PC-36 | Y | Вох | Box 2.1 x 3.0 | | |
| UD_55 | S2-PC-38 | N | Pipe | 1.5m Ø | 54320 | |
| UD_56 | S2-PC-39 | N | Box | 1.5 x 1.5 | 55250 | |
| Loughmuck 0.1 | S2-PC-43 | N | Box | 1.8 x 1.8 | 56300 | |
| Loughmuck 0.2 | S2-PC-44 | N | Вох | 1.8 x 2.4 | 56450 | |
| Freughmore Drain | S2-PC-45 | Y | Box | 2.4 x 2.4 | 57300 | |
| UD_57 | S3-PC-84 | Y | Вох | 1.8 x 1.8 | 61850 | |
| UD_57.2 | S3-PC-56 | Y | Вох | 1.8 x 1.8 | 62100 | |
| UD_58 | S3-PC-51 | N | Вох | 1.5 x 3.0 | 62550 | |
| UD_109 | S3-PC-52 | Y | Вох | 2.1 x 2.1 | 64080 | |
| Ranelly Drain_0.5 | S3-PC-53 | Υ | Вох | 2.7 x 3.3 | 64400 | |





| Watercourse | Culvert ID | Salmonid Potential (Y/N) | Culvert Design | Dimensions | Approx. Chainage | |
|-------------------|------------|--------------------------------|-------------------|---------------|---------------------|--|
| Ranelly Drain_0.5 | S3-PC-74 | Υ | Вох | 2.7 x 3.3 | 64390 | |
| Ranelly Drain_0.5 | S3-PC-82 | Y | Вох | 2.7 x 4.2 | 64500 | |
| Ranelly Drain 1 | S3-PC-06 | Y | Вох | 2.7 x 3.0 | 64980 | |
| Ranelly Drain 2 | S3-PC-07 | Y | Вох | 2.4 x 2.7 | 65580 | |
| Ranelly Drain 2.1 | S3-PC-08 | N | Вох | 2.1 x 5.1 | 65890 | |
| Ranelly Drain 3 | S3-PC-10 | N | Box | 2.1 x 2.7 | 66050 | |
| UD_60 | S3-PC-11 | N | Вох | 1.8 x 1.8 | 66870 | |
| UD_61 | S3-PC-12 | N | Pipe | 1.5m Ø | 67630 | |
| Letfern | S3-PC-14 | Y | Box 2.1 x 3.6 | | 68750 | |
| Letfern | S3-PC-58 | Y | Box | Box 2.1 x 3.6 | | |
| UD_61.2 | S3-PC-15 | Y | Box 1.5 x 1.5 | | 68700 | |
| UD_61.2 | S3-PC-66 | Y | Pipe | 0.6m Ø | 68700 | |
| UD_62 | S3-PC-16 | N | Pipe | 2.4m Ø | 69710 | |
| UD_63.A | S3-PC-17 | N | Вох | 1.8 x 1.8 | 69890 | |
| UD_64 | S3-PC-18 | N | Box | 1.5 x 2.7 | 70200 | |
| UD_67.B | S3-PC-83 | Y | Вох | 1.8 x 1.8 | 71100 | |
| UD_67.A | S3-PC-50 | Υ | Вох | 1.8 x 1.8 | 71150 | |
| UD_67 | S3-PC-19 | Y | Вох | 1.8 x 1.8 | 71350 | |
| UD_68 | S3-PC-21 | Y | Вох | 1.8 x 1.8 | 72090 | |
| UD_69 | S3-PC-22 | Υ | Вох | 1.8 x 1.8 | 72380 | |



Information to Inform an Appropriate Assessment: SAC Watercourses

| Watercourse | Culvert ID | Salmonid Potential (Y/N) | Culvert Design | Dimensions | Approx. Chainage |
|-------------|----------------|--------------------------------|-------------------|------------|---------------------|
| UD_71 | S3-PC-23 | Υ | Box | 2.1 x 2.7 | 73770 |
| UD_72.2 | S3-PC-64 | Y | Box | 2.4 x 3.0 | 74100 |
| UD_72.1 | S3-PC-65 Y Box | | 2.4 x 3.0 | 74210 | |
| UD_110.2 | S3-PC-72 | N | Box | 3.3 x 3.3 | 74900 |
| UD_110 | S3-PC-54 | Y | Box | 2.1 x 2.4 | 75910 |
| UD_110 | S3-PC-60 | Y | Вох | 2.1 x 2.4 | 75900 |
| UD_75.3 | S3-PC-55 | Y | Box | 1.8 x 1.8 | 77000 |
| UD_76 | S3-PC-29 | Y | Box | 2.1 x 2.1 | 77900 |

NB: Some watercourses with no salmonid potential recorded and/or agreed with Loughs Agency require box culverts for flood management proposes.



Appendix 3 – Watercourse Diversion Information

Table A3.1 Watercourse Diversions

| Watercourse | Salmonid Interest (Y/N) | Diversion ID | Associated Culvert | Approximate Chainage |
|----------------------|-------------------------------|-----------------|--------------------|-------------------------|
| New Buildings Stream | Υ | S1-WD-17 | S1-PC-01 | 540 |
| UD_01 | N | S1-WD-01 | S1-PC-02 | 1330 |
| Gortin Hall Drain | Υ | S1-WD-16 | S1-PC-03 | 2485 |
| UD_02 | N | S1-WD-02 | S1-PC-04 & 32 | 3050 |
| Blackstone Burn | Υ | S1-WD-03 | S1-PC-05 | 3375 |
| UD_04 | Υ | S1-WD-05 | S1-PC-06, 29 & 37 | 3950 |
| UD_05 | Υ | S1-WD-06 | S1-PC-07 & 41 | 5800 |
| UD_07 | Y | S1-WD-07 | S1-PC-08 & 38 | 8240 |
| Ballydonaghy Drain | N | S1-WD-08 | S1-PC-09 & 40 | 10990 |
| UD_08 | N | S1-WD-18 | S1-PC-23 | 18180 |
| Urney Road Drain | N | S1-WD-14 | S1-PC-24 | 18720 |
| UD_12 | Υ | S1-WD-19 | S1-PC-28 | 21990 |
| UD_15.2 | Υ | S2-WD-43 | None | 29800 |
| UD_15 | Υ | S2-WD-01 | S2-PC-01 | 29900 |
| UD_19 | Y | S2-WD-33 | S2-PC-03 | 31500 |
| Scotts Mill Layde | N | S2-WD-05 | S2-PC-07 | 37500 |
| UD_21 | N | S2-WD-34 | S2-PC-08 | 38250 |
| UD_23 | Y | S2-WD-08 | S2-PC-10 | 40600 |
| UD_25 | N | S2-WD-35 | None | 41700 |
| UD_26 | N | S2-WD-09 | S2-PC-12 | 41850 |
| UD_28 | Υ | S2-WD-10 | S2-PC-13 | 42600 |
| UD_29 | Υ | S2-WD-36 | S2-PC-14 | 42850 |
| UD_31 | Υ | S2-WD-41 | S2-PC-16 | 43150 |
| UD_32 | Υ | S2-WD-42 | S2-PC-17 | 43370 |





| Watercourse | Salmonid Interest (Y/N) | Diversion ID | Associated Culvert | Approximate Chainage |
|---------------------|-------------------------------|-----------------|--------------------|-------------------------|
| UD_33 | Υ | S2-WD-37 | S2-PC-18 | 43770 |
| UD_34 | N | S2-WD-38 | S2-PC-19 | 43980 |
| UD_35.1 | Υ | S2-WD-11 | S2-PC-50 | 44200 |
| UD_36 | Υ | S2-WD-13 | S2-PC-20 | 44500 |
| UD_37 | N | S2-WD-14 | S2-PC-21 | 46200 |
| UD_38 | Υ | S2-WD-15 | None | 46400 |
| UD_40 | Y | S2-WD-16 | S2-PC-47 | 47300 |
| UD_42 | Υ | S2-WD-18 | None | 47500 |
| UD_45 | Υ | S2-WD-19 | S2-PC-26 | 48950 |
| Tully Drain | N | S2-WD-39 | S2-PC-27 & 53 | 49200 |
| Tully Drain 0.1 | N | S2-WD-20 | None | 49500 |
| Fairy Water 0.1 | N | S2-WD-21 | None | 50135 |
| UD_50 | Υ | S2-WD-25 | None | 52700 |
| UD_52 | Y | S2-WD-40 | S2-PC-32 | 53200 |
| UD_54 | Y | S2-WD-26 | S2-PC-34 & 51 | 53700 |
| Fireagh Lough Drain | Y | S2-WD-27 | S2-PC-36 & 57 | 53950 |
| UD_55 | N | S2-WD-28 | S2-PC-38 | 54300 |
| UD_56 | N | S2-WD-29 | S2-PC-39 | 55250 |
| Loughmuck 0.1 | N | S2-WD-30 | S2-PC-43 & 44 | 56050 |
| Freughmore Drain | Y | S2-WD-31 | S2-PC-45 | 57300 |
| UD_57 | Y | S3-WD-32 | S3-PC-84 | 61850 |
| UD_57.2 | Y | S3-WD-66 | S3-PC-56 | 62000 |
| UD_58.3 | N | S3-WD-43 | None | 62500 |
| UD_108 | N | S3-WD-44 | None | 62650 |
| UD_108 | N | S3-WD-70 | None | 62800 |





| Watercourse | Salmonid Interest (Y/N) | Diversion ID | Associated Culvert | Approximate Chainage | | |
|-------------------|-------------------------------|-----------------|--------------------|-------------------------|--|--|
| UD_109 | Υ | S3-WD-45 | S3-PC-52 | 64100 | | |
| Ranelly Drain 0.5 | Υ | S3-WD-46 | S3-PC-53, 74 & 82 | 64450 | | |
| UD_119 | Y | S3-WD-04 | None | 65000 | | |
| Ranelly Drain 1 | Y | S3-WD-05 | S3-PC-06 | 65050 | | |
| Ranelly Drain 2 | Y | S3-WD-06 | S3-PC-07 | 65650 | | |
| Ranelly Drain 2.1 | N | S3-WD-07 | S3-PC-08 | 65800 | | |
| Ranelly Drain 2.3 | N | S3-WD-08 | None | 65900 | | |
| Ranelly Drain 3 | N | S3-WD-09 | S3-PC-10 | 66050 | | |
| Ranelly Drain 3.1 | Y | S3-WD-10 | None | 66200 | | |
| UD_60.2 | Y | S3-WD-75 | None | 66800 | | |
| UD_61.0 | Y | S3-WD-11 | 67650 | | | |
| UD_61.2 | Y | S3-WD-47 | S3-PC-15 & 66 | 68650 | | |
| Letfern | Y | S3-WD-12 | S3-PC-14 | 68750 | | |
| Letfern 0.1 | Y | S3-WD-48 | S3-PC-58 | 68750 | | |
| UD_62 | N | S3-WD-13 | S3-PC-16 | 69700 | | |
| UD_63 | N | S3-WD-14 | S3-PC-17 | 69900 | | |
| UD_65 | N | S3-WD-16 | S3-PC-18 | 70200 | | |
| UD_66 | Y | S3-WD-17 | None | 70450 | | |
| UD_67.A | Y | S3-WD-18 | S3-PC-50 & 83 | 71270 | | |
| UD_67 | Y | S3-WD-19 | S3-PC-19 | 71300 | | |
| UD_68 | Y | S3-WD-20 | S3-PC-21 | 72100 | | |
| UD_69 | Y | S3-WD-21 | S3-PC-22 | 72400 | | |
| UD_70 | Y | S3-WD-22 | None | 73000 | | |
| UD_71 | Y | S3-WD-49 | S3-PC-23 | 73800 | | |
| UD_110.2 | N | S3-WD-51 | S3-PC-72 | 75300 | | |
| UD_110 | Y | S3-WD-50 | S3-PC-54 & 60 | 75900 | | |



Information to Inform an Appropriate Assessment: SAC Watercourses

| Watercourse | Salmonid Interest (Y/N) | Diversion ID | Associated Culvert | Approximate Chainage |
|-------------|-------------------------------|-----------------|--------------------|-------------------------|
| UD_111.3 | Υ | S3-WD-53 | None | 76950 |
| UD_75.3 | Υ | S3-WD-54 | S3-PC-55 | 77000 |

SAC Watercourses



Appendix 4 – Outfall Information

Table A4.1 Summary of Individual HAWRAT, EQS and Downstream 'In-River' Sediment Assessment Results

| | | z | | HAWRA | HAWRAT Acute | | | | | EQS Ass | essment | | Downstream | |
|-------------|-------------------------|---------------|--|--|-----------------|----------|------------------------|---------------------|--------------|------------------------|-------------------|-------------|-----------------|-------------|
| | und TSS mg/l | Interest Y/N | | Impact HAWRAT Chronic Assessment Impact Assessment | | | | Average d Copper | | l Average Ived Zinc | River Sediment | | | |
| Outfall ID | Background level mg/ | Salmonid Inte | Mitigation | Soluble | Soluble Zinc | Sediment | Low Flow Vel. (m/s) | Deposition Index | Value (µg/l) | Pass / Fail | Value (μg/l) | Pass / Fail | Value (mg/l) | Pass / Fail |
| S1 OF 01.1 | 6.5 | Υ | Wet/Retention Pond | Pass | Pass | Pass | n/a | - | 0.00 | Pass | 0.00 | Pass | 7 | Pass |
| S1 OF 02.1a | 6.5 | Υ | Wet/Retention Pond | Pass | Pass | Pass | n/a | - | 0.00 | Pass | 0.00 | Pass | 7 | Pass |
| S1 OF 2.1b | 6.5 | Υ | Wet/Retention Pond | Pass | Pass | Pass | n/a | - | 0.00 | Pass | 0.00 | Pass | 7 | Pass |
| S1 OF 25 | 6.5 | Υ | Wet/Retention Pond | Pass | Pass | Pass | n/a | 1 | 0.22 | Pass | 0.77 | Pass | 7 | Pass |
| S1 OF 40 | 2 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.12 | - | 0.22 | Pass | 0.75 | Pass | 3 | Pass |
| S1 OF 26 | 6 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.21 | - | 0.28 | Pass | 0.84 | Pass | 7 | Pass |
| S1 OF 05.1 | 7 | Υ | Swales/Grassed Channels & Wet/Retention Pond | Pass | Pass | Pass | 0.11 | - | 0.61 | Pass | 2.16 | Pass | 7 | Pass |
| S1 OF 07.1 | 6 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.13 | - | 0.65 | Pass | 2.28 | Pass | 9 | Pass |
| S1 OF 08 | 6 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.12 | - | 0.15 | Pass | 0.52 | Pass | 7 | Pass |
| S1 OF 10.1 | 6 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.12 | - | 0.21 | Pass | 0.75 | Pass | 7 | Pass |
| S1 OF 11 | 3.5 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.08 | 3 | 0.00 | Pass | 0.01 | Pass | 4 | Pass |
| S1 OF 12 | 3.5 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.07 | 1 | 0.00 | Pass | 0.00 | Pass | 4 | Pass |
| S1 OF 13 | 3.5 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.07 | 2 | 0.00 | Pass | 0.00 | Pass | 4 | Pass |
| S1 OF 42 | 7 | N | Swales/Grassed Channels & Wet/ Retention Pond | Pass | Pass | Pass | 0.04 | 53 | 0.43 | Pass | 1.51 | Pass | 8 | Pass |
| S1 OF 15 | 5 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.2 | - | 0.00 | Pass | 0.01 | Pass | 5 | Pass |



Information to Inform an Appropriate Assessment:

SAC Watercourses

| | | z | | HAWRA [*] | T Acute | | /D.A.T. O.I | | | EQS Ass | essment | | Downstream River | |
|------------|----------------------------|---------------|--|----------------------|-----------------|-------------------------------------|------------------------|---------------------|------------------------------------|-------------|--------------|------------------------|---------------------|-------------|
| | d TSS | Interest Y/N | | Impact Assessment | | HAWRAT Chronic Impact Assessment | | | Annual Average Dissolved Copper | | | l Average Ived Zinc | Sediment | |
| | Background T level mg/l | Salmonid Inte | Mitigation | Soluble Copper | Soluble Zinc | Sediment | Low Flow Vel. (m/s) | Deposition Index | Value (μg/l) | Pass / Fail | Value (μg/l) | Pass / Fail | Value (mg/l) | Pass / Fail |
| S1 OF 16 | 5 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.2 | - | 0.00 | Pass | 0.01 | Pass | 5 | Pass |
| S1 OF 17 | 7 | Ν | Wet/Retention Pond | Pass | Pass | Pass | 0.04 | 53 | 0.16 | Pass | 0.57 | Pass | 10 | Pass |
| S1 OF 27 | 7 | N | Wet/Retention Pond | Pass | Pass | Pass | 0.1 | - | 0.38 | Pass | 1.35 | Pass | 9 | Pass |
| S1 OF 27a | 7 | N | Wet/Retention Pond | Pass | Pass | Pass | 0.1 | - | 0.12 | Pass | 0.41 | Pass | 8 | Pass |
| S1 OF 29.1 | 7 | N | Wet/Retention Pond | Pass | Pass | Pass | 0.1 | - | 0.18 | Pass | 0.62 | Pass | 8 | Pass |
| S1 OF 39 | 7 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.09 | 33 | 0.24 | Pass | 0.86 | Pass | 8 | Pass |
| S1 OF 31 | 7 | N | Wet/Retention Pond | Pass | Pass | Pass | 0.08 | 37 | 0.53 | Pass | 1.86 | Pass | 9 | Pass |
| S1 OF 32 | 7 | Ν | Wet/Retention Pond | Pass | Pass | Pass | 0.07 | 14 | 0.25 | Pass | 0.89 | Pass | 7 | Pass |
| S1 OF 33 | 7 | N | Swales/Grassed Channels & Wet/ Retention Pond | Pass | Pass | Pass | 0.04 | 14 | 0.32 | Pass | 1.15 | Pass | 7 | Pass |
| S1 OF 34 | 7 | N | Dry/Detention Pond & Wet/Retention Pond | Pass | Pass | Pass | 0.04 | 53 | 0.85 | Pass | 3.01 | Pass | 9 | Pass |
| S1 OF 36 | 7 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.03 | 3 | 0.00 | Pass | 0.00 | Pass | 7 | Pass |
| S1 OF 37 | 7 | Υ | Swales/Grassed Channels | Pass | Pass | Pass | 0.03 | - | 0.00 | Pass | 0.00 | Pass | 7 | Pass |
| S1 OF 41 | 7 | Υ | Swales/Grassed Channels | Pass | Pass | Pass | 0.03 | 1 | 0.00 | Pass | 0.00 | Pass | 7 | Pass |
| S1 OF 22.2 | 7 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.03 | 3 | 0.00 | Pass | 0.00 | Pass | 7 | Pass |
| S1 OF 23.1 | 9.6 | N | Wet/Retention Pond | Pass | Pass | Pass | 0.03 | 90 | 0.81 | Pass | 2.85 | Pass | 13 | Pass |
| S1 OF 38 | 9.6 | N | Swales/Grassed Channels & Wet/ Retention Pond | Pass | Pass | Pass | 0.13 | 9 | 0.26 | Pass | 0.9 | Pass | 10 | Pass |
| S1 OF 24.1 | 9 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.17 | - | 0.74 | Pass | 2.61 | Pass | 12 | Pass |



Information to Inform an Appropriate Assessment:

SAC Watercourses

| | | z | | HAWRA ⁻ | T Acute | | | | | EQS Ass | essment | | | stream |
|------------|-------------------------|-----------------------|--|--------------------|-----------------|-------------------------------------|------------------------|---------------------|------------------------------------|-------------|----------------------------------|-------------|-------------------|-------------|
| | d TSS | erest Y/ | | Imp Assess | act | HAWRAT Chronic Impact Assessment | | | Annual Average Dissolved Copper | | Annual Average Dissolved Zinc | | River Sediment | |
| Outfall ID | Background level mg/ | Salmonid Interest Y/N | Mitigation | Soluble Copper | Soluble Zinc | Sediment | Low Flow Vel. (m/s) | Deposition Index | Value (µg/l) | Pass / Fail | Value (μg/l) | Pass / Fail | Value (mg/l) | Pass / Fail |
| S2 OF 01 | 7 | N | Wet/Retention Pond | Pass | Pass | Pass | 0.11 | - | 0.81 | Pass | 2.87 | Pass | 11 | Pass |
| S2 OF 02 | 6 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.27 | - | 0.1 | Pass | 0.54 | Pass | 7 | Pass |
| S2 OF 03 | 6 | Υ | Swales/Grassed Channels & Wet/Retention Pond | Pass | Pass | Pass | 0.14 | - | 0.42 | Pass | 1.47 | Pass | 6 | Pass |
| S2 OF 04 | 6 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.21 | - | 0.35 | Pass | 1.23 | Pass | 8 | Pass |
| S2 OF 05 | 6 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.02 | 5 | 0.00 | Pass | 0.00 | Pass | 6 | Pass |
| S2 OF 06 | 6 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.04 | 5 | 0.00 | Pass | 0.00 | Pass | 6 | Pass |
| S2 OF 08 | 6 | N | Wet/Retention Pond | Pass | Pass | Pass | 0.06 | 19 | 0.02 | Pass | 0.08 | Pass | 6 | Pass |
| S2 OF 09 | 8 | N | Swales/Grassed Channels & Wet/ Retention Pond | Pass | Pass | Pass | 0.04 | 41 | 0.48 | Pass | 1.7 | Pass | 9 | Pass |
| S2 OF 10 | 8 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.38 | - | 0.31 | Pass | 1.08 | Pass | 10 | Pass |
| S2 OF 33 | 7 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.24 | - | 0.3 | Pass | 1.04 | Pass | 9 | Pass |
| S2 OF 34 | 7 | N | Wet/Retention Pond | Pass | Pass | Pass | 0.2 | - | 0.6 | Pass | 2.09 | Pass | 9 | Pass |
| S2 OF 11 | 7 | Ν | Wet/Retention Pond | Pass | Pass | Pass | 0.4 | - | 0.16 | Pass | 0.57 | Pass | 8 | Pass |
| S2 OF 13 | 10 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.12 | - | 0.66 | Pass | 2.32 | Pass | 13 | Pass |
| S2 OF 35 | 10 | Ν | Wet/Retention Pond | Pass | Pass | Pass | 0.34 | - | 0.7 | Pass | 2.47 | Pass | 19 | Pass |
| S2 OF 39 | 10 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.24 | - | 0.87 | Pass | 3.08 | Pass | 19 | Pass |
| S2 OF 18 | 9 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.17 | - | 0.33 | Pass | 1.17 | Pass | 11 | Pass |
| S2 OF 19 | 8 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.17 | - | 0.33 | Pass | 1.16 | Pass | 10 | Pass |
| S2 OF 21 | 10 | Ν | Wet/Retention Pond | Pass | Pass | Pass | 0.2 | - | 0.25 | Pass | 0.88 | Pass | 11 | Pass |

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Information to Inform an Appropriate Assessment:

SAC Watercourses

| | | z | | HAWRA | T Acute | | /D.A.T. O.I. | | | EQS Ass | essment | | | stream |
|------------|----------------------------|-----------------------|--------------------|---------------|-----------------|----------|------------------------|---------------------|--------------|---------------------|--------------|------------------------|-----------------|-------------|
| | d TSS | erest Y/ | | Imp Assess | act | | /RAT Chr ct Assess | | | Average d Copper | | l Average Ived Zinc | | ver ment |
| Outfall ID | Background T level mg/l | Salmonid Interest Y/N | Mitigation | Soluble | Soluble Zinc | Sediment | Low Flow Vel. (m/s) | Deposition Index | Value (μg/l) | Pass / Fail | Value (μg/l) | Pass / Fail | Value (mg/l) | Pass / Fail |
| S2 OF 22 | 10 | N | Wet/Retention Pond | Pass | Pass | Pass | 0.2 | - | 0.13 | Pass | 0.46 | Pass | 11 | Pass |
| S2 OF 23 | 9 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.06 | 5 | 0.00 | Pass | 0.01 | Pass | 9 | Pass |
| S2 OF 41 | 9 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.06 | 3 | 0.00 | Pass | 0.01 | Pass | 9 | Pass |
| S2 OF 24 | 10 | Ν | Wet/Retention Pond | Pass | Pass | Pass | 0.01 | 23 | 0.06 | Pass | 0.2 | Pass | 10 | Pass |
| S2 OF 25 | 10 | N | Wet/Retention Pond | Pass | Pass | Pass | 0.12 | - | 1.32 | Pass | 0.38 | Pass | 10 | Pass |
| S2 OF 27 | 10 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.15 | - | 0.12 | Pass | 0.43 | Pass | 10 | Pass |
| S2 OF 29 | 10 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.17 | - | 0.37 | Pass | 1.29 | Pass | 11 | Pass |
| S2 OF 37 | 10 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.09 | 64 | 0.57 | Pass | 1.99 | Pass | 13 | Pass |
| S2 OF 38 | 10 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.09 | 34 | 0.29 | Pass | 1.03 | Pass | 11 | Pass |
| S2 OF 30 | 7 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.04 | 3 | 0.00 | Pass | 0.00 | Pass | 7 | Pass |
| S2 OF 31 | 7 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.04 | 2 | 0.00 | Pass | 0.00 | Pass | 7 | Pass |
| S2 OF 32 | 10 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.24 | - | 0.24 | Pass | 0.84 | Pass | 11 | Pass |
| S3 OF 21 | 8 | N | Wet/Retention Pond | Pass | Pass | Pass | 0.11 | - | 0.73 | Pass | 2.58 | Pass | 12 | Pass |
| S3 OF 02 | 8 | Υ | Dry/Detention Pond | Pass | Pass | Pass | 0.20 | - | 0.19 | Pass | 0.57 | Pass | 9 | Pass |
| S3 OF 22 | 8 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.34 | - | 0.22 | Pass | 0.76 | Pass | 9 | Pass |
| S3 OF 03 | 8 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.13 | - | 0.75 | Pass | 2.65 | Pass | 20 | Pass |
| S3 OF 04 | 8 | N | Wet/Retention Pond | Pass | Pass | Pass | 0.1 | - | 0.71 | Pass | 2.50 | Pass | 11 | Pass |
| S3 OF 05 | 9 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.22 | - | 0.13 | Pass | 0.45 | Pass | 9 | Pass |



Information to Inform an Appropriate Assessment:

SAC Watercourses

| | w × | | HAWRA [*] | Γ Acute | | /DAT OL | • . | | Downstream River | | | | | |
|------------|-------------------------|---------------|--|-------------------|-----------------|----------|-------------------------------------|---------------------|---------------------|---------------------|--------------|------------------------|-----------------|-------------|
| | d TSS | st | | Impact | | | HAWRAT Chronic Impact Assessment | | | Average d Copper | | l Average Ived Zinc | Sediment | |
| Outfall ID | Background level mg/ | Salmonid Inte | Mitigation | Soluble Copper | Soluble Zinc | Sediment | Low Flow Vel. (m/s) | Deposition Index | Value (μg/l) | Pass / Fail | Value (μg/l) | Pass / Fail | Value (mg/l) | Pass / Fail |
| S3 OF 06 | 7 | N | Swales/Grassed Channels & Wet/ Retention Pond | Pass | Pass | Pass | 0.13 | - | 0.52 | Pass | 1.82 | Pass | 7 | Pass |
| S3 OF 23 | 7 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.2 | - | 0.29 | Pass | 1.02 | Pass | 10 | Pass |
| S3 OF 07 | 6 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.42 | - | 0.02 | Pass | 0.7 | Pass | 6 | Pass |
| S3 OF 24 | 7 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.22 | - | 0.42 | Pass | 1.47 | Pass | 9 | Pass |
| S3 OF 08 | 9 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.13 | - | 0.7 | Pass | 2.48 | Pass | 16 | Pass |
| S3 OF 09 | 9 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.16 | - | 0.35 | Pass | 1.23 | Pass | 10 | Pass |
| S3 OF 10 | 9 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.12 | - | 0.17 | Pass | 0.6 | Pass | 10 | Pass |

Outfall discharges directly to SAC designated watercourse

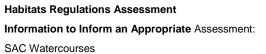
Outfall discharges upstream of SAC designated watercourse(s)

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Table A4.2 Summary of Cumulative HAWRAT & EQS Assessment Results

| | | | T Acute | | | | | EQS Ass | | | | |
|--|------------------------|----------------|-------------------|----------|----------------------------------|------------------|--------------|------------------------------------|--------------|----------------------------------|--------------|-------------------------|
| | | lmp | Impact Assessment | | HAWRAT Chronic Impact Assessment | | | Annual Average Dissolved Copper | | Annual Average Dissolved Zinc | | stream River ediment |
| Outfall ID | Mitigation | Soluble Copper | Soluble Zinc | Sediment | Low Flow Vel. (m/s) | Deposition Index | Value (μg/l) | Pass / Fail | Value (μg/l) | Pass / Fail | Value (mg/l) | Pass/Fail |
| S1 OF 01.1 S1 OF 02.1a S1 OF 02.1b | 3 x Wet/Retention Pond | Pass | Pass | n/a | n/a | n/a | 0.00 | Pass | 0.00 | Pass | 7 | Pass |
| S1 OF 02.1a S1 OF 02.1b S1 OF 25 | 3 x Wet/Retention Pond | Pass | Pass | n/a | n/a | n/a | 0.00 | Pass | 0.00 | Pass | 7 | Pass |
| S1 OF 11 S1 OF 12 S1 OF 13 | 3x Wet/Retention Pond | Pass | Pass | n/a | n/a | n/a | 0.00 | Pass | 0.01 | Pass | 4 | Pass |
| S1 OF 12 S1 OF 13 | 2x Wet/Retention Pond | Pass | Pass | Pass | 0.7 | 3 | 0.00 | Pass | 0.01 | Pass | 4 | Pass |
| S1 OF 15 S1 OF 16 | 2x Wet/Retention Pond | Pass | Pass | Pass | 0.2 | - | 0.00 | Pass | 0.01 | Pass | 5 | Pass |
| S1 OF 17 S1 OF 27 S1 OF 27a | 3x Wet/Retention Pond | Pass | Pass | n/a | n/a | n/a | 0.55 | Pass | 1.93 | Pass | 10 | Pass |





| | | HAWRA | T Acute | | | | | EQS Ass | essment | t | | | | | |
|--|--|----------------|--------------|----------|--------------------------------------|------------------|----------------------------------|-------------|--------------|------------------------------------|--------------|----------------------------------|--|------------------------------|--|
| | | | | | HAWRAT Acute Impact Assessment | | HAWRAT Chronic Impact Assessment | | | Annual Average Dissolved Copper | | Annual Average Dissolved Zinc | | Downstream River Sediment | |
| Outfall ID | Mitigation | Soluble Copper | Soluble Zinc | Sediment | Low Flow Vel. (m/s) | Deposition Index | Value (μg/l) | Pass / Fail | Value (μg/l) | Pass / Fail | Value (mg/l) | Pass/Fail | | | |
| S1 OF 27 S1 OF 27a S1 OF 29.1 | 3x Wet/Retention Pond | Pass | Pass | n/a | n/a | n/a | 0.56 | Pass | 1.96 | Pass | 10 | Pass | | | |
| S1 OF 33 S1 OF 34 | Swales/Grassed Channels 2x Wet/Retention Pond Dry/Detention Pond | Pass | Pass | Pass | 0.04 | 66 | 0.91 | Pass | 3.25 | Pass | 9 | Pass | | | |
| S1 OF 22.2 S1 OF 41 S1 OF 37 S1 OF 36 | 2x Wet/Retention Pond, 2x Swales/ Grassed Channels | Pass | Pass | n/a | n/a | n/a | 0.00 | Pass | 0.01 | Pass | 7 | Pass | | | |
| | 2 x Wet/Retention Pond & wales/Grassed Channels | Pass | Pass | Pass | 0.03 | 99 | 0.86 | Pass | 3.04 | Pass | 13 | Pass | | | |
| S2 OF 05 S2 OF 06 | 2x Wet/Retention Pond | Pass | Pass | Pass | 0.02 | 10 | 0.00 | Pass | 0.01 | Pass | 6 | Pass | | | |
| S2 OF 21 S2 OF 22 | 2x Wet/Retention Pond | Pass | Pass | n/a | n/a | n/a | 0.34 | Pass | 1.2 | Pass | 12 | Pass | | | |

SAC Watercourses



| | | HAWRA | A Cute | | | | | EQS Ass | essment | : | | |
|----------------------|-----------------------|--------------------------------------|--------------|----------------------------------|---------------------|------------------|------------------------------------|-------------|----------------------------------|-------------|------------------------------|-----------|
| | | HAWRAT Acute Impact Assessment | | HAWRAT Chronic Impact Assessment | | | Annual Average Dissolved Copper | | Annual Average Dissolved Zinc | | Downstream River Sediment | |
| Outfall ID | Mitigation | Soluble Copper | Soluble Zinc | Sediment | Low Flow Vel. (m/s) | Deposition Index | Value (μg/l) | Pass / Fail | Value (µg/l) | Pass / Fail | Value (mg/l) | Pass/Fail |
| S2 OF 23 S2 OF 41 | 2x Wet/Retention Pond | Pass | Pass | Pass | 0.06 | 8 | 0.01 | Pass | 0.02 | Pass | 9 | Pass |
| S2 OF 24 S2 OF 25 | 2x Wet/Retention Pond | Pass | Pass | Pass | 0.12 | - | 0.41 | Pass | 1.44 | Pass | 11 | Pass |
| S2 OF 29 S2 OF 27 | 2x Wet/Retention Pond | Pass | Pass | Pass | n/a | n/a | 0.44 | Pass | 1.55 | Pass | 12 | Pass |
| S2 OF 30 S2 OF 31 | 2x Wet/Retention Pond | Pass | Pass | Pass | 0.04 | 5 | 0.01 | Pass | 0.04 | Pass | 7 | Pass |
| S3 OF 10 S3 OF 09 | 2x Wet/Retention Pond | Pass | Pass | n/a | n/a | n/a | 0.46 | Pass | 1.61 | Pass | 11 | Pass |

Outfall discharges directly to SAC designated watercourse

Outfall discharges upstream of SAC designated watercourse(s)



Appendix 5 – Draft Construction Environmental Management Plan



A5 Western Transport

Draft Construction Environmental Management Plan (CEMP)

April 2014

Produced for





Transport Northern Ireland

Prepared by



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A5 Western Transport Corridor



Volume 3 – Appendices



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A5 Western Transport Corridor



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GLOSSARY OF TERMS AND ABBREVIATIONS

| A5WTC | A5 Western Transport Corridor |
|---------|--|
| СЕМР | Construction Environmental Management Plan |
| CEEQUAL | The Civil Engineering Environmental Assessment and Awards Scheme |
| COSHH | The Control of Substances Hazardous to Health Regulations |
| DRD | The Department for Regional Development |
| ECoW | Ecological Clerk of Works |
| EM | Environmental Manager |
| ES | Environmental Statement |
| HSEQ | Health, Safety, Environment and Quality Management |
| MER | Management Environmental Representative |
| NIEA | Northern Ireland Environment Agency |
| PMP | Project Management Plan |
| SWMP | Site Waste Management Plan |



1 INTRODUCTION

1.1 Project Summary

The Department for Regional Development (DRD) TransportNI is proposing improvements to the A5 Western Transport Corridor (A5WTC). The proposals include the construction of 85km of new build road at dual carriageway standard.

The scheme has been divided into three sections for the purposes of delivery, each subject to a separate construction contract.

1.2 Purpose of this Document

Each contractor is required to develop and implement a Construction Environmental Management Plan (CEMP) to help ensure that construction activities are planned and managed in accordance with the environmental requirements identified within the Environmental Statement (ES).

It is anticipated that the contractors use this document as the template for their individual CEMP.

Further details specific to the works being undertaken under each of the three construction contracts will be worked up by the Contractors into their CEMP as the scheme progresses.

1.3 Scope of the Construction Environmental Management Plan (CEMP)

This document provides a summary of the generic principles applicable to all three contracts and provides guidance on a consistent approach to ensure that the requirements of the ES are incorporated in the CEMP and within method statements prepared by each of the three Contractors.

The CEMP will document the Contractors' plans to ensure compliance with their legal and contractual obligations as well as implement best practice in construction environmental management.

The CEMP will be applicable to all works associated with the A5WTC scheme including those carried out by sub-contractors.

1.4 Structure of the CEMP

The structure of this guidance document mirrors that anticipated for the section CEMP to be prepared by each of the three Contractors. The contents can be summarised as follows:

- Chapter 1 Introduction
- Chapter 2 Training and Induction
- Chapter 3 Consultation and Communication
- Chapter 4 Environmental Impacts and Mitigation
- Chapter 5 Pollution Control and Contingency Plan
- Chapter 6 Auditing and Monitoring of Environmental Performance
- Annex 1 Environmental Advice Notes



- Annex 2 Construction Procedures
- Annex 3 Construction Information

1.5 Roles and Responsibilities

The Contractor is responsible to ensure that all members of the Project Team, including subcontractors comply with the procedures set out in the CEMP. The Contractor will ensure that all persons working on site are provided with sufficient training, supervision and instruction to fulfill this requirement.

The Contractor will ensure that all persons allocated specific environmental responsibilities are notified of their appointment and confirm that their responsibilities are clearly understood.

The principal environmental responsibilities for key staff can be identified as follows:

1.5.1 Site Manager

The Site Manager's environmental management responsibilities include but are not limited to:

- preparation and implementation of the CEMP;
- close liaison with the Environmental Manager to ensure adequate resources are made available for implementation of the CEMP;
- ensuring that the risk assessments for control of substances hazardous to health regulations (COSHH), noise and environmental risk are prepared and effectively monitored, reviewed and communicated on site; and
- managing the preparation and implementation of method statements. Ensuring that the Environmental Manager reviews all method statements and that relevant environmental protocols are incorporated and appended.

1.5.2 Environmental Manager (EM)

The responsibilities of Environmental Manager include but are not limited to:

- maintaining environmental records;
- providing guidance for the site team in dealing with environmental matters, including legal and statutory requirements affecting the works;
- reviewing environmental management content of method statements;
- reporting environmental performance to the Site Manager;
- liaison with statutory and non statutory bodies and third parties with an environmental interest in the scheme; and
- collection and collation of CEEQUAL evidence.

1.5.3 Engineering Staff

The engineers' environmental management responsibilities include but are not limited to:

reporting any operations and conditions that deviate from the CEMP to the Site Manager;



- taking an active part in site safety and environmental meetings; and
- ensuring awareness of the contents of method statements, plans, supervisors' meetings or any other meetings that concern the environmental management of the site.

1.5.4 Supervisors

The supervisors' environmental management responsibilities include but are not limited to:

- ensuring all personnel affected by a method statement are briefed and fully understand its content. Monitor operatives for compliance, including sub-contract operatives;
- implementation of environmental management activities required by the CEMP and works method statements; and
- ensuring that all inspections are carried out as prescribed in the CEMP.

1.5.5 Ecological Clerk of Works (ECoW) (part of the Client's supervisory site staff)

The ECoW will be on site when required to monitor work to ensure that no wildlife comes to harm and also to provide advice to site workers regarding best practices. ECoW duties include, but are not limited to:

- · monitoring site works;
- · provision of status reports and updates;
- provision of advice to and liaison with workers on site;
- identifying environmental risks and developing environmental controls;
- delivery of environmental training for site personnel and sub-contractors; and
- · liaison with the Site Manager.

1.5.6 Archaeologist

The Archaeologist will be on site when required to monitor excavation works and also to provide advice to site workers regarding best practices. The archaeologist's duties include but are not limited to:

- completion of mitigation works; in the form of targeted trial trenching, archaeological excavation and watching briefs, as required;
- production of detailed method statements to define how archaeological mitigation is sequenced with earthworks operations;
- · certification of cleared areas prior to commencement of construction works;
- agreeing areas for topsoil strip or the use of toothless buckets;
- ensuring that all scheduled state care monuments and other known archaeological features requiring protection are demarcated with protective fencing and adequate signage;
- provision of induction training to site teams on archaeological controls;
- providing instructions to the site teams on how and when to access expert advice and opinions; and



• examination of incidental or unexpected finds; and agreeing programmes with the Site Manager for investigation and recording of the archaeological remains.



2 TRAINING AND INDUCTION

2.1 Site Induction

All personnel involved in the Scheme will receive environmental awareness training. The environmental training and awareness procedure will ensure that staff are familiar with the principles of the CEMP, the environmental aspects and impacts associated with their activities, the procedures in place to control these impacts and the consequences of departure from these procedures.

2.2 Specific Training and Awareness Raising

A project specific training plan that identifies the competency requirements for all personnel allocated with environmental responsibilities will be produced by the Contractor.

Training will be provided by the Contractor to ensure that all persons working on site have a practical understanding of environmental issues and management requirements prior to commencing activities.

A register of completed training is to be kept by the Environmental Manager.

The Site Manager will ensure that environmental emergency plans are drawn up and the Environmental Manager will conduct regular checks to ensure that the plan is effective by means of emergency drills.



3 CONSULTATION AND COMMUNICATION

3.1 Statutory and Non-Statutory Bodies

During the construction works, communication will be required with external parties such as, statutory authorities, interest groups and the public. Communication may take the form of scheduled meetings, site visits and written correspondence.

3.2 Public

The Site Manager shall ensure that the public is kept informed of operations that may have an effect upon them. This may involve letter drops and meetings to keep local residents up to date with progress with the scheme and any new operations that are to be carried out. The Site Manager will provide details of contacts within the project team for the public to contact should any issues arise.

3.3 Statutory Consents, Licences and Permits

The provisions for controlling, pumping and discharging water will be agreed with the Northern Ireland Environment Agency (NIEA). The Contractor will ensure that any licences required are in place prior to works commencing.

3.4 Environmental Alerts

Legislative changes or proposed improvements to manage processes on site that have a bearing on the commitments given in the Environmental Statement or other consultations will be communicated by the Site Manager to the Client.

3.5 Meetings and Records

Environmental issues relevant to the project will be discussed during weekly Site Progress Meetings attended by the Site Manager and Environment Manager. Environmental performance will also be discussed at regular HSEQ meetings. This will include dissemination and discussion of the findings of audits, environmental reports and other inspections where appropriate.



4 ENVIRONMENTAL IMPACTS AND MITIGATION

An environmental review of the Scheme has been completed to identify all the commitments and agreements made within the ES and other consultations. From this, a schedule of environmental commitments has been produced, which details deliverables including measures identified for the prevention of pollution or damage to the environment during the construction phase.

Environmental commitments have also been incorporated by the design team into archaeological, ecological, landscape and other relevant designs and specifications.



5 POLLUTION CONTROL AND CONTINGENCY PLAN

5.1 Surface Water Run-off, Groundwater and Silt

All operations on site will be carried out in a manner to minimise the production and discharge of silty waters. In particular, where any dewatering has to be carried out an assessment will be made as to the method of disposal of the waters and agreed with the Site Manager.

The management of surface water run-off will be defined within the operation specific method statement and risk assessment. This will ensure that the right solution is implemented for each works activity.

5.2 Fuel, Oil and Chemical Spillage

All fuel, oil and chemical deliveries will be supervised by a responsible person who will be trained to deal with any spillage to prevent a pollution problem occurring.

Storage tank levels will be checked before delivery to prevent overfilling and to ensure that the product is delivered to the correct tank.

The storage of materials in the main compound and work sites will be controlled in such a manner to ensure that materials are not damaged prior to use either through vehicle or people movements or through exposure to the elements.

All fuel, oil and chemicals will be stored on an impervious base within a bunded area and secured. The bund shall have a capacity of 110% of the volume of the products stored within it. All tanks and containers will be kept in a secure compound and be protected from vandalism, and will be clearly marked with their contents. Stores shall be located at least 10 metres from any watercourse.

All mobile plant will be refuelled in a designated area on an impermeable surface and away from drains. In case of any spillages there will be a spill response kit available at each refuelling point and within each machine working within the highway corridor. Where it is impractical to refuel within a bunded area, a drip tray will be available to catch any spills caused by over fuelling.

5.3 Concrete/Mortar Washout

There will be a designated area for the washout of concrete wagons, shoots and mortar bins at each work site. This will be either a lined skip or a pit lined with an impervious membrane to prevent the escape of the alkaline and silty waters entering groundwater or surface water. These pits will be located in areas of low groundwater sensitivity. Excess concrete remaining in the delivery wagon at the end of a pour will be returned to a designated collection area. Once each worksite has been completed any solid concrete in the washout area will be broken out and used either as suitable fill or disposed of to a licensed waste facility.

5.4 Material Storage

Stockpiles should be positioned as far away from sensitive receptors as possible and suitable measures implemented to prevent run off and dispersion if left for any length of time. Any powders



should be stored in sealed bags or silos prior to use. All deliveries of dry powder should be undertaken in a manner to minimise dust emissions.

5.5 Emergency Procedures

A Site Environmental Emergency Plan will be prepared prior to construction and communicated to all members of the project team including sub-contractors and Emergency Services.

The plan will detail the following controls:

- site drainage controls;
- fuel handling procedures;
- · incident notification procedures;
- pollution control equipment requirements;
- procedures for the control of dust and mud;
- · protection of aquifer; and
- measures to protect watercourses and wildlife from chemical spills or sediment laden run
 off.

Responsible staff will be trained in emergency procedures to form an Emergency Team, so that these procedures can be implemented swiftly and effectively. Periodic testing of emergency procedures will be undertaken by the Site Manager. The Environmental Manager will observe the test and to report on results. Any corrective actions are taken forward for review and approval.

Should an emergency incident occur, the Environmental Manager will be notified immediately. The emergency response will be co-ordinated by the Site Manager. Protective measures, mitigation, clean up and remediation actions will be identified from the evaluation and shall be put into place, having regard for the sensitivities of the environment. A record of the emergency incident will be kept to show the nature of the corrective action undertaken.



6 ENVIRONMENTAL PERFORMANCE MANAGEMENT

6.1 Environmental Risk Register

The Environmental Manager will prepare and maintain an Environmental Risk Register having regard for legal requirements, project environmental commitments the potential for aspects of works to cause significant environmental impact.

The Environmental Manager will record responsibilities assigned for actions required for mitigation and control of the environmental risks in the Environmental Risk Register.

The Environmental Risk Register will be subject to regular review by the Environmental Manager together with the Site Manager.

6.2 Consents and Exemptions

The Scheme will require consents and exemptions from various regulatory bodies in advance of construction activities. Copies of legal consents, permits, assents and licences of exemptions obtained will be held in the site environmental file by the Environmental Manager.

6.3 Method Statements and Risk Assessments

Specific environmental risks will be assessed during preparation of method statements. Actions and environmental constraints associated with specific construction operations will be included in method statements, field control sheets and activity plans where appropriate. Generic environmental requirements will be included in all method statements.

6.4 Inspections

Routine inspections to check that pollution control measures are in place will be undertaken by the Environmental Manager, who will produce weekly inspection reports.

Daily inspections will be made by the supervisors during each shift and any environmental problems or risks that are identified will be actioned as soon as is reasonably practicable. Any issues arising from the daily inspections will be notified to the Environmental Manager.

6.5 Auditing

A Project HSEQ internal audit schedule will be prepared. This will include: audits of the implementation of the CEMP and audits of sub-contractor and supplier environmental performance by the Environmental Manager.

6.6 **CEMP Review Programme**

The CEMP is a live document that will be updated by the Contractor and reviewed by the Environmental Manager on a monthly basis.

6.7 Environmental Complaints

The Environmental Manager will ensure that all environmental complaints and concerns will be responded to in 24 hours.



6.8 Notices of Non-Conformance

In instances where the requirements of the CEMP are not upheld a Non-Conformance and Corrective Action Notice will be produced. The Notice will be generated during the inspections conducted by the Supervisors, the Site Manager, Environmental Manager or external third-party audits. The Site Manager will be responsible for ensuring a corrective action plan is established and implemented to address the identified shortcoming.

6.9 Complaints Handling

The response to any complaints will be managed by the Site Manager, who will inform the Environmental Manager of any environmental complaints.

A Complaints Register will be maintained to detail the name and contact details of the complainant, date and time of the complaint, nature of complaint, action taken to resolve issues, and date of complaint handover.

6.10 Key Performance Indicators and Objectives

The Contractor will set Environmental Objectives in order to continuously improve environmental performance on the site. The Contractor will set objectives based on each significant environmental impact and they will be reviewed, and revised if necessary, on a monthly basis. Procedures, monitoring requirements and key performance indicators will be measured against achievable targets.



ANNEX 1: ENVIRONMENTAL ADVICE NOTES

Annex 1.1 EAN 001 In-stream Works Timing Restrictions

Table 6G.1 Tier One In-stream Works Timing Restrictions

| | | | | | | | | | | | | | | | Worki | ng Wi | ndow | S | | | | |
|-----------------|---------|------------------|------------------|----------------------|--|-------------|-----------------------|-----------------------|-----|-----------------------------|---|---|---|---|-------|-------|------|---|---|---|---|---|
| River | Section | Chainage | Structure Ref | Crossing Grid Ref | Fish present | Designation | FFD Categorisation | WFD Risk Category" | HQA | HMS | J | F | М | Α | М | J | J | A | s | 0 | N | D |
| Burn Dennet | 1 | 10500 | S1/B06 | IC 37261 04308 | Atlantic salmon; Brown trout; River/Brook lamprey; European eel. | - | Salmonid River | 2a | 40 | Obviously Modified | | | | | | | | | | | | |
| Glenmornan | 1 | 12700 | S1/B08 | IC 36548 01938 | Atlantic salmon; Brown trout; European eel. | - | Salmonid River | 1b | 31 | Significantly Modified | | | | | | | | | | | | |
| Mourne River | 1 | 17900 | S1/B14 | IH 33501 98061 | Atlantic salmon; Brown trout; European eel; River/Brook lamprey; Gudgeon. | SAC; ASSI | Salmonid River | 1b | 16 | Severely Modified | | | | | | | | | | | | |
| River Finn | 1 | 18700 - 19500 | No structure | - | Atlantic salmon; Brown trout; River/Brook lamprey. | SAC; ASSI | Salmonid River | 1a | | Obviously Modified | | | | | | | | | | | | |
| River Derg | 2 | 34330 | S2/B07 | IH 36387 87669 | Atlantic salmon; Brown trout; European eel; Perch; Roach. | SAC; ASSI | Salmonid River | 1b | 39 | Predominantly Unmodified | | | | | | | | | | | | |
| Fairy Water | 2 | 50100 | S2/B19 | IH 43178 74923 | Atlantic salmon; Brown trout; Roach; Gudgeon; Pike; Perch. | - | Salmonid River | 1b | 30 | Significantly Modified | | | | | | | | | | | | |
| Drumragh | 2 | 56590 | S2/B28 | IH 45772 69866 | Atlantic salmon; Brown trout; River/Brook lamprey. | - | Salmonid River | 2a | 35 | Significantly Modified | | | | | | | | | | | | |
| Routing Burn | 3 | 71700 | S4/B08.1 | IH 51977 61401 | Atlantic salmon; Brown trout; European eel; River/Brook lamprey. | - | Salmonid River | 1b | 74 | Pristine/semi- natural | | | | | | | | | | | | |



| | | | | _ | | | | | | | | Working Windows | | | | | | | | | | | |
|-------|-------|---------|------------------|------------------|----------------------|--|-------------|-----------------------|-----------------------|-----|-----------------------|-----------------|---|---|---|---|---|---|---|---|---|-----|--|
| Ri | ver | Section | Chainage | Structure Ref | Crossing Grid Ref | Fish present | Designation | FFD Categorisation | WFD Risk Category" | HQA | нмѕ | 7 | F | M | Α | M | J | J | A | S | 0 | N D | |
| Black | water | 3 | 93300 - 93600 | No structure | IH 66562 50670 | Atlantic salmon; brown trout; lamprey sp.; stone loach; minnow; European eel; gudgeon; and white-clawed crayfish. | - | | | 60 | Obviously modified | | | | | | | | | | | | |



Table 6G.2 Tier Two In-stream Works Timing Restrictions

| | | | | | | | | | | | Working Windows |
|----------------------|---------|------------------|------------------------------------|-------------------|---|-------------|-----------------------|----------------------|-----|-----------------------------|-------------------------|
| River | Section | Chainage | Culvert Ref | Grid Ref | Fish present | Designation | FFD Categorisation | WFD Risk Category | HQA | HMS | J F M A M J J A S O N D |
| Coolaghy Burn | 2 | 36500 | S2/B09.1 | IH 36344 87548 | | - | - | 2a | 54 | Significantly Modified | |
| | 2 | 50200 | tbc | IH 42541 73990 | | - | - | 2a | - | - | |
| Fireagh Burn | 2 | 51100 | tbc | IH 42826 72440 | | - | - | 2a | - | - | |
| | 2 | 52700 - 54400 | tbc | IH 43528 71273 | | - | - | 2a | - | - | |
| Ramelly Drain | 3 | 64500 - 66000 | tbc | IH 48567 68806 | Atlantic salmon; Brown trout. | - | - | - | 33 | Obviously Modified | |
| Letfern | 3 | 68800 | tbc | IH 50401 63942 | | - | - | 1b | 36 | Severely Modified | |
| River 30 | 3 | 73800 - 74700 | tbc | IH 53102 60693 | | - | - | - | - | - | |
| River 33 | 3 | 78200 | tbc | IH 56601 57200 | Atlantic salmon, Poss. White claw crayfish. | - | - | - | 54 | Obviously Modified | |
| Roughan River | 3 | 81400 | tbc | IH 59651 56381 | Atlantic salmon; Brown trout; River/Brook lamprey, Poss. White claw crayfish. | - | - | 1a | 38 | Obviously Modified | |
| Ballygawley River | 3 | 83800 | \$3/17.3, \$3/17.4, \$3/17.5 | IH 61926 55769 | Brown trout; European eel. Poss. White claw crayfish. | - | - | 1a | 44 | Significantly Modified | |
| River 34 | 3 | 86400 - 86600 | tbc | IH 64093 54758 | Poss. White claw crayfish. | - | - | - | 46 | Predominantly Unmodified | |
| River 35 | 3 | 88100 | tbc | IH 65514 53984 | Poss. White claw crayfish. | - | - | - | - | - | |
| River 36 | 3 | 89500 | tbc | IH 66760 53553 | Poss. White claw crayfish. | - | - | - | 67 | Predominantly Unmodified | |



Table 6G.3 Tier Three In-stream Works Timing Restrictions

| D: | O a a Cara | Chainage | 0.1 | O.: I.D. (| Fish assessed | Destruction | FFD | WFD Risk | 1104 | LIMO | Working Windows |
|-----------------------|------------|------------------|-------------|-------------------|----------------------------|-------------|----------------|----------|------|---------------------------|-------------------------|
| River | Section | (approx) | Culvert Ref | Grid Ref | Fish present | Designation | Categorisation | Category | HQA | HMS | J F M A M J J A S O N D |
| River 1 | 1 | 550 | tbc | IC 41143 12785 | | - | - | - | - | - | * |
| River 2 | 1 | 2500 | tbc | IC 39783 11389 | | - | - | - | 74 | Significantly Modified | * |
| Blackstone Burn | 1 | 3350 | tbc | IC 39247 10773 | | - | - | • | 73 | Significantly Modified | * |
| River 4 | 1 | 5850 | tbc | IC 37706 08892 | | - | - | - | - | - | * |
| River 5 | 1 | 8300 | tbc | IC 37324 06483 | | - | - | - | - | - | * |
| River 9 | 1 | tbc | tbc | IH 33492 94493 | | - | - | - | - | - | * |
| River 10 | 2 | 29800 | tbc | IH 33553 91041 | | - | - | - | 57 | Severely Modified | * |
| Liscreevaghan Burn | 2 | 31500 | tbc | IH 34638 89829 | | - | - | - | 60 | Significantly Modified | * |
| Back Burn | 2 | 39300 | tbc | IH 39779 84955 | | - | - | - | 49 | Obviously Modified | * |
| River 17 | 2 | 40600 | tbc | IH 40918 83843 | | - | - | - | - | - | * |
| River 18 | 2 | 41300 | tbc | IH 41271 83293 | | - | - | - | - | - | * |
| Beltany Burn | 2 | 41900 | tbc | IH 41483 82765 | | - | - | - | - | - | * |
| River 20 | 2 | 43300 | tbc | IH 41653 81476 | | | | | | | * |
| River 21 | 2 | 43500 | tbc | IH 41666 81233 | | | | | | | * |
| River 22 | 2 | 44400 | tbc | IH 41878 80383 | | - | - | - | - | - | * |
| River 23 | 2 | 46300 | tbc | IH 42472 78051 | | - | - | - | 71 | Significantly Modified | * |
| River 25 | 2 | tbc | tbc | IH 41796 77387 | | - | - | - | - | - | * |
| River 25 | 2 | 47400 | tbc | IH 42577 75694 | | - | - | - | - | - | * |
| River 38 | 2 | 56000 - 56400 | tbc | IH 45038 69620 | | - | - | - | - | - | * |
| River 27 | 2 | 57400 | tbc | IH 45999 69314 | | - | - | - | 49 | Significantly Modified | * |
| River 37 | 3 | 89500 | tbc | IH 67678 51982 | Poss. White claw crayfish. | - | - | - | - | - | |



Table 6G.4 Key for Tier 1, 2, and 3

| FFD | Freshwater Fish Directive |
|-----|--|
| WFD | Water Framework Directive |
| HQA | Habitat Quality Assessment (product from RHS survey) |
| HMS | Habitat Modification Score (product from RHS survey) |

Table 6G.5 WFD Risk Categorisation

| WFD Risk Category | UKTAG Reporting Category |
|---|--|
| Water bodies at risk of failing to achieve an environmental | (1.a) Water bodies at significant risk Note: Identifies water bodies for which consideration of appropriate measures can start as soon as practical |
| objective | (1.b) Water bodies probably at significant risk but for which further information will be needed to make sure this view is correct |
| | Note: Focus for more detailed risk assessments (including, where necessary, further characterisation) aimed at determining whether or not the water bodies in this category are at significant risk in time for the publication of the interim overview of significant water management issues in 2007 |
| Water bodies not at risk of failing to achieve an | (2.a & 2.b) Water bodies not at significant risk on the basis of available information |
| environmental objective | (2.a) Water bodies for which confidence in the available information being comprehensive and reliable is low |
| | Note: Work on these water bodies will be focused on appropriately improving the quality of information on pressures and their likely environmental effects in time for the second pressures and impacts analysis due to be completed in 2013 |
| | (2.b) Water bodies for which confidence in the available information being comprehensive and reliable is high |
| | Note:_Review for the next pressures and impacts analysis report in 2013 to identify any significant changes in the situation |



Annex 1.2 EAN 002 Protected Species Timing Restrictions

Table 6G.6 Protected Species Work Timing Restrictions

| Species | Section | Chainage | Legal | Timing Restriction | | | | | | Workin | g Wind | ows | | | | |
|----------------------------|---------|---|------------------------|---|--|-----|-----|-----|-----|--------|--------|-----|------|-----|-----|-----|
| Species | Section | Chainage | protection | · · | | Feb | Mar | Apr | May | Jun | Jul | Aug | Sept | Oct | Nov | Dec |
| Winter birds | 1 | 5000-6000 and 8500 - 10500 | HRA process | No heavy works October - March. No piling, large scale earth movement etc. | | | | | | | | | | | | |
| Nesting birds | All | All woody vegetation | WO 85 | Woody vegetation clearance September - February | | | | | | | | | | | | |
| Nesting Barn owl | All | None found in baseline surveys, but potentially throughout scheme | WO 85 | Destruction of existing nests Sep-Feb only; replacement provided up to 1 year in advance of destruction | | | | | | | | | | | | |
| Nesting king fishers | All | None found in baseline surveys, but potentially throughout scheme | WO 85 | Netting of suitable river banks to prevent summer nesting where necessary | | | | | | | | | | | | |
| Otter holts | 2 | 34400 and 50000 confirmed, 17500, 41800 and 71700 likely. | HR 95 & HRA Process | No time restriction on closure, will be dependant upon activity. Licence and creation of artificial holt up to 1 year in advance of holt closure | | | | | | | | | | | | |
| Bat roosts** | 1 | 3250 and 19000 confirmed (more likely during veg clearance). | HR 95 | Bat licence and creation of artificial roosts up to one year prior to roost closure (Preferred October - April) | | | | | | | | | | | | |
| Badger setts | All | Main setts: 7200, 7700, 34250, 54750, 79500, 81100, 83500 (A4 link road) (more likely during veg clearance) | WO 85 | Badger licence up to one year prior to sett closure (only allowed 1st July – 30th November) creation of alternative sett up to 1 year prior to original's closure | | | | | | | | | | | | |
| Smooth newt breeding ponds | 2 | 19500 | WO 85 | Licence required for trapping and relocation of newts up to one year prior to pond destruction (trapping March-August) creation of alternative pond up to 2 years prior to original's destruction | | | | | | | | | | | | |
| Red Squirrel dreys | 3 | possible 34400 and 79400-79700 | WO 85 | No time restriction on destruction, will be dependant upon activity. Licence up to 1 year in advance of drey destruction | | | | | | | | | | | | |
| White clawed crayfish | 3 | All water courses 78000 - 93000 | WO 85 | No works affecting stream May-June. Licence may be required for removal of individuals from works area July - October | | | | | | | | | | | | |
| Protected flora | 1 | 18000 | WO85 | Translocation of trees November to Feb | | | | | | | | | | | | |

^{*}It will not be possible to locate all breeding sites or resting places prior to vegetation clearance and site construction works. Provision should be made for the unexpected discovery of any of these features.

Bat Roosts** timings only applicable for summar roosts, if maternity or hibernation roosts discovered in update surveys further restrictions will apply.

Table6H.7 Key Indicating Work restrictions

| Work Restrictions Dependant Upon Animal Activity |
|--|
| Restricted Works |
| Recommended Periods for Works |



Annex 1.3 EAN 003 Timetables of Ecology Construction Tasks

Table 6G.8 Draft Ecology Works Timetable

| Species/Task | Jan - Aug 2011 | Sep 2011-Feb 2012 | March-August 2012 | Sep 2012 - Feb 2013 | March - Aug 2013 | Sep 2013 - Feb 2014 | March-August 2014 | Sep 2014 - Feb 2015 | March - Aug 2015 |
|---|--|--|--|--|--------------------------|--|------------------------|---|------------------|
| Hedges, woodland and other habitats suitable for nesting birds | | vegetation clearance where necessary for 2012 work | vegetation clearance under ecologist supervision, if active nests found clearance cannot go ahead in that location until approved by ecologists | vegetation clearance for 2013 works | | vegetation clearance Sep-Feb for 2014 works | | | |
| Sch. 8 Protected Plants (requires licence) | update Sch. 8 surveys | Possible translocation dependent upon NIEA licence terms | Set sch. 8 exclusion zones | | | | | | |
| Sch. 9 Invasive Species | update Sch. 9 surveys | | Set sch. 9 exclusion zones, treatment of areas as required | | | | | | |
| Planting | | | plantii | ng around culvert entrand | ces, verges and on expo | sed earthworks where po | ssible | general sche | eme planting |
| Newts (requires licence) | update ecology surveys (April-May) and construction of 1 x replacement pond | | Fencing of newt areas, creation of new hibernacula (April) / trapping and translocation of newts to new pond area and new hibernacula (May-July) / original pond and hibernacula destruction | | | | | | |
| | | update ba | adger surveys and sett m | nonitoring | | update badger surveys and sett monitoring | | update badger surveys and sett monitoring | |
| Badgers | | eation August-Dec 2011 ure 2012 | | | | | | | |
| (requires licence) | | badger sett closu | ure July-Nov incl. | | | | | | |
| | | | | | | dger commuting routes (ir encing along scheme bou | | | |
| Otters | | | | | or permanent deterrent i | | indary and underpasses | | |
| (requires licence) | update surveys and | otter holt monitoring | otter holt i | monitoring | | otter holt monitoring | | otter holt monitoring | |



| Species/Task | Jan - Aug 2011 | Sep 2011-Feb 2012 | March-August 2012 | Sep 2012 - Feb 2013 | March - Aug 2013 | Sep 2013 - Feb 2014 | March-August 2014 | Sep 2014 - Feb 2015 | March - Aug 2015 |
|-------------------------------|---|---|---|------------------------------------|---|----------------------------|---|---------------------|---|
| | | artificial otter holt creation pre October 2011 for closure pre April 2012 | | | | | | | |
| | | | closure of holts dependent upon activity | | | | | | |
| | | | | installation of I | measures to maintain ott | er commuting routes (inc | c. cover excavations, tem | np fencing etc.) | |
| | | | | installation of lo | edges into new culverts | during construction to be | ready when water cours | es are diverted | |
| | update roost surveys | | | | | | | | |
| | artificial roost creation | artificial roos | st monitoring | | artificial roost monitoring | | artificial roost monitoring | | artificial roost monitoring |
| Bats (requires licence) | | | ual summer roost, some yed under ecologist supe | | | | | | |
| conce, | | Maternity and summer roost closure | Hibernation roost closure | Maternity and summer roost closure | | | | | |
| | | | | instal | lation of measures to ma | aintain bat commuting rou | utes (inc. artificial hedges | s etc.) | |
| | | | | | schem | e planting to involve 'hop | overs' | | |
| | | installation of pollution traps | n prevention/sediment s etc | | | weekly monitoring | of sediment traps | | |
| Aquatic (requires licence) | | | trapping and exclusion of aquatic species from construction areas (July-August) | | trapping and exclusion of aquatic species from construction areas (July-August) | | trapping and exclusion of aquatic species from construction areas (July-August) | | trapping and exclusion of aquatic species from construction areas (July-August) |
| | | | instream works culverting for sensitive water courses (July-August) | | instream works culverting for sensitive water courses (July-August) | | instream works culverting for sensitive water courses (July-August) | | instream works culverting for sensitive water courses (July-August) |
| Birds | pre-construction update barn owl survey | barn owl nest closure (if required) and construction of artificial nest | | | | | | | |
| | pre-construction update kingfisher survey | netting of suitable rive | erbanks for kingfisher | | | | | | |



| Species/Task | Jan - Aug 2011 | Sep 2011-Feb 2012 | March-August 2012 | Sep 2012 - Feb 2013 | March - Aug 2013 | Sep 2013 - Feb 2014 | March-August 2014 | Sep 2014 - Feb 2015 | March - Aug 2015 |
|---------------------------------|----------------|-------------------|---|---------------------|---|-------------------------|---|---------------------|---|
| | | | | | ecologist clerk of works | supervision as required | | | |
| Supervision / clerk of works | | | ecologist tool box talks for all construction staff | | ecologist tool box talks for all construction staff | | ecologist tool box talks for all construction staff | | ecologist tool box talks for all construction staff |

Table 6H.9 Key Draft Ecology Works Timetable

| Recommended Periods for Works |
|--------------------------------------|
| Action TBC Following Detailed Design |



Annex 1.4 EAN 004 Invasive Species Risk Register

Table 6G.10 Invasive Species Risk Register

| Table 6G.10 | | ecies Risk Register | | | | | | |
|---|------------------|-----------------------------|--|---|--|--------------------------------------|--|--|
| Species to be added to Sch. 9 Wildlife Order 1985 | Risk Category | Latin | Habitat Occurrence | Means of Spread | Impacts | Current Range in Co. Tyrone | Confirmed A5 Locations | Control Methods |
| Knotweed, Japanese | | Fallopia japonica | Waste ground, river banks and parks. | vegetative fragments in contaminated soil | Forms extensive stands | Widespread throughout Tyrone. | Burn Dennet (chainage) Mourne (chainage), Strabane Nature Reserve. River Derg (NVC ID Area 26). | Attempting to get rid of stands of Japanese knotweed by digging up or cutting the plant rarely succeeds unless combined with herbicide applications. Fragments of the rhizomes or aerial shoots can regenerate, so must be destroyed by burning. Riverside colonies may spread by fragments floating downstream. The Centre for Aquatic Plant Management (CAPM) recommends control by herbicides as the best option. Transport of soil away from the site containing fragments of Japanese knotweed should be avoided; it might introduce the species to uninfected sites. |
| Knotweed, Giant | | Fallopia sachalinensis | Waste ground, river banks, lakesides, old gardens, etc. | Flowers, rhizomes and vegetative fragments in contaminated soil | Forms extensive stands | Scattered throughout Tyrone. | Burn Dennet | Currently the most effective method of control is repeated spraying with herbicides over a number of years, which gradually reduces the vigour of the plant. This is carried out in early autumn, when the herbicide in thought to have the most impact on the plant. New sites and larger stands may also be sprayed in early summer as well, to stunt the growth before the autumn spraying. |
| Hogweed, Giant | | Heracleum mantegazzianum | Along riversides, stream banks, and other damp waste sites. In suitable environments, it can be abundant. It can extend along several miles of river bank. | Seed dispersal via water transportation and in soil adhering to shoes and machinery. Seeds can stay viable for several years. | Poisonous to people and animals | Widespread throughout Tyrone. | Large stands along R. Finn and Mourne confluence near Strabane. | Eradication programmes may vary depending on the degree of infestation. Small numbers can be controlled by digging out the whole individual plant; docking the plant to prevent it flowering will divert reserves to ensuring the plant survives to attempt to flower the following year. It is best to cut the stem at below ground level, to ensure that the rootstock is damaged. Larger numbers can be sprayed, preferably when the plants are actively growing and less than 1m tall, with a glyphosate herbicide (this is the only herbicide which can be used near water). This can be done either as a spot treatment, or using long reach sprays. The monitoring of the treated area for several years is necessary, to find new seedlings. Establishing greensward or reseeding with native plants is also beneficial after initial eradication. |
| Salmonberry | | Rubus spectabilis | Country parks, river banks, forestry plantations etc. | This plant spreads rapidly by vigorous suckering from the base. It is likely that it could also be spread by careless disposal of garden waste. | Displaces native species. | Widespread throughout Tyrone. | None confirmed. | With well-established large infestations only physical removal involving cutting or digging up the plants, either by hand or mechanically, is feasible. Herbicide should be applied to remaining stumps. |
| Balsam, Himalayan | | Impatiens glandulifera. | River banks and lakesides. | There are no special vectors for long-distance dispersal, although dispersal by water is probable. Local dispersal is by seed from existing colonies. | Displaces native species. Bare patches created in winter when the plant dies back may result in increased riverbank erosion. | Widespread throughout Tyrone. | Scattered along route, particularly along watercourses. | Mechanical control, by repeated cutting or mowing, is an effective control, but plants can regrow if the lower parts are left intact. Regular grazing also suppresses this species. Control by herbicides is effective — for detailed advice on this, see the Centre for Aquatic Plant Management web site (Information Sheet 3: Himalayan Balsam). Herbicide should be sprayed before flowering. |



| Species to be added to Sch. 9 Wildlife Order 1985 | Risk Category | Latin | Habitat Occurrence | Means of Spread | Impacts | Current Range in Co. Tyrone | Confirmed A5 Locations | Control Methods |
|---|------------------|--------------------------------|--|---|---|---|---|--|
| Waterweeds (all species) | | <i>Elodea</i> (all species) | Still or slow-flowing, shallow or deep water. | vegetative fragments in water courses | Can impede flow, increase flooding, destroy ecosystem and affect recreation | E. canadensis scattered throughout Tyrone. E. nuttallii rare in Tyrone. | E. canadensis abundant in pond adjacent to River Finn H32509673. | Elodea canadensis is now an established part of Ireland's aquatic ecosystems. It provides good habitat for many aquatic invertebrates and cover for young fish and amphibians and food for waterfowl. In the case of excessive growth, physical removal is probably the best option, taking care to dispose of the excess material responsibly (by composting or burning). It can also be controlled by suitable herbicides and there is a biological method of control using grass carp (Ctenopharyngodon idellav) which graze the plant. Control of Elodea nuttalli is similar although this species is less widespread than E. canadensis although it is reported to be increasing across the British Isles whilst E. canadensis has declined. This has been linked with generally increasing eutrophication of waters. |
| Knotweed (all species) | | <i>Fallopia</i> (all species) | Comments as per F. japonica and F. sachalinensis. Hybrid between these two spp Fallopia x bohemica. F. baldschuanica (a climber) rarely becomes established in wild. | | | | | |
| Rhubarb, Giant | | Gunnera tinctoria | Damp grassland, woodland and shaded areas near water | self sown and vegetative fragments | Forms extensiev stands and may impede stream flow | Rare in Tyrone. | River Derg | Mechanical removal and chemical treatment. |
| Bluebell, Spanish | | Hyacinthoides hispanica | Woodlands, parkland and gardens. | bulbs in waste soil | Hybridisation with native species | Rarely naturalised in Tyrone. Hybrid with native species is more common. Native sp. is most widespread. | None confirmed. | The complete removal of Spanish or hybrid bluebells from an extensively contaminated site is probably uneconomic and undesirable. The focus of management should be on prevention of further spread into natural woodland or other natural habitats by the removal of garden escapes as and when discovered. |

Table 6H.11 Invasive Species Risk Categories

| High Risk | |
|---------------|--|
| Moderate Risk | |
| Low Risk | |



Annex 1.5 EAN 005 Environmental Consents

Table 6G.12 EAN 005 Consents

| Lisansa | lufo | Barrana N. 1960 | Disagrama | Input Required |
|--|--|-----------------|--|---|
| Licence | Info | Responsibility | Programme | (input and team) |
| FEPA FEPA guidance note information: http://www.ni- environment.gov.uk/fepa_guidance_note s.pdf Construction Licence Application Form: http://www.ni- environment.gov.uk/construction_applic | WMU has suggested that the construction works may occur within 50 metres of the Mean High Water Spring Tide mark of the tidal section of the River Foyle. Therefore you may require a licence issued under Part II of the Food and Environment Protection Act 1985 (A FEPA Licence). This also applies to proposed pipeline outfalls terminating in the sea. WMU's Marine Assessment and Licensing Team should be contacted to determine if the construction works are within this zone and to determine if an FEPA | Contractor | It is recommended that contact of the environment and heritage team Northern Ireland takes place as soon as possible. An application form will need to be submitted FOUR MONTHS BEFORE LICENCE IS REQUIRED. Please find attached link in left hand column. FEPA licences cannot be issued retrospectively. Licences are valid for 12 months. A separate application must be submitted for each stage of construction work. The application will need to be submitted to the environment and heritage team with the following application fee: | The following information is required for the construction licence application: Project costs (Project Manager) Environmental Statement; only If the project is subject to a planning application (Environment Team) Description of materials to be deposited (Design Engineers) |
| ation.pdf the Deposits in the Sea (Exemptions) Order (Northern Ireland), 1995: | Licence is required. If the works are within 50 m then a CONSTRUCTION LICENCE will be required. | | Marine Construction: £175 administration fee. | Method of construction; is needed if the project involves land reclamation (Construction Engineers) |
| http://www.ni- environment.gov.uk/ni_wml_consultatio n_document.pdf | Some minor works of construction may be exempt from FEPA licensing, these arelisted in the Deposits in the Sea (Exemptions) Order (Northern Ireland), 1995, please find attached link in left hand column. | | The application fee must be paid <u>before</u> the application can be processed. | |
| Discharge Consent Discharge Consent application form: | The scheme will require discharge consent, issued under the Water (Northern Ireland) order 1999, prior to commencement of any | Contractor | It is recommended that contact of the environment and heritage team Northern Ireland takes place as soon as possible. An application form will need to be submitted FOUR MONTHS | The following information is required for the discharge consent licence application: Need to state the nature of the discharge, type amount etc |



| Licence | Info | Responsibility | Programme | Input Required (input and team) |
|---|---|----------------|---|--|
| http://www.ni- environment.gov.uk/discharge_consent_ gn.pdf Annex 2 (WO1 – Annex 2 Trade Effluent Discharge, includes site drainage): | consents will also be required for any temporary toilets or wash areas that discharge to the aquatic environment. The scheme is most likely to fall under Annex 2 of | | hand column. The Department has <u>four months</u> from the date on which a valid application is received (or such further period as may be agreed in writing between the applicant and the Department) to determine the application, otherwise it is deemed to have been refused by the department. | Site details including site drainage (Engineers) Details of receiving Environment and impacts (Environment Team) |
| http://www.ni-environment.gov.uk/wo1- annex2-trade-effluent-and-site- drainage.pdf | the discharge consent application. | | Annex 2 (WO1 – Annex 2 Trade Effluent Discharge, includes <u>site</u> <u>drainage</u>) should be completed in addition to the main application form. A separate application form and fee must be submitted for each type of effluent discharge. Please find attached link in left hand column. | |
| Abstraction /impoundment Abstraction/Impoundment Application form: | If the scheme involves abstraction (e.g. dewatering of an excavation) or an impoundment a pool of water formed by a dam or pit) an appropriate abstraction/impoundment license may be required. | Contractor | It is recommended that contact of the Abstraction and Impoundment Licensing Team of WMU takes place as soon as possible. For Impoundment and Abstraction a Comprehensive Application for a Licence to Abstract and/or Impound Water F0002 will be required. Please find attached link in left hand column. The form will NOT be required if extraction is below 10m³ per day (conditions in annex A) Please find attached link in left hand column. With effect from 1st April 2010 the following charges will | The following information is required for the discharge consent licence application: Proposed and existing abstraction/impoundments of water. Abstraction volume details including volume per day for surface, estuarine or coastal waters and groundwater. Monthly Abstraction Volumes in Cubic Metres (m3) (daily maximum). |
| environment.gov.uk/licence_abstract_im pound_water.pdf | ilicense may be required. | | apply: A flat rate fee of £135 for all abstraction applications of 20 cubic metres per day or more. A fee of £30 for any variations to an existing licence. For abstractions greater than 100 cubic metres per day an annual charge may apply | Information on water storage, land etc. (All from engineers) |



ANNEX 2: CONSTRUCTION PROCEDURES

The Contractors and their sub-contractors shall employ the Construction Procedures listed below as a practical means to effect environmental mitigation while working on the project.

Annex 2.1 Procedures Site Clearance

Table 6G.13 Procedure for Site Clearance

| Procedure for Si | te Clearance | CP01 | | | | |
|----------------------------|--|---|------------------------------|--|--|--|
| | | Rev: A | Date: Nov 2010 | | | |
| Purpose | To minimise the impacts of site cleararea. | arance works on ecological | habitats and wildlife in the | | | |
| Responsibility for control | Environmental Manager | | | | | |
| Procedures | Before any work is undertaken the features shall be assessed. | proximity to water bodies a | nd ecologically sensitive | | | |
| | Whole trees shall be removed by tr for the purpose. | rained operators using mulc | hers specifically designed | | | |
| | season (March-August inclusive). Vechecked prior to removal for active | As far as possible all woody vegetation shall be removed outside of the bird breeding season (March-August inclusive). Where this is not possible woody vegetation shall be checked prior to removal for active birds nests. If any are found works in that location shall cease until the nest can be confirmed as no longer active. | | | | |
| | Removal of top soil shall be undertaken in accordance with the soil stripping methods detailed in Procedure CP02. | | | | | |
| | Removal of vegetation or top soil within 20m of a water course shall be carried out under the supervision of the Ecological Clerk of Works. | | | | | |
| | If active birds nests, animal holes of sufficient size to be used by badger or otter, squirrel dreys, bats, lizards or newts are found during vegetation clearance then works in that location shall cease and ecologist advice sought. | | | | | |
| | be undertaken using a 'soft felling' | I of trees highlighted as potential bat roosts in the ES or in update surveys shall rtaken using a 'soft felling' method as detailed in the ES. A licence from NIEA required if a roost is confirmed as present. | | | | |
| | Removal of confirmed bat roosts shall take place under NIEA licence and in accordance with the method detailed in the ES. As the confirmed roosts to be destroyed are summer roosts the licence would probably only be granted between October and February. | | | | | |
| | Removal of vegetation or top soil within 50m of an otter holt or breeding site as highlighted in the ES or update surveys shall be carried out under licence from NIEA. | | | | | |
| | Construction activities that are likely to damage or disturb an active badger sett as highlighted in the ES or update surveys shall be carried out under a licence from NIEA. Closure of badger setts can only be undertaken between July and November | | | | | |
| | Removal of ground flora or top soil or update surveys shall be carried clearance guidance as detailed in t | out in accordance with the s | | | | |



| Procedure for Sit | e Clearance | CP01 | | | |
|--|--|--|---------------------------|--|--|
| | | Rev: A | Date: Nov 2010 | | |
| | Removal of ground flora or top soil ES or update surveys shall be carribe required for the destruction of a between March and September. | ied out under a licence from | NIEA. This licence shall | | |
| | Removal of woody vegetation withi ES or update surveys shall be carriand may require an NIEA licence. | | | | |
| | | lighted within the ES, update surveys or by site oder specific invasive species clearance methodology ts (Appendix 1.4 of the CEMP). | | | |
| Environmental Controls | All necessary, ecological licenses shall be in place prior site clearance start. | | | | |
| Plant & | Excavator mounted and purpose built tracked mulchers. | | | | |
| Equipment | Excavator harvesters. | | | | |
| | Hand strimmers. | | | | |
| | Chainsaws. | | | | |
| | Tree climbing equipment. | | | | |
| Monitoring | The Ecological Clerk of Works shal sensitive areas, all sites within 20m NIEA, all vegetation cleared during vegetation clearance works. | of water courses, all sites | subject to a licence from | | |
| Emergency, preparedness and response If active birds nests, animal hole squirrel dreys are found during we cease and the Ecological Clerk of the cological Cler | | etation clearance the works | | | |
| References | Environmental Statement. | | | | |



Annex 2.2 Soil Strip

Table 6H.14 Procedure for Soil Strip

| Procedure for So | oil Strip | CP02 | | | | | |
|--------------------------------------|--|--|-----------------------------|--|--|--|--|
| | | Rev: A | Date: Nov 2010 | | | | |
| Purpose | To minimise the impacts on ecological habitats and wildlife in the area during soil stripping. | | | | | | |
| | To prevent damage to any archaeological remains discovered during construction. | | | | | | |
| | o enable the re-use of topsoil and the re-establishment of vegetation after work is complete. | | | | | | |
| Responsibility for control | Environmental Manager | | | | | | |
| Procedures | Prior to any topsoil being stripped, on agricultural land, cut and fill slop areas of ecological interest. | | | | | | |
| | Method statements shall be prepar stripped from, temporarily stockpile | | where the topsoil shall be | | | | |
| | Topsoil stripped from the area of excavations and the footprint of structural fill embankments shall be stockpiled in locations convenient for re-use once cut and fill slopes and landscape mitigation areas are ready for top soiling. | | | | | | |
| | Topsoil deemed suitable for re-use for agricultural regeneration or for shrub planting and other landscape mitigation shall be placed in stockpiles not exceeding 3 metres high. | | | | | | |
| | Stockpiles shall be allowed to vege located away from drainage ditches | etate to prevent erosion or weathering and shall be s. | | | | | |
| | Finished worked slopes that are to earthworks progress and topsoil sh | | | | | | |
| Environmental Controls | Where required, Archaeological observers shall be present during the topsoil strip for a watching brief. | | | | | | |
| | Topsoil that has been identified as "ecologically interesting" shall be recorded as such within the method statement and shall be stockpiled for reuse in windrows no more than 1.5 metres high by 3 metres wide, shaped to shed water. | | | | | | |
| | Silt control measures shall consist of small bunds at the toe of the stockpiles as required. Spraying shall be carried out to prevent the proliferation of weeds. | | | | | | |
| Plant & Equipment | Topsoil shall be removed and loaded by a 360° excavator using a toothless bucket to dump trucks for transport to stockpile. A 360° excavator shall handle and shape the topsoil at the stockpile site. | | | | | | |
| Monitoring | Daily haulage record sheets used in productivity analysis shall provide a second reference to identify which topsoil is stripped from where and where it was placed. | | | | | | |
| Emergency, preparedness and response | If animal holes of sufficient size to clearance the works in that location be contacted. | | | | | | |
| | If items of potential archaeological | value are uncovered then w | orks in that location shall | | | | |



| | Procedure for Soil Strip | | CP02 | | |
|--|-------------------------------------|--|---------------|----------------|--|
| | | | Rev: A | Date: Nov 2010 | |
| | cease and the Archaeologist shall | | pe contacted. | | |
| | References Environmental Statement. | | | | |



Annex 2.3 Earthworks and Drainage

Table 6G.15 Procedures for Earthworks and Drainage

| Procedure for Ea | rthworks and Drainage | CP03 | | | | |
|----------------------------|--|--------------------------|---------------------------------|--|--|--|
| | | Rev: A | Date: Nov 2010 | | | |
| Purpose | To minimise the impacts of earthworks on ecological habitats and wildlife in the area. | | | | | |
| | To avoid pollution to water courses. | | | | | |
| | To minimise nuisance to the local or creation of dust, noise and vibration | | ioration of air quality and the | | | |
| | Minimise the surplus materials aris | ing from earthworks. | | | | |
| Responsibility for control | Environmental Manager | | | | | |
| Procedures | Landowners and authorities shall be deposition areas. | e informed in advance | of commencement of filling at | | | |
| | Bunting poles shall be erected arou | und overhead services. | | | | |
| | Advance pre-earthworks, temporary drainage and dewatering shall be undertaken as required to prevent ingress of water to the earthworks and discharge away from the earthworks. Discharge licenses shall be in place before commencement of any works and appropriate treatment provided prior to discharge to watercourses. | | | | | |
| | No water shall be allowed to pond on the formation layer. | | | | | |
| | When unsuitable material is encountered this shall be removed in accordance with the Site Waste Management Plan. | | | | | |
| | Method statements shall be prepared setting out procedures to monitor and control dust, noise, vibration and deposition on roads. | | | | | |
| | Haul Roads shall be constructed to enable access to the works and movement of the earthworks through the site and to disposal areas. | | | | | |
| | Temporary stockpiles of excavated earth shall be constructed within the lands made available. Stockpiles shall be shaped to ensure rainfall does not degrade the stored material. | | | | | |
| | Drains shall be installed along the toe of embankments in fill areas. | | | | | |
| | Embankments shall be constructed and graded to allow water to shed off the completed earthworks. | | | | | |
| | Embankments shall be sealed at the end of each working shift to avoid ingress of water. | | | | | |
| | The earthworks material shall be placed and compacted in layers to prevent water ingress and degradation of the material. | | | | | |
| Environmental Controls | Temporary drainage or dewatering shall be in place to prevent ingress of water to the earthworks and discharge away from the earthworks. | | | | | |
| | Discharge licenses shall be in plac discharge to watercourses. | e and appropriate treati | ment provided prior to | | | |
| Plant & | 50t – 70t primary excavators | | | | | |
| Equipment | 20t – 30t excavators | | | | | |



| Procedure for Ea | rthworks and Drainage | CP03 | | | | |
|--------------------------------------|--|---|----------------|--|--|--|
| | | Rev: A | Date: Nov 2010 | | | |
| | Rock breaking and processing equ | ipment | | | | |
| | Bulldozers Graders | | | | | |
| | | | | | | |
| | 30t – 40t articulated dump trucks | | | | | |
| | Compaction plant including various | s rollers | | | | |
| | Soil stabilisation plant | | | | | |
| Monitoring | Daily physical inspection of the site including; watercourses, haul roads, mechanical state of all plants, shall be undertaken to detect any signs of contamination or disturbance. | | | | | |
| | A program to monitor watercourses, air quality, dust, noise and vibration shall be during the construction phase. | | | | | |
| Emergency, preparedness and response | If animal holes of sufficient size to l clearance the works in that location be contacted. | | | | | |
| | If items of potential archaeological cease and the Archaeologist shall I | value are uncovered then works in that location shall be contacted. | | | | |
| | An emergency plan shall be prepared to ensure that any unforeseen release of silty water or other polluted effluents are brought quickly under control and remediated in consultation with the NIEA. | | | | | |
| References | Environmental Statement. | | | | | |



Annex 2.4 Bridge Construction

Table 6G.16 Procedure for Bridge Construction Across the Rivers

| Procedure for br | idge construction across the | CP04 | | | | |
|----------------------------|--|------------------------------|--------------------------|--|--|--|
| rivers | | Rev: A | Date: Nov 2010 | | | |
| Purpose | To minimise the impacts on ecological habitats and wildlife in the area during bridge construction. | | | | | |
| | To minimise noise nuisance. | | | | | |
| | To prevent environmental pollution | incidents. | | | | |
| Responsibility for control | Environmental Manager | | | | | |
| Procedures | Installing temporary bridges | | | | | |
| | Bunds shall be constructed to surro floodwaters overtopping. | ound the working platforms a | at a level to prevent | | | |
| | Erosion protection shall be installed lead-out edges of the bunds. | d to the temporary bridge ab | outments and lead-in and | | | |
| | The bridge shall be assembled in sections on a working platform. A crawler or all terrain mobile crane shall be used to lift the longitudinal truss sections over the river. | | | | | |
| | Cross members between the trusses shall be infilled using a crane. To remove the bridge the reverse process to erection shall be employed. | | | | | |
| | The deck shall be longitudinally sloping to give positive drainage of the deck surface. The water from rain or cleaning operations shall be channelled into the moat areas on the floodplain to be pumped to the discharge area. | | | | | |
| | Solid face ply board panelling shall be installed to the sides of the deck to prevent any material that might fall from the trucks from falling into the river. It shall also stop splash water entering the river. Open flooring decking shall not be used. | | | | | |
| | A maintenance regime for cleaning the deck of the bridge and cleaning the approach ramps to the bridge shall be in place. Regular dust suppression shall be required during dry periods to keep the surface of the haul road damp. | | | | | |
| | Piling for foundations | | | | | |
| | Any vibration shall be limited to those agreed with the local authorities. | | | | | |
| | Spoil shall be removed by excavator to keep the work area clear and when necessary the excavator shall load the spoil to transportation for removal. | | | | | |
| | Ground water within the bore displaced during placing of concrete shall be pumped away to a washout facility set up off the flood plain. | | | | | |
| | Any spills of concrete shall be cleared up to avoid the possibility of cement contaminating water from rainfall or washing down of equipment. | | | | | |
| | Excavation for pier foundations | | | | | |
| | Prior to commencing the bulk exca be excavated to the full depth of th | | or more sump holes shall | | | |
| | The cofferdam shall be excavated | using an excavator with a pe | erforated bucket. | | | |



| | idge construction across the | CP04 | | | | | |
|-------------------------|---|-------------------------------|----------------------------|--|--|--|--|
| rivers | | Rev: A | Date: Nov 2010 | | | | |
| | Low water table levels shall be ma | intained inside the cofferdar | m by pumping. | | | | |
| | Water from the pumping shall not be appropriate attenuation and treatment | | vatercourse without | | | | |
| | Structure base construction | | | | | | |
| | Prefabrication of formwork shall be undertaken remote from the floodplain and any debris from onsite fixing and fabrication shall be sent in skips for recycling. Dewatering of the cofferdam shall be maintained until the concrete base has been constructed, the piers are constructed to above ground level and the cofferdam has been backfilled. | | | | | | |
| | | | | | | | |
| | Deck construction | | | | | | |
| | The sub-deck shall have edge upsteither side of the river. | tands, shall be watertight an | d shall drain to the moats | | | | |
| | The sub-deck shall provided a second would otherwise reach the river. It river to a place where they can be | shall be designed to deflect | | | | | |
| | Until the permanent deck drainage run-off water from the deck is collewhere it shall be pumped to discha | cted and piped to the moat a | area on the floodplain | | | | |
| Environmental | Method statements shall be prepared for the control of noise and vibration. | | | | | | |
| Controls | A 15 M.P.H. speed limit shall be imposed on the haul road across the floodplains and watercourses. This shall reduce the risk of dust contamination and pollution of the river. | | | | | | |
| | Equipment shall be selected to minimise noise and where appropriate with built in noise attenuation. | | | | | | |
| | Some construction materials will be subject to a COSHH assessment. | | | | | | |
| Plant & | Crawler or all terrain mobile crane. | | | | | | |
| Equipment | Vibrating hammer/extractor. | | | | | | |
| | Breakers or crushing plant. | | | | | | |
| | Jack hammering. | | | | | | |
| | Crane pitching. | | | | | | |
| | Vibrating internal poker | | | | | | |
| | Concrete pumps. | | | | | | |
| | Vibrating rolling screed. | | | | | | |
| | Mechanical scabblers. | | | | | | |
| | Blacktop pavers and rollers. | | | | | | |
| Monitoring | Drainage treatment areas used to a to regular maintenance and monito | | age water shall be subject | | | | |
| Emergency, preparedness | An emergency plan shall be prepar water or other polluted effluents are | | | | | | |



| Procedure for bridge construction across the rivers | | CP04 | |
|---|--------------------------|--------|----------------|
| | | Rev: A | Date: Nov 2010 |
| and response | with the NIEA. | • | |
| References | Environmental Statement. | | |



Annex 2.5 Blasting

Table 6G.17 Procedure for Blasting

| Procedure for E | Blasting | CP05 | | | |
|----------------------------|---|--|-------------------------------------|--|--|
| | | Rev: A | Date: Nov 2010 | | |
| Purpose | To minimise the impacts on ecolo | gical habitats and w | ildlife in the area from blasting. | | |
| | To avoid pollution to water course | s and land. | | | |
| | To minimise nuisance to the local community cause by deterioration of air quality a creation of dust, noise and vibration. | | | | |
| Responsibility for control | Environmental Manager | | | | |
| Procedures | An explosives supervisor shall be | appointed. | | | |
| | A site specific method statement a any blasting operations taking place. | | sessment shall be produced prior to | | |
| | Notice shall be provided to the public informing them of the timing of planned blasts and providing the name, address and telephone number of a contact within the project team, who shall deal with their queries. | | | | |
| | Method statements shall be prepared to specify arrangements for the monitoring of noise and vibration. | | | | |
| | Site Rules shall be drawn up to govern shot-firing for rock extraction. These rules shall state how explosives are stored, transported, used and disposed of. | | | | |
| | Method Statements shall be prepared to specify arrangements for the safety of the workforce and the public. They shall also set down permitted shot-firing times, the determination of danger zones for vibration, warning systems, arrangements for disposal of surplus explosives and monitoring. | | | | |
| | | The disposal of surplus explosives and packaging shall be carried out in strict accordance with the manufactures or suppliers instructions and guidelines. | | | |
| | Where rock is excavated and storthe lands made available. | avated and stored temporarily, stockpiles shall be constructed within ailable. | | | |
| | No water shall be allowed to pond | on the rock surface |). | | |
| | PSNI shall be fully involved in the approval and awareness of any activities associated with the use of explosives | | | | |
| Environmental Controls | Design of blasting methodology to vibration including appropriate cha | | | | |
| Plant & | Rotary drill rig | | | | |
| Equipment | Explosives delivery truck or explos | sives mixing truck | | | |
| | Exploders | | | | |
| | Circuit Testers | | | | |
| | Wooden or anti-static plastic hand tools | | | | |



| Procedure for Blasting | | CP05 | |
|--|---|---|--------------------------|
| | | Rev: A | Date: Nov 2010 |
| Monitoring | A program to monitor watercourses, air quality, dust, noise and vibration shall be put in place during the construction phase. Continuous vibration meters shall be positioned at receptors adjacent to the site prior to shot-firing. | | |
| Emergency, preparedness and response | The Site Manager shall ensure that cover situations involving injury, un of explosive materials. These produith Police, Fire and Ambulance fo | foreseen damage to propert cedures shall clearly identify | y and unaccountable loss |
| References | Environmental Statement. | | |



Annex 2.6 Demolition

Table 6G.18 Procedure for Demolition

| Procedure for De | emolition | CP06 | | | | |
|----------------------------|---|---|-------------------------------|--|--|--|
| | | Rev: A | Date: Nov 2010 | | | |
| Purpose | To avoid pollution to water courses | and land during demolition | works. | | | |
| | To minimise nuisance to the local creation of dust, noise and vibratio | | ration of air quality and the | | | |
| Responsibility for control | Environmental Manager | Environmental Manager | | | | |
| Procedures | A site specific method statement a commencement of any demolition | | shall be produced prior to | | | |
| | All underground pipes, tanks and s labelled with their content and cap | | marked. All tanks shall be | | | |
| | Visible signs of leaking tanks or pil groundwater shall be checked. | Visible signs of leaking tanks or pipes and any signs of contaminated ground or groundwater shall be checked. | | | | |
| | Recyclable waste arisings shall be segregated at source. | | | | | |
| | Asbestos and other hazardous materials shall be separated for safe disposal. | | | | | |
| | Licences shall be obtained from the local environmental health officer before any concrete, masonry or other material is crushed on site. | | | | | |
| | Before removing or perforating tanks, all of their contents and residues shall be emptied for safe disposal by a competent operator in accordance with the Site Waste Management Plan. | | | | | |
| | Pipes shall be capped or valves closed, to prevent spillage. | | | | | |
| | Measures to avoid noise and vibration nuisance shall be agreed with the Local Planning Authority (LPA) and NIEA in advance. | | | | | |
| | A method statement shall be prepa damping down) shall be implemen | e prepared to specify how dust control measures (such as lemented. | | | | |
| | | be controlled. Discharge licenses shall be in place and led prior to discharge to watercourses. | | | | |
| | Dust shall be prevented from escaping from materials in lorries leaving the site. If it is not possible to cover lorries because there are pieces of protruding material, they shall be sprayed them with water just before they leave. | | | | | |
| Environmental Controls | | on to plant and equipment in operation shall be carried out prior to o ensure that noise and vibration levels do not exceed those agreed orities. | | | | |
| | Suitable spill response materials and emergency instructions shall be available on site and staff shall have been adequately trained. | | | | | |
| Plant & | 360° tracked excavator fitted with b | preaker | | | | |
| Equipment | Saw fitted with dust suppressant | | | | | |
| | 40 Tonne tracked crawler crane / 8 | 30t mobile if necessary | | | | |



| Procedure for Demolition | | CP06 | |
|--|--|--------------------------------|----------------------------|
| | | Rev: A | Date: Nov 2010 |
| | Stihl saw | | |
| | Harness and appropriate Personal Protective Equipment (PPE) if necessary | | |
| Monitoring | A program to monitor air quality, du construction phase. | ust, noise and vibration shall | be put in place during the |
| Emergency, preparedness and response | Emergency response plans will be for each individual demolition opera | | ctors' method statements |
| References | Environmental Statement. | | |

Draft versions of the Construction Procedures are set out below for guidance purposes.

The Contractor shall develop these further as an integral part of their operational procedures for issue as Controlled Documents.



ANNEX 3: SITE ACCESS LOCATIONS

Table 6G.19 Site Access Locations

| Site Access | Mainline Chainage | Average Truck Movements (period) | Access Description | Comments |
|------------------------------------|-------------------|----------------------------------|----------------------------------|--|
| | | Section 1 | | |
| Junction 1 - New Buildings | 500 | 20 per day (240 days) | Directly off existing A5 | |
| Junction 2 - New Buildings (South) | 1750 | 20 per day (240 days) | New Junction 2 link road | |
| Shared Accommodation Access | 2850 | 20 per day (300 days) | Shared access to treatment works | |
| Magnagh Dand | 4050 | 20 per day (360 days) | "Using existing side road | |
| Meenagh Road | 4950 | | (permanent stop off)" | |
| Existing A5 | 6400 | 20 per day (360 days) | Directly off existing A5 | |
| Donagheady Road | 7750 | 12 per day (240 days) | New Donagheady side road | |
| Existing A5 | 9100 | 20 per day (360 days) | Directly off existing A5 | |
| Existing A5 | 11600 | 70 per day (360 days) | Directly off existing A5 | |
| Junction 3 | 14700 | 160 per day (480 days) | New Junction 3 link road | Surplus from south of river Mourne & imported fill material. |
| Existing A5 | 16700 - 17900 | 90 per day (480 days) | Directly off existing A5 | Surplus from south of river Mourne & imported fill material. |



| Site Access | Mainline Chainage | Average Truck Movements (period) | Access Description | Comments |
|--------------------------|-------------------|----------------------------------|--|--|
| Junction 6 (Existing A5) | 18050 | 50 per day (480 days) | Directly off existing A5 | |
| Strahans Road | 20400 | 200 per day(360 days) | "Using existing side road (improvements required)" | Surplus cut south of river Mourne hauled north via Strahans road. |
| Orchard Road | 21400 | 15 per day (360 days) | Using existing Orchard road | |
| Junction 8 | 22100 | 10 per day (240 days) | New Junction 8 link road | |
| Peacock Road | 22400 | 20 per day (260 days) | "Using existing side road | |
| reacock Noau | 22400 | 20 per day (360 days) | (improvements required)" | |
| | | Section 2 | | |
| Primrose Park | 27215 | 25 per day (240 days) | From Peacock Road/Ex. A5 | Temporary Diversion to north side. |
| B165 Bells Park Road | 27990 | 20 per day (240 days) | From Ex. A5 | Temporary Diversion to north side. Not required if new alignment is offline from existing. |
| Garden Road | 28000 | | | Assumed Closed until complete with Bells Park Rd. |
| High Road | 28595 | | | |
| Seein Road | 29090 | 10 per day (120 days) | From Bells Park Rd. | Now offline. Shuttle work (traffic lights) to complete tie-ins. |



| Site Access | Mainline Chainage | Average Truck Movements (period) | Access Description | Comments |
|-------------------------|-------------------|----------------------------------|-------------------------------------|---|
| Concess Road | 30140 | | | Short term Road Closures to construct road and beam lifts. |
| B72 Fyfin Raod | 31445 | 50 per day (360 days) | From B165 & Ex. A5 | Shuttle work (traffic lights) to upgrade pavement & markings etc (width/depth). |
| Stone Road | 31910 | | | Temporary closure with diversion using realigned Urbalreagh Rd. |
| Urbalreagh Road (North) | 32000 | 20 per day (360 days) | From B72 Fyfin Rd. | |
| Urbalreagh Road (South) | 32000 | | From B72 Fyfin Rd. | |
| Unnamed Road | 32600 | | | |
| Derg Road | 33960 | 20 per day (240 days) | From Ex. A5 onto Old Bridge Rd. | Temp Diversion using existing to south of new realignment. |
| B164 Deerpark Road | 34700 | 20 per day (240 days) | | Temp Diversion to the north of the new realignment. |
| Milltown Road | 35280 | | | |
| Magheracoltan Road | 36270 | 20 per day (240 days) | From B164 and B84/Drumlegagh Rd. | Short term Road Closures to construct road and beam lifts. |
| Drumlegagh Road | 37050 | 20 per day (240 days) | From Magheracolton Rd to JN2 only. | |
| Golf Course Road | 37200 | | | |



| Site Access | Mainline Chainage | Average Truck Movements (period) | Access Description | Comments |
|---------------------------|-------------------|----------------------------------|-----------------------------------|--|
| B84 Baronscourt Road | 37300 | 50 per day (360 days) | From Old A5 Strabane Rd & Ex. A5. | Now mostly offline. Shuttle work (traffic lights) to complete tie-ins. |
| Oldcastle Road | 38590 | | | Temp Diversion to the north of the new realignment. |
| Honeyford Lane | 39000 | | | |
| New Glen to Old Glen Link | 39350 | | | |
| Glen Road | 39420 | | | Now mostly offline. Shuttle work (traffic lights) to complete tie-ins. |
| Gortgranagh Road | 39500 | | | |
| Castletown Road (North) | 39910 | 50 per day (360 days) | From Old A5 in Newtownstewart. | Maintain existing road until new overbridge complete. |
| Grange Road | 40050 | | | |
| West Road | 41110 | | | Temp Diversion to the north of the new realignment. |
| Joe's Road | 42410 | 25 per day (240 days) | From Ex. A5. | Maintain existing road until new overbridge complete. |
| Unnamed Road | 43590 | 50 per day (240 days) | | Becomes a shared access track. |
| Killinure Road | 44960 | | | Now mostly offline. Shuttle work (traffic lights) to complete tie-ins. |



| Site Access | Mainline Chainage | Average Truck Movements (period) | Access Description | Comments |
|--------------------------|-------------------|----------------------------------|-----------------------------------|--|
| Castletown Road (South) | 45670 | 20 per day (360 days) | From Ex. A5 | Short term Road Closures to construct road and beam lifts. |
| Cashty - Castletown link | 45750 | | | |
| Cashty Road | 46880 | | | |
| Dunteige Road | 46940 | 20 per day (360 days) | From Castletown Rd at Mountjoy | Temp Diversion to the north of the new realignment. |
| Lisnagirr Road | 47550 | 20 per day (480 days) | From Ex. A5. | |
| Tully Link Road East | 48000 | | | |
| Rash Road | 48070 | 20 per day (240 days) | From Ex. A5. | |
| Tully Link Road West | 48200 | | | |
| Proposed JN3 Link Road | 49230 | 25 per day (360 days) | From Ex. A5. | Shuttle work (traffic lights) to complete tie-ins. |
| South Drumlegagh Road | 49620 | 25 per day (360 days) | From Ex. A5. | |
| Todds Road | 49825 | | | |
| Mellon Park Drive | 50440 | | | |
| Armstrong's Lane | 50770 | | | |
| B50/Gillygooly Road | 51280 | 50 per day (360 days) | From Ex. A5. | Now mostly offline. Shuttle work (traffic lights) to complete tie-ins. |
| Mullaghmena Road | 51350 | | | Temporary Road Closure to construct & finalise to new B50. |



| Site Access | Mainline Chainage | Average Truck Movements (period) | Access Description | Comments |
|----------------------|-------------------|----------------------------------|--------------------------------------|---|
| Aghnamoyle Road | 52010 | 20 per day (240 days) | From B50 Gillygooley Rd. | Use existing and realigned Botera Road as temporary diversion until Overbridge complete. |
| Botera Road | 52100 | | | |
| Tamlaght Road | 53100 | 10 per day (240 days) | From Brookmount Rd/ Ex. A5. | Full Road Closure for duration of bridge construction. |
| Brookmount Road | 53720 | 10 per day (240 days) | From Ex. A5. | Short term Road Closures to construct road and beam lifts. |
| A32/Clannobogan Road | 54020 | 50 per day (360 days) | From A32 | Short term Road Closures to construct road and beam lifts. |
| Loughmuck Road | 54350 | 20 per day (120 days) | From Dromore Rd/A32 | Now mostly offline. Shuttle work (traffic lights) to complete tie-ins. |
| Beagh Road | 55910 | | | |
| Ballynahatty Road | 56430 | 20 per day (240 days) | From Old A5, Dublin Rd, Omagh | Now mostly offline. Shuttle work (traffic lights) to complete tie-ins. |
| Blackfort Road | 57000 | 20 per day (120 days) | From Section 3/ B83 Seskinore Rd. | Use existing and realigned Blackfort Road as temporary |



| Site Access | Mainline Chainage | Average Truck Movements (period) | Access Description | Comments |
|----------------------------|-------------------|----------------------------------|---|---|
| | | | | diversion until Overbridge complete. |
| Drumragh Road | 57100 | 20 per day (240 days) | From Section 3/ B83 Seskinore Rd. | |
| | | Section 3 | | |
| Seskinore Road (B83) | 62065 | 120 per day (540 days) | Use existing side road | Large quantities of export and import required. |
| Tattykeel Cottages North | 62600 | 20 per day (360 days) | Use existing side road | |
| Tattykeel Cottages Central | 62850 | 20 per day (360 days) | Acess directly from existing A5 | Access to Doogary Bog |
| Tattykeel Cottages South | 63800 | 20 per day (360 days) | Use existing side road | |
| Drumconnelly Road 1 | 64400 | 70 per day (450 days) | Use existing side road and realigned side road | Large quantities of export and import required. |
| Tullyrush Road | 66000 | 35 per day (450 days) | Use existing side road with minor upgrade works | |
| Rarone Road | 66900 | 25 per day (360 days) | Use existing side road with minor upgrade works | |
| Drumconnolly Road 2 | 67900 | 25 per day (360 days) | Use existing side road with minor upgrade works | |
| Moylagh Road | 68700 | 50 per day (450 days) | Use existing side road | Large quantities of export and import required. |
| Augher Point Road | 68800 | 30 per day (360 days) | Use existing side road and realigned side road | |
| Greenmount Road | 71150 | 65 per day (450 days) | Use existing side road | Large quantities of export and |



| Site Access | Mainline Chainage | Average Truck Movements (period) | Access Description | Comments |
|----------------------------|-------------------|----------------------------------|---|--|
| | | | | import required. |
| Springhill Road | 73800 | 100 per day (720 days) | Use existing side road and temporary road | Large quantities of export and import required. No suitable alternative access between Springhill and Glenhoy. |
| Tullanafoile Road | 75900 | 10 per day (200 days) | Use existing side road | |
| Tullycorker Road | 76600 | 10 per day (200 days) | Use existing side road | |
| Rarogan Road | 78450 | 10 per day (200 days) | Use existing side road | |
| Glenhoy Road | 80300 | 100 per day (720 days) | Use existing side road and realigned side road | Large quantities of export and import required. No suitable alternative access between Springhill and Glenhoy. |
| Ballynasaggart Road | 81650 | 40 per day (720 days) | Use existing side road with minor upgrade works | Large quantities of export and import required. |
| Feddan Road | 83300 | 10 per day (200 days) | Use existing side road | |
| Tullybryan Road | 83400 | 20 per day (360 days) | Use existing side road and realigned side road | |
| A4 Annaghilla Road | 83500 | 100 per day (720 days) | Use existing side road | Large quantities of export and import required. |
| Tullyvar Road (crosses A4) | N/A | 20 per day (360 days) | Use existing side road | |
| Tullywinny Road 2 | 85500 | 130 per day (540 days) | Use existing side road | |



| Site Access | Mainline Chainage | Average Truck Movements (period) | Access Description | Comments |
|---|-------------------|----------------------------------|---|---|
| | | | accessed from Ballynany Road | |
| Lisginny Road | 86800 | 200 per day (540 days) | Use existing side road with minor upgrade works | Large quantities of export and import required. |
| Old Chapel Road | 88000 | 10 per day (240 days) | Use existing side road | |
| Tullyvar Road (A5) | 88500 | 160 per day (720 days) | Use existing side road | Large quantities of export and import required. |
| Carnteel road (B35) | 90500 | 110 per day (360 days) | Use existing side road and realigned side road | Large quantities of export and import required. |
| Rehaghy road (B128) | 91050 | 50 per day (360 days) | Use existing side road and realigned side road | |
| Caledon road | 92200 | 60 per day (360 days) | Use existing side road | |
| Monaghan Road (stopped up, turning head provided) | 93300 | 30 per day (360 days) | Use existing side road | Large quantities of export and import required. |



ANNEX 4: TRAFFIC MANAGEMENT

Table 6G.20 Traffic Management Description

| Side Road Ref | Side Road/ Junction | Mainline Chainage | Side Road Stopped Up | Preferred for Import of Materials & all Vehicles | Comments Temporary Diversion / Road Closure | | |
|---------------|----------------------------|----------------------|-------------------------|--|---|--|--|
| | Section 1 | | | | | | |
| | Junction 1 (New Buildings) | 500 | No | Yes | One way TM (traffic lights) to complete tie-ins with the existing A5 and the junction changes associated with Woodside Road. | | |
| | Junction 2 | 1750 | No | Yes | One way TM to complete tie-ins. | | |
| S1 / SR / 01 | Dunnalong Road | 3900 | No | No | Local School bus route. Temporary diversion to the north of the existing road. | | |
| | Meenagh Road | 4950 | Yes | Yes | No TM requirements. Landowner access will be maintained during works. | | |
| | Existing A5 | 6400 | No | Yes | Traffic flows will be maintained on existing A5 during bridge construction works. Assumed that A5 remains at grade and only requires the relocation of a bus lay-by to the north of the proposed structure. Night closure required for bridge beam lifts. | | |
| S1 / SR / 05 | Tamnabrady Road | 6400 | No | No | New link road running across the top of the Bready cutting will require TM to complete tie-in. | | |
| S1 / SR / 04 | Cloghboy Road | 6500 | No | No | Realigned Cloghboy Road constructed offline. | | |
| S1 / SR / 06 | Donagheady Road | 7750 | No | No | No TM requirements. Existing Donagheady Road maintained until new side road / structure | | |



| Side Road Ref | Side Road/ Junction | Mainline Chainage | Side Road Stopped Up | Preferred for Import of Materials & all Vehicles | Comments Temporary Diversion / Road Closure |
|---------------|---------------------|----------------------|-------------------------|--|---|
| | | | | | completed. One way TM to complete tie-ins. |
| S1 / SR / 24 | Willow Road | 8900 | Yes - in part | No | Realigned Willow Road constructed offline. |
| | Existing A5 | 9100 | No | Yes | Traffic flows will be maintained on existing A5 during bridge construction works. Assumed that A5 remains at grade and requires no upgrade works. Night closure required for bridge beam lifts. |
| S1 / SR / 09 | Ash Avenue | 9600 | Yes | No | Establish Ash / Drumenny link prior to closing Ash Avenue. |
| S1 / SR / 10 | Drumenny Road | 10050 | Yes | No | Traffic will use Ash Avenue during bridge construction works. |
| S1 / SR / 11 | Ballydonaghy Road | 10950 | Yes | No | Temporary diversion to the north of the existing road. |
| S1 / SR / 12 | Moss Road | 11000 | No | No | Traffic will use Ballydonaghy / Moss link during construction. |
| S1 / SR / 14 | Greenlaw Road | 13000 | Yes | No | Establish Park Road / Greenlaw Road link prior to closing Greenlaw Road. |
| S1 / SR / 15 | Park Road (north) | 13550 | No | No | Traffic flows will be maintained on existing Park Road during bridge construction works. |
| | Junction 3 | 14750 | No | Yes | Various local temporary diversions for the realigned existing A5, Woodend Road and Park Road will be required during construction works. One way TM will be required at intervals during construction. |



| Side Road Ref | Side Road/ Junction | Mainline Chainage | Side Road Stopped Up | Preferred for Import of Materials & all Vehicles | Comments Temporary Diversion / Road Closure |
|---------------|----------------------|----------------------|-------------------------|--|---|
| S1 / SR / 16 | Spruce Road | 15000 | Yes | No | Early closure, access via. Park Road during construction. |
| S1 / SR / 17 | Park Road (south) | 17000 | Yes (junction) | No | Existing junction with the A5 to be stopped up and diverted through the realigned link through Junction 4. |
| | Greenbrae Park | 17400 | Yes | No | Road to be closed – no TM required |
| S1 / SR /18 | Lifford Road | 17900 | No | Yes | Various local temporary diversions will be required during construction works. One way TM may be required at intervals during construction. |
| | Junction 5 | 17900 | No | Yes | New arm to be provided on the roundabout for the southbound slip road; TM will be required to complete the tie-in. |
| | Junction 6 | 17900 | No | No | New arm to be provided on the roundabout for the slip roads; TM will be required to complete the tie-in. |
| S1 / SR / 19 | Urney Road | 19600 | No | No | Realigned offline. One way TM to complete tie-ins. |
| S1 / SR / 26 | Carrick Avenue | 19600 | No | No | Realigned offline. One way TM to complete tie-ins. |
| | | | Section 2 | | |
| S2 / SR / 01 | Primrose Park | 27215 | No | Yes - from Sion Mills | Temporary diversion to north side. |
| S2 / SR / 02 | B165 Bells Park Road | 27990 | No | Yes | New alignment is offline from existing. |
| S2 / SR / 49 | Garden Road | 28000 | Diverted | No | Assumed closed until complete with Bells Park Road. |
| S2 / SR / 03 | High Road | 28595 | Yes | No | |



| Side Road Ref | Side Road/ Junction | Mainline Chainage | Side Road Stopped Up | Preferred for Import of Materials & all Vehicles | Comments Temporary Diversion / Road Closure |
|---------------|----------------------------|----------------------|-------------------------|--|---|
| S2 / SR / 04 | Seein Road | 29090 | No | Yes - from Bells Park Road | Offline. Shuttle work (traffic lights) to complete tie- ins. |
| S2 / SR / 05 | Concess Road | 30140 | No | Yes - from Bells Park Road | Short term road closures to construct road and beam lifts. |
| S2 / SR / 06 | B72 Fyfin Road | 31445 | No | Yes | Shuttle work (traffic lights) to upgrade pavement & markings etc (width/depth). |
| S2 / SR / 07 | Stone Road | 31910 | No | Yes | Temporary closure with diversion using realigned Urbalreagh Road. |
| | Urbalreagh Road (North) | 32000 | Diverted | Yes | |
| | Urbalreagh Road (South) | 32000 | Diverted | Yes | |
| S2 / SR / 10 | Derg Road | 33960 | No | Yes - from Ex. A5 | Temp diversion using existing to south of new realignment. |
| S2 / SR / 11 | Deerpark Road | 34700 | No | Yes | Temp diversion to the north of the new realignment. |
| S2 / SR / 12 | Milltown Road | 35280 | Yes | No | |
| S2 / SR / 13 | Magheracoltan Road | 36270 | No | Yes | Short term road closures to construct road and beam lifts. |
| S2 / SR / 14 | Drumlegagh Road North | 37050 | Diverted | Yes | Linked to Junction 10 connector road |
| S2 / SR / 15 | Golf Course Road | 37200 | Yes | Yes | |
| S2 / SR / 16 | Baronscourt Road | 37300 | No | Yes | Offline. Shuttle work (traffic lights) to complete tie- ins. |
| S2 / SR / 17 | Oldcastle Road | 38590 | No | No | Temp diversion to the north of the new |



| Side Road Ref | Side Road/ Junction | Mainline Chainage | Side Road Stopped Up | Preferred for Import of Materials & all Vehicles | Comments Temporary Diversion / Road Closure |
|---------------|----------------------------|----------------------|-------------------------|--|--|
| | | | | | realignment. |
| S2 / SR / 18 | Honeyford Lane | 39000 | Yes | No | |
| S2 / SR / 19 | Glen Road | 39420 | Diverted | Yes | Shuttle work (traffic lights) to complete tie-ins. |
| S2 / SR / 20 | Gortgranagh Road | 39500 | Diverted | No | Shuttle work (traffic lights) to complete tie-ins. |
| S2 / SR / 21 | Castletown Road (North) | 39910 | No | Yes | Maintain existing road until new overbridge complete. |
| S2 / SR / 22 | Grange Road | 40050 | Diverted | No | |
| S2 / SR / 23 | West Road | 41110 | No | No | Temporary diversion to the north of the new realignment |
| S2 / SR / 24 | Joe's Lane | 42410 | Diverted | Yes | Maintain existing road until new overbridge complete. |
| S2 / SR / 25 | Gordon's Lane | 43590 | Yes | Yes | Abandoned between Castletown Road and existing A5. Proposed underbridge (for landowner access) offline to the north. |
| S2 / SR / 26 | Killinure Road | 44960 | No | Yes - from Ex. A5 | Mostly offline. Shuttle work (traffic lights) to complete tie-ins. |
| S2 / SR / 27 | Castletown Road (South) | 45670 | No | Yes - from Ex. A5 | Short term road closures to construct road and beam lifts. |
| S2 / SR / 28 | Cashty - Castletown link | 45750 | Diverted | Yes | |
| S2 / SR / 29 | Dunteige Road | 46940 | No | Yes | Temp diversion to the north of the new alignment. |
| S2 / SR / 30 | Lisnagirr Road | 47550 | Yes | No | |
| S2 / SR / 31 | Tully Road (East) | 48000 | Diverted | No | |
| S2 / SR / 32 | Rash Road | 48070 | No | Y | Temp diversion via Tully Road (East). |



| Side Road Ref | Side Road/ Junction | Mainline Chainage | Side Road Stopped Up | Preferred for Import of Materials & all Vehicles | Comments Temporary Diversion / Road Closure |
|---------------|-----------------------------------|----------------------|-------------------------|--|--|
| S2 / SR / 33 | Tully Road (West) | 48200 | Yes | No | |
| S2 / SR / 34 | Proposed Junction 11 Link Road | 49230 | - | Yes | Shuttle work (traffic lights) to complete tie-ins. |
| S2 / SR / 35 | Drumlegagh Road South | 49620 | Yes | Yes | Link provided to Junction 11. |
| S2 / SR / 36 | Todds Road | 49825 | Yes | No | |
| S2 / SR / 37 | Mellon Park Drive | 50440 | Diverted | Yes | |
| S2 / SR / 38 | B50/Gillygooly Road | 51280 | No | Yes | Offline. Shuttle work (traffic lights) to complete tie- ins. |
| | Mullaghmena Road | 51350 | No | | Temporary road closure to construct and finalise tie-in to new B50. |
| S2 / SR / 39 | Aghnamoyle Road | 52010 | No | Yes | Use existing and realigned Botera Road as temporary diversion until Overbridge complete. |
| S2 / SR / 40 | Botera Road | 52100 | Diverted | No | |
| S2 / SR / 41 | Tamlaght Road | 53100 | No | Yes | Full road closure for duration of bridge construction. |
| S2 / SR / 42 | Brookmount Road | 53720 | No | Yes | Short term road closures to construct road and beam lifts. |
| S2 / SR / 43 | A32/Clanabogan Road | 54020 | No | Yes | Short term road closures to construct road and beam lifts. |
| S2 / SR / 44 | Loughmuck Road | 54350 | No | Yes | Offline to the north. Shuttle work (traffic lights) to complete tie-ins. |
| S2 / SR / 45 | Beagh Road | 55910 | No | Yes | Mostly offline to the south. Partial temp diversion to the north. |
| S2 / SR / 46 | Ballynahatty Road | 56430 | No | Yes | Mostly offline. Shuttle work (traffic lights) to |



| Side Road Ref | Side Road/ Junction | Mainline Chainage | Side Road Stopped Up | Preferred for Import of Materials & all Vehicles | Comments Temporary Diversion / Road Closure |
|---------------|---|----------------------|-------------------------|--|---|
| | | | | | complete tie-ins. |
| S2 / SR / 47 | Blackfort Road | 57000 | No | Yes | Use existing and realigned Drumragh Road as temporary diversion until overbridge complete. |
| S2 / SR / 48 | Drumragh Road | 57100 | Diverted | No | |
| S2 / SR / 01 | Primrose Park | 27215 | No | Yes - from Sion Mills | Temporary diversion to north side. |
| S2 / SR / 02 | B165 Bells Park Road | 27990 | No | Yes | New alignment is offline from existing. |
| S2 / SR / 49 | Garden Road | 28000 | Diverted | No | Assumed closed until complete with Bells Park Road. |
| S2 / SR / 03 | High Road | 28595 | Yes | No | |
| | | | Section 3 | | |
| S3/SR/001 | Seskinore road (B83) | 62065 | Re-aligned | Yes | Temporary road construction for tie-in. Possibly traffic lights for Western tie-in through bog. |
| S3/SR/043 | Doogary road (A5) - joins Seskinore road | 62100 | Re-aligned | Yes | Temporary road construction for tie-ins. |
| S3/SR/044 | Tattykeel cottages north | 62600 | Yes | Yes | Road closure agreed, access provided from south. |
| S3/SR/044 | Tattykeel cottages central | 62850 | Re-aligned | Yes | Road closure agreed, access provided from south. |
| S3/SR/044 | Tattykeel cottages south | 63800 | Yes | Yes | Remains open until central section re-opens. |
| S3/SR/045 | Drumconnelly road 1 | 64300 | Re-aligned | Yes | Short duration closure required to construct tie-in. |



| Side Road Ref | Side Road/ Junction | Mainline Chainage | Side Road Stopped Up | Preferred for Import of Materials & all Vehicles | Comments Temporary Diversion / Road Closure |
|---------------|---------------------|----------------------|-------------------------|--|--|
| S3/SR/007 | Tullyrush road | 66000 | No | Yes | Road closure agreed for duration of structure. Diversion via Seskinore Road. |
| S3/SR/008 | Rarone road | 66900 | No | Yes | Road closure agreed for duration of structure. Diversion via Seskinore Road. |
| S3/SR/049 | Drumconnolly road 2 | 67900 | Yes | Yes | Remains open until Rarone Road re-opened. |
| S3/SR/009 | Moylagh road | 68700 | Re-aligned | Yes | Temporary road required for tie-in. |
| S3/SR/011 | Augher point road | 68800 | Re-aligned | Yes | Temporary road required for tie-in. |
| S3/SR/012 | Killadroy road | 70950 | Re-aligned | No | Short duration closure required to construct tie-in. |
| S3/SR/013 | Greenmount road | 71150 | Re-aligned | Yes | Short duration closure required for tie-ins, beam lifts access via Kiladroy. |
| S3/SR/014 | Routingburn road | 72000 | Yes | No | |
| S3/SR/015 | Springhill road | 73800 | No | Yes | Temporary road constructed to south. |
| S3/SR/017 | Cormore road | 75000 | Yes | No | |
| S3/SR/046 | Tullanafoile road | 75900 | No | Yes | Road closure agreed. Phased with Tullycorker. |
| S3/SR/047 | Tullycorker road | 76600 | No | Υ | Road closure agreed. Phased with Tullanafoile. |
| S3/SR/022 | Tycanny road | 78200 | Re-aligned | N | Short duration road closure required for tie-in. |
| S3/SR/023 | Rarogan road | 78450 | No | Y | Road closure agreed. Phased with Tullycorker. |
| S3/SR/024 | Glenhoy road | 80300 | No | Y | Short duration road closure required for tie-in. |
| S3/SR/050 | Ballynasaggart road | 81650 | No | Y | Road closure agreed. Phased with Crew Road. |



| Side Road Ref | Side Road/ Junction | Mainline Chainage | Side Road Stopped Up | Preferred for Import of Materials & all Vehicles | Comments Temporary Diversion / Road Closure |
|---------------|----------------------------------|----------------------|-------------------------|--|---|
| S3/SR/025 | Crew road | 82000 | Yes | N | Remains open until Ballynasaggart re-opens. |
| S3/SR/027 | Feddan road | 83300 | No | Υ | Road closure required. Alternative access via Ballynasaggart Road. |
| S3/SR/029 | Tullybryan road | 83400 | No | Υ | Online construction. Road closure required. |
| S3/SR/031 | A4 Annaghilla road | 83500 | No | Y | Online construction. Temporary traffic restrictions (dual to single). |
| S3/SR/030 | Tullyvar road (crosses A4) | N/A | No | Υ | Temporary road required for construction of embankments. |
| | Ballynany road | 83700 | Yes | Y | Road closure required. Phased with Tullywinny. |
| S3/SR/032 | Tullywinny road (Tie-In with A4) | N/A | Yes | N | Road closure required. |
| S3/SR/033 | Tullywinny road 2 | 84400 | No | Y | Road closure required. Phased with Ballynany. |
| S3/SR/034 | Lisginny road | 86500 | No | Y | Short duration closure agreed for construction of tie-ins. |
| S3/SR/035 | Old chapel road | 87800 | No | Y | Road closure required for duration of structure. |
| S3/SR/036 | Tullyvar road (A5) | 88350 | No | Υ | Temporary roads required for construction of tie- ins. |
| S3/SR/038 | Loughans road | 88420 | No | N | Road closure required for duration of structure. |
| S3/SR/039 | Carnteel road (B35) | 90280 | No | Y | Temporary roads required for construction of tie- ins. |
| S3/SR/040 | Rehaghy road (B128) | 90800 | No | Υ | Short duration closures required for beam lifts, road closures. |
| S3/SR/041 | Caledon road | 91920 | No | Y | Temporary road required for construction of tie- ins. |



| Side Road Ref | Side Road/ Junction | Mainline Chainage | Side Road Stopped Up | Preferred for Import of Materials & all Vehicles | Comments Temporary Diversion / Road Closure |
|---------------|---|----------------------|-------------------------|--|---|
| S3/SR/042 | Monaghan road (stopped up, turning head provided) | 93100 | Yes | Y | Possibly traffic lights/ temporary road for construction of tie-in. |





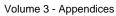
Information to Inform an Appropriate Assessment: SAC Watercourses

Appendix 6 – Draft Silt Management Plan



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A5 Western Transport Corridor







Scheme Wide Silt Management Plan

A5 Western Transport Corridor

05 March 2014

Produced for



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1 Introduction

This plan sets out site controls for management of sediment generated from over pumping during the construction of the new culverts and precipitation run off during earthwork operations.

All relevant construction activities for temporary and permanent works will follow relevant environmental legislation in consultation with Northern Ireland Environment Agency (NIEA) and where required, Rivers Agency, Loughs Agency and the Department of Culture Arts and Leisure, Inland Fisheries Team (DCAL). The main objective of the Silt Management Plan is to ensure that all drainage of temporary works is carried out in adherence with current regulation and to provide guidance on how to prevent water pollution.

Various agencies are responsible for control of distinct elements of the works:

- Rivers Agency proposals do not cause flooding upstream of the works.
- NIEA discharge of precipitation water, extraction and ecological licenses.
- Loughs Agency fish within the Foyle Catchment.
- DCAL fish within the Blackwater Catchment.

The construction phase of all projects is a period within which there is a significant potential for pollution, in particular silt pollution to local watercourses due to unearthed alluvium. The objective of this plan is to provide guidance on the relevant statutory provisions, including any consents required, in respect of the water environment, to protect both physical habitat and morphology and to avoid unacceptable adverse impacts including changes to flow volume, water levels and water quality due to construction.

This plan aims to address the requirements of the Rivers Agency, NIEA, Loughs Agency and DCAL and detail Road Service's strategy for dealing with these key environmental risks.

A Discharge License will be required from NIEA to enable the works to commence. This licence will be granted for each phase of the works and the works will then be monitored on a month by month basis by the NIEA. Each month contractors will be required to issue a monthly return to the NIEA which will be the projected discharges for the following month. These will be linked to the construction programmes. These plans will be reviewed every three months and updated if required.

Where construction activities near water courses and water bodies are essential, steps have been undertaken to identify sufficient mitigation measures for the protection of the watercourses against pollution. The Silt Management Plan also



includes details for pollution prevention measures and construction methodologies to be incorporated during the construction phase of the project.

Caution is required to prevent pollution and/or environmental damage, particularly when the following activities are undertaken:

- Construction of permanent and temporary bridges.
- Discharges into a surface water drainage system.
- Operating plant or machinery in, or in the vicinity of water.
- Discharges of surface water run-off.
- Laying of pipeline or cable.



2 Silt Mitigation

2.1 Scheme Overview

The proposed A5WTC would be an 85km long dual carriageway, running between New Buildings and the border with the Republic of Ireland (ROI), immediately south of Aughnacloy.

The proposed scheme runs along the Foyle Valley, close to the River Foyle, crossing the Burn Dennet

A full description of the scheme alignment is presented in Appendix A.

The works consist of a number of watercourse crossings which require the construction of new piped or box culverts to carry the streams under the new mainline. An example detailed method statement has been developed to control the construction of these and is included in Appendix B.

2.2 Sensitive Areas

The following areas are considered to be particularly sensitive with respect to potential impacts from pollution which may result from inadequate drainage control:

The River Foyle has a catchment area of approximately 2890km2 and extends into the counties of Londonderry, Tyrone and Donegal. The major tributaries of the Foyle include the Burn Dennet, Glenmornan, Finn, Mourne, Strule, Owenkillew, Derg, Fairy Water, Camowen and Drumragh Rivers. The northern section of the proposed route lies within the Lower Foyle Catchment, where the Mourne and the Finn converge at Strabane to form the River Foyle. From Strabane the Foyle flows north to Londonderry and Lough Foyle. The lough is tidal and exerts a tidal influence up the River Foyle as far as Strabane. The tidal reach of the Foyle has a tidal range of approximately 3m and is up to 750m wide in places. The main tributaries to the Foyle in the vicinity of the route are discussed in the following paragraphs. However, there are also a significant number of smaller tributaries which the route crosses. These tributaries are generally large man-made field drains and small streams which have been heavily modified / straightened where they pass through villages and agricultural land. The proposed scheme runs along the eastern side of the River Foyle from New Buildings to Strabane, primarily through agricultural land.

The Burn Dennet has a catchment of approximately 150km2. It rises in the Sperrin Mountains, and flows 35km west to the River Foyle. The catchment is predominantly agricultural, although there are significant sand and gravel quarries close to its lower reaches. The Proposed Scheme crosses the river in the vicinity of Burn Dennet Bridge. Here, the watercourse is approximately 15m wide and typically transitional in character, the valley being relatively unconfined with a wide floodplain and a channel which is relatively shallow in gradient and meandering in form with riffle/pool sequences.



The Glenmornan River has a catchment of approximately 35km2. It rises in the foothills of the Sperrins and flows 16km west to the River Foyle passing through the villages of Artigarvan and Ballymagorry. The upper catchment comprises peat covered hills. The landscape of the mid and lower reaches is predominantly agricultural. There are some sand and gravel workings adjacent to the middle reaches of the watercourse. Where the Proposed Scheme crosses the river, northwest of Ballymagorry, the river channel is between 4m and 20m wide and typically transitional in character.

The River Finn rises in Lough Finn in County Donegal and flows east for 60km to Strabane, where it joins with the River Mourne. The upper reaches of the catchment, which has an area of 495km2, generally flow through mountainous terrain. The route runs along the eastern bank of the lower reaches of the river, which by this point is a mature lowland river, with a wide unconfined valley and floodplain that is relatively deep and slow flowing.

The River Mourne forms the middle section of the main spine of the Foyle Catchment and has a catchment area of 1860km2. The Mourne is formed at the confluence of the River Strule and River Derg near Ardstraw. The river flows north to Strabane, where it merges with the River Finn to form the River Foyle. The route runs parallel with the western bank of the Mourne. The Mourne is a transitional river with numerous riffle and pool sequences, which flow in a relatively unconfined valley within a large floodplain. The river channel is on average 60m wide and has been heavily modified at Sion Mills, where historically a large weir has been constructed. As the Mourne passes through Strabane the river channel has been modified by various flood defences.

The River Derg rises in the Killeter Uplands to the west of the route and flows eastwards to its confluence with the Strule River near Ardstraw. The route crosses the lower reaches of the Derg close to the confluence. The upper reaches of the catchment, which is approximately 440km2, are characterised by peatlands, while the lower reaches flow predominantly through farmland. The main stream length of the River Derg is 53km. Within the vicinity of the Proposed Scheme the River Derg is a transitional (piedmont) river characterised by a well-developed valley, reasonably large floodplain and variable substrate with riffle and pool sequences.

The River Strule forms the upper section of the main spine of the Foyle Catchment, and has a catchment area of 1340km2. The Strule is formed by the confluence of the Camowen and Drumragh rivers in the centre of Omagh. The Strule then flows northwards for approximately 21km before merging with the River Derg to form the Mourne. The entire length of the Strule runs parallel to the route. The Strule has two major tributaries, the Owenkillew which joins the Strule from the east at Newtownstewart and the Fairy Water which joins to the north of Omagh. As the proposed route passes to the west of Newtownstewart the Owenkillew is unlikely to be affected by the proposed road scheme. The route does cross numerous small stream tributaries on the western slopes of the Strule valley. The Strule is a transitional river with variable bed materials, riffle and pool sequences, an



unconfined valley and floodplain. The catchment is predominantly agricultural, although peat bog is present in the upper reaches of the large tributaries and sand and gravel quarrying is present in the Strule valley, particularly north of Newtownstewart.

The Fairy Water rises on the slopes of Bolaght Mountain in west Tyrone and flows eastwards to its confluence with the River Strule to the north of Omagh. It has a catchment area of 180km2 and a main stream length of 30km. The catchment is predominantly agricultural grassland; however there are significant areas of peat throughout the catchment, particularly in the valley floor. The Proposed Scheme crosses the Fairy Water approximately 500m upstream of its confluence with the Strule. In this area the river is approximately 16m wide and has typical transitional characteristics with a meandering channel pattern and riffle and pool sequences.

The Drumragh River lies in the upper reaches of the Foyle Catchment and is formed to the south of Omagh by the confluence of the Ballynahatty Water and Quiggery Water. It has a catchment area of 321km2. The Drumragh flows generally north through the centre of Omagh before merging with the Camowen to become the River Strule. The route crosses the Drumragh approximately 2.5km downstream of the Ballynahatty-Quiggery confluence. At this point the river is approximately 10-15m wide and has typical transitional characteristics with variable bed material, riffle and pool sequences and an unconfined valley and floodplain. Due to the nature of the topography in the Drumragh catchment there is an intricate dendritic drainage network, with a large number of tributary streams. The route skirts around the eastern extent of the upper Drumragh catchment, crossing a number of small streams / large field drains within the Routing Burn and Eskragh Water subcatchments. Many of the streams have been straightened or otherwise modified, with the exception of the Routing Burn main stream length, which is largely unmodified.

The Camowen River rises in the hills to the west of Pomeroy and flows westwards to Omagh, where it joins with the Drumragh to form the River Strule. It has a catchment area of 276km2. The Proposed Scheme passes through the western extent of the Camowen watershed, crossing the headwaters of a minor tributary to the Camowen River, namely the Ranelly Drain. These headwaters generally rise in the low lying peatlands which have formed between the drumlins that characterise the area. The reaches that the route pass over range from small semi-natural streams a few metres wide with good flow to very narrow ditches with limited flow.

The River Blackwater rises to the west of Fivemiletown and flows eastwards to Aughnacloy then north-east to Lough Neagh. It has a catchment area of 1493km2. The Proposed Scheme crosses the eastern part of the Upper Blackwater catchment, passing through the major tributary sub-catchments of the Roughan Burn and Ballygawley River, before terminating on the northern bank of the River Blackwater immediately south of Aughnacloy.

The Roughan Burn rises on the southern slopes of Slievemore and flows south through Ballymackilroy before joining the River Blackwater downstream of Augher. It



has a catchment of 27.02km2. Where the Proposed Route is crossed by the Roughan Burn it is a small, shallow stream with gravel and cobble bed. Although this reach is generally unmodified the lower reaches have been extensively straightened.

The Ballygawley Water rises on the slopes of Eshmore Hill approximately 12.5km northeast of Ballygawley. It has a catchment of 53.25km2. The river flows through the town before joining the river Blackwater at Lismore Bridge, approximately 6km downstream. The Proposed Scheme crosses the Ballygawley Water approximately 2km downstream of the town. At this point the river is approximately 10m wide with a shallow cobble and gravel bed.

2.3 Environmental obligations of the project during construction phase

The surface water management plan and pollution prevention measure installed as part of the A5WTC will be constructed using best practice and in conformance with the requirements of NIEA and other relevant governing bodies. The key legislation and guidance which will be adhered to are as follows:

- Water Framework Directive (Directive 2000/60/EC)
- Water (Northern Ireland) Order 1999
- Water abstraction and impoundment regulations (licensing) Northern Ireland 2006
- Groundwater regulations (Northern Ireland) 1998 (as amended)
- Control of pollution (oil storage) regulations (Northern Ireland) 2010
- Drainage (Northern Ireland) Order 1973 (as amended)
- Environmental Liability (Prevention and Remediation) Regulations (Northern Ireland) 2009
- Pollution Prevention Guidance Notes (PPGs):
 - PPG01 General guide to the prevention of water pollution
 - PPG02 Above ground oil storage tanks
 - PPG05 Works in near or liable to affect watercourses
 - PPG06 Working at construction and demolition sites
 - o PPG07 Refueling Facilities
 - PPG11 Preventing pollution at industrial sites
 - PPG18 Control of spillages and fire fighting run-off
 - o PPG20 Dewatering underground ducts and chambers
 - o PPG21 Pollution Incident Response Planning
 - o PPG23 Maintenance of Structures over Water
 - PPG26 Pollution Prevention Storage and Handling of Drums & Intermediate Bulk Containers
- CIRIA Report C502 Environmental Good Practice on Site



- CIRIA 521 Sustainable Urban Drainage Systems; Design Manual for Scotland and Northern Ireland
- CIRIA Report C532 Control of Water Pollution from Construction Sites
- CIRIA Report C648 Control of Pollution from Linear Construction Project. Technical Guidance
- CIRIA Handbook C650 Environmental good practice on site
- CIRIA Handbook C651 Environmental good practice on site checklist
- CIRIA Report C697 The SUDS Manual

2.4 Silt Management

Contamination by silt from site run off into adjoining water courses is a key risk for this Project if not properly controlled throughout the construction of the Scheme.

Site discharge licences will be required from NIEA prior to works commencing. Any application for such consent must clearly state how site run off with be managed, treated and returned to the water course.

Site run off is made up of two components and are the direct results of heavy rain.

The first component is run off from adjoining land that is not affected by the works. Run off from adjoining land would be intercepted by the early construction of Preearthwork drained ditches (PED). This will be one of the first earthwork operations. Where the new road is in a cutting then the PED would be located at the top of the cut any water entering this ditch would be run off from adjoining land thus would not need treating.

The second component is run off across the works once the topsoil strip has been completed, this could be any of the following:

- Run off across topsoil strip
- Run off down embankment cuttings
- Run off down embankments being constructed.

2.5 General Construction Policies

The Silt Management Plan has been developed to minimise and mitigate for the effects of pollution to all local watercourses. However, this does not remove environmental responsibilities from the contractor / sub-contractors. All site personnel should be made aware of their environmental responsibilities through the production of this Construction Method Statement and an environmental induction.

In accordance with BS6031: 1981 Code of Practice for Earth Works, land disturbance will be kept to minimum and disturbed areas will be stabilised as soon as possible. Soil handling will be undertaken with reference to best practice guidelines.

In general the following will be adhered to in terms of the general Earthworks:

All roads will be kept free from dust and mud deposits.



- Areas of extraction and deposition will be carried out according to BS6031:1981 Code of Practice for Earth Works. Risk assessment will be evaluated to ensure all surface water will be appropriately treated prior to entering a discharge point.
- Any clean surface water not directly linked to a watercourse will be dealt
 with in the appropriate manner and field drainage introduced to the
 nearest stream before work begins.
- Retention ponds will be dug out first. These retention ponds will form part of the permanent SUDS and will be used during the construction period to deal with any surface water and act as sedimentation control.
- Trapezoidal-ditches will be dug out where required to channel any surface water from haul roads into these retention ponds. These will be to minimal gradient and if required straw bales or clean stone will be installed to act as weirs.
- Cut-off drains will be installed around the working areas to intercept uncontaminated surface runoff and divert it around and away from the works; surface water runoff may also be diverted around the excavations using heavy timbers or similar laid on the surface of the ground.

2.6 Installation Programme

At all times silt management features should be constructed prior to, or at the same time as the construction of the works. Before runoff is allowed to flow through the ditches, or across embankments scrutiny must be given by the contractor that the ditches, ponds slopes and embankments are fully stabilised and will not be affected by erosion. This will prevent the clogging of other parts of the system by the silt that is generated.

2.7 Working in the vicinity of water / Buffer zones

The following recommendations apply to the general construction activities either with the watercourses or in the vicinity of watercourses:

- Where practicable construction near streams should be avoided in wet weather.
- Keep cement and raw concrete out of watercourses.
- Plan so that roadside drains do not discharge directly into watercourses, but rather through a vegetated buffer area of adequate width.
- Runoff from excavations will NOT be pumped directly to watercourses.
- Should there be any incidents of pollution to the watercourses NIEA should be notified immediately. Immediate steps will be undertaken to resolve the cause of the pollution and where feasible mitigate against the impact of pollution, following the advice set out in PPG21.

2.8 Temporary Haul Roads

It is proposed that as the scheme progresses, the finished permanent roads will act as the temporary haul roads during the construction phase.



- Construction activities will be scheduled to minimise the area and period of time that soil will be exposed, particularly during winter periods.
- Cut-off drains will be installed around the working areas to intercept uncontaminated surface runoff and divert it around and away from the works.
- Stockpiling of materials will be minimized and essential stockpiles will be located as far away as possible from watercourses.
- Drains and culverts will be kept clear of debris and silt traps will be maintained appropriately. Spoil will not be dumped within buffer areas.
- Erosion of embankments will be avoided and, where possible, a vegetation cover will be maintained.
- Roads, drains and silt traps will be inspected for damage after intense storms and also before and after any intensive use.
- Site roads and approaches to river crossings will be regularly brushed or scraped and kept free from dust and mud deposits. Rubble slumps will be introduced prior to road crossings.

2.9 Settlement Ponds

Where possible, permanent SUDS pond locations will be used during the temporary construction phase to collect silt. At completion of the construction phase the settlement ponds will be fully reinstated to final design requirements.

Site run off will be intercepted by PED and the ditches will feed into temporary balancing ponds. Straw bales will be placed along the length of the ditch to help early removal of silt.

The ponds will be a minimum of 20m x 10m x 3m deep so that the pond can store approximately 500m3. The maximum precipitation on a 1 in 75 year rainfall has been used in the storage calculations. An example of the calculations is attached in Appendix C.

The strategy is to collect the silt contaminated run off at the temporary pond locations, allow the silt to settle and gravity feed the pond water back into the watercourse.

The outlet will be set at a higher level in relation to the inlet so that the pond fills up and allows the silt to settle.

Construction waste materials such as generated silts will be disposed of in such a manner that it does not add risk of additional silt load in the construction run-off.

Settlement ponds will be inspected for damage after intense storms in particular at the entry point and around the forebay area.



In most instances the works will only be affected by normal rain showers and thus operations would stop. Following heavier rainfall events the trace will be allowed to dry before recommencing earthworks operations.

2.10 Exposed Ground and stockpiles

As part of the surface water management plan for the site the following measures have been incorporated for spoil management areas.

- The amount of exposed ground and soil stockpiles will be kept to a minimum.
- Stockpile which will be in place for an extended period of time will be allowed to re-vegetate naturally.
- Short term stock piles will be sealed.
- Cut-off trenches will be installed uphill of spoil management areas to divert flows away from potential sources of silt pollution.
- Silt fences made from a suitable geotextile material will be used alongside all exposed ground where there is a pollution risk. Areas on a steep gradient will be managed to make sure erosion does not take place and small ditches will be considered around the perimeter.

2.11 Excavations

Every effort will be made to prevent water from entering excavations. Cut off ditches will be used to prevent entry of surface water. Clean runoff within the cut off trenches will be discharged back into the natural drainage system.

2.12 Over Pumping

Over Pumping will be avoided for construction of culverts within this scheme wherever possible.

Where over pumping is essential, no direct discharge to the existing watercourse will be permitted. Water from the over pumping operation will pass through a stilling pond and a settlement pond before being discharged to the receiving watercourse.

Any over pumping that may be required for other works such as below ground excavations will be strictly controlled by the on-site Environmental Manager using a 'permit to pump' system and regular monitoring of compliance with control measures.

All pumping operations will ensure that the pumps are sited a minimum of 15m away from the water course, drip trays or lined bunds are used to avoid accidental spillage. Spill kits will be located at the pump locations.

All over pumping would be undertaken using the one of the methods outlined below:

 Water pumped into a silt tank will allow any silt to settle before being gravity fed back into the watercourse downstream of the works back into an approved discharge location.



 Water pumped into the PED which incorporate mitigation measures such as check dams and silt traps which would make its way to a settlement lagoon allowing sediment to settle before water is discharged back into an approved discharge location.

If heavy rain was encountered which could result in flood upstream of the works then over pumping and construction operations will be stopped and the works will be allowed to re-fill with water.

2.13 Plant Crossings

In Salmonid catchments, all in stream works will be carried out during the months of May to September inclusive.

In Brook/Sea Lamprey catchments, all in stream works will be carried out during the months of September to March inclusive. It is intended that culverts that are piped in the permanent solution will be piped using the permanent diameter pipe size as a temporary crossing during this 5-7 month timeframe.

Crossing that are required outside of the windows listed above will require a temporary bridge crossing which will span the top bank of the existing watercourse. Precast concrete abutments will be used in order to mitigate the risk of contamination of the watercourse using concrete. The bridge will use steel beams to span the watercourse and precast concrete planks. Details are contained within Appendix D.

2.14 Sampling

A programme of water monitoring will be carried out during the construction phase. The extent and frequency of the monitoring will be proportionate to the level of activity. Such monitoring will be required in order to:

- Demonstrate that the mitigation measures and surface water management plan is performing as designed;
- Provide reassurance that the in-place mitigation measures are not having a significant impact upon the environment;
- Indicate whether further investigation is required and, where any risks are unacceptable, the need for additional mitigation measures to prevent, reduce or remove any impacts on the water environment.

This monitoring will commence prior to the start of work activities to establish the baseline conditions at each work site.

The surface water-monitoring programme will be site-specific and tailored to provide a meaningful and pragmatic indication of the state of the water environment. Given the nature of the development, it is considered that the surface water monitoring programme will comprise:

 An initial site walkover to establish base line conditions and identify watercourses which are presently polluted from silt deposition or any other waterborne pollutants.



- Regular visual inspections of surface water management features, such as culverts and receiving watercourses, in order to establish whether there is increased erosion or deposition and sediment.
- Regular visual inspections of watercourses during construction and decommissioning stages, particularly during periods of high rainfall, in order to establish that levels of suspended solids have not been increased by site activities.
- Periodic and ad-hoc sampling of surface waters and private water supplies in order to complement the programme of visual inspection.
- Additional monitoring required as a condition of discharge consents, abstraction licences or other environmental regulation.

All subsequent monitoring results will be compared with the baseline data-set to identify any impacts of the development on the surface water environment and to identify the requirement for any appropriate remedial measures. The impacts of the development will be deemed acceptable if there is no significant net deviation from the baseline monitoring results.



3 Flood Defences

For works that affect any existing flood defences a secondary defence will be constructed prior to the removal of the existing defence.

No works will be allowed to take place that affects flood defences without prior approval from the Rivers Agency and NIEA.



4 Monthly Reporting

NIEA, Rivers Agency and Loughs Agency are all key stakeholder on this project and will be part of the monthly stake holder meetings. These meetings will review the last months work, discuss the following months works and discuss and lessons learnt. As part of this forum contractors will submit their monthly work schedule, two monthly rolling programme which clearly show the works areas for the following month their anticipated discharge rates. These will be based on the works area affected and the potential of a 1 in 75 year storm event happening.



Appendices



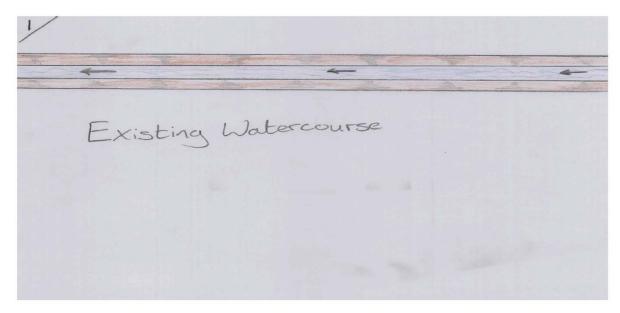
Appendix A – Scheme Alignment

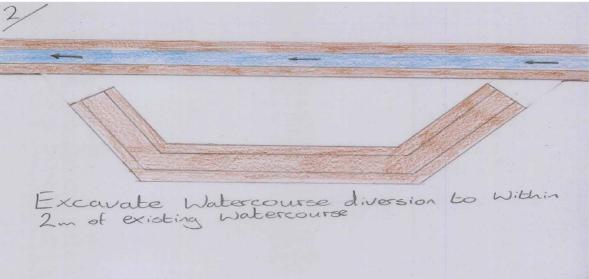
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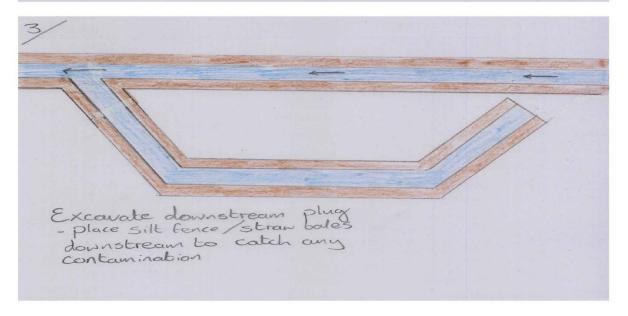


Appendix B – Example Watercourse Crossing Construction Method Statement

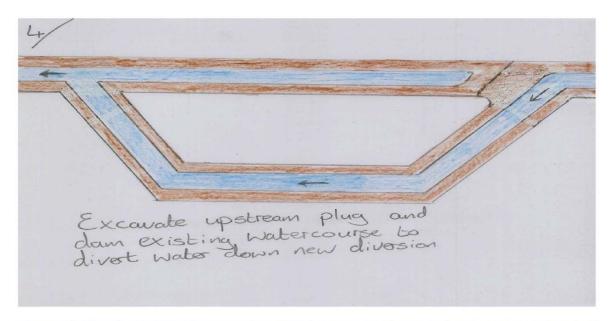


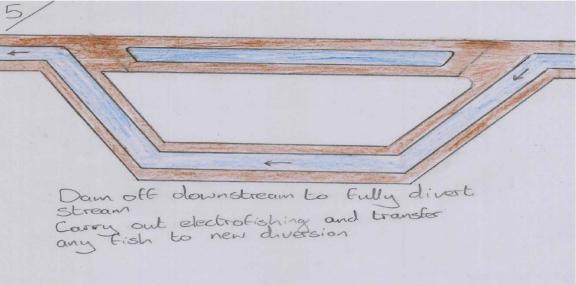


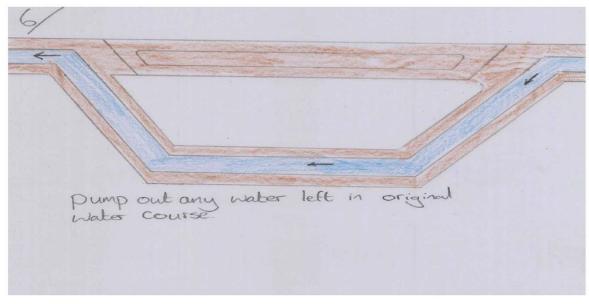




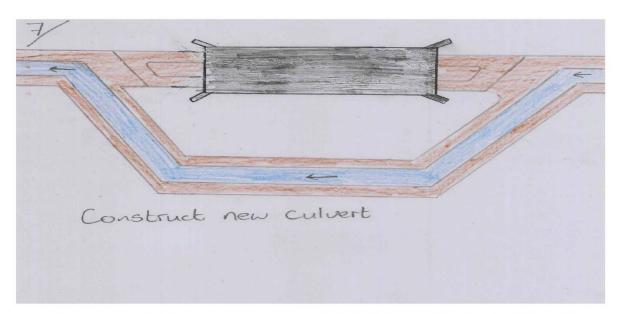


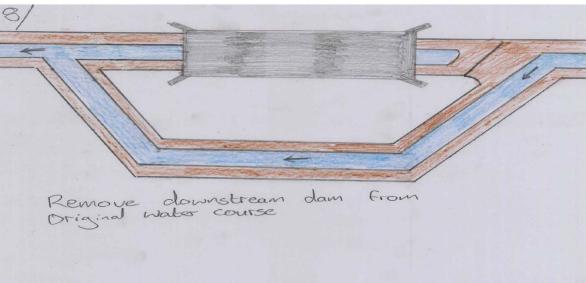


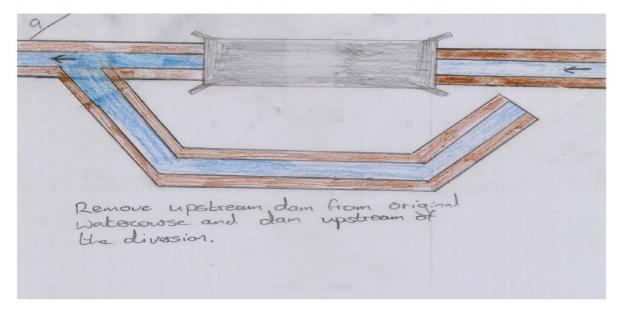




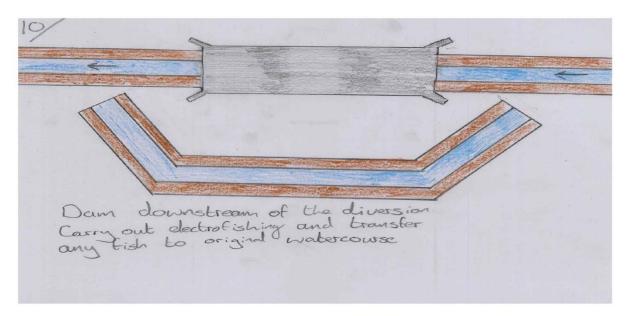


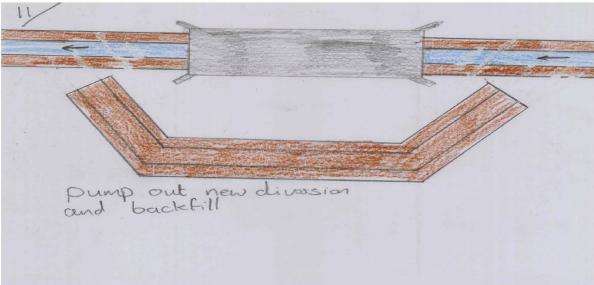
















Appendix C – Example Temporary Retention Pond Calculations

October 2011 Values Copiad for Issue in ASV/TC_S1_SCH_05_00407 Rev June 2012 - Jurfall waterccurses identified 5082906/151/ISI

Schedule of Mainline Ditches

UKGBNISNW250010 UKGBNISNW250010 UKGBNISNW250010 UKGBNISNW250010 UKGBNISNW250010 WFD Waterbody ID Gortin Hall Drain/ River 2 Blackstone Burn Unreferenced UD 0.1/-UD 0.4/-UD 0.2/ Outfall Watercourse Copos te a N'bound earthworks to R Foyle at S1 OF: 25 Bi ackstone Burn Diversion ID S1-WD-03 Olh 3480-3740 drains through rise in ground Gortin Hall Drain - Diversion ID S1-W3-16 Diunnalong Road, Diversion ID S1-WD-05 Unreferenced watercourse at Ch 5595. Baltybeeny Road /i a N'bound earthworks to R Foyle //a N'bound earthworks to R Foyle River Fcyle va Mainline dranage River Fcyle va Mainline dranage River Fcyle at Ch 1030 Diversion ID S1-WD-01 Diversion ID S1-WD-02 Cum. Design Flow (I/s) In 75yrp 173 144 115 185 120 219 221 111 96 lirect to drain on Shound side. Pipe beneath side road ired to watercourse on S'bound side
aross carriageway to N'bound earthworks or separate To Mainline or N'bound earthworks
Direct to watercourse (Gortin Hall Drain) on S'bound and drains direct to watercourse (Gorlin Hall Drain) lirect to watercourse (Gorlin Hall Drain) on S'bound Direct to watercourse on S'bcund side
Thest to watercourse on S'bcund side
Toss carriageway to N'bound earthworks
Cross carriageway to N'bound earthworks. Includes nes with side road drainage to decharge to verted watercourse onbines with above to discharge to diverted Gross carriageway to separate outfall Direct to vaterourse or Shound side Land drains direct to watercourse of Direct to watercourse of Direct to waterocurse or Shound side Cross carriageway to Nbound earthworks tercourse llector ditch includes flow from side road Notes intribution from side road Design Flow (I/s) 1 in 75yrp 143 130 104 28 65 82 4 55 42 6 49 S'bound side 0.278 908.0 0.482 0.944 0.307 0.211 0.787 0.101 1.422 Contributing Area Nbound 1960-2120 2120-2286 2285-2400 3480-3740 4670-5040 2400-2480 2480-2825 3740-3860 3860-3935 3740-3935 5400-5595 Chainage 2480 î Calchment Mainline 23 4 ĸ LO. NO. 9 2

A5 WTC Mainline PED

0.75m

12.50%

Earthworks impermeability = V before lining (m/s) = Depth of ditch = Nominal drainage provision FAPAntingMainline PED Calchments Summary 1910/1/Summary

Direct to drain on Shound side

69

0.445



5082906/15/1/ISH October 2011 Values Copied for issue in ASVITC_S1_SCH_05_00407 Rev June 2012 - Outfall watercourses identified

Schedule of Mainline Ditches

A5 WTC Mainline PED

| | | WFD Waterbody ID | | UKGBNI5NWZ50010 | | | | | | | | | UKGBNI5NW250010 | | | | | | | | | | | | UKGBNI1NW010101070 | | |
|----------------------------------|------------------------------|------------------|--|--|---|---|---|--|---|---|--|---------------------------------------|--|---|--|---|-----------|----------------------------------|---------------------|---|--------|--|---|-----------------------------|-----------------------------|-------------------------|---|
| | | Watercourse ID V | | UD_05/ River 4 U | | | | | | Bready Village | watercourse/culvert | | UD_07 / River 4 U | | | | | | | | | Burn Dennet | | | Ballydonaghy Drain | -/ | |
| | Outfall Watercourse | Description | The state of the s | Diversion ID S1-WD-06. Subject to further detail as deesign for Bready Cut is developed | | | | | | To Bready Village watercourse/culvert S1 OFS: Donagheady Road 3 / Bready Cut Accommodation. | Ch7835-8245 split 2:1 to north and south respectively. Subject to further detail as design for Bready Cut is | developed. | Diversion ID S1-WD-07. Ch7835-8245 split 2:1 to north and south respectively | | | | | | | | | Burn Dennet S1 OF: 11 | | | Disconsistent ID 64. MPL 08 | | |
| | Cum. Design Flow (I/s) | | | 637 | | | | | | | 638 | | 78 | | | | | | | | | 342 | | | 27 | | |
| | Notes | | Direct to watercourse on S'bound side | Alternative with drainage from 6340-6475. At detail design split between draining to watercourse and side road | At detail design spilt between draining to watercourse and side road drainage | Alternative with drainage from 6475-7055 and crosses Victoria Road | Crosses Victoria Road to connect to 5800-6340 | Alternative - connect to drainage in 6340-7055, "Cascade" down slope. | Connect to Mainline carriageway to ponds to north. "Cascade" down slope | Pipe beneath Mainline to discharge to new ditch. (Nom ditch length for grad) "Cascade" down slope | Pipe beneath Mainline to discharge to new ditch. | Direct to watercourse on S'bound side | Direct to watercourse on S'bound side | Connection to Mainline carriageway or N'bound toe of batter - see drg | Culvert beneath Victoria Road to Low Point at Ch9215 | Subsidiary ditch between side road and Mainline to drain side road and batter. Culvert under side road. | | Pipe from Low Point at Ch9215 to | Drains to 9600-9770 | Includes flow from 9600-9770, and Low Point at Ch9215 | | Pipe from Low Point at CH10015 to watercourse. Includes flows from Ch9770-10015 and Ch 10015- 10190. Could be twin 525Ø or triple 450Ø | Land falls away from road to watercourse. Nom. earthworks drain | Ditch direct to watercourse | Ditch direct to watercourse | Ditch direct to culvert | Upslope intercepted by Victoria Road. Nom. earthworks drain |
| Dasion | Flow (l/s) 1 in 75yrp | | 25 | 612 | 158 | 454 | 137 | 317 | 317 | 142 | 396 | 151 | 28 | 19 | 133 | 0 | 38 | 171 | 18 | 279 | 19 | 298 | 0 | 44 | 11 | 16 | 0 |
| eable ng Area | S'bound side | (ha) | 0.149 | 906'0 | 906'0 | 0.778 | 0.778 | 2.76 | 2.76 | 979.0 | 3.51 | 1.27 | 0.183 | 0.37 | 1.203 | 0 | 0.306 | 0 | 0.118 | 0.315 | 0.13 | 0 | 0 | 0.218 | 0.074 | 90.0 | 0 |
| Impermeable Contributing Area | N'bound Side | (ha) | | | | | | | | | , | | | | | | | | | | | × | | | | | |
| | Chainage (m) | | 5750-5800 | 5800-6340 | 5800-6340 | 6340-6475 | 6340-6475 | 6475-7055 | 6475-7055 | 7055-7340 | 7340-7835 | 7835-8245 | 8245-8485 | 8485-8800 | 8800-9150 | 8800-9150 | 9150-9500 | 9215 | 9500-9600 | 9770- | 10015- | 10015 | 10190- | 10500- | 11000 | 11000- | 11220- |
| | Mainline Catchment Ref | | 5 | | so. | 9 | 5 | 10 | 9 | 63 | 69 | 69 | 99 | 6b | 99 | 6b | | 7 | 1 | | 7 | 7 | 7 | 80 | 00 | 00 | 8/8 |

F:\Printing\Mainline PED Catchments Summary 191011Summary



5082906/15/1/SH October 2011 Values Copied for issue in ASWTC_S1_SCH_05_00407 Rev June 2012 - Outfall watercourses identified

Schedule of Mainline Ditches

| | | WFD Waterbody ID | |
|----------------------------------|---|------------------|---|
| | tercourse | Watercourse ID | Unreferenced |
| | Ouffall Watercourse | Description | Unreferenced watercourse on N'bound side at Ch12047 |
| | Cum. Design Flow (i's) | 11110316 | 06 |
| | Notes | | th Mainline to watercourse on N'bound |
| | | | Culvert beneath Mainti |
| Deelm | Flow (i/s) 1 n 75yrp | | - 03 |
| 99 | - | (ha) | Culvert benea |
| Impermeable Contributing Area | Nbound S'bound (1/8) Side side 1 n 75yrp | (ha) (ha) | 90 Culvert benea |
| 99 | S'bound 1 | | 90 Culvert benea |

A5 WTC Mainline PED



5082906/15/1/SH October 2011
Values Copied for issue in ASWTC_ST_SCH_05_00407
Rev June 2012 - Outfall watercourses identified

Schadule of Mainline Ditches

| | | Contrbu | Impermeable Contributing Area | Doelon | | | | | |
|------------------------------|-----------------|-----------------|----------------------------------|-----------------------------|-----------------------------|---------------------------------|---|--------------------|------------------|
| Mainline Catchment Ref | Chairage (m) | N'bound Side | S'bound side | Flow (I/s) 1 in 75yrp | Notes | Cum. Design Flow (I/S) | | Cuffai Watercourse | |
| | | (ha) | (ha) | | | 1 in 75yrp | Description | Watercourse ID | WFD Waterbody ID |
| 10 | 12225- | 10 | 0.412 | 62 | Ditch direct to watercourse | 62 | Unreferenced watercourse ay Ch12370 | Uhreferencad | |
| 10 | 12370- | . 1. | 1.081 | 140 | Ditch direct to watercourse | 140 | To upstream end of Culvert S1-PC-10. | | |
| 10 | 12585- | | 0.484 | 73 | Ditch direct to watercourse | 403 | Disamount Disam | Gleemornan River | |
| 10/11 | 13010 | r | 0.194 | 30 | Ditch direct to watercourse | | 200 | | |
| 11 | 13010- | F. | 0.402 | 22 | Ditch direct to watercourse | 29 | To upstream end of culvert adjacent to S1 OFS: Greenlaw Road 1 | | |
| 11 | 13290- | 19 | 0.199 | 33 | Ditch direct to watercourse | 33 | To watercourse adjacent to Park Road | | |

A5 WTC Mainline PED



| | Impermeable Contribution Area | neable ing Area | | | | | | |
|------------------|----------------------------------|--------------------|---------------------------------------|---|---------------------------------|--------------|---------------------|-----|
| Chairtage (m) | N'bound Side | Stbound | Design Flow (/s) 1 ir 75/rrp | Notes | Cum. Design Flow ((s)) | 5 | Cuffall Watercourse | |
| | (ha) | (ha) | | | 1 in 75yrp | Description | Watercourse ID | |
| 13500- | , | 0 | 0 | Land generally flat with ex watercourses, falls from Mainline or intercepted by ex road. Nom earthworks orain | | | | |
| 18180 | | 0.15 | 24 | Ditch direct to watercourse | | | | |
| 18370 | 4, | 0,232 | 31 | Ditch to connectivity culvert then pipe to watercourse | | | | |
| 370- | , | 0,507 | 69 | Ditch to connectivity culvert then pipe to watercourse | _ | | | |
| 370 | , | 0 | 90 | Pipe from ditches to watercourse | | P | | |
| 13680- | ě. | 0.111 | 12 | Ditch direct to watercourse | | bjeşe | | |
| 235 | | 0 | 0 | Houses back onto Mainline. Nom, earthworks drain | | g cour | | |
| 19235- | r | 0.106 | 15 | Ditch direct to watercourse | | υος λε | | |
| 19575- | | 0 | o | Picked up by side road drainage | | node | | |
| 360 | | 0 | 0 | Land falls away from Maintine in cutting | | motn | | |
| 425 | | 0.038 | 6 | Trapped at crest of cutting - connect to Mainline | | я шедг | | |
| 125- | | 0 | 0 | Land falls away from Mainline. Check reinstatement levels for ex pond/quarry. Nom. dramage provision | | 3 O | | |
| 23890- | 4 | 0 | 15 | Land falls away from Mainline. Ditch required to convey flows from higher catchments to watercourse | | chon | | |
| 190- | | 0.029 | 50 | Also conveys flows from higher catchments | _ | ոս է ե | | |
| 21260- | ¥. | 0.031 | 45 | Also conveys flows from higher catchment. Culvert beneath side road may not be required if side road is stopped up. | | uo o o o o o | | |
| 380- | 4 | 0.282 | 38 | Head of run flowing N'bound. Culvert bereath side road | | : PE0 | | |
| 320- | 1 | 0.562 | 7.3 | Ditch to diverted watercourse | | ant. | | |
| 22000- | | 0,316 | 82 | Ottch to diverted watercourse. Also conveys flows from higher catchment | | | | |
| 290- | ii. | 0.126 | 22 | Head of run flowing N'bound. Culvert beneath side road | | | | |
| 22480- | * | 0,363 | 19 | Connects to Section 2 PED, or separate outfall to watercourse (not included) | | | | - 1 |



S082906/151/ISH Ccober 2011 Values Copied for issue in ASWTC_S1_SCH_05_004(7 Rev_Lune 2012 - Oufall watercourses identified

Schedule of Mainline Ditches

As WTC Mainline PED

| Contributing Area Destire | (m) Side side 1 in 75yrp Notes | (ha) (ha) | Northbound Side | 0 0 | 2 | 0 | 4940-8590 0 - 0 Land falls away from Mainline. Nom. toe of batter drain | 0 . 0 | 6700-7200 0 - 0 Land falls away from Mainline. Nom, toe of bund drain | 7200-7300 0 - 0 Land falls away from Mainline. Nom. toe of batter drain | 7300-7825 5.412 - 43 Land direct to new ditch at toe of batter 7825-8145 5.502 - 93 Vie ditch to new ditch at toe of batter | 0 - 136 | 8145-8230 0 - 0 Land falls away from Mainline. Nom, toe of batter drain | 8230-8430 0 - 0 Land falls away from Maintime in cutting 8430-8890 0 Land falls away from Maintime. Nom, los of bund drain | 0 - 0 | 9970- 0.02 - 6 Trapped against Maintine. Effect of wc div culvert? | 10260 0.45 - 59 Ditch with pipe to watercourse | 10280- 0 - 0 Land falls away from Mainline. Nom. toe of batter drain | 0 - 0 Land falls away from Mainline in cutting | 10790- 3.043 - 11 Ditch direct to watercourse | 0 Land falls away from Mainline. Nom. toe of batter drain | 1355- 0 - 0 Land falls away from Mainline in cutting | 2300- 0 Land falls away from Mainline. Nom. toe of batter drain 14160 | 14340 0 - 0 Land falls away from Mainline in cutting | 4340- 0 Land falls away from Mainline. Nom, toe of batter drain | |
|----------------------------|---------------------------------|------------------|-----------------|-----|---|---|---|-------|---|---|---|--|---|--|-------|--|--|--|--|---|---|--|---|--|---|--|
| | Oum. Design Flow (1/s) | diversity of the | , i | - A | | | ain | | u) | nic | | 27.1 | in | Ę | in | 99 | 8 | sh | | 11 | H | | rie | | ule. | |
| | | Description | | | | | | 76 | | | To Bready Village watercourse/sulvert S1 OFS. Donagheady Read 3 / Bready Cut Accommodation. | Ch7835-8245 split 2:1 to north and south respectively. Subject to further detail as design for Bready Cut is developed. | X. | | | Burn Dennet S1OF: 72 or further downstream - subject | to further detail | | | Diversion ID S1-WD-38. | | | | | | |
| | Outfall Waterocurse | Watercourse ID | | | | | | | | | Bready Village | watercourse/culvert | | | | G mil | | | | Ballydonaghy Drain | | | | | | |
| | | WFD Waterbody ID | | | | | | | | | | | | | | | | | | UKGBNI1NW01010107070 | | | | | | |

Franking/Markine PED Catchmerts, Summary 1910; 1 Summary

Physicia Mainline PED Catchments Summary 1910118umnary

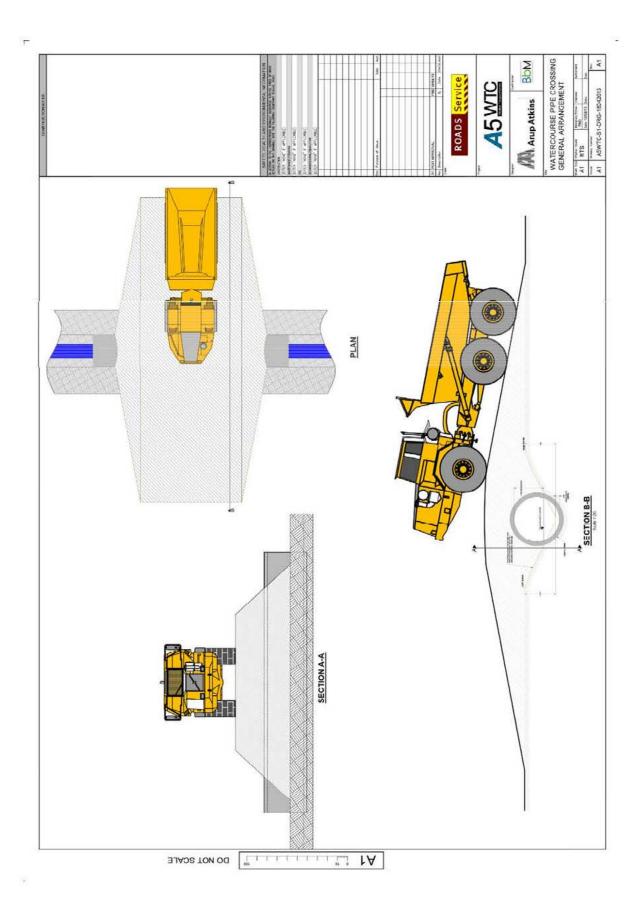


S082906/151/ISH
Cubber 2011
Values Copied for listue in ASV/TC, S1, SCH, 605, 0047;
Rev..une 2012 - Outfall watercourses identified WFD Waterbody ID Watercourse ID Outfall Watercourse This PED is beyond Junction 3. Outfall information not yet completed Schedule of Mainline Ditches Cum. Design Ficw (Vs) in 75yrp Ditch to convey flow from higher catchment. Then picks up side road and junction drainage. Conveys flow from higher catchment. Ditch cuts hrcugh ridge. Additional excavation regulred Conveys flow from higher catchment. At downstream and the ditch begins to run against gradient. Additional and falls away from Mainline. Nom. toe of batter drain and falls away from Mainline. Nom, toe of batter drain Ottch to convey flow from higher catchment and side oed. Lend is flat so ditch may also drain some of this Ditch from high point. Pipe beneath side road and falls away from Mainline in cutting Land falls away from Mainline in cutting and falls away from Mainline in cutting conveys flow from higher catchment Contributing area is conservative. No:es Ditch to watercourse by pond litch runs through junction Design Flow (//s) 239 239 188 278 278 8 32 0 32 Sbound Contributing Area ŧ Nabund 0.332 0,182 0.202 0.444 0.474 0.054 2.168 0 0 0 0 Chainage 20095-20893-E A5 WTC Mainline PED Mainline Catchment Ref 50 8 22 20 20 57 51 21 21

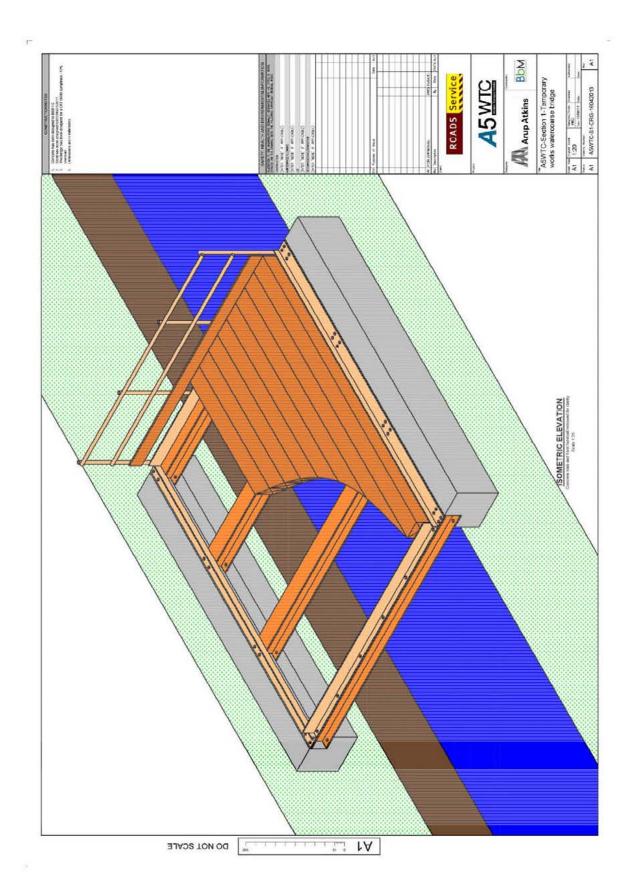


Appendix D – Watercourse Haul Road Crossing Details

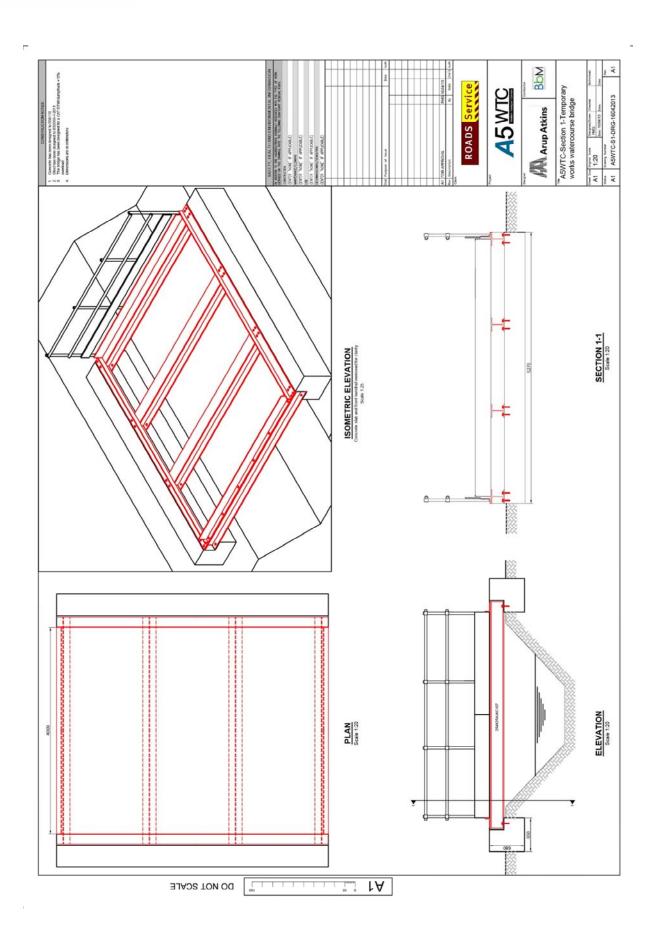










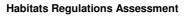




Appendix 7 – Otter Information

Table A7.1 Otter Survey Results

| Site No. | Watercourse ID | X coordinate | Y Coordinate | Access | Otter Presence |
|-------------|--------------------|-----------------|-----------------|-----------|-------------------|
| 0 | UD_01 | 240518 | 412322 | Partial | No |
| 1 | Gorton Hall Drain | 239812 | 411376 | Yes | No |
| 2 | UD_02 | 239465 | 410914 | Yes | No |
| 3 | Blackstone Burn | 239252 | 410747 | Yes | No |
| 4 | UD_03 | 238920 | 410338 | No access | - |
| 5 | UD_04 | 238895 | 410292 | No access | - |
| 6 | UD_04 | 238768 | 410106 | Partial | No |
| 7 | UD_05 | 237639 | 408918 | Yes | No |
| 8 | UD_06 | 237421 | 407999 | Partial | No |
| 9 | UD_07 | 237381 | 406518 | Partial | No |
| 10 | Burn Dennet | 236997 | 404327 | Yes | Yes |
| 11 | Ballydonaghy Drain | 237078 | 403823 | Partial | No |
| 12 | FD_04 | 236531 | 402429 | Yes | No |
| 13 | Glenmornan River | 236442 | 402331 | Yes | Yes |
| 14 | UD_15 | 233537 | 391077 | Partial | No |
| 15 | UD_19 | 234650 | 389867 | Partial | No |
| 16 | River Derg | 236058 | 387484 | Yes | Yes |
| 17 | Derg 0.3 | 236329 | 387560 | Yes | Yes |
| 18 | UD_20 | 237340 | 385896 | No access | - |
| 19 | Scotts Mill Layde | 238242 | 385396 | No access | - |
| 20 | UD_21 | 238940 | 385098 | No access | - |
| 21 | UD_22 | 239879 | 384715 | Yes | No |
| 22 | UD_23 | 240896 | 383873 | Yes | No |
| 23 | UD_24 | 241275 | 383339 | Yes | No |





| Site No. | Watercourse ID | X coordinate | Y Coordinate | Access | Otter Presence |
|-------------|---------------------|-----------------|-----------------|-----------|-------------------|
| 24 | UD_25 | 241363 | 383036 | Yes | No |
| 25 | UD_26 | 241477 | 382793 | No access | - |
| 26 | UD_28 | 241689 | 381979 | Yes | No |
| 27 | UD_29 | 241667 | 381791 | Yes | No |
| 28 | UD_30 | 241668 | 381630 | Yes | No |
| 29 | UD_31 | 241649 | 381478 | Yes | No |
| 30 | UD_32 | 241636 | 381256 | Yes | No |
| 31 | UD_33 | 241740 | 380881 | Yes | No |
| 32 | UD_34 | 241785 | 380691 | Yes | No |
| 33 | UD_35 | 241837 | 380399 | Yes | No |
| 34 | UD_36 | 241872 | 380267 | Yes | Yes |
| 35 | UD_37 | 241550 | 378531 | Partial | No |
| 36 | UD_39 | 241807 | 377996 | Yes | No |
| 37 | UD_42 | 241815 | 377387 | Partial | Yes |
| 38 | UD_43 | 241864 | 377081 | Partial | No |
| 39 | Tully Drain | 242597 | 375692 | Yes | No |
| 40 | Fairywater | 242786 | 374948 | No access | - |
| 41 | UD_48 | 242552 | 374012 | Yes | Possible |
| 42 | UD_49 | 242628 | 373688 | No access | - |
| 43 | UD_50 | 242835 | 372426 | No access | - |
| 44 | UD_52 | 243071 | 371960 | Yes | No |
| 45 | UD_53 | 243146 | 371807 | Partial | No |
| 46 | UD_54 | 243344 | 371521 | Yes | Yes |
| 47 | Fireagh Lough Drain | 243512 | 371284 | Yes | No |
| 48 | UD_55 | 243730 | 371086 | Yes | No |
| 49 | UD_56 | 244479 | 370513 | Yes | No |





| Site No. | Watercourse ID | X coordinate | Y Coordinate | Access | Otter Presence |
|-------------|------------------|-----------------|-----------------|-----------|-------------------|
| 50 | Loughmuck | 245084 | 369615 | Partial | No |
| 51 | Drumragh River | 245297 | 369442 | Partial | Yes |
| 52 | Freughmore Drain | 246057 | 369281 | Partial | Yes |
| 53 | UD_57 | 246718 | 369085 | Partial | No |
| 54 | UD_58 | 247174 | 369123 | Yes | No |
| 55 | UD_108 | 247324 | 368974 | Yes | No |
| 56 | UD_109 | 248168 | 367960 | Partial | No |
| 57 | Ranelly Drain | 248331 | 367700 | Yes | No |
| 58 | Ranelly Drain | 248589 | 367147 | Partial | No |
| 59 | Ranelly Drain | 248674 | 366568 | Partial | No |
| 60 | Ranelly Drain | 248717 | 366356 | Partial | No |
| 61 | Ranelly Drain | 248768 | 366170 | Partial | No |
| 62 | Ranelly Drain | 248867 | 366118 | Partial | No |
| 63 | UD_60 | 249283 | 365494 | Partial | No |
| 64 | UD_61 | 249862 | 364892 | Partial | No |
| 65 | Letfern | 250467 | 364031 | Partial | No |
| 66 | UD_63 | 251210 | 363325 | Partial | No |
| 67 | UD_65 | 251569 | 363033 | Partial | No |
| 68 | UD_66 | 251652 | 362851 | Partial | No |
| 69 | UD_67 | 252195 | 362129 | Partial | No |
| 70 | Routing Burn | 252386 | 361836 | No access | - |
| 71 | UD_68 | 252620 | 361504 | Partial | No |
| 72 | UD_69 | 252847 | 361179 | Partial | No |
| 73 | UD_70 | 253022 | 360887 | Partial | No |
| 74 | UD_70 | 253134 | 360597 | No access | - |
| 75 | UD_71 | 253365 | 359956 | Partial | No |





| Site No. | Watercourse ID | X coordinate | Y Coordinate | Access | Otter Presence |
|-------------|-------------------|-----------------|-----------------|---------|-------------------|
| 76 | LID 110 | 054005 | 250050 | No | |
| | UD_110 | 254305 | 358956 | access | - |
| 77 | UD_110 | 254846 | 358635 | Partial | Yes |
| 78 | UD_111 | 255558 | 357922 | Partial | Yes |
| 79 | UD_76 | 256325 | 357319 | Partial | No |
| 80 | UD_77 | 256579 | 357265 | Partial | Yes |
| 81 | UD_79 | 257225 | 357103 | Yes | No |
| 82 | UD_80.3 | 257784 | 356994 | Yes | No |
| 83 | UD_80 | 258802 | 356899 | Partial | Yes |
| 84 | Roughan | 259693 | 356576 | Yes | Yes |
| 85 | UD_81 | 259997 | 356564 | Partial | No |
| 86 | UD_81.2 | 261165 | 356316 | Partial | No |
| 87 | UD_82 | 262067 | 356307 | Yes | Yes |
| 88 | Ballygawley Water | 262369 | 356492 | Yes | Yes |
| 89 | UD_83 | 262251 | 356296 | Yes | No |





NIEA Agreed Otter Mitigation Procedure

<u>Introduction</u>

Two otter holts have been identified within the landtake of the proposed A5 WTC, with a further holt identified within close proximity of the works, in addition a number of couches or suspected couches have been identified within or in proximity to the landtake. Furthermore, a site with high potential for natal den presence has been recorded at Strabane Nature Reserve, this site could not be investigated fully due to density of vegetation, and thus a precautionary approach has been used in assessing potential impacts at this location.

This method statement has been created to avoid or reduce impacts of works at the specific locations where otter resting places are present and where suspected breeding is taking place. Further detail will be developed following pre-construction surveys and consultation with NIEA staff.

The confirmed otter holts within the landtake are at the Derg River (236185,387548) and along the Fairy Water (242717,374998). The confirmed holt close to the landtake is adjacent to Strabane Nature Reserve (233998,398502). The mitigation measures proposed are designed to safeguard otter during and following construction of the A5 WTC scheme, the measures intend to ensure that:

- Individual otter are not killed or injured during construction.
- No otter holt is damaged unnecessarily, and otters occupying holts are not harmed or disturbed.
- Where a holt must be removed for the construction works, adequate measures are taken to protect otters, and to replace the lost holt.
- Commuting and foraging otters within close vicinity of identified holts are not disturbed by construction works.

Pre-construction surveys Holts and couches

For the holts and couches a pre-construction survey will be undertaken at least 6 weeks prior to construction commencing within 100m of the site. The site will then be monitored on a weekly basis throughout the works. If otter are deemed to be present during the pre-construction survey, a licence will be required and detailed discussions with NIEA will be undertaken to determine the most appropriate course of action, including closure methods, and provision of replacement holts. The otter monitoring survey will use camera trapping to assess otter activity at each holt location. Camera traps will be set up and will then be visited on a monthly basis to collect data and maintain the camera traps. During these visits, the holts and immediate surrounding area will be surveyed for field signs of otter activity, such as otter spraints and footprints.

Strabane Nature Reserve potential natal site

For the potential natal site at Strabane Nature Reserve, a pre-construction monitoring survey for otter commenced in July/August 2016, more than 12 months prior to proposed construction work commencing. The otter monitoring survey is using camera trapping to assess otter activity at each holt





location. Camera traps were set up and are visited on a monthly basis to collect data and maintain the camera traps. During these visits, the holts and immediate surrounding area are surveyed for field signs of otter activity, such as otter spraints and footprints.

The data collected during the otter monitoring survey will be used to create update reports which will be issued to Northern Ireland Environment Agency (NIEA). Update reports will continue to be issued to NIEA once construction is underway.

Camera traps can look suspicious to members of the public. To prevent terrorism concerns arising from the public finding the camera traps, the local police have been informed of the camera trap study prior to camera traps being set up.

<u>Protection Measures – During Construction Holts and couches</u>

Prior to construction, a robust barrier will be erected to demarcate a 30m exclusion zone surround each otter holt or couch. This will exclude otters from the construction area and will protect otter holts and couches from damage by the works. This barrier can be in the form of a sturdy fence or an earth bund, but must be sufficient to restrict otters from entering the works area and restrict machinery from coming close to the otter holt or couch. This barrier will be maintained throughout the duration of the works.

Where a confirmed holt or couch cannot be avoided by the works a detailed method statement for closure of the resting place will be developed in consultation with NIEA, and a licence sought to permit the works. Mitigation measures in these cases will include provision of a replacement holt at the edge of the vesting line, or in a suitable location agreed with NIEA.

A toolbox talk will be provided to contractors prior to work commencing. The talk will be delivered by a suitably experience ecologist who will explain the legal protection afforded to otters, highlight sensitive areas within the construction area and discuss appropriate working methods to ensure otters are safeguarded.

An Ecological Clerk of Works will be appointed ahead of construction commencing. The Ecological Clerk of Works will undertake tasks including pre-construction site checks of areas close to otter holts and supervision of works. As a minimum requirement, the Ecological Clerk of Works will undertake weekly visits to the construction sites adjacent to otter holts and couches.

Works within 100m of otter holts and couches will be restricted to daylight hours to avoid the peak activity period for otter (which is after sunset and before sunrise). Artificial construction lighting will be avoided within this area. Trenches or excavations within 250m of the otter holt or couch will be covered at the end of every working day, or a ramp will be installed to ensure otters are not trapped within excavations. Removal of bankside vegetation within 30m of an otter holt or couch will be avoided unless unavoidable, in which case a licence will be sought from NIEA prior to such works commencing.

Construction works within close vicinity of rivers or drainage channels will be undertaken in accordance with best practice guidelines. This includes adherence to the methods and best practice described the





Pollution Prevention Guidelines (PPG)¹⁷ cooperatively developed by NIEA, the Environment Agency for England and Wales and the Scottish Environment Protection Agency (SEPA) for Scotland.

Strabane Nature Reserve potential natal site

If the site be confirmed as a natal site by pre-construction survey, no works will be undertaken within 150m of the woodland edge prior to NIEA granting a licence.

As otter cubs can remain within the natal site for up to 10 weeks, daily monitoring of the camera trap at the outfall of the small watercourse to the main river will be undertaken until cubs are recorded leaving the site and not returning.

At this point, sensitive clearance of the woodland vegetation which falls within the works area will be undertaken, minimising removal as far as possible. These works will be overseen by an Ecological Clerk of Works, following a careful search of the site, using non-powered hand tools to remove minimal vegetation to facilitate access to the site.

Once the vegetation has been removed a 1.8m high (minimum) close board fence will be erected along the edge of the remaining woodland.

Protection Measures - Post Construction Holts and couches

When construction is complete the otter fence/earth bund should be carefully removed. The 50m area of bankside directly surrounding each otter holt or couch, including areas that may have been disturbed during the works, will be re-planted with appropriate vegetation. Hawthorn will be planted in the area immediately surrounding each holt/couch/replacement holt. This will provide additional protection for and help to prevent future disturbance.

A post-construction otter monitoring survey will be undertaken for 18 months following construction completion to assess if the works have affected otter activity. The monitoring survey will follow the same methods used in the preconstruction monitoring surveys and data collected will be used within update reports which will continue to be issued to NIEA every three months. A final report will be issued to NIEA following completion of the monitoring survey.

Otter-proof fencing is to be installed along the boundary of the newly constructed A5 WTC to reduce the risk of road casualties from otters that are not accustomed to the new road. A 150m stretch of fencing will be installed at the edge of the TNI landownership, or in a location to be agreed with NIEA, on both sides of the road. Such fencing will tie in to an agreed otter crossing point.

Where the A5 WTC does not intersect the watercourse in the locations of the holts/couches, the fencing will be placed to rebound otters away from the road and prevent them from crossing it, and not act to direct them towards a specific crossing point. 58. 50mm wire mesh badger fencing will be used, as described in the DMRB (Volume 10, Section 1, Part 5, Chapter 9. This type of fencing will be robust

¹⁷ http://www.netregs.org.uk/library_of_topics/pollution_prevention_guides.aspx





enough to prevent the fence from being undermined by badgers and rabbits. The addition of a 300mm mesh overhang at the top, as described within DMRB is not seen as essential by Dr Paul Chanin, however it will be included if NIEA require it.

Strabane Nature Reserve potential natal site

Should evidence of otter breeding activity be confirmed by the preconstruction survey works, the close board fencing will be retained at this location, and maintained in perpetuity.

Landscape planting adjacent to the nature reserve will replace lost habitat over time, and serve to bolster the site's appeal to breeding otter.

Additional planting will be included around the adjacent SUDs pond to connect to the remaining portion of the Nature Reserve.

Landscape maintenance plans for this section of the landscape scheme will include notes on otter presence and measures maintenance contractors must take to prevent disturbance to otter at this location.





Appendix 8 – Designated Site Natura 2000 Standard Data Forms



NATURA 2000 STANDARD DATA FORM

FOR SPECIAL PROTECTION AREAS (SPA)

FOR SITES ELIGIBLE FOR IDENTIFICATION AS SITES OF COMMUNITY IMPORTANCE (SCI)

AND

FOR SPECIAL AREAS OF CONSERVATION (SAC)

1. SITE IDENTIFICATION

1.1. TYPE 1.2. SITE CODE 1.3. COMPILATION DATE 1.4. UPDATE

K IE0002301 200306

1.5. RELATION WITH OTHER NATURA 2000 SITES:

NATURA 2000 SITE CODES

IE0004057

1.6. RESPONDENT(S):

National Parks & Wildlife Service of the Department of the Environment, Heritage and Local Government. 7 Ely Place, Dublin 2, Ireland.

1.7. SITE NAME:

River Finn

1.8. SITE INDICATION AND DESIGNATION/CLASSIFICATION DATES:

DATE SITE PROPOSED AS ELIGIBLE AS SCI: DATE CONFIRMED AS SCI:

200306

DATE SITE CLASSIFIED AS SPA: DATE SITE DESIGNATED AS SAC:

2. SITE LOCATION

| 2.1. SIT | TE CENTRE | LOCATION | | | | | | |
|------------|------------|----------------|------------|-------------|-----------|-------------|---------------|---------|
| LONG | ITUDE | | | LA | TITUDE | | | |
| W 7 | 46 0 | | | 54 | 48 | 0 | | |
| W/E (G | Greenwich) | | | | | | | |
| 2.2. AR | REA (HA): | | | 2.3 | . SITE LI | ENGTH (KM): | | |
| 5501. | 79 | | | | | | | |
| 2.4. AL | TITUDE (M |): | | | | | | |
| | MINIMU | IM | N | MAXIMUM | | | MEAN | |
| | -2 | | | 400 | | | 150 | |
| 2.5. AD | OMINISTRAT | TIVE REGION: | | | | | | |
| NUTS | CODE | REC | GION NAME | | | | | % COVER |
| IE011 | | Bor | der | | | | | 94 |
| Marin | e area not | covered by a N | UTS-region | | | | | |
| 2.6. BI | OGEOGRAP. | HIC REGION: | | | | | | |
| | Alpine | Atlantic | Boreal | Continental | Ma | caronesian | Mediterranean | |
| | | ✓ | | | | | | |

3. ECOLOGICAL INFORMATION

3.1. HABITAT types present on the site and assessment for them:

ANNEX I HABITAT TYPES:

| CODE | %COVER | REPRESENTATIVITY | RELATIVE SURFACE | CONSERVATION STATUS | GLOBAL ASSESSMENT |
|------|--------|------------------|------------------|------------------------|----------------------|
| 7130 | 16 | В | С | С | В |
| 3110 | 16 | В | В | В | В |
| 4010 | 3 | В | С | C | С |
| 7140 | 1 | В | С | В | В |

3.2. SPECIES

covered by Article 4 of Directive 79/409/EEC

and

listed in Annex II of Directive 92/43/EEC

and

site assessment for them

3.2.a. BIRDS listed on Annex I of Council directive 79/409/EEC

| CODE | NAME | | POPULA | TION | | | SITE ASSESS | SMENT |
|------|-----------------------------------|----------|--------|-----------|-------|------------|--------------|-----------|
| | | Resident | | Migratory | | Population | Conservation | Isolation |
| | | | Breed | Winter | Stage | | | |
| A037 | Cygnus columbianus bewickii | | | 1-13 i | | С | В | С |
| A038 | Cygnus cygnus | | | <571 i | | В | В | С |
| A103 | Falco peregrinus | 2 p | | | | C | В | C |
| A098 | Falco columbarius | 1-2 p | | | | C | В | C |
| A140 | Pluvialis apricaria | | | 371 i | | С | В | С |

3.2.b. Regularly occuring Migratory Birds not listed on Annex I of Council directive 79/409/EEC

| CODE | NAME | | POPULA | TION | | | SITE ASSESS | SMENT | |
|------|--------------------|----------|--------|-----------|-------|------------|--------------|-----------|---|
| | | Resident | | Migratory | / | Population | Conservation | Isolation | |
| | | | Breed | Winter | Stage | | | | |
| A067 | Bucephala clangula | | | 133 i | | С | В | С | |
| A043 | Anser anser | | | <349 i | | В | В | C | |
| A050 | Anas penelope | | | 64 i | | C | В | С | |
| A052 | Anas crecca | | | 573 i | | C | В | C | |
| A053 | Anas platyrhynchos | | | 349 i | | C | В | С | |
| A061 | Aythya fuligula | | | 87 i | | C | В | С | |
| A067 | Bucephala clangula | | | 78 i | | C | В | С | |
| A069 | Mergus serrator | | | 27 i | | C | В | С | |
| A142 | Vanellus vanellus | | | 401 i | | C | В | C | |
| A160 | Numenius arquata | | | 457 i | | C | В | C | |
| A162 | Tringa totanus | | | 56 i | | C | В | С | |
| A183 | Larus fuscus | | 500 p | | | В | A | C P | ! |
| A282 | Turdus torquatus | | 1-2 p | | | C | В | С | |

3.2.c. MAMMALS listed on Annex II of Council directive 92/43/EEC

| CODE | NAME | | POPULATION | | SITE ASSESSMENT | | | | |
|------|-------------|----------|------------|-----------|-----------------|------------|--------------|-----------|---|
| | | Resident | | Migratory | | Population | Conservation | Isolation | |
| | | | Breed | Winter | Stage | | | | |
| 1355 | Lutra lutra | р | | | | С | A | С | 7 |

3.2.d. AMPHIBIANS and REPTILES listed on Annex II of Council directive 92/43/EEC

3.2.e. FISHES listed on Annex II of Council directive 92/43/EEC

| CODE | CODE NAME | | POPULATION | | | SITE ASSESSMENT | | | |
|------|-------------|----------|------------|-----------|-------|-----------------|--------------|-----------|---|
| | | Resident | | Migratory | | Population | Conservation | Isolation | |
| | | | Breed | Winter | Stage | | | | |
| 1106 | Salmo salar | | С | | | C | A | С | 2 |

3.2.f. INVERTEBRATES listed on Annex II of Council directive 92/43/EEC

3.2.g. PLANTS listed on Annex II of Council directive 92/43/EEC

3.3. Other Important Species of Flora and Fauna

| B M A R F I P P Cephalanthera longifolia p A | |
|---|--|
| D. Combalanthera langifalia | |
| P Cephalanthera longifolia p A | |
| M Lepus timidus hibernicus p A | |
| M Lepus timidus hibernicus p B | |
| M Lepus timidus hibernicus p C | |
| M Meles meles p A | |
| M Meles meles p C | |
| A Rana temporaria p A | |
| A Rana temporaria p C | |
| R Lacerta vivipara p C | |
| F Salvelinus alpinus p A | |
| B Lagopus lagopus p A | |
| B Ardea cinerea 24 i C | |
| B Cygnus olor 30 i | |
| B Lagopus lagopus p C | |

 $⁽B=Birds,\,M=Mammals,\,A=Amphibians,\,R=Reptiles,\,F=Fish,\,I=Invertebrates,\,P=Plants)$

4. SITE DESCRIPTION

4.1. GENERAL SITE CHARACTER:

| Habitat classes | % cover |
|--|---------|
| Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins) | 6 |
| Inland water bodies (Standing water, Running water) | 27 |
| Bogs, Marshes, Water fringed vegetation, Fens | 25 |
| Heath, Scrub, Maquis and Garrigue, Phygrana | 7 |
| Humid grassland, Mesophile grassland | 10 |
| Extensive cereal cultures (including Rotation cultures with regular fallowing) | 5 |
| Improved grassland | 15 |
| Broad-leaved deciduous woodland | 1 |
| Mixed woodland | 1 |
| Artificial forest monoculture (e.g. Plantations of poplar or Exotic trees) | 1 |
| Inland rocks, Screes, Sands, Permanent Snow and ice | 1 |
| Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites) | 1 |
| Total habitat cover | 100 % |

Other site characteristics

This site comprises almost the entire freshwater element of the River Finn and its tributaries - the Corlacky, the Reelan sub-catchment, the Sruhamboy, Elatagh, Cummirk and Glashagh, and also includes Lough Finn, where the river rises. Lough Derg and a section of River Derg, and the tidal stretch of the Foyle north of Lifford to the border, are also part of the site. The underlying geology is Dalradian Schists and Gneiss for the most part though quartzites and Carboniferous Limestones are present in the vicinity of Castlefinn. The hills around Lough Finn are also on quartzite. The mountains of Owendoo and Cloghervaddy are of granite felsite and other intrusive rocks rich in silica. The rivers in the western, upland part of the site flow mainly through peat based soils, while eastwards of the Ballybofey area the main Finn channel passes though fairly intensive agricultural land. In addition to rivers, lakes, bog and heath, the site includes native broad-leaved and mixed woodland, scrub, wet grassland and freshwater marsh. Intertidal mudflats and extensive reedbeds occur along the River Foyle. Improved grassland and arable land are included for water quality reasons. The Finn passes through a number of medium sized towns, notably Lifford, Castlefinn, Stranolar and Ballybofey.

4.2. OUALITY AND IMPORTANCE:

This extensive site contains good examples of the Annex 1 habitats lowland oligotrophic lakes, blanket bog, transition mires and wet heath. Water quality of the lakes is good, as is that in most of the rivers and streams (majority classified as unpolluted). The blanket bog, which is best developed in the Owendoo/Cloghervaddy area, is typical upland bog and is fairly extensive in area. The Finn is an important system for Salmo salar, being an excellent grilse river with extensive spawning habitats. The Finn system sustains one of the only stable spring salmon populations in the country. The rivers and lakes support important populations of Lutra lutra. The upland habitats support a number of important bird species, notably Falco peregrinus and Falco columbarius (Annex I species) and Lagopus lagopus and Turdus torquatus (both Red Data Book species). Lough Derg supports the largest colony of Larus fuscus in Ireland. The section of the River Foyle within the site, along with a contiguous stretch in of the river in Northern Ireland, supports important populations of waterfowl

in autumn and winter, with an internationally important population of Cygnus cygnus, and nationally important numbers of Anser anser, Anas crecca and Phalacrocorax carbo. Salvelinus alpinus occurs in Lough Finn and possibly Lough Derg. A Red Data Book plant species, Cephalanthera longifolia, is known from the site.

4.3. VULNERABILITY

While water quality throughout much of the site is good, there are some locally polluted stretches of river within the lowlands. Pollution, emanating from agricultural activities and centres of population, is a threat to the important Salmo salar populations. Afforestation already exists in part of the Finn catchment and poses a threat to water quality and fish stocks due to acidification and sedimentition. Further afforestation in the catchment could be damaging. The blanket bog and heath habitats are vulnerable to erosion due to over-grazing by sheep. Any further drainage within peatlands would be very damaging.

4.4. SITE DESIGNATION:

4.5. OWNERSHIP

State: Department of Communications, Marine and Natural Resources

Private : multiple

Agency, Wexford.

4.6. DOCUMENTATION

Bracken, J. J. and O'Grady, M. E. (1992). A review of freshwater fisheries research in Ireland. In Feehan, J. (ed.) Environment and Development in Ireland, pp 499-510. The Environmental Institute, UCD, Dublin.

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Doris, Y., McGarrigle, M.L., Clabby, K.J., Lucey, J., Neill, M., Flanagan, M., Quinn, M.B., Sugrue, M. and Lehane, M. (1999). Water quality in Ireland 1995-1997. Statistical Compendium of River Quality Data. Electronic Publication on Disk. Environmental Protection

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Flanagan, P.J. and Toner, P. F. (1975). A Preliminary Survey of Irish Lakes. An Foras Forbartha, Dublin.

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Site code: IE0002301

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Merne, O.J. (1989). Important Bird Areas in the Republic of Ireland. In: Grimmett, R.F.A. and Jones, T.A. (eds.). Important Bird Areas in Europe. ICBP Technical Publication No. 9, Cambridge.

Mooney, E., Goodwillie, R.N. and Douglas, C. (1991). Survey of Mountain Blanket Bogs of Scientific Interest. Unpublished draft to the National Parks & Wildlife Service, Dublin.

O'Reilly, P. (1998). Trout and Salmon Rivers of Ireland: an Anglers Guide. Merlin Unwin Books, London.

Praeger, R.L. (1934) . The Botanist in Ireland. Hodges, Figgis & Co, Dublin.

Reynolds, J.D. (1998). Ireland's Freshwaters. The Marine Institute, Dublin 1998.

Sheppard, R. (1993). Ireland's Wetland Wealth. IWC, Dublin.

Young, R. (1973). A Preliminary Report on Areas of Scientific Interest in County Donegal. An Foras Forbartha, Dublin.

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5. SITE PROTECTION STATUS AND RELATION WITH CORINE BIOTOPES

| 5.1. DESIGNATION TYPES a | t National and Regional l | evel: | | | |
|--|---------------------------|-------------|--|--|--|
| 5.2. RELATION OF THE DES | SCRIBED SITE WITH O | THER SITES: | | | |
| designated at National or Regional lev | vel: | | | | |
| designated at International level: | | | | | |
| 5.3. RELATION OF THE DESCRIBED SITE WITH CORINE BIOTOPE SITES: | | | | | |
| CORINE SITE CODE | OVERLAP TYPE | % COVER | | | |

800000765 800000133

6. IMPACTS AND ACTIVITIES IN AND AROUND THE SITE

6.1. GENERAL IMPACTS AND ACTIVITIES AND PROPORTION OF THE SURFACE OF THE SITE AFFECTED

IMPACTS AND ACTIVITIES WITHIN the site

| CODE | INTENS | SITY | % OF SITE | INFLUENCE |
|------|------------|------|-----------|-----------|
| 100 | A B | C | 5 | + 0 - |
| 120 | A B | C | 20 | + 0 - |
| 140 | A B | С | 60 | + 0 - |
| 160 | A B | C | 1 | + 0 - |
| 220 | A B | С | 15 | + 0 - |
| 502 | A B | C | 1 | + 0 - |
| 701 | A B | C | 5 | + 0 - |
| 810 | A B | С | 5 | + 0 - |
| 966 | A B | C | 5 | + 0 - |

IMPACTS AND ACTIVITIES AROUND the site

| CODE INT | ENSITY | INFLUENCE |
|--------------|--------|-----------|
| 100 A | ВС | + 0 - |
| 120 A | ВС | + 0 - |
| 140 A | вС | + 0 - |
| 160 A | вС | + 0 - |
| 400 A | вС | + 0 - |
| 403 A | вС | + 0 - |
| 410 A | вС | + 0 - |
| 701 A | вС | + 0 - |
| 810 A | вС | + 0 - |

6.2. SITE MANAGEMENT AND PLANS

BODY RESPONSIBLE FOR THE SITE MANAGEMENT

SITE MANAGEMENT AND PLANS

A Conservation Plan for the management of this site will be prepared.

7. MAPS OF THE SITE

- Physical map

$\hbox{\it -} Aerial\ photograph (s)\ included:$

| NUMBER | AREA | SUBJECT | DATE |
|---------|------------|--|--------|
| OS-4112 | Lough Derg | View of Lough Derg | 200005 |
| OS-2289 | Strabane | View of River Finn to west of Strabane | 200005 |

8. SLIDES

.....

NATURA 2000 – STANDARD DATA FORM

Special Areas of Conservation under the EC Habitats Directive (includes candidate SACs, Sites of Community Importance and designated SACs).

Each Natura 2000 site in the United Kingdom has its own Standard Data Form containing site-specific information. The data form for this site has been generated from the Natura 2000 Database submitted to the European Commission on the following date:

22/12/2015

The information provided here, follows the officially agreed site information format for Natura 2000 sites, as set out in the Official Journal of the European Union recording the Commission Implementing Decision of 11 July 2011 (2011/484/EU).

The Standard Data Forms are generated automatically for all of the UK's Natura 2000 sites using the European Environment Agency's Natura 2000 software. The structure and format of these forms is exactly as produced by the EEA's Natura 2000 software (except for the addition of this coversheet and the end notes). The content matches exactly the data submitted to the European Commission.

Please note that these forms contain a number of codes, all of which are explained either within the data forms themselves or in the end notes.

Further technical documentation may be found here http://bd.eionet.europa.eu/activities/Natura_2000/reference_portal

As part of the December 2015 submission, several sections of the UK's previously published Standard Data Forms have been updated. For details of the approach taken by the UK in this submission please refer to the following document: http://incc.defra.gov.uk/pdf/Natura2000 StandardDataForm UKApproach Dec2015.pdf

More general information on Special Areas of Conservation (SACs) in the United Kingdom is available from the <u>SAC home page on the JNCC website</u>. This webpage also provides links to Standard Data Forms for all SACs in the UK.

Date form generated by the Joint Nature Conservation Committee 25 January 2016.

NATURA 2000 - STANDARD DATA FORM



For Special Protection Areas (SPA), Proposed Sites for Community Importance (pSCI), Sites of Community Importance (SCI) and for Special Areas of Conservation (SAC)

SITE **UK0030233**

SITENAME Owenkillew River

TABLE OF CONTENTS

- 1. SITE IDENTIFICATION
- 2. SITE LOCATION
- 3. ECOLOGICAL INFORMATION
- 4. SITE DESCRIPTION
- 5. SITE PROTECTION STATUS AND RELATION WITH CORINE BIOTOPES
- 6. SITE MANAGEMENT

1. SITE IDENTIFICATION

| 1.1 Type | 1.2 Site code | Back to top |
|----------|---------------|-------------|
| В | UK0030233 | |

1.3 Site name

| Owenkillew Rive | • | | |
|-----------------|---|--|--|
| | | | |

| 1.4 First Compilation date | 1.5 Update date |
|----------------------------|-----------------|
| 2001-06 | 2015-12 |

1.6 Respondent:

Name/Organisation: Joint Nature Conservation Committee

Address: Joint Nature Conservation Committee Monkstone House City Road Peterborough

PE1 1JY

Email:

Date site proposed as SCI: 2001-06

Date site confirmed as SCI: 2004-12

Date site designated as SAC: 2005-05

Regulations 6-7 and 10-12 of The Conservation (Natural

Habitats, etc.) Regulations (Northern Ireland) 1995

(http://www.legislation.gov.uk/nisr/1995/380/contents/made)

as amended by The Conservation (Natural Habitats, etc.) (Amendment) Regulations (Northern Ireland) 2004

(http://www.legislation.gov.uk/nisr/2004/435/contents/made).

National legal reference of SAC

designation:

2. SITE LOCATION

2.1 Site-centre location [decimal degrees]:

Back to top

2.2 Area [ha]: 2.3 Marine area [%]

213.84 0.0

2.4 Sitelength [km]:

0.0

2.5 Administrative region code and name

| NUTS level 2 code | Region Name |
|-------------------|------------------|
| UKN0 | Northern Ireland |

2.6 Biogeographical Region(s)

Atlantic (100.0 %)

3. ECOLOGICAL INFORMATION

3.1 Habitat types present on the site and assessment for them

Back to top

| Annex | I Hal | oitat t | ypes | | | Site assessment | | | | |
|---------------|-------|---------|------------|------------------|--------------|------------------|---------------------|--------------|--------|--|
| Code | PF | NP | Cover [ha] | Cave [number] | Data quality | A B C D | A B C | A B C | | |
| | | | | | | Representativity | Relative Surface | Conservation | Global | |
| 3260 8 | | | 75.14 | | G | A | С | В | В | |
| 91A0 | | | 79.44 | | G | В | С | А | В | |
| 91D0 | Х | | 1.5 | | G | В | С | A | С | |

- **PF:** for the habitat types that can have a non-priority as well as a priority form (6210, 7130, 9430) enter "X" in the column PF to indicate the priority form.
- **NP:** in case that a habitat type no longer exists in the site enter: x (optional)
- Cover: decimal values can be entered
- Caves: for habitat types 8310, 8330 (caves) enter the number of caves if estimated surface is not available.
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation)

3.2 Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive

92/43/EEC and site evaluation for them

| Sp | Species | | | | Po | Population in the site Site assessment | | | | t | | | | |
|----|---------|-----------------------------------|---|----|----|--|-------|------|---------|---------|-------|------|------|------|
| G | Code | Scientific Name | S | NP | Т | Size | Unit | Cat. | D.qual. | A B C D | A B C | | | |
| | | | | | | Min | Max | | | | Pop. | Con. | lso. | Glo. |
| F | 1096 | <u>Lampetra</u> <u>planeri</u> | | | р | | | | Р | DD | D | | | |
| М | 1355 | <u>Lutra lutra</u> | | | р | | | | С | DD | С | В | С | С |
| I | 1029 | Margaritifera margaritifera | | | p | 10000 | 10001 | i | | G | В | С | С | В |
| F | 1106 | Salmo salar | | | р | 1001 | 10000 | i | | G | С | В | С | С |

- Group: A = Amphibians, B = Birds, F = Fish, I = Invertebrates, M = Mammals, P = Plants, R = Reptiles
- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Type:** p = permanent, r = reproducing, c = concentration, w = wintering (for plant and non-migratory species use permanent)
- **Unit**: i = individuals, p = pairs or other units according to the Standard list of population units and codes in accordance with Article 12 and 17 reporting (see reference portal)
- Abundance categories (Cat.): C = common, R = rare, V = very rare, P = present to fill if data are deficient (DD) or in addition to population size information
- Data quality: G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation); VP = 'Very poor' (use this category only, if not even a rough estimation of the population size can be made, in this case the fields for population size can remain empty, but the field "Abundance categories" has to be filled in)

4. SITE DESCRIPTION

4.1 General site character

Back to top

| Habitat class | % Cover |
|---------------------|---------|
| N06 | 35.1 |
| N14 | 4.0 |
| N08 | 0.2 |
| N07 | 4.5 |
| N21 | 7.0 |
| N16 | 45.2 |
| N10 | 4.0 |
| Total Habitat Cover | 100 |

Other Site Characteristics

1 Terrestrial: Soil & Geology: shingle,metamorphic,sand,neutral,nutrient-poor,sedimentary,igneous 2 Terrestrial: Geomorphology and landscape: upland,valley

4.2 Quality and importance

Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation for which this is considered to be one of the best areas in the United Kingdom. Old sessile oak woods with Ilex and Blechnum in the British Isles for which this is considered to be one of the best areas in the United Kingdom. Bog woodland for which the area is considered to support a significant presence. which is

considered to be rare as its total extent in the United Kingdom is estimated to be less than 1000 hectares. Salmo salar for which the area is considered to support a significant presence. Lutra lutra for which the area is considered to support a significant presence. Margaritifera margaritifera for which this is considered to be one of the best areas in the United Kingdom.

4.3 Threats, pressures and activities with impacts on the site

The most important impacts and activities with high effect on the site

| Negative In | | | |
|-------------|---------------------------------------|-----------------------------------|---------------------------|
| Rank | Threats and pressures [code] | Pollution (optional) [code] | inside/outside [i o b] |
| Н | J02 | | I |
| M | M01 | | 0 |
| Н | I01 | | l |
| Н | H01 | | 0 |
| M | F02 | | |
| L | C03 | | I |
| L | C01 | | I |
| Н | B02 | | I |

| Positive Impacts | | | | |
|------------------|-------------------------------------|-----------------------------------|---------------------------|--|
| Rank | Activities, management [code] | Pollution (optional) [code] | inside/outside [i o b] | |
| Н | J02 | | I | |
| M | F02 | | I | |
| М | B02 | | | |

Rank: H = high, M = medium, L = low

Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification,

T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions

i = inside, o = outside, b = both

4.5 Documentation

Conservation Objectives - the DOENI link below provides access to the Conservation Objectives for this site. See also the 'UK Approach' document for more information (link via the JNCC website).

Link(s): http://jncc.defra.gov.uk/pdf/Natura2000 StandardDataForm UKApproach Dec2015.pdf

https://www.doeni.gov.uk/sites/default/files/publications/doe/land-information-owenkillew-river-conservation-objectives-2

5. SITE PROTECTION STATUS (optional)

5.1 Designation types at national and regional level:

Back to top

| Code | Cover [%] | Code | Cover [%] | Code | Cover [%] |
|------|-----------|------|-----------|------|-----------|
| UK04 | 100.0 | | | | |

6. SITE MANAGEMENT

6.1 Body(ies) responsible for the site management:

Back to top

| Organisation: | Northern Ireland Environment Agency |
|---------------|-------------------------------------|
| Address: | |
| Email: | |

6.2 Management Plan(s):

An actual management plan does exist:

| | ansorvation massures (antional) |
|---|---------------------------------|
| X | No |
| | No, but in preparation |
| | Yes |

6.3 Conservation measures (optional)

For available information, including on Conservation Objectives, see Section 4.5.

EXPLANATION OF CODES USED IN THE NATURA 2000 STANDARD DATA FORMS

The codes in the table below are also explained in the <u>official European Union guidelines for the Standard Data Form</u>. The relevant page is shown in the table below.

1.1 Site type

| CODE | DESCRIPTION | PAGE NO |
|------|---|---------|
| Α | Designated Special Protection Area | 53 |
| В | SAC (includes candidates Special Areas of Conservation, Sites of Community Importance and designated SAC) | 53 |
| С | SAC area the same as SPA. Note in the UK Natura 2000 submission this is only used for Gibraltar | 53 |

3.1 Habitat representativity

| CODE | DESCRIPTION | PAGE NO |
|------|--------------------------|---------|
| Α | Excellent | 57 |
| В | Good | 57 |
| С | Significant | 57 |
| D | Non-significant presence | 57 |

3.1 Habitat code

| CODE | DESCRIPTION | PAGE NO |
|------|--|---------|
| 1110 | Sandbanks which are slightly covered by sea water all the time | 57 |
| 1130 | Estuaries | 57 |
| 1140 | Mudflats and sandflats not covered by seawater at low tide | 57 |
| 1150 | Coastal lagoons | 57 |
| 1160 | Large shallow inlets and bays | 57 |
| 1170 | Reefs | 57 |
| 1180 | Submarine structures made by leaking gases | 57 |
| 1210 | Annual vegetation of drift lines | 57 |
| 1220 | Perennial vegetation of stony banks | 57 |
| 1230 | Vegetated sea cliffs of the Atlantic and Baltic Coasts | 57 |
| 1310 | Salicornia and other annuals colonizing mud and sand | 57 |
| 1320 | Spartina swards (Spartinion maritimae) | 57 |
| 1330 | Atlantic salt meadows (Glauco-Puccinellietalia maritimae) | 57 |
| 1340 | Inland salt meadows | 57 |
| 1420 | Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi) | 57 |
| 2110 | Embryonic shifting dunes | 57 |
| 2120 | Shifting dunes along the shoreline with Ammophila arenaria ("white dunes") | 57 |
| 2130 | Fixed coastal dunes with herbaceous vegetation ("grey dunes") | 57 |
| 2140 | Decalcified fixed dunes with Empetrum nigrum | 57 |
| 2150 | Atlantic decalcified fixed dunes (Calluno-Ulicetea) | 57 |
| 2160 | Dunes with Hippopha• rhamnoides | 57 |
| 2170 | Dunes with Salix repens ssp. argentea (Salicion arenariae) | 57 |
| 2190 | Humid dune slacks | 57 |
| 21A0 | Machairs (* in Ireland) | 57 |
| 2250 | Coastal dunes with Juniperus spp. | 57 |
| 2330 | Inland dunes with open Corynephorus and Agrostis grasslands | 57 |
| 3110 | Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) | 57 |
| 3130 | Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea | 57 |
| 3140 | Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. | 57 |
| 3150 | Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation | 57 |

| CODE | DESCRIPTION | PAGE NO |
|------|---|---------|
| 3160 | Natural dystrophic lakes and ponds | 57 |
| 3170 | Mediterranean temporary ponds | 57 |
| 3180 | Turloughs | 57 |
| 3260 | Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation | 57 |
| 4010 | Northern Atlantic wet heaths with Erica tetralix | 57 |
| 4020 | Temperate Atlantic wet heaths with Erica ciliaris and Erica tetralix | 57 |
| 4030 | European dry heaths | 57 |
| 4040 | Dry Atlantic coastal heaths with Erica vagans | 57 |
| 4060 | Alpine and Boreal heaths | 57 |
| 4080 | Sub-Arctic Salix spp. scrub | 57 |
| 5110 | Stable xerothermophilous formations with Buxus sempervirens on rock slopes (Berberidion p.p.) | 57 |
| 5130 | Juniperus communis formations on heaths or calcareous grasslands | 57 |
| 6130 | Calaminarian grasslands of the Violetalia calaminariae | 57 |
| 6150 | Siliceous alpine and boreal grasslands | 57 |
| 6170 | Alpine and subalpine calcareous grasslands | 57 |
| 6210 | Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) | 57 |
| 6230 | Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe) | 57 |
| 6410 | Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) | 57 |
| 6430 | Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels | 57 |
| 6510 | Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis) | 57 |
| 6520 | Mountain hay meadows | 57 |
| 7110 | Active raised bogs | 57 |
| 7120 | Degraded raised bogs still capable of natural regeneration | 57 |
| 7130 | Blanket bogs (* if active bog) | 57 |
| 7140 | Transition mires and quaking bogs | 57 |
| 7150 | Depressions on peat substrates of the Rhynchosporion | 57 |
| 7210 | Calcareous fens with Cladium mariscus and species of the Caricion davallianae | 57 |
| 7220 | Petrifying springs with tufa formation (Cratoneurion) | 57 |
| 7230 | Alkaline fens | 57 |
| 7240 | Alpine pioneer formations of the Caricion bicoloris-atrofuscae | 57 |
| 8110 | Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani) | 57 |
| 8120 | Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii) | 57 |
| 8210 | Calcareous rocky slopes with chasmophytic vegetation | 57 |
| 8220 | Siliceous rocky slopes with chasmophytic vegetation | 57 |
| 8240 | Limestone pavements | 57 |
| 8310 | Caves not open to the public | 57 |
| 8330 | Submerged or partially submerged sea caves | 57 |
| 9120 | Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion) | 57 |
| 9130 | Asperulo-Fagetum beech forests | 57 |
| 9160 | Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli | 57 |
| 9180 | Tilio-Acerion forests of slopes, screes and ravines | 57 |
| 9190 | Old acidophilous oak woods with Quercus robur on sandy plains | 57 |
| 91A0 | Old sessile oak woods with Ilex and Blechnum in the British Isles | 57 |
| 91C0 | Caledonian forest | 57 |
| 91D0 | Bog woodland | 57 |
| 91E0 | Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) | 57 |
| 91J0 | Taxus baccata woods of the British Isles | 57 |

3.1 Relative surface

| CODE | DESCRIPTION | PAGE NO |
|------|-------------|---------|
| Α | 15%-100% | 58 |
| В | 2%-15% | 58 |
| С | < 2% | 58 |

3.1 Conservation status habitat

| CODE | DESCRIPTION | PAGE NO |
|------|---------------------------------|---------|
| Α | Excellent conservation | 59 |
| В | Good conservation | 59 |
| С | Average or reduced conservation | 59 |

3.1 Global grade habitat

| CODE | DESCRIPTION | PAGE NO |
|------|-------------------|---------|
| А | Excellent value | 59 |
| В | Good value | 59 |
| С | Significant value | 59 |

3.2 Population (abbreviated to 'Pop.' in data form)

| CODE | DESCRIPTION | PAGE NO |
|------|----------------------------|---------|
| Α | 15%-100% | 62 |
| В | 2%-15% | 62 |
| С | < 2% | 62 |
| D | Non-significant population | 62 |

3.2 Conservation status species (abbreviated to 'Con.' in data form)

| CODE | DESCRIPTION | PAGE NO |
|------|---------------------------------|---------|
| А | Excellent conservation | 63 |
| В | Good conservation | 63 |
| С | Average or reduced conservation | 63 |

3.2 Isolation (abbreviated to 'Iso.' in data form)

| CODE | DESCRIPTION | PAGE NO |
|------|---|---------|
| Α | Population (almost) Isolated | 63 |
| В | Population not-isolated, but on margins of area of distribution | 63 |
| С | Population not-isolated within extended distribution range | 63 |

3.2 Global Grade (abbreviated to 'Glo.' Or 'G.' in data form)

| CODE | DESCRIPTION | PAGE NO |
|------|-------------------|---------|
| Α | Excellent value | 63 |
| В | Good value | 63 |
| С | Significant value | 63 |

3.3 Assemblages types

| CODE | DESCRIPTION | PAGE NO |
|------|--|------------------|
| WATR | Non breeding waterfowl assemblage | UK specific code |
| SBA | Breeding seabird assemblage | UK specific code |
| BBA | Breeding bird assemblage (applies only to sites classified pre 2000) | UK specific code |

4.1 Habitat class code

| CODE | DESCRIPTION | PAGE NO |
|------|--|---------|
| N01 | Marine areas, Sea inlets | 65 |
| N02 | Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins) | 65 |
| N03 | Salt marshes, Salt pastures, Salt steppes | 65 |
| N04 | Coastal sand dunes, Sand beaches, Machair | 65 |
| N05 | Shingle, Sea cliffs, Islets | 65 |
| N06 | Inland water bodies (Standing water, Running water) | 65 |
| N07 | Bogs, Marshes, Water fringed vegetation, Fens | 65 |
| N08 | Heath, Scrub, Maquis and Garrigue, Phygrana | 65 |
| N09 | Dry grassland, Steppes | 65 |
| N10 | Humid grassland, Mesophile grassland | 65 |
| N11 | Alpine and sub-Alpine grassland | 65 |
| N14 | Improved grassland | 65 |
| N15 | Other arable land | 65 |
| N16 | Broad-leaved deciduous woodland | 65 |
| N17 | Coniferous woodland | 65 |
| N19 | Mixed woodland | 65 |
| N21 | Non-forest areas cultivated with woody plants (including Orchards, groves, Vineyards, Dehesas) | 65 |
| N22 | Inland rocks, Screes, Sands, Permanent Snow and ice | 65 |
| N23 | Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites) | 65 |
| N25 | Grassland and scrub habitats (general) | 65 |
| N26 | Woodland habitats (general) | 65 |

4.3 Threats code

| CODE | DESCRIPTION | PAGE NO | | | |
|------|--|---------|--|--|--|
| A01 | Cultivation | 65 | | | |
| A02 | Modification of cultivation practices | 65 | | | |
| A03 | Mowing / cutting of grassland | 65 | | | |
| A04 | Grazing | 65 | | | |
| A05 | Livestock farming and animal breeding (without grazing) | 65 | | | |
| A06 | Annual and perennial non-timber crops | 65 | | | |
| A07 | Use of biocides, hormones and chemicals | 65 | | | |
| A08 | Fertilisation | 65 | | | |
| A10 | Restructuring agricultural land holding | 65 | | | |
| A11 | Agriculture activities not referred to above | 65 | | | |
| B01 | Forest planting on open ground | 65 | | | |
| B02 | Forest and Plantation management & use | 65 | | | |
| B03 | Forest exploitation without replanting or natural regrowth | | | | |
| B04 | Use of biocides, hormones and chemicals (forestry) | | | | |
| B06 | Grazing in forests/ woodland | | | | |
| B07 | Forestry activities not referred to above | | | | |
| C01 | Mining and quarrying | 65 | | | |
| C02 | Exploration and extraction of oil or gas | 65 | | | |
| C03 | Renewable abiotic energy use | 65 | | | |
| D01 | Roads, paths and railroads | 65 | | | |
| D02 | Utility and service lines | 65 | | | |
| D03 | Shipping lanes, ports, marine constructions | 65 | | | |
| D04 | Airports, flightpaths | 65 | | | |
| D05 | Improved access to site | 65 | | | |
| E01 | Urbanised areas, human habitation | 65 | | | |
| E02 | Industrial or commercial areas | 65 | | | |

| CODE | DESCRIPTION | PAGE NO |
|------|---|---------|
| E03 | Discharges | 65 |
| E04 | Structures, buildings in the landscape | 65 |
| E06 | Other urbanisation, industrial and similar activities | 65 |
| F01 | Marine and Freshwater Aquaculture | 65 |
| F02 | Fishing and harvesting aquatic ressources | 65 |
| F03 | Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc., trapping, poisoning, poaching, predator control, accidental capture (e.g. due to fishing gear), etc.) | 65 |
| F04 | Taking / Removal of terrestrial plants, general | 65 |
| F05 | Illegal taking/ removal of marine fauna | 65 |
| F06 | Hunting, fishing or collecting activities not referred to above | 65 |
| G01 | Outdoor sports and leisure activities, recreational activities | 65 |
| G02 | Sport and leisure structures | 65 |
| G03 | Interpretative centres | 65 |
| G04 | Military use and civil unrest | 65 |
| G05 | Other human intrusions and disturbances | 65 |
| H01 | Pollution to surface waters (limnic & terrestrial, marine & brackish) | 65 |
| H02 | Pollution to groundwater (point sources and diffuse sources) | 65 |
| H03 | Marine water pollution | 65 |
| H04 | Air pollution, air-borne pollutants | 65 |
| H05 | Soil pollution and solid waste (excluding discharges) | 65 |
| H06 | Excess energy | 65 |
| H07 | Other forms of pollution | 65 |
| 101 | Invasive non-native species | 65 |
| 102 | Problematic native species | 65 |
| 103 | Introduced genetic material, GMO | 65 |
| J01 | Fire and fire suppression | 65 |
| J02 | Human induced changes in hydraulic conditions | 65 |
| J03 | Other ecosystem modifications | 65 |
| K01 | Abiotic (slow) natural processes | 65 |
| K02 | Biocenotic evolution, succession | 65 |
| K03 | Interspecific faunal relations | 65 |
| K04 | Interspecific floral relations | 65 |
| K05 | Reduced fecundity/ genetic depression | 65 |
| L05 | Collapse of terrain, landslide | 65 |
| L07 | Storm, cyclone | 65 |
| L08 | Inundation (natural processes) | 65 |
| L10 | Other natural catastrophes | 65 |
| M01 | Changes in abiotic conditions | 65 |
| M02 | Changes in biotic conditions | 65 |
| U | Unknown threat or pressure | 65 |
| XO | Threats and pressures from outside the Member State | 65 |

5.1 Designation type codes

| CODE | DESCRIPTION | | | | | | |
|------|--|----|--|--|--|--|--|
| UK00 | No Protection Status | | | | | | |
| UK01 | National Nature Reserve | | | | | | |
| UK02 | Marine Nature Reserve | | | | | | |
| UK04 | Site of Special Scientific Interest (UK) | 67 | | | | | |

NATURA 2000 – STANDARD DATA FORM

Special Areas of Conservation under the EC Habitats Directive (includes candidate SACs, Sites of Community Importance and designated SACs).

Each Natura 2000 site in the United Kingdom has its own Standard Data Form containing site-specific information. The data form for this site has been generated from the Natura 2000 Database submitted to the European Commission on the following date:

22/12/2015

The information provided here, follows the officially agreed site information format for Natura 2000 sites, as set out in the Official Journal of the European Union recording the Commission Implementing Decision of 11 July 2011 (2011/484/EU).

The Standard Data Forms are generated automatically for all of the UK's Natura 2000 sites using the European Environment Agency's Natura 2000 software. The structure and format of these forms is exactly as produced by the EEA's Natura 2000 software (except for the addition of this coversheet and the end notes). The content matches exactly the data submitted to the European Commission.

Please note that these forms contain a number of codes, all of which are explained either within the data forms themselves or in the end notes.

Further technical documentation may be found here http://bd.eionet.europa.eu/activities/Natura_2000/reference_portal

As part of the December 2015 submission, several sections of the UK's previously published Standard Data Forms have been updated. For details of the approach taken by the UK in this submission please refer to the following document: http://incc.defra.gov.uk/pdf/Natura2000 StandardDataForm UKApproach Dec2015.pdf

More general information on Special Areas of Conservation (SACs) in the United Kingdom is available from the <u>SAC home page on the JNCC website</u>. This webpage also provides links to Standard Data Forms for all SACs in the UK.

Date form generated by the Joint Nature Conservation Committee 25 January 2016.

NATURA 2000 - STANDARD DATA FORM



For Special Protection Areas (SPA), Proposed Sites for Community Importance (pSCI), Sites of Community Importance (SCI) and for Special Areas of Conservation (SAC)

SITE **UK0030320**

SITENAME River Foyle and Tributaries

TABLE OF CONTENTS

- 1. SITE IDENTIFICATION
- 2. SITE LOCATION
- 3. ECOLOGICAL INFORMATION
- 4. SITE DESCRIPTION
- 5. SITE PROTECTION STATUS AND RELATION WITH CORINE BIOTOPES
- 6. SITE MANAGEMENT

1. SITE IDENTIFICATION

| 1.1 Type | 1.2 Site code | Back to top |
|----------|---------------|-------------|
| В | UK0030320 | |

1.3 Site name

| 1 4 First Compilation date | 1.5 Undate date | |
|-----------------------------|-----------------|--|
| River Foyle and Tributaries | | |
| 16. – | | |

| 1.4 First Compilation date | 1.5 Update date |
|----------------------------|-----------------|
| 2004-07 | 2015-12 |

1.6 Respondent:

Name/Organisation: Joint Nature Conservation Committee

Address: Joint Nature Conservation Committee Monkstone House City Road Peterborough

PE1 1JY

Email:

designation:

Date site proposed as SCI: 2004-07

Date site confirmed as SCI: 2004-12

Date site designated as SAC: 2005-05

Regulations 6-7 and 10-12 of The Conservation (Natural

Habitats, etc.) Regulations (Northern Ireland) 1995

National legal reference of SAC (http://www.legislation.gov.uk/nisr/1995/380/contents

(http://www.legislation.gov.uk/nisr/1995/380/contents/made) as amended by The Conservation (Natural Habitats, etc.)

(Amendment) Regulations (Northern Ireland) 2004

(http://www.legislation.gov.uk/nisr/2004/435/contents/made).

2. SITE LOCATION

2.1 Site-centre location [decimal degrees]:

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Longitude -7.451666667 **Latitude** 54.73611111

2.2 Area [ha]: 2.3 Marine area [%]

771.8 0.0

2.4 Sitelength [km]:

120.0

2.5 Administrative region code and name

| NUTS level 2 code | Region Name |
|-------------------|------------------|
| UKN0 | Northern Ireland |

2.6 Biogeographical Region(s)

Atlantic (100.0 %)

3. ECOLOGICAL INFORMATION

3.1 Habitat types present on the site and assessment for them

Back to top

| Annex I Habitat types | | | | | | Site assessment | | | | | |
|-----------------------|--|--|--------|---------|-------|------------------|---------------------|--------------|--------|--|--|
| Code | Code PF NP Cover Cave Data [ha] [number] | | | A B C D | A B C | | | | | | |
| | | | | | | Representativity | Relative Surface | Conservation | Global | | |
| 3260 | | | 126.88 | | G | В | С | В | В | | |

- **PF:** for the habitat types that can have a non-priority as well as a priority form (6210, 7130, 9430) enter "X" in the column PF to indicate the priority form.
- **NP:** in case that a habitat type no longer exists in the site enter: x (optional)
- Cover: decimal values can be entered
- Caves: for habitat types 8310, 8330 (caves) enter the number of caves if estimated surface is not available.
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation)

3.2 Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive 92/43/EEC and site evaluation for them

| Species | | Population in the site | Site assessment | | |
|---------|------------|------------------------|-----------------|--|--|
| | Scientific | | | | |

| G | Code | Name | S | NP | Т | Size | Size | | Cat. | D.qual. | A B C D | A B C | | |
|---|------|---------------------------------------|---|----|---|------|-------|---|------|---------|---------|-------|------|------|
| | | | | | | Min | Max | | | | Pop. | Con. | lso. | Glo. |
| F | 1099 | <u>Lampetra</u> <u>fluviatilis</u> | | | p | | | | Р | DD | D | | | |
| F | 1096 | Lampetra planeri | | | p | | | | Р | DD | D | | | |
| М | 1355 | <u>Lutra lutra</u> | | | р | | | | Р | DD | С | В | С | С |
| I | 1029 | Margaritifera margaritifera | | | p | | | | Р | DD | D | | | |
| F | 1095 | Petromyzon marinus | | | p | | | | Р | DD | D | | | |
| F | 1106 | Salmo salar | | | р | 1001 | 10000 | i | | G | В | В | С | В |

- Group: A = Amphibians, B = Birds, F = Fish, I = Invertebrates, M = Mammals, P = Plants, R = Reptiles
- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Type:** p = permanent, r = reproducing, c = concentration, w = wintering (for plant and non-migratory species use permanent)
- **Unit**: i = individuals, p = pairs or other units according to the Standard list of population units and codes in accordance with Article 12 and 17 reporting (see reference portal)
- Abundance categories (Cat.): C = common, R = rare, V = very rare, P = present to fill if data are deficient (DD) or in addition to population size information
- Data quality: G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation); VP = 'Very poor' (use this category only, if not even a rough estimation of the population size can be made, in this case the fields for population size can remain empty, but the field "Abundance categories" has to be filled in)

4. SITE DESCRIPTION

4.1 General site character

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| Habitat class | % Cover |
|---------------------|---------|
| N17 | 0.9 |
| N16 | 5.8 |
| N14 | 3.0 |
| N08 | 7.9 |
| N07 | 7.3 |
| N06 | 31.6 |
| N02 | 38.2 |
| N10 | 4.5 |
| N23 | 0.8 |
| Total Habitat Cover | 100 |

Other Site Characteristics

1 Terrestrial: Soil & Geology: metamorphic,sandstone,alluvium,limestone,peat,acidic 2 Terrestrial: Geomorphology and landscape: valley,lowland 3 Marine: Geology: slate/shale General site characteristics: Soil & geology: The catchment area is dominated by metamorphic rocks of the Dalradian Super Group. These are predominatly schists derived from altered sandstones and siltstones with minor metamorphosed-limestones and dolerites. Small units of young

4.2 Quality and importance

Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation for which this is considered to be one of the best areas in the United Kingdom. Salmo salar for which this is considered to be one of the best areas in the United Kingdom. Lutra lutra for which the area is considered to support a significant presence.

4.3 Threats, pressures and activities with impacts on the site

The most important impacts and activities with high effect on the site

| Negative Impacts | | | | |
|------------------|------------------------------|-----------------------------------|---------------------------|--|
| Rank | Threats and pressures [code] | Pollution (optional) [code] | inside/outside [i o b] | |
| Н | B02 | | I | |
| Н | I01 | | I | |
| Н | M01 | | 0 | |
| M | C01 | | I | |
| M | F02 | | I | |
| Н | H01 | | 0 | |
| M | C03 | | I | |
| Н | J02 | | | |

| Positive Impacts | | | | |
|------------------|-------------------------------------|-----------------------------------|---------------------------|--|
| Rank | Activities, management [code] | Pollution (optional) [code] | inside/outside [i o b] | |
| Н | F02 | | I | |
| Н | J02 | | I | |

Rank: H = high, M = medium, L = low

Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification,

T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions

i = inside, o = outside, b = both

4.5 Documentation

Conservation Objectives - the DOENI link below provides access to the Conservation Objectives for this site. See also the 'UK Approach' document for more information (link via the JNCC website).

Link(s): https://www.doeni.gov.uk/sites/default/files/publications/doe/land-information-river-foyle-and-tributaries-conservation-ob

http://jncc.defra.gov.uk/pdf/Natura2000 StandardDataForm UKApproach Dec2015.pdf

5. SITE PROTECTION STATUS (optional)

5.1 Designation types at national and regional level:

Back to top

| Code | Cover [%] | Code | Cover [%] | Code | Cover [%] |
|------|-----------|------|-----------|------|-----------|
| UK04 | 100.0 | | | | |

6. SITE MANAGEMENT

6.1 Body(ies) responsible for the site management:

|--|

| Organisation: | Northern Ireland Environment Agency |
|---------------|-------------------------------------|
| Address: | |
| Email: | |

6.2 Management Plan(s):

An actual management plan does exist:

| Yes | | |
|--------------------------------------|--|--|
| No, but in preparation | | |
| X No | | |
| 6.3 Conservation measures (optional) | | |

For available information, including on Conservation Objectives, see Section 4.5.

EXPLANATION OF CODES USED IN THE NATURA 2000 STANDARD DATA FORMS

The codes in the table below are also explained in the <u>official European Union guidelines for the Standard Data Form</u>. The relevant page is shown in the table below.

1.1 Site type

| CODE | DESCRIPTION | PAGE NO |
|------|---|---------|
| Α | Designated Special Protection Area | 53 |
| В | SAC (includes candidates Special Areas of Conservation, Sites of Community Importance and designated SAC) | 53 |
| С | SAC area the same as SPA. Note in the UK Natura 2000 submission this is only used for Gibraltar | 53 |

3.1 Habitat representativity

| CODE | DESCRIPTION | PAGE NO |
|------|--------------------------|---------|
| Α | Excellent | 57 |
| В | Good | 57 |
| С | Significant | 57 |
| D | Non-significant presence | 57 |

3.1 Habitat code

| CODE | DESCRIPTION | PAGE NO |
|------|--|---------|
| 1110 | Sandbanks which are slightly covered by sea water all the time | 57 |
| 1130 | Estuaries | 57 |
| 1140 | Mudflats and sandflats not covered by seawater at low tide | 57 |
| 1150 | Coastal lagoons | 57 |
| 1160 | Large shallow inlets and bays | 57 |
| 1170 | Reefs | 57 |
| 1180 | Submarine structures made by leaking gases | 57 |
| 1210 | Annual vegetation of drift lines | 57 |
| 1220 | Perennial vegetation of stony banks | 57 |
| 1230 | Vegetated sea cliffs of the Atlantic and Baltic Coasts | 57 |
| 1310 | Salicornia and other annuals colonizing mud and sand | 57 |
| 1320 | Spartina swards (Spartinion maritimae) | 57 |
| 1330 | Atlantic salt meadows (Glauco-Puccinellietalia maritimae) | 57 |
| 1340 | Inland salt meadows | 57 |
| 1420 | Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi) | 57 |
| 2110 | Embryonic shifting dunes | 57 |
| 2120 | Shifting dunes along the shoreline with Ammophila arenaria ("white dunes") | 57 |
| 2130 | Fixed coastal dunes with herbaceous vegetation ("grey dunes") | 57 |
| 2140 | Decalcified fixed dunes with Empetrum nigrum | 57 |
| 2150 | Atlantic decalcified fixed dunes (Calluno-Ulicetea) | 57 |
| 2160 | Dunes with Hippopha• rhamnoides | 57 |
| 2170 | Dunes with Salix repens ssp. argentea (Salicion arenariae) | 57 |
| 2190 | Humid dune slacks | 57 |
| 21A0 | Machairs (* in Ireland) | 57 |
| 2250 | Coastal dunes with Juniperus spp. | 57 |
| 2330 | Inland dunes with open Corynephorus and Agrostis grasslands | 57 |
| 3110 | Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) | 57 |
| 3130 | Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea | 57 |
| 3140 | Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. | 57 |
| 3150 | Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation | 57 |

| CODE | DESCRIPTION | PAGE NO |
|------|---|---------|
| 3160 | Natural dystrophic lakes and ponds | 57 |
| 3170 | Mediterranean temporary ponds | 57 |
| 3180 | Turloughs | 57 |
| 3260 | Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation | 57 |
| 4010 | Northern Atlantic wet heaths with Erica tetralix | 57 |
| 4020 | Temperate Atlantic wet heaths with Erica ciliaris and Erica tetralix | 57 |
| 4030 | European dry heaths | 57 |
| 4040 | Dry Atlantic coastal heaths with Erica vagans | 57 |
| 4060 | Alpine and Boreal heaths | 57 |
| 4080 | Sub-Arctic Salix spp. scrub | 57 |
| 5110 | Stable xerothermophilous formations with Buxus sempervirens on rock slopes (Berberidion p.p.) | 57 |
| 5130 | Juniperus communis formations on heaths or calcareous grasslands | 57 |
| 6130 | Calaminarian grasslands of the Violetalia calaminariae | 57 |
| 6150 | Siliceous alpine and boreal grasslands | 57 |
| 6170 | Alpine and subalpine calcareous grasslands | 57 |
| 6210 | Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) | 57 |
| 6230 | Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe) | 57 |
| 6410 | Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) | 57 |
| 6430 | Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels | 57 |
| 6510 | Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis) | 57 |
| 6520 | Mountain hay meadows | 57 |
| 7110 | Active raised bogs | 57 |
| 7120 | Degraded raised bogs still capable of natural regeneration | 57 |
| 7130 | Blanket bogs (* if active bog) | 57 |
| 7140 | Transition mires and quaking bogs | 57 |
| 7150 | Depressions on peat substrates of the Rhynchosporion | 57 |
| 7210 | Calcareous fens with Cladium mariscus and species of the Caricion davallianae | 57 |
| 7220 | Petrifying springs with tufa formation (Cratoneurion) | 57 |
| 7230 | Alkaline fens | 57 |
| 7240 | Alpine pioneer formations of the Caricion bicoloris-atrofuscae | 57 |
| 8110 | Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani) | 57 |
| 8120 | Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii) | 57 |
| 8210 | Calcareous rocky slopes with chasmophytic vegetation | 57 |
| 8220 | Siliceous rocky slopes with chasmophytic vegetation | 57 |
| 8240 | Limestone pavements | 57 |
| 8310 | Caves not open to the public | 57 |
| 8330 | Submerged or partially submerged sea caves | 57 |
| 9120 | Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion) | 57 |
| 9130 | Asperulo-Fagetum beech forests | 57 |
| 9160 | Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli | 57 |
| 9180 | Tilio-Acerion forests of slopes, screes and ravines | 57 |
| 9190 | Old acidophilous oak woods with Quercus robur on sandy plains | 57 |
| 91A0 | Old sessile oak woods with Ilex and Blechnum in the British Isles | 57 |
| 91C0 | Caledonian forest | 57 |
| 91D0 | Bog woodland | 57 |
| 91E0 | Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) | 57 |
| 91J0 | Taxus baccata woods of the British Isles | 57 |

3.1 Relative surface

| CODE | DESCRIPTION | PAGE NO |
|------|-------------|---------|
| Α | 15%-100% | 58 |
| В | 2%-15% | 58 |
| С | < 2% | 58 |

3.1 Conservation status habitat

| CODE | DESCRIPTION | PAGE NO |
|------|---------------------------------|---------|
| Α | Excellent conservation | 59 |
| В | Good conservation | 59 |
| С | Average or reduced conservation | 59 |

3.1 Global grade habitat

| CODE | DESCRIPTION | PAGE NO |
|------|-------------------|---------|
| А | Excellent value | 59 |
| В | Good value | 59 |
| С | Significant value | 59 |

3.2 Population (abbreviated to 'Pop.' in data form)

| CODE | DESCRIPTION | PAGE NO |
|------|----------------------------|---------|
| Α | 15%-100% | 62 |
| В | 2%-15% | 62 |
| С | < 2% | 62 |
| D | Non-significant population | 62 |

3.2 Conservation status species (abbreviated to 'Con.' in data form)

| CODE | DESCRIPTION | PAGE NO |
|------|---------------------------------|---------|
| А | Excellent conservation | 63 |
| В | Good conservation | 63 |
| С | Average or reduced conservation | 63 |

3.2 Isolation (abbreviated to 'Iso.' in data form)

| CODE | DESCRIPTION | PAGE NO |
|------|---|---------|
| Α | Population (almost) Isolated | 63 |
| В | Population not-isolated, but on margins of area of distribution | 63 |
| С | Population not-isolated within extended distribution range | 63 |

3.2 Global Grade (abbreviated to 'Glo.' Or 'G.' in data form)

| CODE | DESCRIPTION | PAGE NO |
|------|-------------------|---------|
| Α | Excellent value | 63 |
| В | Good value | 63 |
| С | Significant value | 63 |

3.3 Assemblages types

| CODE | DESCRIPTION | PAGE NO |
|------|--|------------------|
| WATR | Non breeding waterfowl assemblage | UK specific code |
| SBA | Breeding seabird assemblage | UK specific code |
| BBA | Breeding bird assemblage (applies only to sites classified pre 2000) | UK specific code |

4.1 Habitat class code

| CODE | DESCRIPTION | PAGE NO |
|------|--|---------|
| N01 | Marine areas, Sea inlets | 65 |
| N02 | Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins) | 65 |
| N03 | Salt marshes, Salt pastures, Salt steppes | 65 |
| N04 | Coastal sand dunes, Sand beaches, Machair | 65 |
| N05 | Shingle, Sea cliffs, Islets | 65 |
| N06 | Inland water bodies (Standing water, Running water) | 65 |
| N07 | Bogs, Marshes, Water fringed vegetation, Fens | 65 |
| N08 | Heath, Scrub, Maquis and Garrigue, Phygrana | 65 |
| N09 | Dry grassland, Steppes | 65 |
| N10 | Humid grassland, Mesophile grassland | 65 |
| N11 | Alpine and sub-Alpine grassland | 65 |
| N14 | Improved grassland | 65 |
| N15 | Other arable land | 65 |
| N16 | Broad-leaved deciduous woodland | 65 |
| N17 | Coniferous woodland | 65 |
| N19 | Mixed woodland | 65 |
| N21 | Non-forest areas cultivated with woody plants (including Orchards, groves, Vineyards, Dehesas) | 65 |
| N22 | Inland rocks, Screes, Sands, Permanent Snow and ice | 65 |
| N23 | Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites) | 65 |
| N25 | Grassland and scrub habitats (general) | 65 |
| N26 | Woodland habitats (general) | 65 |

4.3 Threats code

| CODE | DESCRIPTION | PAGE NO |
|------|--|---------|
| A01 | Cultivation | 65 |
| A02 | Modification of cultivation practices | 65 |
| A03 | Mowing / cutting of grassland | 65 |
| A04 | Grazing | 65 |
| A05 | Livestock farming and animal breeding (without grazing) | 65 |
| A06 | Annual and perennial non-timber crops | 65 |
| A07 | Use of biocides, hormones and chemicals | 65 |
| A08 | Fertilisation | 65 |
| A10 | Restructuring agricultural land holding | 65 |
| A11 | Agriculture activities not referred to above | 65 |
| B01 | Forest planting on open ground | 65 |
| B02 | Forest and Plantation management & use | 65 |
| B03 | Forest exploitation without replanting or natural regrowth | 65 |
| B04 | Use of biocides, hormones and chemicals (forestry) | 65 |
| B06 | Grazing in forests/ woodland | 65 |
| B07 | Forestry activities not referred to above | 65 |
| C01 | Mining and quarrying | 65 |
| C02 | Exploration and extraction of oil or gas | 65 |
| C03 | Renewable abiotic energy use | 65 |
| D01 | Roads, paths and railroads | 65 |
| D02 | Utility and service lines | 65 |
| D03 | Shipping lanes, ports, marine constructions | 65 |
| D04 | Airports, flightpaths | 65 |
| D05 | Improved access to site | 65 |
| E01 | Urbanised areas, human habitation | 65 |
| E02 | Industrial or commercial areas | 65 |

| CODE | DESCRIPTION | PAGE NO |
|------|---|---------|
| E03 | Discharges | 65 |
| E04 | Structures, buildings in the landscape | 65 |
| E06 | Other urbanisation, industrial and similar activities | 65 |
| F01 | Marine and Freshwater Aquaculture | 65 |
| F02 | Fishing and harvesting aquatic ressources | 65 |
| F03 | Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc., trapping, poisoning, poaching, predator control, accidental capture (e.g. due to fishing gear), etc.) | 65 |
| F04 | Taking / Removal of terrestrial plants, general | 65 |
| F05 | Illegal taking/ removal of marine fauna | 65 |
| F06 | Hunting, fishing or collecting activities not referred to above | 65 |
| G01 | Outdoor sports and leisure activities, recreational activities | 65 |
| G02 | Sport and leisure structures | 65 |
| G03 | Interpretative centres | 65 |
| G04 | Military use and civil unrest | 65 |
| G05 | Other human intrusions and disturbances | 65 |
| H01 | Pollution to surface waters (limnic & terrestrial, marine & brackish) | 65 |
| H02 | Pollution to groundwater (point sources and diffuse sources) | 65 |
| H03 | Marine water pollution | 65 |
| H04 | Air pollution, air-borne pollutants | 65 |
| H05 | Soil pollution and solid waste (excluding discharges) | 65 |
| H06 | Excess energy | 65 |
| H07 | Other forms of pollution | 65 |
| 101 | Invasive non-native species | 65 |
| 102 | Problematic native species | 65 |
| 103 | Introduced genetic material, GMO | 65 |
| J01 | Fire and fire suppression | 65 |
| J02 | Human induced changes in hydraulic conditions | 65 |
| J03 | Other ecosystem modifications | 65 |
| K01 | Abiotic (slow) natural processes | 65 |
| K02 | Biocenotic evolution, succession | 65 |
| K03 | Interspecific faunal relations | 65 |
| K04 | Interspecific floral relations | 65 |
| K05 | Reduced fecundity/ genetic depression | 65 |
| L05 | Collapse of terrain, landslide | 65 |
| L07 | Storm, cyclone | 65 |
| L08 | Inundation (natural processes) | 65 |
| L10 | Other natural catastrophes | 65 |
| M01 | Changes in abiotic conditions | 65 |
| M02 | Changes in biotic conditions | 65 |
| U | Unknown threat or pressure | 65 |
| XO | Threats and pressures from outside the Member State | 65 |

5.1 Designation type codes

| CODE | DESCRIPTION | PAGE NO |
|------|--|---------|
| UK00 | No Protection Status | 67 |
| UK01 | National Nature Reserve | 67 |
| UK02 | Marine Nature Reserve | 67 |
| UK04 | Site of Special Scientific Interest (UK) | 67 |



Information to Inform an Appropriate Assessment: SAC Watercourses

Appendix 9 – Site Integrity Checklists

Table A9.1 River Foyle & Tributaries SAC Integrity of Site Checklist

| Conservation Objectives | |
|---|--------------------|
| Does the project have potential to: | |
| Cause delays in progress towards achieving the conservation objectives of the site? | Yes /No |
| Interrupt progress towards achieving the conservation objectives of the site? | Yes /No |
| Disrupt those factors which help maintain the favourable conditions of the site? | Yes /No |
| Interfere with the balance, distribution and density of key species that are indicators of favourable conditions of the site? | Yes /No |

| Other Indicators | |
|--|--------------------|
| Does the project have potential to: | |
| Cause changes to the vital defining aspects (e.g. nutrient balance) that determine how the site functions as a habitat or ecosystems? | Yes /No |
| Change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site? | Yes /No |
| Interfere with predicted or expected natural changes to the site (such as water dynamics of chemical composition)? | Yes /No |
| Reduce the area of key habitats? | Yes /No |
| Reduce the population of key species? | Yes /No |
| Change the balance between key species? | Yes /No |
| Reduce the diversity of the site? | Yes /No |
| Result in disturbance that could affect population size or density of the balance between key species? | Yes /No |



Information to Inform an Appropriate Assessment: SAC Watercourses

| Result in fragmentation? | Yes /No |
|--|--------------------|
| Result in loss or reduction of key features (e.g. tree cover, tidal exposure, annual flooding, etc)? | Yes /No |

Table A9.2 River Finn SAC Integrity of Site Checklist

| Conservation Objectives | |
|---|--------------------|
| Does the project have potential to: | |
| Cause delays in progress towards achieving the conservation objectives of the site? | Yes /No |
| Interrupt progress towards achieving the conservation objectives of the site? | Yes /No |
| Disrupt those factors which help maintain the favourable conditions of the site? | Yes /No |
| Interfere with the balance, distribution and density of key species that are indicators of favourable conditions of the site? | Yes /No |

| Other Indicators | |
|--|--------------------|
| Does the project have potential to: | |
| Cause changes to the vital defining aspects (e.g. nutrient balance) that determine how the site functions as a habitat or ecosystems? | Yes /No |
| Change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site? | Yes /No |
| Interfere with predicted or expected natural changes to the site (such as water dynamics of chemical composition)? | Yes /No |
| Reduce the area of key habitats? | Yes /No |
| Reduce the population of key species? | Yes /No |
| Change the balance between key species? | Yes /No |



Information to Inform an Appropriate Assessment: SAC Watercourses

| Reduce the diversity of the site? | Yes /No |
|--|--------------------|
| Result in disturbance that could affect population size or density of the balance between key species? | Yes /No |
| Result in fragmentation? | Yes /No |
| Result in loss or reduction of key features (e.g. tree cover, tidal exposure, annual flooding, etc)? | Yes /No |

Table A9.3 Owenkillew SAC Integrity of Site Checklist

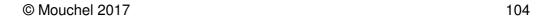
| Conservation Objectives | |
|---|--------------------|
| Does the project have potential to: | |
| Cause delays in progress towards achieving the conservation objectives of the site? | Yes /No |
| Interrupt progress towards achieving the conservation objectives of the site? | Yes /No |
| Disrupt those factors which help maintain the favourable conditions of the site? | Yes /No |
| Interfere with the balance, distribution and density of key species that are indicators of favourable conditions of the site? | Yes /No |

| Other Indicators | |
|--|--------------------|
| Does the project have potential to: | |
| Cause changes to the vital defining aspects (e.g. nutrient balance) that determine how the site functions as a habitat or ecosystems? | Yes /No |
| Change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site? | Yes /No |
| Interfere with predicted or expected natural changes to the site (such as water dynamics of chemical composition)? | Yes /No |



Information to Inform an Appropriate Assessment: SAC Watercourses

| Reduce the area of key habitats? | Yes /No |
|--|--------------------|
| Reduce the population of key species? | Yes /No |
| Change the balance between key species? | Yes /No |
| Reduce the diversity of the site? | Yes /No |
| Result in disturbance that could affect population size or density of the balance between key species? | Yes /No |
| Result in fragmentation? | Yes /No |
| Result in loss or reduction of key features (e.g. tree cover, tidal exposure, annual flooding, etc)? | Yes /No |







Report of Information to Inform an Appropriate Assessment:

718736-3000-R-022 Tully Bog Special Area of Conservation

A5 Western Transport Corridor

April 2017

Produced for

TransportNI

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Distribution

| Organisation | Contact | Copies |
|--------------|---------------|--------|
| TransportNI | Seamus Keenan | 1 |
| NIEA | | 1 |

¹ The Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995, as amended (the Habitats Regulations) indicate that the person or organisation applying for any consent, permission or other authorisation, known as the 'Project Proponent', is responsible for provision of information to support decisions by the 'Competent Authority' on the need for Appropriate Assessment and to allow the Appropriate Assessment to be undertaken. The 'Project Proponent' is taken to mean the project team, including as appropriate: Overseeing Organisation scheme or area staff; design consultants; contractors; Design Build Finance and Operate (DBFO) companies; and managing agents.



Information to Inform an Appropriate Assessment Tully Bog Special Area of Conservation

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Information to Inform an Appropriate Assessment Tully Bog Special Area of Conservation

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Tully Bog Special Area of Conservation



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1 Introduction

- 1.1.1 This document is a Habitats Regulation Assessment (HRA) which contains information to be submitted to the 'Competent Authority' in order to inform the statutory assessments required under the Conservation (Natural Habitats, &c) Regulations (Northern Ireland) 1995 (as amended²), for the proposed A5 Western Transport Corridor (A5WTC) Scheme.
- 1.1.2 These regulations apply to European Natura 2000 sites³, namely Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). The Proposed Scheme would interact with the following sites, namely:
 - River Foyle and Tributaries SAC
 - River Finn (Republic of Ireland) SAC
 - Owenkillew River SAC
 - Tully Bog SAC
 - Lough Swilly (including former Inch Lough and Levels) SPA
 - Lough Foyle (Northern Ireland) SPA (and Ramsar site)
 - Lough Foyle (Republic of Ireland) SPA (and Ramsar site)
 - Lough Neagh and Lough Beg SPA (and Ramsar site)
- 1.1.3 This document (HRA Tully Bog SAC) is one of four assessments, and specifically addresses Tully Bog SAC.
- 1.1.4 . A further three documents have been produced, namely:
 - HRA Report SAC Watercourses (River Foyle & Tributaries SAC; River Finn SAC and Owenkillew SAC);
 - HRA Report SPAs (for Lough Swilly SPA; Lough Foyle SPA; and Lough Neagh and Lough Beg SPA; and

² As amended by the Conservation (Natural Habitats, etc.) (Amendment) Regulations (Northern Ireland) 2012

³ Natura 2000 sites consist of Special Areas of Conservation (SACs) designated under European Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Flora and Fauna (the 'Habitats Directive') and Special Protection Areas (SPAs) designated under Directive 2009/147/EC, (the codified version of 79/409/EEC as amended) on the conservation of wild birds (the 'Birds Directive.')



- Ramsar Site Assessment Report⁴ (for Lough Foyle Ramsar Sites (NI and RoI); and Lough Neagh and Lough Beg Ramsar Site.
- 1.1.5 A first draft of this report was published for consultation in 2014 and responses were received at that time. The content of these responses have been taken into account in developing this second draft report.
- 1.1.6 The information in this second draft is published for consultation, and is being submitted to the Department of Agriculture, Environment, and Rural Affairs (DAERA) as statutory consultee for the designated sites in Northern Ireland. The general public are also invited to provide responses relating to the information and findings contained in the report⁵. The information and comments received in response to the consultations will then be considered by TransportNI and the Minister, when undertaking the Appropriate Assessments required in advance of a decision to proceed or not with the Scheme, in accordance with the requirements of the Directive and Regulations.

1.2 Background

- 1.2.1 The A5 Western Transport Corridor (A5WTC) is one of five key transport corridors making up the strategic road network across Northern Ireland. The Department for Infrastructure (Dfl) TransportNI (TNI) is promoting the dualling of the A5WTC as part of its improvement programme. This project would significantly improve safety and journey times along this route and, in addition to improving the links between the urban centres in the west of the province, provide a strategic link with international gateways. At the border with the Republic of Ireland it will connect with the N2 route which the Irish Government also has longer term plans to upgrade. It passes through New Buildings, Strabane, Sion Mills, Newtownstewart, Omagh and Aughnacloy.
- 1.2.2 The proposed new A5WTC dual carriageway runs for some 85km between the existing A5 north of New Buildings and the existing A5 south of Aughnacloy. The proposal will ultimately link up with an allied proposal in the Republic of Ireland, however as that proposal has not progressed to any meaningful stage which allows assessment, the current documents provide comprehensive assessments of the foreseeable proposals designed to date.

⁴ Ramsar sites are not referred to under the Directives or their transposition into UK and ROI Regulations. However, Planning Policy Statement 2 (PPS2) in Northern Ireland applies the same level of consideration and protection to them as to Natura 2000 sites

⁵ The Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (to which the UK is a signatory) requires [at Article 3]:- 'Each Party shall promote environmental education and environmental awareness among the public, especially on how to obtain access to information, to participate in decision-making and to obtain access to justice in environmental matters'.



- 1.2.3 It is anticipated the construction of the proposed scheme will be undertaken in three phases as follows, and shown on Sheets 1 to 24 (Appendix 1):
 - construction of junctions 1-3 (New Buildings Strabane North) and junctions 13-15 (Omagh South – A4,Ballygawley) between 2017 and 2019;
 - construction of junctions 3-13 (Strabane North Omagh South) between 2021 and 2023;
 and
 - construction of junction 15 (A4,Ballygawley) to the A5 south of Aughnacloy between 2026 and 2028.
- 1.2.4 The currently proposed A5WTC Scheme substantially reflects a previous proposal which was promoted in 2010 and for which an Environmental Statement (A5WTC ES 2010) was prepared and published. The environmental studies reported in the A5WTC ES 2010 were informed by a draft Habitats Regulations Assessment (HRA) which recognised and screened⁶ the above European Designated Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) for likely significant effects. A judicial review of the scheme in 2013 found the ES to be robust, but upheld a challenge that the HRA reporting relating to the Habitats Regulations should have been taken to the next level, namely a Stage 2 assessment⁷.

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⁶ The SACs and SPAs were subject to a screening exercise (Test of Likely Significance (ToLS) to determine if the proposed scheme, with its proposed and committed mitigation measures, would be likely to have a significant effect on the integrity of any of the sites considered. The ToLS process is commonly referred to as Stage 1 of the Habitats Regulations Assessment (HRA) process. When completed, the ToLS concluded the impacts of the proposed scheme (subject to mitigation) would not be likely to have a significant effect upon the integrity of the implicated designated sites in the context of the Habitats or Birds Directives, a conclusion which was agreed with by Northern Ireland Environment Agency (NIEA), the statutory consultee relative to the designated sites in Northern Ireland and the National Parks and Wildlife Service (NPWS) the organisation charged with the implementation of the Habitats and Birds Directives in the ROI.

⁷ The challenge to the consent for the proposed scheme was made in the context that potential impacts upon the River Foyle and Tributaries SAC should have been subject to Stage 2 of the Habitats Regulations Assessment (Appropriate Assessment). This challenge was upheld. The finding was informed by concerns raised by Loughs Agency in responses to the 2010 ES and presented in verbal submissions to the public inquiries held in 2011 concerning the protection of Atlantic salmon (Salmo salar), and clarifications through case law relative to the interpretation of 'likelihood' in the context of screening for likely significant effects as referred to in the Habitats Directive and the Regulations.



- 1.2.5 Further studies have since been completed to address this need for a more robust habitats regulations assessment, and a new Environmental Statement (A5WTC ES 2016) was prepared and published based on this information.
- 1.2.6 The 2016 Environmental Statement (ES), along with the draft vesting orders and other statutory procedures, were subject to a Public Inquiry from October to December 2016. Accordingly, the production of the current suite of HRA Reports have been programmed to ensure they contain the most up to date information.

1.3 Preparation of the HRA

- 1.3.1 The primary author of this report is Stuart Ireland B.Sc. (Hons), MCIEEM, CEnv. He is expert in ecological matters and the full spectrum of environmental assessment techniques, methodologies and statutes. Academically, he holds a combined honours degree in Zoology with Marine Zoology from UCNW Bangor, and professionally, is a member of relevant Institutes requiring the highest standards of professional competence and integrity. He is a Chartered Environmentalist, and a full member of the Chartered Institute of Ecology and Environmental Management.
- 1.3.2 Stuart has practised for 17 years, during which time he has undertaken complex Ecological Impact assessments, Habitats Regulations Assessments for nationally important infrastructure schemes. He has been involved with the A5WTC proposal since its inception in 2008 and is familiar with both the proposal site and the full spectrum of environmental parameters which have influenced the design of the proposal.
- 1.3.3 Stuart has provided ecological advice services for major road schemes, including the Roscommon Way Extension scheme in Essex, ensuring that construction of a flood relief road through a SSSI was undertaken in a manner which preserved the ecological function of the site and its supported species. He has appeared as an Expert Witness on ecological matters and has significant experience in Habitat Regulations Assessments, including working with clients, contractors and Statutory Consultees to design schemes to ensure protection of Natura 2000 sites and their conservation objectives.



2 The HRA Process

2.1 Objectives

- 2.1.1 The overall aims of the Habitats and Birds Directives are to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives, and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the best examples of them. European and national legislation places a collective obligation on its member states and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation status.
- 2.1.2 The maintenance of habitats and species within Natura 2000 sites at favourable conservation status will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.
- 2.1.3 Favourable conservation status of a site is achieved when:
 - The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
 - The conservation status of its typical species is favourable.
- 2.1.4 The favourable conservation status of a species is achieved when:
 - Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
 - The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
 - There is, and will probably continue to be, a sufficiently large habitat to maintain its Population's on a long-term basis.
- 2.1.5 The Habitats Directive promotes a hierarchy of avoidance, mitigation and compensatory measures. Accordingly, recognition of the importance of the identified designated sites within the Scheme study area and undertaking habitats assessment appraisals has been ongoing, and has occurred iteratively throughout the development of the A5WTC Scheme, and has significantly influenced the Scheme design.
- 2.1.6 In the first instance, the Scheme has aimed to avoid any negative impacts on European sites by identifying possible impacts early in the development of the Scheme, and has avoided sites as much as possible during the corridor and route options appraisal.
- 2.1.7 Following that, mitigation measures have been applied where necessary, with the aim of ensuring that no significant adverse impacts on the Sites remain.
- 2.1.8 The purpose of this HRA report is to provide information on the likely significant effects of the Scheme on the qualifying features of the respective designated sites, identify the mitigation



measures proposed, and to assess whether the mitigation measures will ensure that the favourable conservation status of the each of the Sites is maintained.

2.2 Approach to Habitat Regulations Assessment

- 2.2.1 The gathering and presentation of the information in this document has been informed by the guidance provided in 'Managing Natura 2000 Sites, the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (EC, 2000 & 2001)', and 'Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC'. Further useful guidance is provided by Section 4, Part 1 of Volume 11 of the DMRB (HD44/09).
- 2.2.2 In accordance with the guidance, a staged approach is taken to the assessment of plans and projects under the Habitat Regulations:

Stage 1: Screening/Test of likely Significance

This is where it is established if an Appropriate Assessment is required and is referred to as 'screening'. Its purpose is to identify the likely impacts upon a Natura 2000 Site of a project or a plan, either alone or in combination with other plans or projects and considers whether these impacts are likely to be significant. It will include:

- A description of the project;
- Identification of relevant Natura 2000 sites potentially affected;
- Identification and description of individual and cumulative impacts likely to result from implementation of the project;
- Assessment of the significance of the impacts identified above on site integrity; and
- Exclusion of sites where it can be objectively concluded that there will be no significant effects.

Stage 2: Appropriate Assessment

This stage considers the potential impacts on the structure and function, as well as the conservation objectives of the Natura 2000 Sites that the Proposal may have either alone or in combination with other projects or plans. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts is presented. This stage will include:

- A description of the Natura 2000 sites that will be considered further in the AA;
- A description of significant impacts on the conservation feature of these sites likely to occur from the Plan;
- Mitigation Measures; and
- Conclusions.

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Stage 3: Assessment of alternative solutions

This process examines alternative ways of achieving the objectives of the Proposal that avoid adverse impacts on the integrity of the Natura 2000 sites.

Stage 4: Imperative reasons of overriding public interest

This stage is the main reason of exemption from Article 6(4) which examines whether there are imperative reasons of overriding public interest (IROPI), and where no alternative solutions exist, for allowing a plan or project which will have adverse effects on the integrity of a Natura 2000 site to proceed.

2.2.3 This HRA report addresses Stage 1 and Stage 2 of the HRA Process.

Note: For the purposes of this assessment, the term 'likely' is applied within the proper meaning of the term as defined in the corpus of EU environmental law. In that sense, a 'likely' significant effect is deemed herein to be not one which is more likely than not to occur, but rather one with a genuine possibility of occurrence, no matter how small that likelihood may be. That being so, the precautionary principle required in HRA is integrated into the very heart of the assessment methodology and the assessment is thus as robust as possible.

The definition for 'integrity' adopted in this report is that provided in ODPM Circular 06/2005 and Defra Circular 01/2005 - *Biodiversity and Geological conservation – Statutory obligations and their impact within the planning system*, which defines integrity in the context of designated sites as:

The coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified



3 Stage 1 – Screening

3.1.1 As discussed above, the first stage of an HRA assessment is to consider whether a project could cause 'likely significant effect' on the qualifying features of the Natura 2000 site(s), alone or in-combination with other plans/projects. In line with EU Guidance, and the Design Manual for Roads & Bridges (DMRB) method of assessment screening matrices have been completed for each of the potentially affected Natura 2000 sites. Table 2.1 provides this information.

Table 3.1 (Stage 1) Screening Matrix for Tully Bog SAC

| Project Name: | A5 WTC | |
|---------------------------------------|-----------------------------|-------------------------------|
| Natura 2000 Site under Consideration: | Tully Bog SAC | |
| Date: | Author (Name/Organisation): | Verified (Name/Organisation): |
| 5 th August 2014 | S.Ireland, Mouchel | P.Reid, Mouchel |

Description of Project

The proposed 85km A5 Western Transport Corridor (A5 WTC) scheme forms part of a strategically important transport route between Londonderry/Derry in Northern Ireland (NI) and to Dublin in the Republic of Ireland (ROI). The proposed scheme involves replacement of the existing A5 from a point north of New Buildings Londonderry in the north to a point south of Aughnacloy in the south with a dual carriageway along an alignment off-line from the existing road. In NI the existing road passes through New Buildings, Strabane, Sion Mills, Newtownstewart, Omagh and Aughnacloy. The proposed scheme will be close to the designated site in a number of other locations. It is anticipated the proposed scheme will be built in three phases. It is anticipated that each phase will take some 2 to 3 years to construct.

Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:

| Size and scale (road type and probable traffic volume) | |
|---|---|
| Land-take | No works are proposed to take place within the SAC. |
| Distance from the European Site or key features of the site (from edge of the project assessment corridor) | The main carriageway is 205m from the SAC boundary, with slip roads 125m from the boundary. |
| Resource requirements (from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts) | None |

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| Emissions (e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution) | Nitrogen Deposition – the scheme could lead to higher levels of Nitrogen being deposited from traffic emissions. Construction Dust – as standard construction mitigation measures are very successful at controlling dust, it is unlikely that construction dust would impact on the site. |
|--|--|
| Excavation requirements (e.g. impacts of local hydrogeology) | Although part of the route will be in cutting nearby, no drainage features associated with the bog will be affected. Emerging research indicates that raised bogs may be groundwater dependant, thus alteration in local hydrology could impact on the site. |
| Transportation requirements | Construction related traffic and operational use of the scheme may result in potential depositional impacts upon bog features comprising qualifying features of the SAC. |
| Duration of construction, operation, etc | It is anticipated that construction of phases 2 will last for approximately three years. Phases 1 and 3 are located outside of the zone of influence for Tully Bog such that their construction will have no implications for the SAC. |
| Other | None |
| • | and/or mitigation measures plainly established and uncontroversial) mitigation measures, including |
| Nature of proposals | Best practice working procedures will be implemented during construction such as damping down of dust which will reduce airborne matter from contaminating the site during construction. PPGs will be followed during construction to avoid adverse impacts on local water quality. |
| Location | All works within 500m of the SAC |
| Evidence for effectiveness | Legally required and widely accepted best practice |
| Mechanism for delivery | |
| (legal conditions, restrictions or other legally enforceable obligations) | Legal conditions of national legislation & best practice guidance through NIEA PPGs. Contractual obligations placed on the contractor by TNI and monitored by TNI's appointed Environmental Representatives. |
| (legal conditions, restrictions or other legally enforceable obligations) Characteristics of European | NIEA PPGs. Contractual obligations placed on the contractor by TNI and monitored by TNI's appointed Environmental Representatives. an Site(s) |
| (legal conditions, restrictions or other legally enforceable obligations) Characteristics of Europea A brief description of the European A brief description and the European A brief description of the European A brief description and the E | NIEA PPGs. Contractual obligations placed on the contractor by TNI and monitored by TNI's appointed Environmental Representatives. an Site(s) ropean Site should be produced, including information on: |
| (legal conditions, restrictions or other legally enforceable obligations) Characteristics of European | NIEA PPGs. Contractual obligations placed on the contractor by TNI and monitored by TNI's appointed Environmental Representatives. an Site(s) ropean Site should be produced, including information on: |
| (legal conditions, restrictions or other legally enforceable obligations) Characteristics of Europea A brief description of the European Site | NIEA PPGs. Contractual obligations placed on the contractor by TNI and monitored by TNI's appointed Environmental Representatives. an Site(s) ropean Site should be produced, including information on: Tully Bog SAC UK0030326 |
| (legal conditions, restrictions or other legally enforceable obligations) Characteristics of Europea A brief description of the European Site and its EU code Location and distance of the European Site from | NIEA PPGs. Contractual obligations placed on the contractor by TNI and monitored by TNI's appointed Environmental Representatives. an Site(s) ropean Site should be produced, including information on: Tully Bog SAC UK0030326 Tully Bog SAC is located at NI OS Grid Reference H419754 and its boundary is 205m from the proposed carriageway and 125m from the slip |



| Key features of the European Site including the primary reasons for selection and any other qualifying interests | The site consists of a raised bog displaying typical bog vegetation surrounded by former cuttings supporting birch woodland. Its primary reason for selection is the 'active raised bog' habitat. No other reasons or qualifying features are given. |
|--|---|
| Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways | The major threats to the site are drying of the surface through excessive drainage and increased nutrient levels through airborne pollutants. Either of these have the potential to damage the quality of the bog vegetation. |
| European Site conservation objectives – where these are readily available | Maintain the extent of intact lowland raised bog and actively regenerating raised bog vegetation. Maintain and enhance the quality of the lowland raised bog community types including the presence of notable species. Seek to expand the extent of actively regenerating raised bog vegetation into degraded (non-active) areas of cutover bog. Maintain the diversity and quality of other habitats associated with the active raised bog, e.g. acid grassland, fen and swamp, especially where these exhibit natural transition to the raised bog. Maintain the hydrology of the raised bog peat mass. Seek nature conservation management over suitable areas immediately outside the SAC where there may be potential for lowland raised bog rehabilitation. |

Assessment Criteria

Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site.

Degradation of Annex 1 habitat through airborne pollutants

Airborne pollutants in the form of particulate matter and nitrogen compounds could lead to deterioration of the raised bog habitat. Therefore the potential impacts of airborne pollutants cannot be ruled out without further investigation.

Degradation of Annex 1 habitat through changes to hydrological regime

Alteration to local hydrology through excavations or surcharging could reduce the availability of water to the site, leading to a degradation of the raised bog habitat. Therefore, the potential impacts of hydrological change cannot be ruled out without further investigation.

Initial Assessment

The key characteristics of the site and the details of the European Site should be considered in identifying potential impacts.

Describe any likely changes to the site arising as a result of:

| , , | · · · · · · · · · · · · · · · · · · · |
|----------------------------------|--|
| Reduction of habitat area | No direct loss of qualifying habitat anticipated. However, impacts from airborne pollutants or local hydrology could result in a reduction in habitat area if unmitigated. |
| Disturbance to key species | N/A |
| Habitat or species fragmentation | There will not be any fragmentation of habitats within the SAC. |



| Reduction in species density | Density of species associated with a healthy raised bog surface may be reduced if airborne pollutant deposition is shown to be increased beyond levels anticipated without the proposed scheme. Alteration in local hydrology could reduce species density within the bog plant community. |
|--|--|
| Changes in key indicators of conservation value (water quality, etc) | Air quality changes could lead to changes in the key indicator species of the bog. Hydrological changes could lead to changes in the key indicator species of the bog. |
| Climate change | The scheme has the potential to contribute to the problem of climate change by increasing the carrying capacity of the current road network. Changes in rainfall patterns due to climate change could have direct impacts on the integrity of the site. |
| Describe any likely impacts | on the European Site as a whole in terms of: |
| Interference with the key relationships that define the structure of the site | None. |
| Interference with key relationships that define the function of the site | None. |
| Indicate the significance as | a result of the identification of impacts set out above in terms of: |
| Reduction of habitat area | There could be significant effects subject to mitigation. |
| Disturbance to key species | N/A |
| Habitat or species fragmentation | No significant effect predicted. |
| Loss | None |
| Fragmentation | None |
| Disruption | None |
| Disturbance | None |
| Change to key elements of the site (e.g. water quality, hydrological regime etc) | There could be significant effects subject to mitigation. |
| impacts are likely to be sign. An assessment of the pot | tose elements of the project, or combination of elements, where the above ificant or where the scale or magnitude of impacts is not known. Idential effects on air quality including climate change would necessitate ted traffic flow during and after construction. However air quality modelling |

An assessment of the potential effects on air quality including climate change would necessitate detailed studies of anticipated traffic flow during and after construction. However air quality modelling has identified that increases of NOx and deposits of particulate matter are not anticipated on Tully Bog with increases only expected within the immediate vicinity of the proposed works (Mouchel 2010).

| <i>(delete as</i> p | progressed to \$ | | 0 | Qualifying | Habitats. | Assessment |
|---------------------|------------------|----------|---|------------|-----------|------------|
| opriate). | progressed to t | olugo L. | | | | |



| Are the appropriate | YES | | |
|--------------------------|-----|--|--|
| statutory environmental | | | |
| bodies in agreement with | | | |
| this conclusion? (Delete | | | |
| and attach appropriate | | | |
| communication). | | | |

- 3.2 Scope of the information to inform the appropriate assessments.
- 3.2.1 The scope for the studies and assessments which form the focus of the information provided in this report has been established in light of the findings of the screenings for the designated site. Likely impacts identified relate to:
 - degradation of the qualifying habitat as a result of airborne pollutants; and
 - degradation of the qualifying habitat as a result of changes to the hydrological regime.

Degradation of the qualifying habitat by airborne pollutants

Data Sources

- 3.2.2 The following data sources have been relied on:
 - data provided in the 2010 and 2016 ES;
 - data derived from site surveys undertaken in 2014 by the Mouchel assessment team;
 - data derived from the Air Pollution Information System (APIS)⁸; and
 - data derived from air quality modelling undertaken in 2015.

Impact assessment

- 3.2.3 The data derived from the data sources has been reviewed to establish the potential for airborne pollutants to enter the SAC. Potential pollutants which may have a deleterious effect on the SAC are oxides of nitrogen and nitrogen deposition.
- 3.2.4 The information has then been evaluated to determine the nature of the potential impacts on the habitat as a result of the construction and future use of the proposed scheme. Assessments are made against the EU air quality limit of values for vegetation, 30 µg m⁻³, and the United Nations Economic Commission for Europe (UNECE) critical load for raised bog of 5-10 kg N ha⁻¹ y⁻¹

⁸ www.apis.ac.uk



3.2.5 Where the assessment has indicated such impacts would be likely to occur, consideration has then been given to appropriate mitigation measures subject to the findings relating to effects on integrity of the site.

Degradation of the qualifying habitat through changes to the hydrological regime.

Data Sources

- 3.2.6 The following data sources have been relied on:
 - data provided in the A5WTC ES 2010;
 - data derived from site surveys undertaken in 2014 by the Mouchel assessment team;
 - data derived from hydrology and drainage assessments undertaken in 2014.

Impact assessment

- 3.2.7 The data derived from the data sources has been reviewed to establish the potential for alterations to the hydrological regime of the SAC as a result of the construction and location of the proposed scheme.
- 3.2.8 The information has then been evaluated to determine the nature of the potential impacts on the habitat as a result of the construction and future use of the proposed scheme.
- 3.2.9 Where the assessment has indicated such impacts would be likely to occur, consideration has then been given to appropriate mitigation measures subject to the findings relating to effects on integrity of the site.
- 3.3 Determination of adverse impact relative to integrity
- 3.3.1 The identified impacts have been considered to enable the potential that they would be likely to have a negative effect on the integrity of the Natura 2000 site to be evaluated. This has involved consideration of:
 - whether there will be a reduction in the coherence of the ecological structure or function
 of the site, taking into account the whole area of the site, and supporting habitats which
 are integral to the structure and function of the site, and
 - whether any such reduction would reduce the ability of the site to sustain the qualifying habitat and/or the levels of populations of the species for which it has been classified.
- 3.3.2 The DMRB guidance (HD 44/09) provides a suitable checklist to identify interactions and potential effects on the integrity of a site. The completed checklist for Tully Bog SAC is provided in Appendix 4.



4 Description of the proposed scheme

4.1 Alignment and relationship with Tully Bog

- 4.1.1 The proposed scheme comprises an 85km dual carriageway running between the existing A5 north of New Buildings and the existing A5 south of Aughnacloy. Its location and relationship to Tully Bog is shown in Figure 1 in Appendix 1.
- 4.1.2 The section of the proposed scheme which is of relevance to Tully Bog SAC is that between Lisnagirr Road and the Fairy Water. In this location the principal components of the proposed scheme comprise the dual carriageway and junction 11, a full grade-separated junction which caters for access onto and exit from the strategic road north of Omagh, The proposed dual carriageway is located approximately 230 600m east of the designated site. North bound on and off slip roads, a western roundabout forming part of a central dumbbell arrangement at the junction and a link road between the roundabout and Drumlegagh Road South are located between the dual carriageway and the eastern boundary of the designated site. The junction of the link road and Drumlegagh Road is approximately 120m east of the designated site. There will also be a working corridor extending approximately 25m beyond the road footprint.
- 4.1.3 In the vicinity of the SAC the road will be elevated on a shallow embankment for approximately 400m and pass through a shallow cutting for a further 200m. A larger embankment will be required for the side road/interchange at junction 11 approximately 200m from the site. The route passes through a deeper cutting approximately 450m to the north-east of the SAC.
- 4.1.4 The key design aspects of the proposed scheme comprise the carriageway and associated earthworks, junctions, side roads, structures, drainage, lighting, landscape proposals, compensatory flood storage, deposition areas and environmental mitigation measures. The proposed scheme design has been completed with reference to the DMRB, including Volume 10 of that publication for the protection nature conservation and biodiversity features.
- 4.1.5 Table 4.1 provides traffic flows in the vicinity of Tully Bog SAC for the base year and opening year. The Average Annual Daily Traffic (AADT) and the number of HGVs within that total are provided.



Table 4.1 Traffic flows passing Tully Bog SAC for base year and opening year

| Existing A5 Adjacent to Tully Bog Base Y | ear | |
|--|-----------------|------|
| | AADT | HGVs |
| North Bound | 6070 | 783 |
| South Bound | 5989 | 731 |
| Existing A5 Adjacent to Tully Bog Openin | g Year | |
| | AADT | HGVs |
| North Bound (North of J11) | 3203 | 211 |
| South Bound (North of J11) | 3211 | 193 |
| North Bound (South of J11) | 4571 | 357 |
| South Bound (South of J11) | 5317 | 436 |
| Through J11 Opening Year | | |
| | AADT | HGVs |
| North Bound | 5074 | 685 |
| South Bound | 4694 | 573 |
| J11 Slip Roads Opening Year | | |
| | AADT | HGVs |
| North Bound Offslip | 1385 | 118 |
| North Bound Onslip | 2291 | 222 |
| South Bound Offslip | 2782 | 225 |
| South Bound Onslip | 1361 | 90 |
| Drumlegagh Road South within 500m of J | 11 Opening Year | |
| | AADT | HGVs |
| Base Year East Bound | 612 | 97 |
| Base Year West Bound | 461 | 38 |
| Opening Year East Bound | 655 | 107 |
| Opening Year West Bound | 532 | 41 |



5 Tully Bog SAC

5.1 Introduction

- 5.1.1 The designated site, is located within an area of agricultural land, between two local roads, Drumlegagh Road South and Todds Road some 180m north of the Fairy Water in the river's former flood plain and approximately 400m west of the current A5 at NI OS Grid Reference H419754
- 5.1.2 The Natura 2000 data form obtained from the Joint Nature Conservancy Committee (JNCC) website is provided in Appendix 3. The data form notes the site covers an area of 35.99 ha and is designated for active raised bog and degraded raised bog still capable of natural regeneration. Both are priority habitats under Annex 1 of the Directive. The information has been obtained from the Natura 2000 data form obtained from the Joint Nature Conservancy Committee (JNCC) website (www.jncc.gov.uk). The Natura 2000 data form is enclosed in Appendix 3.
- 5.1.3 The SAC is an area of lowland raised bog comprising a large central area of intact raised bog with a peripheral area of birch woodland on former peat cuttings. A drumlin in the centre of the bog is covered with Scot's pine Pinus sylvestris and birch Betula sp. woodland. Some of the peripheral cut over bog is permanently waterlogged. There are several large pools in the west of the site.
- 5.1.4 The designated site has been subject to a detailed survey following National Vegetation Classification (NVC) (Rodwell 1991) methodology and separate bryophyte surveys, all surveys were undertaken between April and August 2014. The results of the NVC surveys are illustrated in Figures 3.
- 5.1.5 The surveys recorded the presence of raised bog, birch woodland and marshy grassland communities. The communities found were assessed for their similarity to known NVC communities which can, in turn, be used as an indication of their conservation status.

5.2 NVC Survey Results for the Raised Bog Habitat

5.2.1 Tully Bog possesses sections within the bog surface which exhibit slightly different floristic characteristics with the southern section of the bog appearing drier and having less extensive Sphagnum coverage than the central and uncut northern sections. The highest similarity coefficient for the central and northern section is for M18a *Erica tetralix-Sphagnum papillosum* raised and blanket *mire-Sphagnum magellanicum-Andromeda polifolia* sub-community. Sphagnum species are constants throughout this area including *S. papillosum, S. tenellum* and *S. capillifolium*. The citation for the SAC states that the notable Sphagnum species S. *fuscum and S. imbricatum* (now separated into two taxa-*S. affine and S. austinii*) are known to occur on the bog. Four hummocks of *S. fuscum* were found near the centre of the bog during an earlier bryophyte survey but *S. affine or S. austinii* were not found to be present. This is a minor change from the 2009 survey which found M18 *Erica tetralix-Sphagnum papillosum* raised and blanket mire to be the closest match to the survey data. This difference is likely to be due to quadrat location differences between the surveys.



5.2.2 The drier southern section of the bog is closest to M19a *Calluna vulgaris-Eriophorum vaginatum* blanket mire-*Erica tetralix* sub-community. This sub-community develops a greater abundance of Sphagnum species than other M19 communities and shows a number of floristic features transitional to M18 mires, with *S. capillifolium* being quite commonly accompanied by *S. papillosum* and sometimes by *S. tenellum* as is the case at Tully Bog. Overall though the Sphagnum coverage is not so rich or dense as in M18 mires

5.3 NVC Survey Results for the Birch Woodland Habitat

5.3.1 The lagg surrounding the bog has been cut for peat. The oldest cuttings at the outer edge of the area are dominated by downy birch woodland, with smaller amounts of Scots pine *Pinus sylvestris*. A small area of birch woodland has also developed to the south of the central area of the bog. The woodland is referable to the W4 *Betula pubescens-Molinia caerulea* woodland-community. This is a minor change from the 2009 NVC survey which classified the woodland as W4a *Betula pubescens-Molinia caerulea* woodland- *Dryopteris dilatata-Rubus fruticosus* subcommunity. This difference is likely to be explained by the sampling quadrat locations during the two surveys differing.

5.4 NVC Survey Results for the Marshy Grassland Habitat

5.4.1 This vegetation type is not mapped in Figure 3 due to the small size of the sample area and the difficulty of matching the results to an NVC community. The MATCH program gives M27c Filipendula ulmaria-Angelica sylvestris-Juncus effusus-Holcus lanatus sub-community as the most appropriate community type but the only M27 constant species Filipendula ulmaria was absent from all quadrat samples.

5.5 Hydrology of the Bog

- 5.5.1 As with the majority of active raised bogs, the depth of the peat isolates the bog from the influence of groundwater; the raised dome of peat, which lies >70 mAOD (metres above Ordnance Datum), is therefore irrigated solely by precipitation (Lindsay 1995). There are two main water discharge points from the bog, one at the north western edge, the other at the south eastern tip of the site (Figure 4 Appendix 1). However discharge from the site is likely to be quite low due to the absorption effect of the woodland buffer that forms the perimeter of the bog. The discharge point at the northwest of the site flows in a north westerly direction (channel width <1 metre) before converging with Tully Drain 2 (channel width <1 metre). Tully Drain 2 then flows in a southerly direction, beneath Todds Road, which runs along the western edge of the bog via a culvert, and on into the Fairy Water approximately 350 metres further south. Upstream of Tully Bog, Tully Drain 2 also receives waters from a significant area of agricultural farmland.
- 5.5.2 The second main discharge point, at the south eastern tip of the site, drains water from two channels which converge and flow south via an unnamed drainage ditch, beneath Todds Road and into the Fairy Water approximately 180 metres south of the peat bog.
- 5.5.3 In general, the site slopes towards the eastern edge of the bog, consequently, the centre of the bog drains in an easterly direction via a network of drainage channels, all eventually flowing into



Tully Drain 1. Tully Drain 1 flows parallel to the eastern edge of the site in a south east direction before flowing beneath the existing A5 and into the Strule River to the north of Straughroy.

5.5.4 There is a significant area of water storage at the north western corner of the site where a pond has developed.

5.6 Surrounding Geology

5.6.1 In the wider context of the former flood-plain of the Fairy Water the geology consists of a combination of alluvium, glaciofluvial sands and gravels within the Mourne and Strule Valleys. Localised areas of glacial tills of low permeability and areas of peat are found between Mountjoy and Omagh. The site is located on peat with areas of clay and alluvial deposits to the east under the proposed scheme footprint (Mouchel 2010a).

5.7 Surrounding Land Use

5.7.1 The surrounding land use is mostly agricultural categorised as improved grassland or arable habitats in the Phase 1 surveys. Tully Bog is isolated from other expanses of bog by these land uses. One small area of birch woodland and modified bog is located just over 500m to the north east, with another 1.3km to the north. Several other small areas of modified bog are located approximately 450m to the south of the SAC, but these are separated from the site by the Fairy Water. The closest areas of extensive bog habitat are those within the Fairy Water Bogs SAC approximately 8km to the west. The only other semi-natural habitats in the vicinity of the site are the woodlands of Mountjoy Forest approximately 1km to the east and isolated patches of woodland along the banks of the Fairy Water. The aerial photography for the surrounding land is displayed on Figures 4 in Appendix 1 to this report.

5.8 Vulnerability

5.8.1 The Natura 2000 data form states:

Tully Bog represents one of the best lowland raised bogs in Co. Tyrone. The area is not managed for agricultural purposes. Potentially the site could be damaged by peat-cutting, drainage, fires or scrub invasion. The site is currently monitored as part of a wider monitoring programme of all designated sites. If damaging practices or deterioration in site quality are recorded, they will be addressed by management agreements with the owners.



5.9 Conservation Objectives

5.9.1 The conservation objective for the site taken from the NIEA SAC Conservation Objective Form is:

'To maintain the active raised bog in favourable condition.'

5.9.2 NIEA have set a number of Component Objectives which seek to attain the conservation objective for the active raised bog. These are described in Table 5.1.

Table 5.1 Component Objectives taken from the NIEA Conservation Objective Form

| Component Objectives taken from the NIEA Conservation Objective Form | | | | | |
|--|--|--|--|--|--|
| Feature | Component Objective | | | | |
| | Maintain the extent of intact lowland raised bog and actively regenerating raised bog vegetation. | | | | |
| | Maintain and enhance the quality of the lowland raised bog community types including the presence of notable species. | | | | |
| | Seek to expand the extent of actively regenerating raised bog vegetation into degraded (non-active) areas of cutover bog. | | | | |
| Active raised bog | Maintain the diversity and quality of other habitats associated with the active raised bog, e.g. acid grassland, fen and swamp, especially where these exhibit natural transition to the raised bog. | | | | |
| | Maintain the hydrology of the raised bog peat mass. | | | | |
| | Seek nature conservation management over suitable areas immediately outside the SAC where there may be potential for lowland raised bog rehabilitation. | | | | |

5.9.3 NIEA state that the first condition assessment of the site was carried out in November 2002. Their provisional evaluation of the results suggests that the active raised bog is in <u>unfavourable</u> condition. The condition assessment undertaken by NIEA in 2008 suggests that the active raised bog is in unfavourable: declining condition due to an increase in signs of drying out.



6 Potential impacts and mitigation

6.1 Degradation of the qualifying habitats by airborne pollutants

Nitrogen deposition

- 6.1.1 Tully Bog has been identified as being potentially sensitive to nitrogen deposition (nitrogen saturation of sphagnum) which could have an effect on the species composition of the bog habitat.
- 6.1.2 Nitrogen is an element which is used in plant growth, and in excessive quantities promotes increase in vascular plant growth, altered growth and species composition of bryophytes; and increased nitrogen in peat and peat water which can alter the habitat composition of a bog. This can lead to the habitat altering in a manner which reduces the biodiversity value of the site.
- 6.1.3 To determine the potential for the scheme to have a significant impact on the qualifying habitats, two scenarios were investigated for the scheme Opening Year: the Do Minimum (DM) scenario, which assumes the scheme has not progressed but that the existing road network has been subject to general maintenance, and that traffic has grown in line with national predictions; and the Do Something (DS) scenario which assumes the scheme has been completed, and that traffic growth and patterns are in line with the national predictions and the traffic modelling undertaken for the scheme.
- 6.1.4 The current levels of Nitrogen deposition for Tully Bog are taken from APIS. These are mapped on a 5 km x 5km basis with the area covered by each 5 km grid square noted. The data currently available on the system are for 2013-2015.
- 6.1.5 The APIS site states levels at Tully Bog for 2013-2015 as 4.9 μg NOx (as NO₂) m⁻³ and 20.44 kg N ha⁻¹ y⁻¹. Therefore current levels are below the EU air quality limit of values for vegetation, 30 μg NOx m⁻³, but above the United Nations Economic Commission for Europe (UNECE) critical load for raised bog of 5-10 kg N ha⁻¹ y⁻¹.
- 6.1.6 Predicted annual mean NO_X concentrations were compared to the national and European air quality limit values for vegetation for the DM and DS scenarios.
- 6.1.7 Nitrogen deposition rates at each site were predicted for both scenarios. These were compared with the critical loads for nitrogen set by the UNECE for the habitat type forming the focus of the designation, raised bog.
- 6.1.8 The predicted minimum and maximum annual mean NO_X concentrations at Tully Bog in the DM and DS scenarios for the opening year and the minimum and maximum changes concentrations when comparing the two scenarios are detailed in Table 6.1. The tables and figures demonstrate that annual mean NO_X concentrations would be substantially below the EU Limit Value in both scenarios.



Table 6.1 Range of Annual Mean NOx Concentration (µg m³) at Tully Bog for DM and DS

| Annual Mean NOx Concentration μg m ⁻³ | | | | | | | | |
|--|------|-------|------|-------|----------------|------|--|--|
| Road Phase | DM \ | /alue | DS V | 'alue | Change (DS-DM) | | | |
| (Year) | Min | Max | Min | Max | Min | Max | | |
| 2 (2023) | 3.4 | 7.8 | 3.7 | 7.8 | +0.3 | +0.0 | | |
| 3 (2028) | 3.0 | 6.4 | 3.2 | 6.9 | +0.2 | +0.5 | | |

6.1.9 The predicted minimum and maximum nitrogen deposition rates for the Tully Bog in the DM and DS scenarios for the opening year and the minimum and maximum changes in rates when comparing the two scenarios are detailed in Table 6.2.

Table 6.2 Range of Annual Mean N-deposition Rate (kg N ha⁻¹ yr⁻¹) at Tully Bog for DM and DS

| N-Deposition Rate (kg ha ⁻¹ y ⁻¹) | | | | | | | | |
|--|-------|-------|-------|-------|----------------|-------|--|--|
| Road Phase | DM \ | /alue | DS V | 'alue | Change (DS-DM) | | | |
| | Min | Max | Min | Max | Min | Max | | |
| 2 (2023) | 21.29 | 22.47 | 21.47 | 21.50 | +0.18 | -0.97 | | |
| 3 (2028) | 19.38 | 20.20 | 19.53 | 20.40 | +0.15 | +0.20 | | |

- 6.1.10 The tables and figures demonstrate that nitrogen deposition critical loads are exceeded currently, and would continue to be exceeded with and without the Proposed Scheme.
- 6.1.11 Without the A5WTC scheme, N-deposition rates are predicted to be 22.47 kg N ha⁻¹ y⁻¹ in 2023 and 20.20 kg N ha⁻¹ y⁻¹ in 2028. This represents an N-deposition rate of 225 to 449% of the UNECE Critical Load for bog habitats in 2023 and 202 to 404% of the UNECE Critical Load for bog habitats in 2028.
- 6.1.12 With the A5WTC scheme, N-deposition rates are predicted to be 21.50 kg N ha-1 y-1 in 2023 and 20.40 kg N ha-1 y-1 in 2028. This represents an N-deposition rate of 215 to 430% of the UNECE Critical Load for bog habitats in 2023 and 204 to 408% of the UNECE Critical Load for bog habitats in 2028.
- 6.1.13 Thus the A5WTC could be seen as potentially contributing between 2 and 4% additional N-deposition in comparison to the UNECE Critical Load.
- 6.1.14 A small proportion of the SAC would experience these slightly elevated levels, and detailed field surveys demonstrate a lack of competitive species, such as purple moor grass, on the bog surface that would take advantage of the increased nitrogen levels to supplant the existing



vegetation. The floral assemblage present would be therefore not expected to alter as a result of the change in nutrient input.

Construction Dust

- 6.1.15 Sources of dust during construction include:
 - use of haul routes;
 - transportation and storage of materials;
 - materials handling, storage, stockpiling, spillage and disposal;
 - excavations and earthworks;
 - drilling and grouting works; and
 - processing, cutting, crushing and grinding activities.
- 6.1.16 Receptors at high risk will be those located within 200m of the proposed working areas. The highest risk relates to receptors located within 50m of the proposed working areas and which are downwind of the predominant south-westerly winds associated with the area.
- 6.1.17 The contractors will be required to incorporate detailed dust control and management procedures within their Construction Environmental Management Plans (CEMPs). The plan will include the identification of a nominated Environmental Site Manager notification procedures where potentially significant dust generating activities are required, method statements for the control of dust in such locations and complaint receipt and management procedures to ensure issues, should they be raised by the public. Dust monitors will be established in areas of high risk.
- 6.1.18 Specific measures that will be adopted will include:
 - roads and accesses will be kept clean;
 - grout or cement-based materials will be mixed using a process suitable for the prevention of dust emissions;
 - fine material will not be stockpiled to an excessive height in order to prevent exposure to wind and/or dust nuisance;
 - dust generating activities (e.g. cutting, grinding and sawing) will be minimised and weather conditions considered prior to conducting potentially dust emitting activities;
 - plant will be located away from site boundaries close to residential areas;
 - water will be used as a dust suppressant where applicable;
 - drop heights from excavators to crushing plant will be kept to a minimum;



- distances from crushing plant to stockpiles will be kept to the minimum practicable to control dust generation associated with the fall of materials;
- skips will be securely covered;
- soiling, seeding, planting or sealing of completed earthworks will be completed as soon as reasonably practicable following completion of earthworks;
- dust suppression and the maintenance of the surface of haul routes will be appropriate to avoid dust as far as practicable, taking into account the intended level of trafficking;
- appropriate speed limits on haul roads will be imposed and enforced for safety reasons and for the purposes of suppressing dust emissions;
- · material will not be burnt on site; and
- engines will be switched off when not in operation.

6.2 Degradation of the qualifying habitat through changes in hydrology

- 6.2.1 The hydrological regime of Tully Bog SAC and of raised bogs in general as ombrotrophic mires, consists of input primarily through precipitation with output through streams around their periphery.
- 6.2.2 In its natural state a bog is 95% to 98% water. Drainage removes water and increases the dry matter content of the peat. This causes shrinkage of the peat causing the bog to sink. Studies undertaken by the Republic of Ireland National Parks and Wildlife Service at Clara Bog, Co. Offaly have shown that the bog has subsided by as much as 5 to 6m depth alongside a main drain and the effects of subsidence are in evidence at a distance of 500m from the drain itself. Cracking of the peat is commonly associated with subsidence. Subsidence of the peat and cracking increases the slope of the bog surface and this increases the discharge of water.
- 6.2.3 Drainage removes water from the peat lowering the water table. Studies at Wedholme Flow in the UK by English Nature (Labaz & Butcher, 2004) showed that each drain inserted, had the effect of lowering the water table over the entire site from 10cm to 30cm or more. This destroys the acrotelm, the upper layer of the bog which contains the living Sphagnum mosses, the peat forming community. As a result the bog loses its peat forming capacity. The vegetation changes from a Sphagnum dominated community to a vegetation type dominated by dry bog species such as heathers, and sometimes colonisation by birch trees follows. Once peat is exposed to air by drainage, it begins to break down. Oxygen in the air makes it possible for bacteria to digest the peat. Carbon is released during decomposition. Drying of the peat and decomposition changes it structurally, making it difficult to re-wet and therefore unsuitable for re colonisation with Sphagnum mosses.
- 6.2.4 Drainage also causes bog pools to dry up with the result that the associated plant and animal communities also disappear. The dry conditions in the bog caused by drainage also make it more susceptible to fire damage. Another detrimental effect to the bog is caused by the practice



of mechanically spreading turf to dry on the bog surface. This damages the vegetation which may die due to the shading effect and damage caused by compaction which affects the bog as a whole.

- 6.2.5 Construction of a road scheme could alter the hydrology of a nearby raised bog if they cause an increase in drainage from the bog surface.
- 6.2.6 The bog occupies the lowest point in the local terrain. The nearest proposed works are the tieins to Todds Rd and Drumlegagh Rd. They do not involve any work to the west side of Drumlegagh Rd. The main line works involve a range of low height embankments and cuttings. The cuttings will not extend below the level of the bog, so would not be expected to depress the local groundwater level.
- 6.2.7 There are areas of soft ground between Junction 11 and Drumlegagh Rd which will need to be removed and replaced with sound material during the construction of the earthworks. However, that excavation is not expected to be more than 2m deep and therefore not significantly below the level of the Tully Bog. Given the distance and temporary nature of those works, the impact upon the groundwater regime is expected to be negligible.
- 6.2.8 The embankments will result in a surcharging of the ground around junction 11, which will result in a minor reduction in the permeability of the clay soils in that area. That may locally result in a minor increase in the groundwater level up-gradient of that location. However, the nature of the local soils is such that the significant permeability thereof is not reduced by the construction of the embankments as such soils are largely incompressible.
- 6.2.9 The construction of the proposed scheme is not expected to affect the hydrological regime either by decreasing the input or increasing the output of water. No drainage features of the bog will be affected as a result of the proposed scheme.
- 6.2.10 Therefore, the proposed scheme is unlikely to have a significant effect on the integrity of the site.

6.3 In-combination Effects

- 6.3.1 The Habitats Directive, NI Regulations and ROI Regulations require consideration to be given to potentially combined effects of a development project and other projects on Natura 2000 sites. Several proposed development projects lying within 1km of Tully Bog SAC, which have either been approved in outline or fully approved in accordance with the relevant development consent regime for the form of development proposed, have been considered to date in the context of this requirement for the currently proposed A5WTC (see Figure 2, Appendix 1).
- 6.3.2 However, between 2009 and 2016 the planning permissions granted are for small individual dwellings or alterations to dwellings, with the exception of a floodlighting permission for an existing playing field and is unlikely to impact on the conservation objectives of the site.
- 6.3.3 No other road schemes are proposed which would alter traffic patterns such that any increase in emissions would be recorded within the SAC.



7 Summary

- 7.1.1 Tully Bog SAC has been identified as a Natura 2000 site with a relationship to the proposed A5WTC which requires that it should be considered in the context of the EC Habitats Directive, as transposed by the Conservation (Natural Habitats, &c) Regulations (Northern Ireland) 1995 as amended by the Conservation (Natural Habitats, etc.) (Amendment) Regulations (Northern Ireland) 2012 in Northern Ireland and the European Communities (Natural Habitats) Regulations 1997 (as amended) in the Republic of Ireland
- 7.1.2 The SAC has been subject to a process of screening based on the guidance provided in HD 44/09 of Volume 11 of the Design Manual for Roads and Bridges. It has been concluded:
 - the proposed scheme is a project which is not connected with or necessary to the management of the SAC;
 - the likelihood of the proposed scheme having a significant effect on the sites cannot be excluded on the basis of objective information; and
 - that Stage 2 Appropriate Assessments should be undertaken.
- 7.1.3 This document provides information to inform an appropriate assessment for the SAC. The information is being made available to statutory consultees and for wider public consultation. The information in this report and information received in response to the consultations will be considered by TNI and the Minister as appropriate assessments are completed in advance of a decision to proceed or not in accordance with the requirements of the Directive and Regulations.

7.1.4 In conclusion:

- The A5WTC has been designed to avoid features related to Natura 2000 site as far as possible;
- There is a high level of knowledge of the qualifying features (habitats and species) in the study area;
- Best practice mitigation has been included in the scheme design; and
- Based on the best scientific knowledge available, there will not be a significant effect on the conservation objectives of the SAC.
- 7.1.5 The information provided in this report indicates the proposed scheme will not have an impact on the integrity of the designated site either independently or in combination with other projects. A final view, however, cannot be concluded until further evaluation is undertaken in light of responses to this consultation.



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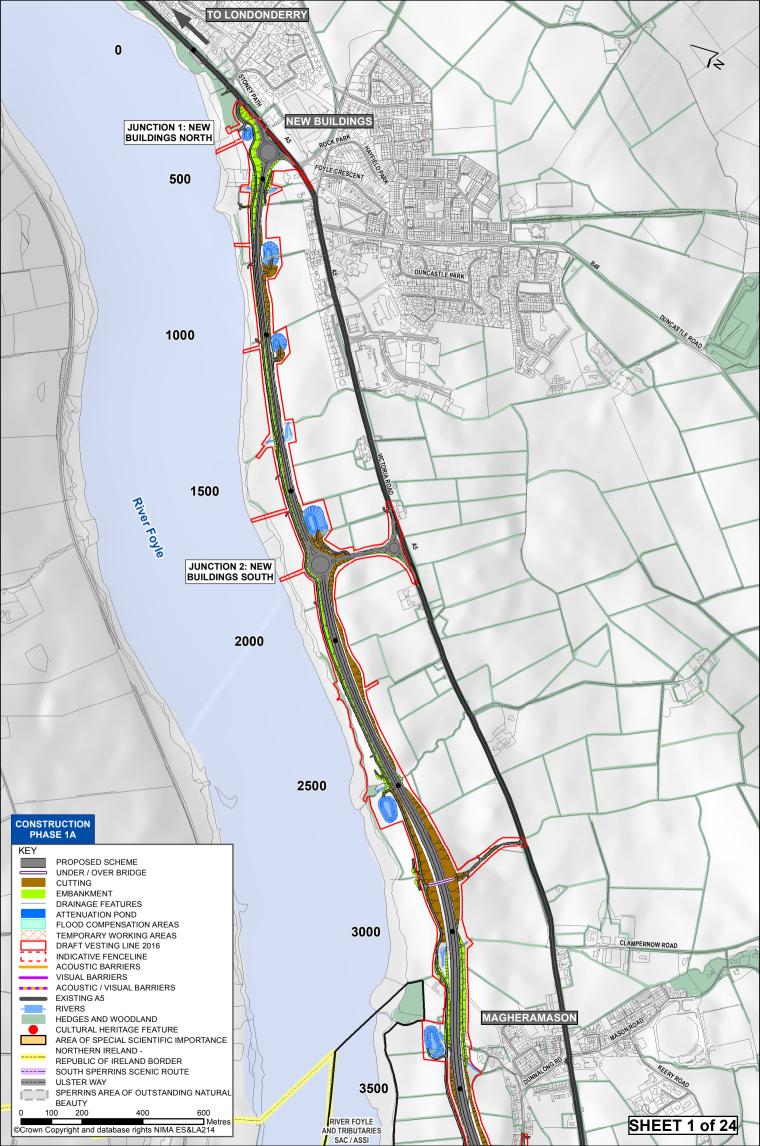
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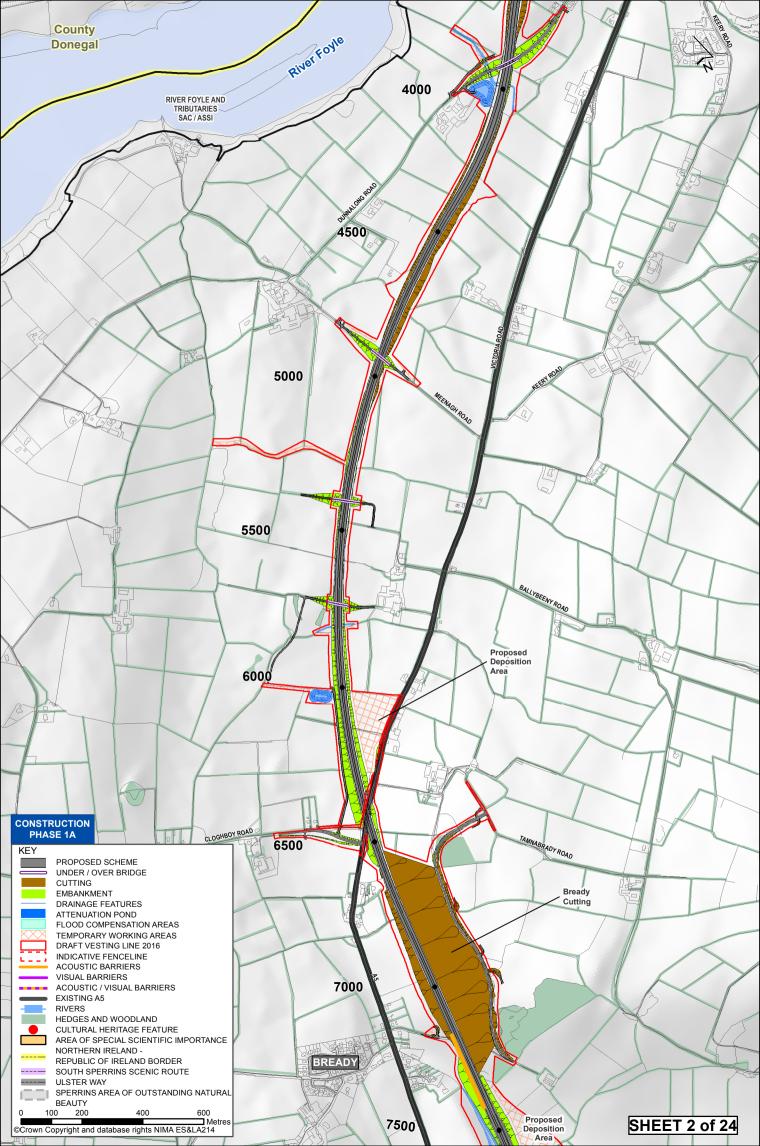
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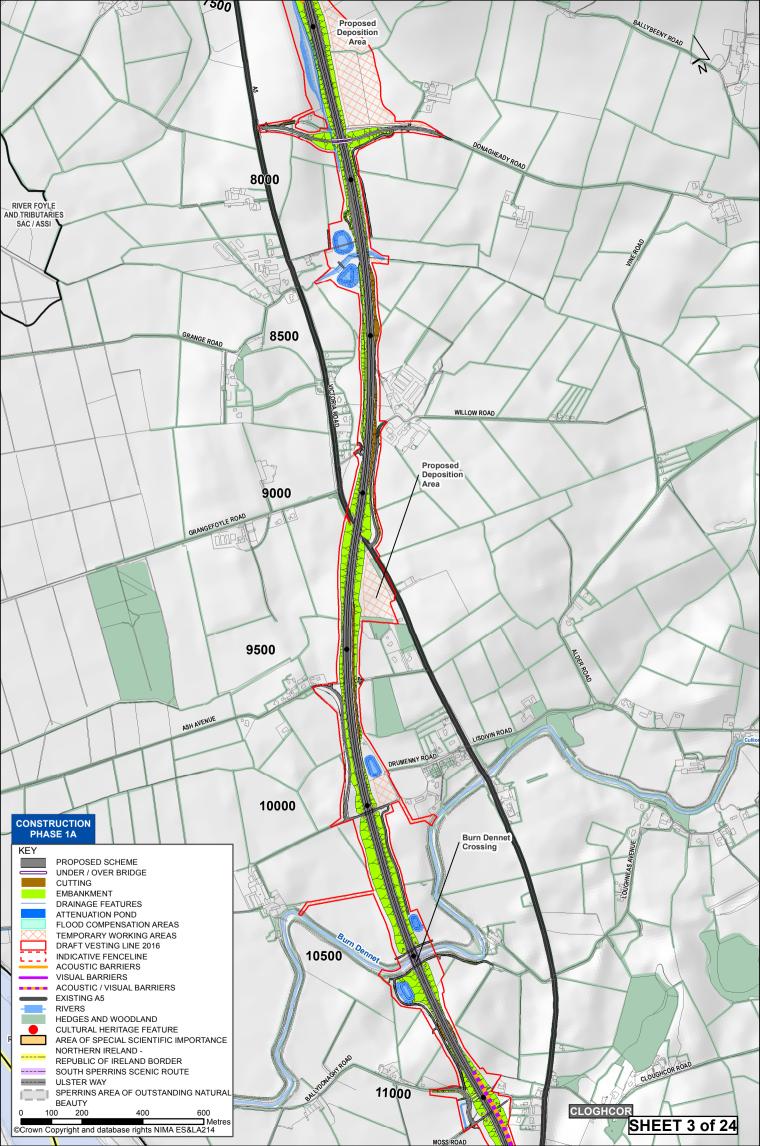
Tully Bog Special Area of Conservation

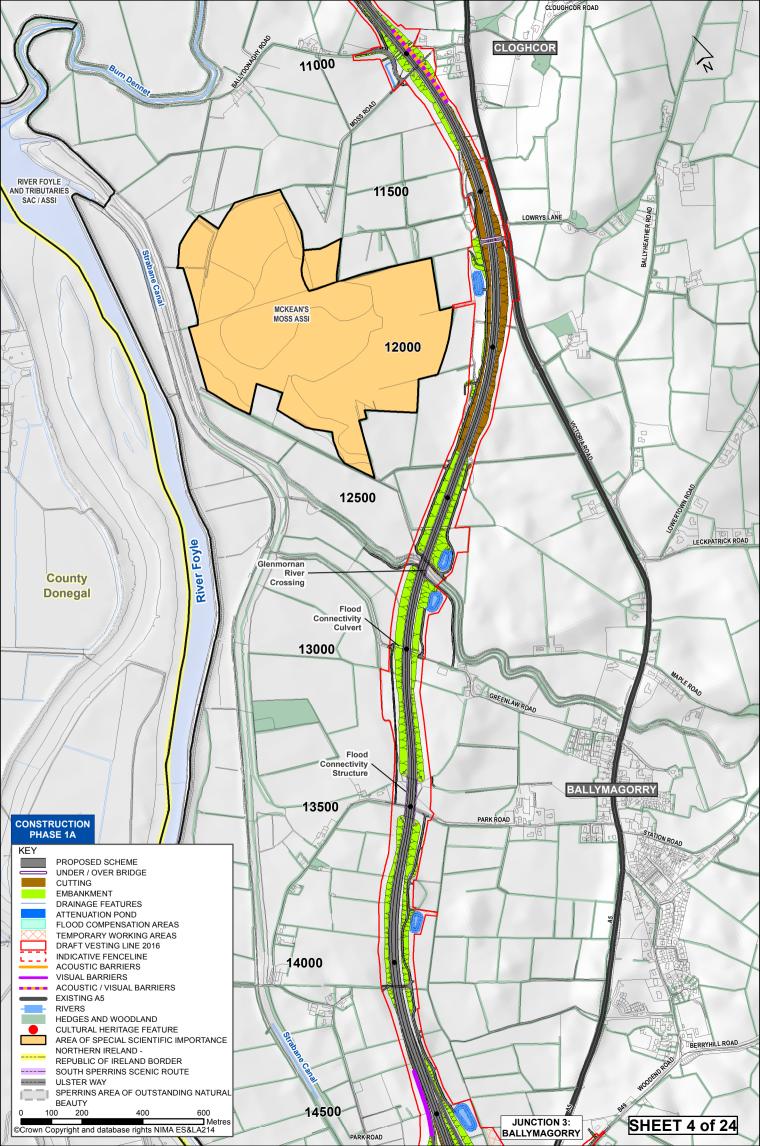


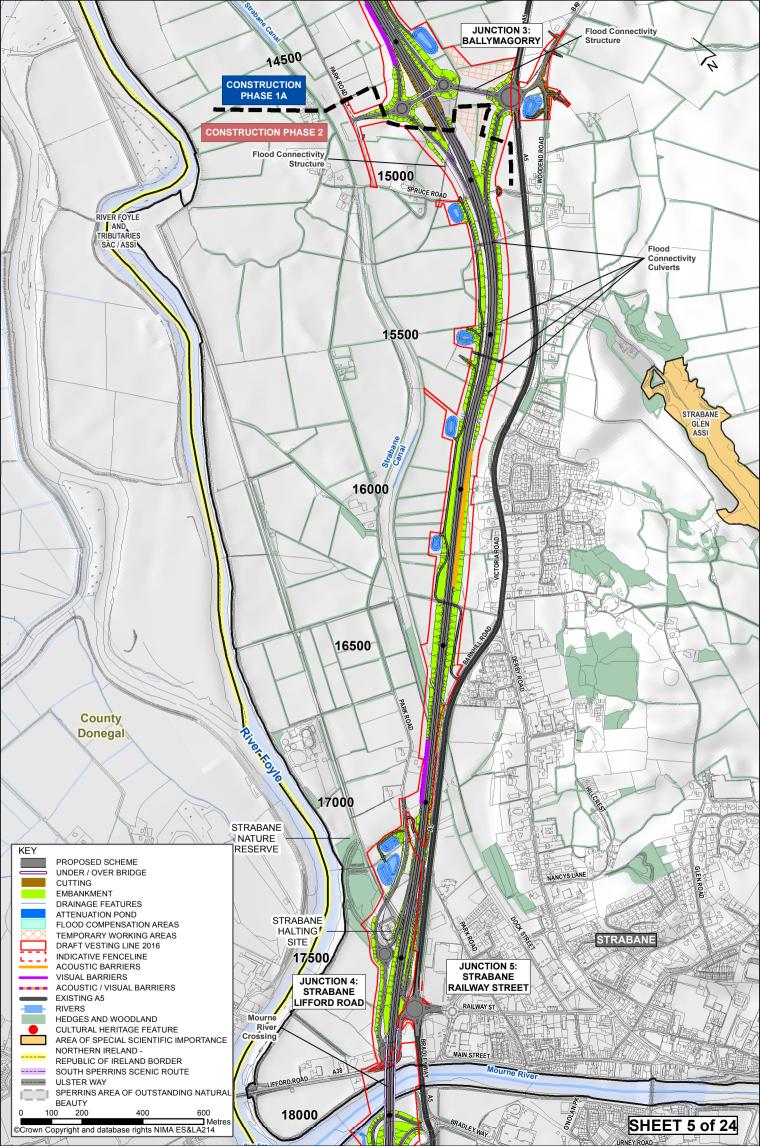
Appendix 1: Figures

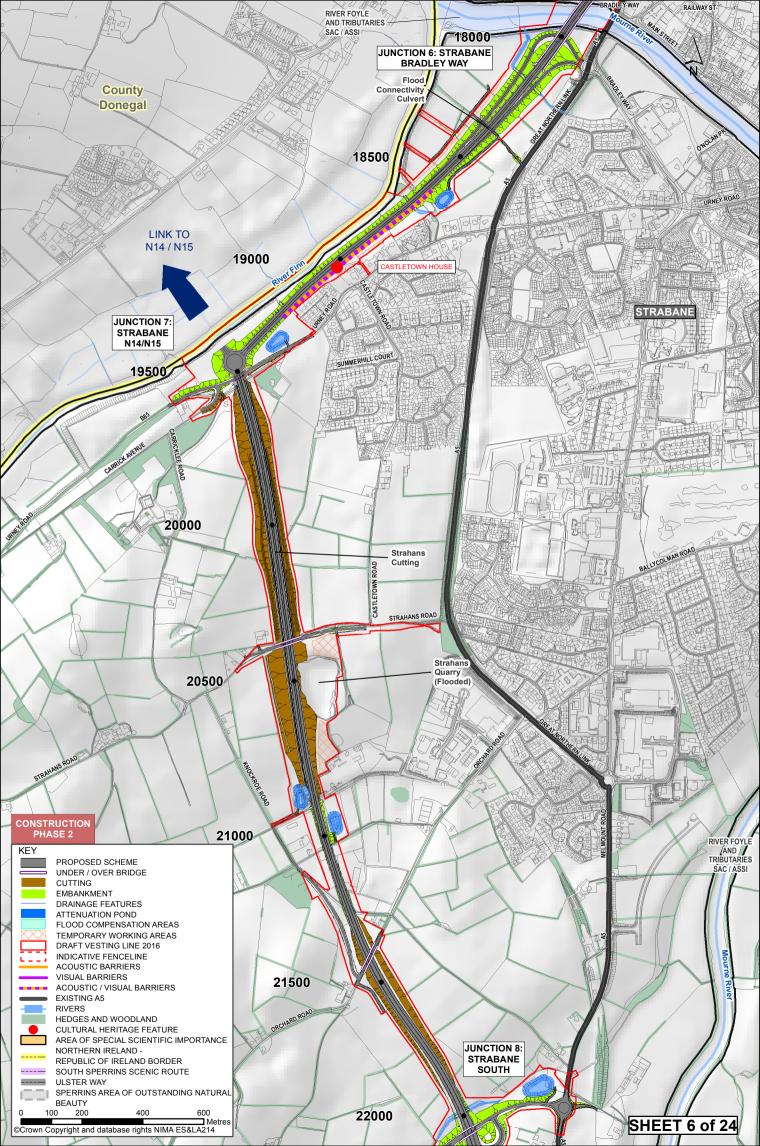


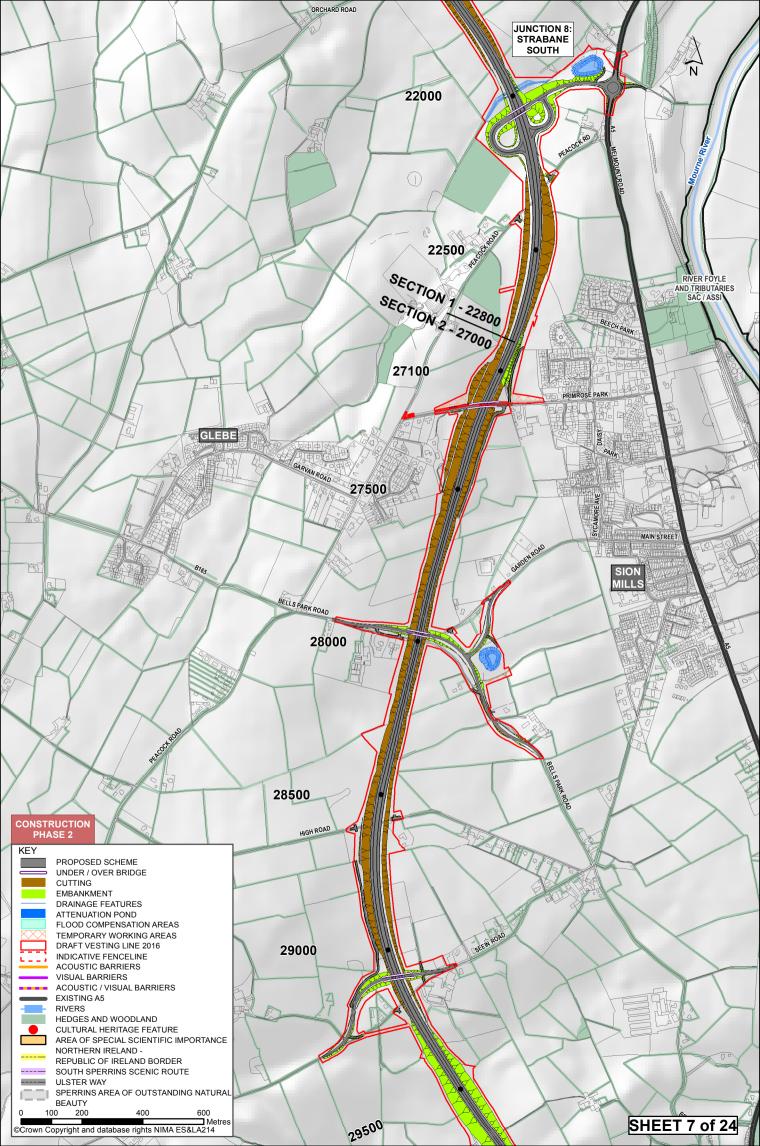


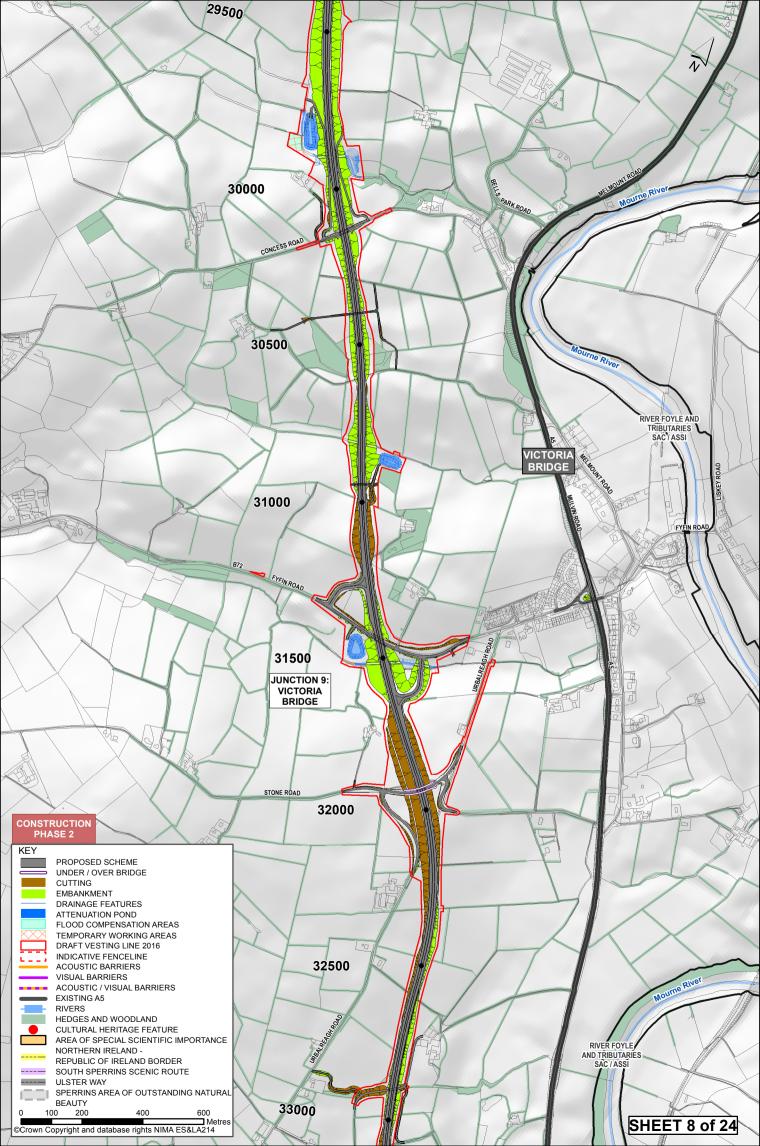


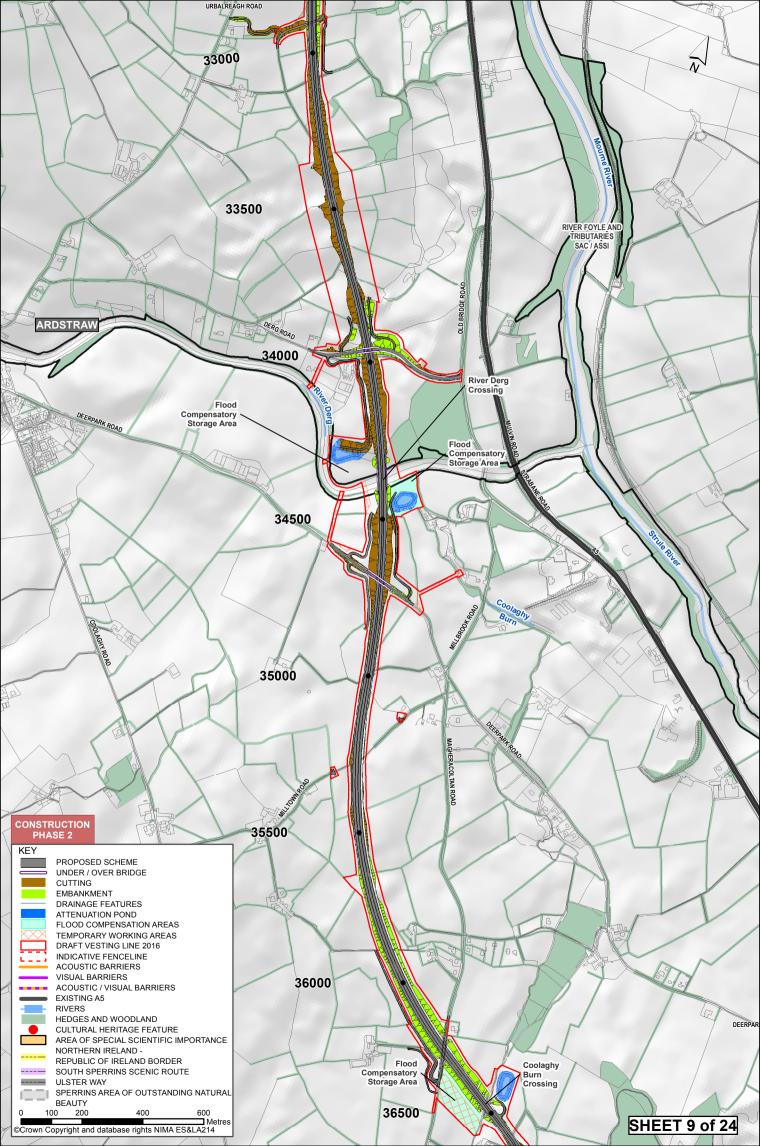


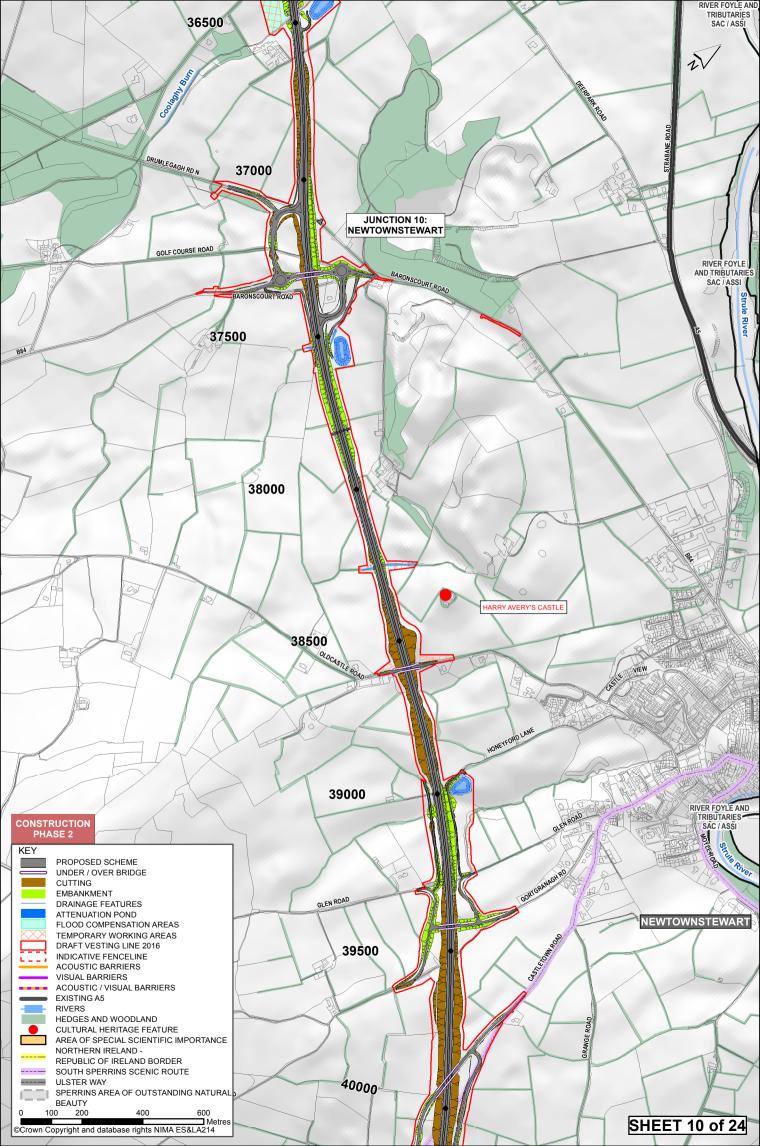


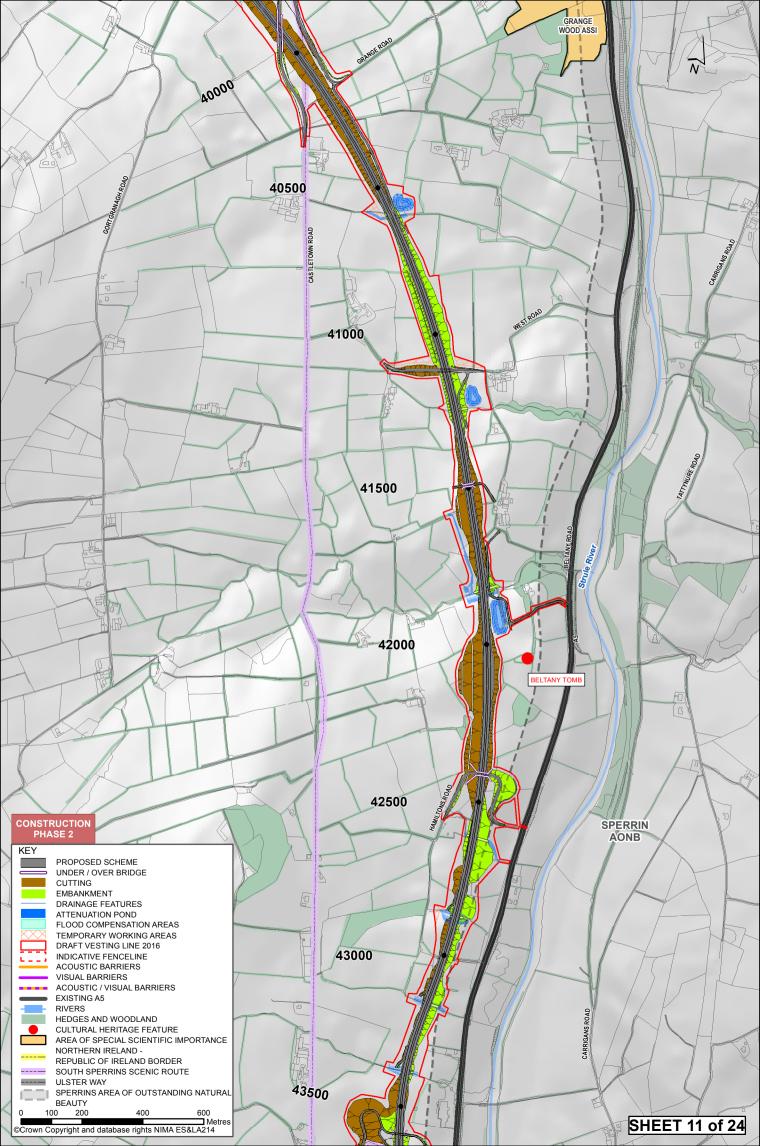


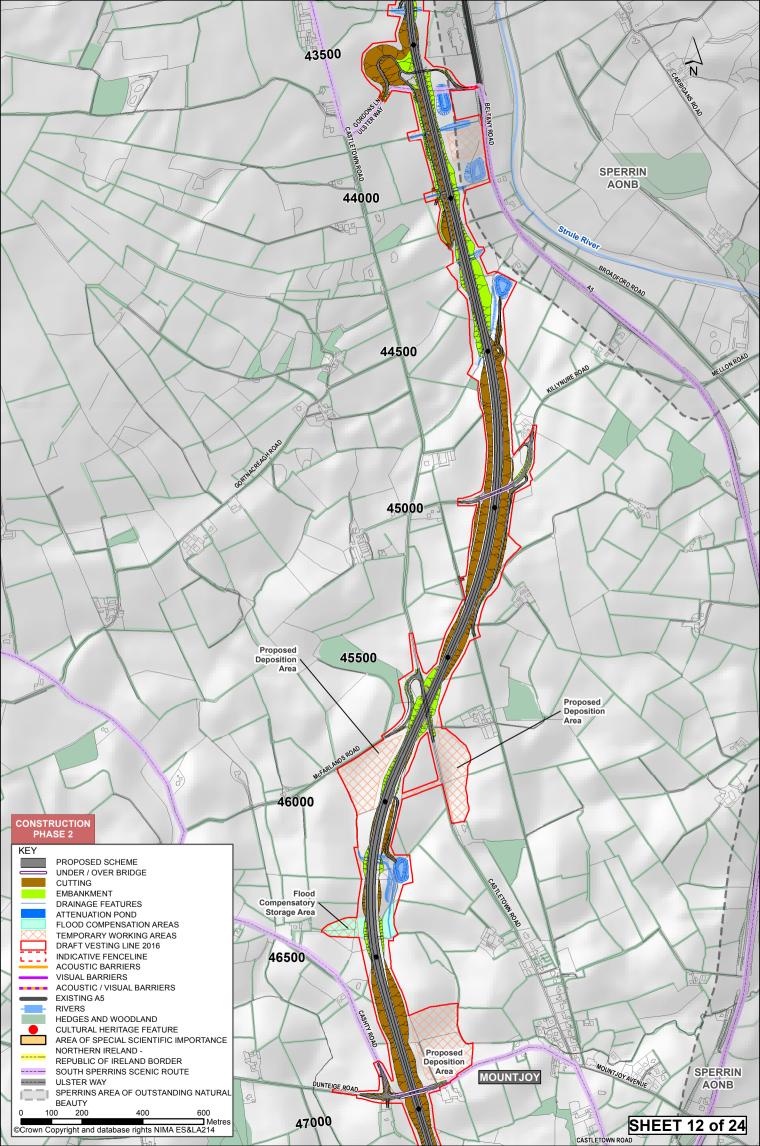


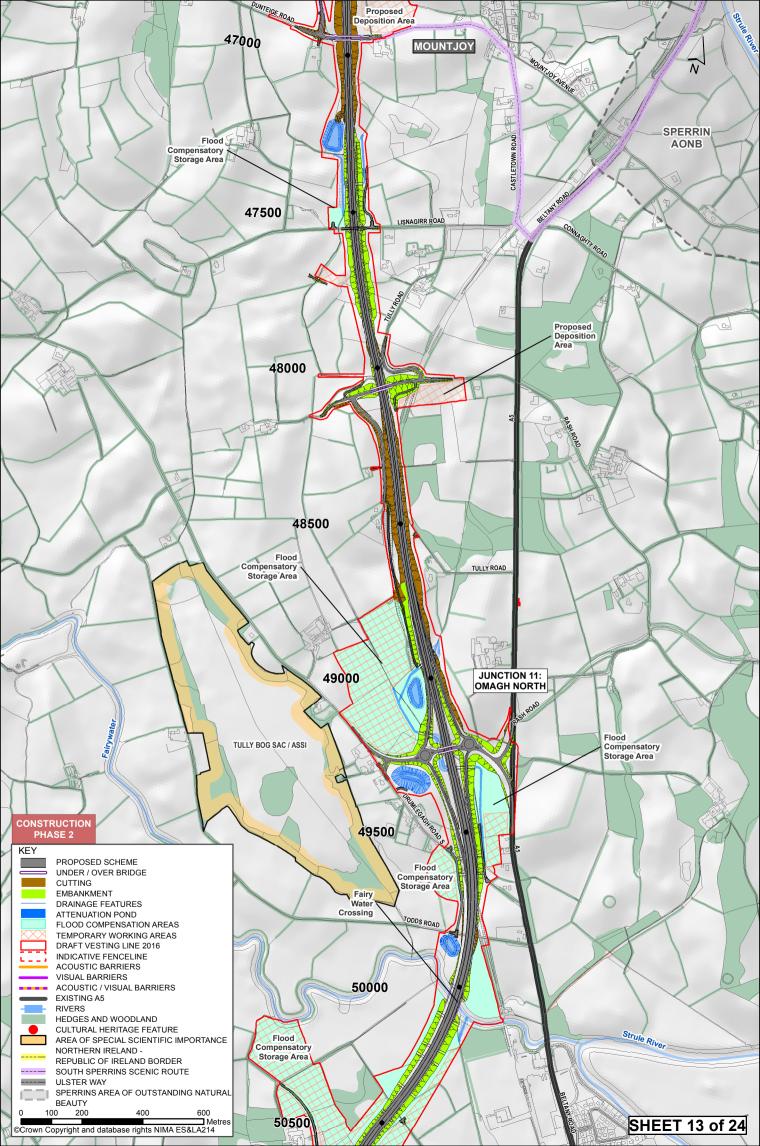


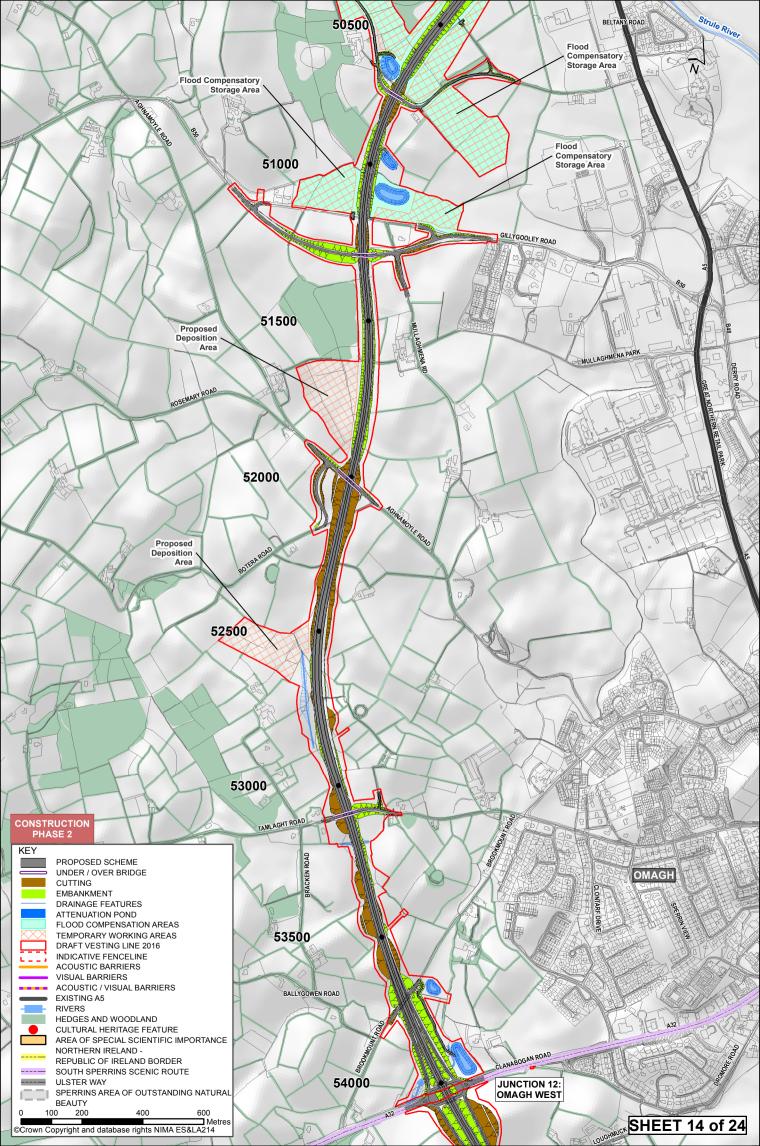


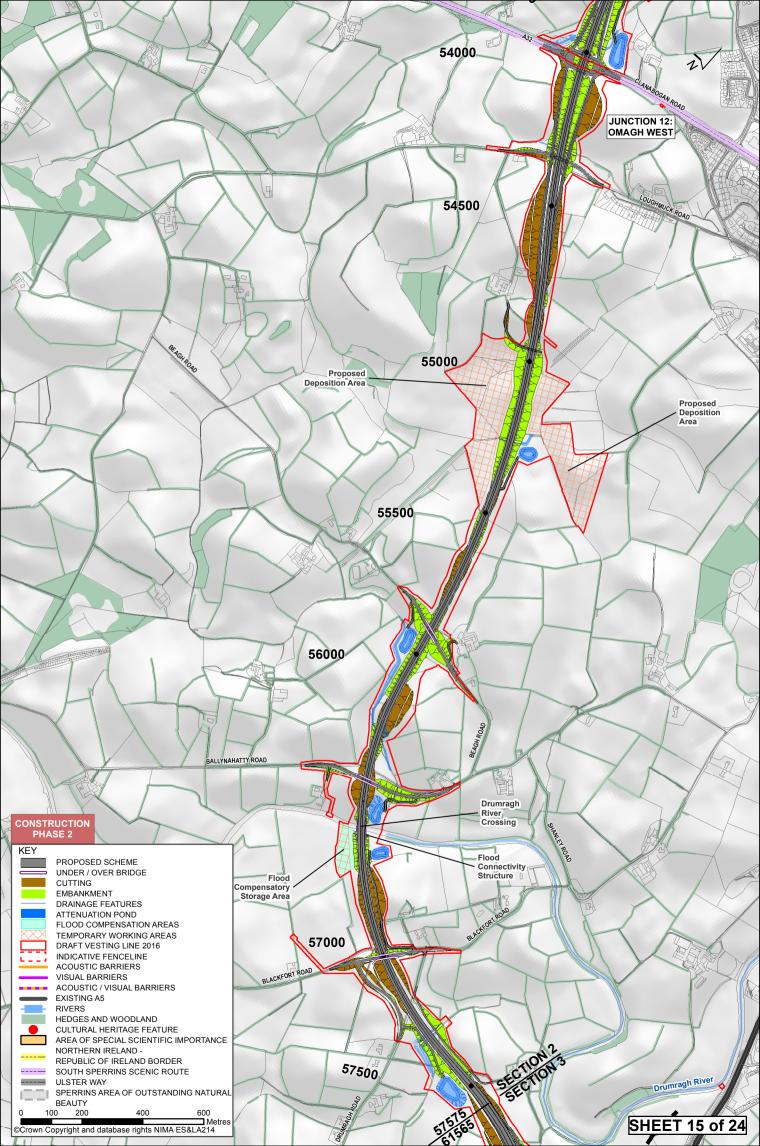


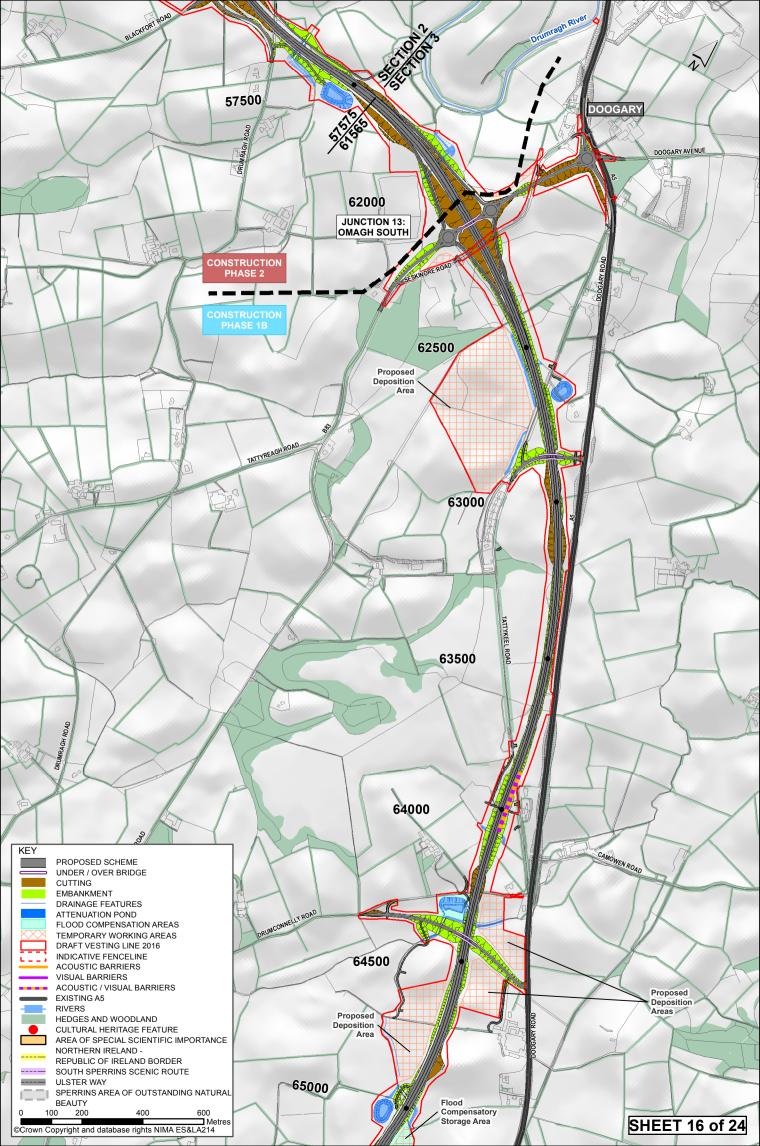


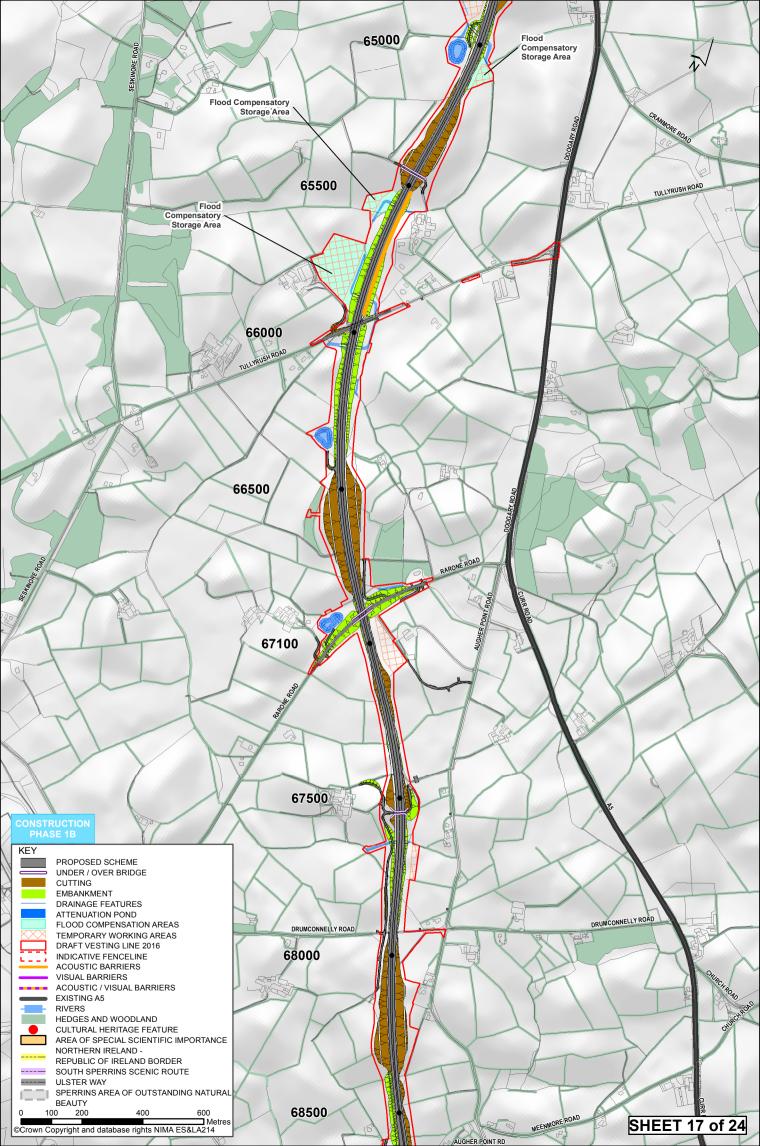


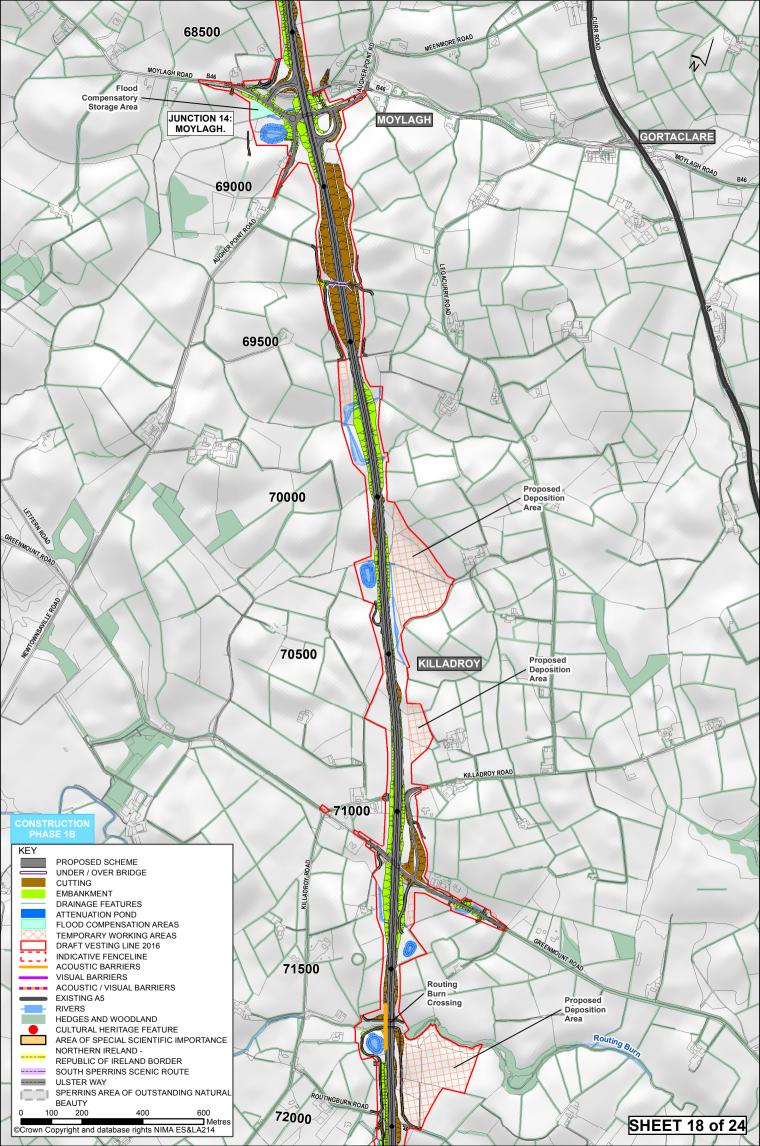


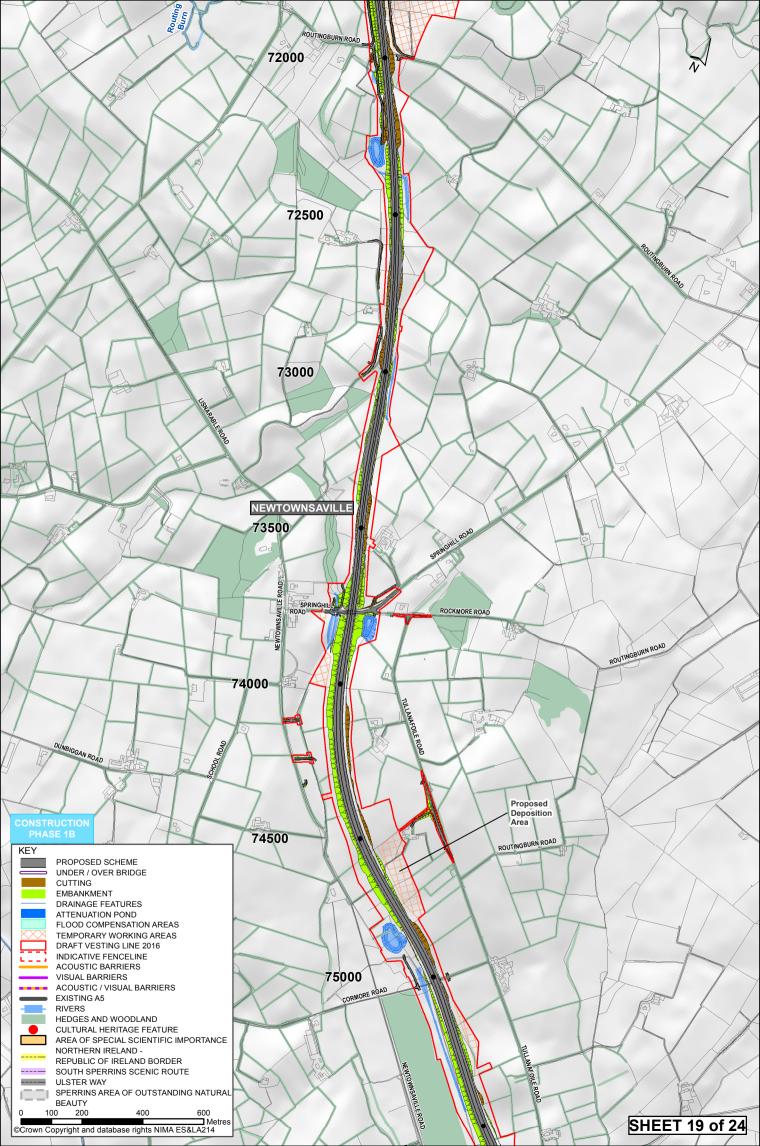


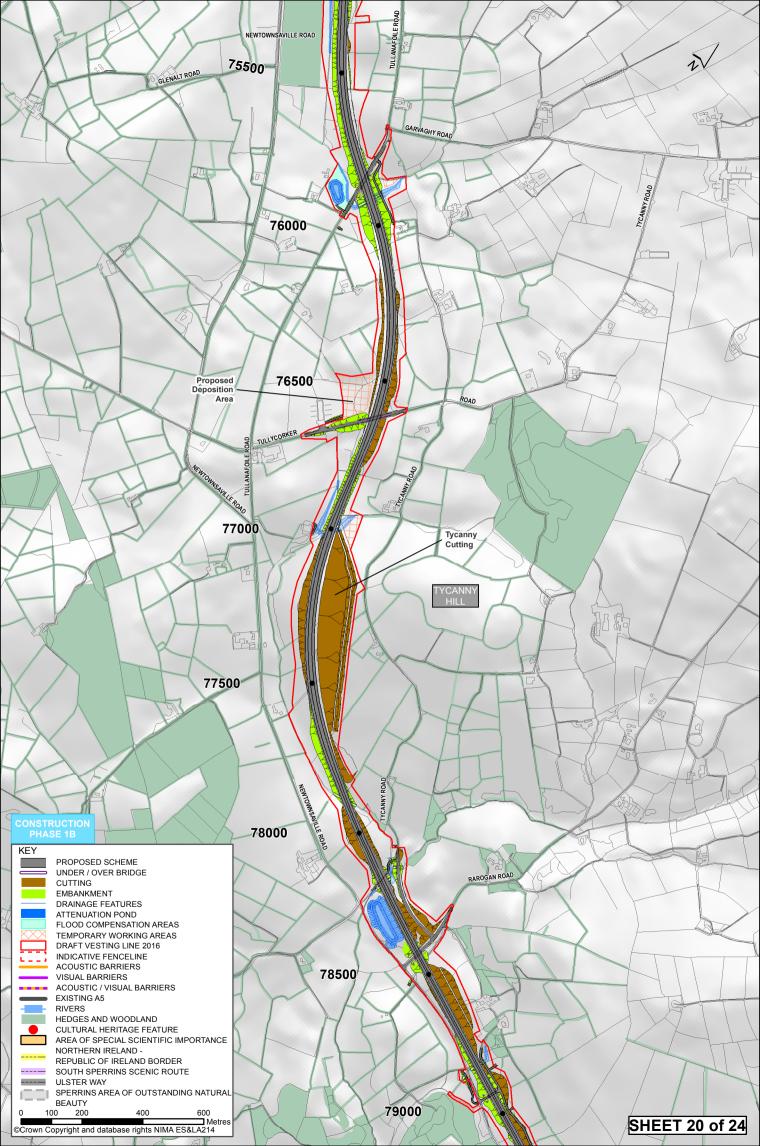


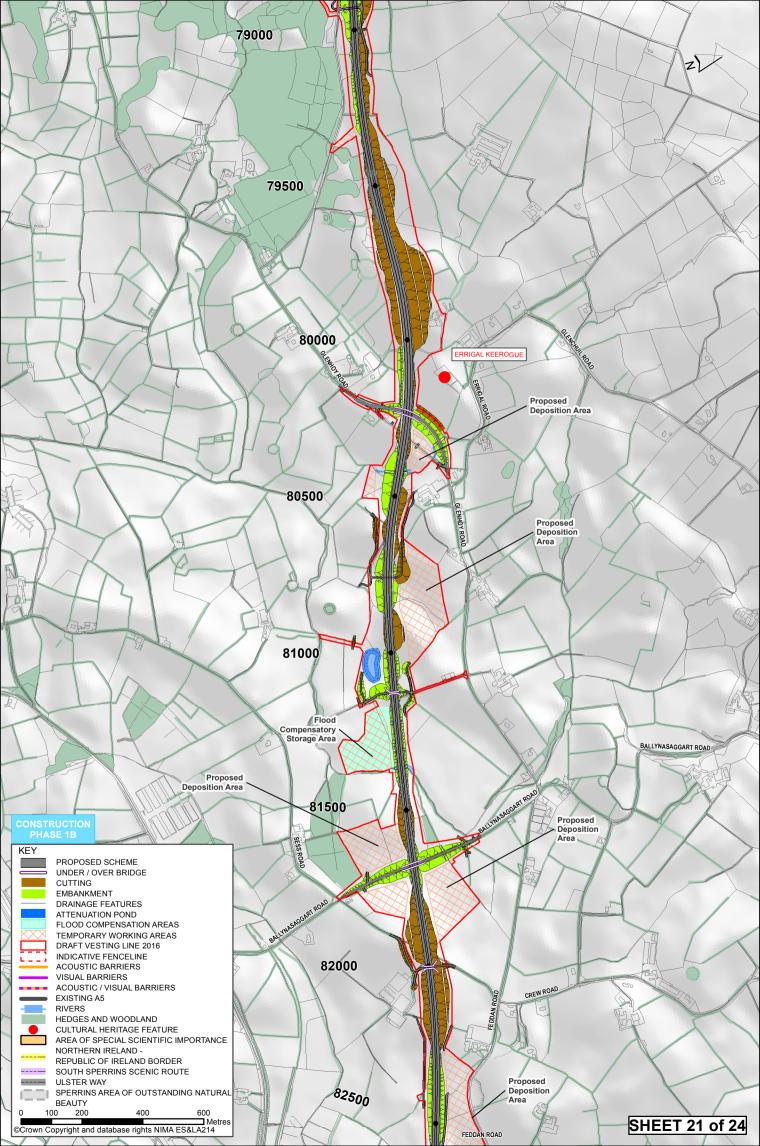


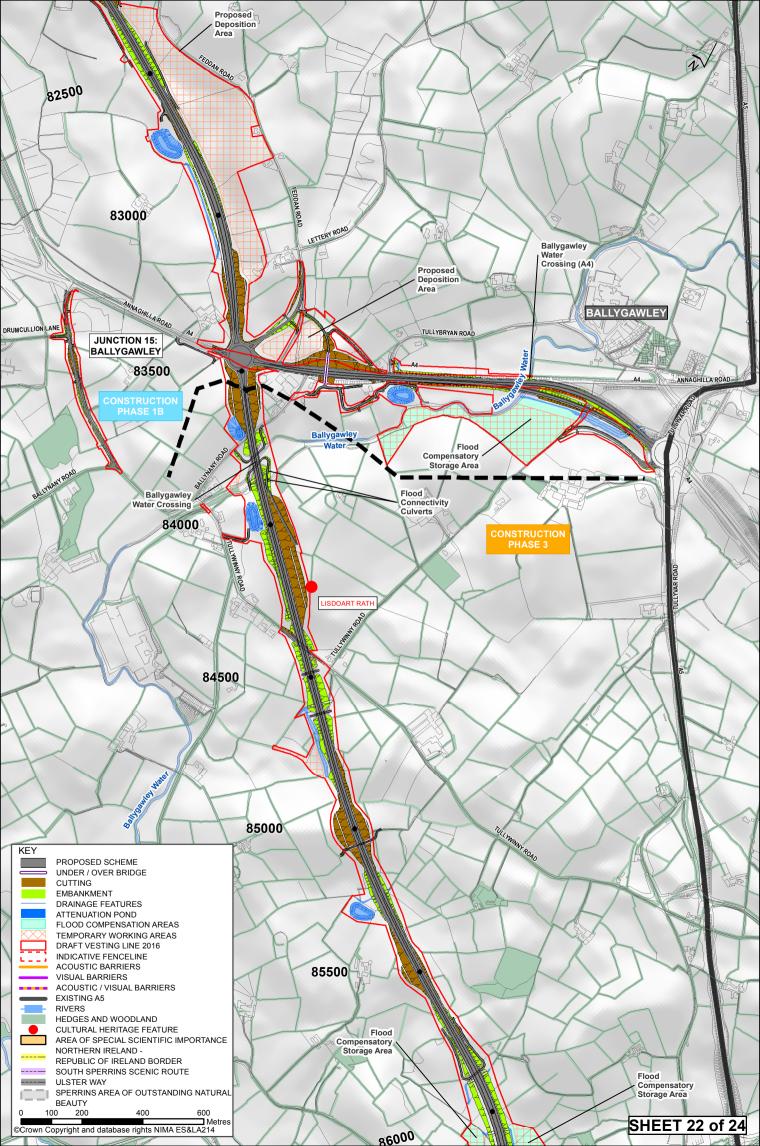


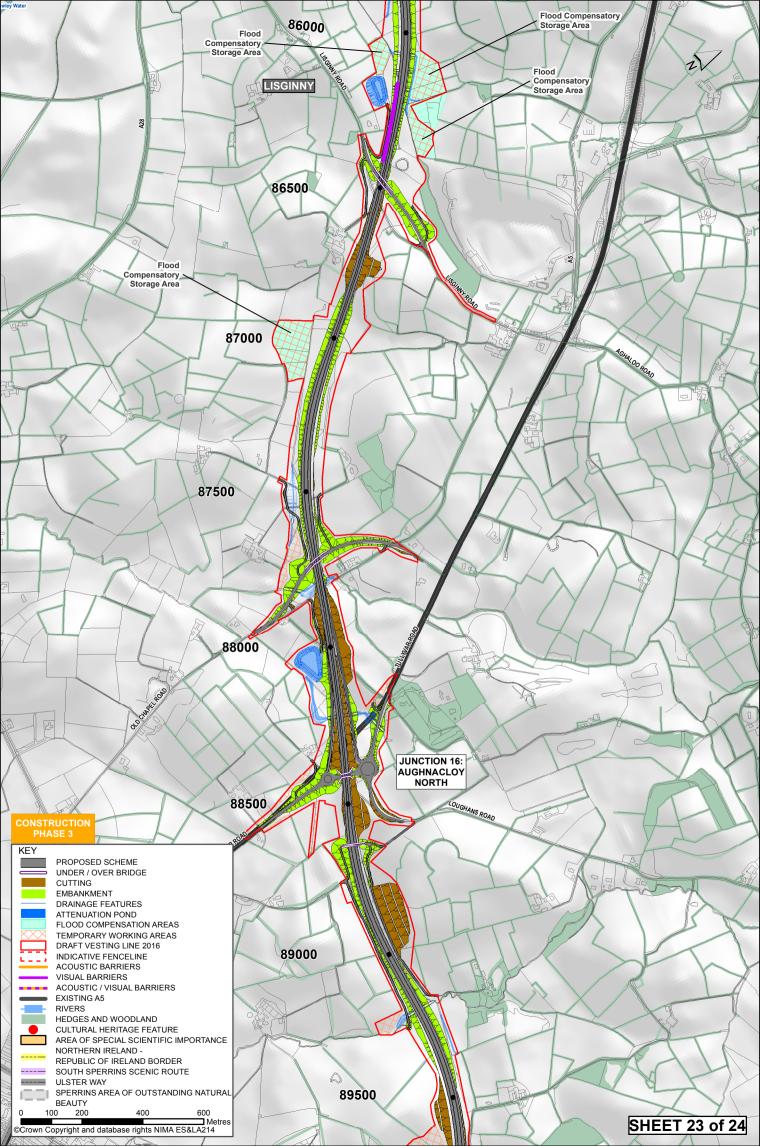


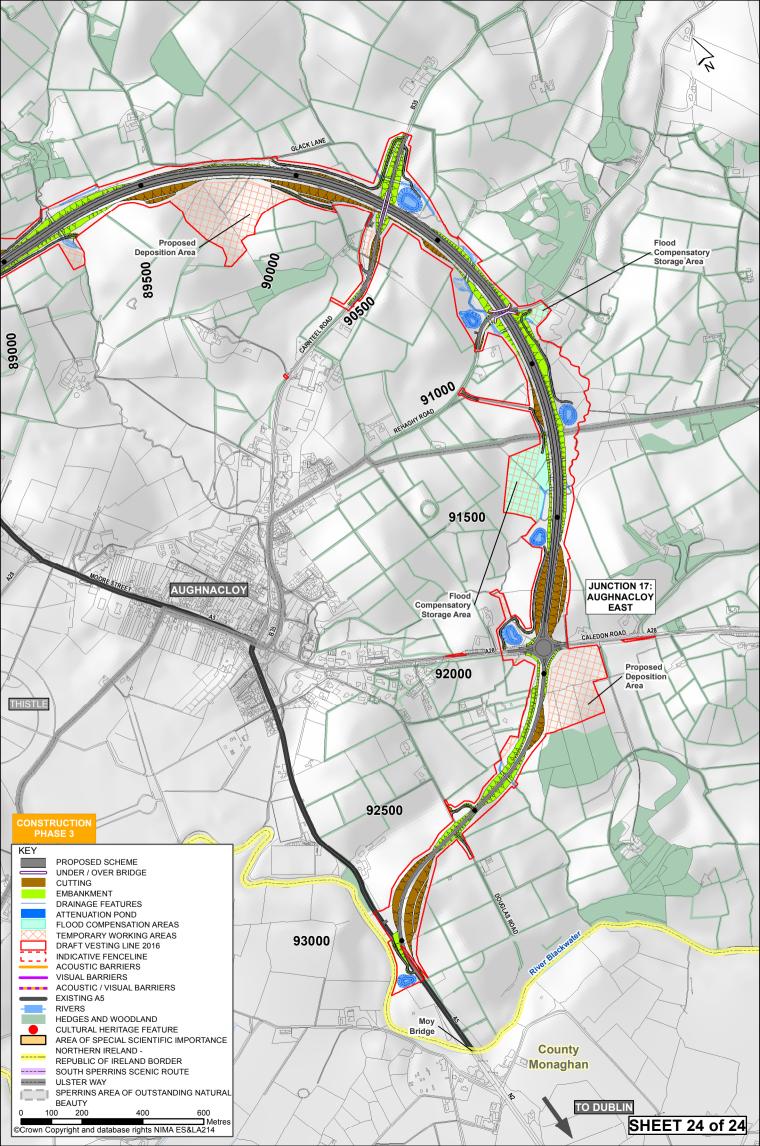


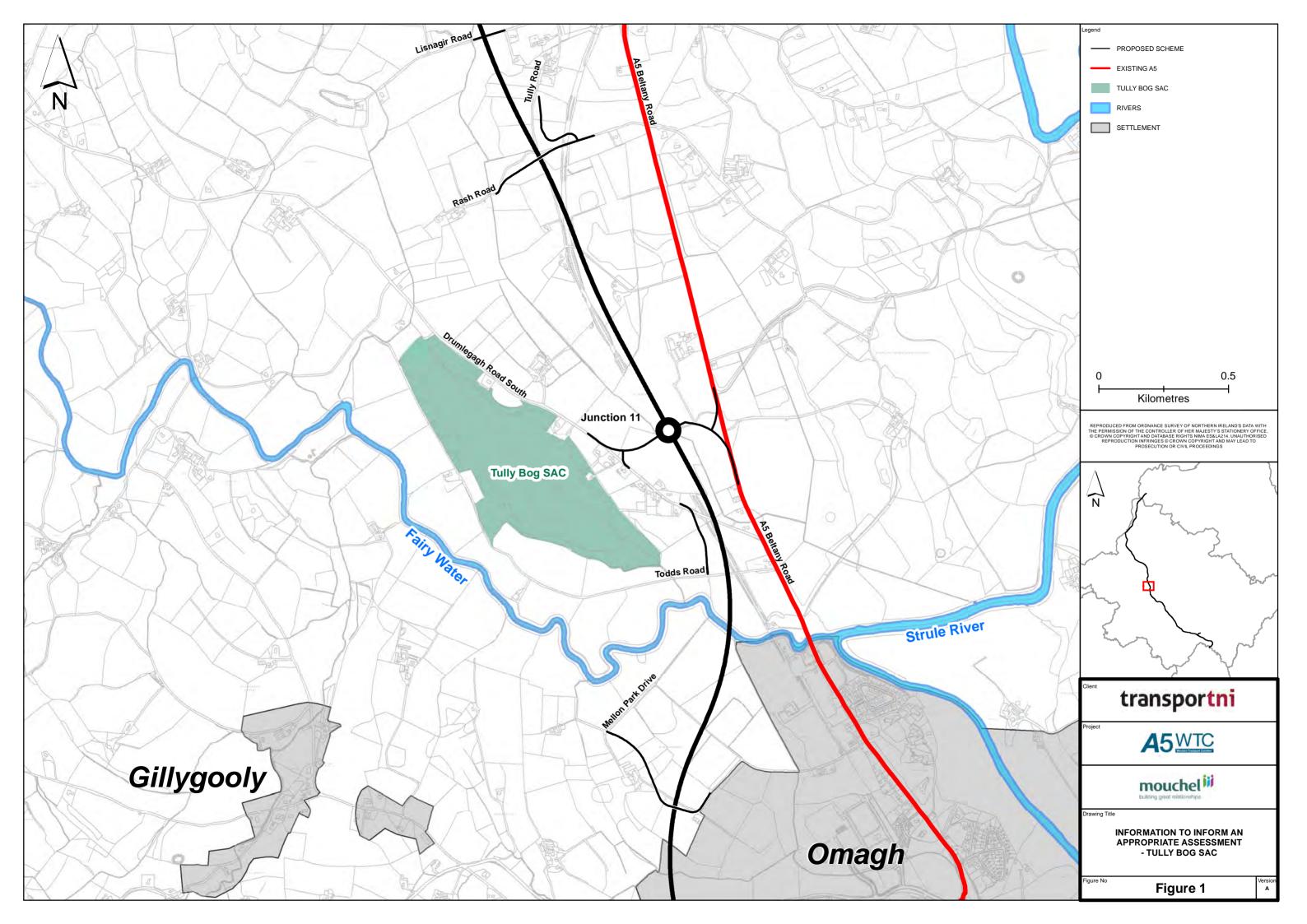


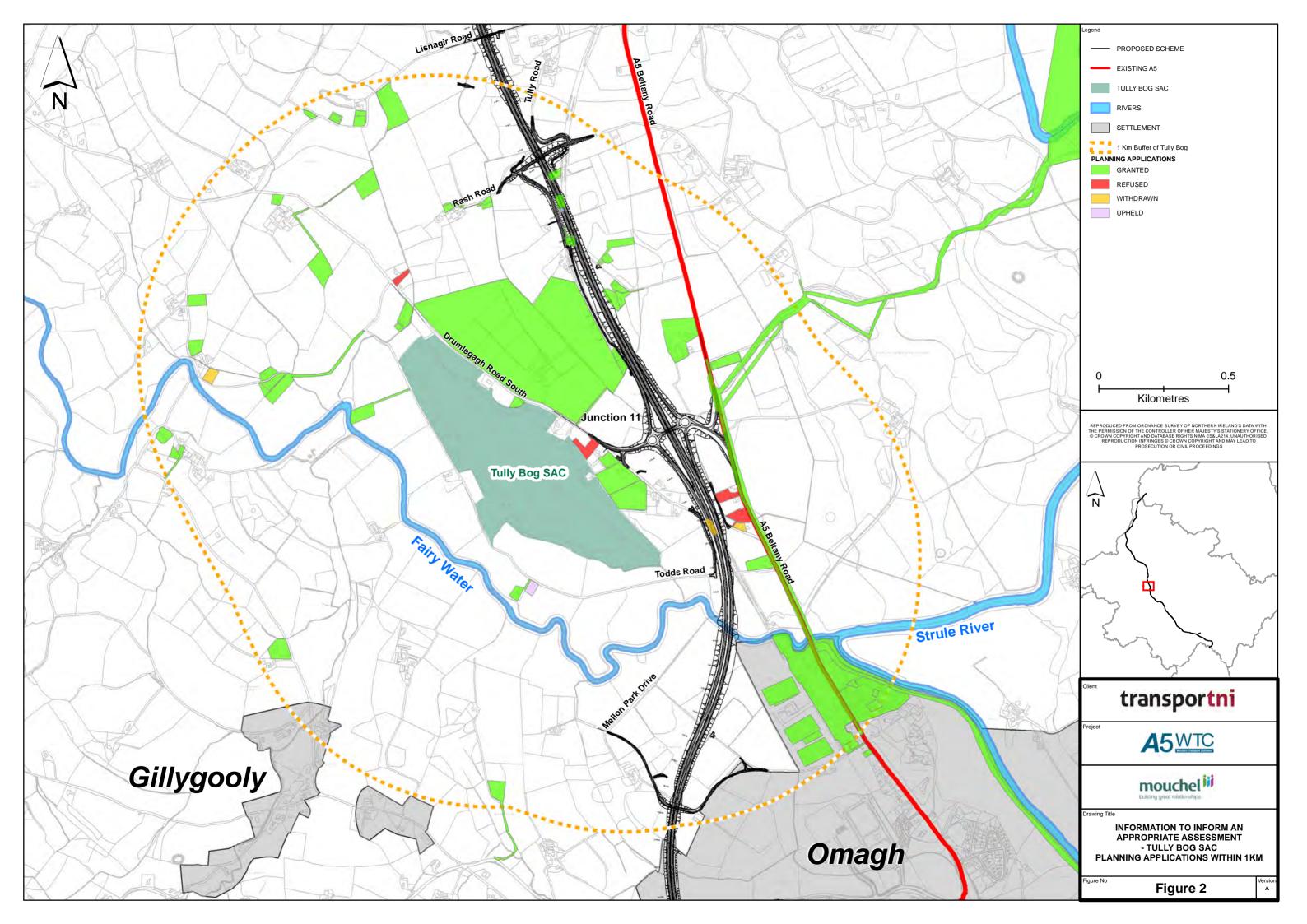


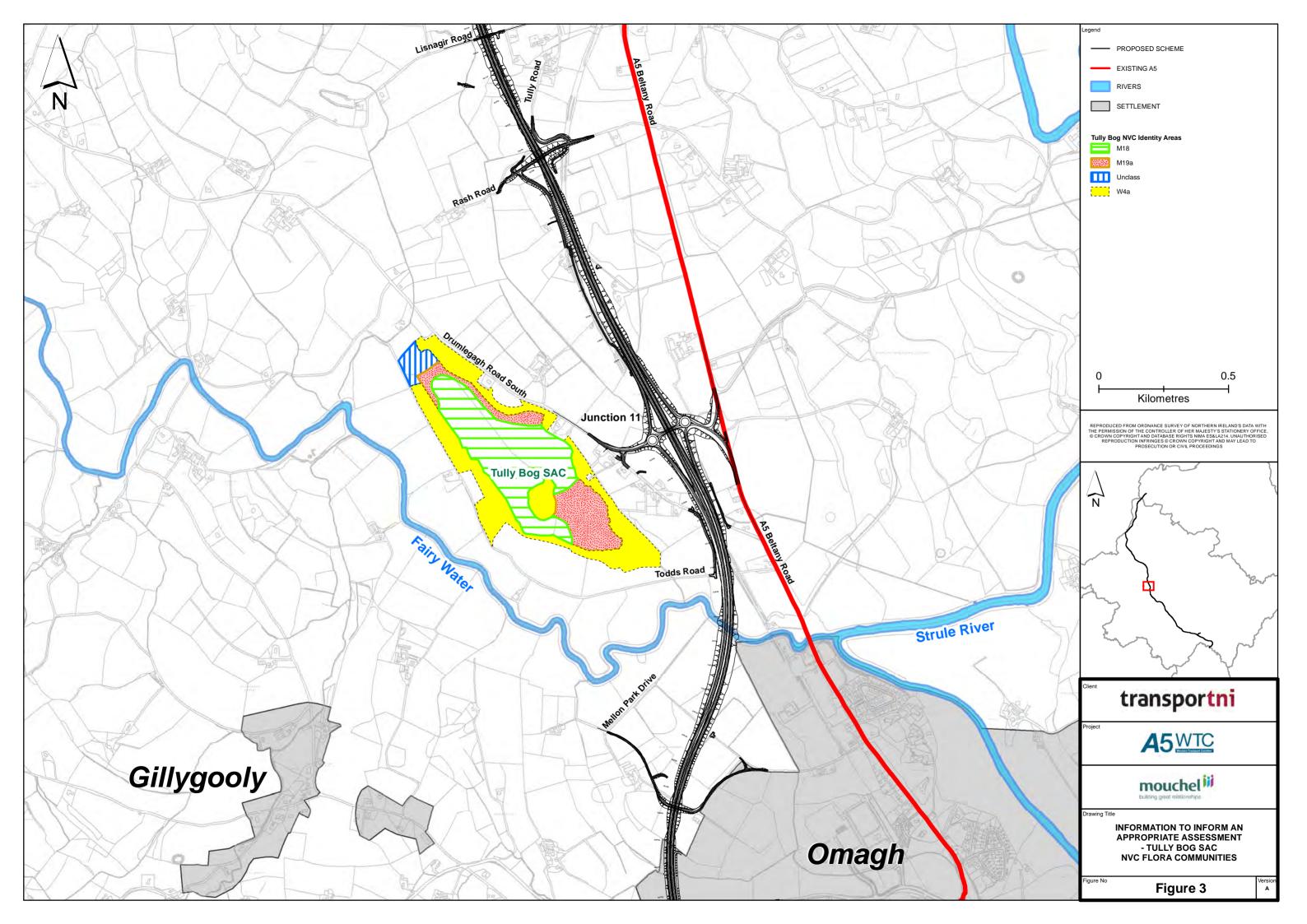


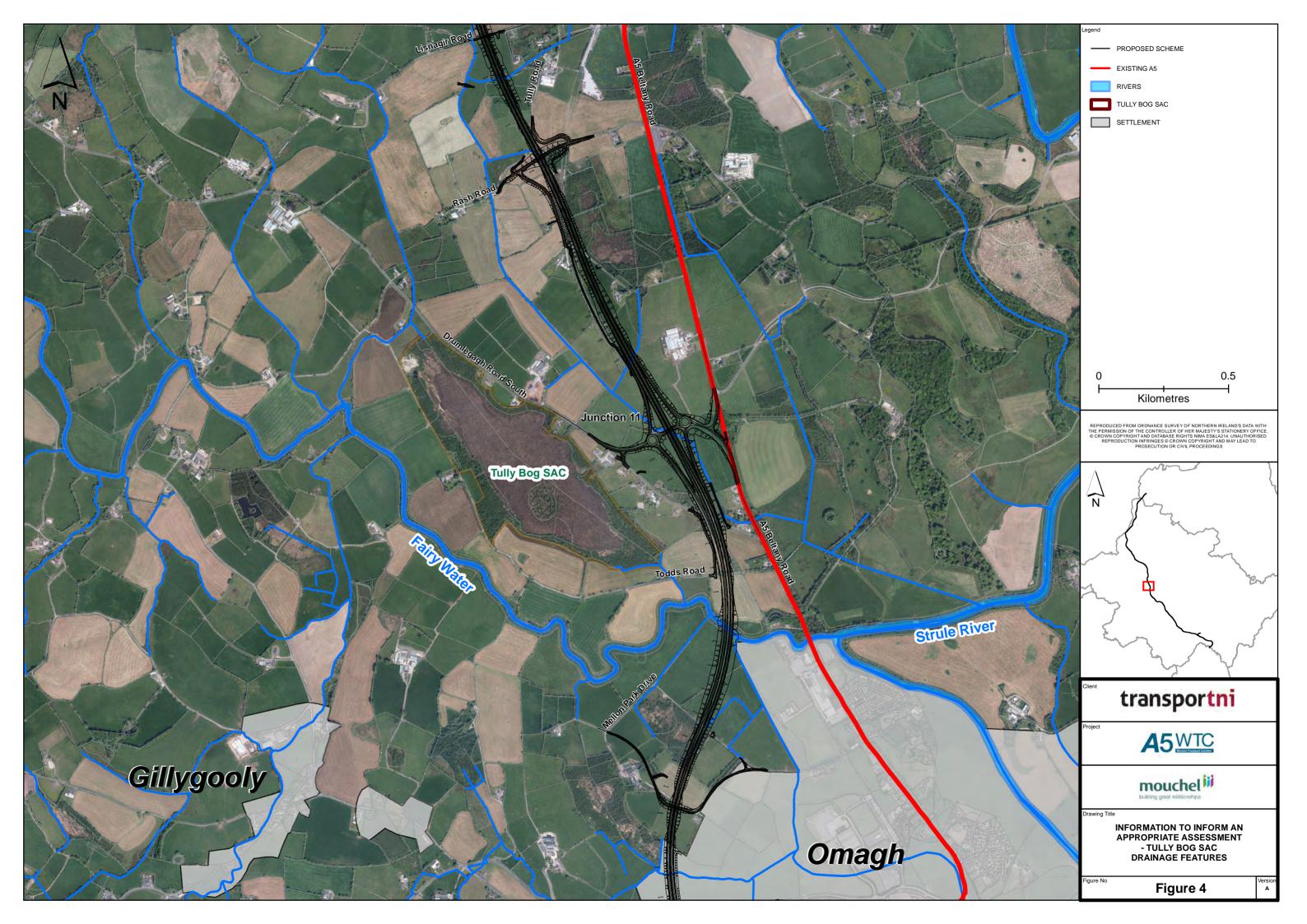












Tully Bog Special Area of Conservation



Appendix 2: Mouchel Report on Re-design of Works near Tully Bog SAC

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Tully Bog SAC Report

1st June 2016

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1 Introduction

1.1 Background to the Scheme

Mouchel has been commissioned by TransportNI (TNI and formerly Roads Service) as client advisor for the proposed A5 Western Transport Corridor (A5 WTC) scheme. The A5 forms part of a strategically important transport route between Londonderry in Northern Ireland (NI) and Dublin in the Republic of Ireland (ROI). The Proposed Scheme will involve the construction of an 86km dual carriageway running between the southern limit of New Buildings and the border with the Republic of Ireland (ROI) immediately south of Aughnacloy. The scheme is being developed and assessed in accordance with the Design Manual for Roads and Bridges (DMRB) and regional guidelines.

1.2 DMRB

Volume 11 of the DMRB relates to the 3 stage assessment process to carry out the Environmental Assessment for the proposed scheme. This process has identified a large number of constraints to be considered and avoided, if possible, by the Proposed Scheme. This included nationally and internationally designated sites, of which Tully Bog Special Area of Conservation (SAC) is one.

1.3 Habitats Regulations

In January 2011, in compliance with the Habitats Regulations, 4 no Habitats Regulations Assessment (HRA) Screening Reports were submitted to the statutory consultees for comment. This included a Report on the Tully Bog SAC and the NIEA responded stating that they were satisfied with the findings of all the Reports.

1.4 High Court Challenge

A High Court challenge to the making of the Orders was submitted in 2012, and the Judge, in making his decision, took into account more recent judgements regarding the Habitats Regulations Assessment process as well as the submission made by the Loughs Agency to the Inspectors at the Public Inquiries (May/June 2011). The judgement made was that an Appropriate Assessment under the Habitats Directive should have been carried out in relation to the River Foyle and Tributaries SAC and as no Appropriate Assessment had been made, the Judge guashed the Orders.





1.5 Appropriate Assessment

Rather than challenge the decision, TNI decided to remedy the situation and have prepared 4 No Reports to Inform an Appropriate Assessment for each category of designation (watercourse SACs, Ramsar Sites, Special Protection Areas (SPAs) and Tully Bog SAC). These reports were published in 2014 for consultation and NIEA were a respondent to all 4 reports. Their response to the Tully Bog SAC Report raised the risk associated with recent research into potential geological links between raised bogs and ground water. Whilst still unpublished research, TNI have adopted a precautionary approach to the HRAs and in this instance instructed Mouchel to review the scheme proposals in the vicinity of the Tully Bog. This report presents the findings of this review and the proposed localised changes to the scheme design which also incorporates other required design changes.





2 History

2.1 Introduction

The route assessment process always identified the Tully Bog SAC as a major constraint and as such the selection of the Preferred Route in 2009 located the proposed dual carriageway to the east of and downstream from the Tully Bog and associated watercourses. During the development of the scheme since 2009, the proposed road has not deviated from the selected line in the vicinity of Tully Bog.

2.2 Location

Tully Bog is designated as an SAC due to the presence of active raised bog (an Annex 1 Habitat) within the site. Surface levels within the SAC range between 62m AOD at the east end to 68m AOD on the north side alongside Drumlegagh Road South.

2.3 Proposed Scheme

The Proposed Scheme passes to the east of the Tully Bog SAC with the dual carriageway being approximately 200m from the Bog at it nearest point and is also downstream of the natural watercourse network (Tully Drain and Fairy Water) in the vicinity of the Bog.

2.4 Ancillary Works

There are major ancillary works in this area associated with the provision of a grade separated junction (Junction 11), side road realignments (Drumlegagh Road South), SUDS drainage systems, watercourse diversions (Tully Drain) and flood plain compensatory storage area associated with the Tully Drain.

2.5 Existing Structures

The NIEA response to the consultation on the Report to Inform the Appropriate Assessment of Tully Bog SAC has indicated that emerging research is identifying that raised bogs (such as Tully Bog) can be affected by changes in groundwater regime – this research was not published at the time of the meeting. This is counter to previous knowledge and understanding that raised bogs were largely fed by rainwater.





3 Design Review

3.1 Embankments

The natural low lying nature of the ground to the east and south of Tully Bog means that the majority of the proposed works are on embankments of varying heights above predicted flood levels of the various watercourses. The only exceptions to this being the watercourse diversion works and the flood compensatory storage areas.

3.2 2010 Proposed Design

In the 2010 proposed design (see drawing No 718736-S2-0800-1484), these latter works required the lowering of the ground level by up to 5m to create replacement floodplain as close as possible to the areas of existing floodplain lost to the road embankments. The proposals included for the vesting of land right up to the edge of Drumlegagh Road South for the proposed floodplain and the western edge of this flood compensatory storage area came within 30m horizontally of the SAC boundary and would be 5m lower than the surface level of the Bog at a level of 63m AOD (approximate).

3.3 Groundwater Data

A review of the available ground water data in this location has indicated that there is insufficient data relating to groundwater levels and flow paths in and around the Bog to determine with scientific certainty that the groundwater regime would not be affected by the 2010 proposed excavation for the flood storage areas.

3.4 Alternative Design

An alternative design for the flood compensatory storage areas has been assessed and prepared which moves the proposed flood compensatory storage areas away from the Bog but requires replacement/additional land from 2 landowners who are already in the proposed vesting of lands for the road scheme.

3.5 Flood Compensatory Storage

TNI have agreed to the changes in design for the flood compensatory storage areas at this location.





4 Hydrogeological Modelling between Tully Bog and Tully Drain

4.1 Further Assessments

Notwithstanding the decision to change the design to avoid any impacts on the hydrology of Tully Bog and without more detailed site information from intrusive site investigation (boreholes and piezometers) in and adjacent to Tully Bog, further assessment work has been carried out to test possible hydrogeological scenarios between Tully Bog and the flood plain of the Tully Drain to the east. The geological information available (boreholes for the road and geological mapping) suggests that the superficial soils in the area are slightly clayey sand, underlain by the Omagh Sandstone formation. The sand description suggests these might be quite permeable, though the slight clay content is likely to depress that significantly. Whilst there is no information relating to the materials within the bog, such bogs tend to be diplotelmic in nature, with a permeable upper acrotelm layer and a low permeability lower catotelmic layer. This latter layer tends to make such bogs self-sealing hydrologically to a certain degree.

4.2 Modelled Scenarios

Based on the above and the assumptions below, hydrogeological modelling of a number of scenarios for a cross section through the bog and flood compensation areas was carried out (see Appendix A for results)., though it is noted that this modelling shows the impact of infiltration on groundwater levels, rather than vice-versa.

4.3 Model Assumptions

Without actual groundwater levels, a model was constructed using the following conservative assumptions:

- The groundwater level at the flood compensation area is the level of the compensation "floor" (it can't be higher, and if it were lower, then the compensation area would then not be a controlling influence);
- The average rainfall is 1000mm/year, all of which soaks into the bog;
- Based on a reasonable interpretation of the soil permeability, the groundwater level generated would be just below the bottom of the bog;





- If the rainfall or peat permeability increased, then the groundwater level rapidly rose to ground level; and
- If the peat permeability decreased, then the groundwater level fell slightly (though the water has to go somewhere and is interpreted to be trapped in the bog).

4.4 Conclusions

Following the scenario modelling which is based upon reasonable technical assumptions and judgements, it can be concluded that:

- the relationship between the groundwater level and the water in the bog is complex;
- the nature of the underlying soils is such that that bog must be to a degree selfsealing otherwise it would not retain water; and
- the excavation of the flood compensation area as currently proposed does not seem to have a significant effect upon the ground water level.

4.5 Graphical Outputs

Appendix A provides detail of the hydrological modelling outputs in graphical form.





5 2016 Proposed Scheme

5.1 Drawings

The scheme design has been updated at 2 locations which are shown on drawings nos 718736-S2-0800-1481 and 1482 and described below.

5.2 Area 1

Area 1 - Mainline chainage 48700 to 49200 (Drawing No 718736-S2-0800-1483): In this area, the flood compensatory storage area and associated vesting of land area is reduced alongside Drumlegagh Road South with works focussed on lowering ground levels within the current floodplain, defined by the existing 64m AOD contour, with the ground sloping to the Tully Drain at a level of 62.0m AOD. These works will increase the capacity of the flood plain at this location to compensate for loss of floodplain under the proposed dual carriageway, junction and connecting roads just to the south. The proposed works are now at least 100m away from the SAC and reducing the levels are not envisaged to have any impact on ground water levels in Tully Bog.

Additional land to the east of Tully drain would now be vested to allow lowering the ground level to between 62.0m AOD and approximately 62.5m AOD, extending the flood compensatory storage area between the Tully Drain and the main carriageway of the A5WTC. Being east of the watercourse, works in this area will not affect ground water levels in the Bog.

5.3 Area 2

Area 2 - Mainline chainage 49500 to 49850 (Drawing No 718736-S2-0800-1484): In this area the proposals now include for excavating a new flood compensatory storage area to a level of 62.7m AOD between Drumlegagh Road South and Todds Road. The proposals also include an additional connectivity culvert under the main dual carriageway at chainage 49600 to connect the new flood compensatory storage area to Tully Drain.

5.4 Monitoring

A monitoring regime will be installed prior to construction commencing to establish a baseline groundwater level which will be monitored during the construction period. An action plan will be developed to maintain groundwater levels if records indicate that levels





may be affected by the works, the details of which will be agreed with NIEA as part of the Construction and Environmental Management Plan (CEMP) to be developed and completed by the contractor prior to works commencing.





6 Summary

6.1 Revised Design

The revised design for the flood compensatory storage areas in this area now significantly removes the risk of the ground water regime for Tully Bog being affected by the proposed A5 Western Transport Corridor.





7 Drawings

2010 Proposals

Drawing No 718736-S2-0800-1480: Section 2 – Specimen Design V7.2

2016 Proposals

Drawing No 718736-S2-0800-1481: Proposed Flood Compensatory Storage adjacent to Tully

Bog SAC - Plan

Drawing No 718736-S2-0800-1482: Proposed Flood Compensatory Storage adjacent to Tully

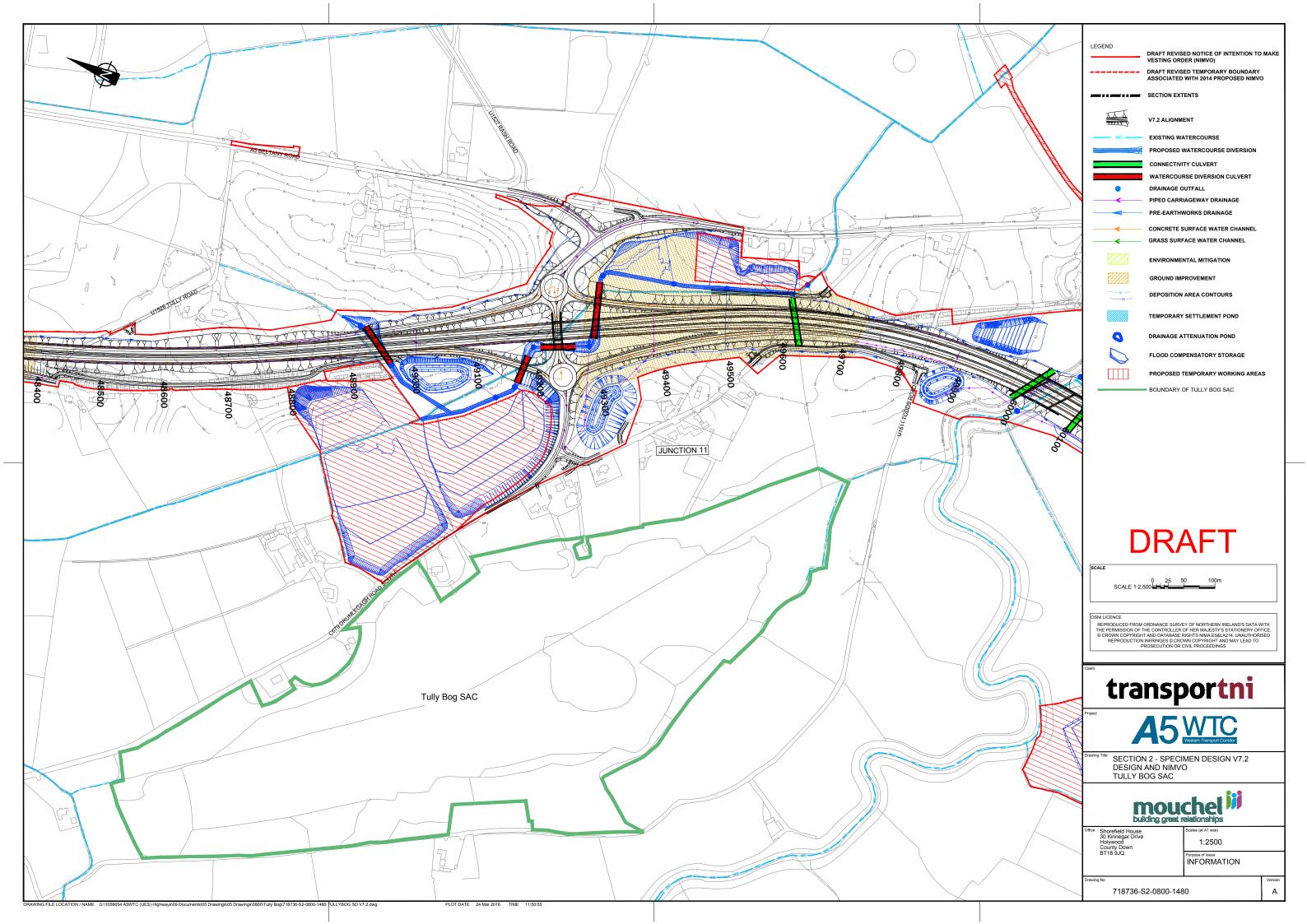
Bog SAC – Cross Section

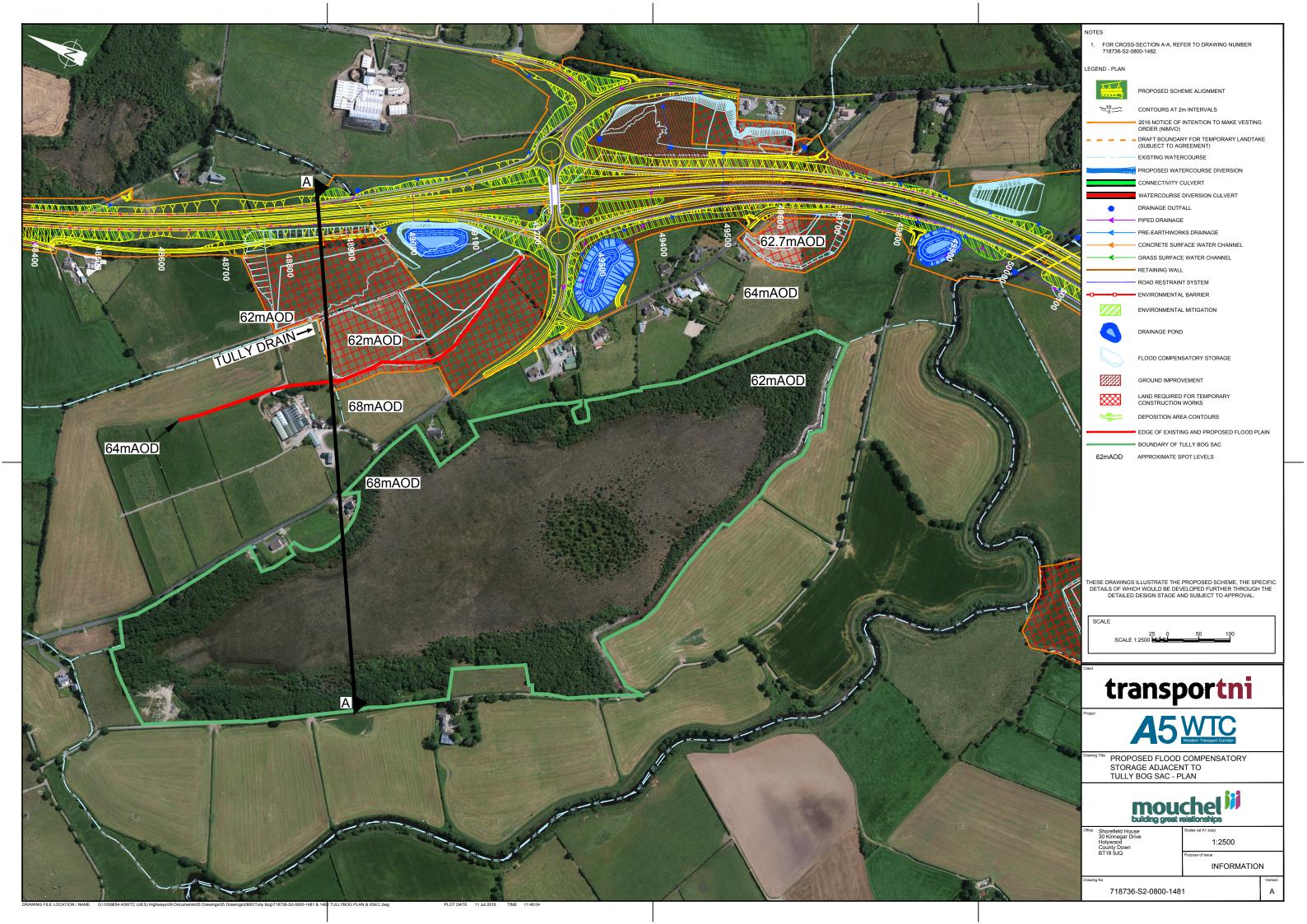
Drawing No 718736-S2-0800-1483: Proposed Flood Compensatory Storage adjacent to Tully

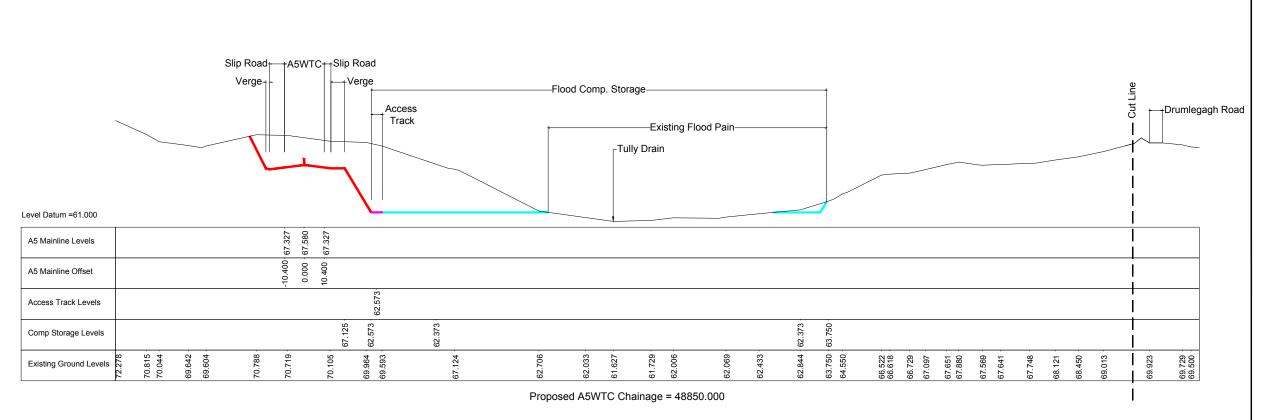
Bog SAC (Sheet 1 of 2)

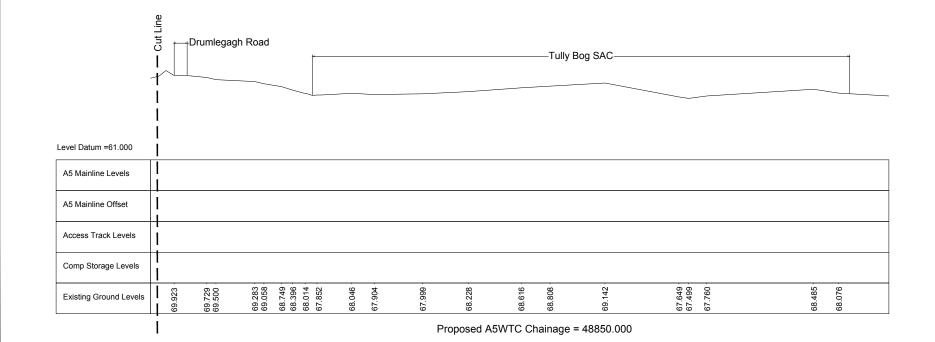
Drawing No 718736-S2-0800-1484: Proposed Flood Compensatory Storage adjacent to Tully

Bog SAC (Sheet 2 of 2)









CROSS-SECTION A-A

NOTES

1. ALL MEASUREMENTS ARE IN METRES.

 FOR LOCATION OF CROSS-SECTION A-A, REFER TO DRAWING NUMBER 718736-S2-0800-1481.

LEGEND - CROSS-SECTION

A5 WESTERN TRANSPORT CORRIDOR

ACCESS TRACK

FLOOD COMPENSATION STORAGE

EXISTING GROUND

THESE DRAWINGS ILLUSTRATE THE PROPOSED SCHEME, THE SPECIFIC DETAILS OF WHICH WOULD BE DEVELOPED FURTHER THROUGH THE DETAILED DESIGN STAGE AND SUBJECT TO APPROVAL.



45 WTC

PROPOSED FLOOD COMPENSATORY
STORAGE ADJACENT TO
TULLY BOG SAC - CROSS SECTION



Shorefield House 30 Kinnegar Drive Holywood County Down BT18 9JQ H: 1:1000, V: 1:200

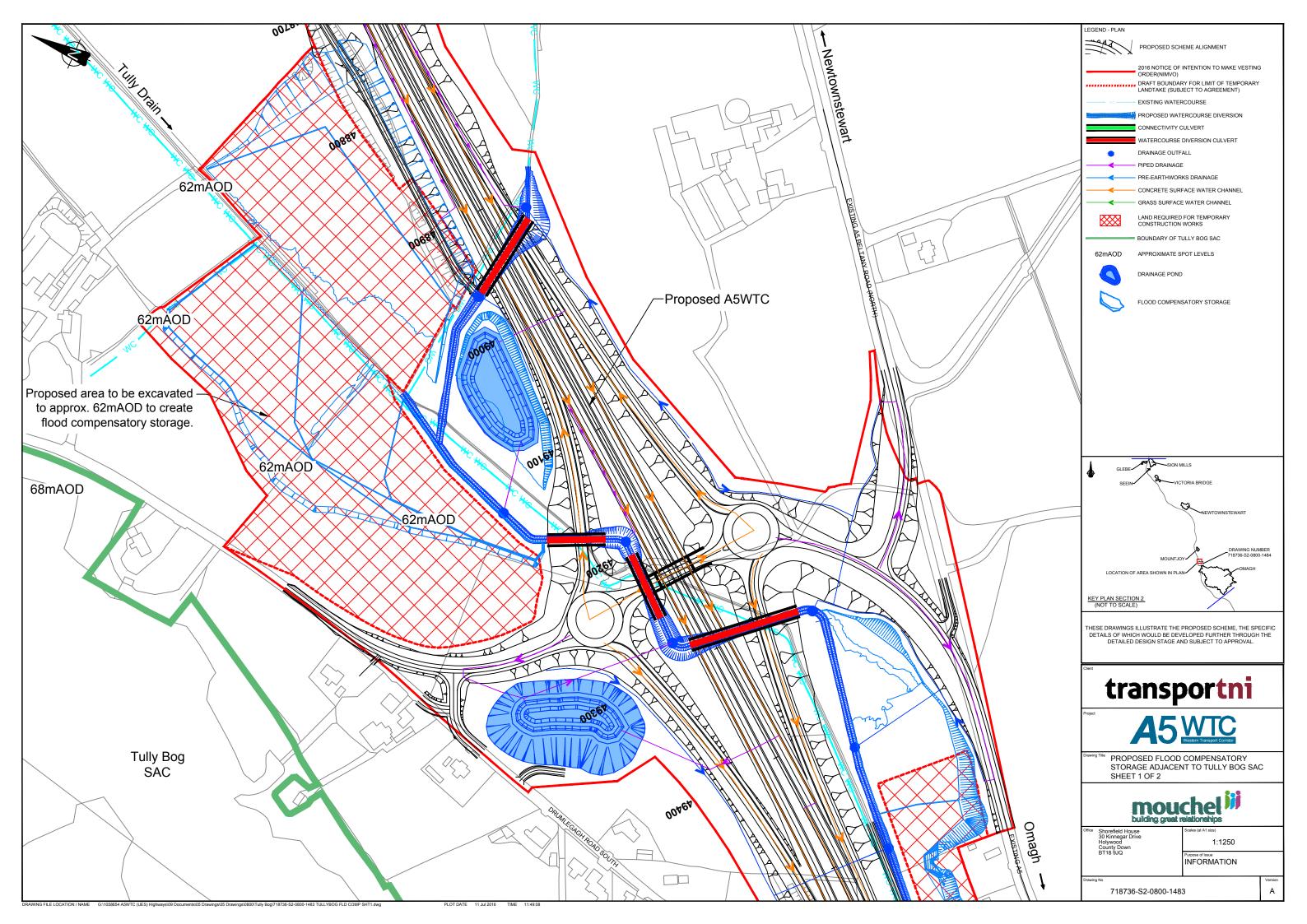
urpose of Issue

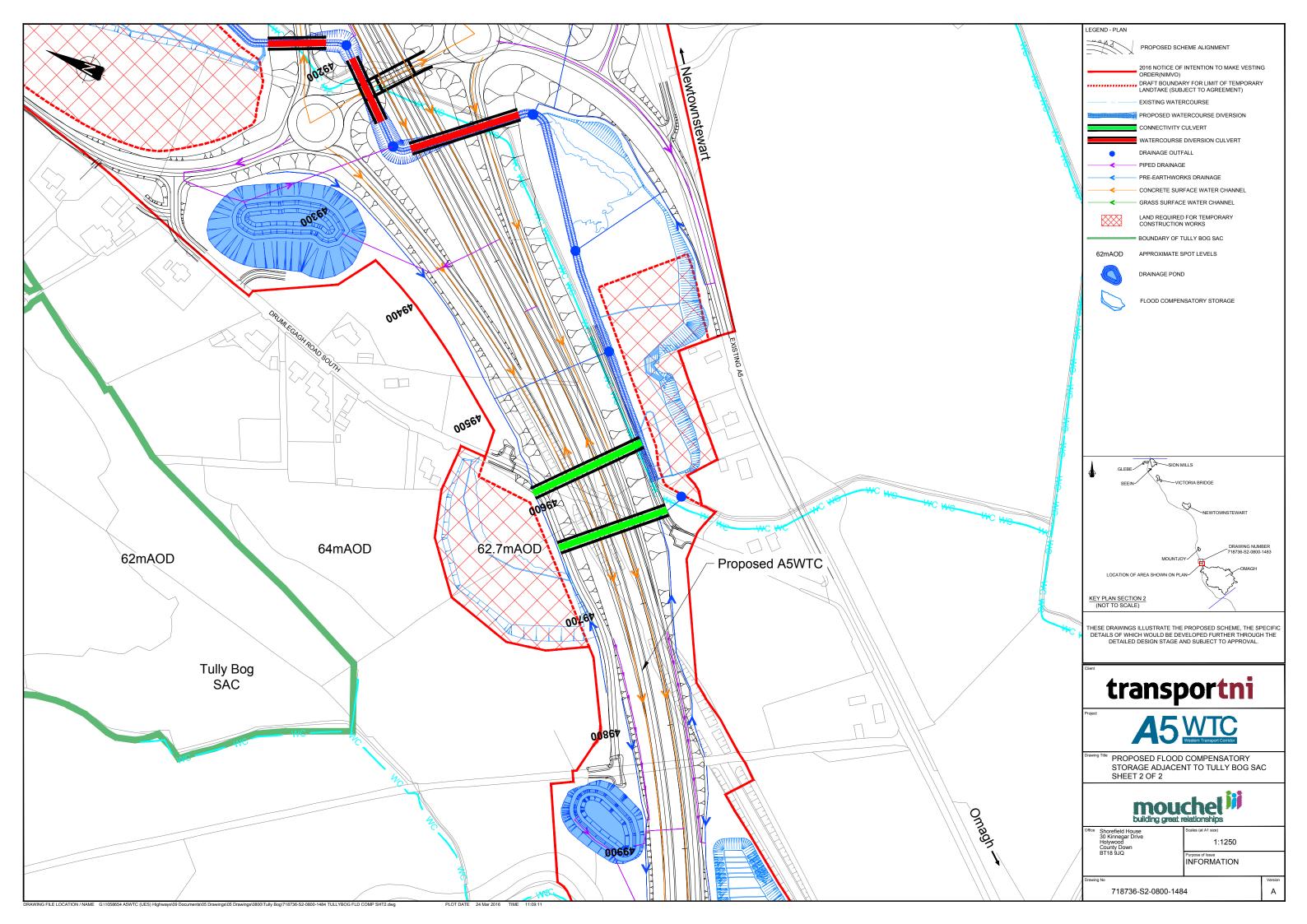
INFORMATION

718736-S2-0800-1482

1482

OFF CONTOURING CONTOUR SET UP TO THE CONTOUR









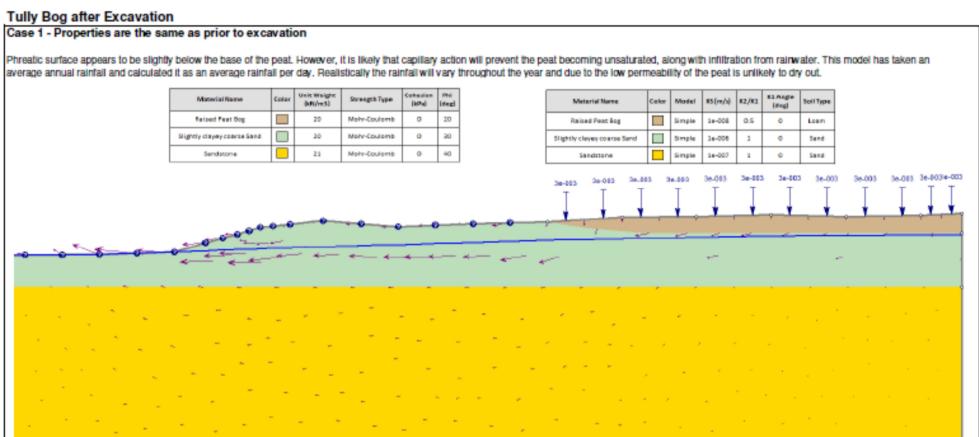
8 Appendix A Hydrogeological Modelling of Scenarios

(AN ASSESSMENT OF THE RELATIONSHIP OF PERMEABILITY AND RAINFALL ON THE GROUNDWATER LEVEL AT TULLY BOG)

- A hydrological model has been constructed using the groundwater modelling module in the SLIDE software to assess the impact of excavation of the flood compensatory storage areas on the hydrology of the Tully Bog.
- The model assumes that the excavated bench for the flood compensation fixes the max groundwater level at one end of the section.
- No assumption is made about groundwater level within or below the bog. An average annual rainfall is provided and if that soaks into the bog, the impact on the underlying groundwater level is assessed.
- 4 A sensitivity check to infiltration and permeability of the bog is made.
- It is acknowledged that the model assesses the impact on infiltration on groundwater level, rather than vice versa.



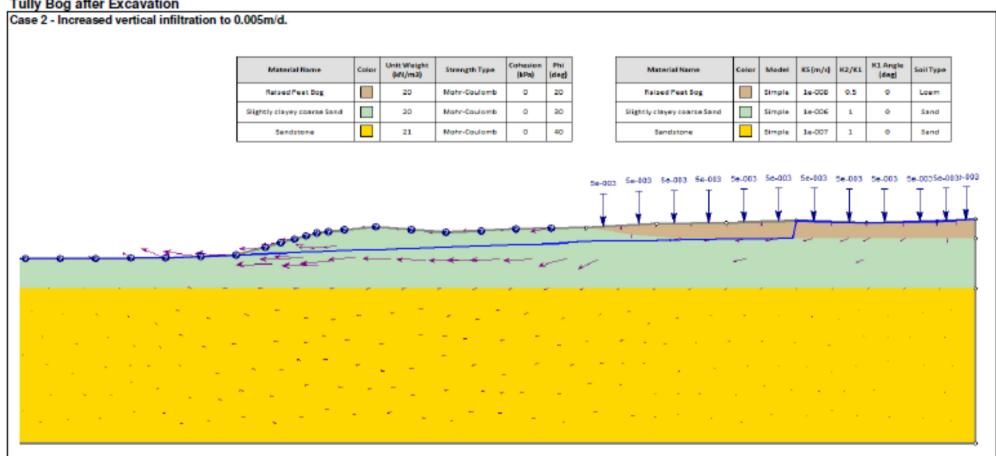








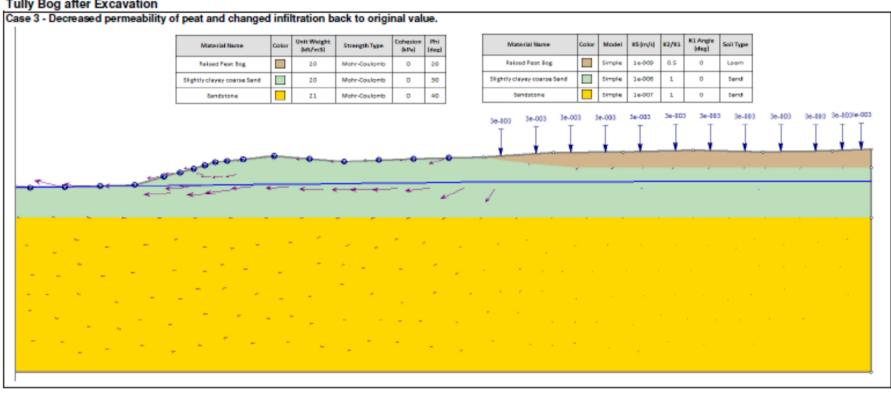
Tully Bog after Excavation







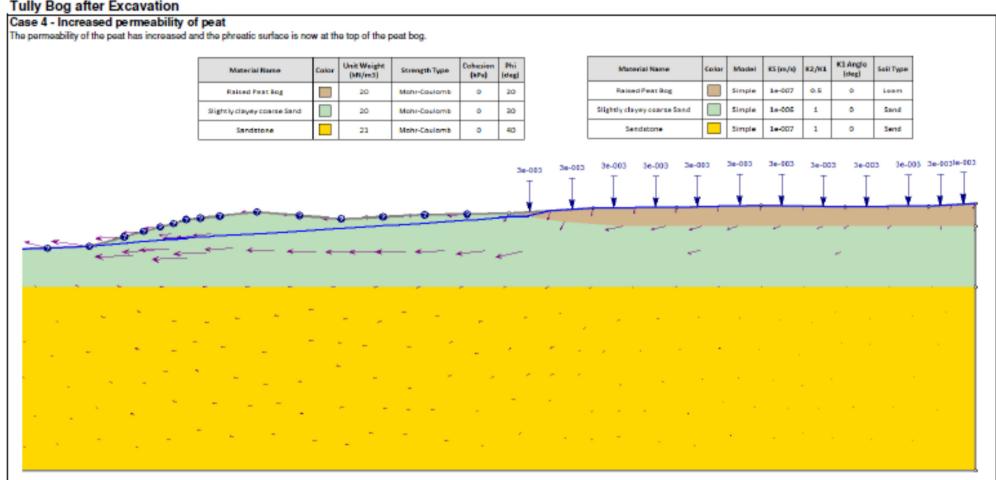
Tully Bog after Excavation







Tully Bog after Excavation





Appendix 3: Tully Bog Natura 2000 Standard Data Form

UK SAC data form

NATURA 2000

STANDARD DATA FORM

FOR SPECIAL PROTECTION AREAS (SPA) FOR SITES ELIGIBLE FOR IDENTIFICATION AS SITES OF COMMUNITY IMPORTANCE (SCI) AND

| FOR SPECI | al Areas | AND OF CONSE | ERVATION (S | SAC) | | |
|---|---------------|-----------------|----------------------|---------------------|---------------------|----------------------|
| 1. Site identification: | | | | | | |
| 1.1 Type B | | 1.2 | Site code | UK00 | 30326 | |
| 1.3 Compilation date 2001 | 304 |] 1.4 | Update | 20060 | 3 | |
| 1.5 Relationship with other Na | ntura 2000 | 0 sites | | | | |
| 1.6 Respondent(s) Inte | ernational I | Designation | is, JNCC, Pe | terborough | | |
| 1.7 Site name Tully Bog | | | | | | |
| 1.8 Site indication and designa | | | dates | | | |
| date site proposed as eligible as SCI | | 200304 | | | | |
| date confirmed as SCI | - 2 | 200412 | | | | |
| date site classified as SPA date site designated as SAC | 2 | 200505 | | | | |
| 2.1 Site centre location longitude latit 07 20 59 W 54 3 2.2 Site area (ha) 35.99 2.5 Administrative region | ude 7 33 N | | .3 Site len | gth (km) | | |
| NUTS code | | Regio | on name | | % co | ver. |
| , | thern Ireland | | л паше | | | .00% |
| 2.6 Biogeographic region X Alpine Atlantic 3. Ecological information: | Boreal | | ntinental | Macaronesi | | rranean |
| 3.1 Annex I habitats Habitat types present on the site an | | assessmen | t for them: | | | |
| Annex I habitat | | % cover | Representati vity | Relative surface | Conservation status | Global assessment |
| Active raised bogs | | 66 | В | С | В | В |
| Tully Bog Natura 2000 Data Form | | | | Produced | by JNCC., 27 | /07/11 |

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Tully Bog Special Area of Conservation



UK SAC data form

| Degraded raised bogs still capable of natural | 30.1 | D | | |
|---|------|---|--|--|
| regeneration | | | | |

3.2 Annex II species

| | | Population | | | | Site assessment | | | |
|--------------|----------|------------|--------|-------|------------|-----------------|-----------|--------|--|
| | Resident | Migratory | | | | | | | |
| Species name | | Breed | Winter | Stage | Population | Conservation | Isolation | Global | |
| | | | | | | | | | |

4. Site description

4.1 General site character

| Habitat classes | % cover |
|--|---------|
| Marine areas. Sea inlets | 1 |
| Tidal rivers. Estuaries. Mud flats. Sand flats. Lagoons (including saltwork basins) | |
| Salt marshes. Salt pastures. Salt steppes | |
| Coastal sand dunes. Sand beaches. Machair | |
| Shingle. Sea cliffs. Islets | |
| Inland water bodies (standing water, running water) | |
| Bogs. Marshes. Water fringed vegetation. Fens | 68.8 |
| Heath. Scrub. Maquis and garrigue. Phygrana | |
| Dry grassland. Steppes | |
| Humid grassland. Mesophile grassland | 3.8 |
| Alpine and sub-alpine grassland | |
| Improved grassland | |
| Other arable land | |
| Broad-leaved deciduous woodland | 27.4 |
| Coniferous woodland | |
| Evergreen woodland | |
| Mixed woodland | |
| Non-forest areas cultivated with woody plants (including orchards, groves, vineyards, dehesas) | |
| Inland rocks. Screes. Sands. Permanent snow and ice | |
| Other land (including towns, villages, roads, waste places, mines, industrial sites) | |
| Total habitat cover | 100% |

4.1 Other site characteristics

| Soil & geology: | |
|-----------------------------|--|
| Acidic, Nutrient-poor, Peat | |
| Geomorphology & landscape: | |
| Floodplain, Lowland | |
| | |

4.2 Quality and importance

Active raised bogs

for which this is considered to be one of the best areas in the United Kingdom.

Tully Bog Natura 2000 Data Form

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Page 2



Information to Inform an Appropriate Assessment
Tully Bog Special Area of Conservation

UK SAC data form

4.3 Vulnerability

Tully Bog represents one of the best lowland raised bogs in Co. Tyrone. The area is not managed for agricultural purposes.

Potentially the site could be damaged by peat-cutting, drainage, fires or scrub invasion. The site is currently monitored as part of a wider monitoring programme of all designated sites. If damaging practices or deterioration in site quality are recorded, they will be addressed by management agreements with the owners. The Conservation Objectives for Tully Bog have recently been reviewed.

5. Site protection status and relation with CORINE biotopes:

5.1 Designation types at national and regional level

| Code | % cover |
|------------------|---------|
| UK04 (SSSI/ASSI) | 100.0 |

Tully Bog Natura 2000 Data Form

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Appendix 4: DMRB Integrity of Site Checklist

Table A4.1 Tully Bog SAC Integrity of Site Checklist

| Conservation Objectives | |
|---|--------------------|
| Does the project have potential to: | |
| Cause delays in progress towards achieving the conservation objectives of the site? | Yes /No |
| Interrupt progress towards achieving the conservation objectives of the site? | Yes /No |
| Disrupt those factors which help maintain the favourable conditions of the site? | Yes /No |
| Interfere with the balance, distribution and density of key species that are indicators of favourable conditions of the site? | Yes /No |

| Other Indicators | |
|--|--------------------|
| Does the project have potential to: | |
| Cause changes to the vital defining aspects (e.g. nutrient balance) that determine how the site functions as a habitat or ecosystems? | Yes /No |
| Change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site? | Yes /No |
| Interfere with predicted or expected natural changes to the site (such as water dynamics of chemical composition)? | Yes /No |
| Reduce the area of key habitats? | Yes /No |
| Reduce the population of key species? | Yes /No |
| Change the balance between key species? | Yes /No |
| Reduce the diversity of the site? | Yes /No |
| Result in disturbance that could affect population size or density of the balance between key species? | Yes /No |
| Result in fragmentation? | Yes /No |
| Result in loss or reduction of key features (e.g. tree cover, tidal exposure, annual flooding, etc)? | Yes /No |





Habitats Regulations Assessment

Report of Information to Inform an Appropriate Assessment:

718736-3000-R-018 SPAs

A5 Western Transport Corridor

April 2017

Produced for

TransportNI

Prepared by



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¹ The Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995, as amended (the Habitats Regulations) indicate that the person or organisation applying for any consent, permission or other authorisation, known as the 'Project Proponent', is responsible for provision of information to support decisions by the 'Competent Authority' on the need for Appropriate Assessment and to allow the Appropriate Assessment to be undertaken. The 'Project Proponent' is taken to mean the project team, including as appropriate: Overseeing Organisation scheme or area staff; design consultants; contractors; Design Build Finance and Operate (DBFO) companies; and managing agents.



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1 Introduction

- 1.1.1 This document is a Habitats Regulation Assessment (HRA) which contains information to be submitted to the 'Competent Authority' in order to inform the statutory assessments required under the Conservation (Natural Habitats, &c) Regulations (Northern Ireland) 1995 (as amended²), for the proposed A5 Western Transport Corridor (A5WTC) Scheme.
- 1.1.2 These regulations apply to European Natura 2000 sites³, namely Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). The Proposed Scheme would interact with the following sites, namely:
 - River Foyle and Tributaries SAC
 - River Finn (Republic of Ireland) SAC
 - Owenkillew River SAC
 - Tully Bog SAC
 - Lough Swilly (including former Inch Lough and Levels) SPA
 - Lough Foyle (Northern Ireland) SPA (and Ramsar site)
 - Lough Foyle (Republic of Ireland) SPA (and Ramsar site)
 - Lough Neagh and Lough Beg SPA (and Ramsar site)
- 1.1.3 This document (HRA SPAs) is one of four assessments, and specifically addresses the SPAs (Lough Foyle SPA (NI and RoI); Lough Swilly SPA and Lough Neagh and Lough Beg SPA).
- 1.1.4 A further three documents have been produced, namely:
 - HRA Report Tully Bog SAC

² As amended by the Conservation (Natural Habitats, etc.) (Amendment) Regulations (Northern Ireland) 2012

³ Natura 2000 sites consist of Special Areas of Conservation (SACs) designated under European Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Flora and Fauna (the 'Habitats Directive') and Special Protection Areas (SPAs) designated under Directive 2009/147/EC, (the codified version of 79/409/EEC as amended) on the conservation of wild birds (the 'Birds Directive.')





- HRA Report Watercourse SACs (for River Foyle & Tributaries SAC, River Finn SAC and Owenkillew SAC); and
- Ramsar Site Assessment Report⁴ (for Lough Foyle Ramsar Sites (NI and RoI); and Lough Neagh and Lough Beg Ramsar Site.
- 1.1.5 A first draft of this report was published for consultation in 2014 and responses were received at that time. The content of these responses have been taken into account in developing this second draft report.
- 1.1.6 The information in this second draft is published for consultation, and is being submitted to the Department of Agriculture, Environment, and Rural Affairs (DAERA) as statutory consultee for the designated sites in Northern Ireland, and to the National Parks and Wildlife Service (NPWS) in the Republic of Ireland. The general public are also invited to provide responses relating to the information and findings contained in the report⁵. The information and comments received in response to the consultations will then be considered by TransportNI and the Minister, when undertaking the Appropriate Assessments required in advance of a decision to proceed or not with the Scheme, in accordance with the requirements of the Directive and Regulations.

1.2 Background

- 1.2.1 The A5 Western Transport Corridor (A5WTC) is one of five key transport corridors making up the strategic road network across Northern Ireland. The Department for Infrastructure (Dfl) TransportNI (TNI) is promoting the dualling of the A5WTC as part of its improvement programme. This project would significantly improve safety and journey times along this route and, in addition to improving the links between the urban centres in the west of the province, provide a strategic link with international gateways. At the border with the Republic of Ireland it will connect with the N2 route which the Irish Government also has longer term plans to upgrade. It passes through New Buildings, Strabane, Sion Mills, Newtownstewart, Omagh and Aughnacloy.
- 1.2.2 The proposed new A5WTC dual carriageway runs for some 85km between the existing A5 north of New Buildings and the existing A5 south of Aughnacloy. The proposal will ultimately

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⁴ Ramsar sites are not referred to under the Directives or their transposition into UK and ROI Regulations. However, Planning Policy Statement 2 (PPS2) in Northern Ireland applies the same level of consideration and protection to them as to Natura 2000 sites

⁵ The Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (to which the UK is a signatory) requires [at Article 3]:- 'Each Party shall promote environmental education and environmental awareness among the public, especially on how to obtain access to information, to participate in decision-making and to obtain access to justice in environmental matters'.





link up with an allied proposal in the Republic of Ireland, however as that proposal has not progressed to any meaningful stage which allows assessment, the current documents provide comprehensive assessments of the foreseeable proposals designed to date.

- 1.2.3 It is anticipated the construction of the proposed scheme will be undertaken in three phases as follows, and shown on Sheets 1 to 24 (Appendix 1):
 - construction of junctions 1-3 (New Buildings Strabane North) and junctions 13-15 (Omagh South – A4,Ballygawley) between 2017 and 2019;
 - construction of junctions 3-13 (Strabane North Omagh South) between 2021 and 2023; and
 - construction of junction 15 (A4,Ballygawley) to the A5 south of Aughnacloy between 2026 and 2028.
- 1.2.4 The currently proposed A5WTC Scheme substantially reflects a previous proposal which was promoted in 2010 and for which an Environmental Statement (A5WTC ES 2010) was prepared and published. The environmental studies reported in the A5WTC ES 2010 were informed by a draft Habitats Regulations Assessment (HRA) which recognised and screened⁶ the above European Designated Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) for likely significant effects. A judicial review of the scheme in 2013 found the ES to be robust, but upheld a challenge that the HRA reporting relating to the Habitats Regulations should have been taken to the next level, namely a Stage 2 assessment⁷.

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⁶ The SACs and SPAs were subject to a screening exercise (Test of Likely Significance (ToLS) to determine if the proposed scheme, with its proposed and committed mitigation measures, would be likely to have a significant effect on the integrity of any of the sites considered. The ToLS process is commonly referred to as Stage 1 of the Habitats Regulations Assessment (HRA) process. When completed, the ToLS concluded the impacts of the proposed scheme (subject to mitigation) would not be likely to have a significant effect upon the integrity of the implicated designated sites in the context of the Habitats or Birds Directives, a conclusion which was agreed with by Northern Ireland Environment Agency (NIEA), the statutory consultee relative to the designated sites in Northern Ireland and the National Parks and Wildlife Service (NPWS) the organisation charged with the implementation of the Habitats and Birds Directives in the ROI.

⁷ The challenge to the consent for the proposed scheme was made in the context that potential impacts upon the River Foyle and Tributaries SAC should have been subject to Stage 2 of the Habitats Regulations Assessment (Appropriate Assessment). This challenge was upheld. The finding was informed by concerns raised by Loughs Agency in responses to the 2010 ES and presented in verbal submissions to the public inquiries held in 2011 concerning the protection of Atlantic salmon (*Salmo salar*), and clarifications through





- 1.2.5 Further studies have since been completed to address this need for a more robust HRA, and a new Environmental Statement (A5WTC ES 2016) was prepared and published based on this information.
- 1.2.6 The 2016 Environmental Statement (ES), along with the draft vesting orders and other statutory procedures, were subject to a Public Inquiry from October to December 2016. Accordingly, the production of the current suite of HRA Reports have been programmed to ensure they contain the most up to date information.

1.3 Preparation of the HRA

- 1.3.1 The primary author of this report is Stuart Ireland B.Sc. (Hons), MCIEEM, CEnv. He is expert in ecological matters and the full spectrum of environmental assessment techniques, methodologies and statutes. Academically, he holds a combined honours degree in Zoology with Marine Zoology from UCNW Bangor, and professionally, is a member of relevant Institutes requiring the highest standards of professional competence and integrity. He is a Chartered Environmentalist, and a full member of the Chartered Institute of Ecology and Environmental Management.
- 1.3.2 Stuart has practised for 17 years, during which time he has undertaken complex Ecological Impact assessments, Habitats Regulations Assessments for nationally important infrastructure schemes. He has been involved with the A5WTC proposal since its inception in 2008 and is familiar with both the proposal site and the full spectrum of environmental parameters which have influenced the design of the proposal.
- 1.3.3 Stuart has provided ecological advice services for major road schemes, including the Roscommon Way Extension scheme in Essex, ensuring that construction of a flood relief road through a SSSI was undertaken in a manner which preserved the ecological function of the site and its supported species. He has appeared as an Expert Witness on ecological matters and has significant experience in Habitat Regulations Assessments, including working with clients, contractors and Statutory Consultees to design schemes to ensure protection of Natura 2000 sites and their conservation objectives.

case law relative to the interpretation of 'likelihood' in the context of screening for likely significant effects as referred to in the Habitats Directive and the Regulations.



2 HRA Process

2.1 Objectives

- 2.1.1 The overall aims of the Habitats and Birds Directives are to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives, and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the best examples of them. European and national legislation places a collective obligation on its member states and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation status.
- 2.1.2 The maintenance of habitats and species within Natura 2000 sites at favourable conservation status will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.
- 2.1.3 Favourable conservation status of a site is achieved when:
 - The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
 - The conservation status of its typical species is favourable.
- 2.1.4 The favourable conservation status of a species is achieved when:
 - Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
 - The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
 - There is, and will probably continue to be, a sufficiently large habitat to maintain its Population's on a long-term basis.
- 2.1.5 The Habitats Directive promotes a hierarchy of avoidance, mitigation and compensatory measures. Accordingly, recognition of the importance of the identified designated sites within the Scheme study area and undertaking habitats assessment appraisals has been ongoing, and has occurred iteratively throughout the development of the A5WTC Scheme, and has significantly influenced the Scheme design.
- 2.1.6 In the first instance, the Scheme has aimed to avoid any negative impacts on European sites by identifying possible impacts early in the development of the Scheme, and has avoided sites as much as possible during the corridor and route options appraisal.
- 2.1.7 Following that, mitigation measures have been applied where necessary, with the aim of ensuring that no significant adverse impacts on the Sites remain.



2.1.8 The purpose of this HRA report is to provide information on the likely significant effects of the Scheme on the qualifying features of the respective designated sites, identify the mitigation measures proposed, and to assess whether the mitigation measures will ensure that the favourable conservation status of the each of the Sites is maintained.

2.2 Approach to Habitat Regulations Assessment

- 2.2.1 The gathering and presentation of the information in this document has been informed by the guidance provided in 'Managing Natura 2000 Sites, the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (EC, 2000 & 2001)', and 'Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC'. Further useful guidance is provided by Section 4, Part 1 of Volume 11 of the DMRB (HD44/09).
- 2.2.2 In accordance with the guidance, a staged approach is taken to the assessment of plans and projects under the Habitat Regulations:

Stage 1: Screening/Test of likely Significance

This is where it is established if an appropriate assessment is required and is referred to as 'screening'. Its purpose is to identify the likely impacts upon a Natura 2000 Site of a project or a plan, either alone or in combination with other plans or projects and considers whether these impacts are likely to be significant. It will include:

- A description of the project;
- Identification of relevant Natura 2000 sites potentially affected;
- Identification and description of individual and cumulative impacts likely to result from implementation of the project;
- Assessment of the significance of the impacts identified above on site integrity; and
- Exclusion of sites where it can be objectively concluded that there will be no significant effects.

Stage 2: Appropriate Assessment

This stage considers the potential impacts on the structure and function, as well as the conservation objectives of the Natura 2000 Sites that the Proposal may have either alone or in combination with other projects or plans. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts is presented. This stage will include:

• A description of the Natura 2000 sites that will be considered further in the AA;



- A description of significant impacts on the conservation feature of these sites likely to occur from the Plan;
- Mitigation Measures; and
- Conclusions.

Stage 3: Assessment of alternative solutions

This process examines alternative ways of achieving the objectives of the Proposal that avoid adverse impacts on the integrity of the Natura 2000 sites.

Stage 4: Imperative reasons of overriding public interest

This stage is the main reason of exemption from Article 6(4) which examines whether there are imperative reasons of overriding public interest (IROPI), and where no alternative solutions exist, for allowing a plan or project which will have adverse effects on the integrity of a Natura 2000 site to proceed.

2.2.3 This HRA report addresses Stage 1 and Stage 2 of the HRA Process.

Note: For the purposes of this assessment, the term 'likely' is applied within the proper meaning of the term as defined in the corpus of EU environmental law. In that sense, a 'likely' significant effect is deemed herein to be not one which is more likely than not to occur, but rather one with a genuine possibility of occurrence, no matter how small that likelihood may be. That being so, the precautionary principle required in HRA is integrated into the very heart of the assessment methodology and the assessment is thus as robust as possible.

The definition for 'integrity' adopted in this report is that provided in ODPM Circular 06/2005 and Defra Circular 01/2005 - *Biodiversity and Geological conservation – Statutory obligations and their impact within the planning system*, which defines integrity in the context of designated sites as:

The coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified



3 Stage 1 – Screening

3.1.1 As discussed above, the first stage of an HRA assessment is to consider whether a project could cause 'likely significant effect' on the qualifying features of the Natura 2000 site(s), alone or in-combination with other plans/projects. In line with EU Guidance, and the Design Manual for Roads & Bridges (DMRB) method of assessment, screening matrices have been completed for each of the potentially affected Natura 2000 sites. Tables 2.1 to 2.3 provide this information and are supported by reference to the A5WTC ES 2010 and the A5WTC ES 2016.

Table 2.1 Screening Matrix for Lough Foyle SPA

| Table 2.1 DMRB Screening Matric for Lough Foyle SPA | | |
|---|-----------------------------|-------------------------------|
| Project Name: | A5 WTC | |
| Natura 2000 Site under Consideration: | Lough Foyle SPA | |
| Date: | Author (Name/Organisation): | Verified (Name/Organisation): |
| 23/07/13 | S.Ireland, Mouchel | P. Reid, Mouchel |

Description of Project

The proposed 85km A5 Western Transport Corridor (A5 WTC) scheme forms part of a strategically important transport route between Londonderry/Derry in Northern Ireland (NI) and to Dublin in the Republic of Ireland (ROI). The proposed scheme involves replacement of the existing A5 from a point north of New Buildings Londonderry in the north to a point south of Aughnacloy in the south with a dual carriageway along an alignment off-line from the existing road. In NI the existing road passes through New Buildings, Strabane, Sion Mills, Newtownstewart, Omagh and Aughnacloy. The proposed scheme will cross the River Foyle and Tributaries SAC in 2 locations and be close to the designated site in a number of other locations. It is anticipated the proposed scheme will be built in three phases starting with Phase 1 to commence in 2017, Phase 2 in 2022 and Phase 3 in 2026. It is anticipated that each phase will take some 2 to 3 years to construct.

Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:

| Size and scale (road type and probable traffic volume) | The project involves the construction of an 85 km long dual carriageway involving construction within the Foyle floodplain in an area known to support birds associated with the SPA, with associated drainage and local road improvements. Traffic volumes are anticipated to be a maximum of 23300 AADT (to the nearest 100) by 2040. There will be no direct impacts on the SPA. However, both construction and operation of the road could lead to impacts on key foraging areas outside of the SPA and on birds foraging within these areas. |
|--|---|
| Land-take | There will be no land take within the SPA. Approximately 40 ha of land within the area of the Foyle floodplain known to support birds associated with the SPA will be lost to the scheme. |

SPAs



| Distance from the European Site or key features of the site (from edge of the project assessment corridor) | The proposed scheme is located approximately 10km south of Lough Foyle SPA. Nevertheless birds which are known to use the SPA and which are designation feature species of the SPA are known to utilise an area of the Foyle floodplain partially encompassed within the project corridor during the winter months between Magheramason and the Burn Dennett crossing. In this location the proposed scheme varies between 0.3km and 1.8km from the River Foyle, running initially to the west of the existing A5, crossing to east of the existing A5 north of Bready and crossing back to west of the existing A5 just south of Grangefoyle Road. |
|---|---|
| Resource requirements (from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts) | None. |
| Emissions (e.g. polluted surface water runoff both soluble and insoluble pollutants, atmospheric pollution) | The SPA is some 10km north and downstream of the proposed works at its closest point. Emissions from the scheme, including run-off from construction and operation, and vehicle emissions are not likely to interact with the SPA. |
| Excavation requirements (e.g. impacts of local hydrogeology) | None. |
| Transportation requirements | Construction related traffic and operational use of the scheme may result in potential disturbance impacts upon whooper swan foraging outside of the SPA boundary. |
| Duration of construction, operation, etc. | The construction of the northern section of Phase 1 of the proposed scheme will take 2-3 years. Phase 2 and 3 are outside of the possible area of interaction with the SPA species. |
| Other | None. |
| Description of avoidance a | nd/or mitigation measures |
| Describe any assumed (plain on: | ly established and uncontroversial) mitigation measures, including information |
| Nature of proposals | At present the operational requirements of the construction are not finalised, therefore potential mitigation in terms of controlled working timeframe of April to September (inclusive) cannot be confirmed. Therefore the potential for disturbance impacts cannot be ruled out. |
| Location | Any mitigation relevant to the designation feature species of the Lough Foyle SPA is likely to be restricted to the eastern Foyle floodplain in areas utilised by the relevant bird populations. |
| Evidence for effectiveness | Potential mitigation in terms of controlled working timeframe of April to September (inclusive) cannot be confirmed. Therefore the potential for disturbance impacts cannot be ruled out. |
| Mechanism for delivery (legal conditions, restrictions or other legally enforceable obligations) | Transport NI will place contractual obligations on contractors to provide all necessary mitigation identified in Stage 2 of the assessment. Environmental Representatives employed by Transport NI will monitor the proposed scheme throughout construction. |



| Characteristics of European Site(s) A brief description of the European Site should be produced, including information on: | |
|--|--|
| Name of European Site and its EU code | Lough Foyle SPA UK9020031 (including the designated section of Lough Foyle located within the ROI (between Muff and Whitecastle) Foyle SPA (site code 004087)). |
| Location and distance of the European Site from the proposed works | The proposed scheme is located approximately 10km south of Lough Foyle SPA. |
| European Site size | 2204.36 ha |
| Key features of the European Site including the primary reasons for selection and any other qualifying interests | The SPA supports populations of European importance of bar-tailed godwit (1,896 individuals, representing 10.8% of the wintering population in Ireland (5 year peak mean 1991/2 - 1995/6)), whooper swan (890 individuals, representing 8.9% of the wintering population in Ireland (5 year peak mean 1991/2 - 1995/6)) and light-bellied brent goose (3730 individuals, representing 18.7% of the wintering population in Ireland (5 year peak mean 1991/2 - 1995/6)). The site also regularly supports at least 20,000 waterfowl (and thereby qualifying as a wetland of international importance). |
| Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways | Although a control programme has begun, the colonisation and spread of aggressive non-native species, such as <i>Spartina spp.</i> is a current problem and poses a potential threat in the future (JNCC website). |
| European Site conservation objectives – where these are readily available | Maintain all features in a favourable condition. ^{8,9} |

Assessment Criteria

Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site.

⁸ Features refers to the selection features for the SPA.

⁹ Individual objectives are set for each feature, they are too numerous to present in this table and are presented in Appendix 2, Table A2.1.



Potential Impacts on whooper swan

The scheme has the potential to give rise to effects on whooper swan associated with this SPA through disturbance and habitat loss outside of the designated site which could lead to a reduction in the populations of birds which form the designation features of the SPA. Mitigation proposals for the construction phase cannot be confirmed at this point, therefore, there remains a potential for significant effects.

Potential Impacts on light-bellied brent geese

No light-bellied brent geese were recorded within the area of potential interaction between the proposed works and habitats supporting designation feature species. Significant effects, upon the species are unlikely.

Potential Impacts on bar-tailed godwit

No bar-tailed godwit were recorded within the area of potential interaction between the proposed works and habitats supporting designation feature species. Significant effects, upon the species are unlikely.

Initial Assessment

The key characteristics of the site and the details of the European Site should be considered in identifying potential impacts.

Describe any likely changes to the site arising as a result of:

| Reduction of habitat area | None. | | |
|---|---|--|--|
| Disturbance to key species | The scheme may cause a significant effect on whooper swan due to disturbance. | | |
| Habitat or species fragmentation | The scheme is unlikely to cause a significant effect to whooper swan due to fragmentation since all sites currently used by the designation species will remain available | | |
| Reduction in species density | The scheme may cause a reduction in species density if the disturbance of foraging birds is sufficient to cause desertion of the Foyle floodplain adjacent to the works by some or all of the designation species population that currently use it. | | |
| Changes in key indicators of conservation value (water quality, etc.) | The scheme is unlikely to result in changes in key indicators of conservation value as sufficient mitigation is in place. | | |
| Climate change | The scheme has the potential to contribute to the problem of climate change by increasing the carrying capacity of the current road network. | | |
| Describe any likely impacts | Describe any likely impacts on the European Site as a whole in terms of: | | |
| Interference with the key relationships that define the structure of the site | None. | | |
| Interference with key relationships that define the function of the site | Possible disturbance of whooper swans on grazing areas outside of the site could cause birds to lose foraging time, and expend energy avoiding the disturbance. Thus reducing the birds' fitness and ability to survive and impacting on the function of the site as winter bird habitat. | | |
| Indicate the significance as a result of the identification of impacts set out above in terms of: | | | |
| Reduction of habitat area | No habitat loss within the SPA. Approximately 40ha of potential foraging habitat loss west of the existing A5, although no whooper swan have been | | |



| | recorded under the scheme footprint. |
|----------------------------------|---|
| Disturbance to key species | There could be a significant effect subject to mitigation. |
| Habitat or species fragmentation | Unlikely to be a significant effect as all foraging habitat utilised by whooper swan will remain. |
| Loss | The project will not cause direct loss of whooper swan. Should disturbance be significant enough to cause abandonment of the preferred grazing areas there could be indirect mortality of whooper swan. |





| Disruption | No disruption of the SPA will occur. However, potential exists for disturbance during construction and operation to disrupt the natural foraging/roosting site interactions of whooper swan. This could have a significant effect on the SPA. |
|--|---|
| Change to key elements of the site (e.g. water quality, hydrological regime etc.) | Not significant. |
| | ose elements of the project, or combination of elements, where the above nificant or where the scale or magnitude of impacts is not known. |
| Outcome of screening stage (delete as appropriate). | Significant effect possible on whooper swan. |
| Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence). | YES |

Table 2.2 Screening Matrix for Lough Swilly SPA

| Table 2.2 DMRB Screening Matrix for Lough Swilly SPA | | |
|--|-----------------------------|-------------------------------|
| Project Name: | A5 WTC | |
| Natura 2000 Site under Consideration: | Lough Swilly SPA | |
| Date: | Author (Name/Organisation): | Verified (Name/Organisation): |
| 23/07/13 | S.Ireland, Mouchel | P. Reid, Mouchel |

Description of Project

The proposed 85km A5 Western Transport Corridor (A5 WTC) scheme forms part of a strategically important transport route between Londonderry/Derry in Northern Ireland (NI) and to Dublin in the Republic of Ireland (ROI). The proposed scheme involves replacement of the existing A5 from a point north of New Buildings Londonderry in the north to a point south of Aughnacloy in the south with a dual carriageway along an alignment off-line from the existing road. In NI the existing road passes through New Buildings, Strabane, Sion Mills, Newtownstewart, Omagh and Aughnacloy. The proposed scheme will cross the River Foyle and Tributaries SAC in 2 locations and be close to the designated site in a number of other locations. It is anticipated the proposed scheme will be built in three phases starting with Phase 1 to commence in 2017, Phase 2 in 2022 and Phase 3 in 2026. It is anticipated that each phase will take some 2 to 3 years to construct.





| Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of: | |
|---|--|
| Size and scale (road type and probable traffic volume) | The project involves the construction of an 85 km long dual carriageway involving the construction within the Foyle floodplain in an area known to support birds associated with the SPA, with associated drainage and local road improvements. Traffic volumes are anticipated to be a maximum of 23300 AADT (to the nearest 100) by 2040. There will be no direct impacts on the SPA. However, both construction and operation of the road could lead to impacts on key foraging areas outside of the SPA and on birds foraging within these areas. |
| Land-take | There will be no land take within the SPA. Approximately 40 ha of land within the area of the Foyle floodplain known to support birds associated with the SPA will be lost to the scheme. |
| Distance from the European Site or key features of the site (from edge of the project assessment corridor) | The proposed scheme is located approximately 12km east/south-east of Lough Swilly SPA. Nevertheless birds which are known to use the SPA and which are designation feature species of the SPA are known to utilise an area of the Foyle floodplain partially encompassed within the project corridor during the winter months between Magheramason and the Burn Dennett crossing. In this location the proposed scheme varies between 0.3km and 1.8km from the River Foyle, running initially to the west of the existing A5, crossing to east of the existing A5 north of Bready and crossing back to west of the existing A5 just south of Grangefoyle Road. |
| Resource requirements (from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts) | None. |
| Emissions (e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution) | The SPA is some 12km west/north-west of the proposed works at its closest point. There is no direct hydrological link to the SPA from the proposed works corridor. Emissions from the scheme, including run-off from construction and operation, and vehicle emissions are not likely to interact with the SPA. |
| Excavation requirements (e.g. impacts of local hydrogeology) | None. |
| Transportation requirements | Construction related traffic and operational use of the scheme may result in potential disturbance impacts upon whooper swan foraging outside of the SPA boundary. |
| Duration of construction, operation, etc. | The construction of the northern section of Phase 1 of the proposed scheme will take 2-3 years. Phase 2 and 3 are outside of the possible area of interaction with the SPA species. |
| Other | None. |



| Description of avoidance and/or mitigation measures Describe any assumed (plainly established and uncontroversial) mitigation measures, including information | | |
|--|--|--|
| Nature of proposals | At present the operational requirements of the construction are not finalised, therefore potential mitigation in terms of controlled working timeframe of April to September (inclusive) cannot be confirmed. Therefore the potential for disturbance impacts cannot be ruled out. | |
| Location | Any mitigation relevant to the qualifying features of the Lough Swilly SPA is likely to be restricted to the eastern Foyle floodplain in areas utilised by the relevant bird populations. | |
| Evidence for effectiveness | Potential mitigation in terms of controlled working timeframe of April to September (inclusive) cannot be confirmed. Therefore the potential for disturbance impacts cannot be ruled out. | |
| Mechanism for delivery (legal conditions, restrictions or other legally enforceable obligations) | Transport NI will place contractual obligations on contractors to provide all necessary mitigation identified in Stage 2 of the assessment. Environmental Representatives employed by Transport NI will monitor the proposed scheme throughout construction. | |
| Characteristics of Europe A brief description of the Eu | an Site(s) uropean Site should be produced, including information on: | |
| Name of European Site and its EU code | Lough Swilly SPA (Site Code IE004075) | |
| Location and distance of the European Site from the proposed works | The proposed scheme is located approximately 12km to the east/south-east of the closest extent of the Lough Swilly SPA. | |
| European Site size | The site comprises the inner part of Lough Swilly and extends from just south of Letterkenny north to Rathmullan. With the subsumed Inch Lough and Levels SPA the complex is approximately 82.6km² in size. | |
| Key features of the European Site including the primary reasons for selection and any other qualifying interests | The SPA supports internationally important wintering populations of Greenland white-fronted geese (5 year mean of winter maximum 1995/96-1999/00 of 970 individuals), whooper swans (5 year mean of winter maximum 1995/96-1999/00 was 1,135 individuals, the largest population in the country) and greylag geese (5 year mean of winter maximum 1995/96-1999/900 was 2,020 individuals - incorporating both migratory birds of the Icelandic population and smaller numbers of feral birds). In the three winters 1995/96 to 1999/2000, 18 species occurred in nationally important numbers as follows (figures are average maximum counts for the 3 winters): Great Crested Grebe (284), Grey Heron (57), Shelduck (772), Wigeon (1,580), Teal (1,581), Mallard (1,169), Shoveler (60), Scaup (103), Goldeneye (170), Red-breasted Merganser (127), Coot (514), Oystercatcher (1,595), Knot (303), Dunlin (7,285), Curlew (1,720), Redshank (1,404), Greenshank (48) and Common Gull (1,523). Other species which occur include Light-bellied Brent Goose (152), Pochard (102), Golden Plover (749), Lapwing (1,408), Ringed Plover (81), Grey Plover (15), Bar-tailed Godwit (139) and Turnstone (73). The site is an important area for Great Northern Diver (19) and the rare Slavonian | |





Grebe (11). The rare winter visitor, Pink-footed Goose, also occurs (15). Nationally important numbers of Mute Swan (265) also use the site.

Inch Lough supports the largest tern colony in the north-west, with nationally important populations of Sandwich Tern (258 pairs in 2001) and Common Tern (89 pairs in 2001) occurring. There is also a nationally important colony of Black-headed Gull (800 pairs in 2001), which represents one of the largest populations in the country.

The site is regularly used by in excess of 20,000 waterfowl and therefore qualifies as of international importance.

Other species of note using the site are: herring gull and little grebe. The site is also used by Irish hare.

Vulnerability of the European Site - any information available from the standard data forms on potential effect pathways

The maintenance of the high numbers of geese and swans is dependent on the continuation of favourable land-use practices on the polders. The principal commercial activity within the estuarine part of the site is aquaculture. It is not known if this is causing significant disturbance to the estuarine habitats or the bird populations. Despite the proximity of several towns, water quality is generally satisfactory. Recreational activities occur in several areas of site and could cause some disturbance to the birds if not properly controlled.

European Site conservation objectives where these are readily available

Objective 1: To maintain the favourable conservation condition of the waterbird Special Conservation Interest species listed for Lough Swilly SPA.

Objective 2: To maintain the favourable conservation condition of the wetland habitat at Lough Swilly SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.

Assessment Criteria

Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site.

Potential Impacts upon whooper swan

The scheme has the potential to give rise to effects on whooper swan associated with this SPA through disturbance and habitat loss outside of the designated site. Mitigation proposals for the construction phase cannot be confirmed at this point, therefore, there remains a potential for significant effects.

Potential Impacts upon greylag geese

The scheme has the potential to give rise to effects on greylag geese associated with this SPA through disturbance and habitat loss outside of the designated site. Mitigation proposals for the construction phase cannot be confirmed at this point, therefore, there remains a potential for significant effects.

Potential Impacts upon Greenland white-fronted geese

No Greenland white fronted geese were recorded within the area of potential interaction between the proposed works and habitats supporting SPA qualifying species. Significant effects, upon the species are unlikely.

Potential Impacts on other designation feature species

A few individuals of other designation feature species have been recorded on the River Foyle. No significant effects are predicted for these species.

SPAs



| Initial Assessment | |
|---|--|
| The key characteristics of the site and the details of the European Site should be considered in identifying potential impacts. | |
| Describe any likely changes | s to the site arising as a result of: |
| Reduction of habitat area | None. |
| Disturbance to key species | The scheme may cause a significant effect on whooper swan and/or greylag geese due to disturbance. |
| Habitat or species fragmentation | The scheme is unlikely to cause a significant effect to whooper swan or greylag geese due to fragmentation since all sites currently used by the designation species will remain available |
| Reduction in species density | The scheme may cause a reduction in species density if the disturbance of foraging birds is sufficient to cause desertion of the Foyle floodplain adjacent to the works by some or all of the designation species population that currently use it. |
| Changes in key indicators of conservation value (water quality, etc.) | The scheme is unlikely to result in changes in key indicators of conservation value as sufficient mitigation is in place. |
| Climate change | The scheme has the potential to contribute to the problem of climate change by increasing the carrying capacity of the current road network. |
| Describe any likely impacts | on the European Site as a whole in terms of: |
| Interference with the key relationships that define the structure of the site | None. |
| Interference with key relationships that define the function of the site | Possible disturbance of whooper swans and/or greylag geese on grazing areas outside of the site could cause birds to lose foraging time, and expend energy avoiding the disturbance. Thus reducing the birds' fitness and ability to survive and impacting on the function of the site as winter bird habitat. |
| Indicate the significance as | a result of the identification of impacts set out above in terms of: |
| Reduction of habitat area | No habitat loss within the SPA. Approximately 40ha of potential foraging habitat loss west of the existing A5, although no whooper swan or greylag geese have been recorded under the scheme footprint. |
| Disturbance to key species | There could be a significant effect subject to mitigation. |
| Habitat or species fragmentation | Unlikely to be a significant effect as all foraging habitat utilised by whooper swan will remain. |
| Loss | The project will not cause direct loss of whooper swan. Should disturbance be significant enough to cause abandonment of the preferred grazing areas there could be indirect mortality of whooper swan and/or greylag geese. |
| Disruption | No disruption of the SPA will occur. However, potential exists for disturbance during construction and operation to disrupt the natural foraging/roosting site interactions of whooper swan and/or greylag geese. This could have a significant effect on the SPA. |
| Change to key elements of the site (e.g. water | Not significant. |



| quality, hydrological regime etc.) | |
|--|--|
| | those elements of the project, or combination of elements, where the above nificant or where the scale or magnitude of impacts is not known. |
| Outcome of screening stage (delete as appropriate). | Significant effect possible on whooper swan and greylag geese. |
| Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence). | YES |

Table 2.3 Screening Matrix for Lough Neagh & Lough Beg SPA

| Table 2.3 DMRB Screening Matrix for Lough Neagh & Lough Beg SPA | | |
|---|-----------------------------|-------------------------------|
| Project Name: | A5WTC | |
| Natura 2000 Site under Consideration: | Lough Neagh & Lough Beg SPA | |
| Date: | Author (Name/Organisation): | Verified (Name/Organisation): |
| 23/07/13 | S.Ireland, Mouchel | P. Reid, Mouchel |

Description of Project

The proposed 85km A5 Western Transport Corridor (A5 WTC) scheme forms part of a strategically important transport route between Londonderry/Derry in Northern Ireland (NI) and to Dublin in the Republic of Ireland (ROI). The proposed scheme involves replacement of the existing A5 from a point north of New Buildings Londonderry in the north to a point south of Aughnacloy in the south with a dual carriageway along an alignment off-line from the existing road. In NI the existing road passes through New Buildings, Strabane, Sion Mills, Newtownstewart, Omagh and Aughnacloy. The proposed scheme will cross the River Foyle and Tributaries SAC in 2 locations and be close to the designated site in a number of other locations. It is anticipated the proposed scheme will be built in three phases starting with Phase 1 to commence in 2017, Phase 2 in 2022 and Phase 3 in 2026. It is anticipated that each phase will take some 2 to 3 years to construct.

Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:

| Size and scale (road type and probable traffic volume) | The project involves the construction of an 85 km long dual carriageway involving construction within the Foyle floodplain in an area known to support birds associated with the SPA, with associated drainage and local road improvements. Traffic volumes are anticipated to be a maximum of 23300 AADT (to the nearest 100) by 2040. There will be no direct impacts on the SPA. However, both construction and operation of the road could lead to impacts on key foraging areas outside of the SPA and on birds from the SPA which are foraging within these areas. |
|--|--|
| Land-take | There will be no land take within the SPA. Approximately 40 ha of land within |



the area of the Foyle floodplain known to support birds associated with the SPA will be lost to the scheme.





| Distance from the European Site or key features of the site (from edge of the project assessment corridor) | The proposed scheme is located approximately 20km west/south-west of Lough Neagh & Lough Beg SPA. Nevertheless birds which are known to use the SPA and which are designation feature species of the SPA are known to utilise an area of the Foyle floodplain partially encompassed within the project corridor during the winter months between Magheramason and the Burn Dennett crossing. In this location the proposed scheme varies between 0.3km and 1.8km from the River Foyle, running initially to the west of the existing A5, crossing to east of the existing A5 north of Bready and crossing back to west of the existing A5 just south of Grangefoyle Road. | |
|---|---|--|
| Resource requirements (from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts) | None. | |
| Emissions (e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution) | The SPA is some 20km west/south-west of the proposed works at its closest point. Emissions from the scheme, including run-off from construction and operation, and vehicle emissions are not likely to interact with the SPA. | |
| Excavation requirements (e.g. impacts of local hydrogeology) | None. | |
| Transportation requirements | Construction related traffic and operational use of the scheme may result in potential disturbance impacts upon whooper swan foraging outside of the SPA boundary during migration. | |
| Duration of construction, operation, etc. | The construction of the northern section of Phase 1 of the proposed scheme will take 2-3 years. Phase 2 and 3 are outside of the possible area of interaction with the SPA species. | |
| Other | None. | |
| Description of avoidance and/or mitigation measures Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on: At present the operational requirements of the construction are not finalised, therefore potential mitigation in terms of controlled working timeframe of April | | |
| Location | to September (inclusive) cannot be confirmed. Therefore the potential for disturbance impacts cannot be ruled out. Any mitigation relevant to the designation feature species of the Lough Neagh & Lough Beg SPA is likely to be restricted to the eastern Foyle floodplain in | |
| | areas utilised by the relevant bird populations. Potential mitigation in terms of controlled working timeframe of April to September (inclusive) cannot be confirmed. Therefore the potential for | |
| Evidence for effectiveness | disturbance impacts cannot be ruled out. | |
| Mechanism for delivery (legal conditions, restrictions or other legally enforceable obligations) | Transport NI will place contractual obligations on contractors to provide all necessary mitigation identified in Stage 2 of the assessment. Environmental Representatives employed by Transport NI will monitor the proposed scheme throughout construction. | |
| | | |

SPAs



| Characteristics of European Site(s) A brief description of the European Site should be produced, including information on: | | |
|---|---|--|
| Name of European Site and its EU code | Lough Neagh and Lough Beg SPA (Site Code UK9020091) | |
| Location and distance of the European Site from the proposed works | The proposed scheme is located approximately 20km to the west/south-west of the closest extent of the SPA. | |
| European Site size | The site comprises Lough Neagh, Lough Beg and Portmore Lough and is 41,188 Ha in size. | |
| Key features of the European Site including the primary reasons for selection and any other qualifying interests | The site regularly supports internationally important numbers of wintering Bewick's swan (the five year peak mean for the period 1989/90 to 1993/94 was 251 which comprises 1.5% of the Western and Central Europe population and 10% of the Irish population) and whooper swan (the five year peak mean for the period 1989/90 to 1993/94 was 923 which comprises 5.4% of the total Icelandic breeding population and 6.5% of the Irish population). The site also qualifies under Article 4.1 by regularly supporting nationally important numbers of breeding common tern (200 pairs in 1995 which comprises 7.4% of the Irish population). The site regularly supports over 20,000 waterfowl in winter, including pochard, tufted duck and goldeneye. Lough Neagh is also notable for supporting an important assemblage of breeding birds including the following species which occur in nationally important numbers: great crested grebe, gadwall, tufted duck, snipe, redshank, common gull, lesser black-backed gull and black-headed gull. Other important breeding wetland species include shelduck, teal, shoveler, lapwing and curlew. | |
| | The Lough drains some 40% of Northern Ireland and has been subject to severe eutrophication as a result of increased nutrient inputs from agricultural run-off and general domestic sewage from catchment housing and other developments. Historically, increased eutrophication may have enhanced wildfowl populations but the effect of eutrophication on such populations is little understood | |
| Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways | although it may have had a positive impact on wintering diving duck. Although some species e.g. swans, use improved fields, recent changes in agricultural land-use i.e. agricultural intensification (land improvements/high grazing levels) and, in some cases, insufficient grazing and tree/scrub management resulting in vegetation succession, may adversely affect feeding/roosting areas for overwintering and breeding waterfowl. Introduction of/invasion by non-native species such as Roach and potentially Zebra Mussels could have a deleterious effect on some species e.g. diving duck, but may be beneficial to others e.g. Great-crested Grebe. Sand dredging is widespread throughout the Lough but the impact is largely unknown. An existing Conservation Plan for Lough Neagh and Lough Beg is currently under review. This review will up-date existing management prescriptions and | |



| | refine existing conservation objectives. | |
|--|--|--|
| | A total of 15 management agreements (NNR/ASSI) mainly for agricultural issues, are established on the site. | |
| | Phosphate stripping at appropriate STW has begun to address the issue of eutrophication. Other measures such as agric-improvement schemes and Water Quality Management Plans to further address this issue are being considered. | |
| European Site conservation objectives – where these are readily available | To maintain each feature in a favourable condition ^{10,11} . | |

Assessment Criteria

Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site.

Potential Impacts on whooper swan

The scheme has the potential to give rise to effects on whooper swan associated with this SPA through disturbance and habitat loss outside of the designated site. Mitigation proposals for the construction phase cannot be confirmed at this point, therefore, there remains a potential for significant effects.

Potential Impacts of Bewick's swan

No Bewick's swan were recorded in the area of potential interaction between the proposed scheme and the habitat supporting SPA designation feature species.

Potential Impacts on other designation feature species

Small numbers of Pochard, tufted duck and goldeneye were noted on the River Foyle. No significant impact is predicted for these species.

Initial Assessment

The key characteristics of the site and the details of the Ramsar Site should be considered in identifying potential impacts.

Describe any likely changes to the site arising as a result of:

| Reduction of habitat area | None. |
|----------------------------------|--|
| Disturbance to key species | The scheme may cause a significant effect on whooper swan due to disturbance. |
| Habitat or species fragmentation | The scheme is unlikely to cause a significant effect to whooper swan due to fragmentation since all sites currently used by the designation species will |

¹⁰ Feature refers to the selection features for the SPA.

¹¹ Individual objectives are set for each feature, they are too numerous to present in this table and are presented in Appendix 1, Table A1.2.



| | remain available | |
|---|---|--|
| | | |
| Reduction in species density | The scheme may cause a reduction in species density if the disturbance of foraging birds is sufficient to cause desertion of the Foyle floodplain adjacent to the works by some or all of the designation species population that currently use it. | |
| Changes in key indicators of conservation value (water quality, etc.) | The scheme is unlikely to result in changes in key indicators of conservation value as sufficient mitigation is in place. | |
| Climate change | The scheme has the potential to contribute to the problem of climate change by increasing the carrying capacity of the current road network. | |
| Describe any likely impacts | on the European Site as a whole in terms of: | |
| Interference with the key relationships that define the structure of the site | None. | |
| Interference with key relationships that define the function of the site | Possible disturbance of whooper swans on grazing areas outside of the site could cause birds to lose foraging time, and expend energy avoiding the disturbance. Thus reducing the birds' fitness and ability to survive and impacting on the function of the site as winter bird habitat. | |
| Indicate the significance as | a result of the identification of impacts set out above in terms of: | |
| Reduction of habitat area | No habitat loss within the SPA. Approximately 40ha of potential foraging habitat loss west of the existing A5, although no whooper swan have been recorded under the scheme footprint. | |
| Disturbance to key species | There could be a significant effect subject to mitigation. | |
| Habitat or species fragmentation | Unlikely to be a significant effect as all foraging habitat utilised by whooper swan will remain. | |
| Loss | The project will not cause direct loss of whooper swan. Should disturbance be significant enough to cause abandonment of the preferred grazing areas there could be indirect mortality of whooper swan. | |
| Fragmentation | No disruption of the SPA will occur. However, potential exists for disturbance during construction and operation to disrupt the natural foraging/roosting site interactions of whooper swan. This could have a significant effect on the SPA. | |
| Disruption | Not significant. | |
| Disturbance | No habitat loss within the SPA. Approximately 40ha of potential foraging habitat loss west of the existing A5, although no whooper swan have been recorded under the scheme footprint. | |
| Change to key elements of the site (e.g. water quality, hydrological regime etc.) | There could be a significant effect subject to mitigation. | |
| | ose elements of the project, or combination of elements, where the above nificant or where the scale or magnitude of impacts is not known. | |
| Outcome of screening stage (delete as appropriate). | Significant effect possible on whooper swan. | |





| Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence). | YES |
|--|-----|

- 3.1.2 Concluding the screening exercise, the four SPAs under consideration have been subject to a screening exercise for the currently proposed scheme based on the guidance provided in HD 44/09 and using the suggested screening matrix template provided in Annex 4 of the guidance to record the findings of the process. In all three instances it has been concluded:
 - the proposed scheme is a project which is not connected with or necessary to the management of the SPAs;
 - the likelihood of the proposed scheme having a significant effect on the sites cannot be excluded on the basis of objective information; and
 - that appropriate assessments should accordingly be undertaken.





4 Stage 2 – Appropriate Assessment

4.1 Introduction

- 4.1.1 As described above, this stage considers the potential impacts on the structure, function, and conservation objectives of the Natura 2000 Sites. Where there is the potential for adverse impacts, an assessment of the potential mitigation of those impacts is presented. The assessment should consider the impacts the Proposal may have either alone or in combination with other projects or plans. This stage includes:
 - A description of the Natura 2000 sites that will be considered in the AA;
 - A description of significant impacts on the conservation feature of these sites likely to occur from the Plan;
 - Mitigation Measures; and
 - Conclusions.

4.2 Scope of the information to inform the appropriate assessments.

- 4.2.1 Across the board spectrum of potential impacts considered and assessed by the studies carried out to date, likely impacts identified which cannot be screened out on the basis of objective information on likely significant effect relate solely to:
 - loss of feeding habitat (functional habitat)¹² at Dunnalong/Thorn Hill and Grange Foyle outside of the SPAs and which is used by wintering birds associated with the four SPAs; and
 - disturbance of wintering birds associated with the four SPAs during their use of feeding habitat outside of the SPAs at Dunnalong/Thorn Hill and Grange Foyle.

Loss of feeding habitat used by wintering birds associated with the four SPAs

4.2.2 The assessment has involved quantification of the extent of available feeding habitat within the Dunnalong /Thorn Hill and Grange Foyle areas and comparison with the total extent of such habitat available in the two areas. Precise quantification of available feeding habitat in this manner is the most objective means of assessing whether any consequent effect is likely to be significant and is the methodology adopted in this report.

¹² Habitat outside of a designated site which is used / relied on by species associated with the designated site



Disturbance of wintering birds associated with the four SPAs during their use of feeding habitat at Dunnalong/Thorn Hill and Grange Foyle

Data Sources

- 4.2.3 The following data sources have been relied on:
 - data provided in the A5WTC ES 2010, including surveys undertaken at Dunnalong/Thorn Hill and Grange Foyle between October 2009 and April 2010;
 - data derived from site surveys undertaken at Dunnalong/Thorn Hill and Grange Foyle between October 2013 and April 2014 by the Mouchel assessment team; and
 - data for use of the area by whooper swan for 2010-2013 provided by the Irish Whooper Swan Study Group.

Impact assessment

- 4.2.4 There are no generally accepted thresholds for the loss of functional habitat or the numbers of birds which may be disturbed and displaced in the short-term or long-term from areas of functional habitat. Determination of whether either or both is likely to have a significant effect on the area of functional habitat and the species which use / are reliant on the area with consequent effects on the integrity of a designated site is necessarily context specific.
- 4.2.5 In the case of the four SPAs considered in this report, habitat loss has been quantified and represented as a percentage of the habitat which surveys have indicated are used and the overall extent of potential functional habitat within the area in the vicinity of the proposed scheme.
- 4.2.6 Potential for disturbance of the whooper swan and greylag geese which annually utilise the area has been considered relative to sources of disturbance during construction and operation and identification and consultation with NIEA and RSPB(NI) regarding mitigation measures with a particular focus on construction activities which are likely to involve higher and tonally distinct noise levels and characteristics. A detailed literature review has been carried out for the purposes of HRA and is included within this report. Reference to peer reviewed scientific studies on the impacts of disturbance upon birds, combined with the detailed assessments carried out and reported within the 2010 ES and 2016 ES, enables the assessments to be carried out and conclusions reached which are beyond the threshold of reasonable scientific doubt required by the Birds and Habitats Directives.

4.3 Determination of adverse impact relative to integrity

4.3.1 Once potential impacts have been identified, they are considered in relation to the potential to have a negative effect on the integrity of the Natura 2000 sites. The assessment determines whether there is likely to be:





- a reduction in the coherence of the ecological structure or function of the site, taking
 into account the whole area of the site, and supporting habitats which are integral to
 the structure and function of the site, and
- whether any such reduction would reduce the ability of the site to sustain the qualifying habitat and/or the levels of populations of the species for which it was classified.
- 4.3.2 The DMRB guidance (HD 44/09) provides a suitable checklist to identify interactions and potential effects on the integrity of the site. Completed checklists are provided in Appendix 4.
- 4.3.3 The definition for integrity adopted in this report is that provided in ODPM Circular 06/2005 and Defra Circular 01/2005 *Biodiversity and Geological conservation Statutory obligations and their impact within the planning system*, which defines integrity in the context of designated site as:

The coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified.







5 Description of the proposed scheme

5.1 Alignment and relationship to the functional habitat associated with the 4 SPAs

- 5.1.1 The proposed scheme comprises an 85km dual carriageway running between the existing A5 north of New Buildings and the existing A5 south of Aughnacloy. Its location and relationship to the four SPAs is shown in Figure 1 in Appendix 1.
- 5.1.2 The section of the proposed scheme corridor which is of relevance to the three SPAs is that between Magheramason and the Burn Dennet. Here, the proposed dual carriageway will generally be located between 1.2 and 2km east of the River Foyle. It is an area of mixed arable and agricultural grassland some 40% of which is within the River Foyle floodplain. Parts of the area are used annually by whooper swan and greylag geese associated with the four SPAs for feeding¹³.
- 5.1.3 Detail relating to the peak counts for whopper swan and greylag geese during the 2009 2010 and 2013 2014 surveys in the Foyle floodplain is provided in Appendix 11O of the 2016 ES. The location of the birds observed is shown in Figures 11.67 and 11.68 of that document (reproduced in Appendix 1 of this report).
- 5.1.4 Over this section, the proposed scheme follows a north-south alignment which broadly reflects that of the existing A5. Between Magheramason and Bready it will be located some 200-250m west of the existing road and will be on embankment as it crosses Meenagh Road and approaches a proposed bridge over the existing A5, Victoria Road north of its existing junction with Cloghboy Road. South of the new bridge, the alignment will initially encroach onto the lower western-facing slopes of Sollus Hill in deep cutting. As the dual carriageway continues south it will be some 200m east of the existing road. It will emerge from the cutting and follow an alignment roughly parallel with the A5, crossing beneath Donagheady Road, and following a gentle curve to the south-west, passing between Willow Farm and housing on the A5, Victoria Road. It will cross Willow Road in shallow cutting and rise on high embankment to enable it to be bridged over the A5, Victoria Road. The dual carriageway will descend from the bridge to cross Ash Avenue on low embankment before rising again onto high embankment and crossing Drumenny Road via a new bridge before approaching and crossing the Burn Dennet via a new open span bridge.
- 5.1.5 Construction of this section, other than at Sollus Hill, will involve the use of large excavators, dump trucks for transporting excavated materials to areas of fill within the working areas, bulldozers, graders, compaction plant including various rollers and soil stabilisation plant. It is not anticipated there will be a need for blasting, the break out of rock at Sollus Hill being implemented by way of rock breakers.

¹³ Either regularly during the winter, or during migration to and from the SPAs



Information to Inform an Appropriate Assessment:

6 The Four SPAs

6.1 Introduction

6.1.1 The location, extent and relationship of the four SPAs to the proposed scheme is indicated in Figure 1 in Appendix 1. Details relating to the species identified as the primary reason for selection as a Natura 2000 site and qualifying species are described in Table 4.1. A comment on the vulnerability of the site is included. The information has been obtained from the Natura 2000 data forms obtained from the Joint Nature Conservancy Committee (JNCC) website (www.jncc.gov.uk) and the National Parks and Wildlife Service (NPWS) website (www.npws.ie). The Natura 2000 data forms are enclosed in Appendix 3.



Table 4.1 Site Descriptions

| Site Name | Designation & Code | Designated Feature Species | | Vulnerability |
|-------------|---|--------------------------------|---|---|
| | | Article 4.1 Species | Article 4.2 Species | |
| Lough Foyle | SPA UK9020031 (Northern Ireland) 004087 (ROI) | Whooper swan Bar-tailed godwit | Wintering: Light-bellied brent geese International Wintering Assemblage: Red-throated diver Great crested grebe Mute swan Bewick's swan Greylag geese Shelduck Teal Mallard Wigeon Eider Red-breasted merganser Oystercatcher Golden plover Grey plover Lapwing Knot Dunlin Curlew Redshank Greenshank | Although a control programme has begun, the colonisation and spread of aggressive non-native species such as <i>Spartina</i> spp. is a current problem and poses a potential threat in the future. An existing Conservation Plan for Lough Foyle is now under review. This review will update existing management prescriptions and refine existing conservation objectives. |

SPAs



| Site Name | Designation & Code | Designated Feature Species | | Vulnerability |
|--------------|--------------------|---|--|--|
| | | Article 4.1 Species | Article 4.2 Species | |
| | | | | |
| | | Other notable species: Slavonian grebe | | |
| Lough Swilly | SPA IE004075 | Wintering: Whooper swan Greylag goose Greenland white-fronted goose | Wintering: Great crested grebe Grey heron Shelduck Wigeon Teal Mallard Shoveler Scaup Goldeneye Red-breasted merganser Coot Oystercatcher Knot Dunlin Curlew Redshank Greenshank Common gull Mute swan Breeding: Sandwich tern | The maintenance of the high numbers of geese and swans is dependent on the continuation of favourable land-use practices on the polders. The principal commercial activity within the estuarine part of the site is aquaculture. It is not known if this is causing significant disturbance to the estuarine habitats or the bird populations. Despite the proximity of several towns, water quality is generally satisfactory. Recreational activities occur in several areas of site and could cause some disturbance to the birds if not properly controlled. |



| Site Name | Designation & Code | n Designated Feature Species | | Vulnerability |
|-----------|--------------------|-----------------------------------|---------------------|---------------|
| | | Article 4.1 Species | Article 4.2 Species | |
| | | | Common tern | |
| | | | Black-headed gull | |
| | | Other Cresies of Note: | | |
| | | Other Species of Note: | | |
| | | Light-bellied brent goose Pochard | | |
| | | | | |
| | | Golden plover | | |
| | | Lapwing | | |
| | | Ringed plover | | |
| | | Grey plover | | |
| | | Bar-tailed godwit | | |
| | | Turnstone | | |
| | | Great northern diver | | |
| | | Slavonian grebe | | |
| | | Pink-footed goose | | |
| | | | | |
| | | Herring gull | | |
| | | Little grebe | | |
| | | Irish hare | | |
| | | | | |



| Site Name | Designation & Code | Designated Feature Species | | Vulnerability |
|----------------------------|--------------------|---|--|---|
| | | Article 4.1 Species | Article 4.2 Species | |
| Lough Neagh & Lough Beg | SPA UK9020091 | Wintering: Bewick's swan Whooper swan Breeding: Common tern | Wintering: Pochard Tufted duck Goldeneye Breeding: Great crested grebe Gadwall Tufted duck Snipe Redshank Common gull Lesser black-backed gull Black-headed gull | The Lough drains some 40% of Northern Ireland and has been subject to severe eutrophication as a result of increased nutrient inputs from agricultural run-off and general domestic sewage from catchment housing and other developments. Historically, increased eutrophication may have enhanced wildfowl populations but the effect of eutrophication on such populations is little understood although it may have had a positive impact on wintering diving duck. Although some species e.g. swans, use improved fields, recent changes in agricultural land-use i.e. agricultural intensification (land improvements/high grazing levels) and, in some cases, insufficient grazing and tree/scrub management resulting in vegetation succession, may adversely affect feeding/roosting areas for overwintering and breeding waterfowl. Introduction of/invasion by non-native species such |



| Site Name | Designation & Code | on Designated Feature Species | | Vulnerability |
|-----------|--------------------|--|---------------------|---|
| | | Article 4.1 Species | Article 4.2 Species | |
| | | Other Species of Note: Breeding: Shelduck Teal | | as Roach and potentially Zebra Mussels could have a deleterious effect on some species e.g. diving duck, but may be beneficial to others e.g. Great-crested Grebe. |
| | | Shoveler Lapwing Curlew | | Sand dredging is widespread throughout the Lough but the impact is largely unknown. |
| | | | | An existing Conservation Plan for Lough Neagh and Lough Beg is currently under review. This review will up-date existing management prescriptions and refine existing conservation objectives. |
| | | | | A total of 15 management agreements (NNR/ASSI) mainly for agricultural issues, are established on the site. |
| | | | | Phosphate stripping at appropriate STW has begun to address the issue of eutrophication. Other measures such as agri-improvement schemes and Water Quality Management Plans to further address this issue are being considered. |



7 Potential impacts and mitigation

7.1 Loss of feeding habitat used by wintering birds associated with the three SPAs

- 7.1.1 The area of the Foyle floodplain between Magheramason in the north and the Burn Dennett in the south has been identified by RSPB and the Irish Whooper Swan Study group as the area of functional habitat for which there is an interaction between the proposed scheme and the qualifying species of the SPAs, due to the use of the area by birds associated with the SPAs for foraging, either as a regular winter foraging area, or during migration to and from the SPAs. Significant numbers of birds associated with the SPAs have been recorded within the Foyle floodplain, thus the potential impact of the scheme may be significant in terms of the integrity of the SPA and requires further assessment to determine if that is indeed the case.
- 7.1.2 There is approximately 1200 ha of potential foraging habitat within the area.
- 7.1.3 Figures 11.67 and 11.68 in Appendix 1 provide peak count numbers and locations of all recorded qualifying bird species for the surveys undertaken in 2009-2010 and 2013-2014 respectively. The numbers demonstrate that the area is used by two species, whooper swan and greylag goose. They also demonstrate that numbers for 2013-2014 have been significantly lower than the numbers recorded in 2009-2010 and that fewer parts of the area have been used. Discussion with RSPB NI indicated that birds were using foraging areas within the RoI, outside of the survey area, and at a significant distance from the proposed construction. For the purposes of this assessment it has been assumed the higher numbers and more dispersed pattern recorded in 2009-2010 is more representative of the use of the area by birds associated with the functional habitat.
- 7.1.4 Field survey results from 2013/2014 showed a peak count of 873¹⁴ birds present on land within the area of the eastern floodplain, at Grange Foyle, approximately 46% of the whooper swan utilising the Lough Foyle/Lough Swilly SPA complex in January 2005. A peak count of 22 birds from north of Dunnalong Road equates to approximately 1.2% of the whooper swan utilising the Lough Foyle/Lough Swilly SPA complex based upon data from 2005. This represents a change in use pattern when compared to the 2009 A5 WTC EIA study (Mouchel, 2009), with fewer birds using the area north of Dunnalong Road and more within the Grange Foyle area.
- 7.1.5 Field survey results from 2013/2014 showed a peak count of 218 birds present on land within the area of the eastern floodplain, at Grange Foyle, approximately 9.2% of the greylag geese utilising the Lough Foyle/Lough Swilly SPA complex. The single bird observed north of Dunnalong Road represents <0.1% of the greylag geese utilising the Lough Foyle/Lough Swilly SPA complex.

¹⁴ This peak count is a summation of all of the highest counts regardless of the month in which those counts occur, it is likely to be artificially high, but allows a robust and precautionary approach to impact assessment.





- 7.1.6 During 2009-2010 an area of approximately 330 ha was used by up to 430¹⁵ whooper swan, and an area of approximately 150 ha was used by up to 350 greylag geese. During 2013-2014 an area of approximately 130 ha was used by up to 205 whooper swan, and an area of approximately 117 ha was used by up to 65 greylag geese.
- 7.1.7 The proposed scheme will involve the loss of approximately 40 ha of land within the area of potential functional habitat representing some 3% of the total area of potential habitat. None of the land take will affect parts of the area where use by either species has been recorded in the two surveys periods, in addition, there are alternative feeding sites located elsewhere along the river.
- 7.1.8 In light of the small percentage of potential loss and absence of loss in areas where use has been demonstrated, it has been concluded there will be no need for mitigation in the form of provision of compensatory habitat. This conclusion is based upon the Source-Pathway-Receptor conceptual model of impact assessment.
- 7.1.9 In order for the existence of an impact to be proven, all three elements of the model must be extant in any given context. In this case the receptor is absent from potentially impacted areas. As no qualifying bird species have been shown to utilise the areas impacts, a corollary of that finding is that no impact is likely to arise which may adversely impact upon them.
- 7.2 Disturbance of wintering birds associated with the four SPAs during their use of feeding habitat at Dunnalong/Thorn Hill and Grange Foyle

The effects of disturbance on avifauna

- 7.2.1 Disturbance has the potential to produce negative impacts on wild bird populations. However, the way in which disturbance affects bird populations is complex and predicting impacts requires a detailed knowledge of how disturbance affects populations and how this varies between species. The aim of this section is to review relevant research with a view to understanding whether any of the predicted sources of disturbance are likely to have a negative impact on populations of birds using the area around the proposal and, in particular, whether this could have an unacceptable impact on any species associated with the Special Protection Areas
- 7.2.2 The role of disturbance on bird populations has been extensively studied both to identify problems with species of conservation concern and as a tool in deterring unwanted species from sensitive areas e.g. airports and valuable crops. While most organisations concerned with management of the countryside actively encourage increased access to the countryside, the resultant increased disturbance can often have significant negative effects on wildlife.

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¹⁵ These numbers represent the highest count during a single survey visit, and allow an accurate calculation of the area of forage habitat in use at any one time.



- 7.2.3 There are two factors to consider when assessing the impact of human disturbance on feeding areas. First, does the disturbance lead to changes in behaviour? Second, does any consequent change in behaviour affect mortality, reproductive success or population size (Gill et al. 2001)? The majority of studies on disturbance concentrate on the first factor in one of two ways: comparison of animal distributions between areas with and without disturbance (e.g. Tuite, Hanson and Owen 1984; Pfister, Harrington and Lavine 1992; Sutherland and Crockford 1993; Milsom et al. 2000), and observations of the direct effects of disturbance on behaviour (e.g. Draulans and van Vessem 1985; Belanger and Bedard 1989). Many studies of this type have focussed on shorebirds as they appear susceptible to disturbance and occur in areas used by large numbers of people (e.g. Burger 1981; Kirkby, Clee and Seager 1993; Smit and Visser 1993).
- 7.2.4 It is generally accepted that most waterfowl populations are limited by availability of food during the winter months (see Owen and Black 1990 for a review). The factors controlling the populations are thought to be "density-dependent" and lead to the population tending towards the "carrying capacity" i.e. the numbers an individual site can support. For example, when numbers of a species are relatively high, mortality will increase resulting in a decrease in the population. Conversely, when numbers are low, mortality will decrease until numbers increase to the carrying capacity of an area. In the case of waterfowl, density-dependence is thought to act through two factors. First, through the availability of prey/food during the winter months. Second, through the levels of fat birds can lay down prior to spring migration. This is important, as the breeding success of many species is directly related to the availability of reserves on arrival in the breeding grounds, especially for arctic-breeding waders and wildfowl.
- 7.2.5 The nature of the density-dependent factors and the timing of their impact need to be understood if meaningful management measures are to be employed. This is recognised in the models used to assess the "surplus" in wildfowl populations that can be exploited through wildfowling. In these models, mortality before the winter food "bottleneck" (when mortality becomes density-dependent) is termed "compensatory mortality" as the removal of birds at this time reduces the mortality during the population bottleneck. Mortality after the bottleneck, will result in a reduction in the population (as the population has already been reduced to the "carrying capacity") and is termed "additive mortality".
- 7.2.6 The recent development of incorporating behavioural ecology theory into conservation research has led to a much better understanding of how factors such as disturbance or habitat loss affect populations of wild animals (Sutherland 1998). In particular, studies of waterfowl populations have changed the way potential impacts should be assessed (Gill 2007, Stillman et al. 2007). These studies have led to an increased understanding of the roles of various potential threats to populations and have even led to the first models capable of predicting impacts of development on major estuarine sites (Durrell et al 2005).
 - 7.2.7 Studying the impact of shellfishing at low tide on Oystercatchers on the Exe estuary, Stillman et al (2000), examined the role of disturbance in reducing access to feeding areas. This model was modified to take into account the time and energy costs associated with that disturbance, including energy expended flying away from disturbance and feeding time lost as a result of the disturbance (West et al 2002). This study showed that disturbance from



many small sources was more significant than fewer large scale sources and that disturbance could be more significant than habitat loss. However, the model also made recommendations on how to minimise the impact of the disturbance and that "preventing disturbance during late winter, when feeding conditions were worse, practically eliminated its predicted population consequences" (Stillman et al 2007). The model demonstrated that disturbance produced very little impact if restricted to daylight hours and if occurring before 1 December. Large-scale disturbance (10% of the site) produced less effect than numerous small events as this involved less commuting energy.

- 7.2.8 In a major study of wading birds on the Seine estuary, France, Durrell et al (2005) used a similar behaviour-based model to predict the impact of an extension to the port at Le Havre on the Seine estuary. They were able to assess the significance of;
 - a reduction in available habitat;
 - · disturbance during the night and the day;
 - the introduction of a buffer zone around the development;
 - the effectiveness of introducing a new mudflat area as mitigation.
- 7.2.9 Supporting the findings of the effect of daytime disturbance on Oystercatchers on the Exe estuary, the authors found "when we simulated disturbance occurring during the daytime only, birds were able to feed within this area at night. In this case, the effect of disturbance was greatly reduced in dunlin and removed altogether in curlew and oystercatcher". Introduction of a 150m "buffer" zone "effectively removed the effect of disturbance on feeding shorebirds.

The effect of disturbance on exploitation of resources

- 7.2.10 The value of a site to a local population can be reduced where disturbance levels result in either reduced levels of exploitation or significantly increased costs associated with that exploitation e.g. commuting costs. Where disturbance may be chronic and birds excluded from feeding areas for long periods of time, feeding when disturbance levels are lower e.g. bad weather, early morning, may result in the same level of use as at sites where disturbance is minimal. The best way to directly assess the role of disturbance on the level of exploitation is to measure prey depletion where the study species is the only predator and where the prey species is non-renewing. This was studied in Black-tailed Godwits feeding on bivalves in the southeast of England. Gill et al. (2001) studied the levels of depletion in bivalve populations at sites experiencing a wide range of levels of disturbance. They predicted that disturbance could result in a slower rate of exploitation, leading to unused resources at the end of the winter. The level to which the resources are unused will determine the extent of the consequent reduction to carrying capacity of the site.
- 7.2.11 The study showed that even at sites with very high levels of disturbance (including a yacht club), Godwits visited the disturbed areas during periods of low disturbance and depleted prey to similar levels recorded at sites where disturbance was minimal. This demonstrated





that the value of a feeding area to a species may not be diminished as long as birds are able to feed sufficiently often to exploit the site fully.

7.2.12 Following "Ideal Free Distribution" theory, areas of high food availability will be preferred to areas of low availability. Where disturbance does result in reductions in foraging effort, food availability is likely to be greater than on adjoining undisturbed areas. When the source of disturbance is removed, birds would be expected to prefer these areas for foraging and, given sufficient time to exploit the resource, will deplete the resource to the same levels as the adjoining undisturbed areas. The key point in studying this type of scenario is to identify whether sufficient opportunities are available for sites/areas within sites, to be exploited fully.

Daytime feeding opportunities

- 7.2.13 Whooper Swans foraging on land at some distance from water must make daily commuting flights between roosting and foraging areas. In respect of such flights, three factors may safely be assumed to be implicated in the timing and duration of these flight; day length, temperature and safety. During midwinter birds naturally endure long periods of darkness, often combined with low temperatures, and it is probable that birds are likely to have lower morning energy stores than at other times of the year. Additionally, the impact of low temperatures and prolonged darkness is that less time is available for foraging as whooper swans are visual feeders. Assuming that the time swans spend at their foraging grounds is positively correlated with energy requirements, in midwinter birds should arrive earlier at, and depart later from, their foraging areas. In addition, time spent feeding during the day should increase relative to day length. These conditions may induce an energetic bottleneck during December & January.
- 7.2.14 With regard to disturbance of the two species associated with construction of the proposed scheme, studies reported by Rees et al (2005) Factors affecting the behavioural responses of whooper swans (Cygnus c. cygnus) to various human activities noted that pedestrian presence disturbed whooper swans when within 250-400m, and that construction vehicles disturbed whooper swan when within 250m, in contrast to tractors which caused disturbance when within 150m and other farm vehicles which caused disturbance when within 250m.
- 7.2.15 The proposed scheme will generally involve construction significantly more than 250m from those parts of the area of functional habitat where the presence of the species has been has been recorded during the surveys. Locations closest to parts of the area where presence has been recorded are:
 - where the realignment of Donagheady Road will bring the works within 50m of an area of recorded use, although the works will be separated from the swans by the existing A5 with its current levels of traffic (see Operational Disturbance below); and.
 - where the proposed introduction of a new link road between Ash Road and Drumenny Road will involve work within 100m of a part of the area where a maximum of 9 swans were recorded in 2009-2010.
- 7.2.16 When considering opportunities for the swans and geese to forage for food, it is appropriate to consider available natural light. The period known as "Civil Twilight" is the time in which



the sun is <6° below the horizon and is the time during which it is considered light enough to work outside without the need for artificial light. During winter months Civil Twilight lasts approximately 30-35 minutes. Most visual foragers (including swans and geese) will be able to forage effectively during this time (and probably for a lot longer).

- 7.2.17 Normal working times specified in the construction contract in relation to the control of noise and vibration are:
 - 1st February to 31st October 07:00 to 19:00 hours
 - 1st November to 31st January 08:00 to 17:00 hours
- 7.2.18 Therefore, it can be seen from Figure 1 below that during the winter months, there will be sufficient light available for foraging swans and geese during non-working periods in early October and again in early November¹⁶, with a further period light enough for foraging occurring outside working hours from early February onward.
- 7.2.19 The limits of the contract working hours are particularly relevant to visual foragers as they are less likely to feed at night and daylight may affect the levels to which they can accrue resources. This could be of particular significance during energetically demanding times such as pre-migration fat deposition and moult.
- 7.2.20 To minimise adverse impact upon Whooper swans during this period, construction work in areas within 250m of areas shown to be utilised by Whooper swans and Geese will be reduced to between 08.00-17.00 hrs, between 1st October and March 31st.
- 7.2.21 Adherence to the construction time periods set out above will eliminate any potential for a reduction in available foraging opportunities as a result of construction within 250m of areas known to be utilised by Whooper swans and geese.
- 7.2.22 The disturbance associated with the proposed development will not be continuous throughout. In view of the close proximity to other feeding areas elsewhere, birds would be likely to respond to periods of no disturbance by feeding preferentially within areas in proximity to the proposal site until the resource levels were similar to neighbouring areas.
- 7.2.23 Implementation of the strategy outlined above will eliminate any potential for a reduction in available foraging opportunities as a result of construction within 250m of areas known to be utilised by Whooper swans and geese.

¹⁶ As clocks go back and it becomes light 'earlier'.



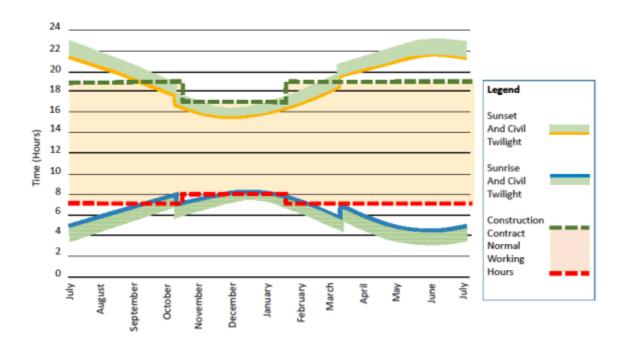


Figure 1: "Civil Twilight" hours in relation to time of year and normal working hours w.r.t. noise and vibration on the site within 250m of areas known to be utilised by swans and geese.

The potential impact of Construction Noise

- 7.2.24 There are two locations where construction will involve noise levels above those associated with the general activities associated with movement and activity of plant and vehicles; where the deep cutting at Bready will involve breaking out of rock at Sollus Hill and where piling will be required for the bridge abutments at the Burn Dennet. The Bready cutting is some 400m from the closest recorded Whooper swan and over 1km from the closest recorded Greylag geese. The Burn Dennett crossing is some 500m from the closest recorded area known to be utilised by Whooper swan and over 2.5km from the closest recorded Greylag geese.
- 7.2.25 Scottish Natural Heritage (SNH) provide guidance on potential impacts on European/Ramsar Sites¹⁷, in which they state that in relation to noise disturbance of birds:

Studies generally show that birds are disturbed by a sudden large noise but have the ability to habituate (become accustomed to) to regular noises. For instance, with respect to piling specifically, it has been concluded that although piling has the potential to create most noise during construction, it often consists of rhythmic "bangs", which, after a short period, birds are likely to become accustomed to (ABP Research, 2001).

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¹⁷ http://www.gov.scot/Publications/2011/03/04165857/15 accessed 23/03/2017



Information to Inform an Appropriate Assessment:

SPAs

As part of the construction work for ABB Power Generation Ltd (Pyewipe), winter bird monitoring showed that there was no large-scale disturbance due to construction work on the site. Although some localised disturbance was recorded in response to two sudden events, this was not considered to have a major effect on surrounding bird populations and was found to be no greater than the effect arising from third party disturbance, including walkers and stopped cyclists, which were unrelated to the work carried out by ABB (ERM, 1996). Observations suggested that it was the initial sudden bang during piling activities, which caused the disturbance, and that subsequent bangs typically resulted in reduced disturbance, demonstrating habituation.

These findings were supported by the studies carried out for the Humber International Terminal development, which again indicated that the key factor in triggering disturbance was human presence (ABP Research, 2000). Over 12 separate visits, disturbance by construction activities (which involved piling and reclamation of part of the foreshore) was observed on 3 occasions and in each case birds were disturbed over a small area and then rapidly resettled within the zone of disturbance (i.e. they did not leave the area). More recently, surveys of the birds around the Immingham Outer Harbour in the Humber (using the same methods) have also indicated that such disturbance events are limited and are often attributable to non-Port related activities such as the presence of Peregrine Falcons or walkers on the mudflat (ABPmer, 2010e).

The ABP Teignmouth Quay Development estimated an approximate zone within which birds may be affected by disturbance from construction works (piling and dredging) to be typically about 200m (ABPmer, 2002). The startling effects of sudden noise were quantified, based on published research, by the Environment Agency for the Humber Estuary Tidal Defences scheme. It was concluded that a sudden noise in the region of 80dB appears to elicit a flight response in waders up to 250m from the source, with levels below this of approximately 70dB causing flight or anxiety behaviour in some species.

- 7.2.26 Following discussion with the geotechnical advisors and contractor advisors for the project it has been confirmed that blasting will not be required. Should further information come to light as the proposed scheme design is finalised which demonstrates a need for blasting, there will be a limitation placed on the timing of the activity to exclude the period between October and March when the birds are present. Such a restriction eliminates the potential for adverse impact from this source.
- 7.2.27 There will also be a requirement under the contract that should it be the intention to undertake breaking out of rock at Bready and piling at the Burn Dennet within the period when the birds are present, trial breaking out and piling must be undertaken with monitoring by an appropriately qualified ecologist. The trials will involve short periods of breaking out and piling at prescribed intervals to establish if the activity results in disturbance which could prove detrimental should the more prolonged periods of the activities which will be required to complete the cutting and bridge abutments be progressed. If the trials indicate this will be likely to the case, the activities will be suspended while whooper swan or greylag geese are within 300m of the noise source. The following factors will be considered to be probative of detrimental disturbance.



- Physical displacement of birds (flight from source) with non-return within 5 minutes;
- Reduction in foraging activity due to increase in scanning times.
- 7.2.28 Should these responses be noted, works will be suspended as above.
- 7.2.29 In consequence, and subject to the mitigation strategies outlined above, construction disturbance impacts are therefore considered to be not significant in relation to the conservation objectives for the SPAs, or the integrity of the sites.

Operational disturbance

- 7.2.30 The operation of the proposed scheme also has potential to cause disturbance to bird species, with the noise generated from increased traffic volume and speeds potentially causing the displacement of whooper swan through increased disturbance. However, behavioural impacts such as disturbance from feeding grounds as a result of construction or operation phases are always context-dependant, with responses to disturbance depending upon the trade-offs experienced by individual birds (Gill, 2007). For example, the decision to stay or to leave an area in response to disturbance will be influenced by the quality of the area, availability and relative quality of alternative areas, and relative predation risk on current and alternative sites among others (Gill, 2007). Habituation, that is 'the relatively persistent waning of a response as a result of repeated stimulation which is not followed by any kind of reinforcement' (Hinde, 1970), has been demonstrated in the short-term in some studies on disturbance to whooper swan, however an increased tolerance did not appear to be maintained over longer periods with the behavioural patterns on a day to day basis providing additional support to this (Rees et al., 2005).
- 7.2.31 While the closest approach of the mainline to a field with recorded whooper swan use is around 150m, which is at the limit of the distance recorded for tractor disturbance of whooper swan (Rees *et al*, 2005), the study was in relation to disturbance 'events' rather than exposure to constant stimuli. Whooper swan have been shown to quickly habituate to continuous traffic movements, for example at the Toome Bypass (Hill. M, 2014, *Pers. Comm*). Therefore, operational disturbance is unlikely to have a significant effect.
- 7.2.32 To determine the potential for disturbance of greylag geese it is important to understand the distances over which they will be disturbed. Keller (1989) identified greylag geese avoid roads in agricultural land in Scotland, with avoidance behaviour recorded for distances of 100m from roads. The closest recorded greylag geese in any of the studies undertaken was over 500m, thus operational disturbance is unlikely to occur.
- 7.2.33 Operational disturbance impacts are therefore considered to be not significant in relation to the conservation objectives for the SPAs, or the integrity of the sites.



8 Summary

- 8.1.1 The Lough Foyle SPAs, Lough Swilly SPA and Lough Neagh & Lough Beg SPA have been identified as Natura 2000 sites with a relationship to the proposed A5WTC which requires that they should be considered in the context of the EC Birds Directive, as transposed by the Conservation (Natural Habitats, &c) Regulations (Northern Ireland) 1995 as amended by the Conservation (Natural Habitats, etc.) (Amendment) Regulations (Northern Ireland) 2012 in Northern Ireland and the European Communities (Natural Habitats) Regulations 1997 (as amended) in the Republic of Ireland
- 8.1.2 All four SPAs have been subject to a process of Stage 1 screening based on the guidance provided in HD 44/09 of Volume 11 of the Design Manual for Roads and Bridges. In all three instances it has been concluded:
 - the proposed scheme is a project which is not connected with or necessary to the management of the SPAs;
 - the likelihood of the proposed scheme having a significant effect on the sites cannot be excluded on the basis of objective information; and
 - that Stage 2 Appropriate Assessments should be undertaken.
- 8.1.3 This document provides further information to inform Appropriate Assessments for the four SPAs. The information is being made available to statutory consultees and for wider public consultation. The information in this report and information received in response to the consultations will be considered by Transport NI and the Minister as Appropriate Assessments are completed in advance of a decision to proceed or not in accordance with the requirements of the Directive and Regulations.

8.1.4 In conclusion:

- The A5WTC has been designed to avoid features related to Natura 2000 sites as far as possible;
- There is a high level of knowledge of the qualifying features (habitats and species) in the study area;
- Best practice mitigation has been included in the scheme design; and
- Based on the best scientific knowledge available, there will not be a significant effect on the conservation objectives of the SPAs.
- 8.1.5 The information provided in this report indicates the proposed scheme will not have an impact on the integrity of the four sites either independently or in combination with other projects. A final view, however, cannot be concluded until further evaluation is undertaken in light of responses to the consultations.



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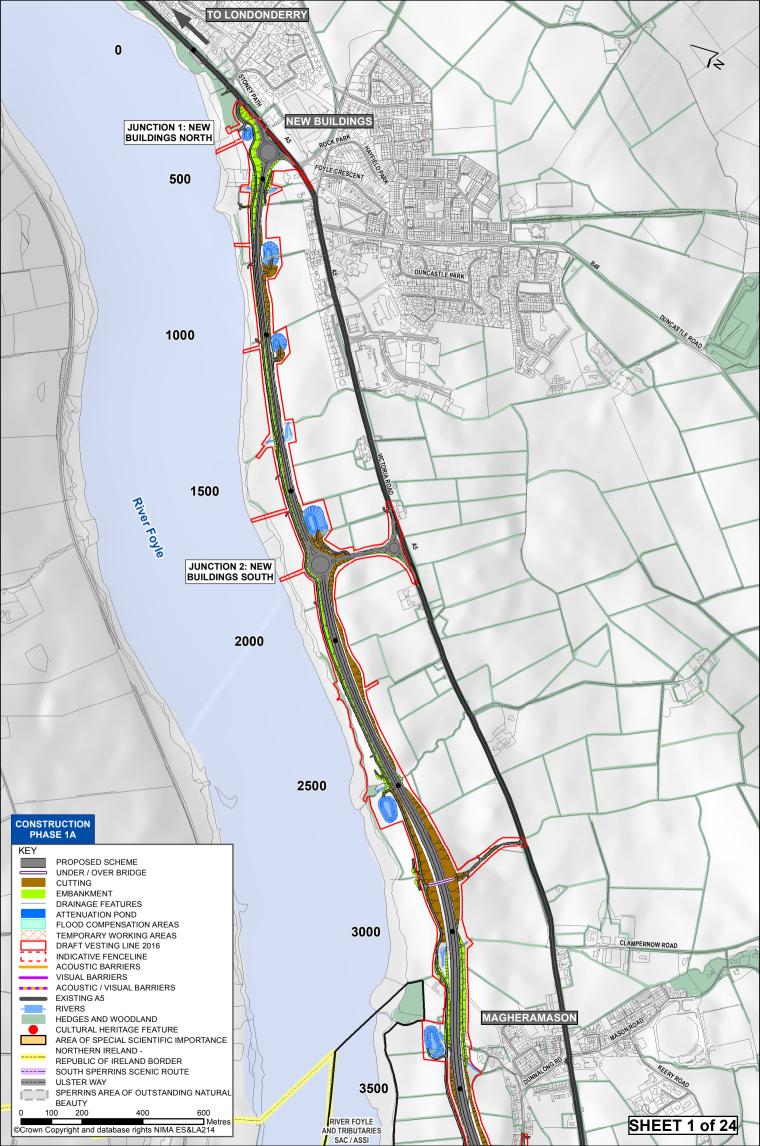
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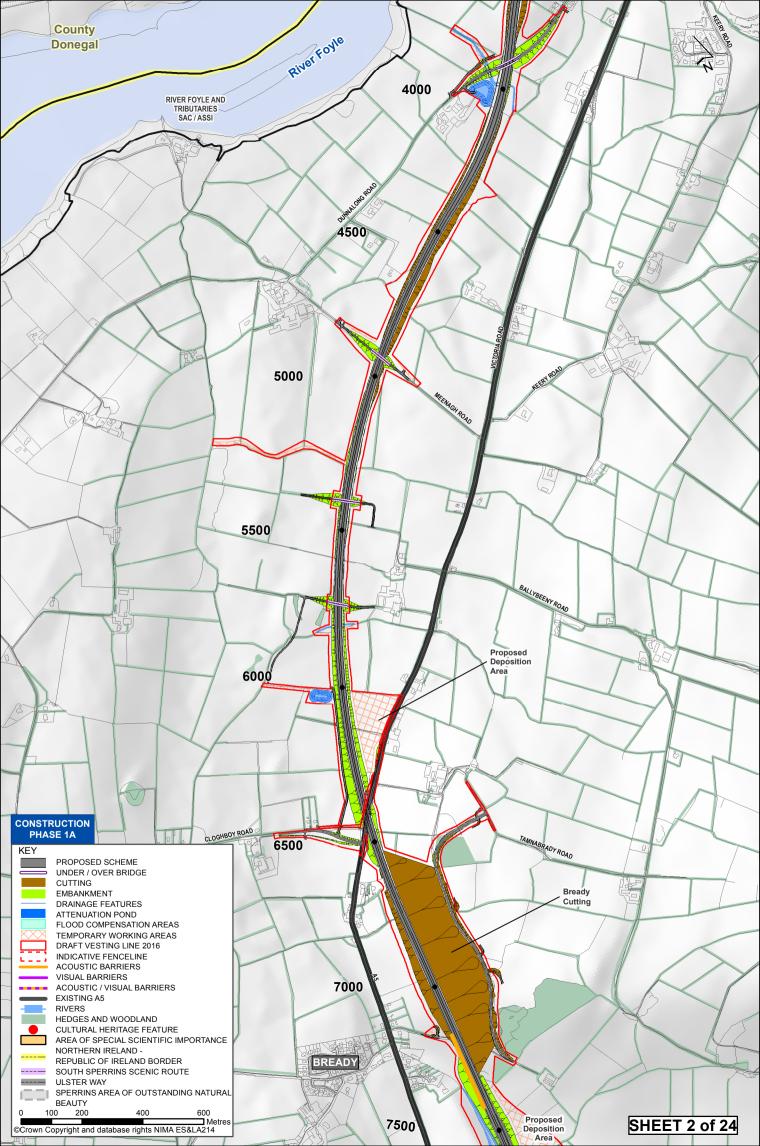
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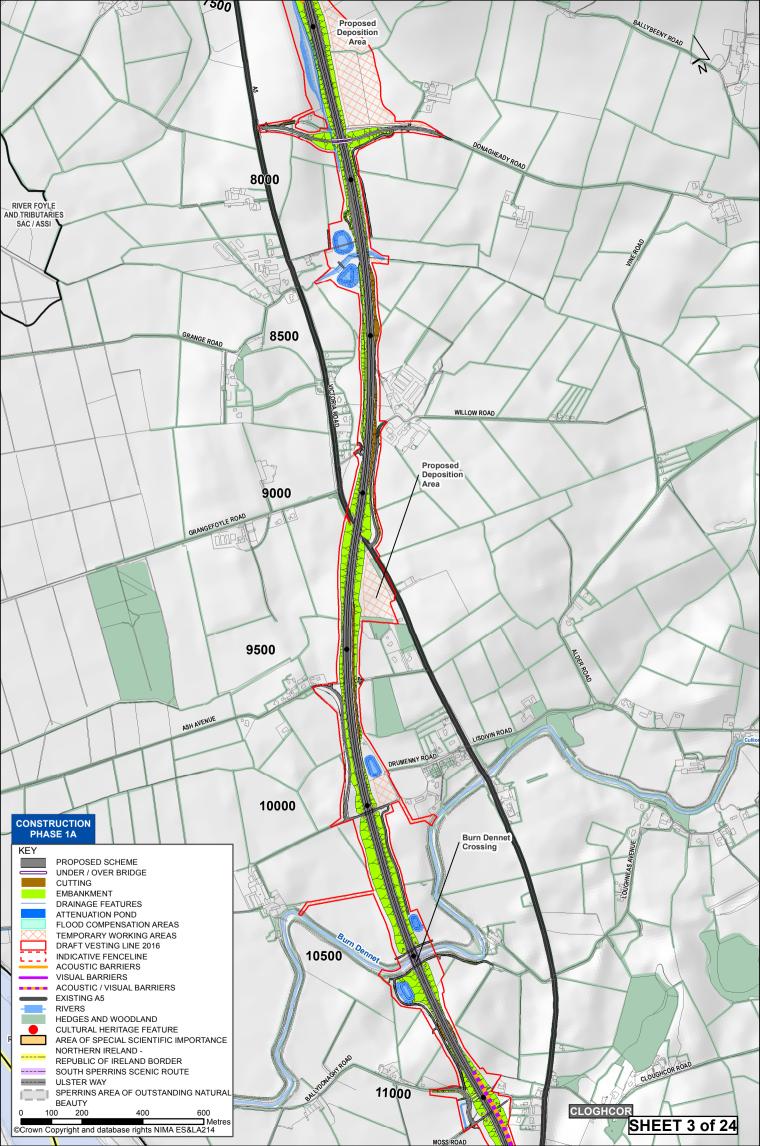


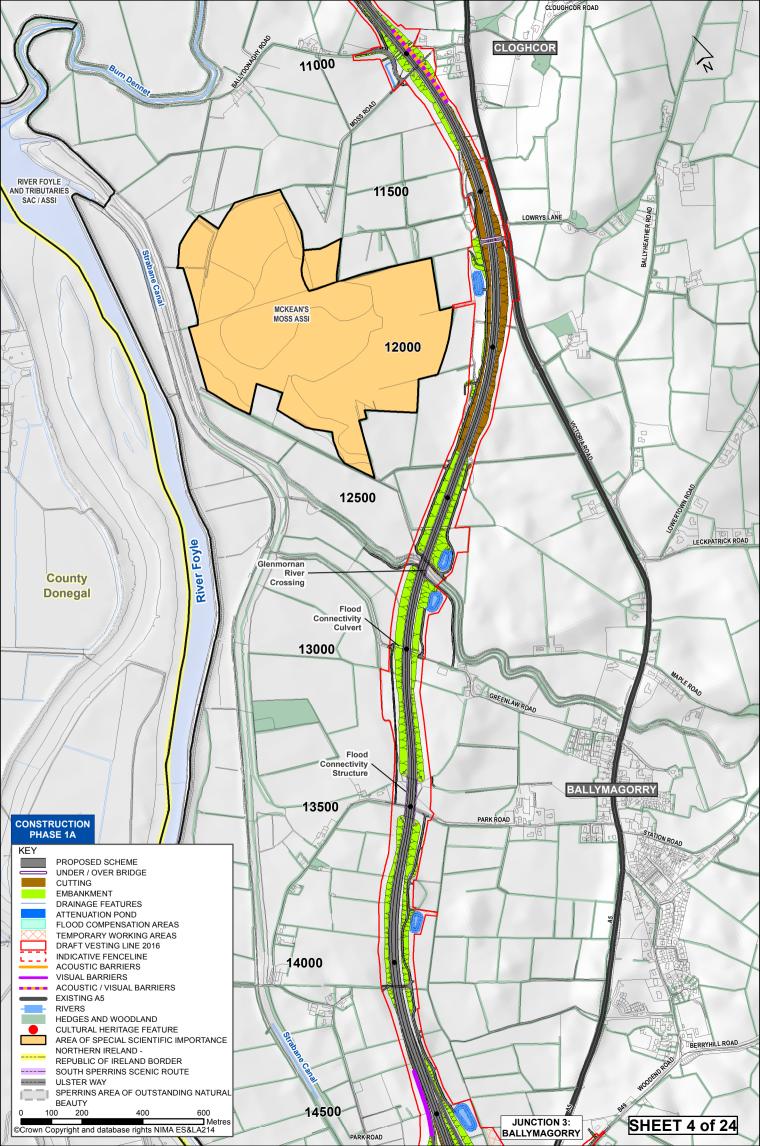
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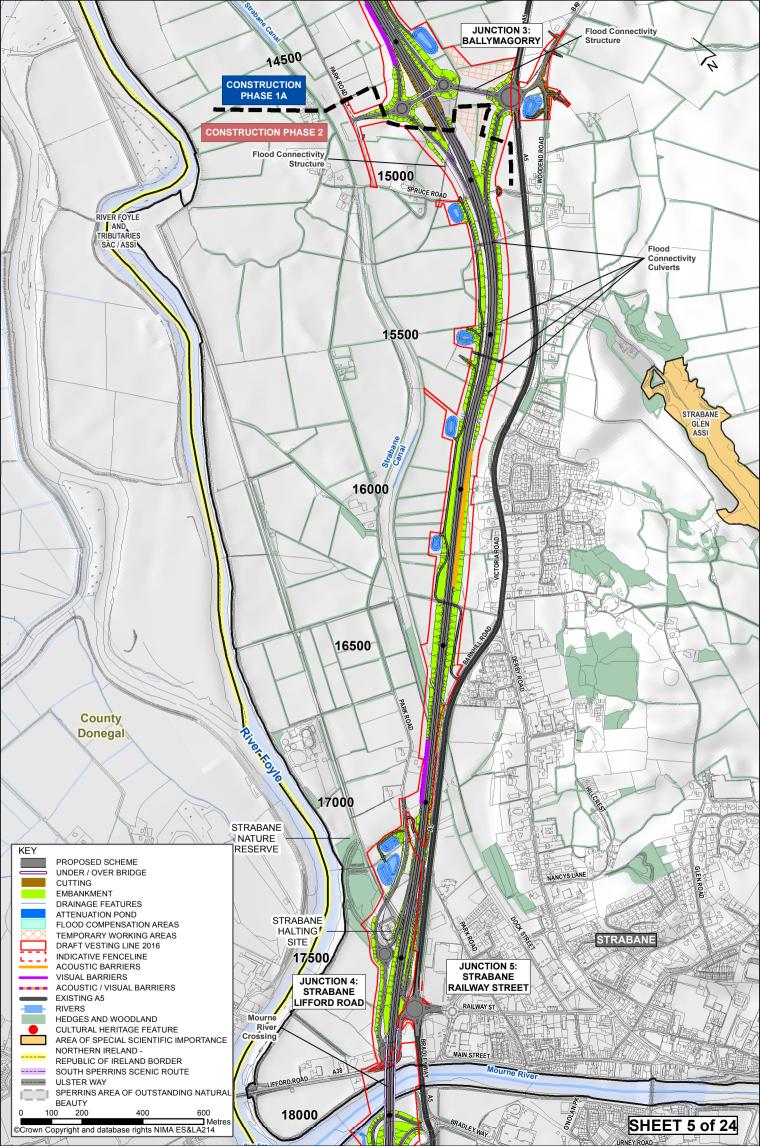
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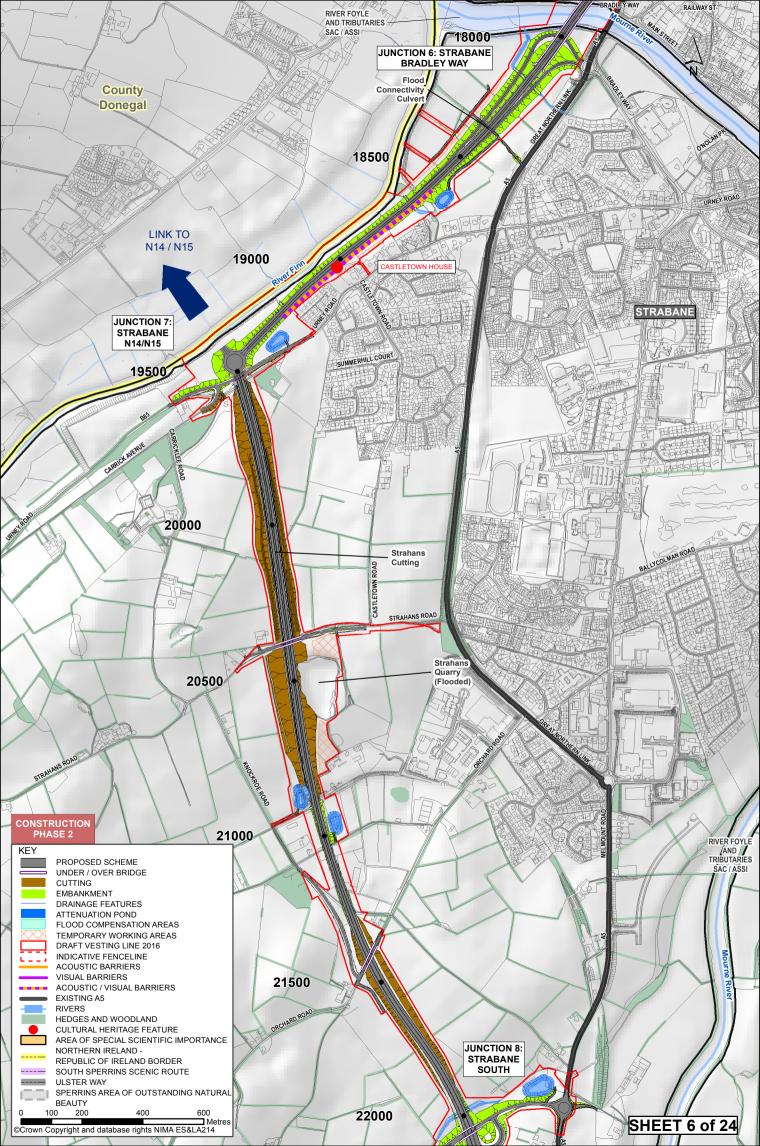


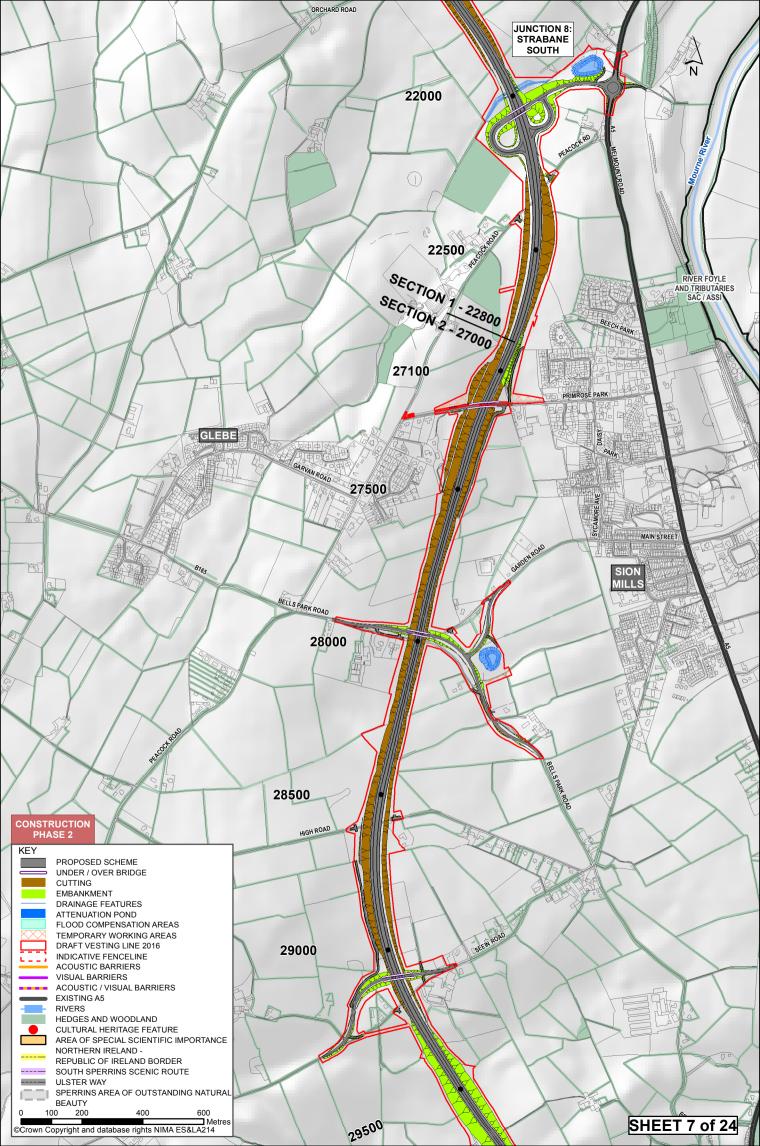


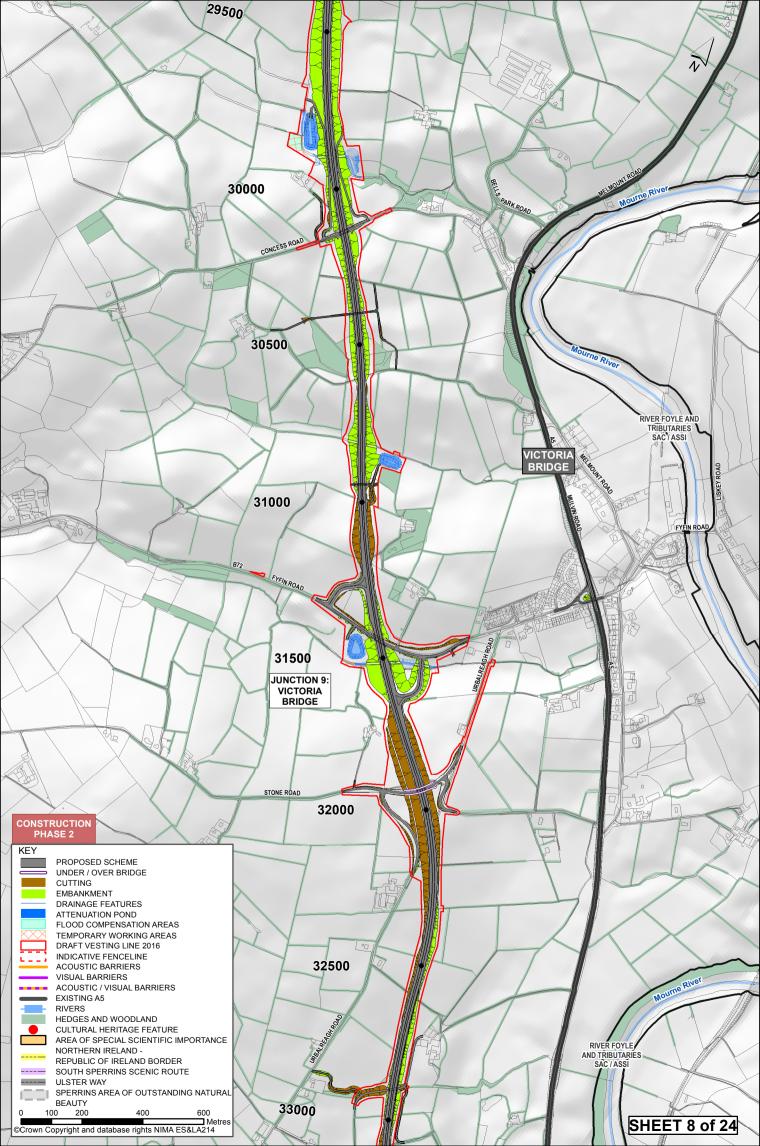


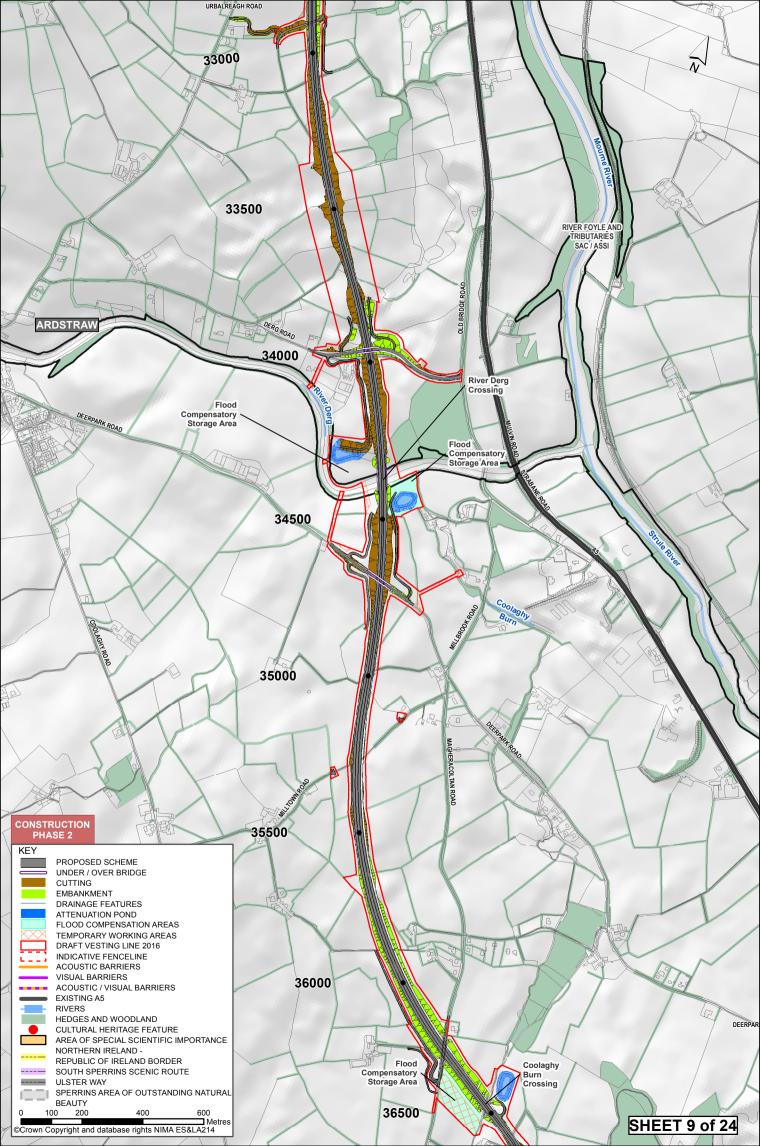


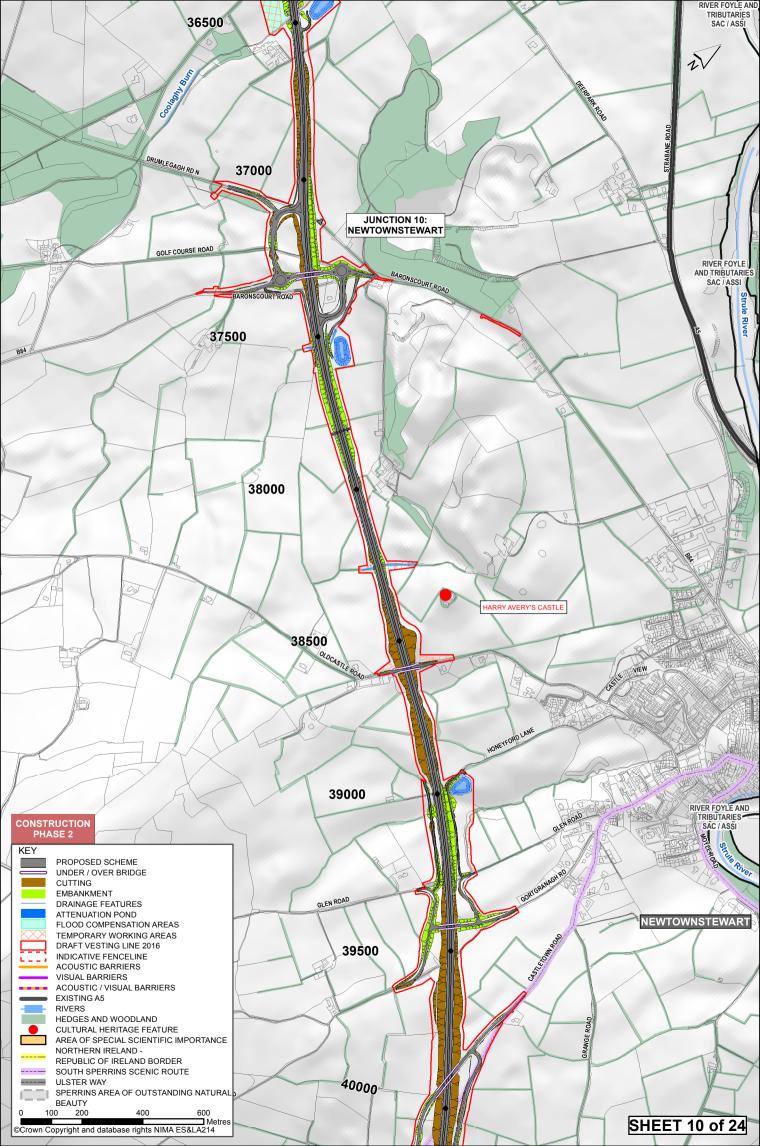


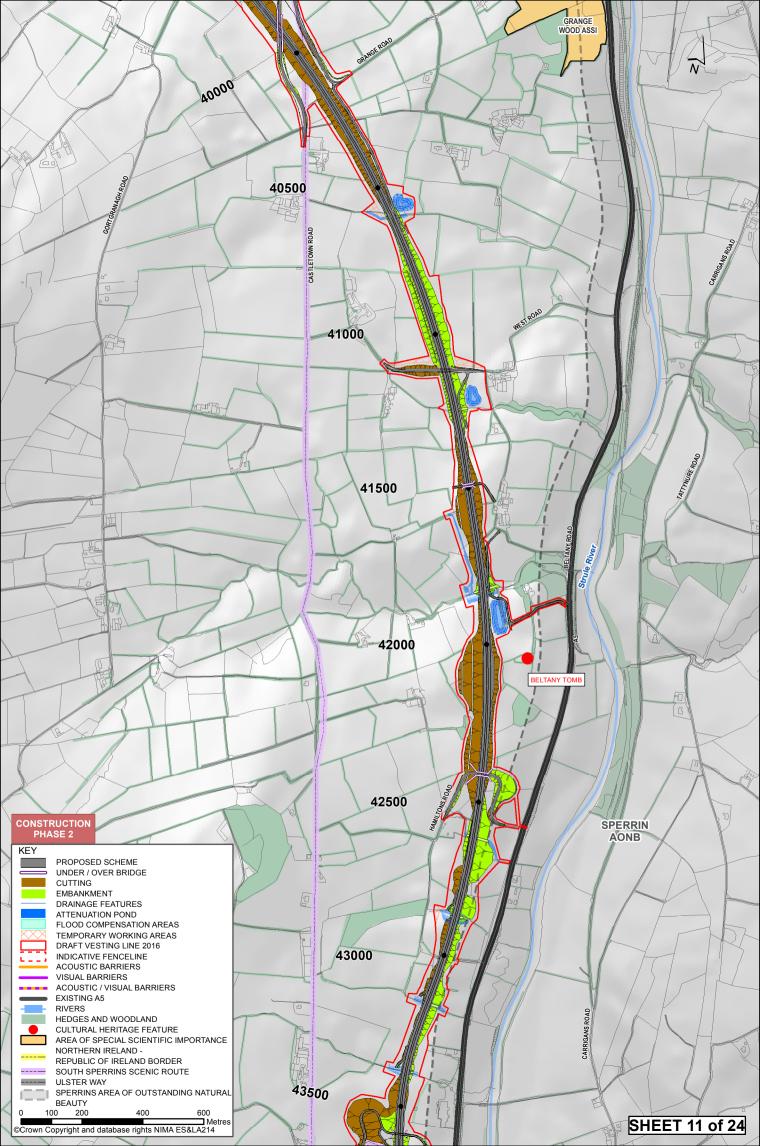


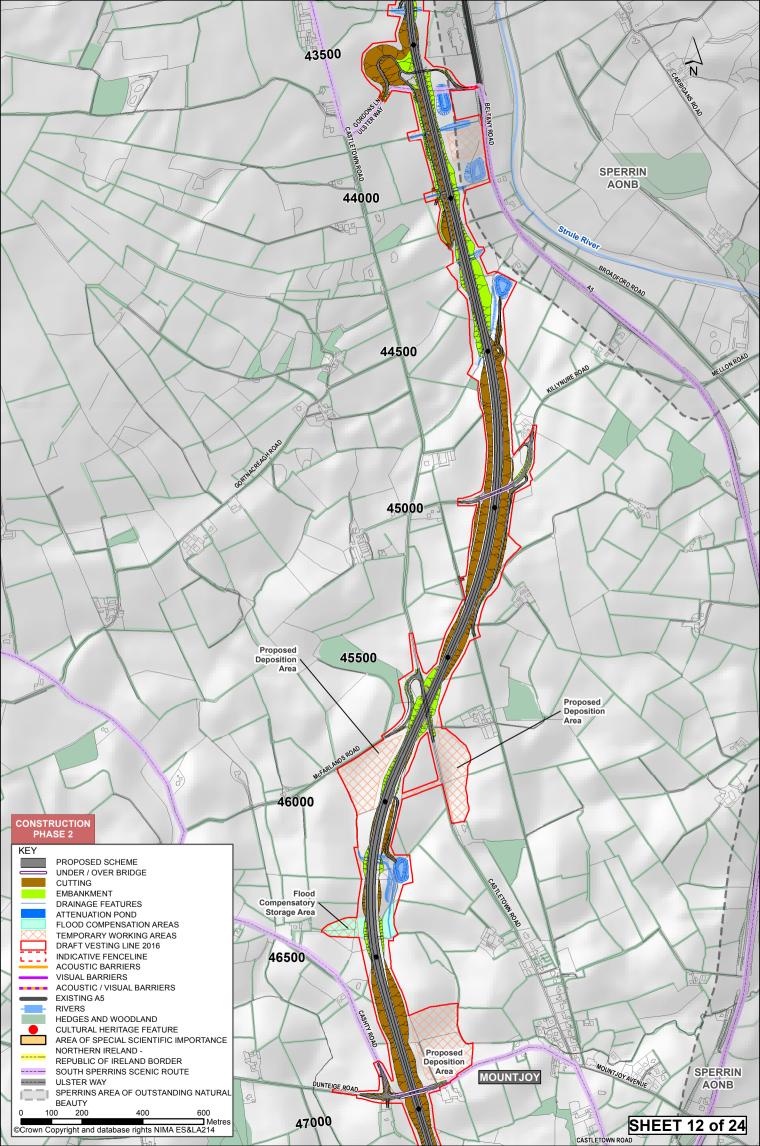


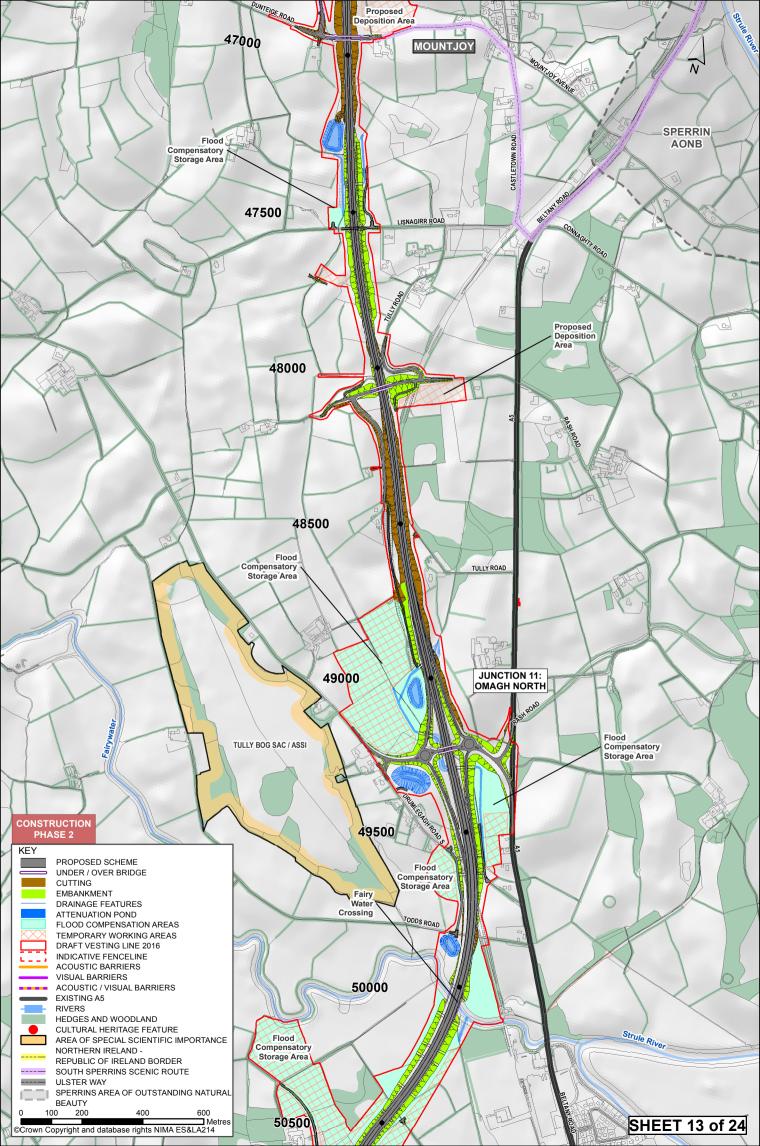


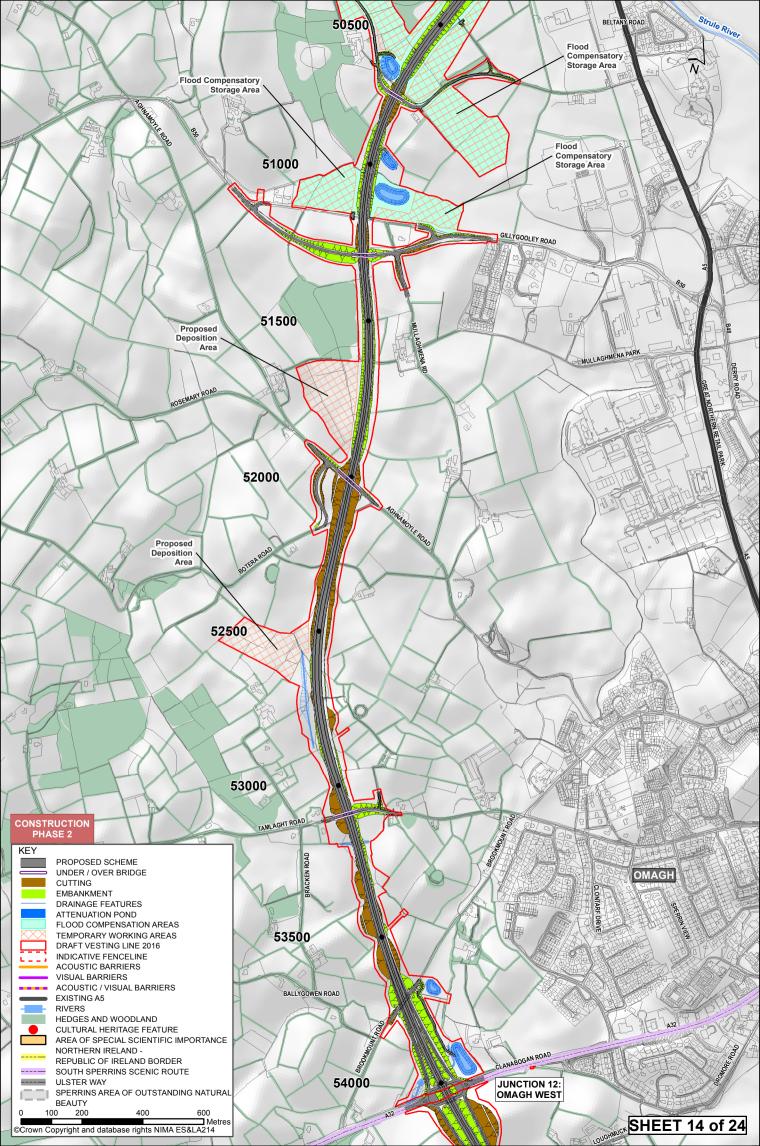


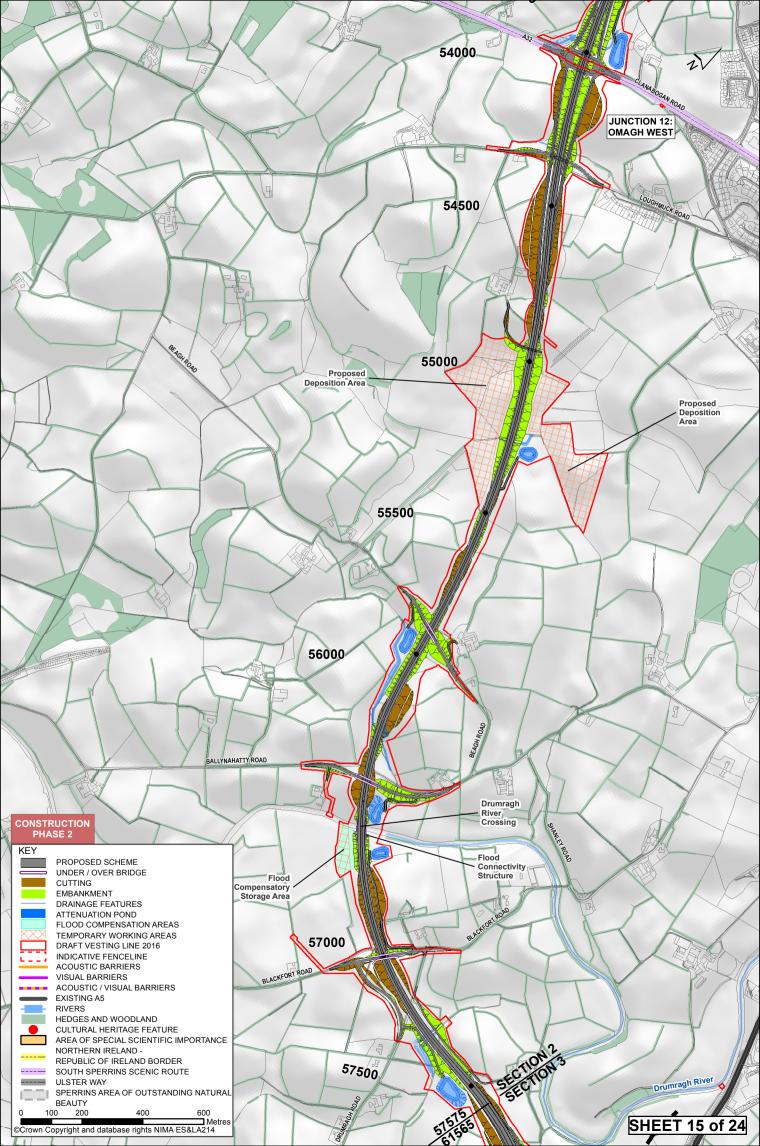


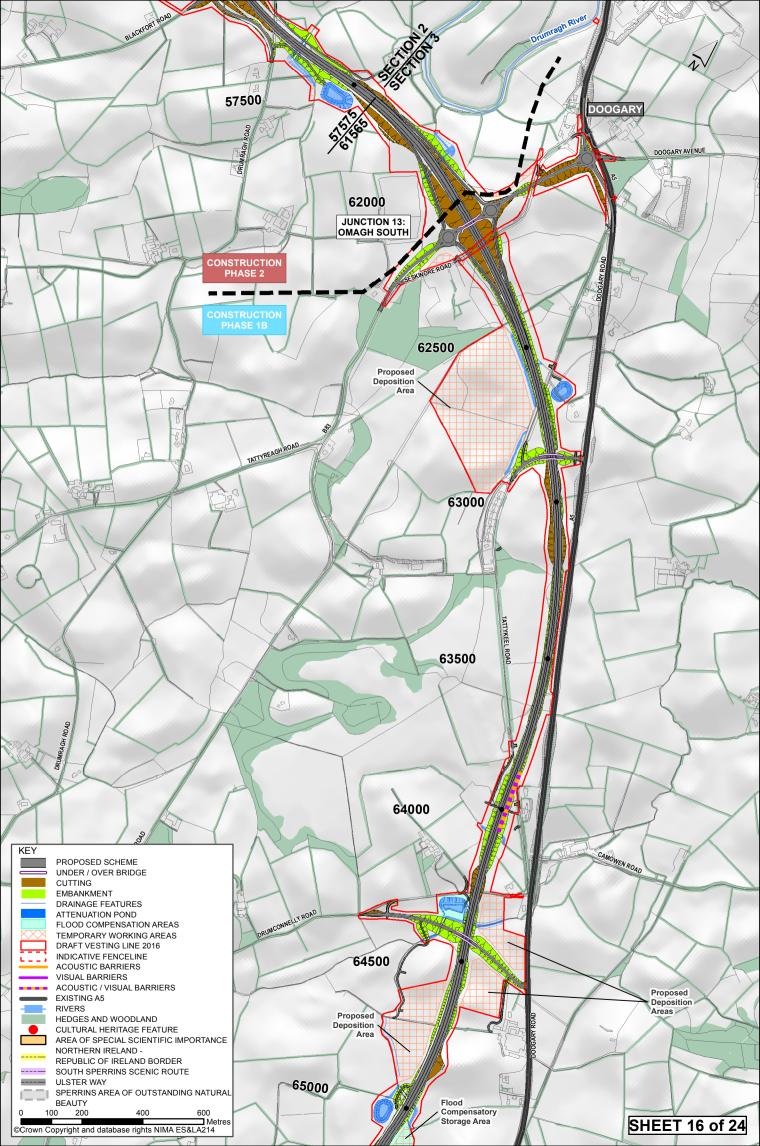


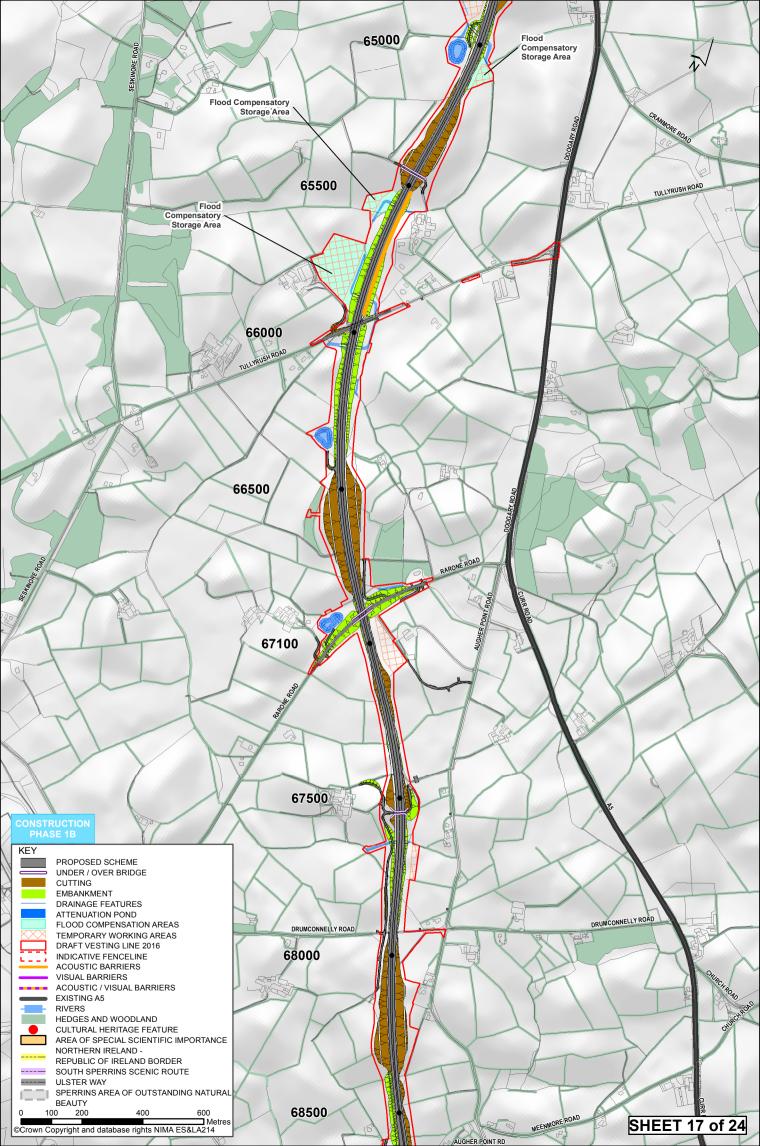


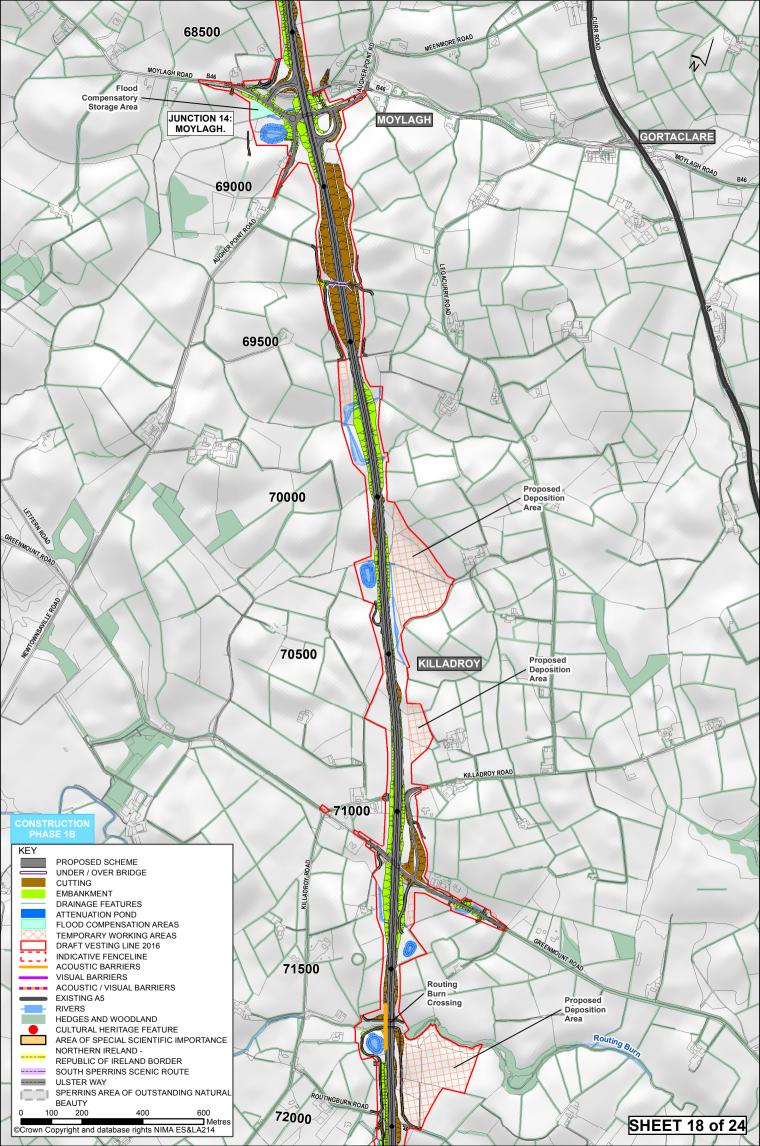


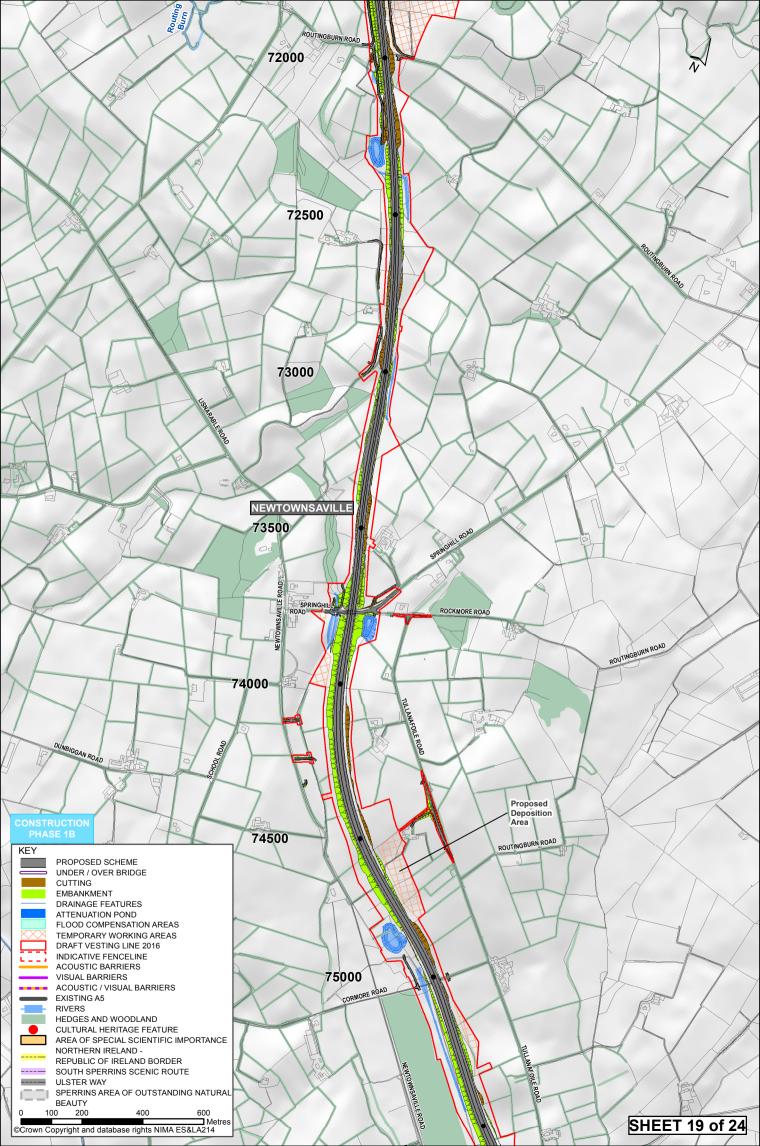


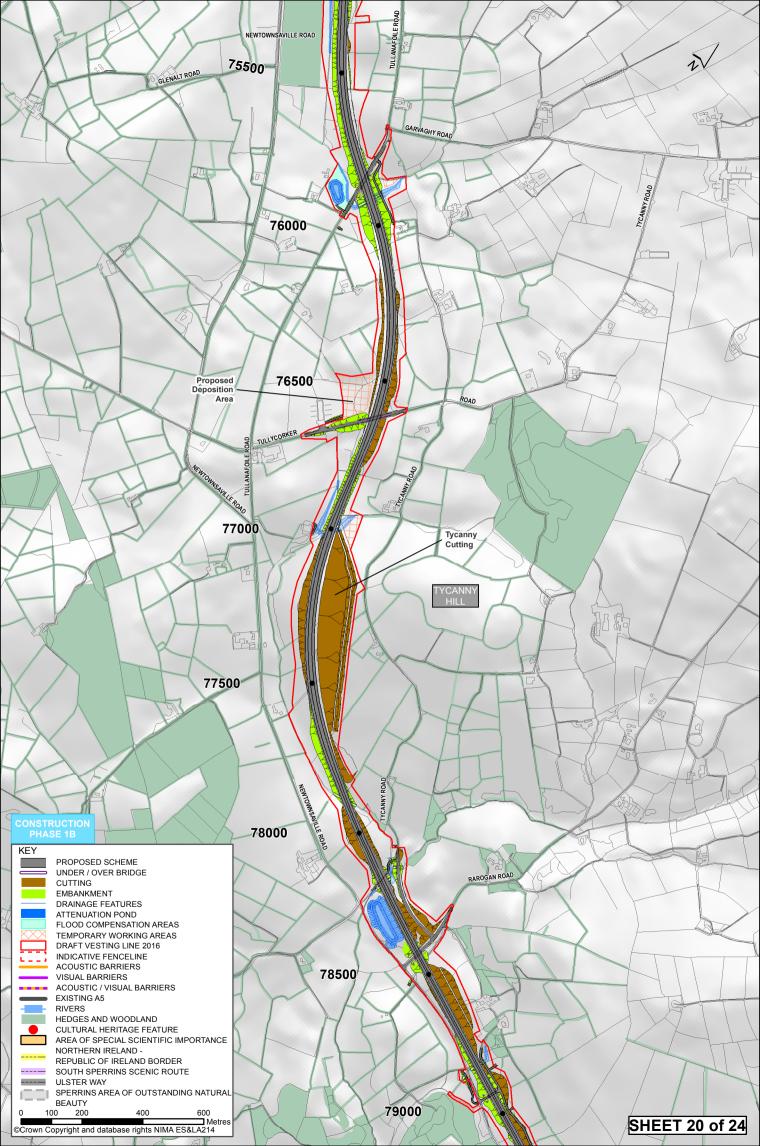


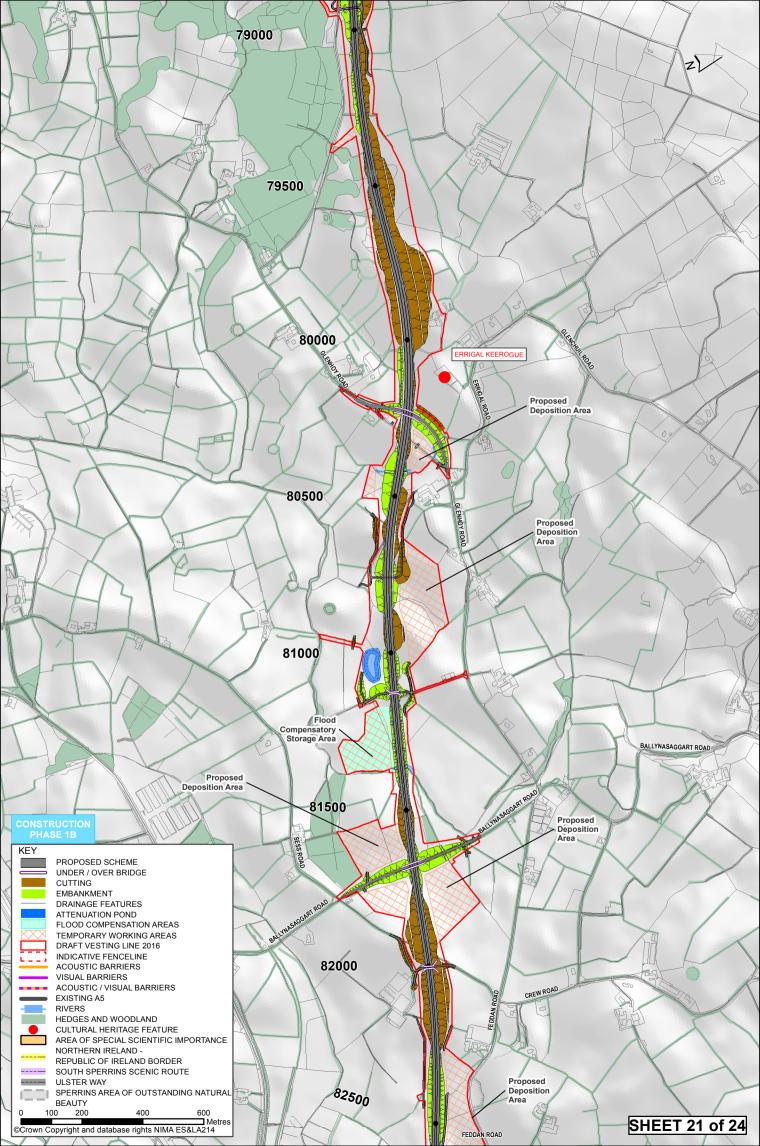


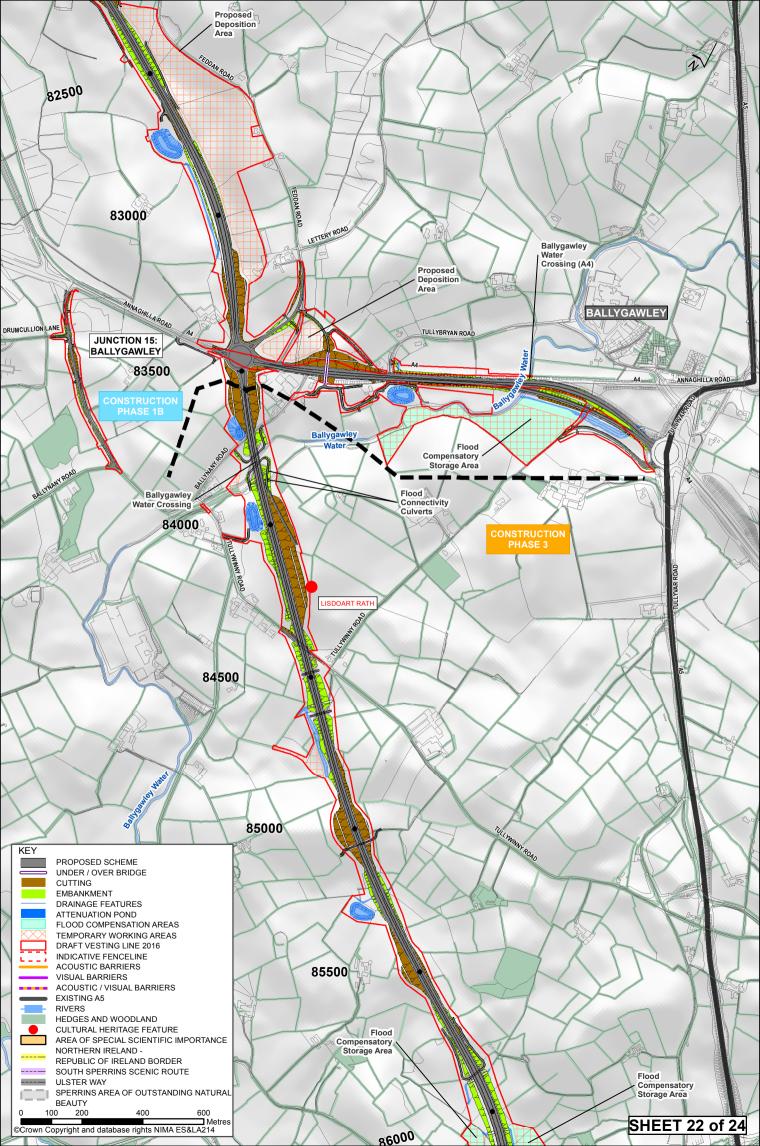


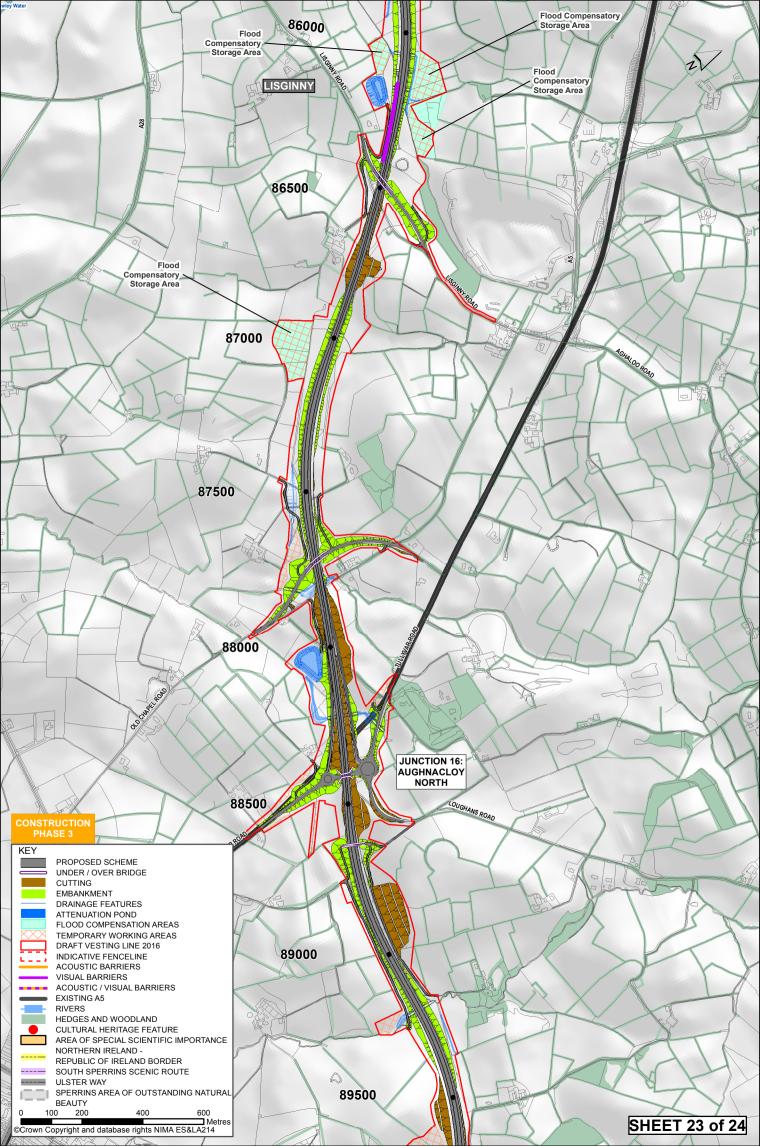


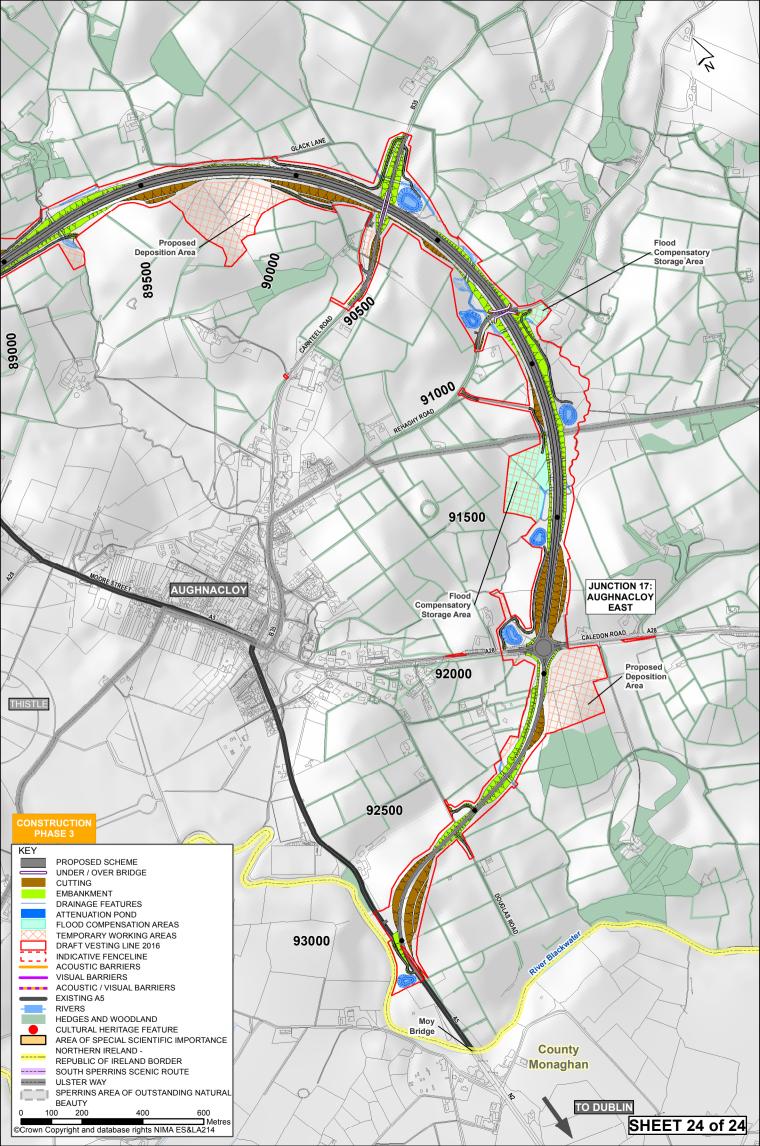


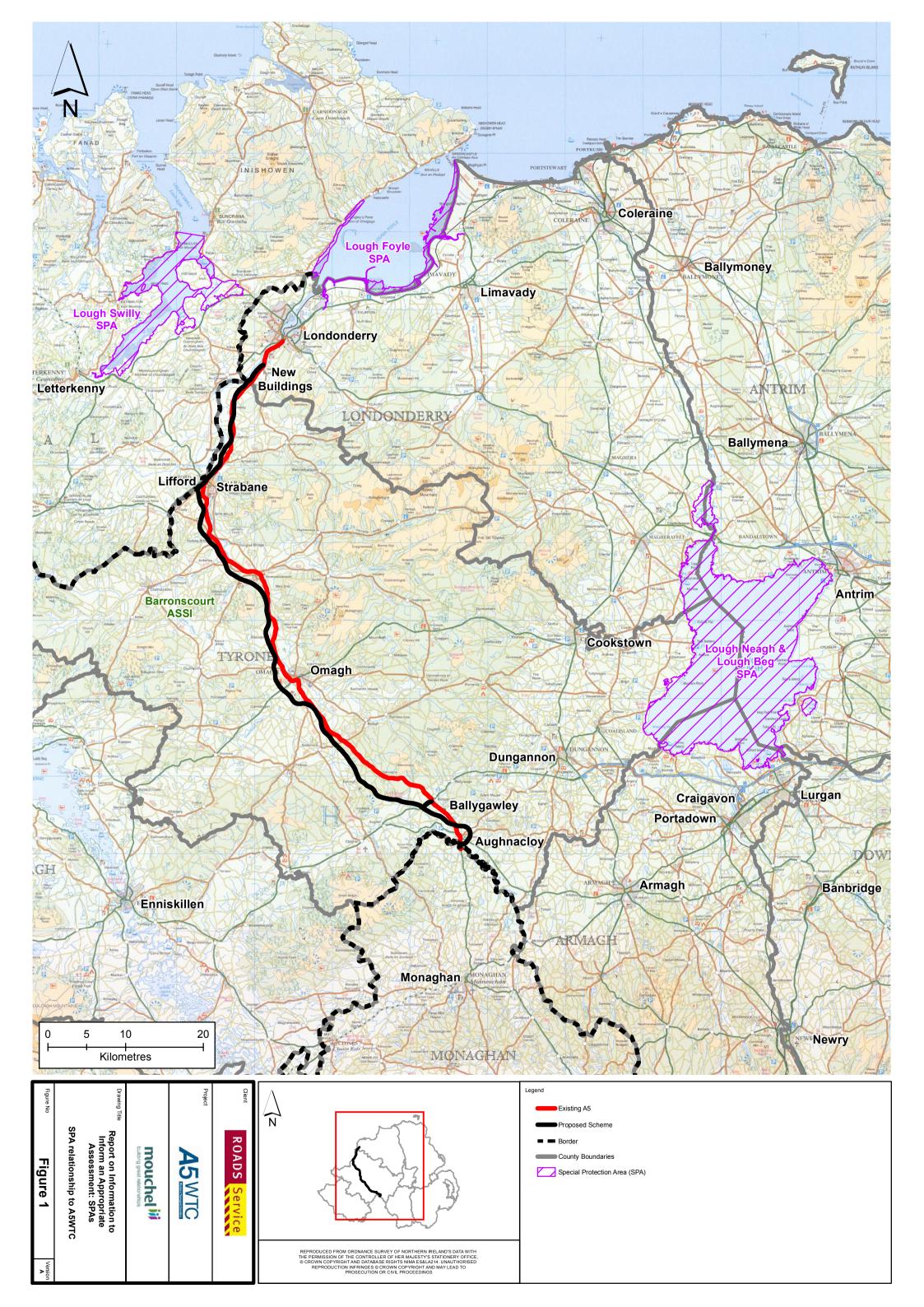


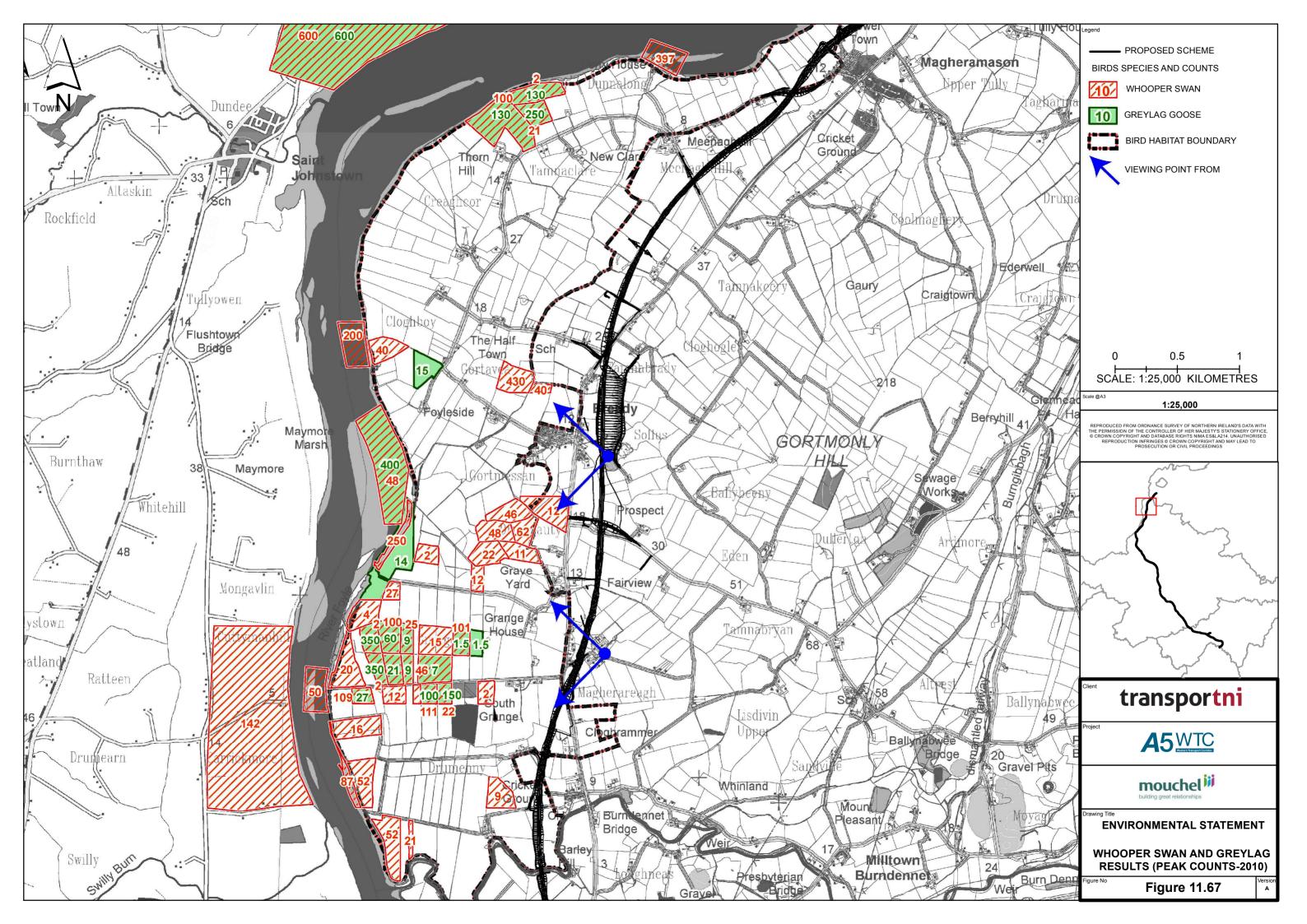


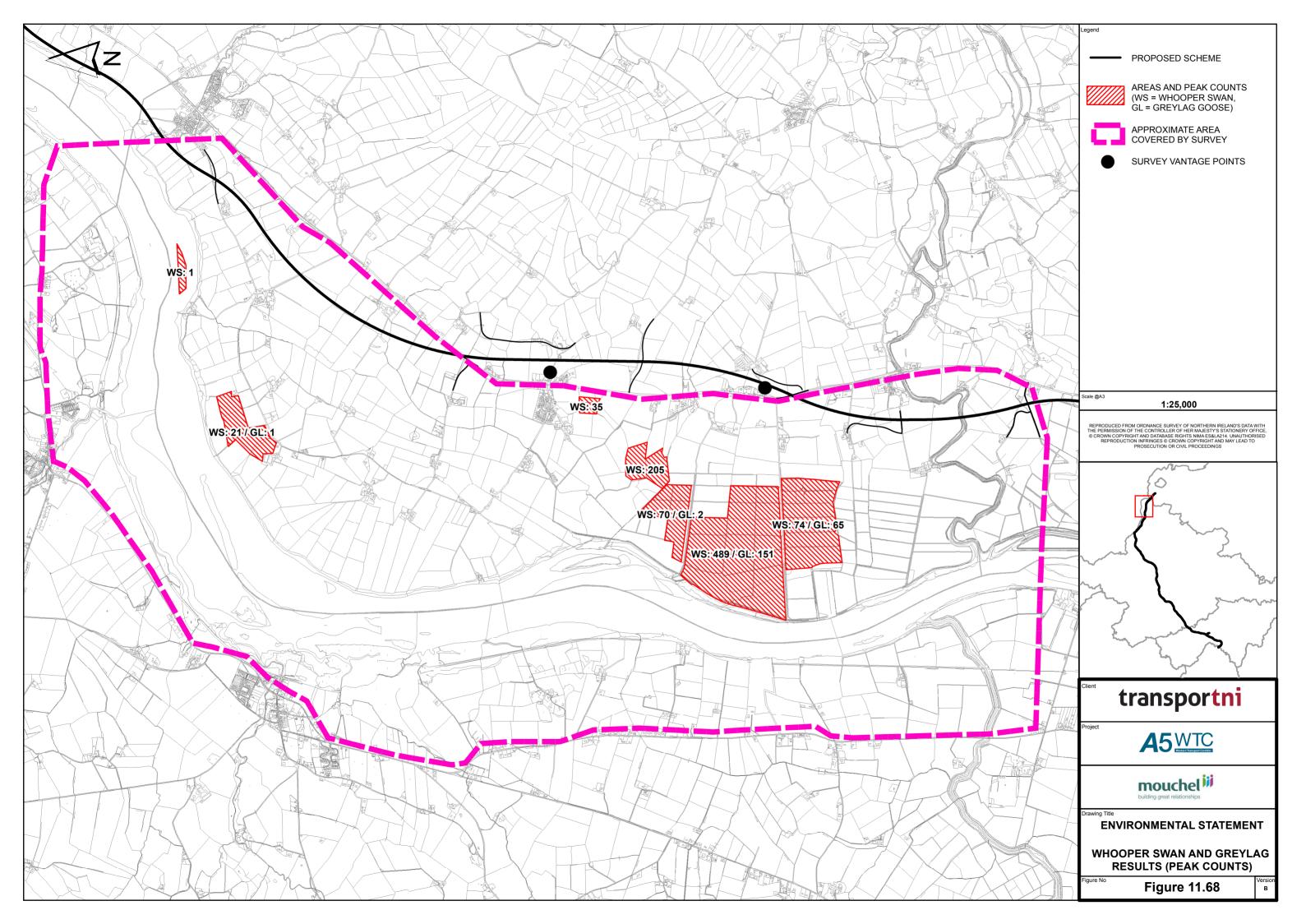














Appendix 2: Natura 2000 Site Feature Objectives

Table A2.1 Lough Foyle SPA Feature Objectives

| Table A2.1 Lough Foyle SPA | |
|--|--|
| Feature | Component Objective |
| Bewick's swan wintering population | No significant decrease in population against national trends, caused by on-site factors |
| Whooper swan wintering population | No significant decrease in population against national trends, caused by on-site factors |
| Golden plover wintering population | No significant decrease in population against national trends, caused by on-site factors |
| Bar-tailed godwit wintering population | No significant decrease in population against national trends, caused by on-site factors |
| Light-bellied brent goose wintering population | No significant decrease in population against national trends, caused by on-site factors |
| Great crested grebe wintering population | No significant decrease in population against national trends, caused by on-site factors |
| Cormorant wintering population | No significant decrease in population against national trends, caused by on-site factors |
| Greylag goose wintering population | No significant decrease in population against national trends, caused by on-site factors |
| Shelduck wintering population | No significant decrease in population against national trends, caused by on-site factors |
| Wigeon wintering population | No significant decrease in population against national trends, caused by on-site factors |
| Teal wintering population | No significant decrease in population against national trends, caused by on-site factors |
| Mallard wintering population | No significant decrease in population against national trends, caused by on-site factors |
| Eider wintering population | No significant decrease in population against national trends, caused by on-site factors |
| Red-breasted merganser wintering population | No significant decrease in population against national trends, caused by on-site factors |
| Oystercatcher wintering population | No significant decrease in population against national trends, caused by on-site factors |
| Lapwing wintering population | No significant decrease in population against national trends, caused by on-site factors |
| Knot wintering population | No significant decrease in population against national trends, caused by on-site factors |
| Dunlin wintering population | No significant decrease in population against national trends, caused by on-site factors |
| Curlew wintering population | No significant decrease in population against national trends, caused by on-site factors |
| Redshank wintering population | No significant decrease in population against national trends, caused by on-site factors |



| Table A2.1 Lough Foyle SPA Feature Objectives | | | | | | | |
|---|---|--|--|--|--|--|--|
| Waterfowl assemblage wintering population | No significant decrease in Waterfowl Assemblage population against national trends, caused by on-site factors | | | | | | |
| Waterfowl assemblage wintering population | Maintain species diversity contributing to the Waterfowl Assemblage | | | | | | |
| Habitat extent | Maintain or enhance the area of natural and semi-natural habitats potentially usable by Feature bird species. (2056.13 ha intertidal area) subject to natural processes | | | | | | |
| Habitat extent | Maintain the extent of main habitat components subject to natural processes | | | | | | |
| Roost sites wintering population | Maintain or enhance sites utilised as roosts | | | | | | |

Table A2.2 Lough Neagh & Lough Beg SPA Feature Objectives

| Table A2.2 Lough Neagh & | Lough Beg SPA Feature Objectives |
|--|--|
| Feature | Component Objective |
| Common tern breeding population | No significant decrease in population against national trends, caused by on- site factors |
| Common tern breeding population | Fledging success |
| Great crested grebe breeding population | No significant decrease in population against national trends, caused by on- site factors |
| Great crested grebe breeding population | Fledging success |
| Great crested grebe passage population | No significant decrease in population against national trends, caused by on- site factors |
| Whooper swan wintering population | No significant decrease in population against national trends, caused by on- site factors |
| Bewick's swan wintering population | No significant decrease in population against national trends, caused by on- site factors |
| Golden plover wintering population | No significant decrease in population against national trends, caused by on- site factors |
| Great crested grebe wintering population | No significant decrease in population against national trends, caused by on- site factors |
| Pochard wintering population | No significant decrease in population against national trends, caused by on- site factors |
| Tufted duck wintering population | No significant decrease in population against national trends, caused by on- site factors |
| Scaup wintering population | No significant decrease in population against national trends, caused by on- site factors |
| Goldeneye wintering population | No significant decrease in population against national trends, caused by on- site factors |
| Little grebe wintering population | No significant decrease in population against national trends, caused by on- site factors |
| Cormorant wintering population | No significant decrease in population against national trends, caused by on- site factors |



| Table A2.2 Lough Neagh & Lough Beg SPA Feature Objectives | | | | | | |
|---|--|--|--|--|--|--|
| Feature | Component Objective | | | | | |
| Greylag goose wintering population | No significant decrease in population against national trends, caused by onsite factors | | | | | |
| Shelduck wintering population | No significant decrease in population against national trends, caused by on- site factors | | | | | |
| Wigeon wintering population | No significant decrease in population against national trends, caused by on- site factors | | | | | |
| Gadwall wintering population | No significant decrease in population against national trends, caused by on- site factors | | | | | |
| Teal wintering population | No significant decrease in population against national trends, caused by on- site factors | | | | | |
| Mallard wintering population | No significant decrease in population against national trends, caused by onsite factors | | | | | |
| Shoveler wintering population | No significant decrease in population against national trends, caused by on- site factors | | | | | |
| Coot wintering population | No significant decrease in population against national trends, caused by on- site factors | | | | | |
| Lapwing wintering population | No significant decrease in population against national trends, caused by on- site factors | | | | | |
| Waterfowl assemblage wintering population | No significant decrease in population against national trends, caused by on- site factors | | | | | |
| Waterfowl assemblage wintering population | Maintain species diversity contributing to the Waterfowl Assemblage | | | | | |
| Habitat | To maintain or enhance the area of natural and semi-natural habitats potentially usable by Feature bird species subject to natural processes | | | | | |
| Habitat | Maintain the extent of main habitat components subject to natural processes | | | | | |
| Habitat | Maintain or enhance sites utilised as roosts | | | | | |



Information to Inform an Appropriate Assessment: SPAs

Appendix 3: Natura 2000 Standard Data Forms

NATURA 2000 STANDARD DATA FORM

FOR SPECIAL PROTECTION AREAS (SPA)

FOR SITES ELIGIBLE FOR IDENTIFICATION AS SITES OF COMMUNITY IMPORTANCE (SCI)

AND

FOR SPECIAL AREAS OF CONSERVATION (SAC)

1. SITE IDENTIFICATION

1.1. TYPE 1.2. SITE CODE 1.3. COMPILATION DATE 1.4. UPDATE

A IE0004087 200404

1.5. RELATION WITH OTHER NATURA 2000 SITES:

1.6. RESPONDENT(S):

National Parks & Wildlife Service of the Department of the Environment, Heritage and Local Government. 7 Ely Place, Dublin 2, Ireland

1.7. SITE NAME:

Lough Foyle SPA

1.8. SITE INDICATION AND DESIGNATION/CLASSIFICATION DATES:

DATE SITE PROPOSED AS ELIGIBLE AS SCI: DATE CONFIRMED AS SCI:

DATE SITE CLASSIFIED AS SPA: DATE SITE DESIGNATED AS SAC:

199610

2. SITE LOCATION

| 2.1. SITE CENTRE LO | OCATION | | | | | | |
|---------------------|----------------|----------|-------------|-----------|-------------|---------------|---------|
| LONGITUDE | | | LA | TITUDE | | | |
| W 7 14 0 | | | 55 | 5 | 0 | | |
| W/E (Greenwich) | | | | | | | |
| 2.2. AREA (HA): | | | 2.3 | . SITE LI | ENGTH (KM): | | |
| 346.81 | | | | | | | |
| 2.4. ALTITUDE (M): | | | | | | | |
| MINIMUM | | N | IAXIMUM | | | MEAN | |
| -2 | | | 0 | | | -1 | |
| 2.5. ADMINISTRATIV | VE REGION: | | | | | | |
| NUTS CODE | REGION | NAME | | | | | % COVER |
| IE011 | Border | | | | | | (|
| Marine area not co | vered by a NUT | S-region | | | | | 10 |
| 2.6. BIOGEOGRAPHI | C REGION: | | | | | | |
| Alpine | Atlantic | Boreal | Continental | Ma | caronesian | Mediterranean | |
| | ✓ | | | | | | |

3. ECOLOGICAL INFORMATION

3.1. HABITAT types present on the site and assessment for them:

ANNEX I HABITAT TYPES:

CODE %COVER REPRESENTATIVITY RELATIVE SURFACE CONSERVATION GLOBAL STATUS ASSESSMENT

3.2. SPECIES

covered by Article 4 of Directive 79/409/EEC

and

listed in Annex II of Directive 92/43/EEC

and

site assessment for them

3.2.a. BIRDS listed on Annex I of Council directive 79/409/EEC

3.2.b. Regularly occuring Migratory Birds not listed on Annex I of Council directive 79/409/EEC

| CODE | NAME | | POPULATION | | | | SITE ASSESSMENT | | |
|------|--------------------------|----------|------------|----------|-------|------------|-----------------|-----------|--|
| | | Resident | | Migrator | y | Population | Conservation | Isolation | |
| | | | Breed | Winter | Stage | | | | |
| A005 | Podiceps cristatus | | | 21 i | | С | С | С | |
| A017 | Phalacrocorax carbo | | | 38 i | | С | С | С | |
| A046 | Branta bernicla | | | 79 i | | С | C | С | |
| A048 | Tadorna tadorna | | | 17 i | | C | C | C | |
| A050 | Anas penelope | | | 115 i | | C | С | C | |
| A053 | Anas platyrhynchos | | | 91 i | | C | С | C | |
| A069 | Mergus serrator | | | 11 i | | C | C | C | |
| A130 | Haematopus ostralegus | | | 275 i | | С | С | С | |
| A137 | Charadrius hiaticula | | | 28 i | | C | C | C | |
| A143 | Calidris canutus | | | 47 i | | C | C | C | |
| A160 | Numenius arquata | | | 390 i | | C | C | C | |
| A162 | Tringa totanus | | | 31 i | | C | С | C | |
| A164 | Tringa nebularia | | | 9 i | | C | С | C | |
| A169 | Arenaria interpres | | | 29 i | | C | C | C | |
| A179 | Larus ridibundus | | | 174 i | | C | С | C | |
| A182 | Larus canus | | | 130 i | | C | С | C | |

3.2.c. MAMMALS listed on Annex II of Council directive 92/43/EEC

3.2.d. AMPHIBIANS and REPTILES listed on Annex II of Council directive 92/43/EEC

3.2.e. FISHES listed on Annex II of Council directive 92/43/EEC

3.2.f. INVERTEBRATES listed on Annex II of Council directive 92/43/EEC

3.2.g. PLANTS listed on Annex II of Council directive 92/43/EEC

3.3. Other Important Species of Flora and Fauna

| GROUP | SCIENTIFIC NAME | POPULATION | MOTIVATION |
|---------|------------------|------------|------------|
| BMARFIP | | | |
| В | Larus argentatus | 535 i | D |
| В | Larus marinus | 109 i | D |

 $(B=Birds,\,M=Mammals,\,A=Amphibians,\,R=Reptiles,\,F=Fish,\,I=Invertebrates,\,P=Plants)$

4. SITE DESCRIPTION

4.1. GENERAL SITE CHARACTER:

| Habitat classes | % cover |
|---|---------|
| Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins) | 98 |
| Shingle, Sea cliffs, Islets | 2 |
| Total habitat cover | 100 % |

Other site characteristics

The site comprises a section of the western shore of Lough Foyle between Muff and White Castle. Habitat is almost entirely intertidal mudflat, with small areas of sand and shingle. The quality of intertidal habitat is not known but it may be somewhat enriched due to the proximity of Derry City (less than 10 km upstream).

4.2. OUALITY AND IMPORTANCE:

This site is a relatively small part of the Lough Foyle estuarine complex, a site of high ornithological importance. The Lough Foyle SPA provides feeding habitat for a range of wintering waterfowl species but all are in relatively low numbers. Gulls are regular in winter, with substantial numbers of Larus argentatus and Larus marinus.

4.3. VULNERABILITY

Despite the proximity of the site to Derry City, there are no known threats to the wintering bird populations. Any developments on the shore above the site could have adverse impacts on the bird populations.

4.4. SITE DESIGNATION:

4.5. OWNERSHIP

State: Department of Communications, Marine and Natural Resources.

4.6. DOCUMENTATION

Colhoun, K. (2001). I-WeBS Report 1998-99. BirdWatch Ireland, Dublin.

Hunt, J., Derwin, J., Coveney, J. and Newton, S. (2000). Republic of Ireland. Pp. 365-416 in Heath, M.F. and Evans, M.I. (eds). Important Bird Areas in Europe: Priority Sites for Conservation 1: Northern Europe. Cambridge, UK: BirdLife International (BirdLife Conservation Series No. 8).

Irish Wetland Birds Survey (I-WeBS) Database, 1994/95-2000/01. BirdWatch Ireland, Dublin.

Sheppard, R. (1993). Ireland's Wetland Wealth. IWC, Dublin.

Site code: IE0004087

5. SITE PROTECTION STATUS AND RELATION WITH CORINE BIOTOPES

| 5.1. DESIGNATION TYPES at National and Regional level: |
|--|
| 5.2. RELATION OF THE DESCRIBED SITE WITH OTHER SITES: |
| designated at National or Regional level: |
| designated at International level: |
| 5.3. RELATION OF THE DESCRIBED SITE WITH CORINE BIOTOPE SITES: |
| |
| |
| |
| |

6. IMPACTS AND ACTIVITIES IN AND AROUND THE SITE

6.1. GENERAL IMPACTS AND ACTIVITIES AND PROPORTION OF THE SURFACE OF THE SITE AFFECTED

IMPACTS AND ACTIVITIES WITHIN the site

IMPACTS AND ACTIVITIES AROUND the site

CODE INTENSITY INFLUENCE 400 **A** B C + 0 -

6.2. SITE MANAGEMENT AND PLANS

BODY RESPONSIBLE FOR THE SITE MANAGEMENT

SITE MANAGEMENT AND PLANS

A Conservation Plan for the management of this site will be prepared.

| 7. MAPS OF THE SITE | |
|----------------------------------|--|
| - Physical map | |
| - Aerial photograph(s) included: | |
| 8. SLIDES | |
| | |

NATURA 2000

STANDARD DATA FORM

FOR SPECIAL PROTECTION AREAS (SPA) FOR SITES ELIGIBLE FOR IDENTIFICATION AS SITES OF COMMUNITY IMPORTANCE (SCI) AND

| FOR SI | PECIAL AREAS | OF CONSI | ERVATION (S | SAC) | | |
|--|---------------------------------|-------------|----------------------|---------------------|---------------------|----------------------|
| 1 (2:40 :]4:6:4: | | | | | | |
| 1. Site identification: | | 1.0 | G14 1 | ***** | 20021 | |
| 1.1 Type J | | 1.2 | Site code | UK90 | 20031 | |
| 1.3 Compilation date | 199901 |] 1.4 | Update | | | |
| 1.5 Relationship with other U K 0 0 1 6 | r Natura 200 6 1 3 | 0 sites | | | | |
| 1.6 Respondent(s) | International l | Designation | ns, JNCC, Pe | terborough | | |
| 1.7 Site name Lough I | Foyle | | | | | |
| 1.8 Site indication and des | ignation class | sification | dates | | | |
| date site proposed as eligible as S | SCI | | | | | |
| date confirmed as SCI | | | | | | |
| date site classified as SPA | 1 | 199901 | | | | |
| date site designated as SAC | | | | | | |
| 2.1 Site centre location longitude 07 01 37 W 2.2 Site area (ha) | latitude 55 05 24 N 04.36 | | 2.3 Site len | ngth (km) | | |
| 2.5 Administrative region | | | | | | |
| NUTS code | | | on name | | % co | ver |
| UKB | Northern Ireland | d | | | 100 | .00% |
| 2.6 Biogeographic region X Alpine Atlantic 3. Ecological informati 3.1 Annex I habitats | Boreal | Con | ntinental | Macaronesi | a Medite | erranean |
| Habitat types present on the sit | te and the site | assessmen | t for them: | | | |
| Annex I habitat | | % cover | Representati vity | Relative surface | Conservation status | Global assessment |
| | | | | | | |

3.2 Annex I birds and regularly occurring migratory birds not listed on Annex I

Population

Site assessment

| | Resident Migratory | | | | | | | | |
|-------|-----------------------|--|-------|--------|-------|------------|--------------|-----------|--------|
| Code | Species name | | Breed | Winter | Stage | Population | Conservation | Isolation | Global |
| A046b | Branta bernicla hrota | | | 3730 I | | A | | С | |
| A038 | Cygnus cygnus | | | 890 I | | В | | С | |
| A157 | Limosa lapponica | | | 1896 I | | В | | С | |

4. Site description:

4.1 General site character

| Habitat classes | % cover |
|--|---------|
| Marine areas. Sea inlets | |
| Tidal rivers. Estuaries. Mud flats. Sand flats. Lagoons (including saltwork basins) | 96.4 |
| Salt marshes. Salt pastures. Salt steppes | 3.6 |
| Coastal sand dunes. Sand beaches. Machair | |
| Shingle. Sea cliffs. Islets | |
| Inland water bodies (standing water, running water) | |
| Bogs. Marshes. Water fringed vegetation. Fens | |
| Heath. Scrub. Maquis and garrigue. Phygrana | |
| Dry grassland. Steppes | |
| Humid grassland. Mesophile grassland | |
| Alpine and sub-alpine grassland | |
| Improved grassland | |
| Other arable land | |
| Broad-leaved deciduous woodland | |
| Coniferous woodland | |
| Evergreen woodland | |
| Mixed woodland | |
| Non-forest areas cultivated with woody plants (including orchards, groves, vineyards, dehesas) | |
| Inland rocks. Screes. Sands. Permanent snow and ice | |
| Other land (including towns, villages, roads, waste places, mines, industrial sites) | |
| Total habitat cover | 100% |

4.1 Other site characteristics

Soil & geology:

Mud, Sand

Geomorphology & landscape:

Estuary, Intertidal sediments (including sandflat/mudflat), Lagoon

4.2 Quality and importance

ARTICLE 4.1 QUALIFICATION (79/409/EEC)

Over winter the area regularly supports:

Cygnus cygnus 8.6% of the all-Ireland population (Iceland/UK/Ireland) 5 year peak mean 1991/92-1995/96

Limosa lapponica 11.9% of the all-Ireland population (Western Palearctic - wintering) 5 year peak mean 1991/92-1995/96

ARTICLE 4.2 QUALIFICATION (79/409/EEC)

Over winter the area regularly supports:

Branta bernicla hrota 18.7% of the population in Ireland (Canada/Ireland) 5 year peak mean 1991/92-1995/96

ARTICLE 4.2 QUALIFICATION (79/409/EEC): AN INTERNATIONALLY IMPORTANT ASSEMBLAGE OF BIRDS

Over winter the area regularly supports:

36599 waterfowl (5 year peak mean 01/10/1998)

Including:

Cygnus cygnus, Branta bernicla hrota, Limosa lapponica.

4.3 Vulnerability

Although a control programme has begun, the colonisation and spread of agressive non-native species such as *Spartina* spp. is a current pronlem and poses a potential threat in the future.

An exisiting Conservation Plan for Lough Foyle is now under review. This review will update exisiting management prescriptions and refine existing conservation objectives.

5. Site protection status and relation with CORINE biotopes:

5.1 Designation types at national and regional level

| Code | % cover |
|------------------|---------|
| UK01 (NNR) | 20.0 |
| UK04 (SSSI/ASSI) | 100.0 |

NATURA 2000

STANDARD DATA FORM

FOR SPECIAL PROTECTION AREAS (SPA) FOR SITES ELIGIBLE FOR IDENTIFICATION AS SITES OF COMMUNITY IMPORTANCE (SCI) AND

| | FOR S | SPECIAL AREAS | of Consi | ERVATION (S | SAC) | | |
|-------------------|--|-----------------------------------|-------------|-------------------|---------------------|---------------------|----------------------|
| 1. 3 | Sita idantification. | | | | | | |
| | Site identification: Type F | | 1.2 | Site code | UK90 | 20091 | |
| 1.1 | Турс | | _ | one code | 01130 | 20071 | |
| 1.3 | Compilation date | 199604 | 1.4 | Update | 19990 |)2 | |
| 1.5 | Relationship with other U K 0 0 3 0 | er Natura 200 2 4 4 4 | 0 sites | | | | |
| 1.6 | Respondent(s) | International l | Designation | ns, JNCC, Pe | terborough | | |
| 1.7 | Site name Lough | Neagh and Lou | ıgh Beg | | | | |
| <u>1.</u> 8 | Site indication and des | signation class | sification | dates | | | |
| date | site proposed as eligible as | SCI | | | | | |
| date | confirmed as SCI | | | | | | |
| date | site classified as SPA | | 199604 | | | | |
| date | site designated as SAC | | | | | | |
| long 06 24 | Site centre location itude 4 34 W Site area (ha) | latitude 54 34 11 N 0835.53 | | 2.3 Site len | ngth (km) | | |
| 2.5 | Administrative region | | | | | | |
| | NUTS code | | | on name | | % co | |
| UKE | 3 | Northern Irelan | d | | | 100 | .00% |
| 3. 1 3.1 | Biogeographic region X Atlantic Ecological informat Annex I habitats | | | ntinental | Macaronesi | a Medite | erranean |
| Habi | tat types present on the si | ite and the site | assessmen | t for them: | | | |
| Anne | x I habitat | | % cover | Representati vity | Relative surface | Conservation status | Global assessment |
| | | | | | | | |

3.2 Annex I birds and regularly occurring migratory birds not listed on Annex I

Population Site assessment

| | | Resident | | Migratory | | | | | |
|------|--------------------------------|----------|-------|-----------|-------|------------|--------------|-----------|--------|
| Code | Species name | | Breed | Winter | Stage | Population | Conservation | Isolation | Global |
| A059 | Aythya ferina | | | 26341 I | | A | | С | |
| A061 | Aythya fuligula | | | 22372 I | | A | | С | |
| A067 | Bucephala clangula | | | 10776 I | | A | | С | |
| A037 | Cygnus columbianus bewickii | | | 136 I | | В | | В | |
| A038 | Cygnus cygnus | | | 1031 I | | В | | С | |
| A193 | Sterna hirundo | | 185 P | | | В | | С | |

4. Site description:

4.1 General site character

| Habitat classes | % cover |
|--|---------|
| Marine areas. Sea inlets | |
| Tidal rivers. Estuaries. Mud flats. Sand flats. Lagoons (including saltwork basins) | |
| Salt marshes. Salt pastures. Salt steppes | |
| Coastal sand dunes. Sand beaches. Machair | |
| Shingle. Sea cliffs. Islets | |
| Inland water bodies (standing water, running water) | 95.0 |
| Bogs. Marshes. Water fringed vegetation. Fens | 2.2 |
| Heath. Scrub. Maquis and garrigue. Phygrana | 2.4 |
| Dry grassland. Steppes | |
| Humid grassland. Mesophile grassland | |
| Alpine and sub-alpine grassland | |
| Improved grassland | |
| Other arable land | |
| Broad-leaved deciduous woodland | |
| Coniferous woodland | |
| Evergreen woodland | |
| Mixed woodland | 0.4 |
| Non-forest areas cultivated with woody plants (including orchards, groves, vineyards, dehesas) | |
| Inland rocks. Screes. Sands. Permanent snow and ice | |
| Other land (including towns, villages, roads, waste places, mines, industrial sites) | |
| Total habitat cover | 100% |

4.1 Other site characteristics

Soil & geology:

Basalt, Clay, Igneous, Peat, Sand

Geomorphology & landscape:

Floodplain, Island, Lowland

4.2 Quality and importance

ARTICLE 4.1 QUALIFICATION (79/409/EEC)

During the breeding season the area regularly supports:

Sterna hirundo 6% of the all-Ireland breeding population

(Northern/Eastern Europe - breeding) Count, as at 1995

Over winter the area regularly supports:

Cygnus columbianus bewickii

(Western Siberia/North-eastern & North-western

Europe)

5.4% of the all-Ireland population 5 year peak mean 1991/92-1995/96

Cygnus cygnus 10% of the all-Ireland population (Iceland/UK/Ireland) 5 year peak mean 1991/92-1995/96

ARTICLE 4.2 QUALIFICATION (79/409/EEC)

Over winter the area regularly supports:

Aythya ferina 7.5% of the population

(North-western/North-eastern Europe) 5 year peak mean 1991/92-1995/96

Aythya fuligula 2.2% of the population

(North-western Europe) 5 year peak mean 1991/92-1995/96

Bucephala clangula 3.6% of the population

(North-western/Central Europe) 5 year peak mean 1991/92-1995/96

ARTICLE 4.2 QUALIFICATION (79/409/EEC): AN INTERNATIONALLY IMPORTANT ASSEMBLAGE OF BIRDS

Over winter the area regularly supports:

99262 waterfowl (5 year peak mean 01/04/1998)

Including:

Cygnus columbianus bewickii , Cygnus cygnus , Aythya ferina , Aythya fuligula , Bucephala clangula .

4.3 Vulnerability

The Lough drains some 40% of Northern Ireland and has been subject to severe eutrophication as a result of increased nutrient inputs from agricultural run-off and general domestic sewage from catchment housing and other developments.

Historically, increased eutrophication may have enhanced wildfowl populations but the effect of eutrophication on such populations is little understood although it may have had a positive impact on wintering diving duck.

Although some spcies e.g. swans, use improved fields, recent changes in agricultural land-use i.e. agricultural intensification (land improvements/high grazing levels) and, in some cases, insufficient grazing and tree/scrub management resulting in vegetation succession, may adversely affect feeding/roosting areas for overwintering and breeding waterfowl.

Introduction of/invasion by non-native species such as Roach and potentially Zebra Mussels could have a deleterious effect on some species e.g. diving duck, but may be beneficial to others e.g. Great-crested Grebe. Sand dredging is widespread throughout the Lough but the impact is largely unknown.

An existing Conservation Plan for Lough Neagh and Lough Beg is currently under review. This review will up-date existing management prescriptions and refine existing conservation objectives.

A total of 15 management agreements (NNR/ASSI) mainly for agricultural issues, are established on the site. Phosphate stripping at appropriate STW has begun to address the issue of eutrophication. Other measures such agric-improvement schemes and Water Quality Management Plans to further address this issue are being considered.

5. Site protection status and relation with CORINE biotopes:

5.1 Designation types at national and regional level

| Code | % cover |
|------------------|---------|
| UK01 (NNR) | 3.0 |
| UK04 (SSSI/ASSI) | 100.0 |

UK SPA data form

NATURA 2000 STANDARD DATA FORM

FOR SPECIAL PROTECTION AREAS (SPA)

FOR SITES ELIGIBLE FOR IDENTIFICATION AS SITES OF COMMUNITY IMPORTANCE (SCI)

AND

FOR SPECIAL AREAS OF CONSERVATION (SAC)

1. SITE IDENTIFICATION

1.1. TYPE 1.2. SITE CODE 1.3. COMPILATION DATE 1.4. UPDATE

J IE0004075 200406

1.5. RELATION WITH OTHER NATURA 2000 SITES:

NATURA 2000 SITE CODES

IE0002287

1.6. RESPONDENT(S):

National Parks & Wildlife Service of the Department of the Environment, Heritage and Local Government. 7 Ely Place, Dublin 2, Ireland.

1.7. SITE NAME:

Lough Swilly SPA

1.8. SITE INDICATION AND DESIGNATION/CLASSIFICATION DATES:

DATE SITE PROPOSED AS ELIGIBLE AS SCI: DATE CONFIRMED AS SCI:

DATE SITE CLASSIFIED AS SPA: DATE SITE DESIGNATED AS SAC:

199511

2. SITE LOCATION

| 2.1. SITE CENTRE LO | OCATION | | | | | | |
|---------------------|-----------------|-----------|------------|--------|-------------|---------------|---------|
| LONGITUDE | | | LATI | ΓUDE | | | |
| W 7 34 0 | | | 55 | 1 | 0 | | |
| W/E (Greenwich) | | | | | | | |
| 2.2. AREA (HA): | | | 2.3. Si | ITE LE | ENGTH (KM): | | |
| 3734.44 | | | | | | | |
| 2.4. ALTITUDE (M): | | | | | | | |
| MINIMUM | | MAXII | MUM | | | MEAN | |
| -5 | | 5 | | | | -1 | |
| 2.5. ADMINISTRATIV | VE REGION: | | | | | | |
| NUTS CODE | REGION | NAME | | | | | % COVER |
| IE011 | Border | | | | | | 20 |
| Marine area not co | vered by a NUTS | S-region | | | | | 8 |
| 2.6. BIOGEOGRAPHI | C REGION: | | | | | | |
| Alpine | Atlantic | Boreal Co | ontinental | Ma | caronesian | Mediterranean | |
| | ✓ | | | | | | |

3. ECOLOGICAL INFORMATION

3.1. HABITAT types present on the site and assessment for them:

ANNEX I HABITAT TYPES:

CODE %COVER REPRESENTATIVITY RELATIVE SURFACE CONSERVATION GLOBAL STATUS ASSESSMENT

3.2. SPECIES

covered by Article 4 of Directive 79/409/EEC

and

listed in Annex II of Directive 92/43/EEC

and

site assessment for them

3.2.a. BIRDS listed on Annex I of Council directive 79/409/EEC

| CODE | NAME | POPULATION | | | | SITE ASSESSMENT | | | |
|------|------------------------------|------------|-------|-----------|-------|-----------------|--------------|-----------|---|
| | | Resident | | Migratory | | Population | Conservation | Isolation | |
| | | | Breed | Winter | Stage | | | | |
| A038 | Cygnus cygnus | | | 283 i | | В | A | С | 7 |
| A140 | Pluvialis apricaria | | | 627 i | | С | В | С | |
| A157 | Limosa lapponica | | | 110 i | | C | В | С | |
| A395 | Anser albifrons flavirostris | | | 824 i | | В | A | С | 7 |

3.2.b. Regularly occuring Migratory Birds not listed on Annex I of Council directive 79/409/EEC

| CODE | NAME | Resident | POPULATION dent Migratory | | Popula | ition | SITE ASSESS Conservation | | | |
|------|--------------------------|----------|------------------------------|--------|--------|-------|-----------------------------|---|---|---|
| | | | Breed | Winter | Stage | | | | | |
| A005 | Podiceps cristatus | | | 158 i | | В | | A | С | |
| A017 | Phalacrocorax carbo | | | 74 i | | | С | В | С | |
| A043 | Anser anser | | | 1208 i | | A | | A | С | 7 |
| A046 | Branta bernicla | | | 125 i | | | C | В | С | |
| A048 | Tadorna tadorna | | | 679 i | | В | | A | С | Z |
| A050 | Anas penelope | | | 1166 i | | | C | A | С | |
| A052 | Anas crecca | | | 1485 i | | В | | A | С | Z |
| A053 | Anas platyrhynchos | | | 751 i | | | C | A | С | |
| A056 | Anas clypeata | | | 56 i | | | С | A | C | |
| A061 | Aythya fuligula | | | 48 i | | | С | В | C | |
| A062 | Aythya marila | | | 111 i | | | C | A | С | |
| A067 | Bucephala clangula | | | 71 i | | | C | A | C | |
| A069 | Mergus serrator | | | 92 i | | В | | A | С | |
| A130 | Haematopus ostralegus | | | 1263 i | | | С | A | С | |
| A137 | Charadrius hiaticula | | | 39 i | | | С | В | С | |
| A142 | Vanellus vanellus | | | 1196 i | | | C | A | C | |
| A143 | Calidris canutus | | | 303 i | | | C | A | C | |
| A149 | Calidris alpina | | | 7001 i | | В | | A | C | 7 |
| A156 | Limosa limosa | | | 56 i | | | C | В | C | |
| A160 | Numenius arquata | | | 1508 i | | В | | A | C | |
| A162 | Tringa totanus | | | 1328 i | | В | | A | C | 7 |
| A164 | Tringa nebularia | | | 39 i | | | C | A | C | |
| A169 | Arenaria interpres | | | 48 i | | | C | В | C | |
| A179 | Larus ridibundus | | | 705 i | | | C | В | C | |
| A182 | Larus canus | | | 388 i | | | C | В | С | |

3.2.c. MAMMALS listed on Annex II of Council directive 92/43/EEC

3.2.d. AMPHIBIANS and REPTILES listed on Annex II of Council directive 92/43/EEC

3.2.e. FISHES listed on Annex II of Council directive 92/43/EEC

3.2.f. INVERTEBRATES listed on Annex II of Council directive 92/43/EEC

3.2.g. PLANTS listed on Annex II of Council directive 92/43/EEC

3.3. Other Important Species of Flora and Fauna

| GROUP | SCIENTIFIC NAME | POPULATION | MOTIVATION |
|---------------|--------------------------|------------|------------|
| B M A R F I P | | | |
| В | Ardea cinerea | 37 i | С |
| В | Larus argentatus | 71 i | D |
| В | Cygnus olor | 40 i | C |
| В | Tachybaptus ruficollis | 21 i | C |
| M | Lepus timidus hibernicus | р | A |
| M | Lepus timidus hibernicus | р | В |
| M | Lepus timidus hibernicus | р | C |

 $⁽B=Birds,\,M=Mammals,\,A=Amphibians,\,R=Reptiles,\,F=Fish,\,I=Invertebrates,\,P=Plants)$

4. SITE DESCRIPTION

4.1. GENERAL SITE CHARACTER:

| Habitat classes | % cover |
|---|---------|
| Extensive cereal cultures (including Rotation cultures with regular fallowing) | 10 |
| Improved grassland | 10 |
| Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins) | 78 |
| Salt marshes, Salt pastures, Salt steppes | 1 |
| Shingle, Sea cliffs, Islets | 1 |
| Total habitat cover | 100 % |

Other site characteristics

Lough Swilly is a long sea inlet situated on the north Donegal coast. The site includes all of the inner part of the lough, extending from below Letterkenny to Ballygreen Point, and also includes the estuary of the Leannan River as far as the town of Rathmelton. This part of the site is estuarine in character, with shallow water and intertidal sand and mud flats being the dominant habitats. Salt marshes fringe much of the shoreline. Also included are the extensive polders at Blanket Nook and Big Isle. A lagoon occurs at Blanket Nook.

4.2. OUALITY AND IMPORTANCE:

Lough Swilly is a fine example of a large, natural sea inlet which is estuarine in character. The site supports an excellent diversity of wintering waterfowl for which it is the most important site in the north-west. It is of international importance because total numbers easily exceed 20,000 birds but it also has internationally important populations of Cygnus cygnus, Anser anser and Anser albifrons flavirostris. The Anser anser population represents over 30% of the national total, whilst the flock of Anser albifrons flavirostris is the largest in the country outside of the Wexford Slobs. In addition, there are at least 13 species which occur in numbers of national importance. Of particular note are the populations of Tadorna tadorna (4.6% of national total), Calidris alpina (7% of total) and Tringa totanus (4% of total). The site also supports regionally important numbers of Pluvialis apricaria and Limosa lapponica. Many of the birds regularly commute to Inch Lough and Levels, a separate SPA. The wintering birds of Lough Swilly have been well-monitored since the early 1980s.

4.3. VULNERABILITY

The maintenance of the high numbers of geese and swans is dependent on the continuation of favourable landuse practices on the polders. The principal commercial activity within the estuarine part of the site is aquaculture. It is not known if this is causing significant disturbance to the estuarine habitats or the bird populations. Despite the proximity of several towns, water quality is generally satisfactory. Recreational activities occur in several areas of site and could cause some disturbance to the birds if not properly controlled.

4.4. SITE DESIGNATION:

4.5. OWNERSHIP

NATURA 2000 Data Form

Site code: IE0004075

State: Department of Communications, Marine and Natural Resources

Private: multiple

4.6. DOCUMENTATION

Colhoun, K. (2001). I-WeBS Report 1998-99. BirdWatch Ireland, Dublin.

Curtis, T.G.F. and Sheehy Skeffington, M.J. (1998). The salt marshes of Ireland: an inventory and account of their geographical variation. Biology and Environment, Proceedings of the Royal Irish Academy 98B: 87-104.

Fox, A.D., Norriss, D.W., Stroud, D.A. and Wilson, H.J. (1994) Greenland White-fronted Geese in Ireland and Britain 1982/83 - 1993/94. Greenland White-fronted Goose Study research report no. 8. Greenland White-fronted Goose Study, Wales and National Parks and Wildlife Service, Dublin.

Hunt, J., Derwin, J., Coveney, J. and Newton, S. (2000). Republic of Ireland. Pp. 365-416 in Heath, M.F. and Evans, M.I. (eds.). Important Bird Areas in Europe: Priority Sites for Conservation 1: Northern Europe. Cambridge, UK: BirdLife International (BirdLife Conservation Series No. 8).

Irish Wetland Birds Survey (I-WeBS) Database, 1994/95-2000/01. BirdWatch Ireland, Dublin.

McElwaine, J.G., Wells, J.H. and Bowler, J.M. (1995). Winter movements of Whooper Swans visiting Ireland: preliminary results. Irish Birds 5: 265-278.

McGarrigle, M.L., Bowman, J.J., Clabby, K.J., Lucey, J., Cunningham, P., MacCarthaigh, M., Keegan, M., Cantrell, B., Lehane, M., Clenaghan, C. and Toner P.F. (2002). Water Quality in Ireland 1998-2000. Environmental Protection Agency, Wexford.

Merne, O.J. (1989). Important bird areas in the Republic of Ireland. In: Grimmett, R.F.A. and Jones, T.A. (eds). Important Bird Areas in Europe. ICBP Technical Publication No. 9. Cambridge.

Sheppard, R. (1993). Ireland's Wetland Wealth. IWC, Dublin.

Sheppard, R. (2002). The wintering waterbirds of Lough Swilly, County Donegal. Irish Birds 7: 65-78.

5. SITE PROTECTION STATUS AND RELATION WITH CORINE BIOTOPES

5.1. DESIGNATION TYPES at National and Regional level:

CODE % COVER

5.2. RELATION OF THE DESCRIBED SITE WITH OTHER SITES:

designated at National or Regional level:

TYPE CODE SITE NAME OVERLAP TYPE % COVER

IE05 Blanket Nook Wildfowl Sanctuary + 1

designated at International level:

5.3. RELATION OF THE DESCRIBED SITE WITH CORINE BIOTOPE SITES:

CORINE SITE CODE OVERLAP TYPE % COVER

800000124

6. IMPACTS AND ACTIVITIES IN AND AROUND THE SITE

6.1. GENERAL IMPACTS AND ACTIVITIES AND PROPORTION OF THE SURFACE OF THE SITE AFFECTED

IMPACTS AND ACTIVITIES WITHIN the site

| CODE | INTENSITY | % OF SITE | INFLUENCE |
|------|--------------|-----------|-----------|
| 120 | A B C | 20 | + 0 - |
| 140 | A B C | 10 | + 0 - |
| 100 | A B C | 10 | + 0 - |
| 200 | A B C | 10 | + 0 - |
| 701 | А В С | 80 | + 0 - |
| 621 | А в С | 20 | + 0 - |

IMPACTS AND ACTIVITIES AROUND the site

| CODE | INTENSITY | INFLUENCE |
|------|--------------|-----------|
| 120 | A B C | + 0 - |
| 400 | A B C | + 0 - |

6.2. SITE MANAGEMENT AND PLANS

BODY RESPONSIBLE FOR THE SITE MANAGEMENT

National Parks and Wildlife Service is responsible for managing part of the site as a Wildfowl Sanctuary

SITE MANAGEMENT AND PLANS

A Conservation Plan for the management of this site is in preparation.

| 7. MAPS OF THE SITE |
|----------------------------------|
| - Physical map |
| - Aerial photograph(s) included: |
| 8. SLIDES |
| |



Appendix 4: Integrity of Site Checklists

Table A4.1 Integrity of Site Checklist for Lough Foyle SPA

| Conservation Objectives | |
|---|--------------------|
| Does the project have potential to: | |
| Cause delays in progress towards achieving the conservation objectives of the site? | Yes /No |
| Interrupt progress towards achieving the conservation objectives of the site? | Yes /No |
| Disrupt those factors which help maintain the favourable conditions of the site? | Yes /No |
| Interfere with the balance, distribution and density of key species that are indicators of favourable conditions of the site? | Yes /No |

| Other Indicators | |
|--|--------------------|
| Does the project have potential to: | |
| Cause changes to the vital defining aspects (e.g. nutrient balance) that determine how the site functions as a habitat or ecosystems? | Yes /No |
| Change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site? | Yes /No |
| Interfere with predicted or expected natural changes to the site (such as water dynamics of chemical composition)? | Yes /No |
| Reduce the area of key habitats? | Yes /No |
| Reduce the population of key species? | Yes /No |
| Change the balance between key species? | Yes /No |
| Reduce the diversity of the site? | Yes /No |
| Result in disturbance that could affect population size or density of the balance between key species? | Yes /No |
| Result in fragmentation? | Yes /No |
| Result in loss or reduction of key features (e.g. tree cover, tidal exposure, annual flooding, etc)? | Yes /No |

Table A4.2 Integrity of Site Checklist for Lough Swilly SPA

| Conservation Objectives | |
|---|--------------------|
| Does the project have potential to: | |
| Cause delays in progress towards achieving the conservation objectives of the site? | Yes /No |
| Interrupt progress towards achieving the conservation objectives of the site? | Yes /No |
| Disrupt those factors which help maintain the favourable conditions of the site? | Yes /No |



| Interfere with the balance, distribution and density of key species that are indicators of | Yes /No |
|--|--------------------|
| favourable conditions of the site? | |

| Other Indicators | |
|--|--------------------|
| Does the project have potential to: | |
| Cause changes to the vital defining aspects (e.g. nutrient balance) that determine how the site functions as a habitat or ecosystems? | Yes /No |
| Change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site? | Yes /No |
| Interfere with predicted or expected natural changes to the site (such as water dynamics of chemical composition)? | Yes /No |
| Reduce the area of key habitats? | Yes /No |
| Reduce the population of key species? | Yes /No |
| Change the balance between key species? | Yes /No |
| Reduce the diversity of the site? | Yes /No |
| Result in disturbance that could affect population size or density of the balance between key species? | Yes /No |
| Result in fragmentation? | Yes /No |
| Result in loss or reduction of key features (e.g. tree cover, tidal exposure, annual flooding, etc)? | Yes /No |

Table A4.3 Integrity of Site Checklist for Lough Neagh & Lough Beg SPA

| Conservation Objectives | |
|---|--------------------|
| Does the project have potential to: | |
| Cause delays in progress towards achieving the conservation objectives of the site? | Yes /No |
| Interrupt progress towards achieving the conservation objectives of the site? | Yes /No |
| Disrupt those factors which help maintain the favourable conditions of the site? | Yes /No |
| Interfere with the balance, distribution and density of key species that are indicators of favourable conditions of the site? | Yes /No |

| Other Indicators | |
|--|--------------------|
| Does the project have potential to: | |
| Cause changes to the vital defining aspects (e.g. nutrient balance) that determine how the site functions as a habitat or ecosystems? | Yes /No |
| Change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site? | Yes /No |



Information to Inform an Appropriate Assessment:

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| Interfere with predicted or expected natural changes to the site (such as water dynamics of chemical composition)? | Yes /No |
|--|--------------------|
| Reduce the area of key habitats? | Yes /No |
| Reduce the population of key species? | Yes /No |
| Change the balance between key species? | Yes /No |
| Reduce the diversity of the site? | Yes /No |
| Result in disturbance that could affect population size or density of the balance between key species? | Yes /No |
| Result in fragmentation? | Yes /No |
| Result in loss or reduction of key features (e.g. tree cover, tidal exposure, annual flooding, etc)? | Yes /No |

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Habitats Regulations Assessment

Report of Information to Inform and Appropriate Assessment:

718736-3000-R-019 Ramsar Sites

A5 Western Transport Corridor

April 2017

Produced for

TranposrtNI

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Ramsar Sites



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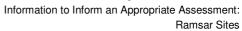
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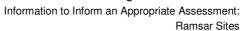
¹ The Habitats Regulations indicate that the person or organisation applying for any consent, permission or other authorisation, known as the 'Project Proponent', is responsible for provision of information to support decisions by the 'Competent Authority' on the need for Appropriate Assessment and to allow the Appropriate Assessment to be undertaken. This is taken to mean the project team, including as appropriate: Overseeing Organisation scheme or area staff; design consultants; contractors; Design Build Finance and Operate (DBFO) companies; and managing agents.





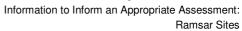
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1 Introduction

- 1.1.1 This document is a Habitats Regulation Assessment (HRA) which contains information to be submitted to the 'Competent Authority' in order to inform the statutory assessments required under the Conservation (Natural Habitats, &c) Regulations (Northern Ireland) 1995 (as amended²), for the proposed A5 Western Transport Corridor (A5WTC) Scheme.
- 1.1.2 These regulations apply to European Natura 2000 sites³, namely Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). The Proposed Scheme would interact with the following sites, namely:
 - River Foyle and Tributaries SAC
 - River Finn (Republic of Ireland) SAC
 - Owenkillew River SAC
 - Tully Bog SAC
 - Lough Swilly (including former Inch Lough and Levels) SPA
 - Lough Foyle (Northern Ireland) SPA (and Ramsar site)
 - Lough Foyle (Republic of Ireland) SPA (and Ramsar site)
 - Lough Neagh and Lough Beg SPA (and Ramsar site)
- 1.1.3 This document (HRA Ramsar Sites) is one of four assessments, and specifically addresses the Ramsar sites Lough Foyle Ramsar site and Lough Neagh & Lough Beg Ramsar Site).
- 1.1.4 A further three documents have been produced, namely:
 - HRA Report Tully Bog SAC
 - HRA Report SPAs (for Lough Swilly SPA; Lough Foyle SPA; and Lough Neagh and Lough Beg SPA; and

² As amended by the Conservation (Natural Habitats, etc.) (Amendment) Regulations (Northern Ireland) 2012

³ Natura 2000 sites consist of Special Areas of Conservation (SACs) designated under European Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Flora and Fauna (the 'Habitats Directive') and Special Protection Areas (SPAs) designated under Directive 2009/147/EC, (the codified version of 79/409/EEC as amended) on the conservation of wild birds (the 'Birds Directive.')

Ramsar Sites



- HRA Report SAC Watercourses (for River Foyle & Tributaries SAC; River Finn SAC and Owenkillew SAC).
- 1.1.5 This information is currently in draft form for consultation, and is being submitted to Loughs Agency and the Department of Agriculture, Environment, and Rural Affairs (DAERA) as statutory consultees for the designated sites in Northern Ireland, and to the National Parks and Wildlife Service (NPWS) in the Republic of Ireland. The general public are also invited to provide responses relating to the information and findings contained in the report⁴. The information and comments received in response to the consultations will then be considered by TransportNI and the Minister, when undertaking the Appropriate Assessments required in advance of a decision to proceed or not with the Scheme, in accordance with the requirements of the Directive and Regulations.

1.2 Background

- 1.2.1 The A5 Western Transport Corridor (A5WTC) is one of five key transport corridors making up the strategic road network across Northern Ireland. The Department for Infrastructure (Dfl) TransportNI (TNI) is promoting the dualling of the A5WTC as part of its improvement programme. This project would significantly improve safety and journey times along this route and, in addition to improving the links between the urban centres in the west of the province, provide a strategic link with international gateways. At the border with the Republic of Ireland it will connect with the N2 route which the Irish Government also has longer term plans to upgrade. It passes through New Buildings, Strabane, Sion Mills, Newtownstewart, Omagh and Aughnacloy.
- 1.2.2 The proposed new A5WTC dual carriageway runs for some 85km between the existing A5 north of New Buildings and the existing A5 south of Aughnacloy. The proposal will ultimately link up with an allied proposal in the Republic of Ireland, however as that proposal has not progressed to any meaningful stage which allows assessment, the current documents provide comprehensive assessments of the foreseeable proposals designed to date.
- 1.2.3 It is anticipated the construction of the proposed scheme will be undertaken in three phases as follows, and shown on Sheets 1 to 24 (Appendix 1):
 - construction of junctions 1-3 (New Buildings Strabane North) and junctions 13-15
 (Omagh South A4,Ballygawley) between 2017 and 2019;
 - construction of junctions 3-13 (Strabane North Omagh South) between 2021 and 2023; and

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⁴ The Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (to which the UK is a signatory) requires [at Article 3]:- 'Each Party shall promote environmental education and environmental awareness among the public, especially on how to obtain access to information, to participate in decision-making and to obtain access to justice in environmental matters'.

Ramsar Sites



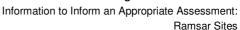
- construction of junction 15 (A4,Ballygawley) to the A5 south of Aughnacloy between 2026 and 2028.
- 1.2.4 The currently proposed A5WTC Scheme substantially reflects a previous proposal which was promoted in 2010 and for which an Environmental Statement (A5WTC ES 2010) was prepared and published. The environmental studies reported in the A5WTC ES 2010 were informed by a draft Habitats Regulations Assessment (HRA) which recognised and screened⁵ the above European Designated Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) for likely significant effects. A judicial review of the scheme in 2013 found the ES to be robust, but upheld a challenge that the HRA reporting relating to the Habitats Regulations should have been taken to the next level, namely a Stage 2 assessment⁶.
- 1.2.5 Further studies have since been completed to address this need for a more robust habitats regulations assessment, and a new Environmental Statement (A5WTC ES 2016) was prepared and published based on this information.
- 1.2.6 The 2016 Environmental Statement (ES), along with the draft vesting orders and other statutory procedures, were subject to a Public Inquiry from October to December 2016. Accordingly, the production of the current suite of HRA Reports have been delayed to ensure they contain the most up to date information.

1.3 Preparation of the HRA

1.3.1 The primary author of this report is Stuart Ireland B.Sc. (Hons), MCIEEM, CEnv. He is expert in ecological matters and the full spectrum of environmental assessment techniques,

⁵ The SACs, SPAs and Ramsar sites SAC were subject to a screening exercise (Test of Likely Significance (ToLS) to determine if the proposed scheme, with its proposed and committed mitigation measures, would be likely to have a significant effect on the integrity of any of the sites considered. The ToLS process is commonly referred to as Stage 1 of the Habitats Regulations Assessment (HRA) process. When completed, the ToLS concluded the impacts of the proposed scheme (subject to mitigation) would not be likely to have a significant effect upon the integrity of the implicated designated sites in the context of the Habitats or Birds Directives, a conclusion which was agreed with by Northern Ireland Environment Agency (NIEA), the statutory consultee relative to the designated sites in Northern Ireland and the National Parks and Wildlife Service (NPWS) the organisation charged with the implementation of the Habitats and Birds Directives in the ROI.

⁶ The challenge to the consent for the proposed scheme was made in the context that potential impacts upon the River Foyle and Tributaries SAC should have been subject to Stage 2 of the Habitats Regulations Assessment (Appropriate Assessment). This challenge was upheld. The finding was informed by concerns raised by Loughs Agency in responses to the 2010 ES and presented in verbal submissions to the public inquiries held in 2011 concerning the protection of Atlantic salmon (Salmo salar), and clarifications through case law relative to the interpretation of 'likelihood' in the context of screening for likely significant effects as referred to in the Habitats Directive and the Regulations.





methodologies and statutes. Academically, he holds a combined honours degree in Zoology with Marine Zoology from UCNW Bangor, and professionally, is a member of relevant Institutes requiring the highest standards of professional competence and integrity. He is a Chartered Environmentalist, and a full member of the Chartered Institute of Ecology and Environmental Management.

- 1.3.2 Stuart has practised for 17 years, during which time he has undertaken complex Ecological Impact assessments, Habitats Regulations Assessments for nationally important infrastructure schemes. He has been involved with the A5WTC proposal since its inception in 2008 and is familiar with both the proposal site and the full spectrum of environmental parameters which have influenced the design of the proposal.
- 1.3.3 Stuart has provided ecological advice services for major road schemes, including the Roscommon Way Extension scheme in Essex, ensuring that construction of a flood relief road through a SSSI was undertaken in a manner which preserved the ecological function of the site and its supported species. He has appeared as an Expert Witness on ecological matters and has significant experience in Habitat Regulations Assessments, including working with clients, contractors and Statutory Consultees to design schemes to ensure protection of Natura 2000 sites and their conservation objectives.



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2 The HRA Process

2.1 Objectives

- 2.1.1 The overall aims of the Habitats and Birds Directives are to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives, and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the best examples of them. European and national legislation places a collective obligation on its member states and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation status.
- 2.1.2 The maintenance of habitats and species within Natura 2000 sites at favourable conservation status will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.
- 2.1.3 Favourable conservation status of a site is achieved when:
 - The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
 - The conservation status of its typical species is favourable.
- 2.1.4 The favourable conservation status of a species is achieved when:
 - Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
 - The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
 - There is, and will probably continue to be, a sufficiently large habitat to maintain its Population's on a long-term basis.
- 2.1.5 The Habitats Directive promotes a hierarchy of avoidance, mitigation and compensatory measures. Accordingly, recognition of the importance of the identified designated sites within the Scheme study area and undertaking habitats assessment appraisals has been ongoing, and has occurred iteratively throughout the development of the A5WTC Scheme, and has significantly influenced the Scheme design.
- 2.1.6 In the first instance, the Scheme has aimed to avoid any negative impacts on European sites by identifying possible impacts early in the development of the Scheme, and has avoided sites as much as possible during the corridor and route options appraisal.
- 2.1.7 Following that, mitigation measures have been applied where necessary, with the aim of ensuring that no significant adverse impacts on the Sites remain.

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Ramsar Sites



2.1.8 The purpose of this HRA report is to provide information on the likely significant effects of the Scheme on the qualifying features of the respective designated sites, identify the mitigation measures proposed, and to assess whether the mitigation measures will ensure that the favourable conservation status of the each of the Sites is maintained.

2.2 Approach to Habitat Regulations Assessment

- 2.2.1 The gathering and presentation of the information in this document has been informed by the guidance provided in 'Managing Natura 2000 Sites, the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (EC, 2000 & 2001)', and 'Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC'. Further useful guidance is provided by Section 4, Part 1 of Volume 11 of the DMRB (HD44/09).
- 2.2.2 In accordance with the guidance, a staged approach is taken to the assessment of plans and projects under the Habitat Regulations:

Stage 1: Screening/Test of likely Significance

This is where it is established if an Appropriate Assessment is required and is referred to as 'screening'. Its purpose is to identify the likely impacts upon a Natura 2000 Site of a project or a plan, either alone or in combination with other plans or projects and considers whether these impacts are likely to be significant. It will include:

- A description of the project;
- Identification of relevant Natura 2000 sites potentially affected;
- Identification and description of individual and cumulative impacts likely to result from implementation of the project;
- Assessment of the significance of the impacts identified above on site integrity; and
- Exclusion of sites where it can be objectively concluded that there will be no significant effects.

Stage 2: Appropriate Assessment

This stage considers the potential impacts on the structure and function, as well as the conservation objectives of the Natura 2000 Sites, that the Proposal may have either alone or in combination with other projects or plans. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts is presented. This stage will include:

- A description of the Natura 2000 sites that will be considered further in the AA;
- A description of significant impacts on the conservation feature of these sites likely to occur from the Plan;

Ramsar Sites



- Mitigation Measures; and
- Conclusions.

Stage 3: Assessment of alternative solutions

This process examines alternative ways of achieving the objectives of the Proposal that avoid adverse impacts on the integrity of the Natura 2000 sites.

Stage 4: Imperative reasons of overriding public interest

This stage is the main reason of exemption from Article 6(4) which examines whether there are imperative reasons of overriding public interest (IROPI), and where no alternative solutions exist, for allowing a plan or project which will have adverse effects on the integrity of a Natura 2000 site to proceed.

2.2.3 This HRA report addresses Stage 1 and Stage 2 of the HRA Process.

Note: For the purposes of this assessment, the term 'likely' is applied within the proper meaning of the term as defined in the corpus of EU environmental law. In that sense, a 'likely' significant effect is deemed herein to be not one which is more likely than not to occur, but rather one with a genuine possibility of occurrence, no matter how small that likelihood may be. That being so, the precautionary principle required in HRA is integrated into the very heart of the assessment methodology and the assessment is thus as robust as possible.

The definition for 'integrity' adopted in this report is that provided in ODPM Circular 06/2005 and Defra Circular 01/2005 - *Biodiversity and Geological conservation – Statutory obligations and their impact within the planning system*, which defines integrity in the context of designated sites as:

The coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified



Information to Inform an Appropriate Assessment:

Ramsar Sites

3 Stage 1 – Screening

3.1.1 As discussed above, the first stage of an HRA assessment is to consider whether a project could cause 'likely significant effect' on the qualifying features of the Natura 2000 site(s), alone or in-combination with other plans/projects. In line with EU Guidance, and the Design Manual for Roads & Bridges (DMRB) method of assessment, screening matrices have been completed for each of the potentially affected Natura 2000 sites. Tables 3.1 and 3.2 provide this information and are supported by reference to the A5WTC ES 2010 and the A5WTC ES 2016.

Table 3.1 Screening Matrix for Lough Foyle Ramsar Site

| Table 3.1 DMRB Screening M | Matrix for Lough | Foyle Ramsar S | ite |
|---|------------------|-------------------------|-------------------------------|
| Project Name: Site under Consideration: | | A5 WTC | |
| | | Lough Foyle Ramsar Site | |
| Date: Author (N | | Organisation): | Verified (Name/Organisation): |
| 23/07/13 S.Ireland, N | | ichel | P. Reid, Mouchel |

Description of Project

The proposed 85km A5 Western Transport Corridor (A5 WTC) scheme forms part of a strategically important transport route between Londonderry/Derry in Northern Ireland (NI) and to Dublin in the Republic of Ireland (ROI). The proposed scheme involves replacement of the existing A5 from a point north of New Buildings Londonderry in the north to a point south of Aughnacloy in the south with a dual carriageway along an alignment off-line from the existing road. The existing A5 passes through New Buildings, Strabane, Sion Mills, Newtownstewart, Omagh and Aughnacloy. It is anticipated the proposed scheme will be built in three phases starting with Phase 1 to commence in 2017, Phase 2 in 2021 and Phase 3 in 2026. It is anticipated that each phase will take some 2 to 3 years to construct.

Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the Ramsar Site by virtue of:

| Size and scale (road type and probable traffic volume) | The project involves the construction of an 85 km long dual carriageway involving construction within the Foyle floodplain in an area known to support birds associated with the Ramsar Site, with associated drainage and local road improvements. Traffic volumes are anticipated to be a maximum of 23300 AADT (to the nearest 100) by 2040. There will be no direct impacts on the Ramsar Site. However, both construction and operation of the road could lead to impacts on key foraging areas outside of the Ramsar Site and on birds foraging within these areas. |
|--|---|
| Land-take | There will be no land take within the Ramsar Site. Outside of the Ramsar Site, the land take will involve areas of functional habitat utilised by Whooper Swan, Greylag Goose and by Atlantic salmon and sea lamprey. All four species are identified in the information sheet for the Ramsar Site. |
| Distance from the Ramsar Site or key features of the site (from edge of the project assessment corridor) | The proposed scheme is located approximately 10km south of the Ramsar Site. Birds which are known to use the Ramsar Site and which are designation feature species of the Ramsar Site (Whooper Swan and Greylag Geese) are, however, known to utilise parts of an area between Magheramason and the Burn Dennet defined to the west by |

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Ramsar Sites



| Table 3.1 DMRB Screening Matrix for Lough | Foyle Ramsar Site | |
|---|---|--|
| | the River Foyle and to the east by the existing A5 where the proposed scheme will follow a north-south alignment which reflects that of the existing road during the winter months. The proposed scheme will also involve the implementation of works and future presence of the proposed dual carriageway and its associated traffic along and in the vicinity of watercourses within the Foyle Catchment which are utilised by Atlantic salmon and sea lamprey. | |
| Resource requirements (from the Ramsar Site or from areas in proximity to the site, where of relevance to consideration of impacts) | None. | |
| Emissions (e.g. polluted surface water runoff both soluble and insoluble pollutants, atmospheric pollution) | The proposed scheme is located approximately 10km south of the Ramsar Site. Numbers of the populations of designation feature species of the Ramsar Site (Whooper Swan and Greylag Geese) are, however, known to utilise parts of an area between Magheramason and the Burn Dennet defined to the west by the River Foyle and to the east by the existing A5 where the proposed scheme will follow a north-south alignment which reflects that of the existing road during the winter months. The proposed scheme will also involve the implementation of works and future presence of the proposed dual carriageway and its associated traffic along and in the vicinity of watercourses within the Foyle Catchment which are utilised by Atlantic salmon and sea lamprey. | |
| Excavation requirements (e.g. impacts of local hydrogeology) | The proposed works will not involve excavation in the designated area. There will be a requirement for excavation in relation to the proposed vertical alignment between Magheramason and the Burn Dennet and associated with works in the vicinity of the watercourses in the Foyle Catchment. None of the excavation has the potential to affect the designated sites by virtue of impacts on hydrogeological features which are essential to the designation or the functional habitat utilised by species identified in the Information Sheet for the sites. | |
| Transportation requirements | Transportation requirements relative to the delivery and removal of materials and plant from the working areas required for the construction of the proposed scheme will not involve direct or indirect impacts on the designated sites. | |
| Duration of construction, operation, etc | It is anticipated that construction relative to the parts of the proposed scheme where a relationship between the Ramsar Sites and their associated species has been identified will last for a period of 2-3 years beginning in 2017 and 2021. | |
| Other | None. | |
| | escription of avoidance and/or mitigation measures Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on: | |
| Nature of proposals | At present the operational requirements of the construction are not finalised, therefore potential mitigation for bird species in terms of controlled working timeframe of April to September (inclusive) cannot be confirmed. Therefore the | |



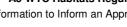
| Table 3.1 DMRB Screening Matrix for Lough Foyle Ramsar Site | | |
|--|--|--|
| | potential for disturbance impacts cannot be ruled out. | |
| | For Atlantic salmon: | |
| | Open span crossings of Mourne and Derg. | |
| | 2. Box culverts at minor watercourse crossings with salmonid spawning or nursery potential. | |
| | 3. Appropriate pipe culverts on watercourse crossings with sea lamprey potential. | |
| | 4. Treatment of water outfalling from the scheme to reduce pollutants and sediment. | |
| | Without significant further investigation, certainty of the effectiveness of these measures for Atlantic salmon cannot be confirmed. | |
| | Any mitigation relevant to the bird species of the Lough Foyle Ramsar Site is likely to be restricted to the eastern Foyle floodplain in areas utilised by the relevant bird populations. For Atlantic salmon and sea lamprey: | |
| Location | Mourne and Derg crossings | |
| | Throughout the scheme. | |
| | | |
| | 3. Throughout the scheme. | |
| | 4. Throughout the scheme. At present the operational requirements of the construction are not finalised, therefore potential mitigation for bird species in terms of controlled working timeframe of April to September (inclusive) cannot be confirmed. Therefore the potential for disturbance impacts cannot be ruled out. For Atlantic salmon: | |
| | 1. Open span crossings of Mourne and Derg. | |
| Evidence for effectiveness | 2. Box culverts at minor watercourse crossings with salmonid spawning or nursery potential. | |
| | 3. Appropriate pipe culverts on watercourse crossings with sea lamprey potential. | |
| | 4. Treatment of water outfalling from the scheme to reduce pollutants and sediment. | |
| | Without significant further investigation, certainty of the effectiveness of these measures for Atlantic salmon cannot be confirmed. | |
| Mechanism for delivery (legal conditions, restrictions or other legally enforceable obligations) | TNI will place contractual obligations on contractors to provide all necessary mitigation. Environmental Representatives employed by TNI will monitor the implementation of the measures throughout construction. | |
| Characteristics of Ramsar Site(s) | | |

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A brief description of the Ramsar Site should be produced, including information on:



| Table 3.1 DMRB Screening Matrix for Lough | Foyle Ramsar Site |
|--|---|
| Name of Ramsar Site and its EU code | Lough Foyle Ramsar Site 3UK133 |
| Location and distance of the Ramsar Site from the proposed works | The proposed scheme is located approximately 10km south of Lough Foyle Ramsar Site. |
| Ramsar Site size | 2204.36 ha |
| | Ramsar criterion 1 This is a particularly good representative example of a wetland complex including intertidal sand and mudflats with extensive seagrass beds, saltmarsh, estuaries and associated brackish ditches. This is a particularly good representative example of a wetland, which plays a substantial hydrological, biological and ecological system role in the natural functioning of a major river basin which is located in a trans-border position. Ramsar criterion 2 The site supports an appreciable assemblage of rare, vulnerable or endangered species or sub-species of plant and animal. A range of notable fish species have been recorded for the Lough Foyle estuary and the lower reaches of some of its tributary rivers. These include allis shad Alosa alosa, twaite shad A. fallax fallax, smelt Osmerus eperlanus and sea lamprey Petromyzon marinus, all of which are Irish Red Data Book species. In addition, important populations of Atlantic salmon Salmo salar migrate through the system to and from their spawning grounds. |
| Key features of the Ramsar Site including the primary reasons for selection and any other qualifying interests | Ramsar criterion 3 The site supports a diverse assemblage of wintering waterfowl which are indicative of wetland values, productivity and diversity. These include internationally important populations of whooper swan Cygnus cygnus, light-bellied brent goose Branta bernicla hrota and bar-tailed godwit Limosa lapponica. Additional wildfowl species which are nationally important in an all-Ireland context are red-throated diver Gavia stellata, great crested grebe Podiceps cristatus, mute swan Cygnus olor, Bewick's Swan C. columbianus, greylag goose Anser anser, shelduck Tadorna tadorna, teal Anas crecca, mallard A. platyrhynchos, wigeon A. penelope, eider Somateria mollissima, and red-breasted merganser Mergus serrator. Nationally important wader species are oystercatcher Haematopus ostralegus, golden plover Pluvialis apricaria, grey plover P. squatarola, lapwing Vanellus vanellus, knot Calidris canutus, dunlin C. aplina, curlew Numenius arquata, redshank Tringa totanus and greenshank T. nebilaria. Ramsar criterion 5 The site supports about 29000 migratory birds. Species and numbers are listed in Section 20 of the Ramsar Information Sheet in Appendix 7. Ramsar criterion 6 |





| Table 3.1 DMRB Screening Matrix for Lough Foyle Ramsar Site | | | |
|--|--|--|--|
| | Species with peak counts in spring/autumn: | | |
| | Whooper swan, <i>Cygnus cygnus</i> , Iceland/UK/Ireland | | |
| | Light-bellied brent goose, <i>Branta bernicla hrota</i> , East Canada/Ireland | | |
| | Species with peak counts in winter: | | |
| | Bar-tailed godwit, Limosa lapponica lapponica, W Palearctic | | |
| | Contemporary data and information on waterbird trends at this site and their regional (sub-national) and national contexts can be found in the Wetland Bird Survey report, which is updated annually. See www.bto.org/survey/webs/webs-alerts-index.htm. | | |
| | See Sections 19/20 of the Ramsar Information Sheet in Appendix 7 for details of noteworthy species | | |
| | Details of bird species occurring at levels of National importance are given in Section 20 of the Ramsar Information Sheet in Appendix 7. | | |
| Vulnerability of the Ramsar Site – any information available from the standard data forms on potential effect pathways | Invasive species e.g. Spartina spp. | | |
| Ramsar Site conservation objectives – where these are readily available | NIEA state that no separate conservation objectives exist for Lough Foyle Ramsar Site. | | |

Assessment Criteria

Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the Ramsar Site.

Potential Impacts on whooper swan

The proposed scheme has the potential to give rise to effects on whooper swan associated with functional habitat outside of the Ramsar Site this site through disturbance and habitat loss outside of the designated site. Mitigation proposals for the construction phase cannot be confirmed at this point, therefore, there remains a potential for significant effects.

Potential Impacts upon greylag geese

The scheme has the potential to give rise to effects on greylag geese associated with this site through disturbance and habitat loss outside of the designated site. Mitigation proposals for the construction phase cannot be confirmed at this point, therefore, there remains a potential for significant effects.

Potential habitat degradation and indirect effects to Atlantic salmon and sea lamprey

The scheme could result in the loss, degradation and fragmentation of some habitat relevant to Atlantic salmon and sea lamprey. This could give rise to significant effects on the site.

Potential impacts upon Atlantic salmon and sea lamprey

The scheme could give rise to significant effects as a result of construction procedures, water quality deterioration or disturbance due to light, noise and vibration.

Initial Assessment

The key characteristics of the site and the details of the Ramsar Site should be considered in identifying potential impacts.

Describe any likely changes to the site arising as a result of:

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| Table 3.1 DMRB Screening Matrix for Lough | Table 3.1 DMRB Screening Matrix for Lough Foyle Ramsar Site | | | |
|---|---|--|--|--|
| Reduction of habitat area | None. | | | |
| Disturbance to key species | The scheme may cause a significant effect on whooper swan, greylag geese, Atlantic salmon and sea lamprey due to disturbance in areas of functional habitat outside of the Ramsar Site which are used by the species. | | | |
| Habitat or species fragmentation | The scheme is unlikely to cause a significant effect to whooper swan or greylag geese due to fragmentation since all sites currently used by the designation species will remain available. In terms of Atlantic salmon and sea lamprey the scheme could have significant effects due to fragmentation of habitat where the proposed scheme crosses watercourses within the River Foyle Catchment. | | | |
| Reduction in species density | The scheme may cause a reduction in species density if the disturbance of foraging birds is sufficient to cause desertion of the site by some or all of the designation species population that currently use it. The scheme could result in a reduction in Atlantic salmon and sea lamprey species density through pollution/sedimentation of habitat. | | | |
| Changes in key indicators of conservation value (water quality, etc) | The scheme could result in changes in water quality a key indicator of conservation value to Atlantic salmon and sea lamprey | | | |
| Climate change | The scheme has the potential to contribute to the problem of climate change by increasing the carrying capacity of the current road network. It is difficult to determine whether greenhouse gas emissions will be significantly altered by the proposed scheme, as a reduction in the stop-go nature of the congested current network reduces CO2 emissions, while an increase in average speed above 45mph increases CO2 emissions. | | | |
| Describe any likely impacts on the Ramsar S | ite as a whole in terms of: | | | |
| Interference with the key relationships that define the structure of the site | None. | | | |
| Interference with key relationships that define the function of the site | Possible disturbance of whooper swans and greylag geese using functional habitat outside of the Ramsar site could cause birds to lose foraging time, and expend energy avoiding the disturbance. Thus reducing the birds fitness and ability to survive and impacting on the function of the site as winter bird habitat. | | | |
| | The scheme could result in a reduction in the density and distribution of Atlantic salmon and sea lamprey through habitat severance, loss and decrease in water quality. | | | |
| Indicate the significance as a result of the identification of impacts set out above in terms of: | | | | |
| Reduction of habitat area | No habitat loss within the Ramsar Site. Loss of approximately 40ha of potential foraging habitat west of the existing A5. | | | |



| Table 3.1 DMRB Screening Matrix for Lough | Foyle Ramsar Site | | |
|--|--|--|--|
| Disturbance to key species | There could be a significant effect subject to mitigation. | | |
| Habitat or species fragmentation | Unlikely to be a significant effect as all foraging habitat utilised by whooper swan or greylag geese will remain. There could be a significant effect on Atlantic salmon and sea lamprey subject to mitigation. | | |
| Loss | The project will not cause direct loss of whooper swan or greylag geese. Should disturbance be significant enough to cause abandonment of the preferred grazing areas there could be indirect mortality of whooper swan or greylag geese. There could be a significant effect on Atlantic salmon and sea lamprey subject to mitigation. | | |
| Disruption | No disruption of the Ramsar Site will occur. However, potential exists for disturbance during construction and operation to disrupt the natural foraging/roosting site interactions of whooper swan and greylag geese. This could have a significant effect on the Ramsar Site. There could be a significant effect on Atlantic salmon and sea lamprey subject to mitigation. | | |
| Change to key elements of the site (e.g. water quality, hydrological regime etc) | There could be a significant effect outside the Ramsar Site, subject to mitigation. | | |
| Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known. | | | |
| Outcome of screening stage (delete as appropriate). | Significant effect possible on whooper swan, greylag geese, Atlantic salmon and sea lamprey. | | |
| Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence). | YES | | |

Table 3.2 Screening Matrix for Lough Neagh & Lough Beg Ramsar Site

| Table 3.2 DMRB Screening Matrix for Lough Neagh & Lough Beg Ramsar Site | | | |
|---|-----------------------------|-------------------------------------|-------------------------------|
| Project Name: | | A5WTC | |
| Site under Consideration: | | Lough Neagh & Lough Beg Ramsar Site | |
| Date: | Author (Name/Organisation): | | Verified (Name/Organisation): |
| 23/07/13 | S.Ireland, Mouchel | | P. Reid, Mouchel |

Description of Project

The proposed 85km A5 Western Transport Corridor (A5 WTC) scheme forms part of a strategically important transport route between Londonderry/Derry in Northern Ireland (NI) and to Dublin in the Republic of Ireland (ROI). The proposed scheme involves replacement of the existing A5 from a point north of New Buildings Londonderry in the north to a point south of Aughnacloy in the south with a dual carriageway along an alignment off-line from the existing road. The existing A5 passes through New Buildings, Strabane, Sion Mills, Newtownstewart, Omagh and Aughnacloy. It is anticipated the proposed scheme will be built in



three phases starting with Phase 1 to commence in 2017, Phase 2 in 2021 and Phase 3 in 2026. It is anticipated that each phase will take some 2 to 3 years to construct.

| Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the Ramsar Site by virtue of: | | | |
|---|--|--|--|
| The project involves the construction of an 85 km long dual carriageway involving construction within the Foyle floodplain in an area known to support birds associated with the Ramsar Site, with associated drainage and local road improvements. Traffic volumes are anticipated to be a maximum of 23300 AADT (to the nearest 100) by 2040. There will be no direct impacts on the Ramsar Site. However, both construction and operation of the road could lead to impacts on key foraging areas outside of the Ramsar Site and on birds foraging within these areas. | | | |
| There will be no land take within the Ramsar Site. Outside of the Ramsar Site, the land take will involve areas of functional habitat utilised by Whooper Swan, Greylag Goose for feeding. Both species are identified in the information sheet for the Ramsar Site. | | | |
| The proposed scheme is located approximately 20km west/south-west of the Ramsar Site. Numbers of the populations of designation feature species of the Ramsar Site (Whooper Swan and Greylag Geese) are, however, known to utilise parts of an area between Magheramason and the Burn Dennet defined to the west by the River Foyle and to the east by the existing A5 where the proposed scheme will follow a north-south alignment which reflects that of the existing road during the winter months. | | | |
| None. | | | |
| The proposed scheme is located approximately 20km west/south-west of the Ramsar Site. Birds which are known to use the Ramsar Site and which are designation feature species of the Ramsar Site (Whooper Swan and Greylag Geese) are, however, known to utilise parts of an area between Magheramason and the Burn Dennet defined to the west by the River Foyle and to the east by the existing A5 where the proposed scheme will follow a north-south alignment which reflects that of the existing road during the winter months. | | | |
| The proposed works will not involve excavation in the designated area. There will be a requirement for excavation in relation to the proposed vertical alignment between Magheramason and the Burn Dennet. None of the excavation has the potential to affect the designated sites or the functional habitat utilised by species identified in the Information Sheet for the sites. | | | |
| Transportation requirements relative to the delivery and removal of materials and plant from the working areas required for the construction of the proposed scheme will not involve direct or indirect impacts on the designated sites. | | | |
| | | | |

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| Duration of construction, operation, etc | uction, operation, etc It is anticipated that construction relative to the parts of the proposed scheme along the Foyle floodplain, at watercours crossings and in areas in close proximity to watercourses we last for a period of 2-3 years beginning in 2017 and 2021. | | |
|--|--|--|--|
| Other | None. | | |
| Description of avoidance and/or mitigatio Describe any assumed (plainly established a on: | n measures and uncontroversial) mitigation measures, including information | | |
| Nature of proposals | At present the operational requirements of the construction are not finalised, therefore potential mitigation for bird species in terms of controlled working timeframe of April to September (inclusive) cannot be confirmed. Therefore the potential for disturbance impacts cannot be ruled out. | | |
| Location | Any mitigation relevant to the bird species of the Lough Neagh & Lough Beg Ramsar Site is likely to be restricted to the eastern Foyle floodplain in areas utilised by the relevant bird populations. | | |
| Evidence for effectiveness | Potential mitigation for bird species in terms of controlled working timeframe of April to September (inclusive) cannot be confirmed. Therefore the potential for disturbance impacts cannot be ruled out. | | |
| Mechanism for delivery (legal conditions, restrictions or other legally enforceable obligations) | TNI will place contractual obligations on contractors to provide all necessary mitigation. Environmental Representatives employed by TNI will monitor the proposed scheme throughout construction. | | |
| Characteristics of Ramsar Site(s) | and he are dueed including information on | | |
| Name of Ramsar Site and its site code | Lough Neagh and Lough Beg Ramsar Site (Site Code 3UK009) | | |
| Location and distance of the Ramsar Site from the proposed works | The proposed scheme is located approximately 20km to the west/south-west of the closest extent of the Ramsar site. | | |
| Ramsar Site size | 50,165.84 ha | | |
| Key features of the Ramsar Site including the primary reasons for selection and any other qualifying interests | Ramsar criterion 1 A particularly good representative example of natural or nearnatural wetlands, common to more than one biogeographic region. The site is the largest freshwater lake in the United Kingdom. Lough Neagh a relatively shallow body of water supporting beds of submerged aquatic vegetation fringed by associated species-rich damp grassland, reedbeds, islands, fens, marginal swampy woodland and pasture. Other interesting vegetation types include those associated with pockets of cut-over bog, basalt rock outcrops and boulders, and the mobile sandy shore. Ramsar criterion 2 | | |
| | Supports an appreciable assemblage of rare, vulnerable or endangered species or sub-species of plant or an appreciable number of individuals of any one of these | | |

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species. The site supports over 40 rare or local vascular plants which have been recorded for the site since 1970; the most notable are eight-stamened waterwort *Elatine hydropiper*, marsh pea *Lathyrus palustris*, Irish lady's tresses *Spiranthes romanzoffiana*, alder buckthorn *Frangula alnus*, narrow small-reed *Calamagrostis stricta* and holy grass *Hierochloe odorata*. The Lough and its margin are also home to a large number of rare or local invertebrates, including two aquatic and two terrestrial molluscs, a freshwater shrimp *Mysis relicta*, eight beetles, five hoverflies, seven moths and two butterflies. Of the rare beetles recorded two, *Stenus palposus* and *Dyschirius obscurus*, have their only known Irish location around the Lough. The Lough also supports twelve species of dragonfly.

Ramsar criterion 3

This site is of special value for maintaining the genetic and ecological diversity of a region because of the quality and peculiarities of its flora and fauna. The site regularly supports substantial numbers of individuals from particular groups of waterfowl which are indicative of wetland values, productivity and diversity. In addition, this site is of special value for maintaining the genetic and ecological diversity of Northern Ireland because of the quality and peculiarities of its flora and fauna. A large number of plants and animal species are confined or almost confined to this area within Northern Ireland.

Ramsar criterion 4

This site is of special value as the habitat of plants or animals at a critical stage of their biological cycles. The site supports an important assemblage of breeding birds including the following species with which occur in nationally important numbers: great crested grebe *Podiceps cristatus*, gadwall *Anas strepera*, pochard *Aythya ferina*, tufted duck *A. fuligula*, snipe *Gallinago gallinago* and redshank *Tringa totanus*. Other important breeding wetland species include shelduck *Tadorna tadorna*, teal *Anas crecca*, shoveler *A. clypeata*, lapwing *Vanellus vanellus* and curlew *Numenius.arquata*.

Ramsar criterion 5

Assemblages of international importance:

Species with peak counts in winter:

86639 waterfowl (5 year peak mean 1998/99-2002/2003)

Species and numbers are listed in Section 20 of the Ramsar Information Sheet in Appendix 7.

Ramsar criterion 6

Qualifying Species/populations (as identified at designation): Species with peak counts in spring/autumn:

Tundra swan, *Cygnus columbianus bewickii*, NW Europe Species with peak counts in winter:

Common goldeneye, *Bucephala clangula clangula*, NW & C Europe

Common pochard, *Aythya ferina*, NE & NW Europe Greater scaup, *Aythya marila marila*, W Europe

Tufted duck, Aythya fuligula, NW Europe

Whooper swan, Cygnus cygnus, Iceland/UK/Ireland



| Assessment Criteria | |
|--|---|
| Ramsar Site conservation objectives – where these are readily available | NIEA state that no separate conservation objectives exist for Lough Neagh & Lough Beg Ramsar Site. |
| Vulnerability of the Ramsar Site – any information available from the standard data forms on potential effect pathways | The Lough drains some 40% of Northern Ireland and has been subject to severe eutrophication as a result of increased nutrient inputs from agricultural run-off and general domestic sewage from catchment housing and other developments. |
| | Eutrophication: The Lough drains some 40% of Northern Ireland and has been subject to severe eutrophication as a result of increased nutrient inputs from agricultural run-off and general domestic sewage from catchment housing and other developments. Pollution – fertilisers: |
| | The site supports a population of pollan <i>Coregonus autumnalis</i> , one of the few locations in Ireland and one of the two known locations in the UK (the other is Lower Lough Erne). It is one of the most important species in Ireland in terms of faunal biodiversity since it occurs nowhere else in Europe, and the Irish populations are all well outside the typical range – the Arctic Ocean drainages of Siberia, Alaska and north-western Canada, where it is known as the Arctic cisco. |
| | More contemporary data and information on waterbird trends at this site and their regional (sub-national) and national contexts can be found in the Wetland Bird Survey Alerts report, which is updated annually. See http://www.bto.org/survey/webs/webs-alerts-index.htm. Ramsar criterion 7 |
| | species/populations identified subsequent to designation for possible future consideration under criterion 6. Species with peak counts in spring/autumn: Great cormorant, <i>Phalacrocorax carbo carbo</i> , NW Europe Mute swan, <i>Cygnus olor</i> , Britain |
| | Species/populations identified subsequent to designation for |

Assessment Criteria

Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the Ramsar Site.

Potential Impacts on whooper swan

The proposed scheme has the potential to give rise to effects on whooper swan associated with functional habitat outside of the Ramsar Site this site through disturbance and habitat loss outside of the designated site. Mitigation proposals for the construction phase cannot be confirmed at this point, therefore, there remains a potential for significant effects.

Initial Assessment

The key characteristics of the site and the details of the Ramsar Site should be considered in identifying potential impacts.

Describe any likely changes to the site arising as a result of:



| Reduction of habitat area | None. | | |
|---|---|--|--|
| Disturbance to key species | The scheme may cause a significant effect on whooper swan due to disturbance. | | |
| Habitat or species fragmentation | The scheme is unlikely to cause a significant effect to whooper swan due to fragmentation since all sites currently used by the designation species will remain available | | |
| Reduction in species density | The scheme may cause a reduction in species density if the disturbance of foraging birds is sufficient to cause desertion of the site by some or all of the designation species population that currently use it. | | |
| Changes in key indicators of conservation value (water quality, etc) | The scheme is unlikely to result in changes in key indicators of conservation value as sufficient mitigation is in place. | | |
| Climate change | The scheme has the potential to contribute to the problem of climate change by increasing the carrying capacity of the current road network. It is difficult to determine whether greenhouse gas emissions will be significantly altered by the proposed scheme, as a reduction in the stop-go nature of the congested current network reduces CO2 emissions, while an increase in average speed above 45mph increases CO2 emissions. | | |
| Describe any likely impacts on the Ramsar S | ite as a whole in terms of: | | |
| Interference with the key relationships that define the structure of the site | None. | | |
| Interference with key relationships that define the function of the site | Possible disturbance of whooper swans on grazing areas outside of the site could cause birds to lose foraging time, and expend energy avoiding the disturbance. Thus reducing the birds' fitness and ability to survive and impacting on the function of the site as winter bird habitat. | | |
| Indicate the significance as a result of the ide | entification of impacts set out above in terms of: | | |
| Reduction of habitat area No habitat loss within the Ramsar Site. Approximately of potential foraging habitat loss west of the existing As although no whooper swan have been recorded under scheme footprint. | | | |
| Disturbance to key species | There could be a significant effect subject to mitigation. | | |
| Habitat or species fragmentation | Unlikely to be a significant effect as all foraging habitat utilised by whooper swan will remain. | | |
| Loss | The project will not cause direct loss of whooper swan. Should disturbance be significant enough to cause abandonment of the preferred grazing areas there could be indirect mortality of whooper swan. | | |
| Fragmentation | No disruption of the Ramsar Site will occur. However, potential exists for disturbance during construction and operation to disrupt the natural foraging/roosting site interactions of whooper swan. This could have a significant effect on the Ramsar Site. | | |
| Disruption | Not significant. | | |
| Disturbance | No habitat loss within the Ramsar Site. Approximately 40ha of potential foraging habitat loss west of the existing A5, although no whooper swan have been recorded under the | | |

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Information to Inform an Appropriate Assessment:

Ramsar Sites

| | scheme footprint. | | |
|--|--|--|--|
| Change to key elements of the site (e.g. water quality, hydrological regime etc) There could be a significant effect subject to mitigation. | | | |
| Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known. | | | |
| Outcome of screening stage (delete as appropriate). | Significant effect possible on whooper swan. | | |
| Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence). | YES | | |

- 3.1.2 Based on the EU guidance, and using the templates provided in Annex 4 of the HD 44/09 guidance to record the findings of the screening process sequentially and transparently in this report, it has been concluded for both Ramsar sites:
 - that the proposed Scheme is a project which is not connected with or necessary to the management of the implicated Ramsar sites;
 - that by virtue of the Schemes' proximity to, hydrological connectivity with, and/or localised crossing of associated watercourses and other functional habitat, and given the clarification on interpretation though recent case law, the likelihood of the proposed Scheme having a significant effect on the sites cannot be excluded on the basis of reasonable scientific certainty and information; and
 - that Stage 2 Appropriate Assessments should be undertaken.

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4 Stage 2 - Appropriate Assessment

4.1 Introduction

- 4.1.1 As described above, this stage considers the potential impacts on the structure, function, and conservation objectives of the Natura 2000 Sites. Where there is the potential for adverse impacts, an assessment of the potential mitigation of those impacts is presented. The assessment should consider the impacts the Proposal may have either alone or in combination with other projects or plans. This stage includes:
 - A description of the Natura 2000 sites that will be considered in the AA;
 - A description of significant impacts on the conservation feature of these sites likely to occur from the Plan
 - Mitigation Measures; and
 - Conclusions.

4.2 Scope of the information to inform the Appropriate Assessments.

- 4.2.1 This section describes the data sources and studies undertaken, the methodologies applied and design parameters taken into account, to inform this stage of the HRA process, and follows on from the information presented in the Screening Tables above. This section addresses:
 - loss of feeding habitat (functional habitat)⁷ at Dunnalong/Thorn Hill and Grange Foyle
 outside of the Ramsar Sites and which is used by wintering birds associated with the
 Ramsar Sites; and
 - disturbance of wintering birds associated with the Ramsar Sites during their use of feeding habitat outside of the Ramsar Sites at Dunnalong/Thorn Hill and Grange Foyle;
 - Atlantic salmon and sea lamprey;
 - Assessment of adverse effects on site integrity.

Loss of feeding habitat used by wintering birds associated with the two Ramsar Sites

4.2.2 The assessment has involved quantification of the extent of available feeding habitat within the Dunnalong /Thorn Hill and Grange Foyle areas and comparison with the total extent of such habitat available in the two areas.

⁷ Habitat outside of a designated site which is used / relied on by species associated with the designated site



Disturbance of wintering birds associated with the two Ramsar Sites during their use of feeding habitat at Dunnalong/Thorn Hill and Grange Foyle

Baseline Data Sources

- 4.2.3 The following data sources have been relied on:
 - data provided in the A5WTC ES 2010, including surveys undertaken at Dunnalong/Thorn Hill and Grange Foyle between October 2009 and April 2010;
 - data derived from site surveys undertaken at Dunnalong/Thorn Hill and Grange Foyle between October 2013 and April 2014 by the Mouchel assessment team; and
 - data for use of the area by whooper swan for 2010-2013 provided by the Irish Whooper Swan Study Group.

Impact assessment

- 4.2.4 There are no generally accepted thresholds for the loss of functional habitat or the numbers of birds which may be disturbed and displaced in the short-term or long-term from areas of functional habitat. Determination of whether either or both is likely to have a significant effect on the area of functional habitat and the species which use / are reliant on the area with consequent effects on the integrity of a designated site is necessarily context specific.
- 4.2.5 In the case of the Ramsar sites considered in this report, habitat loss has been quantified and represented as a percentage of the habitat which surveys have indicated are used and the overall extent of potential functional habitat within the area in the vicinity of the proposed scheme.
- 4.2.6 Potential for disturbance of the whooper swan and greylag geese which annually utilise the area has been considered relative to sources of disturbance during construction and operation and identification and consultation with NIEA and RSPB(NI) regarding mitigation measures with a particular focus on construction activities which are likely to involve higher and tonally distinct noise levels and characteristics. A detailed literature review has been carried out for the purposes of HRA and is included within this report. Reference to peer reviewed scientific studies on the impacts of disturbance upon birds, combined with the detailed assessments carried out and reported within the 2010 ES and 2016 ES, enables the assessments to be carried out and conclusions reached which are beyond the threshold of reasonable scientific doubt required by the Birds and Habitats Directives.

Disturbance or harm to Atlantic salmon and sea lamprey associated with the two Ramsar Sites

Baseline Data sources

- 4.2.7 The following data sources have been relied on:
 - data provided in the 2010 and 2016 ES;



- data derived from site surveys undertaken between 2012 and 2014 by the Mouchel assessment team at specific locations where the provision of bridges, culverts, watercourse diversions and drainage outfalls will involve construction on watercourses within the wider Foyle Catchment to establish the presence, potential presence or absence of salmonid holding (resting), spawning or nursery habitat in the specific locations;
- data derived from surveys undertaken by Loughs Agency along sections of watercourses where the proposed of bridges, culverts, watercourse diversions and drainage outfalls are located to establish the presence, potential presence or absence of salmonid holding, spawning or nursery habitat in the relevant sections.
- 4.2.8 Where either or both of the two sets of data relating to location-specific and section-related salmonid interest have indicated salmonid presence or potential they have been classified as sections of salmonid watercourse. For the purposes of this initial assessment, and in keeping with a precautionary approach, it has been assumed that all watercourses with salmonid potential are utilised by Atlantic salmon.
- 4.2.9 The location-specific site surveys were undertaken in August and September 2012, July to September 2013 and January 2014. The surveys were conducted in accordance with guidance issued by the former Department of Agriculture for Northern Ireland (Fisheries Division) and agreed with Loughs Agency. The relevant watercourses were surveyed 250m upstream and downstream from each bridge, culvert, watercourse diversion or outfall. The following data was collected:
 - Flow velocity this was taken where possible using an in-stream flow meter with impeller to provide a count or measured by timing a floating object over a known distance, velocity has then been calculated using the count, depth and width measurements – the flow velocity is critical to keep eggs/fry in a spawning/ nursery area well oxygenated,
 - In-stream vegetation presence and extent was estimated looking downstream to the left and right – in-stream vegetation can provide adequate cover in the nursery habitat as shelter from predators,
 - The extent of mature scrubby bank cover where present mature scrubby vegetation can provide cover for nursery areas as well as stability and cover in holding areas,
 - The extent of overhanging bank cover where present overhanging tree and scrub cover can enhance the food supply available for fry in nursery areas by way of insects dropping off branches into the water,
 - Water depth the depth of the water is important for all three habitat classifications. Adequate depth in spawning areas ensures that redds⁸ are covered by water at all

⁸ A redd is a spawning nest dug in gravels of the stream bed by fish, especially salmon



times. Shallow water in the nursery area makes the fry less vulnerable to predation not only from larger fish but also rippling of the water surface makes them less easily seen by birds. Deeper water allows adult fish to rest where the minimum energy is required to stay on station,

- Water width this measurement has been used in combination with depth to calculate flow velocity,
- Substrate type this has been measured as a percentage of bedrock, boulder, cobble, gravel, fines, sand, silt and mud a stable substrate in holding areas allows adult fish secure resting areas on a staged ascent/ descent of the river. A stony substrate provides good shelter from predators and creates more territory space allowing it to accommodate more fry in the nursery area. This stable environment also will invariably have more invertebrates living on the stones as a source of food for the fry. The presence and size of gravel is critical for the creation of a redd in salmonid spawning areas whilst the presence of large quantities of finer silt material with gravel can cause compaction of the gravel making redd construction more difficult and reduce oxygen supply to the eggs,
- Gravel depth the depth of gravel and, thereby, the potential depth of a redd exerts a strong influence on spawning in relation to the size and type of fish able to lay eggs in an area.

Information on potential impacts

- 4.2.10 The data collected from the location-specific surveys has been reviewed and each location has been classified relative to its salmonid potential in accordance with the Annex 1 Habitat Classification detailed in the Fisheries Division guidance. Each location has been categorised relative to holding spawning or nursery habitat into one of four grades, grade 1 being optimal habitat and grade 4 indicating an absence of habitat or habitat which is failing. Only locations with classifications of 4 relative to all three holding, spawning or nursery habitat types have been excluded as not being of salmonid interest.
- 4.2.11 Information relating to the nature of the construction activities which will be required to install the proposed bridges, culverts, watercourse diversions and drainage outfalls has been confirmed with by Transport NI's appointed contractors for the proposed scheme. Consideration has also been given to sections of watercourses which will be located within 50m of the proposed working areas and, hence, where the risk of migration of sediments over ground, particularly during rainfall, could have an impact on water quality and /or marginal and aquatic habitats. The assessment has involved consideration of the risk taking into account proposed mitigation measures which have been agreed with the contractor advisors and which will be incorporated into a Construction Environment Management Plan (CEMP) and Silt Management Plan (SMP) which contractors will be required to adopt during construction.
- 4.2.12 A construction phase threshold in concentrations of in-stream sediment, measured as Total Suspended Solids (TSS) above background levels, will be determined in accordance with



the updated Common Monitoring Standards for Freshwater Fauna (CSMFF)⁹. These Standards will be adhered to during construction for watercourses identified as having Atlantic salmon spawning or nursery interest.

- 4.2.13 The assessments relative to impacts associated with the future use of the proposed scheme have been focused on discharge of sediments from drainage outfalls which could result in the smothering of salmonid habitat, harm to fish as they pass through the relevant section of watercourse and fragmentation associated with obstruction of passage along watercourses.
- 4.2.14 In relation to discharge of sediments and other road related pollutants from the proposed road drainage networks, analysis and calculations have been undertaken to establish if design parameters agreed with NIEA and Loughs Agency, will be likely to be achieved and if water quality relative to sediments and other pollutants, such as metals and hydrocarbons, associated with road related run-off will prove acceptable in the context of the ecological status of the watercourses using the Highways Agency Water Risk Assessment Tool (HAWRAT). The HAWRAT is an assessment tool which is recommended in Volume 11 of the DMRB and which has been agreed with the statutory bodies responsible for water quality throughout the UK. NIEA has agreed it as the appropriate means of assessing the discharge concentrations for the proposed scheme. The outcome from the application of the HAWRAT is that a discharge will either pass or fail in light of the predicted concentrations of sediments and other pollutants and the sensitivity for the receiving watercourse. Where the evaluation has indicated an outfall will fail, appropriate combinations of mitigation measures have been identified and the evaluation has been re-run until the outfall achieves a pass.
- 4.2.15 The proposals have been based on the following design parameters:

Construction

- adoption of the 1 year, 5 minute duration, return period storm event with an additional 20% allowance for climate change;
- adoption of a target limit of 50mg/l end of pipe TSS level at all discharges to watercourses in accordance with NIEA requirements;
- adoption of a 25mg/l maximum uplift against background TSS levels for non-sensitive watercourses, and a maximum uplift in accordance with CSMFF for sensitive watercourses, as agreed with Loughs Agency;
- adoption of the Q90¹⁰ flow rate for receiving watercourses for the purposes of calculating TSS concentrations in receiving watercourses following treatment as agreed with Loughs Agency.

⁹ Common Standards for Monitoring: Freshwater Fauna (JNCC October 2015). Updated from 2005.

^{10, 11} The Q90 flow rate is the rate which is exceeded 90% of the time in a watercourse, and is calculated using computer modelling of the watercourse's catchment.



Operation

- adoption of the 1 year, 5 minute duration, return period storm event with an additional 20% allowance for climate change;
- adoption of a maximum of 25mg/l annual average TSS as based on the Common Standards for Monitoring for Freshwater Fauna (JNCC, 2005);
- adoption of the Q90¹¹ flow rate for receiving watercourses for the purposes of calculating TSS concentrations in receiving watercourses following treatment as agreed with Loughs Agency.
- 4.2.16 Evaluation of the 50mg/l discharge threshold at outfalls has involved adoption of the standard TSS value of 139mg/l for untreated road and identification of appropriate combinations of mitigation measures for inclusion in the drainage design to achieve a minimum 57% sediment treatment required to achieve the threshold. The untreated TSS value has been taken from Phase 2 of the Improved Determination of Runoff from Highways Project (Crabtree et al, 2007).
- 4.2.17 The calculations relating to the 25mg/l downstream concentrations have involved use of the local standard annual average rainfall value in combination with the impermeable area of each drainage network to establish an annual volume of water draining through each network to outfall. The standard TSS value of 139mg/l for untreated road runoff adopted for evaluation of the 50mg/l discharge threshold has been applied. The sediment loading has been compared to the receiving annual water flow volume and TSS data for the receiving watercourse. Data for TSS was gained from a combination of Loughs Agency and NIEA Monitoring Stations and surveys undertaken by Mouchel prior to the publication of the A5WTC ES 2010. Where the calculation has indicated a concentration will exceed the instream threshold, appropriate combinations of mitigation measures have been identified and the calculation has been re-run until the outfall achieves a pass.
- 4.2.18 The identification of the specific mitigation measures proposed for each drainage outfall has involved the adoption of the most onerous combination of measures in light of the outcome of all three evaluations.
- 4.2.19 Where more than one outfall discharges into the same reach of a watercourse the combined impacts will be more significant. In these circumstances the outfalls were subject to an aggregate assessment in HAWRAT.
- 4.2.20 To aggregate the outfalls the drained areas were simply added together. The location on the watercourse used for the cumulative assessment was positioned downstream of the last outfall in the reach. For this purpose a reach is defined as a length of watercourse between



two confluences, as the available dilution and stream velocity will naturally change at confluences and influence the assessment.

4.2.21 Watercourse reaches can vary greatly in length. Therefore, for the assessment of the impacts of soluble pollutants, only outfalls within 1km of each other along the length of a watercourse were aggregated for cumulative assessment. When assessing the combined impact of sediment bound pollutants, outfalls within 100m of one another were assessed. Beyond 100m, the road runoff sediment is likely to be sufficiently diluted with natural sediments so as not to have an adverse impact¹².

4.3 Determination of adverse impact relative to integrity

- 4.3.1 Once potential impacts have been identified, they are considered in relation to the potential to have a negative effect on the integrity of the Natura 2000 sites. The assessment determines whether there is likely to be:
 - a reduction in the coherence of the ecological structure or function of the site, taking
 into account the whole area of the site, and supporting habitats which are integral to
 the structure and function of the site, and
 - whether any such reduction would reduce the ability of the site to sustain the qualifying habitat and/or the levels of populations of the species for which it was classified.
- 4.3.2 The DMRB guidance (HD 44/09) provides a suitable checklist to identify interactions and potential effects on the integrity of the site. Completed checklists are provided in Appendix 8.
- 4.3.3 The definition for integrity adopted in this report is that provided in ODPM Circular 06/2005 and Defra Circular 01/2005 Biodiversity and Geological conservation Statutory obligations and their impact within the planning system, which defines integrity in the context of designated site as:

The coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified.

¹² In accordance with DMRB Volume 11 Section 3 Part 10 HD45/09 Annex I



5 Description of the proposed scheme

5.1 Alignment and relationship to the functional habitat associated with the Ramsar Sites

- 5.1.1 The proposed scheme comprises an 85km dual carriageway running between the existing A5 north of New Buildings and the existing A5 south of Aughnacloy. Its location and relationship to the Ramsar sites is shown in Figure 1 in Appendix 1.
- 5.1.2 The section of the proposed scheme corridor which is of relevance to the Ramsar sites is that between Magheramason and the Burn Dennet. Here, the proposed dual carriageway will generally be located between 1.2 and 2km east of the River Foyle. It is an area of mixed arable and agricultural grassland some 40% of which is within the River Foyle floodplain. Parts of the area are used annually by whooper swan and greylag geese associated with the Ramsar sites for feeding¹³.
- 5.1.3 Detail relating to the peak counts for whopper swan and greylag geese during the 2009 2010 and 2013 2014 surveys in the Foyle floodplain is provided in Appendix 11O of the 2016 ES. The location of the birds observed is shown in Figures 11.67 and 11.68 of that document (reproduced in Appendix 1 of this report).
- 5.1.4 Over this section, the proposed scheme follows a north-south alignment which broadly reflects that of the existing A5. Between Magheramason and Bready it will be located some 200-250m west of the existing road and will be on embankment as it crosses Meenagh Road and approaches a proposed bridge over the existing A5, Victoria Road north of its existing junction with Cloghboy Road. South of the new bridge, the alignment will initially encroach onto the lower western-facing slopes of Sollus Hill in deep cutting. As the dual carriageway continues south it will be some 200m east of the existing road. It will emerge from the cutting and follow an alignment roughly parallel with the A5, crossing beneath Donagheady Road, and following a gentle curve to the south-west, passing between Willow Farm and housing on the A5, Victoria Road. It will cross Willow Road in shallow cutting and rise on high embankment to enable it to be bridged over the A5, Victoria Road. The dual carriageway will descend from the bridge to cross Ash Avenue on low embankment before rising again onto high embankment and crossing Drumenny Road via a new bridge before approaching and crossing the Burn Dennet via a new open span bridge.
- 5.1.5 Construction of this section, other than at Sollus Hill, will involve the use of large excavators, dump trucks for transporting excavated materials to areas of fill within the working areas, bulldozers, graders, compaction plant including various rollers and soil stabilisation plant. It is not anticipated there will be a need for blasting, the break out of rock at Sollus Hill being implemented by way of rock breakers.

¹³ Either regularly during the winter, or during migration to and from the Ramsar sites



5.2 Bridges

5.2.1 Open span bridges are proposed where the dual carriageway crosses the seven principal rivers within the Foyle Catchment, namely the Burn Dennet, Glenmornan River, River Mourne, River Derg, Fairy Water, Drumragh River and the Routing Burn.

5.3 Culverts and piped watercourses

- 5.3.1 Wherever the proposed scheme crosses watercourses, other than the seven rivers described above, the proposals provide for the introduction of a culvert on the existing line of the watercourse or a culvert which forms part of a diverted section of watercourse. The latter approach is to be adopted where the angle of the crossing would require an overly long culvert or relative levels between the carriageways and existing channel of the watercourse require diversion to achieve appropriate clearances.
- 5.3.2 A total of 104 culverts are proposed along the length of the proposed scheme. These are scheduled in Appendix 2 and indicated in Figures 4-9 in Appendix 1. Selection of the form of culvert to be provided relates to the volumes of flow, context relative to floodplains and status relative to salmonids. Box culverts are proposed were volumes and/or the flooding regime indicates a need. They are also provided where the sections of watercourse have been identified as ones with salmonid presence or potential identified in accordance with the data, surveys and criteria described section 4. Those where salmonid potential has informed the selection of box culvert are indicated in the schedule in Appendix 2.
- 5.3.3 The design for culverts provided in light of the salmonid potential of a watercourse allows for a 350mm embedding of the culvert base below existing ground level and import of boulders and clean gravels which have been screened to ensure no invasive species are imported. The boulders and gravels will be substantially filled to the embedded depth to recreate suitable habitat and allow the generation of a narrower channel during periods of lower flow. The channel will not be completely filled to allow for natural recruitment of river bed material and formation of a 'natural' channel.
- 5.3.4 Boulders will also be located upstream and downstream of the culverts to enhance the value of these locations as resting areas prior to and following the passage of fish through the structures. Placement of the boulders and gravels within the culverts and upstream and downstream of them will be undertaken in consultation with Loughs Agency personnel.
- 5.3.5 Construction of all culverts will involve either the introduction of a temporary diversion to maintain flows and passage along the watercourses where the culvert is on line or the completion of construction of the culverts on diverted sections or watercourse in advance of the abandonment of the existing section of watercourse which is being diverted.

5.4 Watercourse diversions

5.4.1 A total of 77 watercourse diversions are proposed along watercourses located within the Foyle and Tributaries catchment. They are scheduled in Appendix 3. Their location is indicated in Figures 4-9 in Appendix 1. The schedule in Appendix 3 also indicates those sections of watercourse which have been identified as being of salmonid interest.



5.4.2 The construction of all watercourse diversions will involve the completion of construction of the diversions in advance of the abandonment of the existing section of watercourse which is being diverted.

5.5 Drainage and outfalls

- 5.5.1 The drainage strategy for the proposed scheme provides for discharge of road related run-off to existing watercourses. It includes a range of Sustainable Drainage Systems (SuDS) features focused on the interception and reduction in concentrations of sediments and other potentially harmful substances which are either suspended or in soluble form within road related run-off prior to discharge. Measures include the use of grassed surface water channels, attenuation ponds and wetlands. Discharges will be subject to Rivers Agency Consent prior to commencement off construction.
- 5.5.2 The proposals have been based on the design parameters described in 4.2.15.
- 5.5.3 A total of 74 drainage outfalls are proposed to watercourses within the River Foyle Catchment. These are scheduled in Appendix 4. Their location is indicated in Figures 4-9 in Appendix 1. The schedule also indicates the design/mitigation measures which are proposed at the various outfalls which have been included to facilitate achievement of the design parameters relative to TSS concentrations and HAWRAT parameters relative to pollutants.
- 5.5.4 Construction of the proposed outfalls will involve localised removal of bankside and marginal vegetation and installation of headwalls, wingwalls and aprons as indicated in the typical outfall detail provided in Figure 7.

5.6 Lighting

5.6.1 The dual carriageway will not be lit other than at the proposed junctions. Lighting will accordingly be located in the vicinity of several watercourses identified as having salmonid interest associated with the wider River Foyle Catchment.

5.7 Temporary structures

- 5.7.1 Temporary clear span structures are proposed for crossing the Burn Dennet, Glenmornan, River Derg and the Fairy Water. These structures will be required for the duration of the construction of the appropriate phase (approximately 3 years).
- 5.7.2 During construction smaller existing watercourses will need to be crossed until the mainline of the proposed scheme is structurally complete, at which point the temporary crossing can be removed. Following discussion with Loughs Agency it has been agreed these watercourses will be crossed using single bore pipes placed in stream with suitable cover placed over the pipe.
- 5.7.3 Where a smaller watercourse is to be provided with a pipe culvert in the final design, this culvert will be constructed and used as the crossing during construction of the remainder of the phase.



Information to Inform an Appropriate Assessment: Lough Foyle and Lough Neagh & Lough Beg Ramsar Sites

6 The Two Ramsar Sites

6.1 Introduction

6.1.1 The location, extent and relationship of the two Ramsar Sites to the proposed scheme is indicated in Figure 1 in Appendix 1. Details relating to the habitats and species identified as the primary reason for selection as a Ramsar Site and qualifying species are described in Table 6.1. A comment on the vulnerability of the site is included. The information has been obtained from the Ramsar Site Information Forms obtained from the Ramsar Site Information Service website (www.ramsar.wetlands.org). The Ramsar Site Information Forms are enclosed in Appendix 7.





Table 6.1 Site Descriptions

| | Designation | Ramsar Criteria | Vulnerability |
|-------------|------------------|--|--|
| | & Code | Details Rationale for Criteria | |
| Lough Foyle | Ramsar 3UK133 | 1, 2, 3, 5, 6 ¹⁴ | Introduction of invasive species of plant e.g. Spartina spp. |
| | | Ramsar criterion 1 | |
| | | This is a particularly good representative example of a wetland complex including intertidal sand and mudflats with extensive seagrass beds, saltmarsh, estuaries and associated brackish ditches. | |
| | | This is a particularly good representative example of a wetland, which plays a substantial hydrological, biological and ecological system role in the natural functioning of a major river basin which is located in a trans-border position. | |
| | | Ramsar criterion 2 | |
| | | The site supports an appreciable assemblage of rare, vulnerable or endangered species or sub-species of plant and animal. A range of notable fish species have been recorded for the Lough Foyle estuary and the lower reaches of some of its tributary rivers. These include allis shad <i>Alosa alosa</i> , twaite shad <i>A. fallax fallax</i> , smelt <i>Osmerus eperlanus</i> and sea lamprey <i>Petromyzon marinus</i> , all of which are Irish Red Data Book species. In addition, important populations of Atlantic salmon <i>Salmo salar</i> migrate through the system to and from their spawning grounds. | |
| | | Ramsar criterion 3 | |
| | | The site supports a diverse assemblage of wintering waterfowl which are indicative of wetland values, productivity and diversity. These include internationally important populations of whooper swan <i>Cygnus cygnus</i> , light-bellied brent goose <i>Branta bernicla hrota</i> and bar-tailed godwit <i>Limosa lapponica</i> . Additional wildfowl species which are nationally important in an all-Ireland context are red-throated diver <i>Gavia stellata</i> , great crested grebe <i>Podiceps cristatus</i> , mute swan <i>Cygnus olor</i> , Bewick's Swan <i>C</i> . | |

¹⁴ Ramsar Selection Criteria are explained in Appendix 7





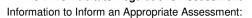
| Site Name | Designation | Ramsar Criteria | Vulnerability |
|-----------|-------------|---|---------------|
| | & Code | Details Rationale for Criteria | |
| | | columbianus, greylag goose Anser anser, shelduck Tadorna tadorna, teal Anas | |
| | | crecca, mallard Anas platyrhynchos, wigeon A. penelope, eider Somateria mollissima, and red-breasted merganser Mergus serrator. Nationally important wader species are oystercatcher Haematopus ostralegus. golden plover Pluvialis apricaria, grey plover P. squatarola, lapwing Vanellus vanellus, knot Calidris canutus, dunlin C. aplina, curlew Numenius arquata, redshank Tringa totanus and greenshank T. nebilaria. | |
| | | Ramsar criterion 5 | |
| | | The site supports about 29000 migrating birds. | |
| | | Species and numbers are listed in Section 20 of the Ramsar Information Sheet in Appendix 7. | |
| | | Ramsar criterion 6 | |
| | | Qualifying Species/populations (as identified at designation): | |
| | | Species with peak counts in spring/autumn: | |
| | | Whooper swan, Cygnus cygnus, Iceland/UK/Ireland | |
| | | Light-bellied brent goose, Branta bernicla hrota, East Canada/Ireland | |
| | | Species with peak counts in winter: | |
| | | Bar-tailed godwit, Limosa Iapponica Iapponica, W Palearctic | |
| | | Contemporary data and information on waterbird trends at this site and their regional (sub-national) and national contexts can be found in the Wetland Bird Survey report, which is updated annually. See www.bto.org/survey/webs/webs-alerts-index.htm. | |
| | | See Sections 19/20 of the Ramsar Information Sheet in Appendix 7 for details of noteworthy species | |
| | | Details of bird species occurring at levels of National importance are given in Section 20 of the Ramsar Information Sheet in Appendix 7. | |

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| Site Name | Designation & Code | Ramsar Criteria | Vulnerability |
|----------------------------|--------------------|--|--|
| | | Details Rationale for Criteria | |
| Lough Neagh & Lough Beg | Ramsar 3UK009 | Ramsar criterion 1 A particularly good representative example of natural or near-natural wetlands, common to more than one iogeographic region. The site is the largest freshwater lake in the United Kingdom. Lough Neagh a relatively shallow body of water supporting beds of submerged aquatic vegetation fringed by associated species-rich damp grassland, reedbeds, islands, fens, marginal swampy woodland and pasture. Other interesting vegetation types include those associated with pockets of cut-over bog, basalt rock outcrops and boulders, and the mobile sandy shore. Ramsar criterion 2 Supports an appreciable assemblage of rare, vulnerable or endangered species or sub-species of plant or animal or an appreciable number of individuals of any one of these species. The site supports over 40 rare or local vascular plants which have been recorded for the site since 1970; the most notable are eight-stamened waterwort Elatine hydropiper, marsh pea Lathyrus palustris, Irish lady's tresses Spiranthes romanzoffiana, alder buckthorn Frangula alnus, narrow small-reed Calamagrostis stricta and holy grass Hierochloe odorata. The Lough and its margin are also home to a large number of rare or local invertebrates, including two aquatic and two terrestrial molluscs, a freshwater shrimp Mysis relicta, eight beetles, five hoverflies, seven moths and two butterflies. Of the rare beetles recorded two, Stenus palposus and Dyschirius obscurus, have their only known Irish location around the Lough. The Lough also supports twelve species of dragonfly. Ramsar criterion 3 This site is of special value for maintaining the genetic and ecological diversity of a region because of the quality and peculiarities of its flora and fauna. The site regularly supports substantial numbers of individuals from particular groups of waterfowl which are indicative of wetland values, productivity and diversity. In addition, this site is of | Eutrophication and pollution by fertilisers. |

¹⁵ Ramsar Selection Criteria are explained in Appendix 7





| Site Name | Designation & Code | Ramsar Criteria | Vulnerability |
|-----------|--------------------|---|---------------|
| | | tails Rationale for Criteria | |
| | | special value for maintaining the genetic and ecological diversity of Northern Ireland because of the quality and peculiarities of its flora and fauna. A large number of plants and animal species are confined or almost confined to this area within Northern Ireland. | |
| | | Ramsar criterion 4 | |
| | | This site is of special value as the habitat of plants or animals at a critical stage of their biological cycles. The site supports an important assemblage of breeding birds including the following species with which occur in nationally important numbers: great crested grebe <i>Podiceps cristatus</i> , gadwall <i>Anas strepera</i> , pochard <i>Aythya ferina</i> , tufted duck <i>Aythya fuligula</i> , snipe <i>Gallinago gallinago</i> and redshank <i>Tringa totanus</i> . Other important breeding wetland species include shelduck <i>Tadorna tadorna</i> , teal <i>Anas crecca</i> , shoveler <i>Anas clypeata</i> , lapwing <i>Vanellus vanellus</i> and curlew <i>Numenius.arquata</i> . | |
| | | Ramsar criterion 5 | |
| | | Assemblages of international importance: | |
| | | Species with peak counts in winter: | |
| | | 86639 waterfowl (5 year peak mean 1998/99-2002/2003) | |
| | | Species and numbers are listed in Section 20 of the Ramsar Information Sheet in Appendix 7. | |
| | | Ramsar criterion 6 | |
| | | Qualifying Species/populations (as identified at designation): | |
| | | Species with peak counts in spring/autumn: | |
| | 4 | Tundra swan, Cygnus columbianus bewickii, NW Europe | |
| | ì | Species with peak counts in winter: | |
| | | Common goldeneye, Bucephala clangula clangula, NW & C Europe | |
| | | Common pochard, Aythya ferina, NE & NW Europe | |
| | | Greater scaup, Aythya marila marila, W Europe | |
| | | Tufted duck, Aythya fuligula, NW Europe | |
| | | Whooper swan, Cygnus cygnus, Iceland/UK/Ireland | |



| Site Name | Designation & Code | Ramsar Criteria | Vulnerability |
|-----------|--------------------|--|---------------|
| | | Details Rationale for Criteria | |
| | | Species/populations identified subsequent to designation for possible future consideration under criterion 6. Species with peak counts in spring/autumn: Great cormorant, Phalacrocorax carbo carbo, NW Europe Mute swan, Cygnus olor, Britain More contemporary data and information on waterbird trends at this site and their regional (sub-national) and national contexts can be found in the Wetland Bird Survey Alerts report, which is updated annually. See http://www.bto.org/survey/webs/webs-alerts-index.htm. | |
| | | Ramsar criterion 7 | |
| | | The site supports a population of pollan <i>Coregonus autumnalis</i> , one of the few locations in Ireland and one of the two known locations in the UK (the other is Lower Lough Erne). It is one of the most important species in Ireland in terms of faunal biodiversity since it occurs nowhere else in Europe, and the Irish populations are all well outside the typical range – the Arctic Ocean drainages of Siberia, Alaska and north-western Canada, where it is known as the Arctic cisco. | |



7 Potential impacts and mitigation

7.1 Loss of feeding habitat used by wintering birds associated with the Ramsar Sites

- 7.1.1 The area of the Foyle floodplain between Magheramason in the north and the Burn Dennett in the south has been identified by RSPB and the Irish Whooper Swan Study group as the area of functional habitat for which there is an interaction between the proposed scheme and the qualifying species of the Ramsar sites, due to the use of the area by birds associated with the Ramsar sites for foraging, either as a regular winter foraging area, or during migration to and from the Ramsar sites. Significant numbers of birds associated with the SPAs have been recorded within the Foyle floodplain, thus the potential impact of the scheme may be significant in terms of the integrity of the Ramsar sites and requires further assessment to determine if that is indeed the case.
- 7.1.2 There is approximately 1200 ha of potential foraging habitat within the area.
- 7.1.3 Figures 11.67 and 11.68 in Appendix 1 provide peak count numbers and locations of all recorded qualifying bird species for the surveys undertaken in 2009-2010 and 2013-2014 respectively. The numbers demonstrate that the area is used by two species, whooper swan and greylag goose. They also demonstrate that numbers for 2013-2014 have been significantly lower than the numbers recorded in 2009-2010 and that fewer parts of the area have been used. Discussion with RSPB NI indicated that birds were using foraging areas within the RoI, outside of the survey area, and at a significant distance from the proposed construction. For the purposes of this assessment it has been assumed the higher numbers and more dispersed pattern recorded in 2009-2010 is more representative of the use of the area by birds associated with the functional habitat.
- 7.1.4 Field survey results from 2013/2014 showed a peak count of 873¹⁶ birds present on land within the area of the eastern floodplain, at Grange Foyle, approximately 46% of the whooper swan utilising the Lough Foyle/Lough Swilly SPA complex in January 2005. A peak count of 22 birds from north of Dunnalong Road equates to approximately 1.2% of the whooper swan utilising the Lough Foyle/Lough Swilly SPA complex based upon data from 2005. This represents a change in use pattern when compared to the 2009 A5 WTC EIA study (Mouchel, 2009), with fewer birds using the area north of Dunnalong Road and more within the Grange Foyle area.
- 7.1.5 Field survey results from 2013/2014 showed a peak count of 218 birds present on land within the area of the eastern floodplain, at Grange Foyle, approximately 9.2% of the greylag geese utilising the Lough Foyle/Lough Swilly SPA complex. The single bird observed north of Dunnalong Road represents <0.1% of the greylag geese utilising the Lough Foyle/Lough Swilly SPA complex.

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¹⁶ This peak count is a summation of all of the highest counts regardless of the month in which those counts occur, it is likely to be artificially high, but allows a robust and precautionary approach to impact assessment.



- 7.1.6 During 2009-2010 an area of approximately 330 ha was used by up to 430¹⁷ whooper swan, and an area of approximately 150 ha was used by up to 350 greylag geese. During 2013-2014 an area of approximately 130 ha was used by up to 205 whooper swan, and an area of approximately 117 ha was used by up to 65 greylag geese.
- 7.1.7 The proposed scheme will involve the loss of approximately 40 ha of land within the area of potential functional habitat representing some 3% of the total area of potential habitat. None of the land take will affect parts of the area where use by either species has been recorded in the two surveys periods, in addition, there are alternative feeding sites located elsewhere along the river.
- 7.1.8 In light of the small percentage of potential loss and absence of loss in areas where use has been demonstrated, it has been concluded there will be no need for mitigation in the form of provision of compensatory habitat. This conclusion is based upon the Source-Pathway-Receptor conceptual model of impact assessment.
- 7.1.9 In order for the existence of an impact to be proven, all three elements of the model must be extant in any given context. In this case the receptor is absent from potentially impacted areas. As no qualifying bird species have been shown to utilise the areas impacts, a corollary of that finding is that no impact is likely to arise which may adversely impact upon them.
- 7.2 Disturbance of wintering birds associated with the Ramsar sites during their use of feeding habitat at Dunnalong/Thorn Hill and Grange Foyle

The effects of disturbance on avifauna

- 7.2.1 Disturbance has the potential to produce negative impacts on wild bird populations. However, the way in which disturbance affects bird populations is complex and predicting impacts requires a detailed knowledge of how disturbance affects populations and how this varies between species. The aim of this section is to review relevant research with a view to understanding whether any of the predicted sources of disturbance are likely to have a negative impact on populations of birds using the area around the proposal and, in particular, whether this could have an unacceptable impact on any species associated with the Special Protection Areas
- 7.2.2 The role of disturbance on bird populations has been extensively studied both to identify problems with species of conservation concern and as a tool in deterring unwanted species from sensitive areas e.g. airports and valuable crops. While most organisations concerned with management of the countryside actively encourage increased access to the countryside, the resultant increased disturbance can often have significant negative effects on wildlife.

¹⁷ These numbers represent the highest count during a single survey visit, and allow an accurate calculation of the area of forage habitat in use at any one time.



mation to inform an Appropriate Assessment:

Ramsar Sites

- 7.2.3 There are two factors to consider when assessing the impact of human disturbance on feeding areas. First, does the disturbance lead to changes in behaviour? Second, does any consequent change in behaviour affect mortality, reproductive success or population size (Gill et al. 2001) The majority of studies on disturbance concentrate on the first factor in one of two ways: comparison of animal distributions between areas with and without disturbance (e.g. Tuite, Hanson and Owen 1984; Pfister, Harrington and Lavine 1992; Sutherland and Crockford 1993; Milsom et al. 2000), and observations of the direct effects of disturbance on behaviour (e.g. Draulans and van Vessem 1985; Belanger and Bedard 1989). Many studies of this type have focussed on shorebirds as they appear susceptible to disturbance and occur in areas used by large numbers of people (e.g. Burger 1981; Kirkby, Clee and Seager 1993; Smit and Visser 1993).
- 7.2.4 It is generally accepted that most waterfowl populations are limited by availability of food during the winter months (see Owen and Black 1990 for a review). The factors controlling the populations are thought to be "density-dependent" and lead to the population tending towards the "carrying capacity" i.e. the numbers an individual site can support. For example, when numbers of a species are relatively high, mortality will increase resulting in a decrease in the population. Conversely, when numbers are low, mortality will decrease until numbers increase to the carrying capacity of an area. In the case of waterfowl, density-dependence is thought to act through two factors. First, through the availability of prey/food during the winter months. Second, through the levels of fat birds can lay down prior to spring migration. This is important, as the breeding success of many species is directly related to the availability of reserves on arrival in the breeding grounds, especially for arctic-breeding waders and wildfowl.
- 7.2.5 The nature of the density-dependent factors and the timing of their impact need to be understood if meaningful management measures are to be employed. This is recognised in the models used to assess the "surplus" in wildfowl populations that can be exploited through wildfowling. In these models, mortality before the winter food "bottleneck" (when mortality becomes density-dependent) is termed "compensatory mortality" as the removal of birds at this time reduces the mortality during the population bottleneck. Mortality after the bottleneck, will result in a reduction in the population (as the population has already been reduced to the "carrying capacity") and is termed "additive mortality".
- 7.2.6 The recent development of incorporating behavioural ecology theory into conservation research has led to a much better understanding of how factors such as disturbance or habitat loss affect populations of wild animals (Sutherland 1998). In particular, studies of waterfowl populations have changed the way potential impacts should be assessed (Gill 2007, Stillman et al. 2007). These studies have led to an increased understanding of the roles of various potential threats to populations and have even led to the first models capable of predicting impacts of development on major estuarine sites (Durrell et al 2005).
 - 7.2.7 Studying the impact of shellfishing at low tide on Oystercatchers on the Exe estuary, Stillman et al (2000), examined the role of disturbance in reducing access to feeding areas. This model was modified to take into account the time and energy costs associated with that disturbance, including energy expended flying away from disturbance and feeding time lost as a result of the disturbance (West et al 2002). This study showed that disturbance from



many small sources was more significant than fewer large scale sources and that disturbance could be more significant than habitat loss. However, the model also made recommendations on how to minimise the impact of the disturbance and that "preventing disturbance during late winter, when feeding conditions were worse, practically eliminated its predicted population consequences" (Stillman et al 2007). The model demonstrated that disturbance produced very little impact if restricted to daylight hours and if occurring before 1 December. Large-scale disturbance (10% of the site) produced less effect than numerous small events as this involved less commuting energy.

- 7.2.8 In a major study of wading birds on the Seine estuary, France, Durrell et al (2005) used a similar behaviour-based model to predict the impact of an extension to the port at Le Havre on the Seine estuary. They were able to assess the significance of;
 - a reduction in available habitat;
 - disturbance during the night and the day;
 - the introduction of a buffer zone around the development;
 - the effectiveness of introducing a new mudflat area as mitigation.
- 7.2.9 Supporting the findings of the effect of daytime disturbance on Oystercatchers on the Exe estuary, the authors found "when we simulated disturbance occurring during the daytime only, birds were able to feed within this area at night. In this case, the effect of disturbance was greatly reduced in dunlin and removed altogether in curlew and oystercatcher". Introduction of a 150m "buffer" zone "effectively removed the effect of disturbance on feeding shorebirds.

The effect of disturbance on exploitation of resources

- 7.2.10 The value of a site to a local population can be reduced where disturbance levels result in either reduced levels of exploitation or significantly increased costs associated with that exploitation e.g. commuting costs. Where disturbance may be chronic and birds excluded from feeding areas for long periods of time, feeding when disturbance levels are lower e.g. bad weather, early morning, may result in the same level of use as at sites where disturbance is minimal. The best way to directly assess the role of disturbance on the level of exploitation is to measure prey depletion where the study species is the only predator and where the prey species is non-renewing. This was studied in Black-tailed Godwits feeding on bivalves in the southeast of England. Gill et al. (2001) studied the levels of depletion in bivalve populations at sites experiencing a wide range of levels of disturbance. They predicted that disturbance could result in a slower rate of exploitation, leading to unused resources at the end of the winter. The level to which the resources are unused will determine the extent of the consequent reduction to carrying capacity of the site.
- 7.2.11 The study showed that even at sites with very high levels of disturbance (including a yacht club), Godwits visited the disturbed areas during periods of low disturbance and depleted prey to similar levels recorded at sites where disturbance was minimal. This demonstrated



that the value of a feeding area to a species may not be diminished as long as birds are able to feed sufficiently often to exploit the site fully.

7.2.12 Following "Ideal Free Distribution" theory, areas of high food availability will be preferred to areas of low availability. Where disturbance does result in reductions in foraging effort, food availability is likely to be greater than on adjoining undisturbed areas. When the source of disturbance is removed, birds would be expected to prefer these areas for foraging and, given sufficient time to exploit the resource, will deplete the resource to the same levels as the adjoining undisturbed areas. The key point in studying this type of scenario is to identify whether sufficient opportunities are available for sites/areas within sites, to be exploited fully.

Daytime feeding opportunities

- 7.2.13 Whooper Swans foraging on land at some distance from water must make daily commuting flights between roosting and foraging areas. In respect of such flights, three factors may safely be assumed to be implicated in the timing and duration of these flight; day length, temperature and safety. During midwinter birds naturally endure long periods of darkness, often combined with low temperatures, and it is probable that birds are likely to have lower morning energy stores than at other times of the year. Additionally, the impact of low temperatures and prolonged darkness is that less time is available for foraging as whooper swans are visual feeders. Assuming that the time swans spend at their foraging grounds is positively correlated with energy requirements, in midwinter birds should arrive earlier at, and depart later from, their foraging areas. In addition, time spent feeding during the day should increase relative to day length. These conditions may induce an energetic bottleneck during December & January.
- 7.2.14 With regard to disturbance of the two species associated with construction of the proposed scheme, studies reported by Rees et al (2005) Factors affecting the behavioural responses of whooper swans (Cygnus c. cygnus) to various human activities noted that pedestrian presence disturbed whooper swans when within 250-400m, and that construction vehicles disturbed whooper swan when within 250m, in contrast to tractors which caused disturbance when within 150m and other farm vehicles which caused disturbance when within 250m.
- 7.2.15 The proposed scheme will generally involve construction significantly more than 250m from those parts of the area of functional habitat where the presence of the species has been has been recorded during the surveys. Locations closest to parts of the area where presence has been recorded are:
 - where the realignment of Donagheady Road will bring the works within 50m of an area of recorded use, although the works will be separated from the swans by the existing A5 with its current levels of traffic (see Operational Disturbance below); and.
 - where the proposed introduction of a new link road between Ash Road and Drumenny Road will involve work within 100m of a part of the area where a maximum of 9 swans were recorded in 2009-2010.
- 7.2.16 When considering opportunities for the swans and geese to forage for food, it is appropriate to consider available natural light. The period known as "Civil Twilight" is the time in which



the sun is <6° below the horizon and is the time during which it is considered light enough to work outside without the need for artificial light. During winter months Civil Twilight lasts approximately 30-35 minutes. Most visual foragers (including swans and geese) will be able to forage effectively during this time (and probably for a lot longer).

- 7.2.17 Normal working times specified in the construction contract in relation to the control of noise and vibration are:
 - 1st February to 31st October 07:00 to 19:00 hours
 - 1st November to 31st January 08:00 to 17:00 hours
- 7.2.18 Therefore, it can be seen from Figure 1 below that during the winter months, there will be sufficient light available for foraging swans and geese during non-working periods in early October and again in early November¹⁸, with a further period light enough for foraging occurring outside working hours from early February onward.
- 7.2.19 The limits of the contract working hours are particularly relevant to visual foragers as they are less likely to feed at night and daylight may affect the levels to which they can accrue resources. This could be of particular significance during energetically demanding times such as pre-migration fat deposition and moult.
- 7.2.20 To minimise adverse impact upon Whooper swans during this period, construction work in areas within 250m of areas shown to be utilised by Whooper swans and Geese will be reduced to between 08.00-17.00 hrs, between 1st October and March 31st.
- 7.2.21 The disturbance associated with the proposed development will not be continuous throughout. In view of the close proximity to other feeding areas elsewhere, birds would be likely to respond to periods of no disturbance by feeding preferentially within areas in proximity to the proposal site until the resource levels were similar to neighbouring areas.
- 7.2.22 Adherence to the construction time periods set out above will eliminate any potential for a reduction in available foraging opportunities as a result of construction within 250m of areas known to be utilised by Whooper swans and geese.

¹⁸ As clocks go back and it becomes light 'earlier'.



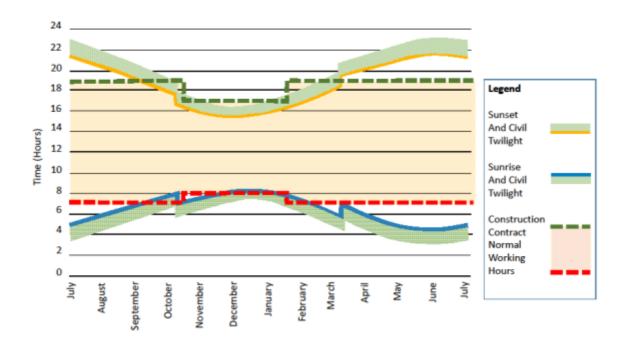


Figure 1: "Civil Twilight" hours in relation to time of year and normal working hours on the site within 250m of areas known to be utilised by swans and geese.

- 7.2.23 The disturbance associated with the proposed development will not be continuous throughout. In view of the close proximity to other feeding areas elsewhere, birds would be likely to respond to periods of no disturbance by feeding preferentially within areas in proximity to the proposal site until the resource levels were similar to neighbouring areas.
- 7.2.24 Implementation of the strategy outlined above will eliminate any potential for a reduction in available foraging opportunities as a result of construction within 250m of areas known to be utilised by Whooper swans and geese.

The potential impact of Construction Noise

- 7.2.25 There are two locations where construction will involve noise levels above those associated with the general activities associated with movement and activity of plant and vehicles; where the deep cutting at Bready will involve breaking out of rock at Sollus Hill and where piling will be required for the bridge abutments at the Burn Dennet. The Bready cutting is some 400m from the closest recorded Whooper swan and over 1km from the closest recorded Greylag geese. The Burn Dennett crossing is some 500m from the closest recorded area known to be utilised by Whooper swan and over 2.5km from the closest recorded Greylag geese.
- 7.2.26 Scottish Natural Heritage (SNH) provide guidance on potential impacts on European/Ramsar Sites¹⁹, in which they state that in relation to noise disturbance of birds:

¹⁹ http://www.gov.scot/Publications/2011/03/04165857/15 accessed 23/03/2017



Studies generally show that birds are disturbed by a sudden large noise but have the ability to habituate (become accustomed to) to regular noises. For instance, with respect to piling specifically, it has been concluded that although piling has the potential to create most noise during construction, it often consists of rhythmic "bangs", which, after a short period, birds are likely to become accustomed to (ABP Research, 2001).

and:

As part of the construction work for ABB Power Generation Ltd (Pyewipe), winter bird monitoring showed that there was no large-scale disturbance due to construction work on the site. Although some localised disturbance was recorded in response to two sudden events, this was not considered to have a major effect on surrounding bird populations and was found to be no greater than the effect arising from third party disturbance, including walkers and stopped cyclists, which were unrelated to the work carried out by ABB (ERM, 1996). Observations suggested that it was the initial sudden bang during piling activities, which caused the disturbance, and that subsequent bangs typically resulted in reduced disturbance, demonstrating habituation.

These findings were supported by the studies carried out for the Humber International Terminal development, which again indicated that the key factor in triggering disturbance was human presence (ABP Research, 2000). Over 12 separate visits, disturbance by construction activities (which involved piling and reclamation of part of the foreshore) was observed on 3 occasions and in each case birds were disturbed over a small area and then rapidly resettled within the zone of disturbance (i.e. they did not leave the area). More recently, surveys of the birds around the Immingham Outer Harbour in the Humber (using the same methods) have also indicated that such disturbance events are limited and are often attributable to non-Port related activities such as the presence of Peregrine Falcons or walkers on the mudflat (ABPmer, 2010e).

The ABP Teignmouth Quay Development estimated an approximate zone within which birds may be affected by disturbance from construction works (piling and dredging) to be typically about 200m (ABPmer, 2002). The startling effects of sudden noise were quantified, based on published research, by the Environment Agency for the Humber Estuary Tidal Defences scheme. It was concluded that a sudden noise in the region of 80dB appears to elicit a flight response in waders up to 250m from the source, with levels below this of approximately 70dB causing flight or anxiety behaviour in some species.

- 7.2.27 Following discussion with the geotechnical advisors and contractor advisors for the project it has been confirmed that blasting will not be required. Should further information come to light as the proposed scheme design is finalised which demonstrates a need for blasting, there will be a limitation placed on the timing of the activity to exclude the period between October and March when the birds are present. Such a restriction eliminates the potential for adverse impact from this source.
- 7.2.28 There will also be a requirement under the contract that should it be the intention to undertake breaking out of rock at Bready and piling at the Burn Dennet within the period when the birds are present, trial breaking out and piling must be undertaken with monitoring



by an appropriately qualified ecologist. The trials will involve short periods of breaking out and piling at prescribed intervals to establish if the activity results in disturbance which could prove detrimental should the more prolonged periods of the activities which will be required to complete the cutting and bridge abutments be progressed. If the trials indicate this will be likely to the case, the activities will be suspended while whooper swan or greylag geese are within 300m of the noise source. The following factors will be considered to be probative of detrimental disturbance.

- Physical displacement of birds (flight from source) with non-return within 5 minutes;
- Reduction in foraging activity due to increase in scanning times.
- 7.2.29 Should these responses be noted, works will be suspended as above.
- 7.2.30 In consequence, and subject to the mitigation strategies outlined above, construction disturbance impacts are therefore considered to be not significant in relation to the conservation objectives for the Ramsar sites, or the integrity of the sites.

Operational disturbance

- 7.2.31 The operation of the proposed scheme also has potential to cause disturbance to bird species, with the noise generated from increased traffic volume and speeds potentially causing the displacement of whooper swan through increased disturbance. However, behavioural impacts such as disturbance from feeding grounds as a result of construction or operation phases are always context-dependant, with responses to disturbance depending upon the trade-offs experienced by individual birds (Gill, 2007). For example, the decision to stay or to leave an area in response to disturbance will be influenced by the quality of the area, availability and relative quality of alternative areas, and relative predation risk on current and alternative sites among others (Gill, 2007). Habituation, that is 'the relatively persistent waning of a response as a result of repeated stimulation which is not followed by any kind of reinforcement' (Hinde, 1970), has been demonstrated in the short-term in some studies on disturbance to whooper swan, however an increased tolerance did not appear to be maintained over longer periods with the behavioural patterns on a day to day basis providing additional support to this (Rees et al., 2005).
- 7.2.32 While the closest approach of the mainline to a field with recorded whooper swan use is around 150m, which is at the limit of the distance recorded for tractor disturbance of whooper swan (Rees *et al*, 2005), the study was in relation to disturbance 'events' rather than exposure to constant stimuli. Whooper swan have been shown to quickly habituate to continuous traffic movements, for example at the Toome Bypass (Hill. M, 2014, *Pers. Comm*). Therefore, operational disturbance is unlikely to have a significant effect.
- 7.2.33 To determine the potential for disturbance of greylag geese it is important to understand the distances over which they will be disturbed. Keller (1989) identified greylag geese avoid roads in agricultural land in Scotland, with avoidance behaviour recorded for distances of 100m from roads. The closest recorded greylag geese in any of the studies undertaken was over 500m, thus operational disturbance is unlikely to occur.



7.2.34 Operational disturbance impacts are therefore considered to be not significant in relation to the conservation objectives for the Ramsar sites, or the integrity of the sites.

7.3 Atlantic salmon and sea lamprey

- 7.3.1 The introduction of the proposed scheme into the existing mosaic of terrestrial and aquatic habitats within the River Foyle Catchment has the potential to affect Atlantic salmon and sea lamprey as a reason for selection of the Lough Foyle Ramsar Site where they are present within the Foyle catchment.
- 7.3.2 Potential impacts associated with the construction and future presence of the proposed scheme and its associated traffic which have been identified comprise:
 - Potential impacts associated with the construction and future presence of the proposed scheme and its associated traffic which have been identified comprise:
 - disturbance or harm associated with construction related noise, vibration and lighting within the wider catchments;
 - disturbance or harm associated with the construction of bridges, culverts, watercourse diversions and drainage outfalls and other locations where working areas including site compounds will be within 50m of watercourses in the wider catchments;
 - loss of habitat relied on by the species within the wider catchments;
 - fragmentation as a result of obstruction or prevention of passage for the species along watercourses in the wider catchments once the proposed scheme is open to use;
 - harm to the population of the species associated with the Ramsar sites as a result of increased concentrations of TSS and other harmful substances in watercourses associated with discharges from drainage outfalls for the proposed scheme; and
 - disturbance during use as a result of road related lighting.

Construction related noise, vibration and lighting

Noise and vibration

7.3.3 Atlantic salmon are capable of detecting the pressure and particle motion components of sound; levels of anthropogenic noise and vibration may exceed the hearing threshold of Atlantic salmon (Hawkins and Johnstone, 1978). This is due to their physiological makeup and the particle composition of water and soil, which facilitate propagation further than in air (Popper, 2008). The resulting potential impacts can be hearing impairment (Nedwell et al., 2005) or death, either directly from the noise generation or indirectly as a result of hearing impairment. Construction activities associated with the proposed scheme likely to pose such a risk are blasting or piling particularly within watercourses.



- 7.3.4 The proposals do not require blasting or piling within watercourses. The establishment of abutment foundations at the proposed River Mourne and Rive Derg crossings will, however, involve piling close to the top of the bankside slopes at both watercourses. In light of this, discussions have been held with Loughs Agency and appropriate mitigation measures have been identified and agreed.
- 7.3.5 The draft CEMP includes identification of working windows for watercourses with salmonid interest. A working window of May to September has been agreed with Loughs Agency for the Derg crossing, which represents a period outside of the critical salmonid migration periods.
- 7.3.6 In the case of the River Mourne crossing the contractors will be required to utilise Continuous Flight Auger (CFA) piles. In the case of the foundations for the abutment walls at other bridges either CFA or drilled piles will be used. Therefore all piles will be rotary bored piles which do not produce significant vibration.
- 7.3.7 Mitigation to be incorporated in the construction procedure will include a soft -start methodology. The soft-start methodology will involve a gradual increase in force and intensity of drilling, and hence, noise and vibration, over a 30 minute period to allow Atlantic salmon to move outside of the area of influence. The soft-start methodology would be required each time the machinery is started following a 30 minute rest period. Once the piling is in full operation, associated noise and vibration from the machinery will keep fish outside of the area of influence and thus equipment can be switched off. This process will need to be repeated at the start of each day, as overnight working is not proposed for construction works in close proximity to watercourses.

Lighting

- 7.3.8 Artificial lighting at night has the potential to disrupt and disorientate fish, increase exposure to predation, alter light-sensitive endocrine systems and disrupt crepuscular and nocturnal mating, signalling and dispersal (Rich and Longcore, 2006). With regards to Atlantic salmon, the main impacts resulting from artificial lighting are disruption to migration behaviour (Thorpe et al., 1988; Nemeth and Anderson, 1992) and increased mortality rates due to increased efficiency of predators (Tabor et al., 2004; Kemp and Williams, 2009).
- 7.3.9 Night working in the vicinity of watercourses identified as being of salmonid interest will not generally be allowed. However, circumstances may arise which require emergency works outside of daylight hours, in these cases lighting will be positioned/cowled to minimise light spill onto the watercourse and the duration will be kept to a minimum. These approaches will be contractual commitments placed on contractors by Transport NI.

Disturbance or harm associated with construction

Release of sediment or other construction related pollutants into watercourses

7.3.10 Construction related to earthworks and structures can involve in the release of sediments and other construction related pollutants into watercourses. In the context of the proposed



scheme this could result in loss of spawning and nursery habitat used by Atlantic salmon and direct harm to the species as a result of concentrations of sediments and other pollutants in the water.

7.3.11 In the wider catchments the risk will occur where:

- localised in-stream works and works on the bankside of watercourses will be required for the construction of temporary and permanent bridges, culverts, watercourse diversions and headwalls for drainage outfalls;
- construction of earthworks to establish the vertical alignment for the proposed scheme is located within 50m of the watercourses;
- construction of filter drains, ditches, swales, grassed channels and wet and dry ponds is required to attenuate and carry road related run-off to drainage outfalls;
- site compounds and materials storage areas are located close to watercourses.
- 7.3.12 The installation of rip-rap to protect bridge abutments will require the placing of rock-filled gabion mattresses on the profiled and consolidated banks at the base of bridge abutments. Measures and requirements detailed in Annex 2.4 of the draft CEMP in Appendix 5 of this report will be adhered to minimise potential sediment release into watercourses to negligible levels. Contractors will also be required to ensure imported rock does not contain invasive species of plant.
- 7.3.13 The temporary bridges over the Burn Dennet, Glenmornan, River Derg and Fairy Water will be clear span temporary bridge structures that will be installed at a level which allows for flood water to pass underneath, and does not block movement of animals along the watercourse corridor.
- 7.3.14 The installation of culverts and watercourse diversions will result in disturbance to watercourse channels and banksides and could result in consequent release of sediments into the watercourses. The proposed method of construction whereby culverts on diverted sections of watercourse will be completed prior to abandonment of the relevant section of existing channel, and temporary sections of diverted watercourse will be provided along watercourses where culverts are to be constructed on-line, will substantially limit potential release of sediments into waters of salmonid presence or potential.
- 7.3.15 As illustrated in Figure 7 headwalls will generally be of concrete construction. The area which will be subject to disturbance and the volumes of soils which will require to be excavated will be small. Excavated soils will be temporarily set aside a minimum of 3m from the top of the bankside and any not required for reinstatement of the bankside will be removed from site once reinstatement of the bankside profile is completed. The activity is one which will be of short duration.



- 7.3.16 The risk will be greater where outfalls are required on smaller tributaries and headwaters with relatively low volumes of flow. In these locations the works will be programmed for implementation at times of lowest flow between May and September.
- 7.3.17 Spillage of fuels and oils associated with machinery required for earthworks and installation of the structures could result in release of hydrocarbons in all of the above locations. The presence of cement in storage prior to use and release of such contaminants into watercourses as structures are built could result in mortality or harm where the watercourses are used by Atlantic salmon.
- 7.3.18 The Water Framework Directive identifies a requirement for suspended solids levels to be kept below 25mg/l for fish species to thrive. However, Loughs Agency have raised concerns that the risks associated with sediments relative to Atlantic salmon will be greater during construction rather than during use of the proposed scheme upon completion of construction. The Agency's concern particularly relates to the proximity of work activities where sediments will be generated and potentially released into parts of the watercourses where there is spawning and nursery habitat and has stipulated a requirement for a more stringent standard during construction above background levels in such locations.
- 7.3.19 Mitigation measures have accordingly been discussed with Loughs Agency which are focused on the achievement of both thresholds in accordance with the status of the watercourses as ones used for fish passage and ones where salmonid nursery and spawning habitat is present. The measures have been formalised in Section 2 of the draft SMP provided in Appendix 6 and will be a mandatory requirement of the contract-specific SMPs which contractors will be required to prepare agree with TNI and Loughs Agency prior to the commencement of works.

Loss of supporting habitat

7.3.20 Where bridges, culverts, watercourse diversions and headwalls for drainage outfalls are proposed there will be a permanent loss of habitats other than primary and qualifying habitats which are relied on by Atlantic salmon. These include marginal habitats with overhanging vegetation and reduced flows which are important for fish migration as they provide areas of cover under which to rest. They also provide protection from predators and direct sunlight.

Open span bridges

7.3.21 The proposed open span bridges will involve the permanent loss of the bankside vegetation beneath the open span structures. The loss will include grassy banks, scrub and overhanging trees. In the context of each of the watercourses crossed, the length and scale of the watercourses and extent of salmonid habitat associated with each watercourse, the loss will be negligible. To ensure that in stream vegetation habitat loss is minimised preplanted coir rolls of suitable native emergent and marginal vegetation will be inserted into the rip-rap during construction. In addition, suitable bankside planting will be undertaken where possible. Where open span bridges are installed at major watercourse crossings, there may be an impact from the shade cast by the bridge on in-stream habitats. This shade could



reduce the ability of the habitats to thrive, and could result in a minor reduction in primary production within the watercourse.

Culverts

- 7.3.22 The proposed culverts will involve the permanent loss of supporting habitats where the culverts are aligned beneath the proposed dual carriageway and its supporting earthworks. The surveys undertaken during 2012 and 2013 by Mouchel and Loughs Agency have established that a total of 64 culverts will be located on watercourses classified as being of salmonid potential. In line with the precautionary approach adopted during the preparation of this initial information, these are currently assumed to be of importance to Atlantic salmon and will comprise box culverts as described in Table A2.1.
- 7.3.23 The proposed culverts vary in length from 25m to 110m. Most do not exceed 60m. The total length of culvert, and hence the length over which bankside, marginal and in-stream habitat will be permanently lost is some 3400m. 14 salmonid watercourses have more than one culvert proposed, with 12 of these requiring 2 culverts and 2 requiring 3 culverts.
- 7.3.24 There will be a permanent loss of some 6800m of marginal and bankside habitat²⁰ in the context of in excess of 300 kilometres of watercourse where salmonid presence / potential has been established.
- 7.3.25 Proposed mitigation provides for the introduction of bankside planting reflecting that which will be lost within the vested land upstream and downstream of each culvert which will in some instances enhance the tree, scrub and grassland habitats as sources of food and shade at resting places.
- 7.3.26 Initial loss of in-stream habitat, primarily comprising gravels and boulders, will be largely mitigated as a result of the proposals relating to the embedding of culvert bases, introduction of gravels and boulders, provision for natural sedimentation and location of boulders upstream and downstream of the structures.

Watercourse diversions

- 7.3.27 The 55 proposed watercourse diversions of watercourses with salmonid interest will involve the permanent loss of supporting habitats along some 10km of existing sections of watercourse which will be abandoned. The lost habitat will, however, be re-established as part of the construction of the new sections.
- 7.3.28 This will involve the replication of bed and channel characteristics of the watercourses and planting of marginal and bankside habitat which will reinstate the ecological characteristics of the original watercourse along the diversions on which they are located. It will also be a specific requirement of the contracts that construction of the new sections must be

²⁰ Taking the precautionary approach that both banks have suitable habitat for the length lost, i.e.3400m x 2



completed prior to the closure and abandonment of the diverted section. The de-watering of the abandoned sections will be carried out under supervision of an ecological clerk of works to ensure fish which may be present, including salmon, are safely removed.

Habitat Fragmentation

- 7.3.29 The introduction of bridges and culverts along watercourses associated with the Ramsar sites and used by Atlantic salmon could potentially obstruct or discourage passage of the fish as they seek to return to spawning areas and migrate to sea. The following design and mitigation measures which include advice detailed in River Crossings and Migratory Fish: Design Guidance' (Scottish Executive 2000) have accordingly been incorporated into the proposals:
 - provision of oversized box culverts along watercourses identified as being of importance to salmonids;
 - diversion of watercourses to facilitate the introduction of a shorter culvert, with lower flow velocity downstream and better light penetration, at or close to right angles to the proposed scheme carriageways where the angle of crossing would otherwise be overly long or steep;
 - avoidance of steps in the vertical profile through culverts and along associated diverted watercourses;
 - avoidance of bends in culverts which could initiate the deposition of debris and obstruct passage;
 - adoption of vertical profiles through the culverts relative to length in accordance with Table 5.1 of the guidance;
 - provision of resting areas upstream and downstream of the culverts.
- 7.3.30 The proposals recognise that during periods of low flow many of the smaller watercourses which feed into the main rivers and principal tributaries and in the upper parts of the catchment have little depth of water. The design proposals described in 5.3.3 and 5.3.4 which require embedding of culvert bases, introduction of gravels and boulders, provision for natural sedimentation and location of boulders upstream and downstream of the structures, make specific provision for these locations but will also be required wherever box culverts are proposed in light of salmonid presence / potential.

Road related lighting

7.3.31 All new lighting will involve the use of full spill cut-off luminaires which will contain the extent of spill within the dual carriageway footprint. Luminaires on the existing Mourne River bridge and associated with the existing A38 approach and bridge linking the existing A5 and Lifford will also be replaced with full spill cut-off units such that the extent of spill associated with the



existing bridge will be reduced. This combination of proposals will result in a slight improvement relative to light and the passage of salmon in this location.





8 Summary

- 8.1.1 The Lough Foyle Ramsar Site and Lough Neagh & Lough Beg Ramsar Site have been identified as sites with a relationship to the proposed A5WTC which requires that they should be considered in the context of the EC Birds Directive, as transposed by the Conservation (Natural Habitats, &c) Regulations (Northern Ireland) 1995 as amended by the Conservation (Natural Habitats, etc.) (Amendment) Regulations (Northern Ireland) 2012 in Northern Ireland and the European Communities (Natural Habitats) Regulations 1997 (as amended) in the Republic of Ireland
- 8.1.2 Both Ramsar Sites have been subject to a process of screening based on the guidance provided in HD 44/09 of Volume 11 of the Design Manual for Roads and Bridges. In both instances it has been concluded:
 - the proposed scheme is a project which is not connected with or necessary to the management of the Ramsar sites;
 - the likelihood of the proposed scheme having a significant effect on the sites cannot be excluded on the basis of objective information; and
 - that Stage 2 Appropriate Assessments should be undertaken.
- 8.1.3 This document provides further information to inform Appropriate Assessments for the Ramsar sites. The information is being made available to statutory consultees and for wider public consultation. The information in this report and information received in response to the consultations will be considered by Transport NI and the Minister as Appropriate Assessments are completed in advance of a decision to proceed or not in accordance with the requirements of the Directive and Regulations.

8.1.4 In conclusion:

- The A5WTC has been designed to avoid features related to Natura 2000 sites as far as possible;
- There is a high level of knowledge of the qualifying features (habitats and species) in the study area;
- Best practice mitigation has been included in the scheme design; and
- Based on the best scientific knowledge available, there will not be a significant effect on the conservation objectives of the Ramsar sites.
- 8.1.5 The information provided in this report indicates the proposed scheme will not have an impact on the integrity of the four sites either independently or in combination with other projects. A final view, however, cannot be concluded until further evaluation is undertaken in light of responses to the consultations.



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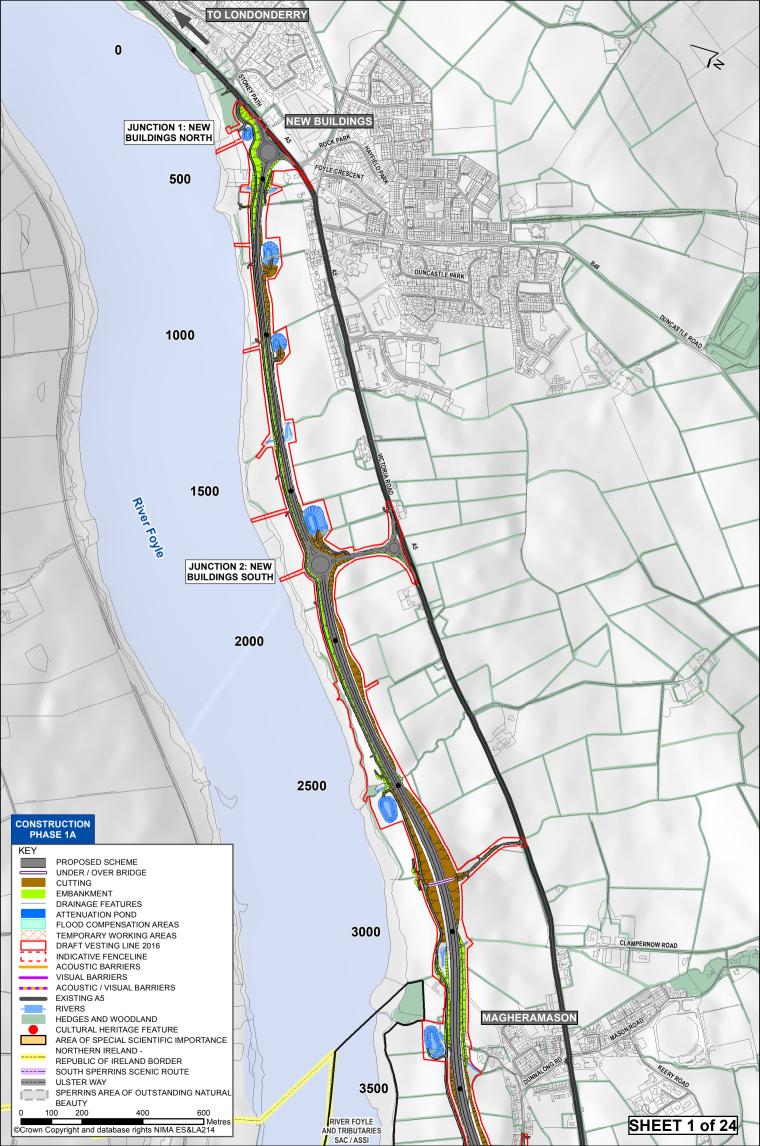
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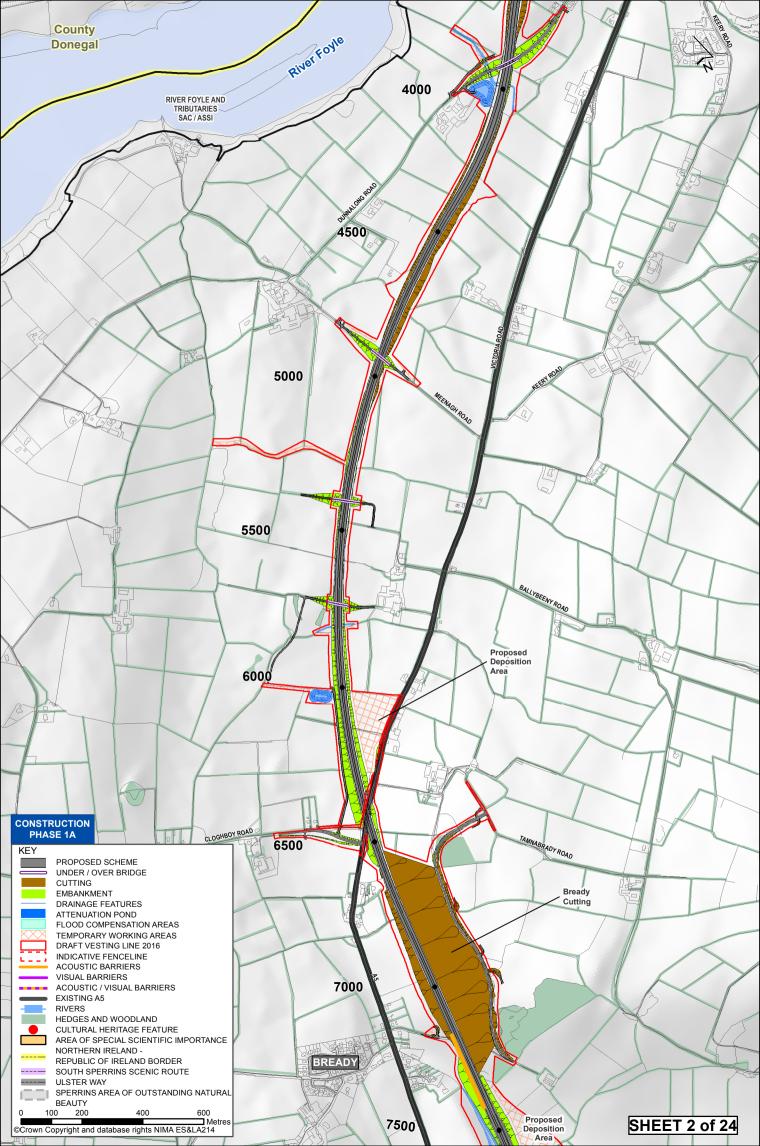


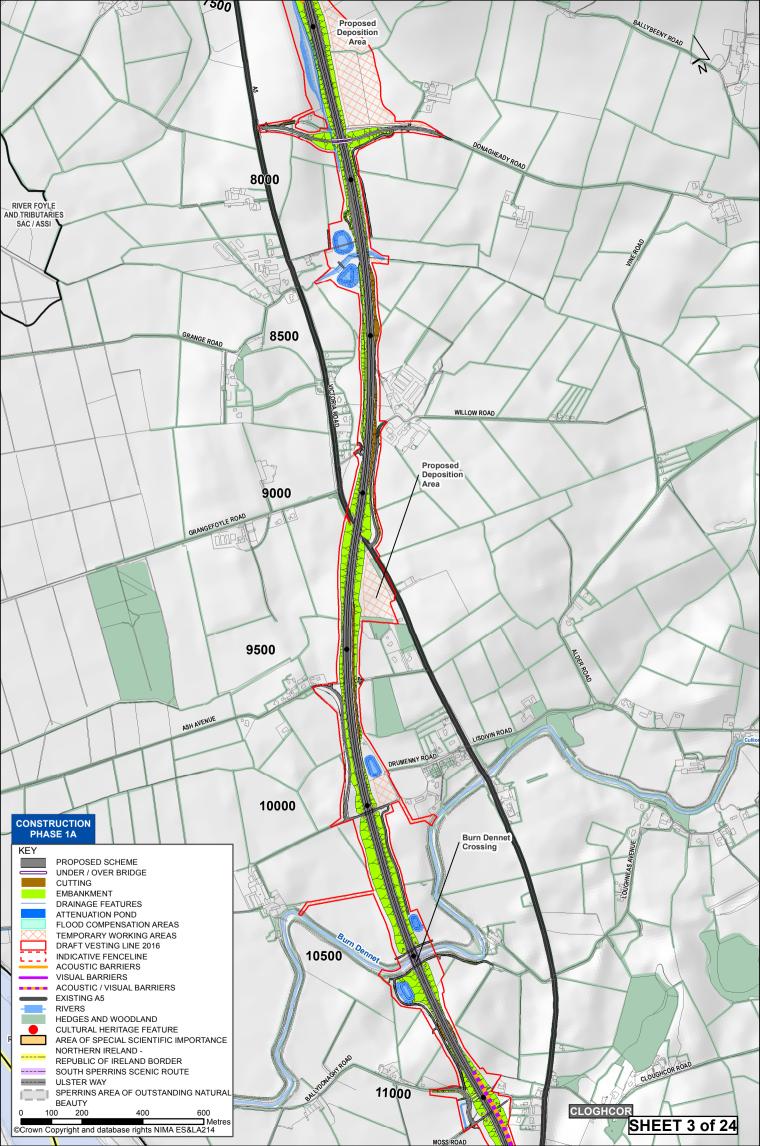


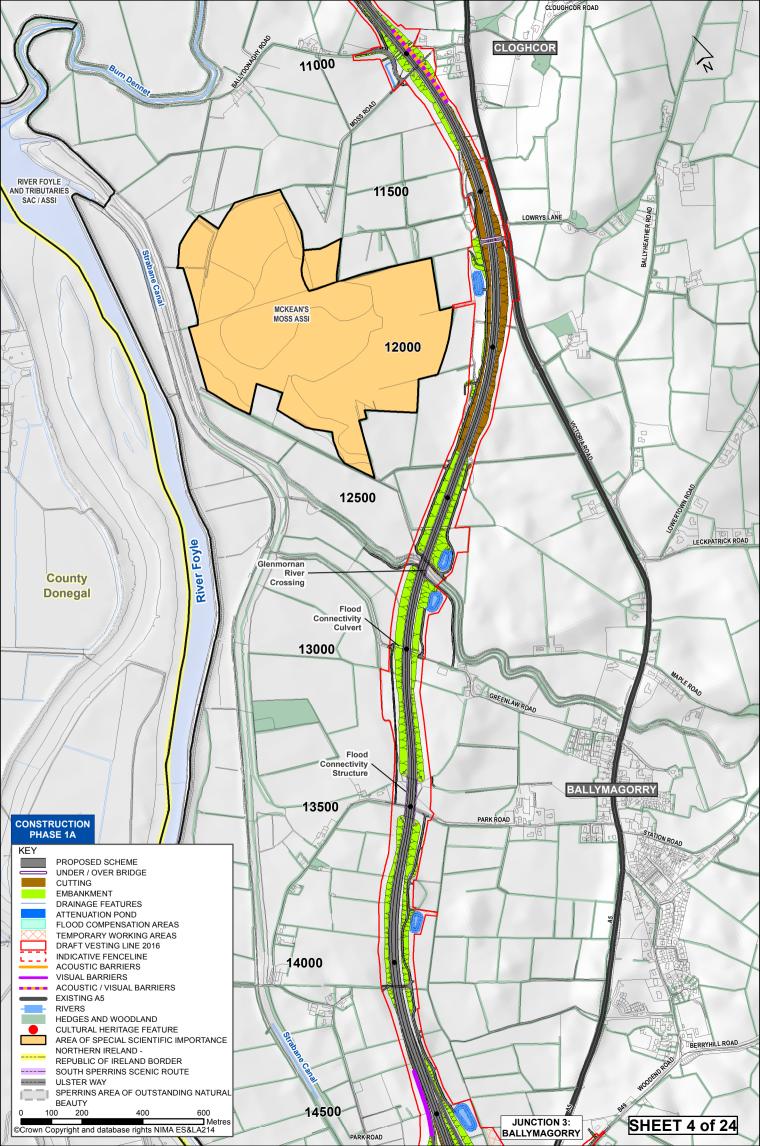
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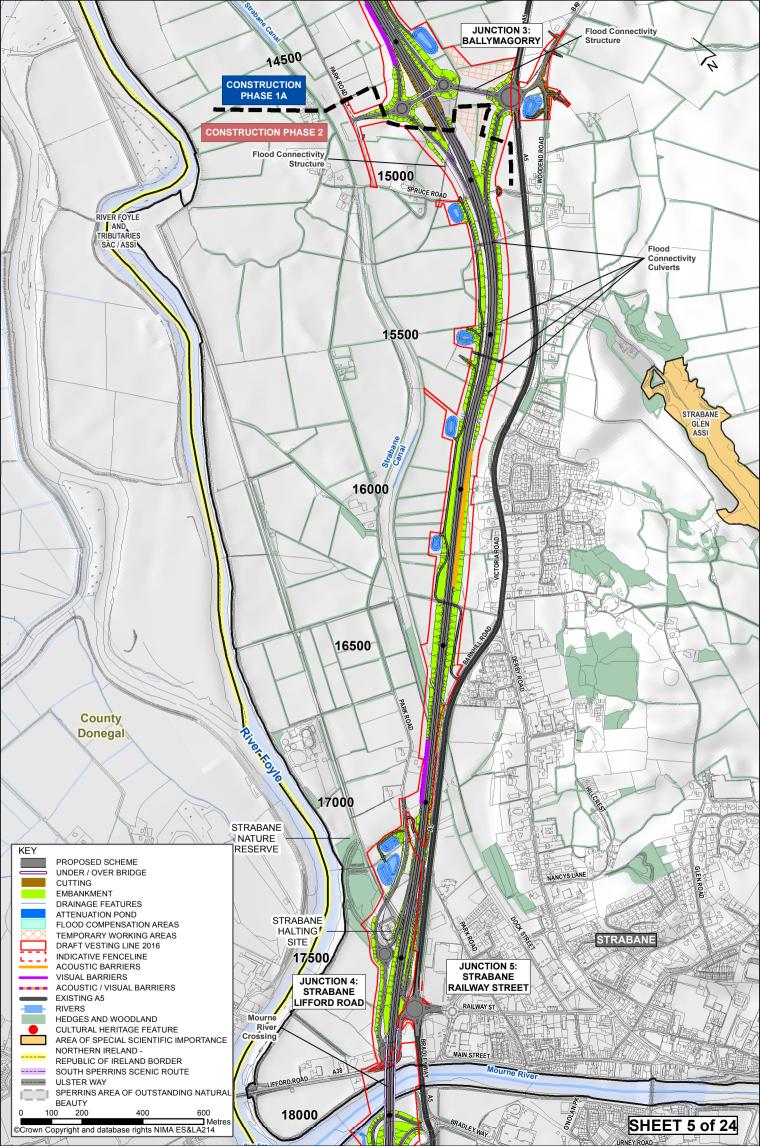


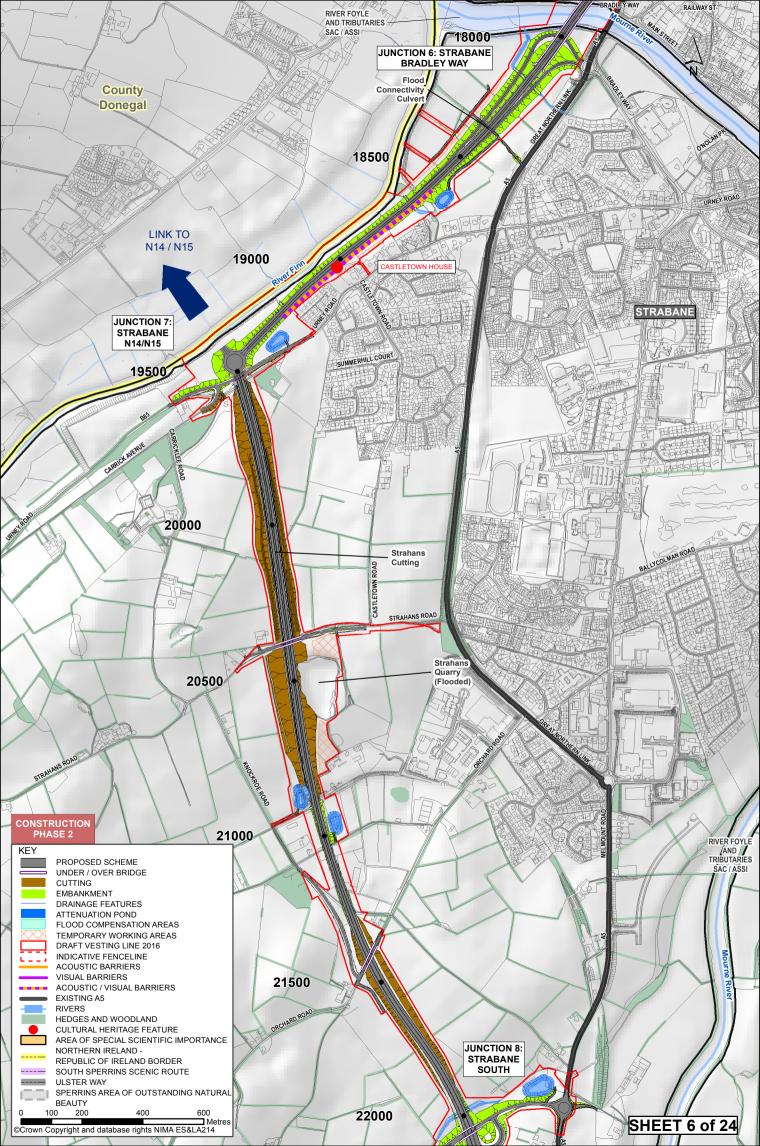


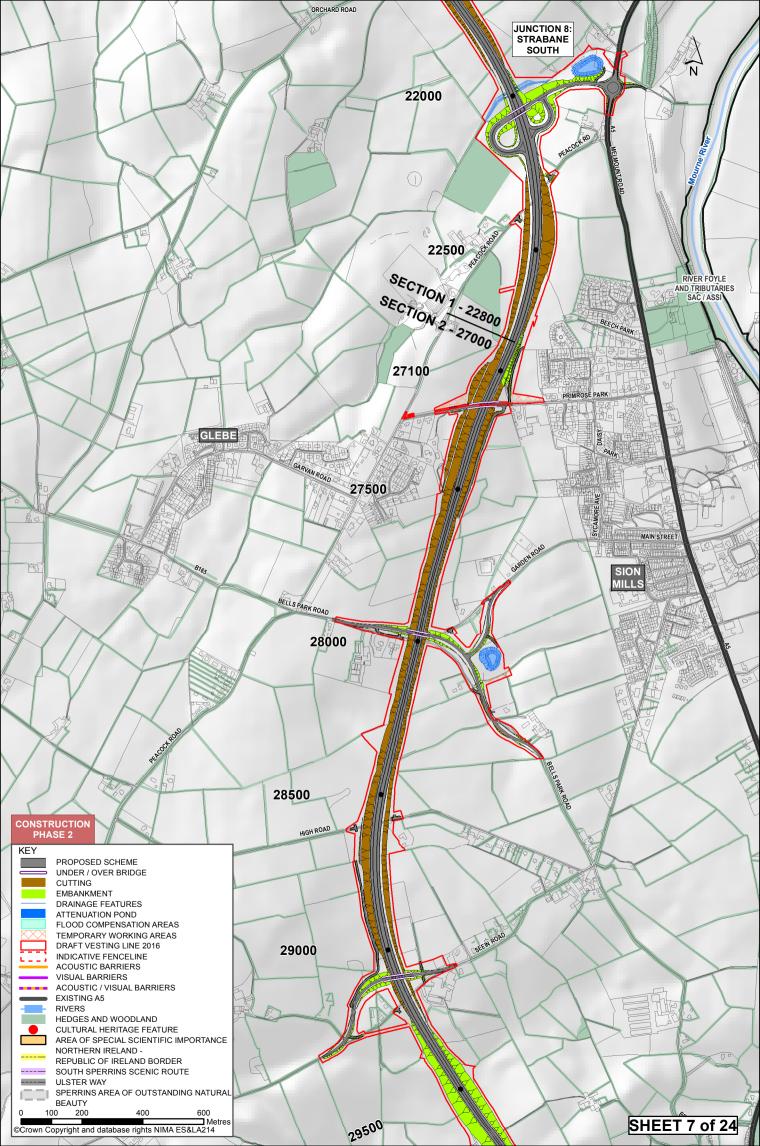


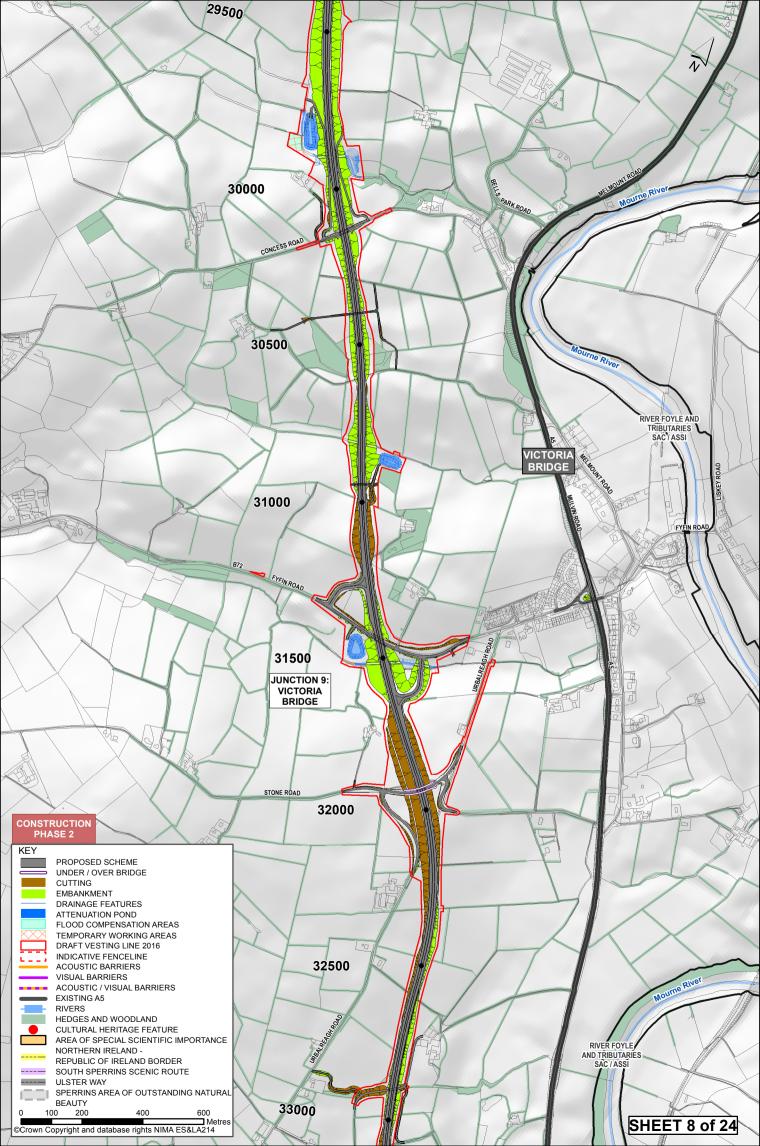


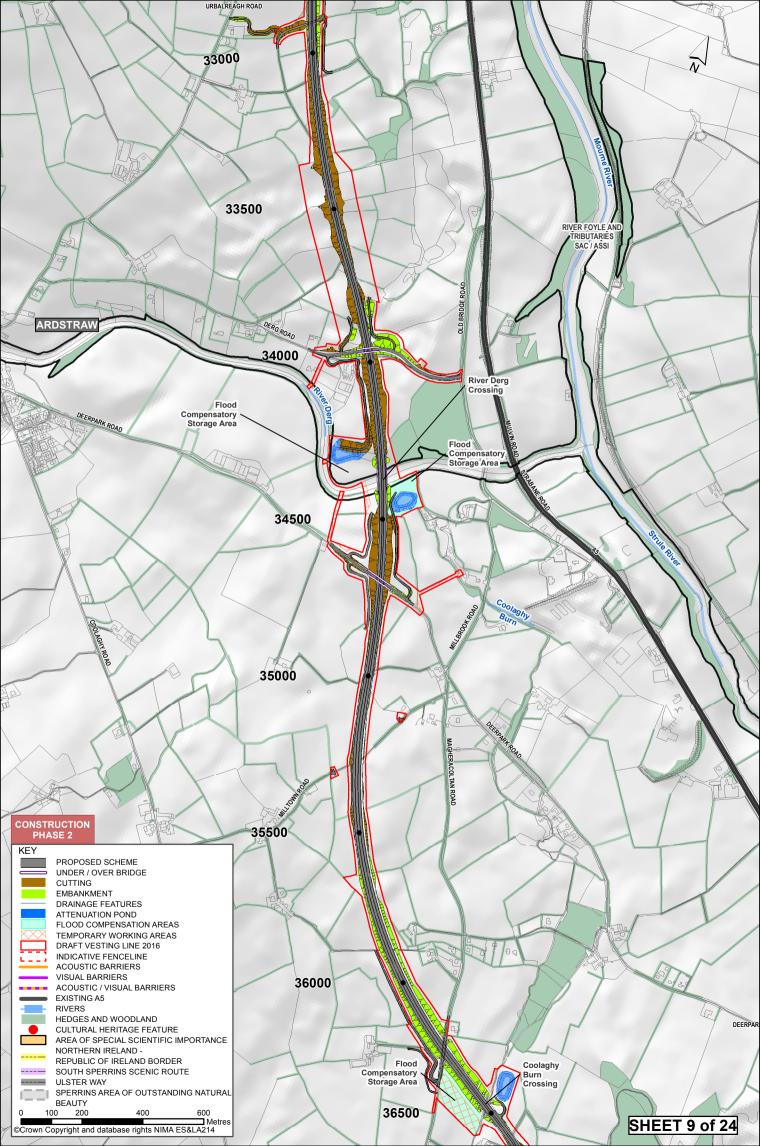


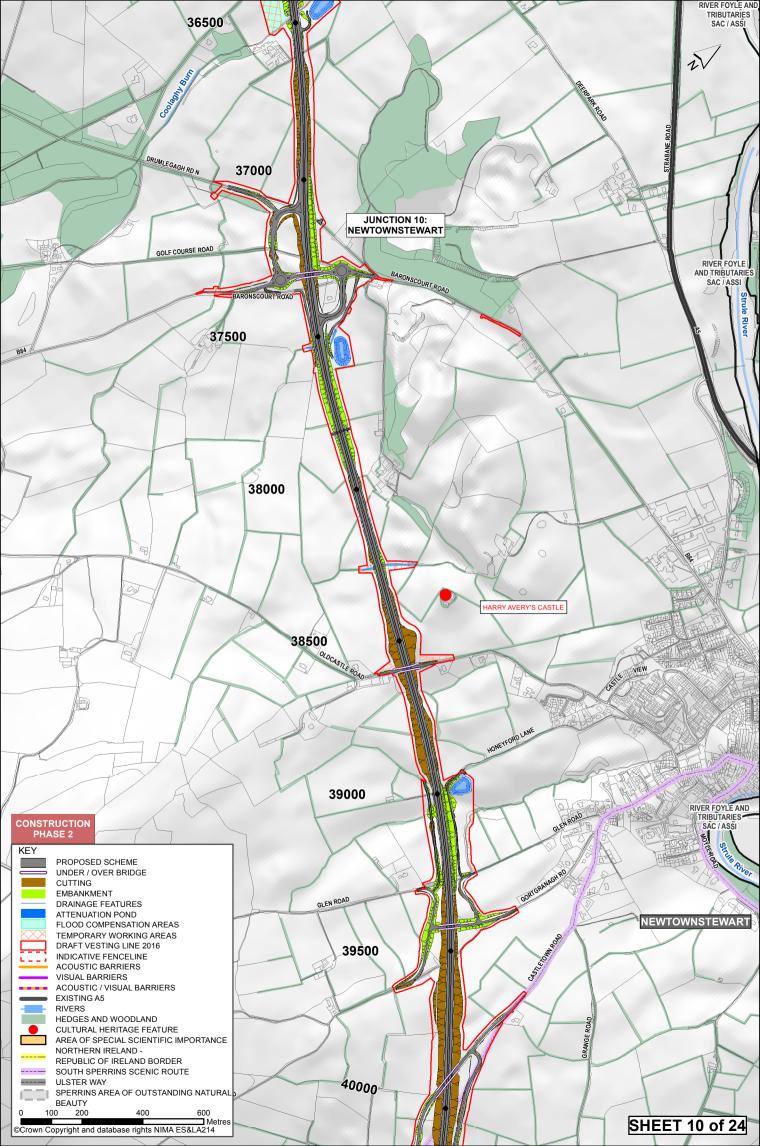


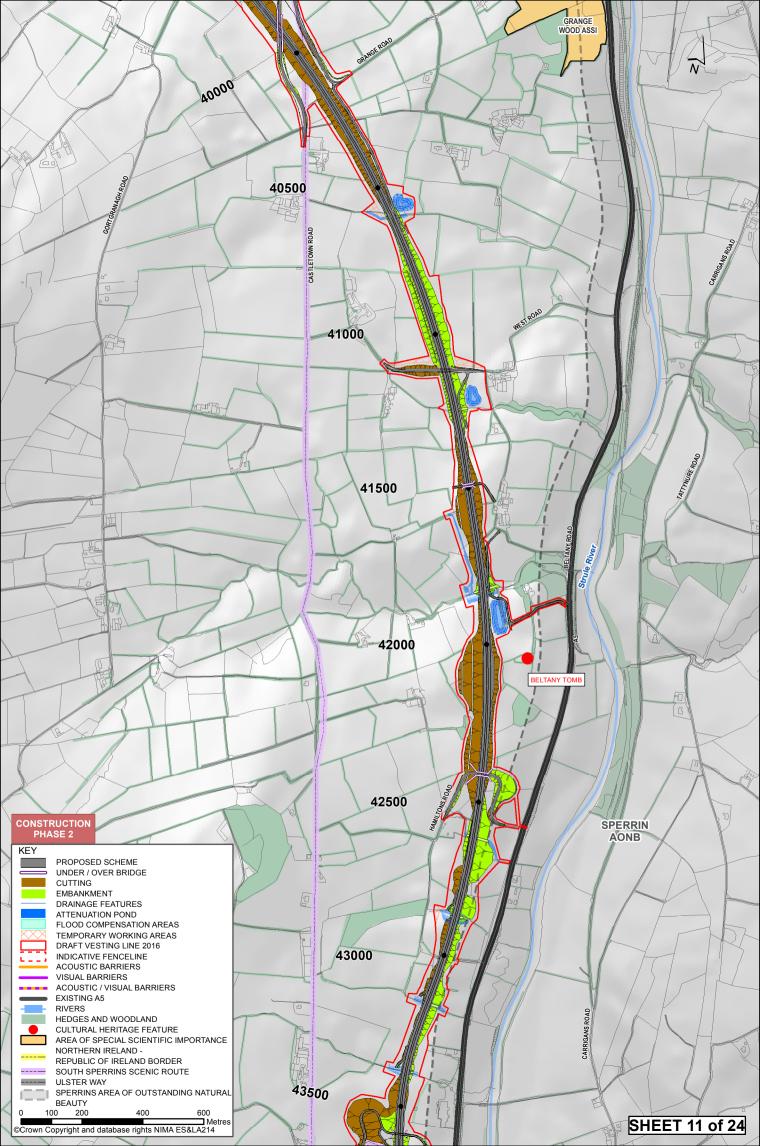


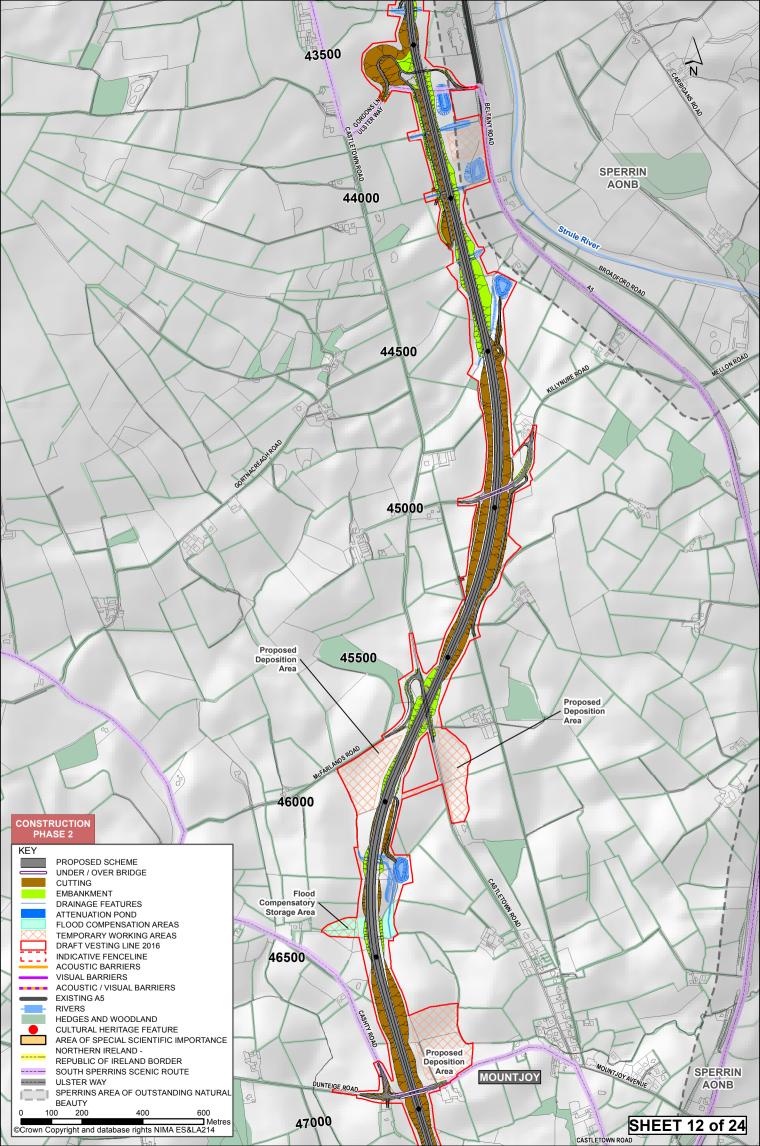


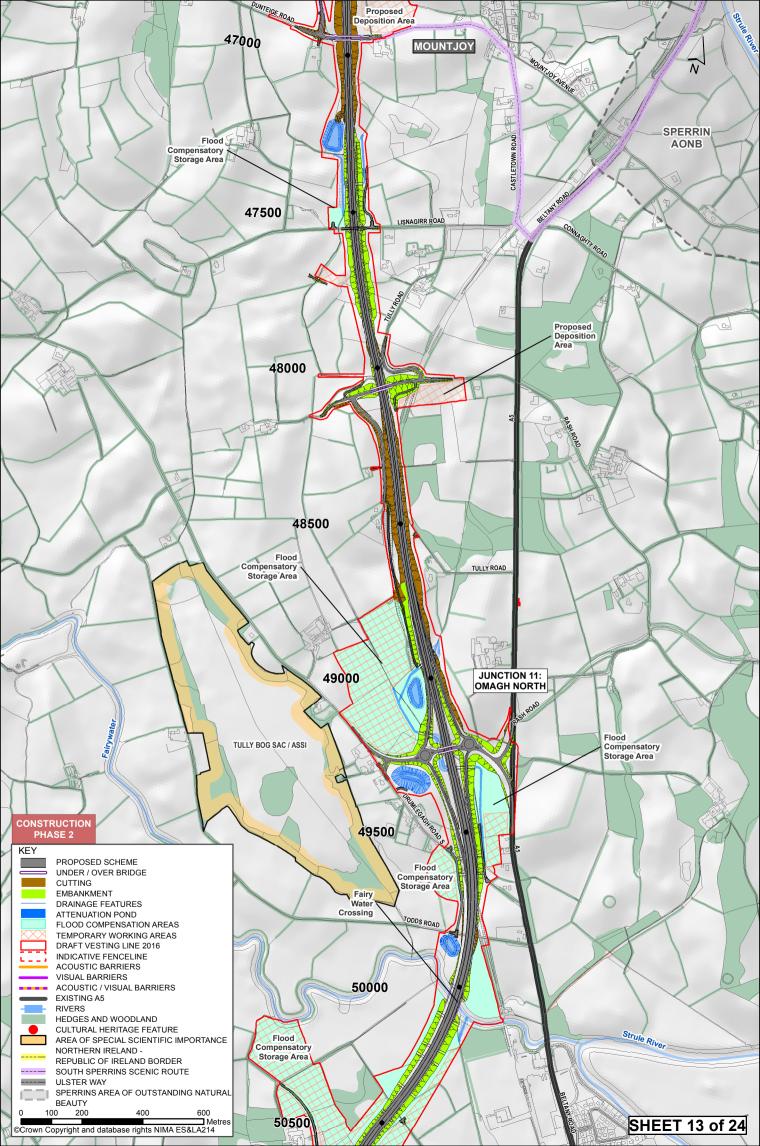


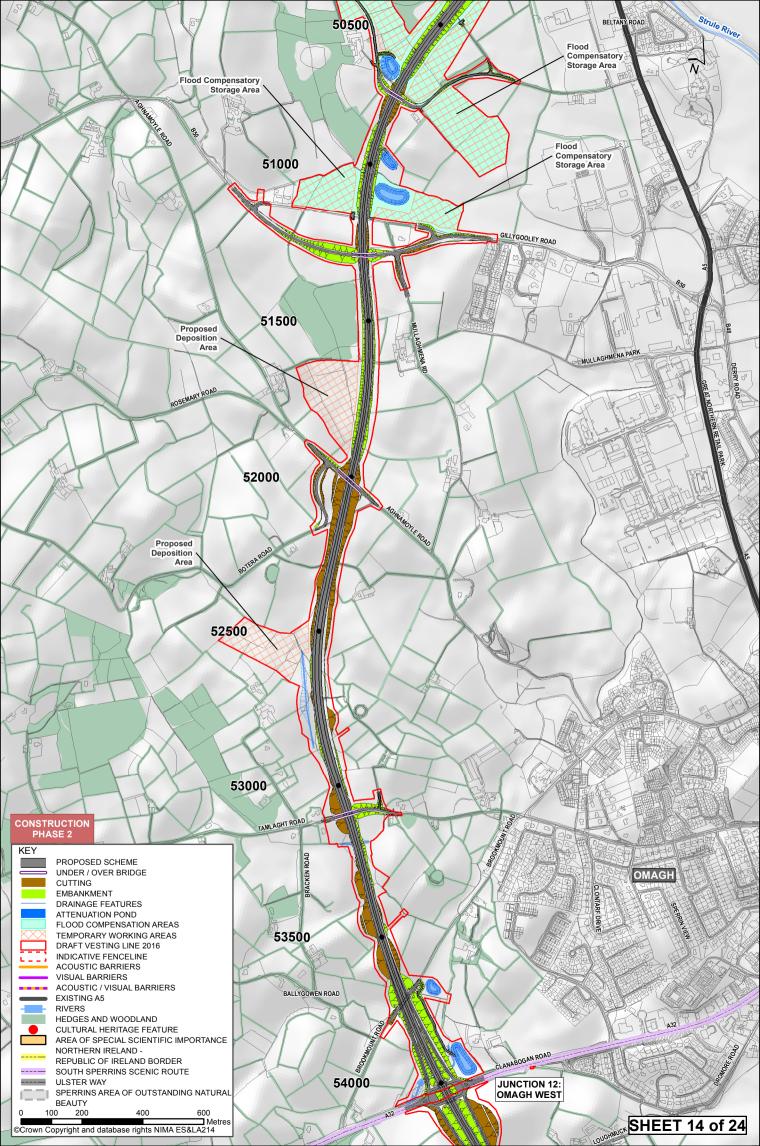


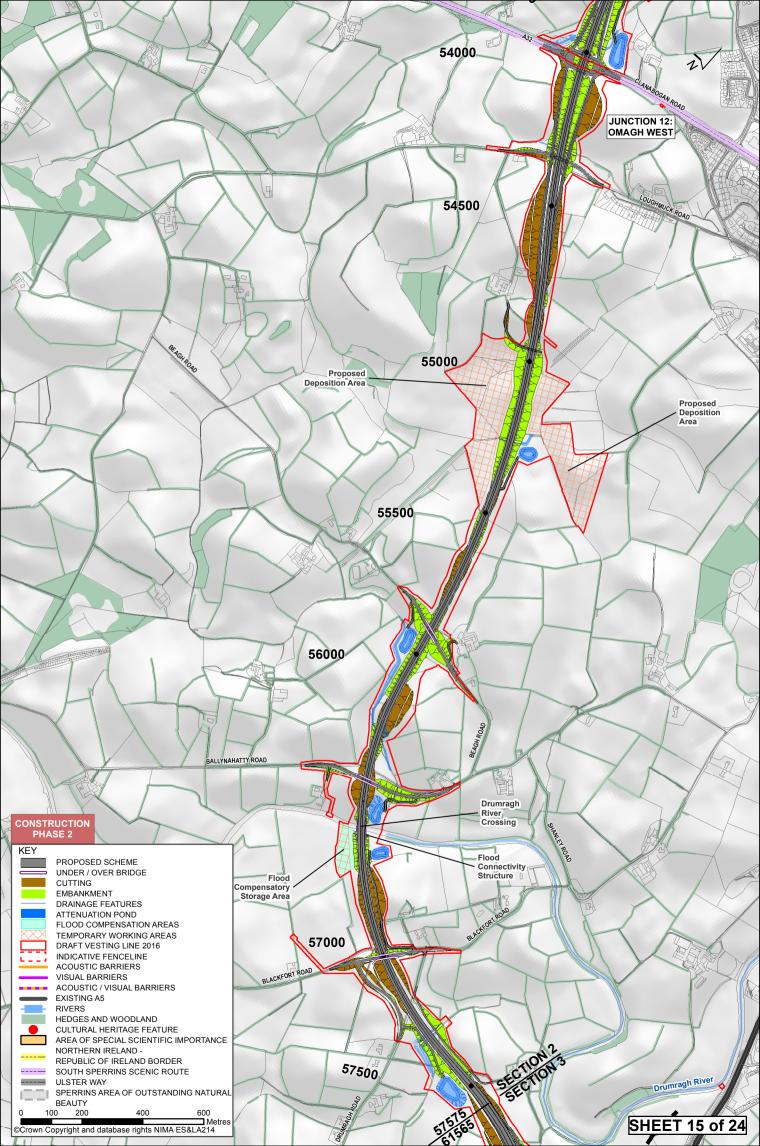


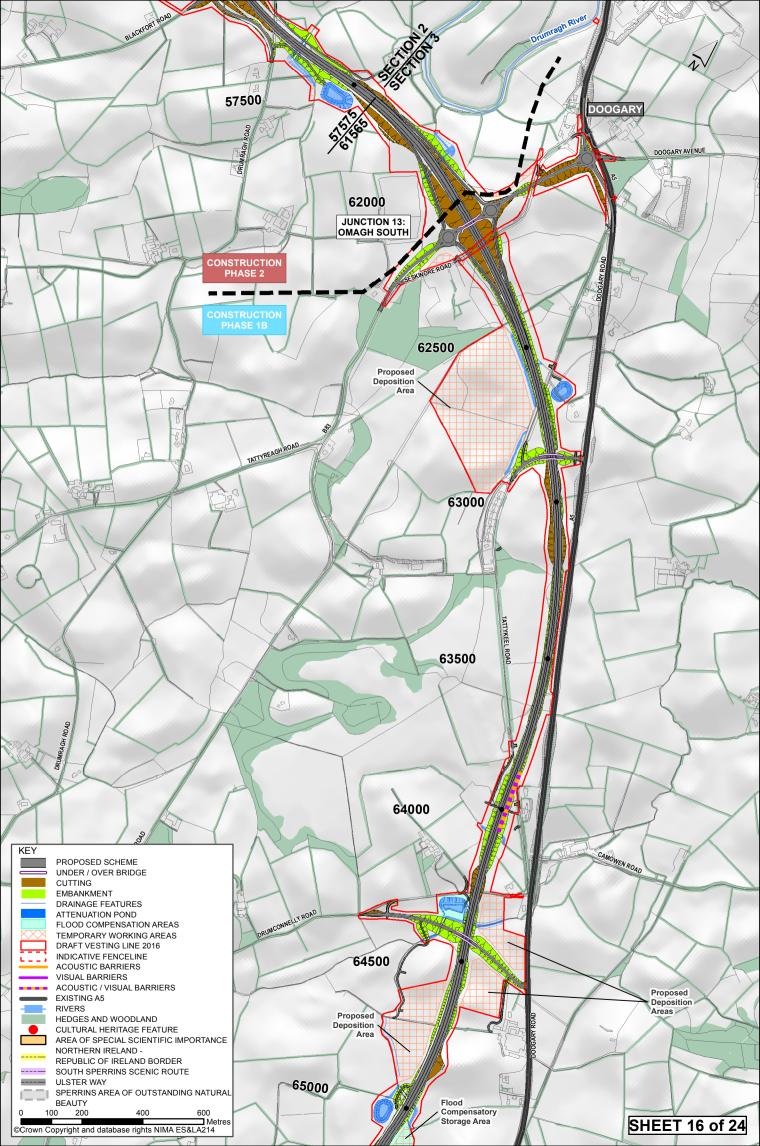


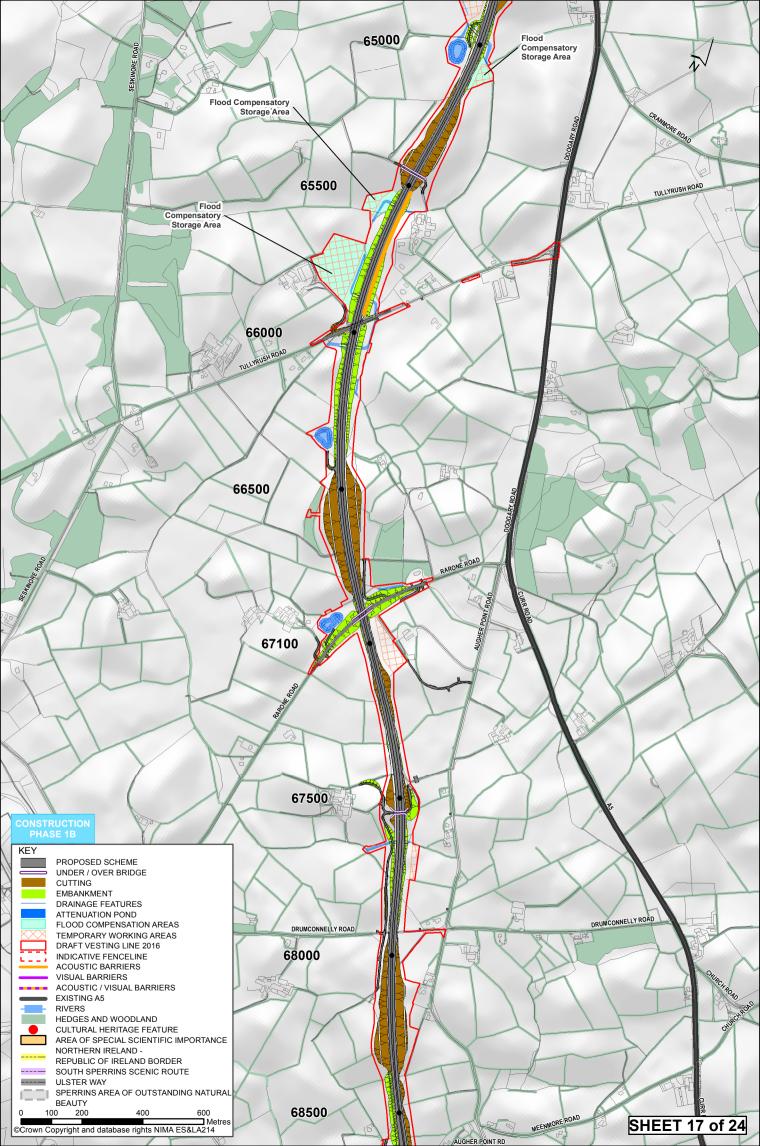


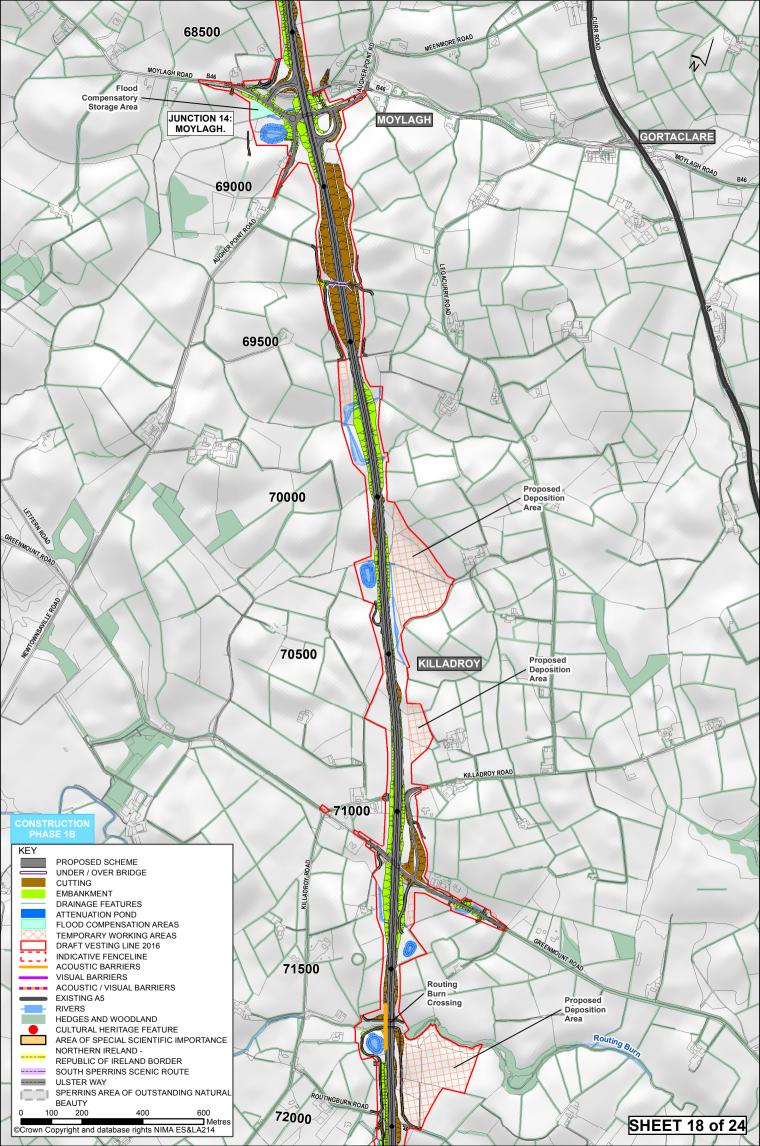


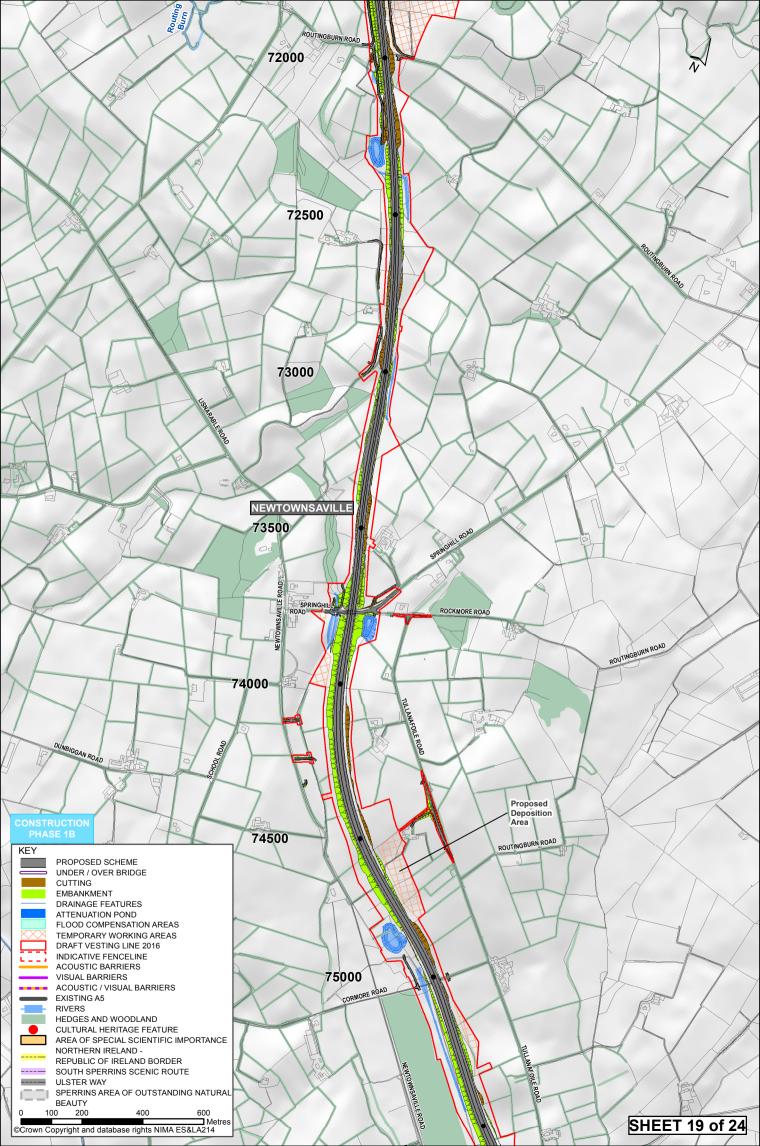


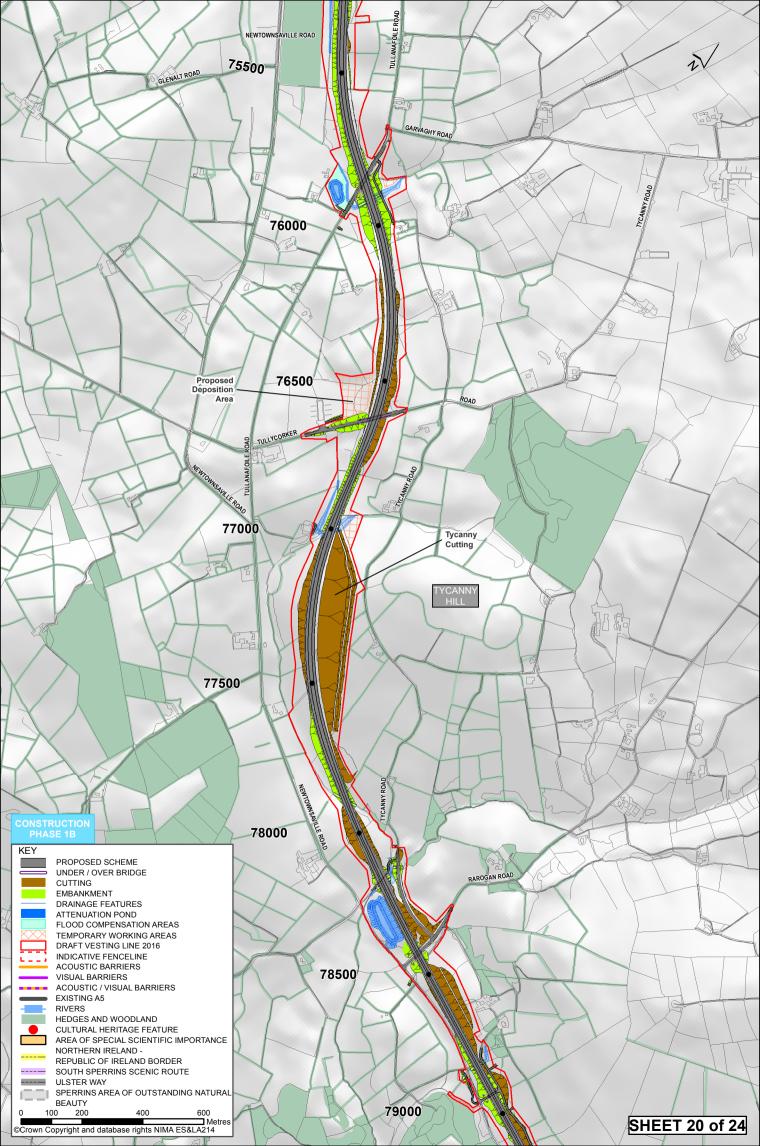


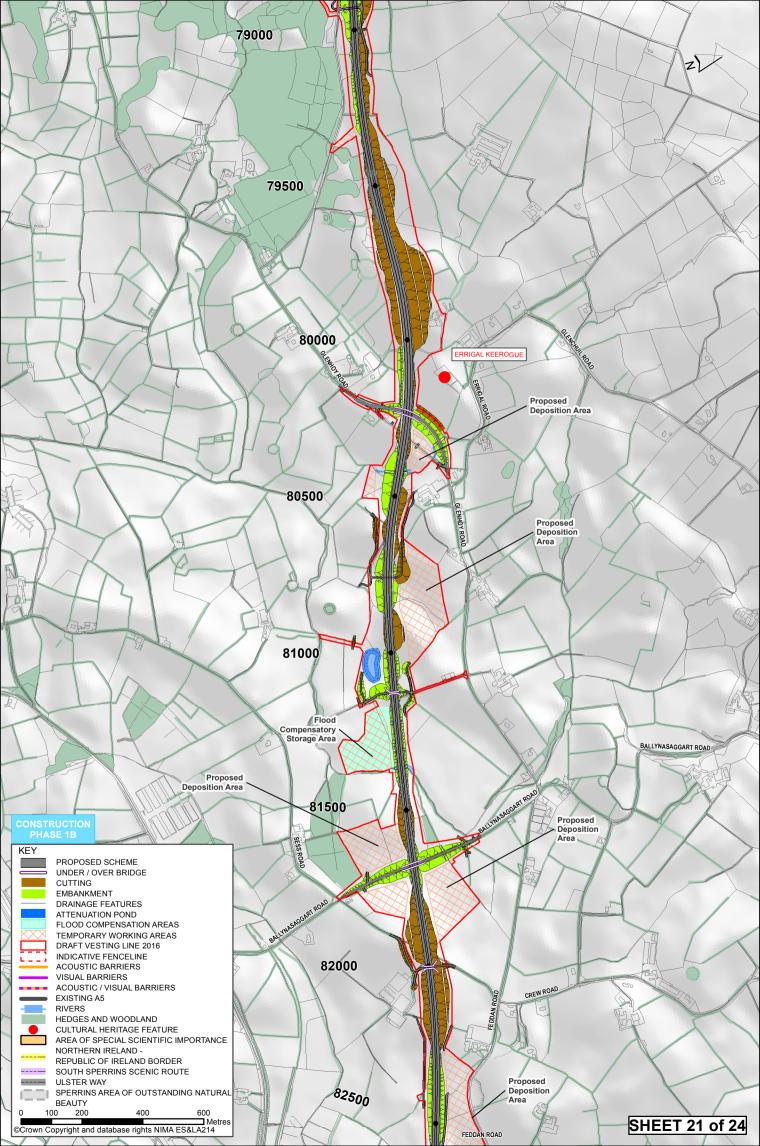


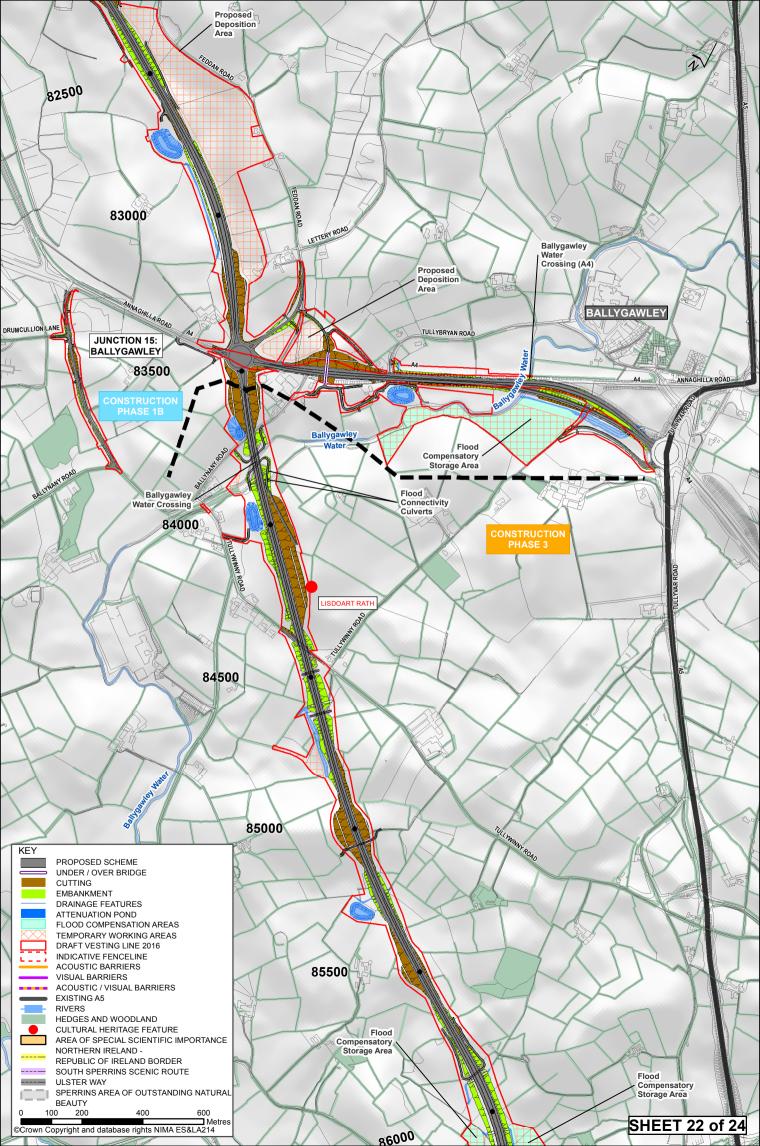


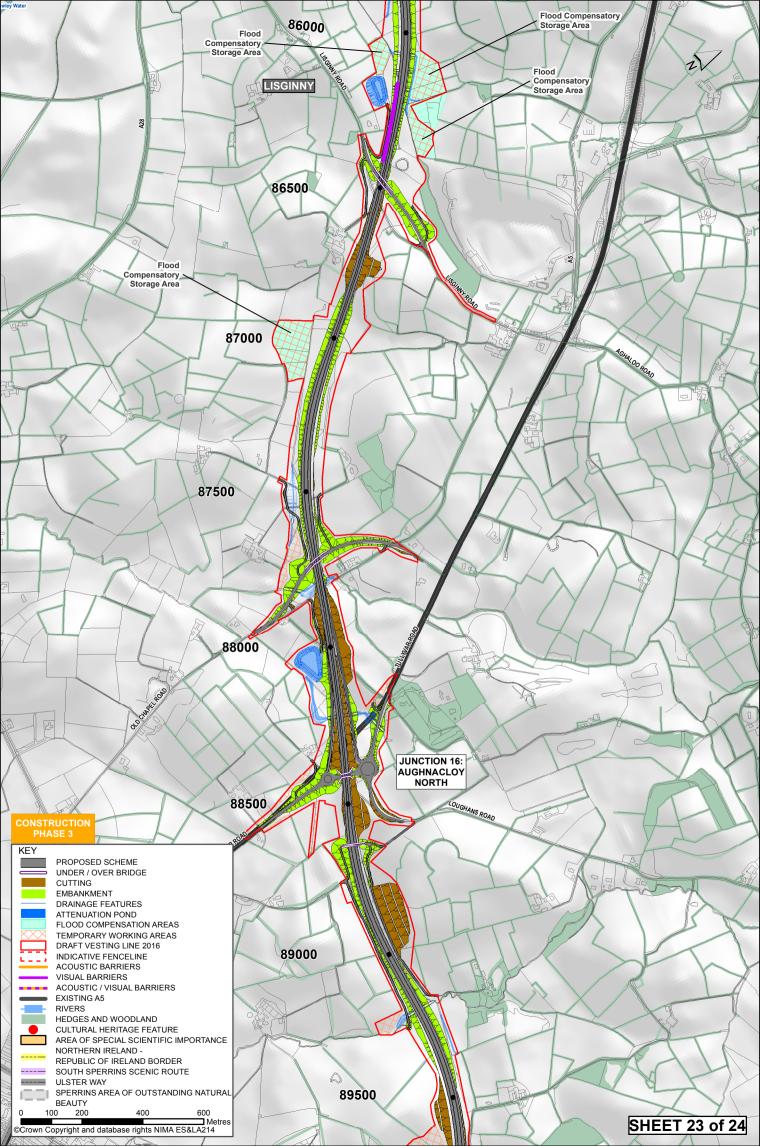


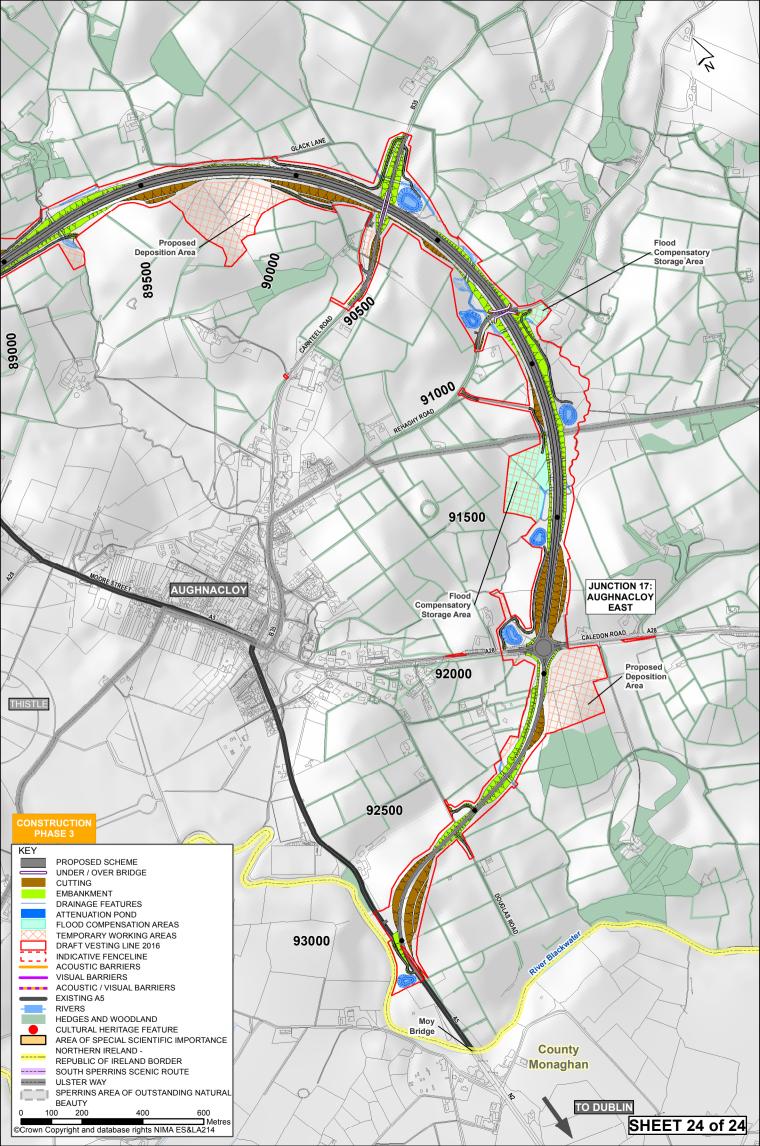


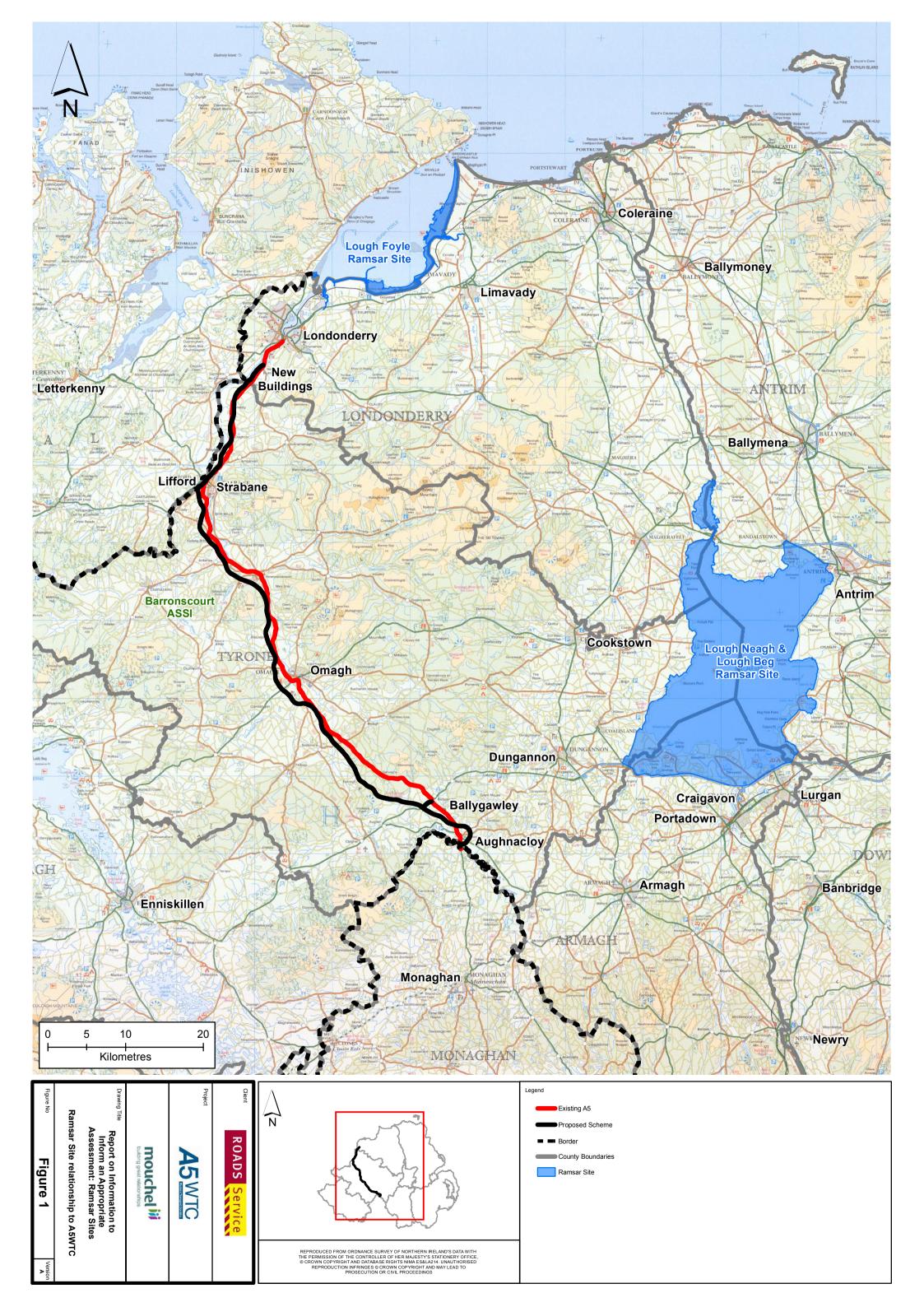


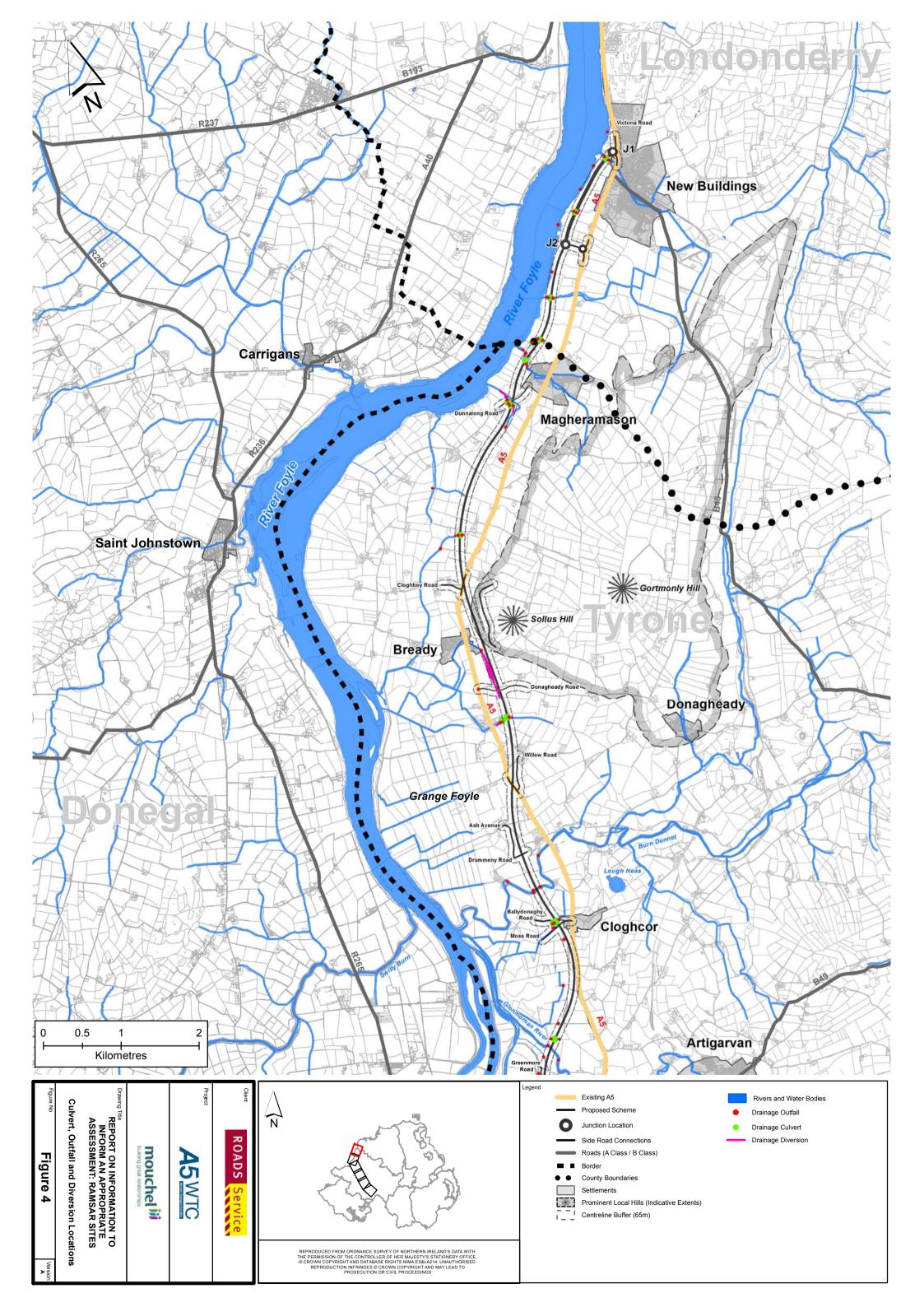


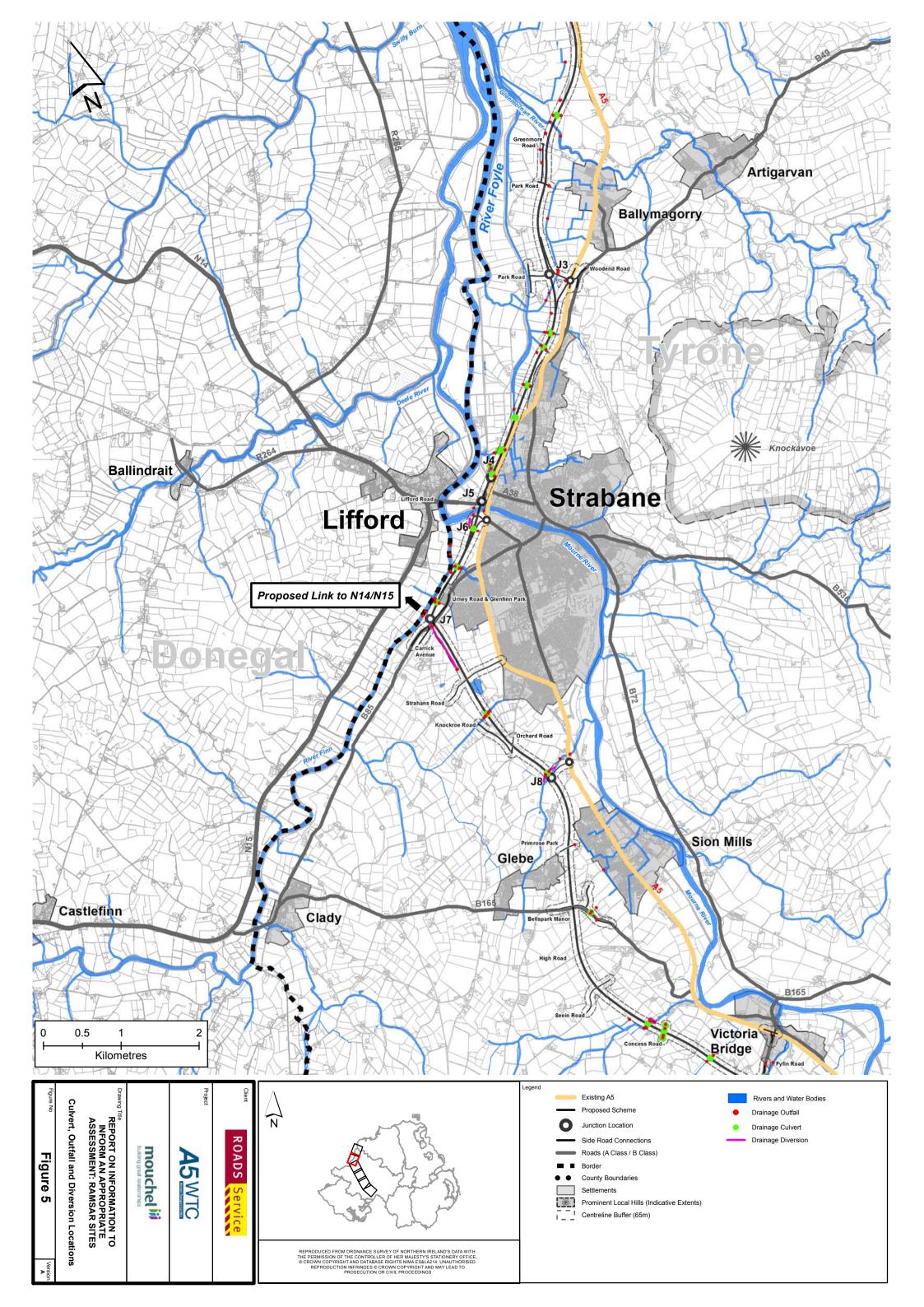


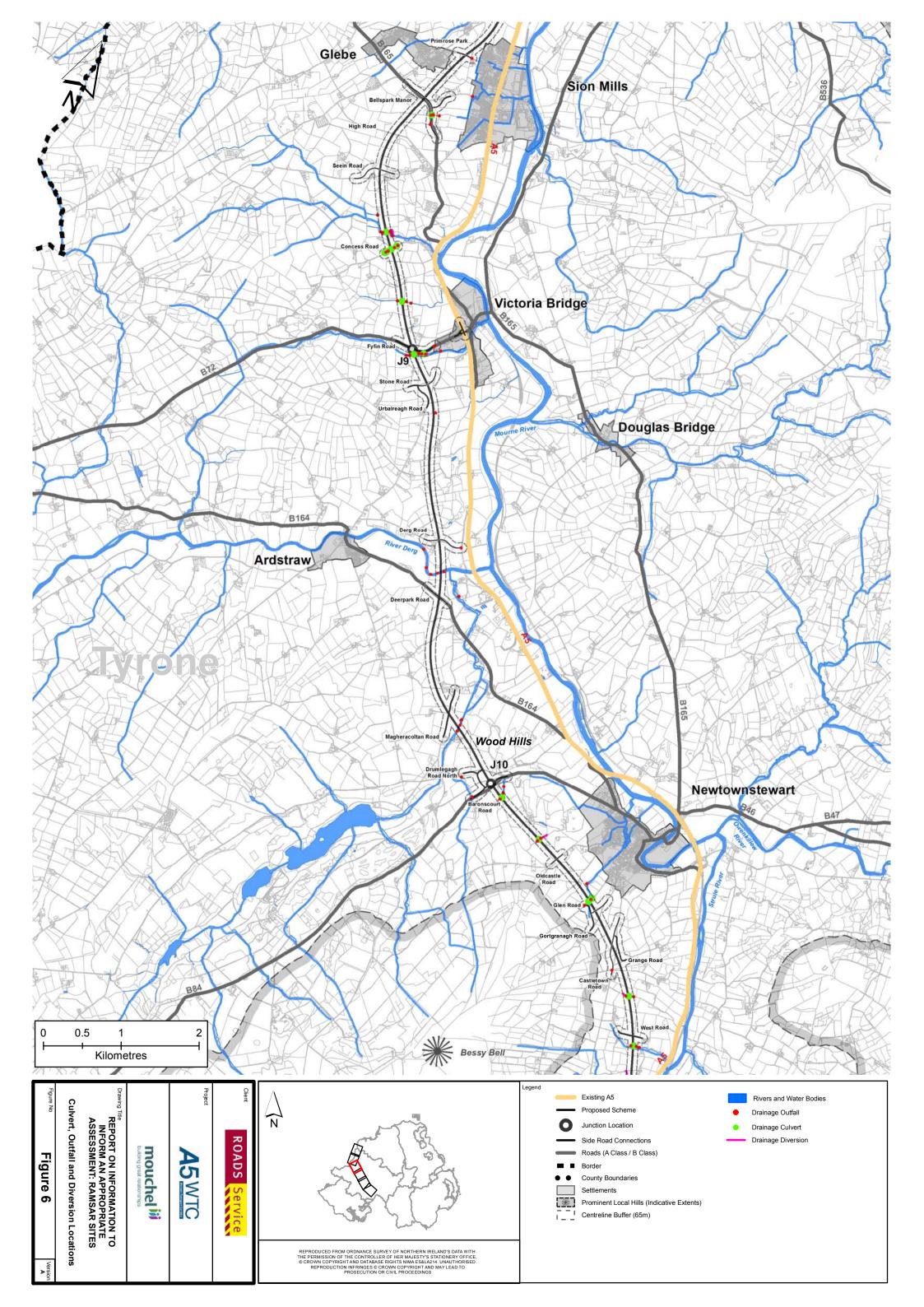


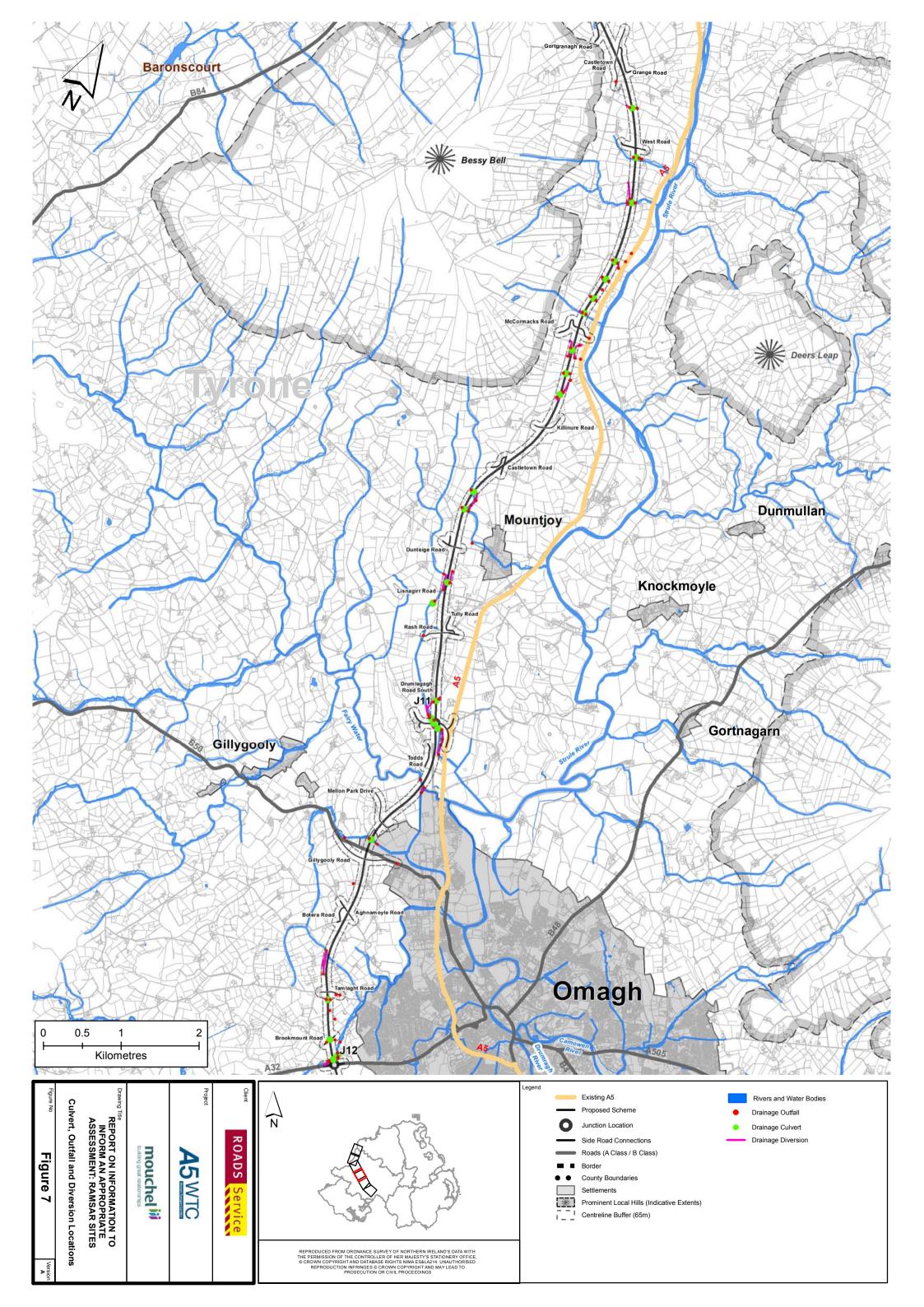


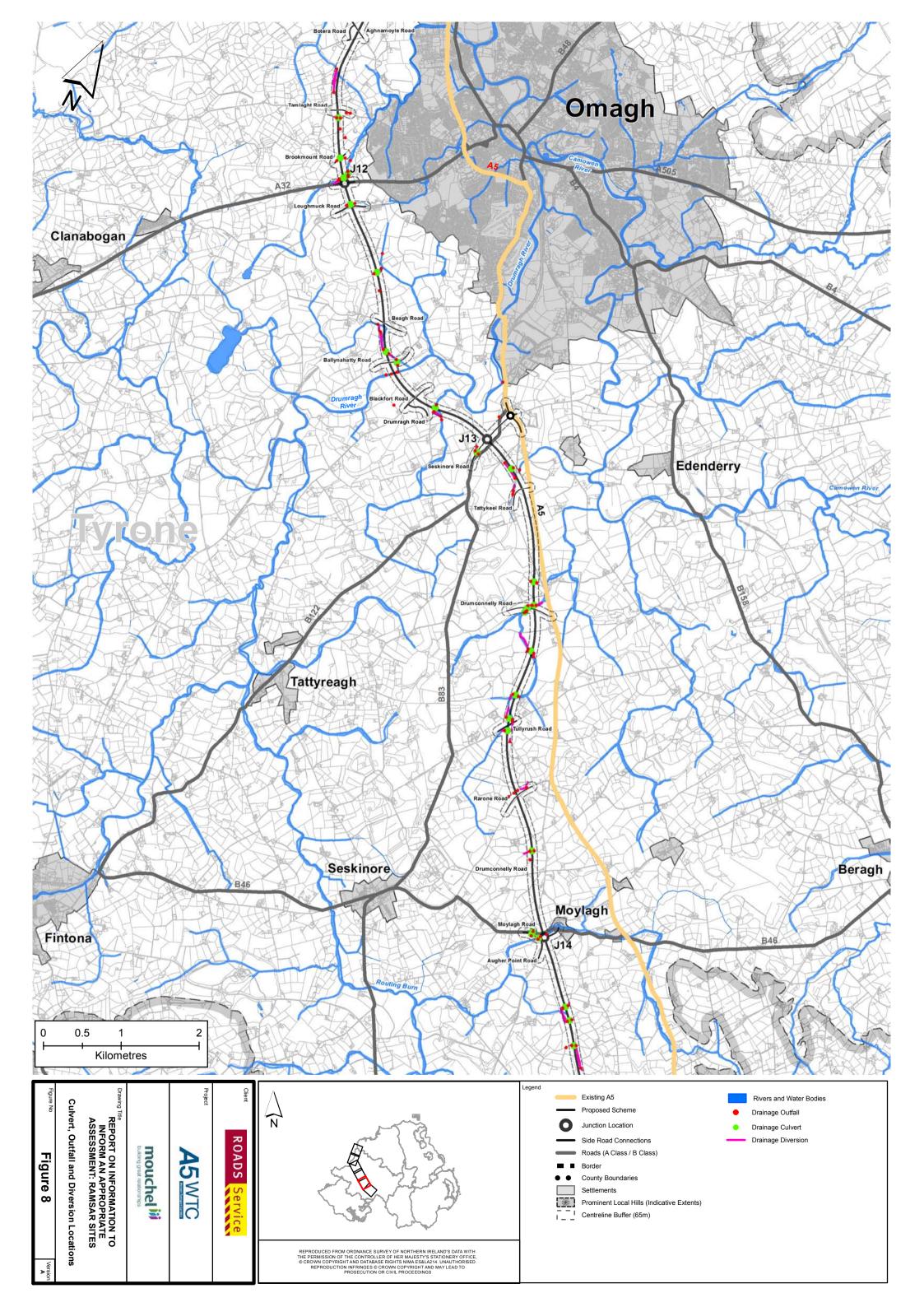


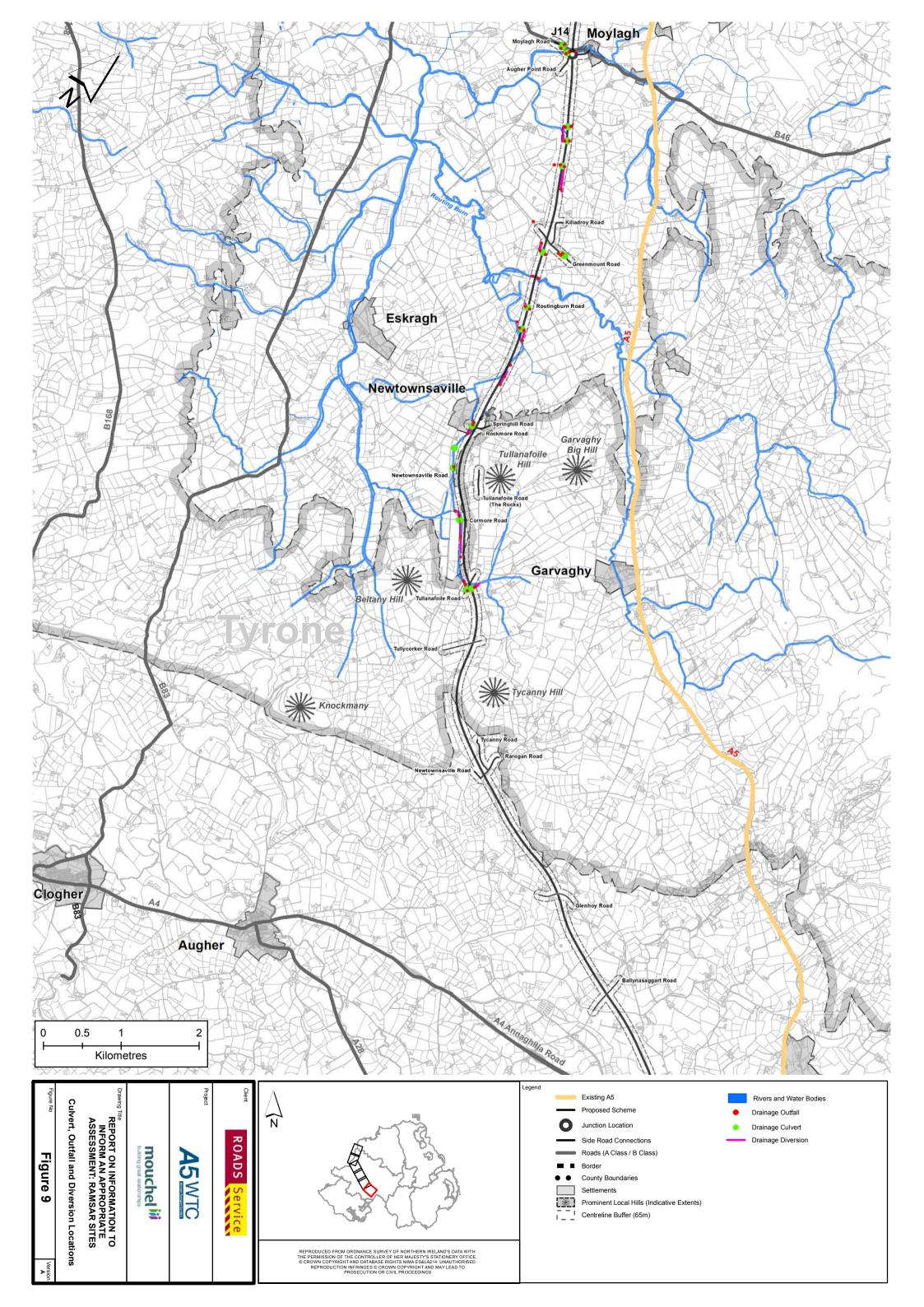


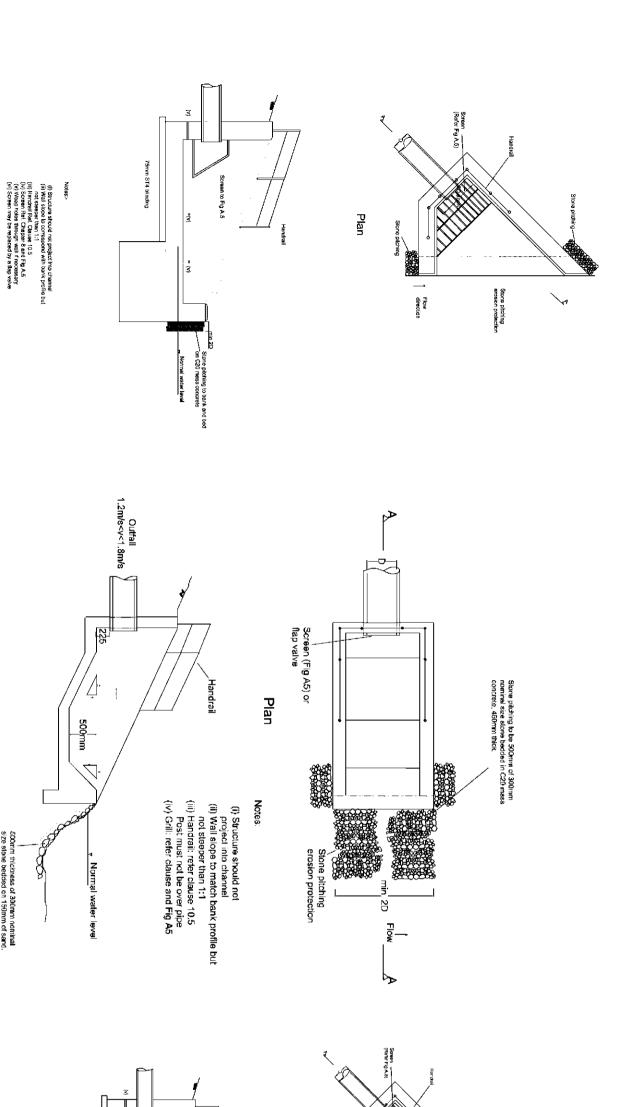












Bleev Steer

Stone pitching erosion protection

How direction

Plan

Figure A3: Headwall with Stilling Basin

Section 'A-A'

500mm thickness of 300mm nominal size stone bedded on 150mm of sand.

75mm \$⁻⁴ of nding

(M)

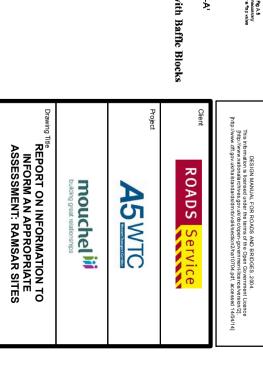
Stone pitching to bank and bad on C20 mass concrete Vormal water level

Figure A1: Typical Outfall Headwall

Section 'A-A'

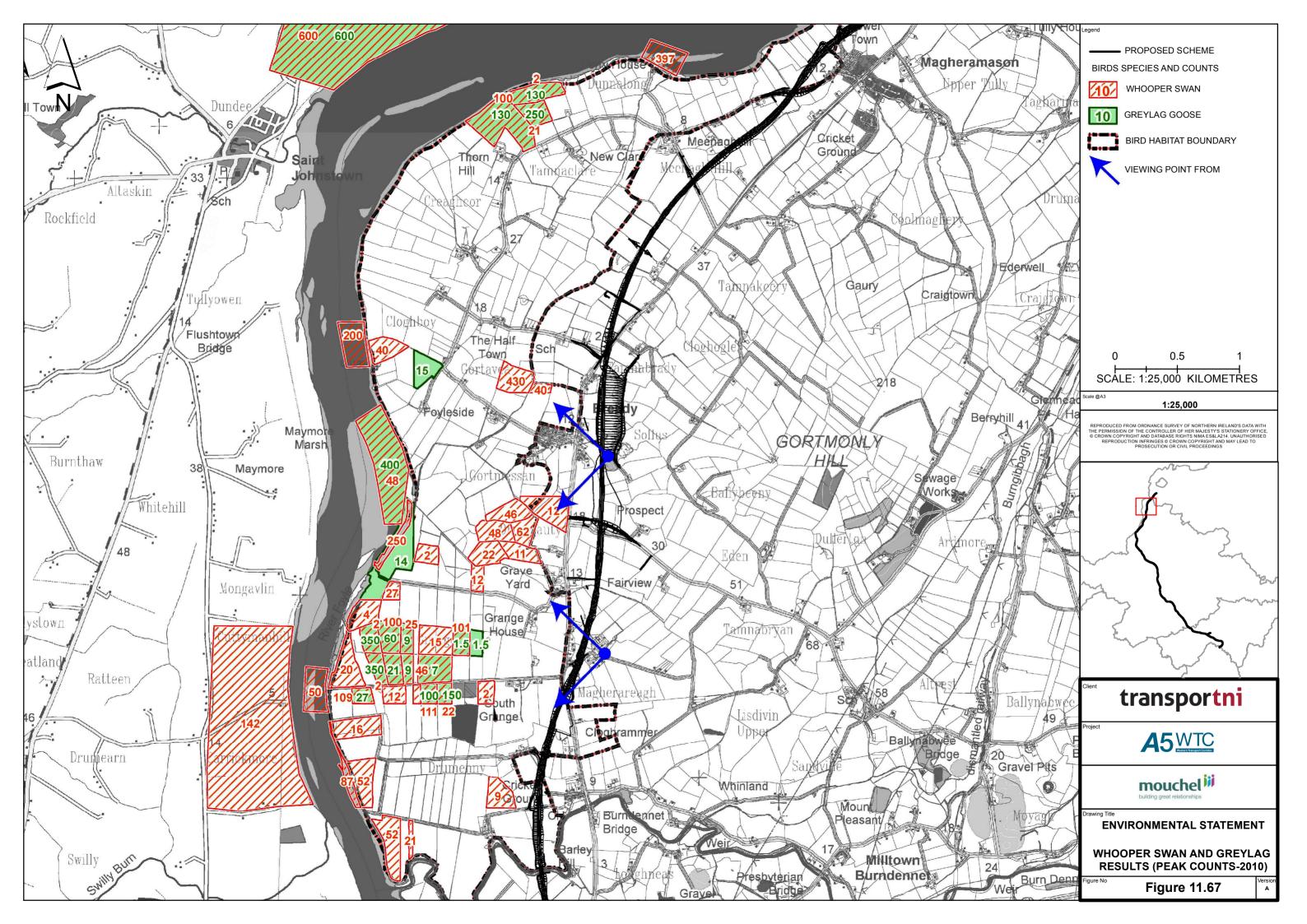


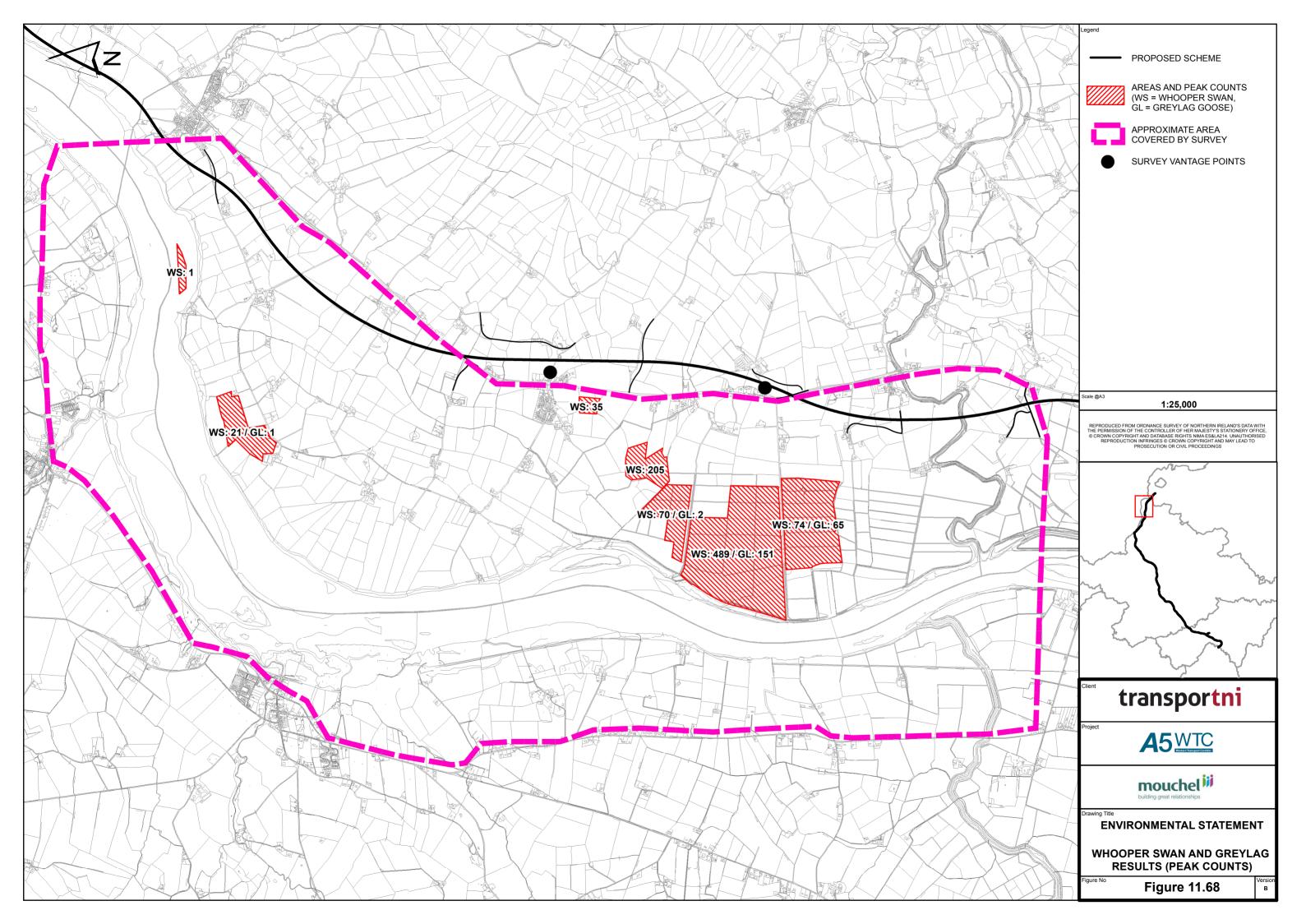
Figure A4: Headwall with Baffle Blocks



DMRB HEADWALL SCHEMATICS

Figure 10







Appendix 2: Culvert Information

Table A2.1 Salmonid Potential, Watercourse Identification and Crossing Designs

| Watercourse | Culvert ID | Salmonid Potential (Y/N) | Culvert Design | Dimensions | Approx. Chainage |
|----------------------|------------|--------------------------------|-------------------|------------|---------------------|
| New Buildings Stream | S1-PC-01 | Y | Box | 1.8 x 2.7 | 540 |
| UD_01 | S1-PC-02 | N | Box | 2.1 x 2.1 | 1330 |
| Gortin Hall Drain | S1-PC-03 | Y | Box | 1.8 x 4.5 | 2485 |
| UD_02 | S1-PC-04 | N | Pipe | 1.5m Ø | 3050 |
| UD_02 | S1-PC-32 | N | Pipe | 1.5m Ø | 3125 |
| Blackstone Burn | S1-PC-05 | Y | Box | 2.1 x 3.9 | 3375 |
| UD_04 | S1-PC-37 | Y | Box | 1.8 x 1.8 | 3900 |
| UD_04 | S1-PC-06 | Y | Box | 1.8 x 1.8 | 3980 |
| UD_04 | S1-PC-29 | Y | Box | 1.8 x 1.8 | 3950 |
| UD_05 | S1-PC-07 | Y | Box | 1.5 x 1.5 | 5800 |
| UD_05 | S1-PC-41 | Y | Box | 1.5 x 1.5 | 5825 |
| UD_07 | S1-PC-08 | Y | Box | 2.1 x 3.0 | 8240 |
| UD_07 | S1-PC-38 | Y | Box | 2.1 x 3.0 | 8250 |
| Ballydonaghy Drain | S1-PC-09 | N | Pipe | 1.8m Ø | 10990 |
| Ballydonaghy Drain | S1-PC-40 | N | Pipe | 1.8m Ø | 10990 |
| FD_04 | S1-PC-10 | N | Pipe | 1.5m Ø | 12600 |
| Strabane Glen Stream | S1-PC-16 | Υ | Вох | 2.7 x 3.0 | 15470 |
| Roundhill Drain | S1-PC-17 | N | Вох | 1.8 x 2.4 | 15680 |
| FD_13.b | S1-PC-18 | N | Pipe | 1.8m Ø | 16210 |



| Watercourse | Culvert ID | Salmonid Potential (Y/N) | Culvert Design | Dimensions | Approx. Chainage |
|------------------|------------|--------------------------------|-------------------|------------|---------------------|
| Backfence Drain | S1-PC-19 | N | Pipe | 2.4m Ø | 16650 |
| Nancy Burn | S1-PC-20A | N | Pipe | 0.6m Ø | 17090 |
| Nancy Burn | S1-PC-20B | N | Pipe | 1.2m Ø | 17090 |
| Nancy Burn | S1-PC-20C | N | Pipe | 0.6m Ø | 17090 |
| Nancy Burn | S1-PC-33 | N | Box | 2.4 x 3.9 | 17130 |
| Nancy Burn | S1-PC-42 | N | Box | 2.4 x 3.9 | 17200 |
| Park Road Drain | S1-PC-22 | N | Pipe | 1.5m Ø | 17380 |
| UD_08 | S1-PC-23 | N | Pipe | 1.8m Ø | 18180 |
| Urney Road Drain | S1-PC-24 | N | Box | 2.4 x 2.4 | 18720 |
| UD_10 | S1-PC-25 | N | Pipe | 1.8m Ø | 19240 |
| Flushtown | S1-PC-27 | Y | Box | 2.1 x 3.6 | 20900 |
| UD_12 | S1-PC-28 | Y | Вох | 2.1 x 2.1 | 21990 |
| UD_13.1 | S2-PC-54 | N | Pipe | 0.6m Ø | 28100 |
| UD_15 | S2-PC-01 | Y | Вох | 2.4 x 5.4 | 29900 |
| UD_16 | S2-PC-55 | N | Pipe | 1.2m Ø | 30150 |
| UD_16 | S2-PC-48 | N | Pipe | 1.2m Ø | 30150 |
| UD_16 | S2-PC-56 | N | Pipe | 1.2m Ø | 30150 |
| UD_16 | S2-PC-58 | N | Pipe | 1.2m Ø | 30150 |
| UD_17 | S2-PC-02 | Y | Вох | 1.8 x 2.7 | 30820 |
| UD_19 | S2-PC-03 | Y | Вох | 2.1 x 3.3 | 31500 |
| UD_19 | S2-PC-49 | Y | Box | 2.4 x 3.6 | 31500 |



| Watercourse | Culvert ID | Salmonid Potential (Y/N) | Culvert Design | Dimensions | Approx. Chainage | | |
|-------------------|------------|--------------------------------|-------------------|------------|---------------------|--|--|
| Scotts Mill Layde | S2-PC-07 | N | Pipe 1.5m Ø | | 37500 | | |
| UD_21 | S2-PC-08 | N | Вох | 1.2 x 2.1 | 38250 | | |
| UD_22 | S2-PC-09 | Y | Вох | 1.8 x 1.8 | 39250 | | |
| UD_22 | S2-PC-60 | Y | Box | 1.8 x 1.8 | 39250 | | |
| UD_23 | S2-PC-10 | Y | Box | 1.8 x 1.8 | 40600 | | |
| UD_24 | S2-PC-11 | N | Pipe | 1.8m Ø | 41250 | | |
| UD_26 | S2-PC-12 | N | Вох | 1.8 x 3.3 | 41850 | | |
| UD_28 | S2-PC-13 | Y | Box | 1.2 x 1.2 | 42600 | | |
| UD_29 | S2-PC-14 | Y | Box 1.2 x 1.5 | | 42850 | | |
| UD_31 | S2-PC-16 | Y | Box | 1.5 x 1.5 | 43150 | | |
| UD_32 | S2-PC-17 | Y | Вох | 1.8 x 2.4 | 43370 | | |
| UD_33 | S2-PC-18 | Y | Вох | 1.5 x 1.5 | 43780 | | |
| UD_34 | S2-PC-19 | N | Pipe | 1.2m Ø | 43950 | | |
| UD_35a | S2-PC-50 | Y | Вох | 1.2 x 1.2 | 44200 | | |
| UD_36 | S2-PC-20 | Y | Вох | 1.5 x 1.8 | 44500 | | |
| UD_37 | S2-PC-21 | N | Вох | 2.1 x 3.0 | 46200 | | |
| UD_39 | S2-PC-22 | Y | Вох | 1.8 x 3.0 | 46440 | | |
| UD_40 | S2-PC-47 | Y | Вох | 2.1 x 2.1 | 47350 | | |
| UD_43.1 | S2-PC-59 | Y | Вох | 2.1 x 2.1 | 47700 | | |
| UD_45 | S2-PC-26 | Y | Вох | 1.5 x 1.5 | 48950 | | |
| Tully Drain | S2-PC-27 | N | Вох | 3.9 x 5.1 | 49180 | | |
| | | | | | | | |



| | | Salmonid | | | |
|---------------------|------------|--------------------|-------------------|------------|---------------------|
| Watercourse | Culvert ID | Potential (Y/N) | Culvert Design | Dimensions | Approx. Chainage |
| Tully Drain | S2-PC-53 | N | Вох | 3.9 x 5.1 | 49250 |
| Tully Drain | S2-PC-28 | N | Вох | 3.9 x 5.1 | 49290 |
| Aghnamoyle Drain | S2-PC-29 | N | Вох | 4.5 x 5.1 | 51025 |
| UD_52 | S2-PC-32 | Y | Box | 1.2 x 1.2 | 53200 |
| UD_54 | S2-PC-34 | Y | Box | 1.5 x 1.5 | 53700 |
| UD_54 | S2-PC-51 | Y | Вох | 1.5 x 1.5 | 53700 |
| Fireagh Lough Drain | S2-PC-57 | Y | Вох | 2.1 x 3.0 | 53900 |
| Fireagh Lough Drain | S2-PC-36 | Y | Box | 2.1 x 3.0 | 53970 |
| UD_55 | S2-PC-38 | N | Pipe | 1.5m Ø | 54320 |
| UD_56 | S2-PC-39 | N | Box | 1.5 x 1.5 | 55250 |
| Loughmuck 0.1 | S2-PC-43 | N | Вох | 1.8 x 1.8 | 56300 |
| Loughmuck 0.2 | S2-PC-44 | N | Box 1.8 x 2.4 | | 56450 |
| Freughmore Drain | S2-PC-45 | Y | Вох | 2.4 x 2.4 | 57300 |
| UD_57 | S3-PC-84 | Y | Вох | 1.8 x 1.8 | 61850 |
| UD_57.2 | S3-PC-56 | Y | Вох | 1.8 x 1.8 | 62100 |
| UD_58 | S3-PC-51 | N | Вох | 1.5 x 3.0 | 62550 |
| UD_109 | S3-PC-52 | Y | Вох | 2.1 x 2.1 | 64080 |
| Ranelly Drain_0.5 | S3-PC-53 | Υ | Box | 2.7 x 3.3 | 64400 |
| Ranelly Drain_0.5 | S3-PC-74 | Y | Box | 2.7 x 3.3 | 64390 |
| Ranelly Drain_0.5 | S3-PC-82 | Y | Вох | 2.7 x 4.2 | 64500 |
| Ranelly Drain 1 | S3-PC-06 | Y | Box | 2.7 x 3.0 | 64980 |



| Watercourse | Culvert ID | Salmonid Potential (Y/N) | Culvert Design | Dimensions | Approx. Chainage |
|-------------------|------------|--------------------------------|-------------------|------------|---------------------|
| Ranelly Drain 2 | S3-PC-07 | Υ | Box | 2.4 x 2.7 | 65580 |
| Ranelly Drain 2.1 | S3-PC-08 | N | Вох | 2.1 x 5.1 | 65890 |
| Ranelly Drain 3 | S3-PC-10 | N | Вох | 2.1 x 2.7 | 66050 |
| UD_60 | S3-PC-11 | N | Box | 1.8 x 1.8 | 66870 |
| UD_61 | S3-PC-12 | N | Pipe | 1.5m Ø | 67630 |
| Letfern | S3-PC-14 | Y | Вох | 2.1 x 3.6 | 68750 |
| Letfern | S3-PC-58 | Y | Вох | 2.1 x 3.6 | 68780 |
| UD_61.2 | S3-PC-15 | Y | Box | 1.5 x 1.5 | 68700 |
| UD_61.2 | S3-PC-66 | Y | Pipe 0.6m Ø | | 68700 |
| UD_62 | S3-PC-16 | N | Pipe | 2.4m Ø | 69710 |
| UD_63.A | S3-PC-17 | N | Box 1.8 x 1.8 | | 69890 |
| UD_64 | S3-PC-18 | N | Вох | 1.5 x 2.7 | 70200 |
| UD_67.B | S3-PC-83 | Y | Вох | 1.8 x 1.8 | 71100 |
| UD_67.A | S3-PC-50 | Y | Вох | 1.8 x 1.8 | 71150 |
| UD_67 | S3-PC-19 | Y | Вох | 1.8 x 1.8 | 71350 |
| UD_68 | S3-PC-21 | Y | Вох | 1.8 x 1.8 | 72090 |
| UD_69 | S3-PC-22 | Y | Вох | 1.8 x 1.8 | 72380 |
| UD_71 | S3-PC-23 | Υ | Box | 2.1 x 2.7 | 73770 |
| UD_72.2 | S3-PC-64 | Y | Box | 2.4 x 3.0 | 74100 |
| UD_72.1 | S3-PC-65 | Y | Вох | 2.4 x 3.0 | 74210 |
| UD_110.2 | S3-PC-72 | N | Вох | 3.3 x 3.3 | 74900 |
| | ı | ı | | | |



| Watercourse | Culvert ID | Salmonid Potential (Y/N) | Culvert Design | Dimensions | Approx. Chainage |
|-------------|------------|--------------------------------|-------------------|------------|---------------------|
| UD_110 | S3-PC-54 | Y | Box | 2.1 x 2.4 | 75910 |
| UD_110 | S3-PC-60 | Y | Box | 2.1 x 2.4 | 75900 |
| UD_75.3 | S3-PC-55 | Y | Box | 1.8 x 1.8 | 77000 |
| UD_76 | S3-PC-29 | Y | Box | 2.1 x 2.1 | 77900 |

NB: Some watercourses with no salmonid potential recorded and/or agreed with Loughs Agency require box culverts for flood management proposes.





Appendix 3: Watercourse Diversion Information

Table A3.1 Watercourse Diversions

| Watercourse | Salmonid Interest (Y/N) | Diversion ID | Associated Culvert | Approximate Chainage |
|----------------------|-------------------------------|-----------------|--------------------|-------------------------|
| New Buildings Stream | Y | S1-WD-17 | S1-PC-01 | 540 |
| UD_01 | N | S1-WD-01 | S1-PC-02 | 1330 |
| Gortin Hall Drain | Y | S1-WD-16 | S1-PC-03 | 2485 |
| UD_02 | N | S1-WD-02 | S1-PC-04 & 32 | 3050 |
| Blackstone Burn | Y | S1-WD-03 | S1-PC-05 | 3375 |
| UD_04 | Y | S1-WD-05 | S1-PC-06, 29 & 37 | 3950 |
| UD_05 | Y | S1-WD-06 | S1-PC-07 & 41 | 5800 |
| UD_07 | Y | S1-WD-07 | S1-PC-08 & 38 | 8240 |
| Ballydonaghy Drain | N | S1-WD-08 | S1-PC-09 & 40 | 10990 |
| UD_08 | N | S1-WD-18 | S1-PC-23 | 18180 |
| Urney Road Drain | N | S1-WD-14 | S1-PC-24 | 18720 |
| UD_12 | Y | S1-WD-19 | S1-PC-28 | 21990 |
| UD_15.2 | Y | S2-WD-43 | None | 29800 |
| UD_15 | Y | S2-WD-01 | S2-PC-01 | 29900 |
| UD_19 | Y | S2-WD-33 | S2-PC-03 | 31500 |
| Scotts Mill Layde | N | S2-WD-05 | S2-PC-07 | 37500 |
| UD_21 | N | S2-WD-34 | S2-PC-08 | 38250 |
| UD_23 | Y | S2-WD-08 | S2-PC-10 | 40600 |
| UD_25 | N | S2-WD-35 | None | 41700 |
| UD_26 | N | S2-WD-09 | S2-PC-12 | 41850 |
| UD_28 | Y | S2-WD-10 | S2-PC-13 | 42600 |
| UD_29 | Y | S2-WD-36 | S2-PC-14 | 42850 |
| UD_31 | Y | S2-WD-41 | S2-PC-16 | 43150 |
| UD_32 | Y | S2-WD-42 | S2-PC-17 | 43370 |



| Watercourse | Salmonid Interest (Y/N) | Diversion ID | Associated Culvert | Approximate Chainage |
|---------------------|-------------------------------|-----------------|--------------------|-------------------------|
| UD_33 | Y | S2-WD-37 | S2-PC-18 | 43770 |
| UD_34 | N | S2-WD-38 | S2-PC-19 | 43980 |
| UD_35.1 | Y | S2-WD-11 | S2-PC-50 | 44200 |
| UD_36 | Y | S2-WD-13 | S2-PC-20 | 44500 |
| UD_37 | N | S2-WD-14 | S2-PC-21 | 46200 |
| UD_38 | Y | S2-WD-15 | None | 46400 |
| UD_40 | Y | S2-WD-16 | S2-PC-47 | 47300 |
| UD_42 | Y | S2-WD-18 | None | 47500 |
| UD_45 | Y | S2-WD-19 | S2-PC-26 | 48950 |
| Tully Drain | N | S2-WD-39 | S2-PC-27 & 53 | 49200 |
| Tully Drain 0.1 | N | S2-WD-20 | None | 49500 |
| Fairy Water 0.1 | N | S2-WD-21 | None | 50135 |
| UD_50 | Y | S2-WD-25 | None | 52700 |
| UD_52 | Y | S2-WD-40 | S2-PC-32 | 53200 |
| UD_54 | Y | S2-WD-26 | S2-PC-34 & 51 | 53700 |
| Fireagh Lough Drain | Y | S2-WD-27 | S2-PC-36 & 57 | 53950 |
| UD_55 | N | S2-WD-28 | S2-PC-38 | 54300 |
| UD_56 | N | S2-WD-29 | S2-PC-39 | 55250 |
| Loughmuck 0.1 | N | S2-WD-30 | S2-PC-43 & 44 | 56050 |
| Freughmore Drain | Y | S2-WD-31 | S2-PC-45 | 57300 |
| UD_57 | Y | S3-WD-32 | S3-PC-84 | 61850 |
| UD_57.2 | Y | S3-WD-66 | S3-PC-56 | 62000 |
| UD_58.3 | N | S3-WD-43 | None | 62500 |
| UD_108 | N | S3-WD-44 | None | 62650 |
| UD_108 | N | S3-WD-70 | None | 62800 |
| UD_109 | Y | S3-WD-45 | S3-PC-52 | 64100 |



| Watercourse | Salmonid Interest (Y/N) | Diversion ID | Associated Culvert | Approximate Chainage |
|-------------------|-------------------------------|-----------------|--------------------|-------------------------|
| Ranelly Drain 0.5 | Y | S3-WD-46 | S3-PC-53, 74 & 82 | 64450 |
| UD_119 | Y | S3-WD-04 | None | 65000 |
| Ranelly Drain 1 | Y | S3-WD-05 | S3-PC-06 | 65050 |
| Ranelly Drain 2 | Y | S3-WD-06 | S3-PC-07 | 65650 |
| Ranelly Drain 2.1 | N | S3-WD-07 | S3-PC-08 | 65800 |
| Ranelly Drain 2.3 | N | S3-WD-08 | None | 65900 |
| Ranelly Drain 3 | N | S3-WD-09 | S3-PC-10 | 66050 |
| Ranelly Drain 3.1 | Y | S3-WD-10 | None | 66200 |
| UD_60.2 | Y | S3-WD-75 | None | 66800 |
| UD_61.0 | Y | S3-WD-11 | S3-PC-12 | 67650 |
| UD_61.2 | Y | S3-WD-47 | S3-PC-15 & 66 | 68650 |
| Letfern | Y | S3-WD-12 | S3-PC-14 | 68750 |
| Letfern 0.1 | Y | S3-WD-48 | S3-PC-58 | 68750 |
| UD_62 | N | S3-WD-13 | S3-PC-16 | 69700 |
| UD_63 | N | S3-WD-14 | S3-PC-17 | 69900 |
| UD_65 | N | S3-WD-16 | S3-PC-18 | 70200 |
| UD_66 | Y | S3-WD-17 | None | 70450 |
| UD_67.A | Y | S3-WD-18 | S3-PC-50 & 83 | 71270 |
| UD_67 | Y | S3-WD-19 | S3-PC-19 | 71300 |
| UD_68 | Y | S3-WD-20 | S3-PC-21 | 72100 |
| UD_69 | Y | S3-WD-21 | S3-PC-22 | 72400 |
| UD_70 | Y | S3-WD-22 | None | 73000 |
| UD_71 | Y | S3-WD-49 | S3-PC-23 | 73800 |
| UD_110.2 | N | S3-WD-51 | S3-PC-72 | 75300 |
| UD_110 | Y | S3-WD-50 | S3-PC-54 & 60 | 75900 |
| UD_111.3 | Y | S3-WD-53 | None | 76950 |



| Watercourse | Salmonid Interest (Y/N) | Diversion ID | Associated Culvert | Approximate Chainage |
|-------------|-------------------------------|-----------------|--------------------|-------------------------|
| UD_75.3 | Υ | S3-WD-54 | S3-PC-55 | 77000 |





Appendix 4: Outfall Information

Table A4.1 Summary of Individual HAWRAT, EQS and Downstream 'In-River' Sediment Assessment Results

| | | S X | | HAWRA' | T Acute | | | | | EQS Ass | essment | | Downstream | |
|-------------|----------------------------------|-------------------------|--|-------------------------------------|-----------------|------------------------------------|------------------------|----------------------------------|--------------|-------------------|--------------|-------------|-----------------|-------------|
| T T Sest | | Impact Assessment | | HAWRAT Chronic Impact Assessment | | Annual Average Dissolved Copper | | Annual Average Dissolved Zinc | | River Sediment | | | | |
| Outfall ID | Backgrour level m level m OIIIIE | Background level mg/ | | Soluble Copper | Soluble Zinc | Sediment | Low Flow Vel. (m/s) | Deposition Index | Value (μg/l) | Pass / Fail | Value (µg/l) | Pass / Fail | Value (mg/l) | Pass / Fail |
| S1 OF 01.1 | 6.5 | Υ | Wet/Retention Pond | Pass | Pass | Pass | n/a | - | 0.00 | Pass | 0.00 | Pass | 7 | Pass |
| S1 OF 02.1a | 6.5 | Υ | Wet/Retention Pond | Pass | Pass | Pass | n/a | - | 0.00 | Pass | 0.00 | Pass | 7 | Pass |
| S1 OF 2.1b | 6.5 | Υ | Wet/Retention Pond | Pass | Pass | Pass | n/a | - | 0.00 | Pass | 0.00 | Pass | 7 | Pass |
| S1 OF 25 | 6.5 | Υ | Wet/Retention Pond | Pass | Pass | Pass | n/a | 1 | 0.22 | Pass | 0.77 | Pass | 7 | Pass |
| S1 OF 40 | 2 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.12 | - | 0.22 | Pass | 0.75 | Pass | 3 | Pass |
| S1 OF 26 | 6 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.21 | - | 0.28 | Pass | 0.84 | Pass | 7 | Pass |
| S1 OF 05.1 | 7 | Υ | Swales/Grassed Channels & Wet/Retention Pond | Pass | Pass | Pass | 0.11 | - | 0.61 | Pass | 2.16 | Pass | 7 | Pass |
| S1 OF 07.1 | 6 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.13 | - | 0.65 | Pass | 2.28 | Pass | 9 | Pass |
| S1 OF 08 | 6 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.12 | - | 0.15 | Pass | 0.52 | Pass | 7 | Pass |
| S1 OF 10.1 | 6 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.12 | - | 0.21 | Pass | 0.75 | Pass | 7 | Pass |
| S1 OF 11 | 3.5 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.08 | 3 | 0.00 | Pass | 0.01 | Pass | 4 | Pass |
| S1 OF 12 | 3.5 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.07 | 1 | 0.00 | Pass | 0.00 | Pass | 4 | Pass |
| S1 OF 13 | 3.5 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.07 | 2 | 0.00 | Pass | 0.00 | Pass | 4 | Pass |
| S1 OF 42 | 7 | N | Swales/Grassed Channels & Wet/ Retention Pond | Pass | Pass | Pass | 0.04 | 53 | 0.43 | Pass | 1.51 | Pass | 8 | Pass |
| S1 OF 15 | 5 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.2 | - | 0.00 | Pass | 0.01 | Pass | 5 | Pass |



Information to Inform an Appropriate Assessment:

| ioimation to inioim an Appropria | te Assessment. | |
|----------------------------------|----------------|--|
| | Ramsar Sites | |

| | | z | | HAWRA [*] | T Acute | | /D. 4 = .01 | | | EQS Ass | essment | | Downstream River | |
|------------|------------------------------|-----------------------|--|--------------------|-----------------|----------|------------------------|---------------------|--------------|---------------------|--------------|------------------------|---------------------|-------------|
| | d TSS | erest Y/ | | Imp Assess | act | | VRAT Chr ct Assess | | | Average d Copper | | l Average Ived Zinc | | ver ment |
| Outfall ID | Background TSS level mg/l | Salmonid Interest Y/N | Mitigation | Soluble Copper | Soluble Zinc | Sediment | Low Flow Vel. (m/s) | Deposition Index | Value (µg/l) | Pass / Fail | Value (μg/l) | Pass / Fail | Value (mg/l) | Pass / Fail |
| S1 OF 16 | 5 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.2 | - | 0.00 | Pass | 0.01 | Pass | 5 | Pass |
| S1 OF 17 | 7 | N | Wet/Retention Pond | Pass | Pass | Pass | 0.04 | 53 | 0.16 | Pass | 0.57 | Pass | 10 | Pass |
| S1 OF 27 | 7 | N | Wet/Retention Pond | Pass | Pass | Pass | 0.1 | - | 0.38 | Pass | 1.35 | Pass | 9 | Pass |
| S1 OF 27a | 7 | N | Wet/Retention Pond | Pass | Pass | Pass | 0.1 | - | 0.12 | Pass | 0.41 | Pass | 8 | Pass |
| S1 OF 29.1 | 7 | N | Wet/Retention Pond | Pass | Pass | Pass | 0.1 | - | 0.18 | Pass | 0.62 | Pass | 8 | Pass |
| S1 OF 39 | 7 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.09 | 33 | 0.24 | Pass | 0.86 | Pass | 8 | Pass |
| S1 OF 31 | 7 | N | Wet/Retention Pond | Pass | Pass | Pass | 0.08 | 37 | 0.53 | Pass | 1.86 | Pass | 9 | Pass |
| S1 OF 32 | 7 | N | Wet/Retention Pond | Pass | Pass | Pass | 0.07 | 14 | 0.25 | Pass | 0.89 | Pass | 7 | Pass |
| S1 OF 33 | 7 | N | Swales/Grassed Channels & Wet/ Retention Pond | Pass | Pass | Pass | 0.04 | 14 | 0.32 | Pass | 1.15 | Pass | 7 | Pass |
| S1 OF 34 | 7 | Ν | Dry/Detention Pond & Wet/Retention Pond | Pass | Pass | Pass | 0.04 | 53 | 0.85 | Pass | 3.01 | Pass | 9 | Pass |
| S1 OF 36 | 7 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.03 | 3 | 0.00 | Pass | 0.00 | Pass | 7 | Pass |
| S1 OF 37 | 7 | Υ | Swales/Grassed Channels | Pass | Pass | Pass | 0.03 | - | 0.00 | Pass | 0.00 | Pass | 7 | Pass |
| S1 OF 41 | 7 | Υ | Swales/Grassed Channels | Pass | Pass | Pass | 0.03 | 1 | 0.00 | Pass | 0.00 | Pass | 7 | Pass |
| S1 OF 22.2 | 7 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.03 | 3 | 0.00 | Pass | 0.00 | Pass | 7 | Pass |
| S1 OF 23.1 | 9.6 | N | Wet/Retention Pond | Pass | Pass | Pass | 0.03 | 90 | 0.81 | Pass | 2.85 | Pass | 13 | Pass |
| S1 OF 38 | 9.6 | N | Swales/Grassed Channels & Wet/ Retention Pond | Pass | Pass | Pass | 0.13 | 9 | 0.26 | Pass | 0.9 | Pass | 10 | Pass |
| S1 OF 24.1 | 9 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.17 | - | 0.74 | Pass | 2.61 | Pass | 12 | Pass |
| S2 OF 01 | 7 | N | Wet/Retention Pond | Pass | Pass | Pass | 0.11 | - | 0.81 | Pass | 2.87 | Pass | 11 | Pass |

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|--|---|--------------|--|
| | | Ramsar Sites | |

| | | z | | HAWRA | T Acute | | /D . T . O. | | | EQS Ass | sessment | | Downstream River | |
|------------|------------------------------|-----------------------|--|---------------|-----------------|----------|------------------------|---------------------|--------------|---------------------|--------------|------------------------|---------------------|-------------|
| | und TSS mg/l | erest Y/ | | Imp Assess | act | | VRAT Chr ct Assess | | | Average d Copper | | l Average Ived Zinc | | ver ment |
| Outfall ID | Background TSS level mg/l | Salmonid Interest Y/N | Mitigation | Soluble | Soluble Zinc | Sediment | Low Flow Vel. (m/s) | Deposition Index | Value (μg/l) | Pass / Fail | Value (μg/l) | Pass / Fail | Value (mg/l) | Pass / Fail |
| S2 OF 02 | 6 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.27 | - | 0.1 | Pass | 0.54 | Pass | 7 | Pass |
| S2 OF 03 | 6 | Y | Swales/Grassed Channels & Wet/Retention Pond | Pass | Pass | Pass | 0.14 | - | 0.42 | Pass | 1.47 | Pass | 6 | Pass |
| S2 OF 04 | 6 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.21 | - | 0.35 | Pass | 1.23 | Pass | 8 | Pass |
| S2 OF 05 | 6 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.02 | 5 | 0.00 | Pass | 0.00 | Pass | 6 | Pass |
| S2 OF 06 | 6 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.04 | 5 | 0.00 | Pass | 0.00 | Pass | 6 | Pass |
| S2 OF 08 | 6 | N | Wet/Retention Pond | Pass | Pass | Pass | 0.06 | 19 | 0.02 | Pass | 0.08 | Pass | 6 | Pass |
| S2 OF 09 | 8 | N | Swales/Grassed Channels & Wet/ Retention Pond | Pass | Pass | Pass | 0.04 | 41 | 0.48 | Pass | 1.7 | Pass | 9 | Pass |
| S2 OF 10 | 8 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.38 | - | 0.31 | Pass | 1.08 | Pass | 10 | Pass |
| S2 OF 33 | 7 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.24 | - | 0.3 | Pass | 1.04 | Pass | 9 | Pass |
| S2 OF 34 | 7 | N | Wet/Retention Pond | Pass | Pass | Pass | 0.2 | - | 0.6 | Pass | 2.09 | Pass | 9 | Pass |
| S2 OF 11 | 7 | N | Wet/Retention Pond | Pass | Pass | Pass | 0.4 | - | 0.16 | Pass | 0.57 | Pass | 8 | Pass |
| S2 OF 13 | 10 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.12 | - | 0.66 | Pass | 2.32 | Pass | 13 | Pass |
| S2 OF 35 | 10 | N | Wet/Retention Pond | Pass | Pass | Pass | 0.34 | - | 0.7 | Pass | 2.47 | Pass | 19 | Pass |
| S2 OF 39 | 10 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.24 | - | 0.87 | Pass | 3.08 | Pass | 19 | Pass |
| S2 OF 18 | 9 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.17 | - | 0.33 | Pass | 1.17 | Pass | 11 | Pass |
| S2 OF 19 | 8 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.17 | - | 0.33 | Pass | 1.16 | Pass | 10 | Pass |
| S2 OF 21 | 10 | N | Wet/Retention Pond | Pass | Pass | Pass | 0.2 | - | 0.25 | Pass | 0.88 | Pass | 11 | Pass |
| S2 OF 22 | 10 | N | Wet/Retention Pond | Pass | Pass | Pass | 0.2 | - | 0.13 | Pass | 0.46 | Pass | 11 | Pass |
| S2 OF 23 | 9 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.06 | 5 | 0.00 | Pass | 0.01 | Pass | 9 | Pass |

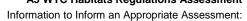
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| simation to inform an Appropriate Accessing | | |
|---|----|--|
| Ramsar Site | es | |

| | | z | | HAWRA [*] | Γ Acute | | VD 4 T 61 | | | EQS Ass | essment | | Downstream River | |
|------------|------------------------------|---------------|--|--------------------|-----------------|----------|------------------------|---------------------|--------------|---------------------|--------------|------------------------|---------------------|-------------|
| | nd TSS ig/l | Interest Y/N | | Imp Assess | act | | VRAT Chr ct Assess | | | Average d Copper | | l Average Ived Zinc | | ver ment |
| Outfall ID | Background TSS level mg/l | Salmonid Inte | Mitigation | Soluble Copper | Soluble Zinc | Sediment | Low Flow Vel. (m/s) | Deposition Index | Value (μg/l) | Pass / Fail | Value (μg/l) | Pass / Fail | Value (mg/l) | Pass / Fail |
| S2 OF 41 | 9 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.06 | 3 | 0.00 | Pass | 0.01 | Pass | 9 | Pass |
| S2 OF 24 | 10 | N | Wet/Retention Pond | Pass | Pass | Pass | 0.01 | 23 | 0.06 | Pass | 0.2 | Pass | 10 | Pass |
| S2 OF 25 | 10 | N | Wet/Retention Pond | Pass | Pass | Pass | 0.12 | - | 1.32 | Pass | 0.38 | Pass | 10 | Pass |
| S2 OF 27 | 10 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.15 | - | 0.12 | Pass | 0.43 | Pass | 10 | Pass |
| S2 OF 29 | 10 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.17 | - | 0.37 | Pass | 1.29 | Pass | 11 | Pass |
| S2 OF 37 | 10 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.09 | 64 | 0.57 | Pass | 1.99 | Pass | 13 | Pass |
| S2 OF 38 | 10 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.09 | 34 | 0.29 | Pass | 1.03 | Pass | 11 | Pass |
| S2 OF 30 | 7 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.04 | 3 | 0.00 | Pass | 0.00 | Pass | 7 | Pass |
| S2 OF 31 | 7 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.04 | 2 | 0.00 | Pass | 0.00 | Pass | 7 | Pass |
| S2 OF 32 | 10 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.24 | - | 0.24 | Pass | 0.84 | Pass | 11 | Pass |
| S3 OF 21 | 8 | N | Wet/Retention Pond | Pass | Pass | Pass | 0.11 | - | 0.73 | Pass | 2.58 | Pass | 12 | Pass |
| S3 OF 02 | 8 | Υ | Dry/Detention Pond | Pass | Pass | Pass | 0.20 | - | 0.19 | Pass | 0.57 | Pass | 9 | Pass |
| S3 OF 22 | 8 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.34 | - | 0.22 | Pass | 0.76 | Pass | 9 | Pass |
| S3 OF 03 | 8 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.13 | - | 0.75 | Pass | 2.65 | Pass | 20 | Pass |
| S3 OF 04 | 8 | N | Wet/Retention Pond | Pass | Pass | Pass | 0.1 | - | 0.71 | Pass | 2.50 | Pass | 11 | Pass |
| S3 OF 05 | 9 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.22 | - | 0.13 | Pass | 0.45 | Pass | 9 | Pass |
| S3 OF 06 | 7 | N | Swales/Grassed Channels & Wet/ Retention Pond | Pass | Pass | Pass | 0.13 | - | 0.52 | Pass | 1.82 | Pass | 7 | Pass |
| S3 OF 23 | 7 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.2 | - | 0.29 | Pass | 1.02 | Pass | 10 | Pass |
| S3 OF 07 | 6 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.42 | - | 0.02 | Pass | 0.7 | Pass | 6 | Pass |



Ramsar Sites



| | | Z | | HAWRA | Γ Acute | 1100 | ID AT Ch | ania. | | EQS Ass | essment | | | stream |
|------------|-------------------------|------------------|--------------------|----------------------|-----------------|-------------------------------------|------------------------|---------------------|------------------------------------|-------------|----------------------------------|-------------|-----------------|-------------|
| | nd TSS | st Y, | | Impact Assessment | | HAWRAT Chronic Impact Assessment | | | Annual Average Dissolved Copper | | Annual Average Dissolved Zinc | | | ver ment |
| Outfall ID | Background level mg/ | Salmonid Interes | Mitigation | Soluble Copper | Soluble Zinc | Sediment | Low Flow Vel. (m/s) | Deposition Index | Value (μg/l) | Pass / Fail | Value (μg/l) | Pass / Fail | Value (mg/l) | Pass / Fail |
| S3 OF 24 | 7 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.22 | - | 0.42 | Pass | 1.47 | Pass | 9 | Pass |
| S3 OF 08 | 9 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.13 | - | 0.7 | Pass | 2.48 | Pass | 16 | Pass |
| S3 OF 09 | 9 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.16 | - | 0.35 | Pass | 1.23 | Pass | 10 | Pass |
| S3 OF 10 | 9 | Υ | Wet/Retention Pond | Pass | Pass | Pass | 0.12 | - | 0.17 | Pass | 0.6 | Pass | 10 | Pass |

Outfall discharges directly to SAC designated watercourse

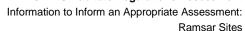
Outfall discharges upstream of SAC designated watercourse(s)





Table A4.2 Summary of Cumulative HAWRAT & EQS Assessment Results

| | | HAWRA | T Acute | | | | | EQS Asse | essment | | | |
|--|------------------------|----------------|---------------|----------|------------------------|------------------|--------------|--------------------------|--------------|-----------------------|--------------|-------------------------|
| | | lmp | pact sment | | AT Chronic Assessme | | | al Average ved Copper | | l Average ved Zinc | | stream River ediment |
| Outfall ID | Mitigation | Soluble Copper | Soluble Zinc | Sediment | Low Flow Vel. (m/s) | Deposition Index | Value (μg/l) | Pass / Fail | Value (μg/l) | Pass / Fail | Value (mg/l) | Pass/Fail |
| S1 OF 01.1 S1 OF 02.1a S1 OF 02.1b | 3 x Wet/Retention Pond | Pass | Pass | n/a | n/a | n/a | 0.00 | Pass | 0.00 | Pass | 7 | Pass |
| S1 OF 02.1a S1 OF 02.1b S1 OF 25 | 3 x Wet/Retention Pond | Pass | Pass | n/a | n/a | n/a | 0.00 | Pass | 0.00 | Pass | 7 | Pass |
| S1 OF 11 S1 OF 12 S1 OF 13 | 3x Wet/Retention Pond | Pass | Pass | n/a | n/a | n/a | 0.00 | Pass | 0.01 | Pass | 4 | Pass |
| S1 OF 12 S1 OF 13 | 2x Wet/Retention Pond | Pass | Pass | Pass | 0.7 | 3 | 0.00 | Pass | 0.01 | Pass | 4 | Pass |
| S1 OF 15 S1 OF 16 | 2x Wet/Retention Pond | Pass | Pass | Pass | 0.2 | - | 0.00 | Pass | 0.01 | Pass | 5 | Pass |
| S1 OF 17 S1 OF 27 S1 OF 27a | 3x Wet/Retention Pond | Pass | Pass | n/a | n/a | n/a | 0.55 | Pass | 1.93 | Pass | 10 | Pass |





| | | HAWRA | T Acute | | | | | EQS Asso | essment | : | | |
|--|--|----------------|----------------|----------|------------------------|------------------|--------------|--------------------------|--------------|------------------------|--------------|-------------------------|
| | | lmp | pact ssment | | AT Chronic Assessme | | | ıl Average ved Copper | | I Average lved Zinc | | stream River ediment |
| Outfall ID | Mitigation | Soluble Copper | Soluble Zinc | Sediment | Low Flow Vel. (m/s) | Deposition Index | Value (μg/l) | Pass / Fail | Value (μg/l) | Pass / Fail | Value (mg/l) | Pass/Fail |
| S1 OF 27 S1 OF 27a S1 OF 29.1 | 3x Wet/Retention Pond | Pass | Pass | n/a | n/a | n/a | 0.56 | Pass | 1.96 | Pass | 10 | Pass |
| S1 OF 33 S1 OF 34 | Swales/Grassed Channels 2x Wet/Retention Pond Dry/Detention Pond | Pass | Pass | Pass | 0.04 | 66 | 0.91 | Pass | 3.25 | Pass | 9 | Pass |
| S1 OF 22.2 S1 OF 41 S1 OF 37 S1 OF 36 | 2x Wet/Retention Pond, 2x Swales/ Grassed Channels | Pass | Pass | n/a | n/a | n/a | 0.00 | Pass | 0.01 | Pass | 7 | Pass |
| S1 OF 23.1 S1 OF 38 | 2 x Wet/Retention Pond & Swales/Grassed Channels | Pass | Pass | Pass | 0.03 | 99 | 0.86 | Pass | 3.04 | Pass | 13 | Pass |
| S2 OF 05 S2 OF 06 | 2x Wet/Retention Pond | Pass | Pass | Pass | 0.02 | 10 | 0.00 | Pass | 0.01 | Pass | 6 | Pass |
| S2 OF 21 S2 OF 22 | 2x Wet/Retention Pond | Pass | Pass | n/a | n/a | n/a | 0.34 | Pass | 1.2 | Pass | 12 | Pass |



| | | LI AWD / | AT Acute | | | | | EQS Ass | essment | | | |
|----------------------|-----------------------|----------------|----------------|----------|------------------------|------------------|--------------|--------------------------|--------------|-----------------------|--------------|-------------------------|
| | | lm | pact ssment | | AT Chronic Assessme | | | al Average /ed Copper | | l Average ved Zinc | | stream River ediment |
| Outfall ID | Mitigation | Soluble Copper | Soluble Zinc | Sediment | Low Flow Vel. (m/s) | Deposition Index | Value (μg/l) | Pass / Fail | Value (μg/l) | Pass / Fail | Value (mg/l) | Pass/Fail |
| S2 OF 23 S2 OF 41 | 2x Wet/Retention Pond | Pass | Pass | Pass | 0.06 | 8 | 0.01 | Pass | 0.02 | Pass | 9 | Pass |
| S2 OF 24 S2 OF 25 | 2x Wet/Retention Pond | Pass | Pass | Pass | 0.12 | - | 0.41 | Pass | 1.44 | Pass | 11 | Pass |
| S2 OF 29 S2 OF 27 | 2x Wet/Retention Pond | Pass | Pass | Pass | n/a | n/a | 0.44 | Pass | 1.55 | Pass | 12 | Pass |
| S2 OF 30 S2 OF 31 | 2x Wet/Retention Pond | Pass | Pass | Pass | 0.04 | 5 | 0.01 | Pass | 0.04 | Pass | 7 | Pass |
| S3 OF 10 S3 OF 09 | 2x Wet/Retention Pond | Pass | Pass | n/a | n/a | n/a | 0.46 | Pass | 1.61 | Pass | 11 | Pass |

Outfall discharges directly to SAC designated watercourse

Outfall discharges upstream of SAC designated watercourse(s)



Appendix 5: Draft Construction Environmental Management Plan



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A5 Western Transport

Draft Construction Environmental Management Plan (CEMP)

April 2014

Produced for





Transport Northern Ireland

Prepared by



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A5 Western Transport Corridor



Volume 3 – Appendices

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A5 Western Transport Corridor



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GLOSSARY OF TERMS AND ABBREVIATIONS

| A5WTC | A5 Western Transport Corridor |
|---------|--|
| СЕМР | Construction Environmental Management Plan |
| CEEQUAL | The Civil Engineering Environmental Assessment and Awards Scheme |
| COSHH | The Control of Substances Hazardous to Health Regulations |
| DRD | The Department for Regional Development |
| ECoW | Ecological Clerk of Works |
| EM | Environmental Manager |
| ES | Environmental Statement |
| HSEQ | Health, Safety, Environment and Quality Management |
| MER | Management Environmental Representative |
| NIEA | Northern Ireland Environment Agency |
| PMP | Project Management Plan |
| SWMP | Site Waste Management Plan |



1 INTRODUCTION

1.1 Project Summary

The Department for Regional Development (DRD) TransportNI is proposing improvements to the A5 Western Transport Corridor (A5WTC). The proposals include the construction of 85km of new build road at dual carriageway standard.

The scheme has been divided into three sections for the purposes of delivery, each subject to a separate construction contract.

1.2 Purpose of this Document

Each contractor is required to develop and implement a Construction Environmental Management Plan (CEMP) to help ensure that construction activities are planned and managed in accordance with the environmental requirements identified within the Environmental Statement (ES).

It is anticipated that the contractors use this document as the template for their individual CEMP.

Further details specific to the works being undertaken under each of the three construction contracts will be worked up by the Contractors into their CEMP as the scheme progresses.

1.3 Scope of the Construction Environmental Management Plan (CEMP)

This document provides a summary of the generic principles applicable to all three contracts and provides guidance on a consistent approach to ensure that the requirements of the ES are incorporated in the CEMP and within method statements prepared by each of the three Contractors.

The CEMP will document the Contractors' plans to ensure compliance with their legal and contractual obligations as well as implement best practice in construction environmental management.

The CEMP will be applicable to all works associated with the A5WTC scheme including those carried out by sub-contractors.

1.4 Structure of the CEMP

The structure of this guidance document mirrors that anticipated for the section CEMP to be prepared by each of the three Contractors. The contents can be summarised as follows:

- Chapter 1 Introduction
- Chapter 2 Training and Induction
- Chapter 3 Consultation and Communication
- Chapter 4 Environmental Impacts and Mitigation
- Chapter 5 Pollution Control and Contingency Plan
- Chapter 6 Auditing and Monitoring of Environmental Performance
- Annex 1 Environmental Advice Notes



- Annex 2 Construction Procedures
- Annex 3 Construction Information

1.5 Roles and Responsibilities

The Contractor is responsible to ensure that all members of the Project Team, including subcontractors comply with the procedures set out in the CEMP. The Contractor will ensure that all persons working on site are provided with sufficient training, supervision and instruction to fulfill this requirement.

The Contractor will ensure that all persons allocated specific environmental responsibilities are notified of their appointment and confirm that their responsibilities are clearly understood.

The principal environmental responsibilities for key staff can be identified as follows:

1.5.1 Site Manager

The Site Manager's environmental management responsibilities include but are not limited to:

- preparation and implementation of the CEMP;
- close liaison with the Environmental Manager to ensure adequate resources are made available for implementation of the CEMP;
- ensuring that the risk assessments for control of substances hazardous to health regulations (COSHH), noise and environmental risk are prepared and effectively monitored, reviewed and communicated on site; and
- managing the preparation and implementation of method statements. Ensuring that the Environmental Manager reviews all method statements and that relevant environmental protocols are incorporated and appended.

1.5.2 Environmental Manager (EM)

The responsibilities of Environmental Manager include but are not limited to:

- maintaining environmental records;
- providing guidance for the site team in dealing with environmental matters, including legal and statutory requirements affecting the works;
- reviewing environmental management content of method statements;
- reporting environmental performance to the Site Manager;
- liaison with statutory and non statutory bodies and third parties with an environmental interest in the scheme; and
- collection and collation of CEEQUAL evidence.

1.5.3 Engineering Staff

The engineers' environmental management responsibilities include but are not limited to:

reporting any operations and conditions that deviate from the CEMP to the Site Manager;



- taking an active part in site safety and environmental meetings; and
- ensuring awareness of the contents of method statements, plans, supervisors' meetings or any other meetings that concern the environmental management of the site.

1.5.4 Supervisors

The supervisors' environmental management responsibilities include but are not limited to:

- ensuring all personnel affected by a method statement are briefed and fully understand its content. Monitor operatives for compliance, including sub-contract operatives;
- implementation of environmental management activities required by the CEMP and works method statements; and
- ensuring that all inspections are carried out as prescribed in the CEMP.

1.5.5 Ecological Clerk of Works (ECoW) (part of the Client's supervisory site staff)

The ECoW will be on site when required to monitor work to ensure that no wildlife comes to harm and also to provide advice to site workers regarding best practices. ECoW duties include, but are not limited to:

- · monitoring site works;
- provision of status reports and updates;
- provision of advice to and liaison with workers on site;
- identifying environmental risks and developing environmental controls;
- delivery of environmental training for site personnel and sub-contractors; and
- · liaison with the Site Manager.

1.5.6 Archaeologist

The Archaeologist will be on site when required to monitor excavation works and also to provide advice to site workers regarding best practices. The archaeologist's duties include but are not limited to:

- completion of mitigation works; in the form of targeted trial trenching, archaeological excavation and watching briefs, as required;
- production of detailed method statements to define how archaeological mitigation is sequenced with earthworks operations;
- · certification of cleared areas prior to commencement of construction works;
- agreeing areas for topsoil strip or the use of toothless buckets;
- ensuring that all scheduled state care monuments and other known archaeological features requiring protection are demarcated with protective fencing and adequate signage;
- provision of induction training to site teams on archaeological controls;
- providing instructions to the site teams on how and when to access expert advice and opinions; and



• examination of incidental or unexpected finds; and agreeing programmes with the Site Manager for investigation and recording of the archaeological remains.



2 TRAINING AND INDUCTION

2.1 Site Induction

All personnel involved in the Scheme will receive environmental awareness training. The environmental training and awareness procedure will ensure that staff are familiar with the principles of the CEMP, the environmental aspects and impacts associated with their activities, the procedures in place to control these impacts and the consequences of departure from these procedures.

2.2 Specific Training and Awareness Raising

A project specific training plan that identifies the competency requirements for all personnel allocated with environmental responsibilities will be produced by the Contractor.

Training will be provided by the Contractor to ensure that all persons working on site have a practical understanding of environmental issues and management requirements prior to commencing activities.

A register of completed training is to be kept by the Environmental Manager.

The Site Manager will ensure that environmental emergency plans are drawn up and the Environmental Manager will conduct regular checks to ensure that the plan is effective by means of emergency drills.



3 CONSULTATION AND COMMUNICATION

3.1 Statutory and Non-Statutory Bodies

During the construction works, communication will be required with external parties such as, statutory authorities, interest groups and the public. Communication may take the form of scheduled meetings, site visits and written correspondence.

3.2 Public

The Site Manager shall ensure that the public is kept informed of operations that may have an effect upon them. This may involve letter drops and meetings to keep local residents up to date with progress with the scheme and any new operations that are to be carried out. The Site Manager will provide details of contacts within the project team for the public to contact should any issues arise.

3.3 Statutory Consents, Licences and Permits

The provisions for controlling, pumping and discharging water will be agreed with the Northern Ireland Environment Agency (NIEA). The Contractor will ensure that any licences required are in place prior to works commencing.

3.4 Environmental Alerts

Legislative changes or proposed improvements to manage processes on site that have a bearing on the commitments given in the Environmental Statement or other consultations will be communicated by the Site Manager to the Client.

3.5 Meetings and Records

Environmental issues relevant to the project will be discussed during weekly Site Progress Meetings attended by the Site Manager and Environment Manager. Environmental performance will also be discussed at regular HSEQ meetings. This will include dissemination and discussion of the findings of audits, environmental reports and other inspections where appropriate.



4 ENVIRONMENTAL IMPACTS AND MITIGATION

An environmental review of the Scheme has been completed to identify all the commitments and agreements made within the ES and other consultations. From this, a schedule of environmental commitments has been produced, which details deliverables including measures identified for the prevention of pollution or damage to the environment during the construction phase.

Environmental commitments have also been incorporated by the design team into archaeological, ecological, landscape and other relevant designs and specifications.



5 POLLUTION CONTROL AND CONTINGENCY PLAN

5.1 Surface Water Run-off, Groundwater and Silt

All operations on site will be carried out in a manner to minimise the production and discharge of silty waters. In particular, where any dewatering has to be carried out an assessment will be made as to the method of disposal of the waters and agreed with the Site Manager.

The management of surface water run-off will be defined within the operation specific method statement and risk assessment. This will ensure that the right solution is implemented for each works activity.

5.2 Fuel, Oil and Chemical Spillage

All fuel, oil and chemical deliveries will be supervised by a responsible person who will be trained to deal with any spillage to prevent a pollution problem occurring.

Storage tank levels will be checked before delivery to prevent overfilling and to ensure that the product is delivered to the correct tank.

The storage of materials in the main compound and work sites will be controlled in such a manner to ensure that materials are not damaged prior to use either through vehicle or people movements or through exposure to the elements.

All fuel, oil and chemicals will be stored on an impervious base within a bunded area and secured. The bund shall have a capacity of 110% of the volume of the products stored within it. All tanks and containers will be kept in a secure compound and be protected from vandalism, and will be clearly marked with their contents. Stores shall be located at least 10 metres from any watercourse.

All mobile plant will be refuelled in a designated area on an impermeable surface and away from drains. In case of any spillages there will be a spill response kit available at each refuelling point and within each machine working within the highway corridor. Where it is impractical to refuel within a bunded area, a drip tray will be available to catch any spills caused by over fuelling.

5.3 Concrete/Mortar Washout

There will be a designated area for the washout of concrete wagons, shoots and mortar bins at each work site. This will be either a lined skip or a pit lined with an impervious membrane to prevent the escape of the alkaline and silty waters entering groundwater or surface water. These pits will be located in areas of low groundwater sensitivity. Excess concrete remaining in the delivery wagon at the end of a pour will be returned to a designated collection area. Once each worksite has been completed any solid concrete in the washout area will be broken out and used either as suitable fill or disposed of to a licensed waste facility.

5.4 Material Storage

Stockpiles should be positioned as far away from sensitive receptors as possible and suitable measures implemented to prevent run off and dispersion if left for any length of time. Any powders



should be stored in sealed bags or silos prior to use. All deliveries of dry powder should be undertaken in a manner to minimise dust emissions.

5.5 Emergency Procedures

A Site Environmental Emergency Plan will be prepared prior to construction and communicated to all members of the project team including sub-contractors and Emergency Services.

The plan will detail the following controls:

- site drainage controls;
- fuel handling procedures;
- · incident notification procedures;
- pollution control equipment requirements;
- procedures for the control of dust and mud;
- · protection of aquifer; and
- measures to protect watercourses and wildlife from chemical spills or sediment laden run
 off.

Responsible staff will be trained in emergency procedures to form an Emergency Team, so that these procedures can be implemented swiftly and effectively. Periodic testing of emergency procedures will be undertaken by the Site Manager. The Environmental Manager will observe the test and to report on results. Any corrective actions are taken forward for review and approval.

Should an emergency incident occur, the Environmental Manager will be notified immediately. The emergency response will be co-ordinated by the Site Manager. Protective measures, mitigation, clean up and remediation actions will be identified from the evaluation and shall be put into place, having regard for the sensitivities of the environment. A record of the emergency incident will be kept to show the nature of the corrective action undertaken.



6 ENVIRONMENTAL PERFORMANCE MANAGEMENT

6.1 Environmental Risk Register

The Environmental Manager will prepare and maintain an Environmental Risk Register having regard for legal requirements, project environmental commitments the potential for aspects of works to cause significant environmental impact.

The Environmental Manager will record responsibilities assigned for actions required for mitigation and control of the environmental risks in the Environmental Risk Register.

The Environmental Risk Register will be subject to regular review by the Environmental Manager together with the Site Manager.

6.2 Consents and Exemptions

The Scheme will require consents and exemptions from various regulatory bodies in advance of construction activities. Copies of legal consents, permits, assents and licences of exemptions obtained will be held in the site environmental file by the Environmental Manager.

6.3 Method Statements and Risk Assessments

Specific environmental risks will be assessed during preparation of method statements. Actions and environmental constraints associated with specific construction operations will be included in method statements, field control sheets and activity plans where appropriate. Generic environmental requirements will be included in all method statements.

6.4 Inspections

Routine inspections to check that pollution control measures are in place will be undertaken by the Environmental Manager, who will produce weekly inspection reports.

Daily inspections will be made by the supervisors during each shift and any environmental problems or risks that are identified will be actioned as soon as is reasonably practicable. Any issues arising from the daily inspections will be notified to the Environmental Manager.

6.5 Auditing

A Project HSEQ internal audit schedule will be prepared. This will include: audits of the implementation of the CEMP and audits of sub-contractor and supplier environmental performance by the Environmental Manager.

6.6 **CEMP Review Programme**

The CEMP is a live document that will be updated by the Contractor and reviewed by the Environmental Manager on a monthly basis.

6.7 Environmental Complaints

The Environmental Manager will ensure that all environmental complaints and concerns will be responded to in 24 hours.



6.8 Notices of Non-Conformance

In instances where the requirements of the CEMP are not upheld a Non-Conformance and Corrective Action Notice will be produced. The Notice will be generated during the inspections conducted by the Supervisors, the Site Manager, Environmental Manager or external third-party audits. The Site Manager will be responsible for ensuring a corrective action plan is established and implemented to address the identified shortcoming.

6.9 Complaints Handling

The response to any complaints will be managed by the Site Manager, who will inform the Environmental Manager of any environmental complaints.

A Complaints Register will be maintained to detail the name and contact details of the complainant, date and time of the complaint, nature of complaint, action taken to resolve issues, and date of complaint handover.

6.10 Key Performance Indicators and Objectives

The Contractor will set Environmental Objectives in order to continuously improve environmental performance on the site. The Contractor will set objectives based on each significant environmental impact and they will be reviewed, and revised if necessary, on a monthly basis. Procedures, monitoring requirements and key performance indicators will be measured against achievable targets.



ANNEX 1: ENVIRONMENTAL ADVICE NOTES

Annex 1.1 EAN 001 In-stream Works Timing Restrictions

Table 6G.1 Tier One In-stream Works Timing Restrictions

| | | | | | | | | | | | | | | | Worki | ng Wi | ndow | S | | | | |
|-----------------|---------|------------------|------------------|----------------------|--|-------------|-----------------------|-----------------------|-----|-----------------------------|---|---|---|---|-------|-------|------|---|---|---|---|---|
| River | Section | Chainage | Structure Ref | Crossing Grid Ref | Fish present | Designation | FFD Categorisation | WFD Risk Category" | HQA | HMS | J | F | М | Α | М | J | J | A | s | 0 | N | D |
| Burn Dennet | 1 | 10500 | S1/B06 | IC 37261 04308 | Atlantic salmon; Brown trout; River/Brook lamprey; European eel. | - | Salmonid River | 2a | 40 | Obviously Modified | | | | | | | | | | | | |
| Glenmornan | 1 | 12700 | S1/B08 | IC 36548 01938 | Atlantic salmon; Brown trout; European eel. | - | Salmonid River | 1b | 31 | Significantly Modified | | | | | | | | | | | | |
| Mourne River | 1 | 17900 | S1/B14 | IH 33501 98061 | Atlantic salmon; Brown trout; European eel; River/Brook lamprey; Gudgeon. | SAC; ASSI | Salmonid River | 1b | 16 | Severely Modified | | | | | | | | | | | | |
| River Finn | 1 | 18700 - 19500 | No structure | - | Atlantic salmon; Brown trout; River/Brook lamprey. | SAC; ASSI | Salmonid River | 1a | | Obviously Modified | | | | | | | | | | | | |
| River Derg | 2 | 34330 | S2/B07 | IH 36387 87669 | Atlantic salmon; Brown trout; European eel; Perch; Roach. | SAC; ASSI | Salmonid River | 1b | 39 | Predominantly Unmodified | | | | | | | | | | | | |
| Fairy Water | 2 | 50100 | S2/B19 | IH 43178 74923 | Atlantic salmon; Brown trout; Roach; Gudgeon; Pike; Perch. | - | Salmonid River | 1b | 30 | Significantly Modified | | | | | | | | | | | | |
| Drumragh | 2 | 56590 | S2/B28 | IH 45772 69866 | Atlantic salmon; Brown trout; River/Brook lamprey. | - | Salmonid River | 2a | 35 | Significantly Modified | | | | | | | | | | | | |
| Routing Burn | 3 | 71700 | S4/B08.1 | IH 51977 61401 | Atlantic salmon; Brown trout; European eel; River/Brook lamprey. | - | Salmonid River | 1b | 74 | Pristine/semi- natural | | | | | | | | | | | | |



| | River Section | | | Carrottino | | | | on FFD | WFD Risk | | | | | | | Worki | ng W | indov | NS | | | |
|-------|---------------|----------|------------------|----------------------|----------------|--|-----------------------|-----------------------|----------|-----|-----------------------|---|---|---|---|-------|------|-------|----|---|-----|--|
| Ri | | Chainage | Structure Ref | Crossing Grid Ref | Fish present | Designation | FFD Categorisation | WFD Risk Category" | HQA | нмѕ | 7 | F | M | Α | M | J | J | A | S | 0 | N D | |
| Black | water | 3 | 93300 - 93600 | No structure | IH 66562 50670 | Atlantic salmon; brown trout; lamprey sp.; stone loach; minnow; European eel; gudgeon; and white-clawed crayfish. | - | | | 60 | Obviously modified | | | | | | | | | | | |



Table 6G.2 Tier Two In-stream Works Timing Restrictions

| | | | | | | | | | | | Working Windows |
|----------------------|---------|------------------|------------------------------------|-------------------|--|-------------|-----------------------|----------------------|-----|-----------------------------|-------------------------|
| River | Section | Chainage | Culvert Ref | Grid Ref | Fish present | Designation | FFD Categorisation | WFD Risk Category | HQA | HMS | J F M A M J J A S O N D |
| Coolaghy Burn | 2 | 36500 | S2/B09.1 | IH 36344 87548 | | - | - | 2a | 54 | Significantly Modified | |
| | 2 | 50200 | tbc | IH 42541 73990 | | - | - | 2a | - | - | |
| Fireagh Burn | 2 | 51100 | tbc | IH 42826 72440 | | - | - | 2a | - | - | |
| | 2 | 52700 - 54400 | tbc | IH 43528 71273 | | - | - | 2a | - | - | |
| Ramelly Drain | 3 | 64500 - 66000 | tbc | IH 48567 68806 | Atlantic salmon; Brown trout. | - | - | - | 33 | Obviously Modified | |
| Letfern | 3 | 68800 | tbc | IH 50401 63942 | | - | - | 1b | 36 | Severely Modified | |
| River 30 | 3 | 73800 - 74700 | tbc | IH 53102 60693 | | - | - | - | - | - | |
| River 33 | 3 | 78200 | tbc | IH 56601 57200 | Atlantic salmon, Poss. White claw crayfish. | - | - | - | 54 | Obviously Modified | |
| Roughan River | 3 | 81400 | tbc | IH 59651 56381 | Atlantic salmon; Brown trout; River/Brook lamprey, Poss. White claw crayfish. | - | - | 1a | 38 | Obviously Modified | |
| Ballygawley River | 3 | 83800 | \$3/17.3, \$3/17.4, \$3/17.5 | IH 61926 55769 | Brown trout; European eel. Poss. White claw crayfish. | - | - | 1a | 44 | Significantly Modified | |
| River 34 | 3 | 86400 - 86600 | tbc | IH 64093 54758 | Poss. White claw crayfish. | - | - | - | 46 | Predominantly Unmodified | |
| River 35 | 3 | 88100 | tbc | IH 65514 53984 | Poss. White claw crayfish. | - | - | - | - | - | |
| River 36 | 3 | 89500 | tbc | IH 66760 53553 | Poss. White claw crayfish. | - | - | - | 67 | Predominantly Unmodified | |



Table 6G.3 Tier Three In-stream Works Timing Restrictions

| D: | O a a Cara | Chainage | 0.1 | O.: I.D. (| Fish assessed | Destruction | FFD | WFD Risk | 1104 | LIMO | Working Windows |
|-----------------------|------------|------------------|-------------|-------------------|----------------------------|-------------|----------------|----------|------|---------------------------|-------------------------|
| River | Section | (approx) | Culvert Ref | Grid Ref | Fish present | Designation | Categorisation | Category | HQA | HMS | J F M A M J J A S O N D |
| River 1 | 1 | 550 | tbc | IC 41143 12785 | | - | - | - | - | - | * |
| River 2 | 1 | 2500 | tbc | IC 39783 11389 | | - | - | - | 74 | Significantly Modified | * |
| Blackstone Burn | 1 | 3350 | tbc | IC 39247 10773 | | - | - | • | 73 | Significantly Modified | * |
| River 4 | 1 | 5850 | tbc | IC 37706 08892 | | - | - | - | - | - | * |
| River 5 | 1 | 8300 | tbc | IC 37324 06483 | | - | - | - | - | - | * |
| River 9 | 1 | tbc | tbc | IH 33492 94493 | | - | - | - | - | - | * |
| River 10 | 2 | 29800 | tbc | IH 33553 91041 | | - | - | - | 57 | Severely Modified | * |
| Liscreevaghan Burn | 2 | 31500 | tbc | IH 34638 89829 | | - | - | - | 60 | Significantly Modified | * |
| Back Burn | 2 | 39300 | tbc | IH 39779 84955 | | - | - | - | 49 | Obviously Modified | * |
| River 17 | 2 | 40600 | tbc | IH 40918 83843 | | - | - | - | - | - | * |
| River 18 | 2 | 41300 | tbc | IH 41271 83293 | | - | - | - | - | - | * |
| Beltany Burn | 2 | 41900 | tbc | IH 41483 82765 | | - | - | - | - | - | * |
| River 20 | 2 | 43300 | tbc | IH 41653 81476 | | | | | | | * |
| River 21 | 2 | 43500 | tbc | IH 41666 81233 | | | | | | | * |
| River 22 | 2 | 44400 | tbc | IH 41878 80383 | | - | - | - | - | - | * |
| River 23 | 2 | 46300 | tbc | IH 42472 78051 | | - | - | - | 71 | Significantly Modified | * |
| River 25 | 2 | tbc | tbc | IH 41796 77387 | | - | - | - | - | - | * |
| River 25 | 2 | 47400 | tbc | IH 42577 75694 | | - | - | - | - | - | * |
| River 38 | 2 | 56000 - 56400 | tbc | IH 45038 69620 | | - | - | - | - | - | * |
| River 27 | 2 | 57400 | tbc | IH 45999 69314 | | - | - | - | 49 | Significantly Modified | * |
| River 37 | 3 | 89500 | tbc | IH 67678 51982 | Poss. White claw crayfish. | - | - | - | - | - | |



Table 6G.4 Key for Tier 1, 2, and 3

| FFD | Freshwater Fish Directive |
|-----|--|
| WFD | Water Framework Directive |
| HQA | Habitat Quality Assessment (product from RHS survey) |
| HMS | Habitat Modification Score (product from RHS survey) |

Table 6G.5 WFD Risk Categorisation

| WFD Risk Category 1. Water bodies at risk of failing to achieve an environmental objective | UKTAG Reporting Category (1.a) Water bodies at significant risk Note: Identifies water bodies for which consideration of appropriate measures can start as soon as practical (1.b) Water bodies probably at significant risk but for which further information will be needed to make sure this view is correct Note: Focus for more detailed risk assessments (including, where necessary, further characterisation) aimed at determining whether or not the water bodies in this category are at |
|---|--|
| Water bodies not at risk of failing to | significant risk in time for the publication of the interim overview of significant water management issues in 2007 (2.a & 2.b) Water bodies not at significant risk on the basis of available |
| achieve an environmental objective | information (2.a) Water bodies for which confidence in the available information being comprehensive and reliable is low |
| | Note: Work on these water bodies will be focused on appropriately improving the quality of information on pressures and their likely environmental effects in time for the second pressures and impacts analysis due to be completed in 2013 |
| | (2.b) Water bodies for which confidence in the available information being comprehensive and reliable is high |
| | Note:_Review for the next pressures and impacts analysis report in 2013 to identify any significant changes in the situation |



Annex 1.2 EAN 002 Protected Species Timing Restrictions

Table 6G.6 Protected Species Work Timing Restrictions

| Species | Section | Chainage | Legal | Timing Restriction | | | | | | Workin | g Wind | ows | | | | |
|----------------------------|---------|---|------------------------|---|-----|-----|-----|-----|-----|--------|--------|-----|------|-----|-----|-----|
| Species | Section | Chainage | protection | Tilling Restriction | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sept | Oct | Nov | Dec |
| Winter birds | 1 | 5000-6000 and 8500 - 10500 | HRA process | No heavy works October - March. No piling, large scale earth movement etc. | | | | | | | | | | | | |
| Nesting birds | All | All woody vegetation | WO 85 | Woody vegetation clearance September - February | | | | | | | | | | | | |
| Nesting Barn owl | All | None found in baseline surveys, but potentially throughout scheme | WO 85 | Destruction of existing nests Sep-Feb only; replacement provided up to 1 year in advance of destruction | | | | | | | | | | | | |
| Nesting king fishers | All | None found in baseline surveys, but potentially throughout scheme | WO 85 | Netting of suitable river banks to prevent summer nesting where necessary | | | | | | | | | | | | |
| Otter holts | 2 | 34400 and 50000 confirmed, 17500, 41800 and 71700 likely. | HR 95 & HRA Process | No time restriction on closure, will be dependant upon activity. Licence and creation of artificial holt up to 1 year in advance of holt closure | | | | | | | | | | | | |
| Bat roosts** | 1 | 3250 and 19000 confirmed (more likely during veg clearance). | HR 95 | Bat licence and creation of artificial roosts up to one year prior to roost closure (Preferred October - April) | | | | | | | | | | | | |
| Badger setts | All | Main setts: 7200, 7700, 34250, 54750, 79500, 81100, 83500 (A4 link road) (more likely during veg clearance) | WO 85 | Badger licence up to one year prior to sett closure (only allowed 1st July – 30th November) creation of alternative sett up to 1 year prior to original's closure | | | | | | | | | | | | |
| Smooth newt breeding ponds | 2 | 19500 | WO 85 | Licence required for trapping and relocation of newts up to one year prior to pond destruction (trapping March-August) creation of alternative pond up to 2 years prior to original's destruction | | | | | | | | | | | | |
| Red Squirrel dreys | 3 | possible 34400 and 79400-79700 | WO 85 | No time restriction on destruction, will be dependant upon activity. Licence up to 1 year in advance of drey destruction | | | | | | | | | | | | |
| White clawed crayfish | 3 | All water courses 78000 - 93000 | WO 85 | No works affecting stream May-June. Licence may be required for removal of individuals from works area July - October | | | | | | | | | | | | |
| Protected flora | 1 | 18000 | WO85 | Translocation of trees November to Feb | | | | | | | | | | | | |

^{*}It will not be possible to locate all breeding sites or resting places prior to vegetation clearance and site construction works. Provision should be made for the unexpected discovery of any of these features.

Bat Roosts** timings only applicable for summar roosts, if maternity or hibernation roosts discovered in update surveys further restrictions will apply.

Table6H.7 Key Indicating Work restrictions

| Work Restrictions Dependant Upon Animal Activity |
|--|
| Restricted Works |
| Recommended Periods for Works |



Annex 1.3 EAN 003 Timetables of Ecology Construction Tasks

Table 6G.8 Draft Ecology Works Timetable

| Species/Task | Jan - Aug 2011 | Sep 2011-Feb 2012 | March-August 2012 | Sep 2012 - Feb 2013 | March - Aug 2013 | Sep 2013 - Feb 2014 | March-August 2014 | Sep 2014 - Feb 2015 | March - Aug 2015 |
|---|--|--|--|--|--------------------------|--|------------------------|---|------------------|
| Hedges, woodland and other habitats suitable for nesting birds | | vegetation clearance where necessary for 2012 work | vegetation clearance under ecologist supervision, if active nests found clearance cannot go ahead in that location until approved by ecologists | vegetation clearance for 2013 works | | vegetation clearance Sep-Feb for 2014 works | | | |
| Sch. 8 Protected Plants (requires licence) | update Sch. 8 surveys | Possible translocation dependent upon NIEA licence terms | Set sch. 8 exclusion zones | | | | | | |
| Sch. 9 Invasive Species | update Sch. 9 surveys | | Set sch. 9 exclusion zones, treatment of areas as required | | | | | | |
| Planting | | | plantii | ng around culvert entrand | ces, verges and on expo | sed earthworks where po | ssible | general sche | eme planting |
| Newts (requires licence) | update ecology surveys (April-May) and construction of 1 x replacement pond | | Fencing of newt areas, creation of new hibernacula (April) / trapping and translocation of newts to new pond area and new hibernacula (May-July) / original pond and hibernacula destruction | | | | | | |
| | | update ba | adger surveys and sett m | nonitoring | | update badger surveys and sett monitoring | | update badger surveys and sett monitoring | |
| Badgers | | eation August-Dec 2011 ure 2012 | | | | | | | |
| (requires licence) | | badger sett closu | ure July-Nov incl. | | | | | | |
| | | | | | | dger commuting routes (ir encing along scheme bou | | | |
| Otters | | | | | or permanent deterrent i | | indary and underpasses | | |
| (requires licence) | update surveys and | otter holt monitoring | otter holt i | monitoring | | otter holt monitoring | | otter holt monitoring | |



| Species/Task | Jan - Aug 2011 | Sep 2011-Feb 2012 | March-August 2012 | Sep 2012 - Feb 2013 | March - Aug 2013 | Sep 2013 - Feb 2014 | March-August 2014 | Sep 2014 - Feb 2015 | March - Aug 2015 |
|-------------------------------|---|---|---|------------------------------------|---|----------------------------|---|---------------------|---|
| | | artificial otter holt creation pre October 2011 for closure pre April 2012 | | | | | | | |
| | | | closure of holts dependent upon activity | | | | | | |
| | | | | installation of I | measures to maintain ott | er commuting routes (inc | c. cover excavations, tem | np fencing etc.) | |
| | | | | installation of lo | edges into new culverts | during construction to be | ready when water cours | es are diverted | |
| | update roost surveys | | | | | | | | |
| | artificial roost creation | artificial roos | st monitoring | | artificial roost monitoring | | artificial roost monitoring | | artificial roost monitoring |
| Bats (requires licence) | | | ual summer roost, some yed under ecologist supe | | | | | | |
| conce, | | Maternity and summer roost closure | Hibernation roost closure | Maternity and summer roost closure | | | | | |
| | | | | instal | lation of measures to ma | aintain bat commuting rou | utes (inc. artificial hedges | s etc.) | |
| | | | | | schem | e planting to involve 'hop | overs' | | |
| | | installation of pollution traps | n prevention/sediment s etc | | | weekly monitoring | of sediment traps | | |
| Aquatic (requires licence) | | | trapping and exclusion of aquatic species from construction areas (July-August) | | trapping and exclusion of aquatic species from construction areas (July-August) | | trapping and exclusion of aquatic species from construction areas (July-August) | | trapping and exclusion of aquatic species from construction areas (July-August) |
| | | | instream works culverting for sensitive water courses (July-August) | | instream works culverting for sensitive water courses (July-August) | | instream works culverting for sensitive water courses (July-August) | | instream works culverting for sensitive water courses (July-August) |
| Birds | pre-construction update barn owl survey | barn owl nest closure (if required) and construction of artificial nest | | | | | | | |
| | pre-construction update kingfisher survey | netting of suitable rive | erbanks for kingfisher | | | | | | |



| Species/Task | Jan - Aug 2011 | Sep 2011-Feb 2012 | March-August 2012 | Sep 2012 - Feb 2013 | March - Aug 2013 | Sep 2013 - Feb 2014 | March-August 2014 | Sep 2014 - Feb 2015 | March - Aug 2015 |
|---------------------------------|----------------|-------------------|---|---------------------|---|-------------------------|---|---------------------|---|
| | | | | | ecologist clerk of works | supervision as required | | | |
| Supervision / clerk of works | | | ecologist tool box talks for all construction staff | | ecologist tool box talks for all construction staff | | ecologist tool box talks for all construction staff | | ecologist tool box talks for all construction staff |

Table 6H.9 Key Draft Ecology Works Timetable

| Recommended Periods for Works |
|--------------------------------------|
| Action TBC Following Detailed Design |



Annex 1.4 EAN 004 Invasive Species Risk Register

Table 6G.10 Invasive Species Risk Register

| Table 6G.10 | | | | | | | | |
|---|------------------|-----------------------------|--|---|--|--------------------------------------|--|--|
| Species to be added to Sch. 9 Wildlife Order 1985 | Risk Category | Latin | Habitat Occurrence | Means of Spread | Impacts | Current Range in Co. Tyrone | Confirmed A5 Locations | Control Methods |
| Knotweed, Japanese | | Fallopia japonica | Waste ground, river banks and parks. | vegetative fragments in contaminated soil | Forms extensive stands | Widespread throughout Tyrone. | Burn Dennet (chainage) Mourne (chainage), Strabane Nature Reserve. River Derg (NVC ID Area 26). | Attempting to get rid of stands of Japanese knotweed by digging up or cutting the plant rarely succeeds unless combined with herbicide applications. Fragments of the rhizomes or aerial shoots can regenerate, so must be destroyed by burning. Riverside colonies may spread by fragments floating downstream. The Centre for Aquatic Plant Management (CAPM) recommends control by herbicides as the best option. Transport of soil away from the site containing fragments of Japanese knotweed should be avoided; it might introduce the species to uninfected sites. |
| Knotweed, Giant | | Fallopia sachalinensis | Waste ground, river banks, lakesides, old gardens, etc. | Flowers, rhizomes and vegetative fragments in contaminated soil | Forms extensive stands | Scattered throughout Tyrone. | Burn Dennet | Currently the most effective method of control is repeated spraying with herbicides over a number of years, which gradually reduces the vigour of the plant. This is carried out in early autumn, when the herbicide in thought to have the most impact on the plant. New sites and larger stands may also be sprayed in early summer as well, to stunt the growth before the autumn spraying. |
| Hogweed, Giant | | Heracleum mantegazzianum | Along riversides, stream banks, and other damp waste sites. In suitable environments, it can be abundant. It can extend along several miles of river bank. | Seed dispersal via water transportation and in soil adhering to shoes and machinery. Seeds can stay viable for several years. | Poisonous to people and animals | Widespread throughout Tyrone. | Large stands along R. Finn and Mourne confluence near Strabane. | Eradication programmes may vary depending on the degree of infestation. Small numbers can be controlled by digging out the whole individual plant; docking the plant to prevent it flowering will divert reserves to ensuring the plant survives to attempt to flower the following year. It is best to cut the stem at below ground level, to ensure that the rootstock is damaged. Larger numbers can be sprayed, preferably when the plants are actively growing and less than 1m tall, with a glyphosate herbicide (this is the only herbicide which can be used near water). This can be done either as a spot treatment, or using long reach sprays. The monitoring of the treated area for several years is necessary, to find new seedlings. Establishing greensward or reseeding with native plants is also beneficial after initial eradication. |
| Salmonberry | | Rubus spectabilis | Country parks, river banks, forestry plantations etc. | This plant spreads rapidly by vigorous suckering from the base. It is likely that it could also be spread by careless disposal of garden waste. | Displaces native species. | Widespread throughout Tyrone. | None confirmed. | With well-established large infestations only physical removal involving cutting or digging up the plants, either by hand or mechanically, is feasible. Herbicide should be applied to remaining stumps. |
| Balsam, Himalayan | | Impatiens glandulifera. | River banks and lakesides. | There are no special vectors for long-distance dispersal, although dispersal by water is probable. Local dispersal is by seed from existing colonies. | Displaces native species. Bare patches created in winter when the plant dies back may result in increased riverbank erosion. | Widespread throughout Tyrone. | Scattered along route, particularly along watercourses. | Mechanical control, by repeated cutting or mowing, is an effective control, but plants can regrow if the lower parts are left intact. Regular grazing also suppresses this species. Control by herbicides is effective — for detailed advice on this, see the Centre for Aquatic Plant Management web site (Information Sheet 3: Himalayan Balsam). Herbicide should be sprayed before flowering. |



| Species to be added to Sch. 9 Wildlife Order 1985 | Risk Category | Latin | Habitat Occurrence | Means of Spread | Impacts | Current Range in Co. Tyrone | Confirmed A5 Locations | Control Methods | |
|---|------------------|--------------------------------|--|---|---|---|---|--|--|
| Waterweeds (all species) | | <i>Elodea</i> (all species) | Still or slow-flowing, shallow or deep water. | vegetative fragments in water courses | Can impede flow, increase flooding, destroy ecosystem and affect recreation | E. canadensis scattered throughout Tyrone. E. nuttallii rare in Tyrone. | E. canadensis abundant in pond adjacent to River Finn H32509673. | Elodea canadensis is now an established part of Ireland's aquatic ecosystems. It provides good habitat for many aquatic invertebrates and cover for young fish and amphibians and food for waterfowl. In the case of excessive growth, physical removal is probably the best option, taking care to dispose of the excess material responsibly (by composting or burning). It can also be controlled by suitable herbicides and there is a biological method of control using grass carp (Ctenopharyngodon idellav) which graze the plant. Control of Elodea nuttalli is similar although this species is less widespread than E. canadensis although it is reported to be increasing across the British Isles whilst E. canadensis has declined. This has been linked with generally increasing eutrophication of waters. | |
| Knotweed (all species) | | <i>Fallopia</i> (all species) | Comments as per F. japonica and F. sachalinensis. Hybrid between these two spp Fallopia x bohemica. F. baldschuanica (a climber) rarely becomes established in wild. | | | pohemica. F. baldschuanica (a climber) rarely becomes established in wild. | | | |
| Rhubarb, Giant | | Gunnera tinctoria | Damp grassland, woodland and shaded areas near water | self sown and vegetative fragments | Forms extensiev stands and may impede stream flow | Rare in Tyrone. | River Derg | Mechanical removal and chemical treatment. | |
| Bluebell, Spanish | | Hyacinthoides hispanica | Woodlands, parkland and gardens. | bulbs in waste soil | Hybridisation with native species | Rarely naturalised in Tyrone. Hybrid with native species is more common. Native sp. is most widespread. | None confirmed. | The complete removal of Spanish or hybrid bluebells from an extensively contaminated site is probably uneconomic and undesirable. The focus of management should be on prevention of further spread into natural woodland or other natural habitats by the removal of garden escapes as ar when discovered. | |

Table 6H.11 Invasive Species Risk Categories

| High Risk | |
|---------------|--|
| Moderate Risk | |
| Low Risk | |



Annex 1.5 EAN 005 Environmental Consents

Table 6G.12 EAN 005 Consents

| Lisansa | lufo | Doononeihilitu | Disagrama | Input Required |
|--|--|----------------|--|---|
| Licence | Info | Responsibility | Programme | (input and team) |
| FEPA FEPA guidance note information: http://www.ni- environment.gov.uk/fepa_guidance_note s.pdf Construction Licence Application Form: http://www.ni- environment.gov.uk/construction_applic | WMU has suggested that the construction works may occur within 50 metres of the Mean High Water Spring Tide mark of the tidal section of the River Foyle. Therefore you may require a licence issued under Part II of the Food and Environment Protection Act 1985 (A FEPA Licence). This also applies to proposed pipeline outfalls terminating in the sea. WMU's Marine Assessment and Licensing Team should be contacted to determine if the construction works are within this zone and to determine if an FEPA | Contractor | It is recommended that contact of the environment and heritage team Northern Ireland takes place as soon as possible. An application form will need to be submitted FOUR MONTHS BEFORE LICENCE IS REQUIRED. Please find attached link in left hand column. FEPA licences cannot be issued retrospectively. Licences are valid for 12 months. A separate application must be submitted for each stage of construction work. The application will need to be submitted to the environment and heritage team with the following application fee: | The following information is required for the construction licence application: Project costs (Project Manager) Environmental Statement; only If the project is subject to a planning application (Environment Team) Description of materials to be deposited (Design Engineers) |
| ation.pdf the Deposits in the Sea (Exemptions) Order (Northern Ireland), 1995: | Licence is required. If the works are within 50 m then a CONSTRUCTION LICENCE will be required. | | Marine Construction: £175 administration fee. | Method of construction; is needed if the project involves land reclamation (Construction Engineers) |
| http://www.ni- environment.gov.uk/ni_wml_consultatio n_document.pdf | Some minor works of construction may be exempt from FEPA licensing, these arelisted in the Deposits in the Sea (Exemptions) Order (Northern Ireland), 1995, please find attached link in left hand column. | | The application fee must be paid <u>before</u> the application can be processed. | |
| Discharge Consent Discharge Consent application form: | The scheme will require discharge consent, issued under the Water (Northern Ireland) order 1999, prior to commencement of any | Contractor | It is recommended that contact of the environment and heritage team Northern Ireland takes place as soon as possible. An application form will need to be submitted FOUR MONTHS | The following information is required for the discharge consent licence application: Need to state the nature of the discharge, type amount etc |



| Licence | Info | Responsibility | Programme | Input Required (input and team) |
|---|---|----------------|---|--|
| http://www.ni- environment.gov.uk/discharge_consent_ gn.pdf Annex 2 (WO1 – Annex 2 Trade Effluent Discharge, includes site drainage): | consents will also be required for any temporary toilets or wash areas that discharge to the aquatic environment. The scheme is most likely to fall under Annex 2 of | | hand column. The Department has <u>four months</u> from the date on which a valid application is received (or such further period as may be agreed in writing between the applicant and the Department) to determine the application, otherwise it is deemed to have been refused by the department. | Site details including site drainage (Engineers) Details of receiving Environment and impacts (Environment Team) |
| http://www.ni-environment.gov.uk/wo1- annex2-trade-effluent-and-site- drainage.pdf | the discharge consent application. | | Annex 2 (WO1 – Annex 2 Trade Effluent Discharge, includes <u>site</u> <u>drainage</u>) should be completed in addition to the main application form. A separate application form and fee must be submitted for each type of effluent discharge. Please find attached link in left hand column. | |
| Abstraction /impoundment Abstraction/Impoundment Application form: | If the scheme involves abstraction (e.g. dewatering of an excavation) or an impoundment a pool of water formed by a dam or pit) an appropriate abstraction/impoundment license may be required. | Contractor | It is recommended that contact of the Abstraction and Impoundment Licensing Team of WMU takes place as soon as possible. For Impoundment and Abstraction a Comprehensive Application for a Licence to Abstract and/or Impound Water F0002 will be required. Please find attached link in left hand column. The form will NOT be required if extraction is below 10m³ per day (conditions in annex A) Please find attached link in left hand column. With effect from 1st April 2010 the following charges will | The following information is required for the discharge consent licence application: Proposed and existing abstraction/impoundments of water. Abstraction volume details including volume per day for surface, estuarine or coastal waters and groundwater. Monthly Abstraction Volumes in Cubic Metres (m3) (daily maximum). |
| environment.gov.uk/licence_abstract_im pound_water.pdf | ilicense may be required. | | apply: A flat rate fee of £135 for all abstraction applications of 20 cubic metres per day or more. A fee of £30 for any variations to an existing licence. For abstractions greater than 100 cubic metres per day an annual charge may apply | Information on water storage, land etc. (All from engineers) |



ANNEX 2: CONSTRUCTION PROCEDURES

The Contractors and their sub-contractors shall employ the Construction Procedures listed below as a practical means to effect environmental mitigation while working on the project.

Annex 2.1 Procedures Site Clearance

Table 6G.13 Procedure for Site Clearance

| Procedure for Si | te Clearance | CP01 | | | |
|----------------------------|--|---|------------------------------|--|--|
| | | Rev: A | Date: Nov 2010 | | |
| Purpose | To minimise the impacts of site cleararea. | arance works on ecological | habitats and wildlife in the | | |
| Responsibility for control | Environmental Manager | | | | |
| Procedures | Before any work is undertaken the features shall be assessed. | proximity to water bodies a | nd ecologically sensitive | | |
| | Whole trees shall be removed by tr for the purpose. | rained operators using mulc | hers specifically designed | | |
| | season (March-August inclusive). Vechecked prior to removal for active | As far as possible all woody vegetation shall be removed outside of the bird breeding season (March-August inclusive). Where this is not possible woody vegetation shall be checked prior to removal for active birds nests. If any are found works in that location shall cease until the nest can be confirmed as no longer active. | | | |
| | Removal of top soil shall be undertaken in accordance with the soil stripping methods detailed in Procedure CP02. | | | | |
| | Removal of vegetation or top soil within 20m of a water course shall be carried out under the supervision of the Ecological Clerk of Works. | | | | |
| | If active birds nests, animal holes of sufficient size to be used by badger or otter, squirrel dreys, bats, lizards or newts are found during vegetation clearance then works in that location shall cease and ecologist advice sought. | | | | |
| | Removal of trees highlighted as potential bat roosts in the ES or in update surveys shall be undertaken using a 'soft felling' method as detailed in the ES. A licence from NIEA may be required if a roost is confirmed as present. | | | | |
| | Removal of confirmed bat roosts shall take place under NIEA licence and in accordance with the method detailed in the ES. As the confirmed roosts to be destroyed are summer roosts the licence would probably only be granted between October and February. | | | | |
| | Removal of vegetation or top soil within 50m of an otter holt or breeding site as highlighted in the ES or update surveys shall be carried out under licence from NIEA. | | | | |
| | Construction activities that are likely to damage or disturb an active badger sett as highlighted in the ES or update surveys shall be carried out under a licence from NIEA. Closure of badger setts can only be undertaken between July and November | | | | |
| | Removal of ground flora or top soil or update surveys shall be carried clearance guidance as detailed in t | out in accordance with the s | | | |



| Procedure for Sit | e Clearance | CP01 | | | |
|--|--|-------------------------------|---------------------------|--|--|
| | | Rev: A | Date: Nov 2010 | | |
| | Removal of ground flora or top soil ES or update surveys shall be carribe required for the destruction of a between March and September. | ied out under a licence from | NIEA. This licence shall | | |
| | Removal of woody vegetation withi ES or update surveys shall be carriand may require an NIEA licence. | | | | |
| | Removal of invasive species highliq contractors shall be carried out und detailed in Environmental Consents | der specific invasive species | s clearance methodology | | |
| Environmental Controls | All necessary, ecological licenses shall be in place prior site clearance start. | | | | |
| Plant & | Excavator mounted and purpose built tracked mulchers. | | | | |
| Equipment | Excavator harvesters. | | | | |
| | Hand strimmers. | | | | |
| | Chainsaws. | | | | |
| | Tree climbing equipment. | | | | |
| Monitoring | Monitoring The Ecological Clerk of Works shat sensitive areas, all sites within 20n NIEA, all vegetation cleared during vegetation clearance works. | | subject to a licence from | | |
| Emergency, preparedness and response | If active birds nests, animal holes of squirrel dreys are found during veg cease and the Ecological Clerk of \ | etation clearance the works | | | |
| References | Environmental Statement. | | | | |



Annex 2.2 Soil Strip

Table 6H.14 Procedure for Soil Strip

| Procedure for So | oil Strip | CP02 | | | | |
|--------------------------------------|---|--|-----------------------------|--|--|--|
| | | Rev: A | Date: Nov 2010 | | | |
| Purpose | To minimise the impacts on ecolog stripping. | gical habitats and wildlife in the area during soil | | | | |
| | To prevent damage to any archaeological remains discovered during construction. To enable the re-use of topsoil and the re-establishment of vegetation after work is complete. | | | | | |
| | | | | | | |
| Responsibility for control | Environmental Manager | | | | | |
| Procedures | Prior to any topsoil being stripped, on agricultural land, cut and fill slop areas of ecological interest. | | | | | |
| | Method statements shall be prepar stripped from, temporarily stockpile | | where the topsoil shall be | | | |
| | Topsoil stripped from the area of excavations and the footprint of structural fill embankments shall be stockpiled in locations convenient for re-use once cut and fill slopes and landscape mitigation areas are ready for top soiling. Topsoil deemed suitable for re-use for agricultural regeneration or for shrub planting other landscape mitigation shall be placed in stockpiles not exceeding 3 metres high | | | | | |
| | | | | | | |
| | Stockpiles shall be allowed to vege located away from drainage ditches | reathering and shall be | | | | |
| | Finished worked slopes that are to earthworks progress and topsoil sh | | | | | |
| Environmental Controls | Where required, Archaeological observers shall be present during the topsoil strip for a watching brief. | | | | | |
| | | is "ecologically interesting" shall be recorded as such shall be stockpiled for reuse in windrows no more tha e, shaped to shed water. | | | | |
| | Silt control measures shall consist Spraying shall be carried out to pre | of small bunds at the toe of the stockpiles as required. event the proliferation of weeds. | | | | |
| Plant & Equipment | | ded by a 360° excavator using a toothless bucket to pile. A 360° excavator shall handle and shape the | | | | |
| Monitoring | Daily haulage record sheets used i reference to identify which topsoil i | | | | | |
| Emergency, preparedness and response | If animal holes of sufficient size to clearance the works in that location be contacted. | | | | | |
| | If items of potential archaeological | value are uncovered then w | orks in that location shall | | | |



| | Procedure for Soil Strip cease and the Archaeologist shall to References Environmental Statement. | | CP02 | | |
|--|---|--|---------------|----------------|--|
| | | | Rev: A | Date: Nov 2010 | |
| | | | pe contacted. | | |
| | | | | | |



Annex 2.3 Earthworks and Drainage

Table 6G.15 Procedures for Earthworks and Drainage

| Procedure for Ea | rthworks and Drainage | CP03 | | | | | |
|----------------------------|--|---|---------------------------------|--|--|--|--|
| | | Rev: A | Date: Nov 2010 | | | | |
| Purpose | To minimise the impacts of earthworks on ecological habitats and wildlife in the area. | | | | | | |
| | Γο avoid pollution to water courses. | | | | | | |
| | To minimise nuisance to the local or creation of dust, noise and vibration | | ioration of air quality and the | | | | |
| | Minimise the surplus materials aris | mise the surplus materials arising from earthworks. | | | | | |
| Responsibility for control | Environmental Manager | | | | | | |
| Procedures | Landowners and authorities shall be deposition areas. | e informed in advance | of commencement of filling at | | | | |
| | Bunting poles shall be erected arou | und overhead services. | | | | | |
| | Advance pre-earthworks, temporary drainage and dewatering shall be undertaken as required to prevent ingress of water to the earthworks and discharge away from the earthworks. Discharge licenses shall be in place before commencement of any works and appropriate treatment provided prior to discharge to watercourses. | | | | | | |
| | No water shall be allowed to pond on the formation layer. | | | | | | |
| | When unsuitable material is encountered this shall be removed in accordance with the Site Waste Management Plan. | | | | | | |
| | Method statements shall be prepared setting out procedures to monitor and control dust, noise, vibration and deposition on roads. | | | | | | |
| | Haul Roads shall be constructed to enable access to the works and movement of the earthworks through the site and to disposal areas. | | | | | | |
| | Temporary stockpiles of excavated earth shall be constructed within the lands made available. Stockpiles shall be shaped to ensure rainfall does not degrade the stored material. | | | | | | |
| | Drains shall be installed along the toe of embankments in fill areas. | | | | | | |
| | Embankments shall be constructed and graded to allow water to shed off the completed earthworks. | | | | | | |
| | Embankments shall be sealed at the end of each working shift to avoid ingress of water. | | | | | | |
| | The earthworks material shall be placed and compacted in layers to prevent water ingress and degradation of the material. | | | | | | |
| Environmental Controls | Temporary drainage or dewatering shall be in place to prevent ingress of water to the earthworks and discharge away from the earthworks. | | | | | | |
| | Discharge licenses shall be in plac discharge to watercourses. | e and appropriate treati | ment provided prior to | | | | |
| Plant & | 50t – 70t primary excavators | | | | | | |
| Equipment | 20t – 30t excavators | | | | | | |



| Procedure for Ea | rthworks and Drainage | CP03 | | | |
|--------------------------------------|--|---|----------------|--|--|
| | | Rev: A | Date: Nov 2010 | | |
| | Rock breaking and processing equ | ipment | | | |
| | Bulldozers | | | | |
| | Graders | | | | |
| | 30t – 40t articulated dump trucks | | | | |
| | Compaction plant including various | rollers | | | |
| | Soil stabilisation plant | | | | |
| Monitoring | Daily physical inspection of the site including; watercourses, haul roads, mechanical st of all plants, shall be undertaken to detect any signs of contamination or disturbance. | | | | |
| | A program to monitor watercourses during the construction phase. | es, air quality, dust, noise and vibration shall be in place | | | |
| Emergency, preparedness and response | If animal holes of sufficient size to l clearance the works in that location be contacted. | | | | |
| | If items of potential archaeological cease and the Archaeologist shall I | value are uncovered then works in that location shall be contacted. | | | |
| | An emergency plan shall be prepart water or other polluted effluents are consultation with the NIEA. | | | | |
| References | Environmental Statement. | | | | |



Annex 2.4 Bridge Construction

Table 6G.16 Procedure for Bridge Construction Across the Rivers

| Procedure for bridge construction across the rivers | | CP04 | | | |
|---|---|--|-----------------------|--|--|
| | | Rev: A | Date: Nov 2010 | | |
| Purpose | To minimise the impacts on ecological habitats and wildlife in the area during be construction. | | | | |
| | To minimise noise nuisance. | | | | |
| | To prevent environmental pollution incidents. | | | | |
| Responsibility for control | Environmental Manager | | | | |
| Procedures | Installing temporary bridges | | | | |
| | Bunds shall be constructed to surro floodwaters overtopping. | ound the working platforms | at a level to prevent | | |
| | Erosion protection shall be installed to the temporary bridge abutments and lead-out edges of the bunds. | | | | |
| | The bridge shall be assembled in sections on a working platform. A crawler or all terrain mobile crane shall be used to lift the longitudinal truss sections over the river. | | | | |
| | Cross members between the trusses shall be infilled using a crane. To remove the bridge the reverse process to erection shall be employed. | | | | |
| | The deck shall be longitudinally sloping to give positive drainage of the deck surface water from rain or cleaning operations shall be channelled into the moat areas on a floodplain to be pumped to the discharge area. Solid face ply board panelling shall be installed to the sides of the deck to prevent material that might fall from the trucks from falling into the river. It shall also stop is water entering the river. Open flooring decking shall not be used. | | | | |
| | | | | | |
| | maintenance regime for cleaning the deck of the bridge and cleaning the approach amps to the bridge shall be in place. Regular dust suppression shall be required during ry periods to keep the surface of the haul road damp. | | | | |
| | Piling for foundations | | | | |
| | Any vibration shall be limited to those agreed with the local authorities. | | | | |
| | Spoil shall be removed by excavator to keep the work area clear and when necessary the excavator shall load the spoil to transportation for removal. | | | | |
| | Ground water within the bore displeto a washout facility set up off the f | ne bore displaced during placing of concrete shall be pumped away et up off the flood plain. | | | |
| | Any spills of concrete shall be cleared up to avoid the possibility of cement contaminating water from rainfall or washing down of equipment. | | | | |
| | Excavation for pier foundations | | | | |
| | Prior to commencing the bulk excavation of the cofferdam one or more sump holes shall be excavated to the full depth of the excavation. | | | | |
| | The cofferdam shall be excavated using an excavator with a perforated bucket. | | | | |



| Procedure for bridge construction across the rivers | | CP04 | | | |
|---|---|-------------------------------|----------------------------|--|--|
| | | Rev: A | Date: Nov 2010 | | |
| | Low water table levels shall be maintained inside the cofferdam by pumping. Water from the pumping shall not be discharge back into any watercourse without appropriate attenuation and treatment. Structure base construction Prefabrication of formwork shall be undertaken remote from the floodplain and any debris from onsite fixing and fabrication shall be sent in skips for recycling. Dewatering of the cofferdam shall be maintained until the concrete base has been constructed, the piers are constructed to above ground level and the cofferdam has been backfilled. | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | Deck construction The sub-deck shall have edge upstands, shall be watertight and shall drain to the either side of the river. | | | | |
| | | | | | |
| | The sub-deck shall provided a second line of protection to catch debris and liquids that would otherwise reach the river. It shall be designed to deflect objects away from the river to a place where they can be collected and disposed of. Until the permanent deck drainage is installed, measures shall be implemented to ensurun-off water from the deck is collected and piped to the moat area on the floodplain where it shall be pumped to discharge areas following suitable attenuation and treatments. | | | | |
| | | | | | |
| Environmental | Method statements shall be prepar | ed for the control of noise a | nd vibration. | | |
| Controls | A 15 M.P.H. speed limit shall be imposed on the haul road across the floodplains and watercourses. This shall reduce the risk of dust contamination and pollution of the river. | | | | |
| | Equipment shall be selected to minimise noise and where appropriate with built in noise attenuation. | | | | |
| | Some construction materials will be | e subject to a COSHH asses | ssment. | | |
| Plant & | Crawler or all terrain mobile crane. | | | | |
| Equipment | Vibrating hammer/extractor. | | | | |
| | Breakers or crushing plant. | | | | |
| | Jack hammering. | | | | |
| | Crane pitching. | | | | |
| | Vibrating internal poker | | | | |
| | Concrete pumps. | | | | |
| | Vibrating rolling screed. | | | | |
| | Mechanical scabblers. | | | | |
| | Blacktop pavers and rollers. | | | | |
| Monitoring | Drainage treatment areas used to a to regular maintenance and monito | | age water shall be subject | | |
| Emergency, preparedness | An emergency plan shall be prepar water or other polluted effluents are | | | | |



| Procedure for bridge construction across the rivers | | CP04 | |
|---|--------------------------|--------|----------------|
| | | Rev: A | Date: Nov 2010 |
| and response | with the NIEA. | • | · |
| References | Environmental Statement. | | |



Annex 2.5 Blasting

Table 6G.17 Procedure for Blasting

| Procedure for Blasting | | CP05 | | |
|----------------------------|---|--|----------------|--|
| | | Rev: A | Date: Nov 2010 | |
| Purpose | To minimise the impacts on ecological habitats and wildlife in the area from blasting. | | | |
| | To avoid pollution to water courses and land. | | | |
| | To minimise nuisance to the local community cause by deterioration of air quality and the creation of dust, noise and vibration. | | | |
| Responsibility for control | Environmental Manager | | | |
| Procedures | An explosives supervisor shall be | appointed. | | |
| | A site specific method statement and detailed risk assessment shall be produced prior to any blasting operations taking place. | | | |
| | Notice shall be provided to the public informing them of the timing of planned blasts and providing the name, address and telephone number of a contact within the project team, who shall deal with their queries. | | | |
| | Method statements shall be prepared to specify arrangements for the monitoring of noise and vibration. | | | |
| | Site Rules shall be drawn up to govern shot-firing for rock extraction. These rules shall state how explosives are stored, transported, used and disposed of. | | | |
| | Method Statements shall be prepared to specify arrangements for the safety of the workforce and the public. They shall also set down permitted shot-firing times, the determination of danger zones for vibration, warning systems, arrangements for disposal of surplus explosives and monitoring. | | | |
| | | of surplus explosives and packaging shall be carried out in strict with the manufactures or suppliers instructions and guidelines. | | |
| | Where rock is excavated and storthe lands made available. | ere rock is excavated and stored temporarily, stockpiles shall be constructed within lands made available. | | |
| | No water shall be allowed to pond | rater shall be allowed to pond on the rock surface. | | |
| | PSNI shall be fully involved in the with the use of explosives | approval and awareness of any activities associated | | |
| Environmental Controls | Design of blasting methodology to maximize efficiency and reduce the transmission of vibration including appropriate charging based upon site specific regression analysis. | | | |
| Plant & Equipment | Rotary drill rig | | | |
| | Explosives delivery truck or explosives mixing truck | | | |
| | Exploders | | | |
| | Circuit Testers | | | |
| | Wooden or anti-static plastic hand tools | | | |



| Procedure for Blasting | | CP05 | |
|--|---|--|--------------------------|
| | | Rev: A | Date: Nov 2010 |
| Monitoring | A program to monitor watercourses place during the construction phase Continuous vibration meters shall be shot-firing. | e. | · |
| Emergency, preparedness and response | The Site Manager shall ensure that cover situations involving injury, un of explosive materials. These prowith Police, Fire and Ambulance for | foreseen damage to propert cedures shall clearly identify | y and unaccountable loss |
| References | Environmental Statement. | | |



Annex 2.6 Demolition

Table 6G.18 Procedure for Demolition

| Procedure for De | emolition | CP06 | | | |
|----------------------------|---|--|-------------------------------|--|--|
| | | Rev: A | Date: Nov 2010 | | |
| Purpose | To avoid pollution to water courses | and land during demolition | works. | | |
| | To minimise nuisance to the local creation of dust, noise and vibratio | | ration of air quality and the | | |
| Responsibility for control | Environmental Manager | Environmental Manager | | | |
| Procedures | | A site specific method statement and detailed risk assessment shall be produced prior to commencement of any demolition works. | | | |
| | All underground pipes, tanks and s labelled with their content and cap | | marked. All tanks shall be | | |
| | Visible signs of leaking tanks or pipes and any signs of contaminated ground or groundwater shall be checked. | | | | |
| | Recyclable waste arisings shall be | | | | |
| | Asbestos and other hazardous materials shall be separated for safe disposal. | | | | |
| | Licences shall be obtained from the local environmental health officer before any concrete, masonry or other material is crushed on site. | | | | |
| | Before removing or perforating tanks, all of their contents and residues shall be emptied for safe disposal by a competent operator in accordance with the Site Waste Management Plan. | | | | |
| | Pipes shall be capped or valves clo | osed, to prevent spillage. | | | |
| | Measures to avoid noise and vibra Authority (LPA) and NIEA in advar | | d with the Local Planning | | |
| | A method statement shall be prepa damping down) shall be implemen | e prepared to specify how dust control measures (such as plemented. | | | |
| | | all be controlled. Discharge licenses shall be in place and vided prior to discharge to watercourses. | | | |
| | Dust shall be prevented from esca possible to cover lorries because t sprayed them with water just befor | here are pieces of protruding | | | |
| Environmental Controls | Adequate inspection to plant and equipment in operation shall be carried out p demolition works to ensure that noise and vibration levels do not exceed those with the local authorities. | | | | |
| | Suitable spill response materials and emergency instructions shall be available and staff shall have been adequately trained. | | | | |
| Plant & | 360° tracked excavator fitted with b | preaker | | | |
| Equipment | Saw fitted with dust suppressant | | | | |
| | 40 Tonne tracked crawler crane / 8 | 30t mobile if necessary | | | |



| Procedure for Demolition | | CP06 | | |
|--|--|--------|----------------------------|--|
| | | Rev: A | Date: Nov 2010 | |
| | Stihl saw | | | |
| | Harness and appropriate Personal Protective Equipment (PPE) if necessary | | | |
| Monitoring | A program to monitor air quality, dust, noise and vibration shall be put in place during the construction phase. | | be put in place during the | |
| Emergency, preparedness and response | Emergency response plans will be for each individual demolition opera | | ctors' method statements | |
| References | Environmental Statement. | | | |

Draft versions of the Construction Procedures are set out below for guidance purposes.

The Contractor shall develop these further as an integral part of their operational procedures for issue as Controlled Documents.



ANNEX 3: SITE ACCESS LOCATIONS

Table 6G.19 Site Access Locations

| Site Access | Mainline Chainage | Average Truck Movements (period) | Access Description | Comments | |
|------------------------------------|-------------------|----------------------------------|----------------------------------|--|--|
| Section 1 | | | | | |
| Junction 1 - New Buildings | 500 | 20 per day (240 days) | Directly off existing A5 | | |
| Junction 2 - New Buildings (South) | 1750 | 20 per day (240 days) | New Junction 2 link road | | |
| Shared Accommodation Access | 2850 | 20 per day (300 days) | Shared access to treatment works | | |
| Magnagh Dand | 4950 | 20 per day (360 days) | "Using existing side road | | |
| Meenagh Road | 4950 | | (permanent stop off)" | | |
| Existing A5 | 6400 | 20 per day (360 days) | Directly off existing A5 | | |
| Donagheady Road | 7750 | 12 per day (240 days) | New Donagheady side road | | |
| Existing A5 | 9100 | 20 per day (360 days) | Directly off existing A5 | | |
| Existing A5 | 11600 | 70 per day (360 days) | Directly off existing A5 | | |
| Junction 3 | 14700 | 160 per day (480 days) | New Junction 3 link road | Surplus from south of river Mourne & imported fill material. | |
| Existing A5 | 16700 - 17900 | 90 per day (480 days) | Directly off existing A5 | Surplus from south of river Mourne & imported fill material. | |



| Site Access | Mainline Chainage | Average Truck Movements (period) | Access Description | Comments |
|--------------------------|-------------------|----------------------------------|--|--|
| Junction 6 (Existing A5) | 18050 | 50 per day (480 days) | Directly off existing A5 | |
| Strahans Road | 20400 | 200 per day(360 days) | "Using existing side road (improvements required)" | Surplus cut south of river Mourne hauled north via Strahans road. |
| Orchard Road | 21400 | 15 per day (360 days) | Using existing Orchard road | |
| Junction 8 | 22100 | 10 per day (240 days) | New Junction 8 link road | |
| Peacock Road | 22400 | 20 per day (260 days) | "Using existing side road | |
| reacock Roau | 22400 | 20 per day (360 days) | (improvements required)" | |
| | | Section 2 | | |
| Primrose Park | 27215 | 25 per day (240 days) | From Peacock Road/Ex. A5 | Temporary Diversion to north side. |
| B165 Bells Park Road | 27990 | 20 per day (240 days) | From Ex. A5 | Temporary Diversion to north side. Not required if new alignment is offline from existing. |
| Garden Road | 28000 | | | Assumed Closed until complete with Bells Park Rd. |
| High Road | 28595 | | | |
| Seein Road | 29090 | 10 per day (120 days) | From Bells Park Rd. | Now offline. Shuttle work (traffic lights) to complete tie-ins. |



| Site Access | Mainline Chainage | Average Truck Movements (period) | Access Description | Comments |
|-------------------------|-------------------|----------------------------------|-------------------------------------|---|
| Concess Road | 30140 | | | Short term Road Closures to construct road and beam lifts. |
| B72 Fyfin Raod | 31445 | 50 per day (360 days) | From B165 & Ex. A5 | Shuttle work (traffic lights) to upgrade pavement & markings etc (width/depth). |
| Stone Road | 31910 | | | Temporary closure with diversion using realigned Urbalreagh Rd. |
| Urbalreagh Road (North) | 32000 | 20 per day (360 days) | From B72 Fyfin Rd. | |
| Urbalreagh Road (South) | 32000 | | From B72 Fyfin Rd. | |
| Unnamed Road | 32600 | | | |
| Derg Road | 33960 | 20 per day (240 days) | From Ex. A5 onto Old Bridge Rd. | Temp Diversion using existing to south of new realignment. |
| B164 Deerpark Road | 34700 | 20 per day (240 days) | | Temp Diversion to the north of the new realignment. |
| Milltown Road | 35280 | | | |
| Magheracoltan Road | 36270 | 20 per day (240 days) | From B164 and B84/Drumlegagh Rd. | Short term Road Closures to construct road and beam lifts. |
| Drumlegagh Road | 37050 | 20 per day (240 days) | From Magheracolton Rd to JN2 only. | |
| Golf Course Road | 37200 | | | |



| Site Access | Mainline Chainage | Average Truck Movements (period) | Access Description | Comments |
|---------------------------|-------------------|----------------------------------|-----------------------------------|--|
| B84 Baronscourt Road | 37300 | 50 per day (360 days) | From Old A5 Strabane Rd & Ex. A5. | Now mostly offline. Shuttle work (traffic lights) to complete tie-ins. |
| Oldcastle Road | 38590 | | | Temp Diversion to the north of the new realignment. |
| Honeyford Lane | 39000 | | | |
| New Glen to Old Glen Link | 39350 | | | |
| Glen Road | 39420 | | | Now mostly offline. Shuttle work (traffic lights) to complete tie-ins. |
| Gortgranagh Road | 39500 | | | |
| Castletown Road (North) | 39910 | 50 per day (360 days) | From Old A5 in Newtownstewart. | Maintain existing road until new overbridge complete. |
| Grange Road | 40050 | | | |
| West Road | 41110 | | | Temp Diversion to the north of the new realignment. |
| Joe's Road | 42410 | 25 per day (240 days) | From Ex. A5. | Maintain existing road until new overbridge complete. |
| Unnamed Road | 43590 | 50 per day (240 days) | | Becomes a shared access track. |
| Killinure Road | 44960 | | | Now mostly offline. Shuttle work (traffic lights) to complete tie-ins. |



| Site Access | Mainline Chainage | Average Truck Movements (period) | Access Description | Comments |
|--------------------------|-------------------|----------------------------------|-----------------------------------|--|
| Castletown Road (South) | 45670 | 20 per day (360 days) | From Ex. A5 | Short term Road Closures to construct road and beam lifts. |
| Cashty - Castletown link | 45750 | | | |
| Cashty Road | 46880 | | | |
| Dunteige Road | 46940 | 20 per day (360 days) | From Castletown Rd at Mountjoy | Temp Diversion to the north of the new realignment. |
| Lisnagirr Road | 47550 | 20 per day (480 days) | From Ex. A5. | |
| Tully Link Road East | 48000 | | | |
| Rash Road | 48070 | 20 per day (240 days) | From Ex. A5. | |
| Tully Link Road West | 48200 | | | |
| Proposed JN3 Link Road | 49230 | 25 per day (360 days) | From Ex. A5. | Shuttle work (traffic lights) to complete tie-ins. |
| South Drumlegagh Road | 49620 | 25 per day (360 days) | From Ex. A5. | |
| Todds Road | 49825 | | | |
| Mellon Park Drive | 50440 | | | |
| Armstrong's Lane | 50770 | | | |
| B50/Gillygooly Road | 51280 | 50 per day (360 days) | From Ex. A5. | Now mostly offline. Shuttle work (traffic lights) to complete tie-ins. |
| Mullaghmena Road | 51350 | | | Temporary Road Closure to construct & finalise to new B50. |



| Site Access | Mainline Chainage | Average Truck Movements (period) | Access Description | Comments |
|----------------------|-------------------|----------------------------------|--------------------------------------|---|
| Aghnamoyle Road | 52010 | 20 per day (240 days) | From B50 Gillygooley Rd. | Use existing and realigned Botera Road as temporary diversion until Overbridge complete. |
| Botera Road | 52100 | | | |
| Tamlaght Road | 53100 | 10 per day (240 days) | From Brookmount Rd/ Ex. A5. | Full Road Closure for duration of bridge construction. |
| Brookmount Road | 53720 | 10 per day (240 days) | From Ex. A5. | Short term Road Closures to construct road and beam lifts. |
| A32/Clannobogan Road | 54020 | 50 per day (360 days) | From A32 | Short term Road Closures to construct road and beam lifts. |
| Loughmuck Road | 54350 | 20 per day (120 days) | From Dromore Rd/A32 | Now mostly offline. Shuttle work (traffic lights) to complete tie-ins. |
| Beagh Road | 55910 | | | |
| Ballynahatty Road | 56430 | 20 per day (240 days) | From Old A5, Dublin Rd, Omagh | Now mostly offline. Shuttle work (traffic lights) to complete tie-ins. |
| Blackfort Road | 57000 | 20 per day (120 days) | From Section 3/ B83 Seskinore Rd. | Use existing and realigned Blackfort Road as temporary |



| Site Access | Mainline Chainage | Average Truck Movements (period) | Access Description | Comments |
|----------------------------|-------------------|----------------------------------|---|---|
| | | | | diversion until Overbridge complete. |
| Drumragh Road | 57100 | 20 per day (240 days) | From Section 3/ B83 Seskinore Rd. | |
| | | Section 3 | | |
| Seskinore Road (B83) | 62065 | 120 per day (540 days) | Use existing side road | Large quantities of export and import required. |
| Tattykeel Cottages North | 62600 | 20 per day (360 days) | Use existing side road | |
| Tattykeel Cottages Central | 62850 | 20 per day (360 days) | Acess directly from existing A5 | Access to Doogary Bog |
| Tattykeel Cottages South | 63800 | 20 per day (360 days) | Use existing side road | |
| Drumconnelly Road 1 | 64400 | 70 per day (450 days) | Use existing side road and realigned side road | Large quantities of export and import required. |
| Tullyrush Road | 66000 | 35 per day (450 days) | Use existing side road with minor upgrade works | |
| Rarone Road | 66900 | 25 per day (360 days) | Use existing side road with minor upgrade works | |
| Drumconnolly Road 2 | 67900 | 25 per day (360 days) | Use existing side road with minor upgrade works | |
| Moylagh Road | 68700 | 50 per day (450 days) | Use existing side road | Large quantities of export and import required. |
| Augher Point Road | 68800 | 30 per day (360 days) | Use existing side road and realigned side road | |
| Greenmount Road | 71150 | 65 per day (450 days) | Use existing side road | Large quantities of export and |



| Site Access | Mainline Chainage | Average Truck Movements (period) | Access Description | Comments |
|----------------------------|-------------------|----------------------------------|---|--|
| | | | | import required. |
| Springhill Road | 73800 | 100 per day (720 days) | Use existing side road and temporary road | Large quantities of export and import required. No suitable alternative access between Springhill and Glenhoy. |
| Tullanafoile Road | 75900 | 10 per day (200 days) | Use existing side road | |
| Tullycorker Road | 76600 | 10 per day (200 days) | Use existing side road | |
| Rarogan Road | 78450 | 10 per day (200 days) | Use existing side road | |
| Glenhoy Road | 80300 | 100 per day (720 days) | Use existing side road and realigned side road | Large quantities of export and import required. No suitable alternative access between Springhill and Glenhoy. |
| Ballynasaggart Road | 81650 | 40 per day (720 days) | Use existing side road with minor upgrade works | Large quantities of export and import required. |
| Feddan Road | 83300 | 10 per day (200 days) | Use existing side road | |
| Tullybryan Road | 83400 | 20 per day (360 days) | Use existing side road and realigned side road | |
| A4 Annaghilla Road | 83500 | 100 per day (720 days) | Use existing side road | Large quantities of export and import required. |
| Tullyvar Road (crosses A4) | N/A | 20 per day (360 days) | Use existing side road | |
| Tullywinny Road 2 | 85500 | 130 per day (540 days) | Use existing side road | |



| Site Access | Mainline Chainage | Average Truck Movements (period) | Access Description | Comments |
|---|-------------------|----------------------------------|---|---|
| | | | accessed from Ballynany Road | |
| Lisginny Road | 86800 | 200 per day (540 days) | Use existing side road with minor upgrade works | Large quantities of export and import required. |
| Old Chapel Road | 88000 | 10 per day (240 days) | Use existing side road | |
| Tullyvar Road (A5) | 88500 | 160 per day (720 days) | Use existing side road | Large quantities of export and import required. |
| Carnteel road (B35) | 90500 | 110 per day (360 days) | Use existing side road and realigned side road | Large quantities of export and import required. |
| Rehaghy road (B128) | 91050 | 50 per day (360 days) | Use existing side road and realigned side road | |
| Caledon road | 92200 | 60 per day (360 days) | Use existing side road | |
| Monaghan Road (stopped up, turning head provided) | 93300 | 30 per day (360 days) | Use existing side road | Large quantities of export and import required. |



ANNEX 4: TRAFFIC MANAGEMENT

Table 6G.20 Traffic Management Description

| Side Road Ref | Side Road/ Junction | Mainline Chainage | Side Road Stopped Up | Preferred for Import of Materials & all Vehicles | Comments Temporary Diversion / Road Closure |
|---------------|-------------------------------|----------------------|-------------------------|--|---|
| | | | Section 1 | | |
| | Junction 1 (New Buildings) | 500 | No | Yes | One way TM (traffic lights) to complete tie-ins with the existing A5 and the junction changes associated with Woodside Road. |
| | Junction 2 | 1750 | No | Yes | One way TM to complete tie-ins. |
| S1 / SR / 01 | Dunnalong Road | 3900 | No | No | Local School bus route. Temporary diversion to the north of the existing road. |
| | Meenagh Road | 4950 | Yes | Yes | No TM requirements. Landowner access will be maintained during works. |
| | Existing A5 | 6400 | No | Yes | Traffic flows will be maintained on existing A5 during bridge construction works. Assumed that A5 remains at grade and only requires the relocation of a bus lay-by to the north of the proposed structure. Night closure required for bridge beam lifts. |
| S1 / SR / 05 | Tamnabrady Road | 6400 | No | No | New link road running across the top of the Bready cutting will require TM to complete tie-in. |
| S1 / SR / 04 | Cloghboy Road | 6500 | No | No | Realigned Cloghboy Road constructed offline. |
| S1 / SR / 06 | Donagheady Road | 7750 | No | No | No TM requirements. Existing Donagheady Road maintained until new side road / structure |



| Side Road Ref | Side Road/ Junction | Mainline Chainage | Side Road Stopped Up | Preferred for Import of Materials & all Vehicles | Comments Temporary Diversion / Road Closure |
|---------------|---------------------|----------------------|-------------------------|--|---|
| | | | | | completed. One way TM to complete tie-ins. |
| S1 / SR / 24 | Willow Road | 8900 | Yes - in part | No | Realigned Willow Road constructed offline. |
| | Existing A5 | 9100 | No | Yes | Traffic flows will be maintained on existing A5 during bridge construction works. Assumed that A5 remains at grade and requires no upgrade works. Night closure required for bridge beam lifts. |
| S1 / SR / 09 | Ash Avenue | 9600 | Yes | No | Establish Ash / Drumenny link prior to closing Ash Avenue. |
| S1 / SR / 10 | Drumenny Road | 10050 | Yes | No | Traffic will use Ash Avenue during bridge construction works. |
| S1 / SR / 11 | Ballydonaghy Road | 10950 | Yes | No | Temporary diversion to the north of the existing road. |
| S1 / SR / 12 | Moss Road | 11000 | No | No | Traffic will use Ballydonaghy / Moss link during construction. |
| S1 / SR / 14 | Greenlaw Road | 13000 | Yes | No | Establish Park Road / Greenlaw Road link prior to closing Greenlaw Road. |
| S1 / SR / 15 | Park Road (north) | 13550 | No | No | Traffic flows will be maintained on existing Park Road during bridge construction works. |
| | Junction 3 | 14750 | No | Yes | Various local temporary diversions for the realigned existing A5, Woodend Road and Park Road will be required during construction works. One way TM will be required at intervals during construction. |



| Side Road Ref | Side Road/ Junction | Mainline Chainage | Side Road Stopped Up | Preferred for Import of Materials & all Vehicles | Comments Temporary Diversion / Road Closure |
|---------------|----------------------|----------------------|-------------------------|--|---|
| S1 / SR / 16 | Spruce Road | 15000 | Yes | No | Early closure, access via. Park Road during construction. |
| S1 / SR / 17 | Park Road (south) | 17000 | Yes (junction) | No | Existing junction with the A5 to be stopped up and diverted through the realigned link through Junction 4. |
| | Greenbrae Park | 17400 | Yes | No | Road to be closed – no TM required |
| S1 / SR /18 | Lifford Road | 17900 | No | Yes | Various local temporary diversions will be required during construction works. One way TM may be required at intervals during construction. |
| | Junction 5 | 17900 | No | Yes | New arm to be provided on the roundabout for the southbound slip road; TM will be required to complete the tie-in. |
| | Junction 6 | 17900 | No | No | New arm to be provided on the roundabout for the slip roads; TM will be required to complete the tie-in. |
| S1 / SR / 19 | Urney Road | 19600 | No | No | Realigned offline. One way TM to complete tie-ins. |
| S1 / SR / 26 | Carrick Avenue | 19600 | No | No | Realigned offline. One way TM to complete tie-ins. |
| | | | Section 2 | | |
| S2 / SR / 01 | Primrose Park | 27215 | No | Yes - from Sion Mills | Temporary diversion to north side. |
| S2 / SR / 02 | B165 Bells Park Road | 27990 | No | Yes | New alignment is offline from existing. |
| S2 / SR / 49 | Garden Road | 28000 | Diverted | No | Assumed closed until complete with Bells Park Road. |
| S2 / SR / 03 | High Road | 28595 | Yes | No | |



| Side Road Ref | Side Road/ Junction | Mainline Chainage | Side Road Stopped Up | Preferred for Import of Materials & all Vehicles | Comments Temporary Diversion / Road Closure |
|---------------|----------------------------|----------------------|-------------------------|--|---|
| S2 / SR / 04 | Seein Road | 29090 | No | Yes - from Bells Park Road | Offline. Shuttle work (traffic lights) to complete tie- ins. |
| S2 / SR / 05 | Concess Road | 30140 | No | Yes - from Bells Park Road | Short term road closures to construct road and beam lifts. |
| S2 / SR / 06 | B72 Fyfin Road | 31445 | No | Yes | Shuttle work (traffic lights) to upgrade pavement & markings etc (width/depth). |
| S2 / SR / 07 | Stone Road | 31910 | No | Yes | Temporary closure with diversion using realigned Urbalreagh Road. |
| | Urbalreagh Road (North) | 32000 | Diverted | Yes | |
| | Urbalreagh Road (South) | 32000 | Diverted | Yes | |
| S2 / SR / 10 | Derg Road | 33960 | No | Yes - from Ex. A5 | Temp diversion using existing to south of new realignment. |
| S2 / SR / 11 | Deerpark Road | 34700 | No | Yes | Temp diversion to the north of the new realignment. |
| S2 / SR / 12 | Milltown Road | 35280 | Yes | No | |
| S2 / SR / 13 | Magheracoltan Road | 36270 | No | Yes | Short term road closures to construct road and beam lifts. |
| S2 / SR / 14 | Drumlegagh Road North | 37050 | Diverted | Yes | Linked to Junction 10 connector road |
| S2 / SR / 15 | Golf Course Road | 37200 | Yes | Yes | |
| S2 / SR / 16 | Baronscourt Road | 37300 | No | Yes | Offline. Shuttle work (traffic lights) to complete tie- ins. |
| S2 / SR / 17 | Oldcastle Road | 38590 | No | No | Temp diversion to the north of the new |



| Side Road Ref | Side Road/ Junction | Mainline Chainage | Side Road Stopped Up | Preferred for Import of Materials & all Vehicles | Comments Temporary Diversion / Road Closure |
|---------------|----------------------------|----------------------|-------------------------|--|--|
| | | | | | realignment. |
| S2 / SR / 18 | Honeyford Lane | 39000 | Yes | No | |
| S2 / SR / 19 | Glen Road | 39420 | Diverted | Yes | Shuttle work (traffic lights) to complete tie-ins. |
| S2 / SR / 20 | Gortgranagh Road | 39500 | Diverted | No | Shuttle work (traffic lights) to complete tie-ins. |
| S2 / SR / 21 | Castletown Road (North) | 39910 | No | Yes | Maintain existing road until new overbridge complete. |
| S2 / SR / 22 | Grange Road | 40050 | Diverted | No | |
| S2 / SR / 23 | West Road | 41110 | No | No | Temporary diversion to the north of the new realignment |
| S2 / SR / 24 | Joe's Lane | 42410 | Diverted | Yes | Maintain existing road until new overbridge complete. |
| S2 / SR / 25 | Gordon's Lane | 43590 | Yes | Yes | Abandoned between Castletown Road and existing A5. Proposed underbridge (for landowner access) offline to the north. |
| S2 / SR / 26 | Killinure Road | 44960 | No | Yes - from Ex. A5 | Mostly offline. Shuttle work (traffic lights) to complete tie-ins. |
| S2 / SR / 27 | Castletown Road (South) | 45670 | No | Yes - from Ex. A5 | Short term road closures to construct road and beam lifts. |
| S2 / SR / 28 | Cashty - Castletown link | 45750 | Diverted | Yes | |
| S2 / SR / 29 | Dunteige Road | 46940 | No | Yes | Temp diversion to the north of the new alignment. |
| S2 / SR / 30 | Lisnagirr Road | 47550 | Yes | No | |
| S2 / SR / 31 | Tully Road (East) | 48000 | Diverted | No | |
| S2 / SR / 32 | Rash Road | 48070 | No | Y | Temp diversion via Tully Road (East). |



| Side Road Ref | Side Road/ Junction | Mainline Chainage | Side Road Stopped Up | Preferred for Import of Materials & all Vehicles | Comments Temporary Diversion / Road Closure |
|---------------|-----------------------------------|----------------------|-------------------------|--|--|
| S2 / SR / 33 | Tully Road (West) | 48200 | Yes | No | |
| S2 / SR / 34 | Proposed Junction 11 Link Road | 49230 | - | Yes | Shuttle work (traffic lights) to complete tie-ins. |
| S2 / SR / 35 | Drumlegagh Road South | 49620 | Yes | Yes | Link provided to Junction 11. |
| S2 / SR / 36 | Todds Road | 49825 | Yes | No | |
| S2 / SR / 37 | Mellon Park Drive | 50440 | Diverted | Yes | |
| S2 / SR / 38 | B50/Gillygooly Road | 51280 | No | Yes | Offline. Shuttle work (traffic lights) to complete tie- ins. |
| | Mullaghmena Road | 51350 | No | | Temporary road closure to construct and finalise tie-in to new B50. |
| S2 / SR / 39 | Aghnamoyle Road | 52010 | No | Yes | Use existing and realigned Botera Road as temporary diversion until Overbridge complete. |
| S2 / SR / 40 | Botera Road | 52100 | Diverted | No | |
| S2 / SR / 41 | Tamlaght Road | 53100 | No | Yes | Full road closure for duration of bridge construction. |
| S2 / SR / 42 | Brookmount Road | 53720 | No | Yes | Short term road closures to construct road and beam lifts. |
| S2 / SR / 43 | A32/Clanabogan Road | 54020 | No | Yes | Short term road closures to construct road and beam lifts. |
| S2 / SR / 44 | Loughmuck Road | 54350 | No | Yes | Offline to the north. Shuttle work (traffic lights) to complete tie-ins. |
| S2 / SR / 45 | Beagh Road | 55910 | No | Yes | Mostly offline to the south. Partial temp diversion to the north. |
| S2 / SR / 46 | Ballynahatty Road | 56430 | No | Yes | Mostly offline. Shuttle work (traffic lights) to |



| Side Road Ref | Side Road/ Junction | Mainline Chainage | Side Road Stopped Up | Preferred for Import of Materials & all Vehicles | Comments Temporary Diversion / Road Closure |
|---------------|---|----------------------|-------------------------|--|---|
| | | | | | complete tie-ins. |
| S2 / SR / 47 | Blackfort Road | 57000 | No | Yes | Use existing and realigned Drumragh Road as temporary diversion until overbridge complete. |
| S2 / SR / 48 | Drumragh Road | 57100 | Diverted | No | |
| S2 / SR / 01 | Primrose Park | 27215 | No | Yes - from Sion Mills | Temporary diversion to north side. |
| S2 / SR / 02 | B165 Bells Park Road | 27990 | No | Yes | New alignment is offline from existing. |
| S2 / SR / 49 | Garden Road | 28000 | Diverted | No | Assumed closed until complete with Bells Park Road. |
| S2 / SR / 03 | High Road | 28595 | Yes | No | |
| | | | Section 3 | | |
| S3/SR/001 | Seskinore road (B83) | 62065 | Re-aligned | Yes | Temporary road construction for tie-in. Possibly traffic lights for Western tie-in through bog. |
| S3/SR/043 | Doogary road (A5) - joins Seskinore road | 62100 | Re-aligned | Yes | Temporary road construction for tie-ins. |
| S3/SR/044 | Tattykeel cottages north | 62600 | Yes | Yes | Road closure agreed, access provided from south. |
| S3/SR/044 | Tattykeel cottages central | 62850 | Re-aligned | Yes | Road closure agreed, access provided from south. |
| S3/SR/044 | Tattykeel cottages south | 63800 | Yes | Yes | Remains open until central section re-opens. |
| S3/SR/045 | Drumconnelly road 1 | 64300 | Re-aligned | Yes | Short duration closure required to construct tie-in. |



| Side Road Ref | Side Road/ Junction | Mainline Chainage | Side Road Stopped Up | Preferred for Import of Materials & all Vehicles | Comments Temporary Diversion / Road Closure |
|---------------|---------------------|----------------------|-------------------------|--|--|
| S3/SR/007 | Tullyrush road | 66000 | No | Yes | Road closure agreed for duration of structure. Diversion via Seskinore Road. |
| S3/SR/008 | Rarone road | 66900 | No | Yes | Road closure agreed for duration of structure. Diversion via Seskinore Road. |
| S3/SR/049 | Drumconnolly road 2 | 67900 | Yes | Yes | Remains open until Rarone Road re-opened. |
| S3/SR/009 | Moylagh road | 68700 | Re-aligned | Yes | Temporary road required for tie-in. |
| S3/SR/011 | Augher point road | 68800 | Re-aligned | Yes | Temporary road required for tie-in. |
| S3/SR/012 | Killadroy road | 70950 | Re-aligned | No | Short duration closure required to construct tie-in. |
| S3/SR/013 | Greenmount road | 71150 | Re-aligned | Yes | Short duration closure required for tie-ins, beam lifts access via Kiladroy. |
| S3/SR/014 | Routingburn road | 72000 | Yes | No | |
| S3/SR/015 | Springhill road | 73800 | No | Yes | Temporary road constructed to south. |
| S3/SR/017 | Cormore road | 75000 | Yes | No | |
| S3/SR/046 | Tullanafoile road | 75900 | No | Yes | Road closure agreed. Phased with Tullycorker. |
| S3/SR/047 | Tullycorker road | 76600 | No | Υ | Road closure agreed. Phased with Tullanafoile. |
| S3/SR/022 | Tycanny road | 78200 | Re-aligned | N | Short duration road closure required for tie-in. |
| S3/SR/023 | Rarogan road | 78450 | No | Y | Road closure agreed. Phased with Tullycorker. |
| S3/SR/024 | Glenhoy road | 80300 | No | Y | Short duration road closure required for tie-in. |
| S3/SR/050 | Ballynasaggart road | 81650 | No | Υ | Road closure agreed. Phased with Crew Road. |



| Side Road Ref | Side Road/ Junction | Mainline Chainage | Side Road Stopped Up | Preferred for Import of Materials & all Vehicles | Comments Temporary Diversion / Road Closure |
|---------------|----------------------------------|----------------------|-------------------------|--|---|
| S3/SR/025 | Crew road | 82000 | Yes | N | Remains open until Ballynasaggart re-opens. |
| S3/SR/027 | Feddan road | 83300 | No | Υ | Road closure required. Alternative access via Ballynasaggart Road. |
| S3/SR/029 | Tullybryan road | 83400 | No | Υ | Online construction. Road closure required. |
| S3/SR/031 | A4 Annaghilla road | 83500 | No | Y | Online construction. Temporary traffic restrictions (dual to single). |
| S3/SR/030 | Tullyvar road (crosses A4) | N/A | No | Υ | Temporary road required for construction of embankments. |
| | Ballynany road | 83700 | Yes | Y | Road closure required. Phased with Tullywinny. |
| S3/SR/032 | Tullywinny road (Tie-In with A4) | N/A | Yes | N | Road closure required. |
| S3/SR/033 | Tullywinny road 2 | 84400 | No | Y | Road closure required. Phased with Ballynany. |
| S3/SR/034 | Lisginny road | 86500 | No | Y | Short duration closure agreed for construction of tie-ins. |
| S3/SR/035 | Old chapel road | 87800 | No | Y | Road closure required for duration of structure. |
| S3/SR/036 | Tullyvar road (A5) | 88350 | No | Υ | Temporary roads required for construction of tie- ins. |
| S3/SR/038 | Loughans road | 88420 | No | N | Road closure required for duration of structure. |
| S3/SR/039 | Carnteel road (B35) | 90280 | No | Y | Temporary roads required for construction of tie- ins. |
| S3/SR/040 | Rehaghy road (B128) | 90800 | No | Υ | Short duration closures required for beam lifts, road closures. |
| S3/SR/041 | Caledon road | 91920 | No | Υ | Temporary road required for construction of tie- ins. |



| Side Road Ref | Side Road/ Junction | Mainline Chainage | Side Road Stopped Up | Preferred for Import of Materials & all Vehicles | Comments Temporary Diversion / Road Closure |
|---------------|---|----------------------|-------------------------|--|---|
| S3/SR/042 | Monaghan road (stopped up, turning head provided) | 93100 | Yes | Y | Possibly traffic lights/ temporary road for construction of tie-in. |

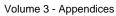


Appendix 6: Draft Silt Management Plan



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A5 Western Transport Corridor







Scheme Wide Silt Management Plan

A5 Western Transport Corridor

05 March 2014

Produced for



Prepared by



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1 Introduction

This plan sets out site controls for management of sediment generated from over pumping during the construction of the new culverts and precipitation run off during earthwork operations.

All relevant construction activities for temporary and permanent works will follow relevant environmental legislation in consultation with Northern Ireland Environment Agency (NIEA) and where required, Rivers Agency, Loughs Agency and the Department of Culture Arts and Leisure, Inland Fisheries Team (DCAL). The main objective of the Silt Management Plan is to ensure that all drainage of temporary works is carried out in adherence with current regulation and to provide guidance on how to prevent water pollution.

Various agencies are responsible for control of distinct elements of the works:

- Rivers Agency proposals do not cause flooding upstream of the works.
- NIEA discharge of precipitation water, extraction and ecological licenses.
- Loughs Agency fish within the Foyle Catchment.
- DCAL fish within the Blackwater Catchment.

The construction phase of all projects is a period within which there is a significant potential for pollution, in particular silt pollution to local watercourses due to unearthed alluvium. The objective of this plan is to provide guidance on the relevant statutory provisions, including any consents required, in respect of the water environment, to protect both physical habitat and morphology and to avoid unacceptable adverse impacts including changes to flow volume, water levels and water quality due to construction.

This plan aims to address the requirements of the Rivers Agency, NIEA, Loughs Agency and DCAL and detail Road Service's strategy for dealing with these key environmental risks.

A Discharge License will be required from NIEA to enable the works to commence. This licence will be granted for each phase of the works and the works will then be monitored on a month by month basis by the NIEA. Each month contractors will be required to issue a monthly return to the NIEA which will be the projected discharges for the following month. These will be linked to the construction programmes. These plans will be reviewed every three months and updated if required.

Where construction activities near water courses and water bodies are essential, steps have been undertaken to identify sufficient mitigation measures for the protection of the watercourses against pollution. The Silt Management Plan also



includes details for pollution prevention measures and construction methodologies to be incorporated during the construction phase of the project.

Caution is required to prevent pollution and/or environmental damage, particularly when the following activities are undertaken:

- Construction of permanent and temporary bridges.
- Discharges into a surface water drainage system.
- Operating plant or machinery in, or in the vicinity of water.
- Discharges of surface water run-off.
- Laying of pipeline or cable.



2 Silt Mitigation

2.1 Scheme Overview

The proposed A5WTC would be an 85km long dual carriageway, running between New Buildings and the border with the Republic of Ireland (ROI), immediately south of Aughnacloy.

The proposed scheme runs along the Foyle Valley, close to the River Foyle, crossing the Burn Dennet

A full description of the scheme alignment is presented in Appendix A.

The works consist of a number of watercourse crossings which require the construction of new piped or box culverts to carry the streams under the new mainline. An example detailed method statement has been developed to control the construction of these and is included in Appendix B.

2.2 Sensitive Areas

The following areas are considered to be particularly sensitive with respect to potential impacts from pollution which may result from inadequate drainage control:

The River Foyle has a catchment area of approximately 2890km2 and extends into the counties of Londonderry, Tyrone and Donegal. The major tributaries of the Foyle include the Burn Dennet, Glenmornan, Finn, Mourne, Strule, Owenkillew, Derg, Fairy Water, Camowen and Drumragh Rivers. The northern section of the proposed route lies within the Lower Foyle Catchment, where the Mourne and the Finn converge at Strabane to form the River Foyle. From Strabane the Foyle flows north to Londonderry and Lough Foyle. The lough is tidal and exerts a tidal influence up the River Foyle as far as Strabane. The tidal reach of the Foyle has a tidal range of approximately 3m and is up to 750m wide in places. The main tributaries to the Foyle in the vicinity of the route are discussed in the following paragraphs. However, there are also a significant number of smaller tributaries which the route crosses. These tributaries are generally large man-made field drains and small streams which have been heavily modified / straightened where they pass through villages and agricultural land. The proposed scheme runs along the eastern side of the River Foyle from New Buildings to Strabane, primarily through agricultural land.

The Burn Dennet has a catchment of approximately 150km2. It rises in the Sperrin Mountains, and flows 35km west to the River Foyle. The catchment is predominantly agricultural, although there are significant sand and gravel quarries close to its lower reaches. The Proposed Scheme crosses the river in the vicinity of Burn Dennet Bridge. Here, the watercourse is approximately 15m wide and typically transitional in character, the valley being relatively unconfined with a wide floodplain and a channel which is relatively shallow in gradient and meandering in form with riffle/pool sequences.



The Glenmornan River has a catchment of approximately 35km2. It rises in the foothills of the Sperrins and flows 16km west to the River Foyle passing through the villages of Artigarvan and Ballymagorry. The upper catchment comprises peat covered hills. The landscape of the mid and lower reaches is predominantly agricultural. There are some sand and gravel workings adjacent to the middle reaches of the watercourse. Where the Proposed Scheme crosses the river, northwest of Ballymagorry, the river channel is between 4m and 20m wide and typically transitional in character.

The River Finn rises in Lough Finn in County Donegal and flows east for 60km to Strabane, where it joins with the River Mourne. The upper reaches of the catchment, which has an area of 495km2, generally flow through mountainous terrain. The route runs along the eastern bank of the lower reaches of the river, which by this point is a mature lowland river, with a wide unconfined valley and floodplain that is relatively deep and slow flowing.

The River Mourne forms the middle section of the main spine of the Foyle Catchment and has a catchment area of 1860km2. The Mourne is formed at the confluence of the River Strule and River Derg near Ardstraw. The river flows north to Strabane, where it merges with the River Finn to form the River Foyle. The route runs parallel with the western bank of the Mourne. The Mourne is a transitional river with numerous riffle and pool sequences, which flow in a relatively unconfined valley within a large floodplain. The river channel is on average 60m wide and has been heavily modified at Sion Mills, where historically a large weir has been constructed. As the Mourne passes through Strabane the river channel has been modified by various flood defences.

The River Derg rises in the Killeter Uplands to the west of the route and flows eastwards to its confluence with the Strule River near Ardstraw. The route crosses the lower reaches of the Derg close to the confluence. The upper reaches of the catchment, which is approximately 440km2, are characterised by peatlands, while the lower reaches flow predominantly through farmland. The main stream length of the River Derg is 53km. Within the vicinity of the Proposed Scheme the River Derg is a transitional (piedmont) river characterised by a well-developed valley, reasonably large floodplain and variable substrate with riffle and pool sequences.

The River Strule forms the upper section of the main spine of the Foyle Catchment, and has a catchment area of 1340km2. The Strule is formed by the confluence of the Camowen and Drumragh rivers in the centre of Omagh. The Strule then flows northwards for approximately 21km before merging with the River Derg to form the Mourne. The entire length of the Strule runs parallel to the route. The Strule has two major tributaries, the Owenkillew which joins the Strule from the east at Newtownstewart and the Fairy Water which joins to the north of Omagh. As the proposed route passes to the west of Newtownstewart the Owenkillew is unlikely to be affected by the proposed road scheme. The route does cross numerous small stream tributaries on the western slopes of the Strule valley. The Strule is a transitional river with variable bed materials, riffle and pool sequences, an



unconfined valley and floodplain. The catchment is predominantly agricultural, although peat bog is present in the upper reaches of the large tributaries and sand and gravel quarrying is present in the Strule valley, particularly north of Newtownstewart.

The Fairy Water rises on the slopes of Bolaght Mountain in west Tyrone and flows eastwards to its confluence with the River Strule to the north of Omagh. It has a catchment area of 180km2 and a main stream length of 30km. The catchment is predominantly agricultural grassland; however there are significant areas of peat throughout the catchment, particularly in the valley floor. The Proposed Scheme crosses the Fairy Water approximately 500m upstream of its confluence with the Strule. In this area the river is approximately 16m wide and has typical transitional characteristics with a meandering channel pattern and riffle and pool sequences.

The Drumragh River lies in the upper reaches of the Foyle Catchment and is formed to the south of Omagh by the confluence of the Ballynahatty Water and Quiggery Water. It has a catchment area of 321km2. The Drumragh flows generally north through the centre of Omagh before merging with the Camowen to become the River Strule. The route crosses the Drumragh approximately 2.5km downstream of the Ballynahatty-Quiggery confluence. At this point the river is approximately 10-15m wide and has typical transitional characteristics with variable bed material, riffle and pool sequences and an unconfined valley and floodplain. Due to the nature of the topography in the Drumragh catchment there is an intricate dendritic drainage network, with a large number of tributary streams. The route skirts around the eastern extent of the upper Drumragh catchment, crossing a number of small streams / large field drains within the Routing Burn and Eskragh Water subcatchments. Many of the streams have been straightened or otherwise modified, with the exception of the Routing Burn main stream length, which is largely unmodified.

The Camowen River rises in the hills to the west of Pomeroy and flows westwards to Omagh, where it joins with the Drumragh to form the River Strule. It has a catchment area of 276km2. The Proposed Scheme passes through the western extent of the Camowen watershed, crossing the headwaters of a minor tributary to the Camowen River, namely the Ranelly Drain. These headwaters generally rise in the low lying peatlands which have formed between the drumlins that characterise the area. The reaches that the route pass over range from small semi-natural streams a few metres wide with good flow to very narrow ditches with limited flow.

The River Blackwater rises to the west of Fivemiletown and flows eastwards to Aughnacloy then north-east to Lough Neagh. It has a catchment area of 1493km2. The Proposed Scheme crosses the eastern part of the Upper Blackwater catchment, passing through the major tributary sub-catchments of the Roughan Burn and Ballygawley River, before terminating on the northern bank of the River Blackwater immediately south of Aughnacloy.

The Roughan Burn rises on the southern slopes of Slievemore and flows south through Ballymackilroy before joining the River Blackwater downstream of Augher. It



has a catchment of 27.02km2. Where the Proposed Route is crossed by the Roughan Burn it is a small, shallow stream with gravel and cobble bed. Although this reach is generally unmodified the lower reaches have been extensively straightened.

The Ballygawley Water rises on the slopes of Eshmore Hill approximately 12.5km northeast of Ballygawley. It has a catchment of 53.25km2. The river flows through the town before joining the river Blackwater at Lismore Bridge, approximately 6km downstream. The Proposed Scheme crosses the Ballygawley Water approximately 2km downstream of the town. At this point the river is approximately 10m wide with a shallow cobble and gravel bed.

2.3 Environmental obligations of the project during construction phase

The surface water management plan and pollution prevention measure installed as part of the A5WTC will be constructed using best practice and in conformance with the requirements of NIEA and other relevant governing bodies. The key legislation and guidance which will be adhered to are as follows:

- Water Framework Directive (Directive 2000/60/EC)
- Water (Northern Ireland) Order 1999
- Water abstraction and impoundment regulations (licensing) Northern Ireland 2006
- Groundwater regulations (Northern Ireland) 1998 (as amended)
- Control of pollution (oil storage) regulations (Northern Ireland) 2010
- Drainage (Northern Ireland) Order 1973 (as amended)
- Environmental Liability (Prevention and Remediation) Regulations (Northern Ireland) 2009
- Pollution Prevention Guidance Notes (PPGs):
 - PPG01 General guide to the prevention of water pollution
 - PPG02 Above ground oil storage tanks
 - PPG05 Works in near or liable to affect watercourses
 - PPG06 Working at construction and demolition sites
 - o PPG07 Refueling Facilities
 - PPG11 Preventing pollution at industrial sites
 - PPG18 Control of spillages and fire fighting run-off
 - o PPG20 Dewatering underground ducts and chambers
 - PPG21 Pollution Incident Response Planning
 - o PPG23 Maintenance of Structures over Water
 - PPG26 Pollution Prevention Storage and Handling of Drums & Intermediate Bulk Containers
- CIRIA Report C502 Environmental Good Practice on Site



- CIRIA 521 Sustainable Urban Drainage Systems; Design Manual for Scotland and Northern Ireland
- CIRIA Report C532 Control of Water Pollution from Construction Sites
- CIRIA Report C648 Control of Pollution from Linear Construction Project. Technical Guidance
- CIRIA Handbook C650 Environmental good practice on site
- CIRIA Handbook C651 Environmental good practice on site checklist
- CIRIA Report C697 The SUDS Manual

2.4 Silt Management

Contamination by silt from site run off into adjoining water courses is a key risk for this Project if not properly controlled throughout the construction of the Scheme.

Site discharge licences will be required from NIEA prior to works commencing. Any application for such consent must clearly state how site run off with be managed, treated and returned to the water course.

Site run off is made up of two components and are the direct results of heavy rain.

The first component is run off from adjoining land that is not affected by the works. Run off from adjoining land would be intercepted by the early construction of Preearthwork drained ditches (PED). This will be one of the first earthwork operations. Where the new road is in a cutting then the PED would be located at the top of the cut any water entering this ditch would be run off from adjoining land thus would not need treating.

The second component is run off across the works once the topsoil strip has been completed, this could be any of the following:

- Run off across topsoil strip
- Run off down embankment cuttings
- Run off down embankments being constructed.

2.5 General Construction Policies

The Silt Management Plan has been developed to minimise and mitigate for the effects of pollution to all local watercourses. However, this does not remove environmental responsibilities from the contractor / sub-contractors. All site personnel should be made aware of their environmental responsibilities through the production of this Construction Method Statement and an environmental induction.

In accordance with BS6031: 1981 Code of Practice for Earth Works, land disturbance will be kept to minimum and disturbed areas will be stabilised as soon as possible. Soil handling will be undertaken with reference to best practice guidelines.

In general the following will be adhered to in terms of the general Earthworks:

All roads will be kept free from dust and mud deposits.



- Areas of extraction and deposition will be carried out according to BS6031:1981 Code of Practice for Earth Works. Risk assessment will be evaluated to ensure all surface water will be appropriately treated prior to entering a discharge point.
- Any clean surface water not directly linked to a watercourse will be dealt with in the appropriate manner and field drainage introduced to the nearest stream before work begins.
- Retention ponds will be dug out first. These retention ponds will form part of the permanent SUDS and will be used during the construction period to deal with any surface water and act as sedimentation control.
- Trapezoidal-ditches will be dug out where required to channel any surface water from haul roads into these retention ponds. These will be to minimal gradient and if required straw bales or clean stone will be installed to act as weirs.
- Cut-off drains will be installed around the working areas to intercept uncontaminated surface runoff and divert it around and away from the works; surface water runoff may also be diverted around the excavations using heavy timbers or similar laid on the surface of the ground.

2.6 Installation Programme

At all times silt management features should be constructed prior to, or at the same time as the construction of the works. Before runoff is allowed to flow through the ditches, or across embankments scrutiny must be given by the contractor that the ditches, ponds slopes and embankments are fully stabilised and will not be affected by erosion. This will prevent the clogging of other parts of the system by the silt that is generated.

2.7 Working in the vicinity of water / Buffer zones

The following recommendations apply to the general construction activities either with the watercourses or in the vicinity of watercourses:

- Where practicable construction near streams should be avoided in wet weather.
- Keep cement and raw concrete out of watercourses.
- Plan so that roadside drains do not discharge directly into watercourses, but rather through a vegetated buffer area of adequate width.
- Runoff from excavations will NOT be pumped directly to watercourses.
- Should there be any incidents of pollution to the watercourses NIEA should be notified immediately. Immediate steps will be undertaken to resolve the cause of the pollution and where feasible mitigate against the impact of pollution, following the advice set out in PPG21.

2.8 Temporary Haul Roads

It is proposed that as the scheme progresses, the finished permanent roads will act as the temporary haul roads during the construction phase.



- Construction activities will be scheduled to minimise the area and period of time that soil will be exposed, particularly during winter periods.
- Cut-off drains will be installed around the working areas to intercept uncontaminated surface runoff and divert it around and away from the works.
- Stockpiling of materials will be minimized and essential stockpiles will be located as far away as possible from watercourses.
- Drains and culverts will be kept clear of debris and silt traps will be maintained appropriately. Spoil will not be dumped within buffer areas.
- Erosion of embankments will be avoided and, where possible, a vegetation cover will be maintained.
- Roads, drains and silt traps will be inspected for damage after intense storms and also before and after any intensive use.
- Site roads and approaches to river crossings will be regularly brushed or scraped and kept free from dust and mud deposits. Rubble slumps will be introduced prior to road crossings.

2.9 Settlement Ponds

Where possible, permanent SUDS pond locations will be used during the temporary construction phase to collect silt. At completion of the construction phase the settlement ponds will be fully reinstated to final design requirements.

Site run off will be intercepted by PED and the ditches will feed into temporary balancing ponds. Straw bales will be placed along the length of the ditch to help early removal of silt.

The ponds will be a minimum of 20m x 10m x 3m deep so that the pond can store approximately 500m3. The maximum precipitation on a 1 in 75 year rainfall has been used in the storage calculations. An example of the calculations is attached in Appendix C.

The strategy is to collect the silt contaminated run off at the temporary pond locations, allow the silt to settle and gravity feed the pond water back into the watercourse.

The outlet will be set at a higher level in relation to the inlet so that the pond fills up and allows the silt to settle.

Construction waste materials such as generated silts will be disposed of in such a manner that it does not add risk of additional silt load in the construction run-off.

Settlement ponds will be inspected for damage after intense storms in particular at the entry point and around the forebay area.



In most instances the works will only be affected by normal rain showers and thus operations would stop. Following heavier rainfall events the trace will be allowed to dry before recommencing earthworks operations.

2.10 Exposed Ground and stockpiles

As part of the surface water management plan for the site the following measures have been incorporated for spoil management areas.

- The amount of exposed ground and soil stockpiles will be kept to a minimum.
- Stockpile which will be in place for an extended period of time will be allowed to re-vegetate naturally.
- Short term stock piles will be sealed.
- Cut-off trenches will be installed uphill of spoil management areas to divert flows away from potential sources of silt pollution.
- Silt fences made from a suitable geotextile material will be used alongside all exposed ground where there is a pollution risk. Areas on a steep gradient will be managed to make sure erosion does not take place and small ditches will be considered around the perimeter.

2.11 Excavations

Every effort will be made to prevent water from entering excavations. Cut off ditches will be used to prevent entry of surface water. Clean runoff within the cut off trenches will be discharged back into the natural drainage system.

2.12 Over Pumping

Over Pumping will be avoided for construction of culverts within this scheme wherever possible.

Where over pumping is essential, no direct discharge to the existing watercourse will be permitted. Water from the over pumping operation will pass through a stilling pond and a settlement pond before being discharged to the receiving watercourse.

Any over pumping that may be required for other works such as below ground excavations will be strictly controlled by the on-site Environmental Manager using a 'permit to pump' system and regular monitoring of compliance with control measures.

All pumping operations will ensure that the pumps are sited a minimum of 15m away from the water course, drip trays or lined bunds are used to avoid accidental spillage. Spill kits will be located at the pump locations.

All over pumping would be undertaken using the one of the methods outlined below:

 Water pumped into a silt tank will allow any silt to settle before being gravity fed back into the watercourse downstream of the works back into an approved discharge location.



 Water pumped into the PED which incorporate mitigation measures such as check dams and silt traps which would make its way to a settlement lagoon allowing sediment to settle before water is discharged back into an approved discharge location.

If heavy rain was encountered which could result in flood upstream of the works then over pumping and construction operations will be stopped and the works will be allowed to re-fill with water.

2.13 Plant Crossings

In Salmonid catchments, all in stream works will be carried out during the months of May to September inclusive.

In Brook/Sea Lamprey catchments, all in stream works will be carried out during the months of September to March inclusive. It is intended that culverts that are piped in the permanent solution will be piped using the permanent diameter pipe size as a temporary crossing during this 5-7 month timeframe.

Crossing that are required outside of the windows listed above will require a temporary bridge crossing which will span the top bank of the existing watercourse. Precast concrete abutments will be used in order to mitigate the risk of contamination of the watercourse using concrete. The bridge will use steel beams to span the watercourse and precast concrete planks. Details are contained within Appendix D.

2.14 Sampling

A programme of water monitoring will be carried out during the construction phase. The extent and frequency of the monitoring will be proportionate to the level of activity. Such monitoring will be required in order to:

- Demonstrate that the mitigation measures and surface water management plan is performing as designed;
- Provide reassurance that the in-place mitigation measures are not having a significant impact upon the environment;
- Indicate whether further investigation is required and, where any risks are unacceptable, the need for additional mitigation measures to prevent, reduce or remove any impacts on the water environment.

This monitoring will commence prior to the start of work activities to establish the baseline conditions at each work site.

The surface water-monitoring programme will be site-specific and tailored to provide a meaningful and pragmatic indication of the state of the water environment. Given the nature of the development, it is considered that the surface water monitoring programme will comprise:

 An initial site walkover to establish base line conditions and identify watercourses which are presently polluted from silt deposition or any other waterborne pollutants.



- Regular visual inspections of surface water management features, such as culverts and receiving watercourses, in order to establish whether there is increased erosion or deposition and sediment.
- Regular visual inspections of watercourses during construction and decommissioning stages, particularly during periods of high rainfall, in order to establish that levels of suspended solids have not been increased by site activities.
- Periodic and ad-hoc sampling of surface waters and private water supplies in order to complement the programme of visual inspection.
- Additional monitoring required as a condition of discharge consents, abstraction licences or other environmental regulation.

All subsequent monitoring results will be compared with the baseline data-set to identify any impacts of the development on the surface water environment and to identify the requirement for any appropriate remedial measures. The impacts of the development will be deemed acceptable if there is no significant net deviation from the baseline monitoring results.



3 Flood Defences

For works that affect any existing flood defences a secondary defence will be constructed prior to the removal of the existing defence.

No works will be allowed to take place that affects flood defences without prior approval from the Rivers Agency and NIEA.



4 Monthly Reporting

NIEA, Rivers Agency and Loughs Agency are all key stakeholder on this project and will be part of the monthly stake holder meetings. These meetings will review the last months work, discuss the following months works and discuss and lessons learnt. As part of this forum contractors will submit their monthly work schedule, two monthly rolling programme which clearly show the works areas for the following month their anticipated discharge rates. These will be based on the works area affected and the potential of a 1 in 75 year storm event happening.



Appendices



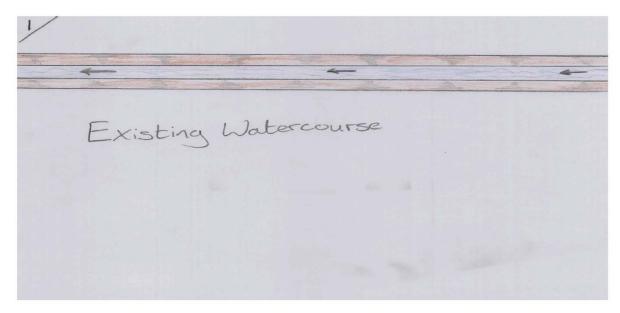
Appendix A – Scheme Alignment

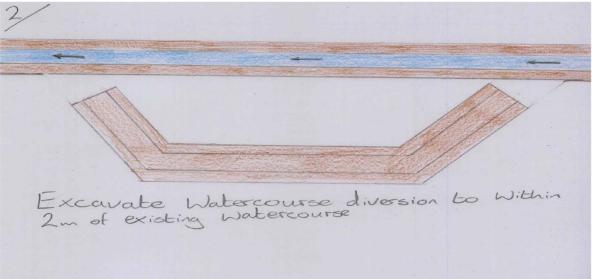
See Volume 2 Figures 6.1 to 6.17.

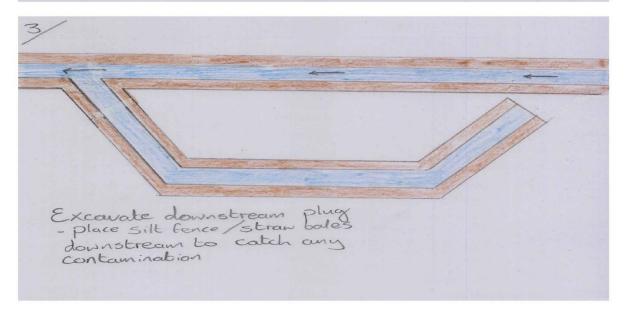


Appendix B – Example Watercourse Crossing Construction Method Statement

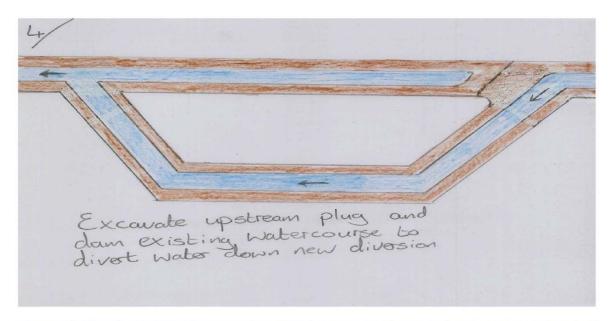


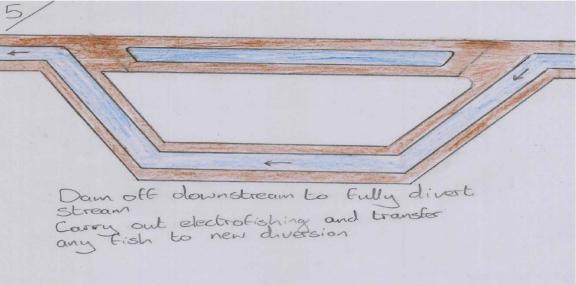


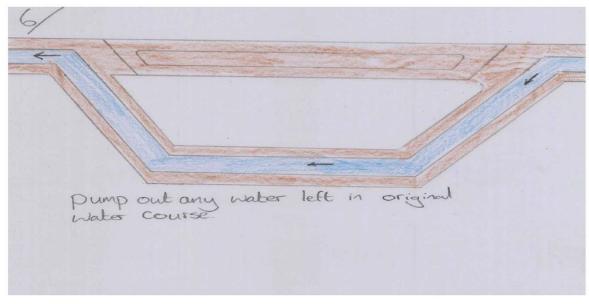




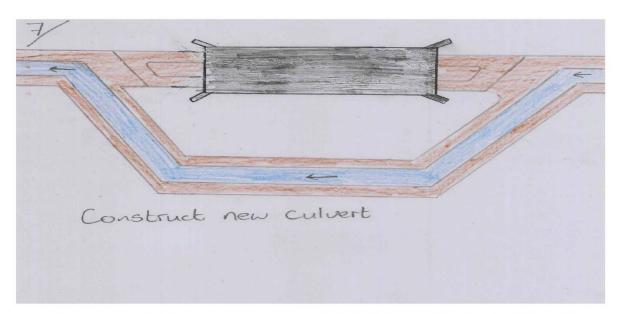


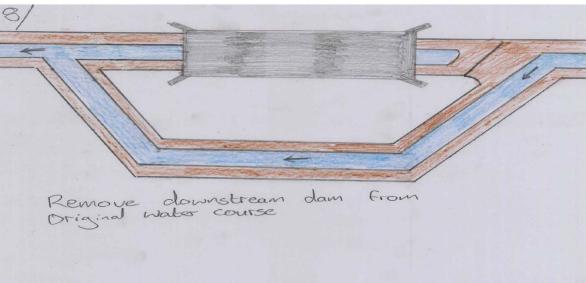


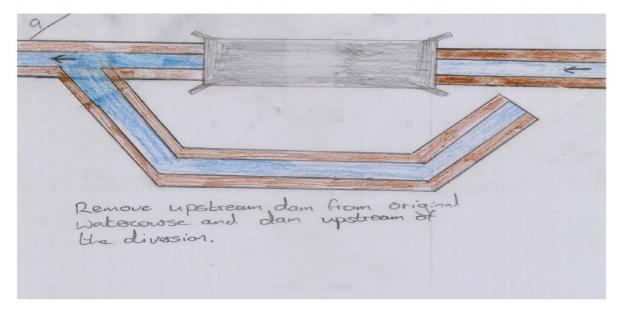




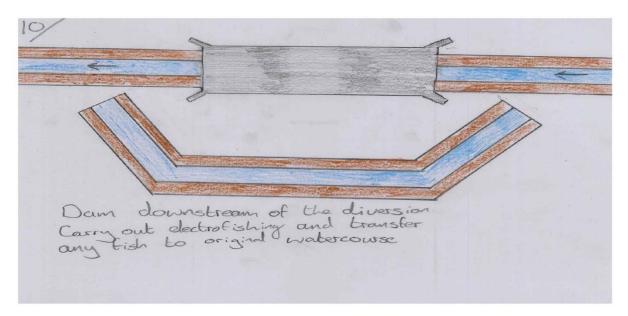


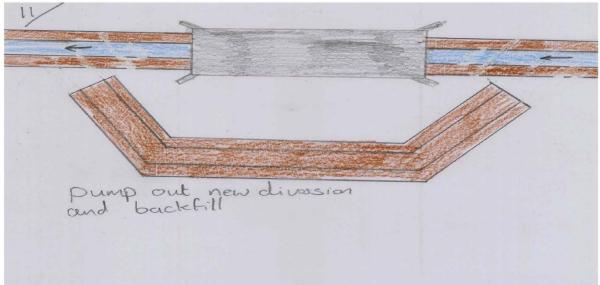


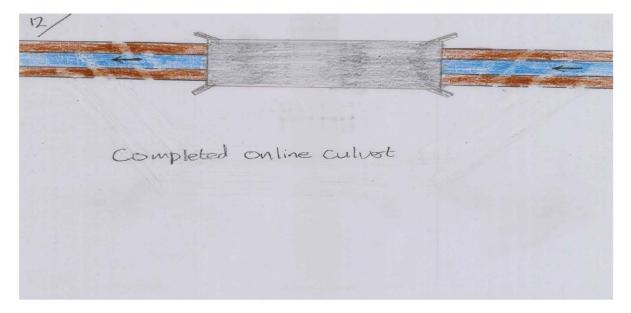














Appendix C – Example Temporary Retention Pond Calculations

October 2011 Values Copiad for Issue in ASV/TC_S1_SCH_05_00407 Rev June 2012 - Jurfall waterccurses identified 5082906/151/ISI

Schedule of Mainline Ditches

UKGBNISNW250010 UKGBNISNW250010 UKGBNISNW250010 UKGBNISNW250010 UKGBNISNW250010 WFD Waterbody ID Gortin Hall Drain/ River 2 Blackstone Burn Unreferenced UD 0.1/-UD 0.4/-UD 0.2/ Outfall Watercourse Copos te a N'bound earthworks to R Foyle at S1 OF: 25 Bi ackstone Burn Diversion ID S1-WD-03 Oth 3480-3740 drains through rise in ground Gortin Hall Drain - Diversion ID S1-W3-16 Diunnalong Road, Diversion ID S1-WD-05 Unreferenced watercourse at Ch 5595. Baltybeeny Road /i a N'bound earthworks to R Foyle //a N'bound earthworks to R Foyle River Fcyle va Mainline dranage River Fcyle va Mainline dranage River Fcyle at Ch 1030 Diversion ID S1-WD-01 Diversion ID S1-WD-02 Cum. Design Flow (I/s) In 75yrp 173 144 115 185 120 219 221 111 96 lirect to drain on Shound side. Pipe beneath side road ired to watercourse on S'bound side
aross carriageway to N'bound earthworks or separate To Mainline or N'bound earthworks
Direct to watercourse (Gortin Hall Drain) on S'bound and drains direct to watercourse (Gorlin Hall Drain) lirect to watercourse (Gorlin Hall Drain) on S'bound Direct to watercourse on S'bcund side
Thest to watercourse on S'bcund side
Toss carriageway to N'bound earthworks
Cross carriageway to N'bound earthworks. Includes nes with side road drainage to decharge to verted watercourse onbines with above to discharge to diverted Gross carriageway to separate outfall Direct to vaterourse or Shound side Land drains direct to watercourse of Direct to watercourse of Direct to waterocurse or Shound side Cross carriageway to Nbound earthworks tercourse llector ditch includes flow from side road Notes intribution from side road Design Flow (I/s) 1 in 75yrp 143 130 104 28 65 82 4 55 42 6 49 S'bound side 0.278 908.0 0.482 0.944 0.307 0.211 0.787 0.101 1.422 Contributing Area Nbound 1960-2120 2120-2286 2285-2400 3480-3740 4670-5040 2400-2480 2480-2825 3740-3860 3860-3935 3740-3935 5400-5595 Chainage 2480 î Calchment Mainline 23 4 ĸ LO. NO. 9 2

A5 WTC Mainline PED

0.75m

12.50%

Earthworks impermeability = V before lining (m/s) = Depth of ditch = Nominal drainage provision FAPAntingMainline PED Calchments Summary 1910/1/Summary

Direct to drain on Shound side

69

0.445



5082906/15/1/ISH October 2011 Values Copied for issue in ASVITC_S1_SCH_05_00407 Rev June 2012 - Outfall watercourses identified

Schedule of Mainline Ditches

A5 WTC Mainline PED

| | | WFD Waterbody ID | | UKGBNI5NWZ50010 | | | | | | | | | UKGBNI5NW250010 | | | | | | | | | | | | UKGBNI1NW010101070 | | |
|----------------------------------|------------------------------|------------------|--|--|---|---|---|--|---|---|--|---------------------------------------|--|---|--|---|-----------|----------------------------------|---------------------|---|--------|--|---|-----------------------------|-----------------------------|-------------------------|---|
| | | Watercourse ID V | | UD_05/ River 4 U | | | | | | Bready Village | watercourse/culvert | | UD_07 / River 4 U | | | | | | | | | Burn Dennet | | | Ballydonaghy Drain | -/ | |
| | Outfall Watercourse | Description | The state of the s | Diversion ID S1-WD-06. Subject to further detail as deesign for Bready Cut is developed | | | | | | To Bready Village watercourse/culvert S1 OFS: Donagheady Road 3 / Bready Cut Accommodation. | Ch7835-8245 split 2:1 to north and south respectively. Subject to further detail as design for Bready Cut is | developed. | Diversion ID S1-WD-07. Ch7835-8245 split 2:1 to north and south respectively | | | | | | | | | Burn Dennet S1 OF: 11 | | | Disconsistent ID 64. MPL 08 | | |
| | Cum. Design Flow (I/s) | | | 637 | | | | | | | 638 | | 78 | | | | | | | | | 342 | | | 27 | | |
| | Notes | | Direct to watercourse on S'bound side | Alternative with drainage from 6340-6475. At detail design split between draining to watercourse and side road | At detail design spilt between draining to watercourse and side road drainage | Alternative with drainage from 6475-7055 and crosses Victoria Road | Crosses Victoria Road to connect to 5800-6340 | Alternative - connect to drainage in 6340-7055, "Cascade" down slope. | Connect to Mainline carriageway to ponds to north. "Cascade" down slope | Pipe beneath Mainline to discharge to new ditch. (Nom ditch length for grad) "Cascade" down slope | Pipe beneath Mainline to discharge to new ditch. | Direct to watercourse on S'bound side | Direct to watercourse on S'bound side | Connection to Mainline carriageway or N'bound toe of batter - see drg | Culvert beneath Victoria Road to Low Point at Ch9215 | Subsidiary ditch between side road and Mainline to drain side road and batter. Culvert under side road. | | Pipe from Low Point at Ch9215 to | Drains to 9600-9770 | Includes flow from 9600-9770, and Low Point at Ch9215 | | Pipe from Low Point at CH10015 to watercourse. Includes flows from Ch9770-10015 and Ch 10015- 10190. Could be twin 525Ø or triple 450Ø | Land falls away from road to watercourse. Nom. earthworks drain | Ditch direct to watercourse | Ditch direct to watercourse | Ditch direct to culvert | Upslope intercepted by Victoria Road. Nom. earthworks drain |
| Dasion | Flow (I/s) 1 in 75yrp | | 25 | 612 | 158 | 454 | 137 | 317 | 317 | 142 | 396 | 151 | 28 | 19 | 133 | 0 | 38 | 171 | 18 | 279 | 19 | 298 | 0 | 44 | 11 | 16 | 0 |
| eable ng Area | S'bound side | (ha) | 0.149 | 906'0 | 906'0 | 0.778 | 0.778 | 2.76 | 2.76 | 979.0 | 3.51 | 1.27 | 0.183 | 0.37 | 1.203 | 0 | 0.306 | 0 | 0.118 | 0.315 | 0.13 | 0 | 0 | 0.218 | 0.074 | 90.0 | 0 |
| Impermeable Contributing Area | N'bound Side | (ha) | | | | | | | | | , | | | | | | | | | | | × | | | | | |
| | Chainage (m) | | 5750-5800 | 5800-6340 | 5800-6340 | 6340-6475 | 6340-6475 | 6475-7055 | 6475-7055 | 7055-7340 | 7340-7835 | 7835-8245 | 8245-8485 | 8485-8800 | 8800-9150 | 8800-9150 | 9150-9500 | 9215 | 9500-9600 | 9770- | 10015- | 10015 | 10190- | 10500- | 11000 | 11000- | 11220- |
| | Mainline Catchment Ref | | 5 | | so. | 9 | 5 | 10 | 9 | 63 | 69 | 69 | 99 | 6b | 99 | 6b | | 7 | 1 | | 7 | 7 | 7 | 80 | 00 | 00 | 8/8 |

F:\Printing\Mainline PED Catchments Summary 191011Summary



5082906/15/1/SH October 2011 Values Copied for issue in ASWTC_S1_SCH_05_00407 Rev June 2012 - Outfall watercourses identified

Schedule of Mainline Ditches

| | | WFD Waterbody ID | |
|----------------------------------|---|------------------|---|
| | tercourse | Watercourse ID | Unreferenced |
| | Ouffall Watercourse | Description | Unreferenced watercourse on N'bound side at Ch12047 |
| | Cum. Design Flow (i's) | 11110316 | 06 |
| | Notes | | th Mainline to watercourse on N'bound |
| | | | Culvert beneath Mainti |
| Deelm | Flow (i/s) 1 n 75yrp | | - 00 |
| 99 | - | (ha) | Culvert benea |
| Impermeable Contributing Area | Nbound S'bound (1/8) Side side 1 n 75yrp | (ha) (ha) | 90 Culvert benea |
| 99 | S'bound 1 | | 90 Culvert benea |

A5 WTC Mainline PED



5082906/15/1/SH October 2011
Values Copied for issue in ASWTC_ST_SCH_05_00407
Rev June 2012 - Outfall watercourses identified

Schadule of Mainline Ditches

| | | Contrbu | Impermeable Contributing Area | Doelon | | | | | |
|------------------------------|-----------------|-----------------|----------------------------------|-----------------------------|-----------------------------|---------------------------------|---|--------------------|------------------|
| Mainline Catchment Ref | Chairage (m) | N'bound Side | S'bound side | Flow (I/s) 1 in 75yrp | Notes | Cum. Design Flow (I/S) | | Cuffai Watercourse | |
| | | (ha) | (ha) | | | 1 in 75yrp | Description | Watercourse ID | WFD Waterbody ID |
| 10 | 12225- | 10 | 0.412 | 62 | Ditch direct to watercourse | 62 | Unreferenced watercourse ay Ch12370 | Uhreferencad | |
| 10 | 12370- | . 1. | 1.081 | 140 | Ditch direct to watercourse | 140 | To upstream end of Culvert S1-PC-10. | | |
| 10 | 12585- | | 0.484 | 73 | Ditch direct to watercourse | 403 | Disamount Disam | Gleemornan River | |
| 10/11 | 13010 | r | 0.194 | 30 | Ditch direct to watercourse | | 200 | | |
| 11 | 13010- | F. | 0.402 | 22 | Ditch direct to watercourse | 29 | To upstream end of culvert adjacent to S1 OFS: Greenlaw Road 1 | | |
| 11 | 13290- | 19 | 0.199 | 33 | Ditch direct to watercourse | 33 | To watercourse adjacent to Park Road | | |

A5 WTC Mainline PED



| | Impermeable Contribution Area | neable ing Area | | | | | | |
|------------------|----------------------------------|--------------------|---------------------------------------|---|---------------------------------|-------------|---------------------|-----|
| Chairtage (m) | N'bound Side | Stbound | Design Flow (/s) 1 ir 75/rrp | Notes | Cum. Design Flow ((s)) | 5 | Cuffall Watercourse | |
| | (ha) | (ha) | | | 1 in 75yrp | Description | Watercourse ID | |
| 13500- | , | 0 | 0 | Land generally flat with ex watercourses, falls from Mainline or intercepted by ex road. Nom earthworks orain | | | | |
| 18180 | | 0.15 | 24 | Ditch direct to watercourse | | | | |
| 18370 | 4, | 0,232 | 31 | Ditch to connectivity culvert then pipe to watercourse | | | | |
| 370- | , | 0,507 | 69 | Ditch to connectivity culvert then pipe to watercourse | _ | | | |
| 370 | , | 0 | 90 | Pipe from ditches to watercourse | | P | | |
| 13680- | ě. | 0.111 | 12 | Ditch direct to watercourse | | bjeşe | | |
| 235 | | 0 | 0 | Houses back onto Mainline. Nom, earthworks drain | | g cour | | |
| 19235- | r | 0.106 | 15 | Ditch direct to watercourse | | υος λε | | |
| 19575- | | 0 | o | Picked up by side road drainage | | node | | |
| 360 | | 0 | 0 | Land falls away from Mairtine in cutting | | moln | | |
| 425 | | 0.038 | 6 | Trapped at crest of cutting - connect to Mainline | | я шедг | | |
| 125- | | 0 | 0 | Land falls away from Mainline. Check reinstatement levels for ex pond/quarry. Nom. dramage provision | | 3 O | | |
| 23890- | 4 | 0 | 15 | Land falls away from Mainline. Ditch required to convey flows from higher catchments to watercourse | | chon | | |
| 190- | | 0.029 | 50 | Also conveys flows from higher catchments | _ | ոս է ե | 7. | |
| 21260- | ¥. | 0.031 | 45 | Also conveys flows from higher catchment. Culvert beneath side road may not be required if side road is stopped up. | | uo Aoq si | | |
| 380- | 4 | 0.282 | 38 | Head of run flowing N'bound. Culvert bereath side road | | : PE0 | | |
| 320- | 1 | 0.562 | 7.3 | Ditch to diverted watercourse | | ant. | | |
| 22000- | | 0,316 | 82 | Ottch to diverted watercourse. Also conveys flows from higher catchment | | | | |
| 290- | ii. | 0.126 | 22 | Head of run flowing N'bound. Culvert beneath side road | | | | |
| 22480- | * | 0,363 | 19 | Connects to Section 2 PED, or separate outfall to watercourse (not included) | | | | - 1 |



S082906/151/ISH Ccober 2011 Values Copied for issuue in ASWTC_S1_SCH_05_004(7 Rev_Lune 2012 - Oufall watercourses identified

Schedule of Mainline Ditches

As WTC Mainline PED

| Contributing Area Destire | (m) Side side 1 in 75yrp Notes | (ha) (ha) | Northbound Side | 0 0 | 2 | 0 | 4940-8590 0 - 0 Land falls away from Mainline. Nom. toe of batter drain | 0 . 0 | 6700-7200 0 - 0 Land falls away from Mainline. Nom, toe of bund drain | 7200-7300 0 - 0 Land falls away from Mainline. Nom. toe of batter drain | 7300-7825 5.412 - 43 Land direct to new ditch at toe of batter 7825-8145 5.502 - 93 Vie ditch to new ditch at toe of batter | 0 - 136 | 8145-8230 0 - 0 Land falls away from Mainline. Nom, toe of batter drain | 8230-8430 0 - 0 Land falls away from Maintime in cutting 8430-8890 0 Land falls away from Maintime. Nom, los of bund drain | 0 - 0 | 9970- 0.02 - 6 Trapped against Maintine. Effect of wc div culvert? | 10260 0.45 - 59 Ditch with pipe to watercourse | 10280- 0 - 0 Land falls away from Mainline. Nom. toe of batter drain | 0 - 0 Land falls away from Mainline in cutting | 10790- 3.043 - 11 Ditch direct to watercourse | 0 Land falls away from Mainline. Nom. toe of batter drain | 1355- 0 - 0 Land falls away from Mainline in cutting | 2300- 0 Land falls away from Mainline. Nom. toe of batter drain 14160 | 14340 0 - 0 Land falls away from Mainline in cutting | 4340- 0 Land falls away from Mainline. Nom, toe of batter drain | |
|----------------------------|---------------------------------|------------------|-----------------|-----|---|---|---|-------|---|---|---|--|---|--|-------|--|--|--|--|---|---|--|---|--|---|--|
| | Oum. Design Flow (1/s) | diversity of the | , i | - A | | | ain | | u) | nic | | 27.1 | in | Ę | in | 99 | 8 | sh | | 11 | H. | | uje | | ule. | |
| | | Description | | | | | | 76 | | | To Bready Village watercourse/sulvert S1 OFS. Donagheady Read 3 / Bready Cut Accommodation. | Ch7835-8245 split 2:1 to north and south respectively. Subject to further detail as design for Bready Cut is developed. | X. | | | Burn Dennet S1OF: 72 or further downstream - subject | to further detail | | | Diversion ID S1-WD-38. | | | | | | |
| | Outfall Waterocurse | Watercourse ID | | | | | | | | | Bready Village | watercourse/culvert | | | | G mil | | | | Ballydonaghy Drain | | | | | | |
| | | WFD Waterbody ID | | | | | | | | | | | | | | | | | | UKGBNI1NW01010107070 | | | | | | |

Franking/Markine PED Catchmerts, Summary 1910; 1 Summary

Physical Mainline PED Catchments Summary 1910118ummary

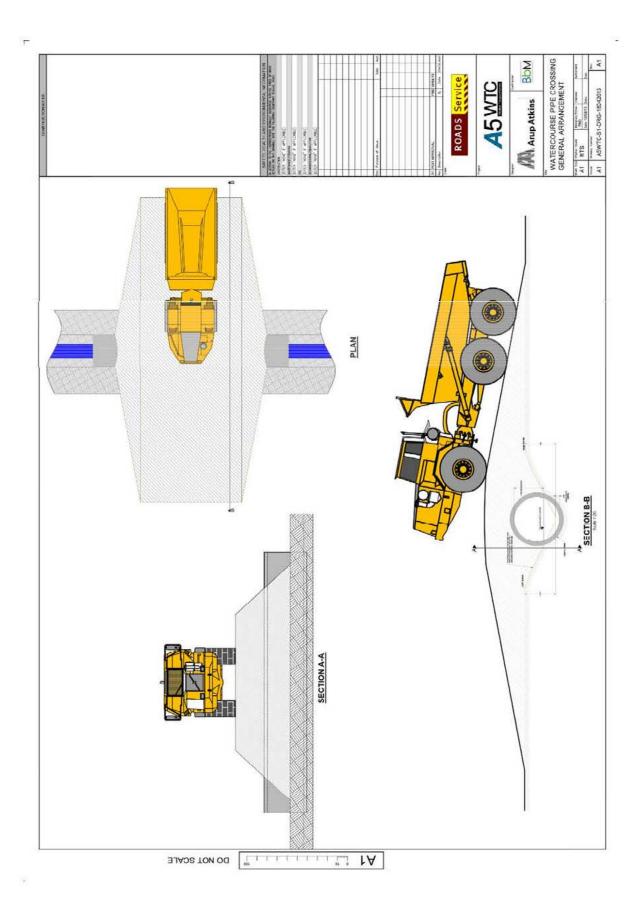


S082906/151/ISH
Cubber 2011
Values Copied for listue in ASV/TC, S1, SCH, 605, 0047;
Rev..une 2012 - Outfall watercourses identified WFD Waterbody ID Watercourse ID Outfall Watercourse This PED is beyond Junction 3. Outfall information not yet completed Schedule of Mainline Ditches Cum. Design Ficw (Vs) in 75yrp Ditch to convey flow from higher catchment. Then picks up side road and junction drainage. Conveys flow from higher catchment. Ditch cuts hrcugh ridge. Additional excavation regulred Conveys flow from higher catchment. At downstream and the ditch begins to run against gradient. Additional and falls away from Mainline. Nom. toe of batter drain and falls away from Mainline. Nom, toe of batter drain Ottch to convey flow from higher catchment and side oed. Lend is flat so ditch may also drain some of this Ditch from high point. Pipe beneath side road and falls away from Mainline in cutting Land falls away from Mainline in cutting and falls away from Mainline in cutting conveys flow from higher catchment Contributing area is conservative. No:es Ditch to watercourse by pond litch runs through junction Design Flow (//s) 1 in 75yrp 239 239 188 278 278 8 32 0 32 Sbound Contributing Area ŧ Nabund 0.332 0,182 0.202 0.444 0.474 0.054 2.168 0 0 0 0 Chainage 20095-20893-E A5 WTC Mainline PED Mainline Catchment Ref 50 8 22 20 20 57 51 21 21

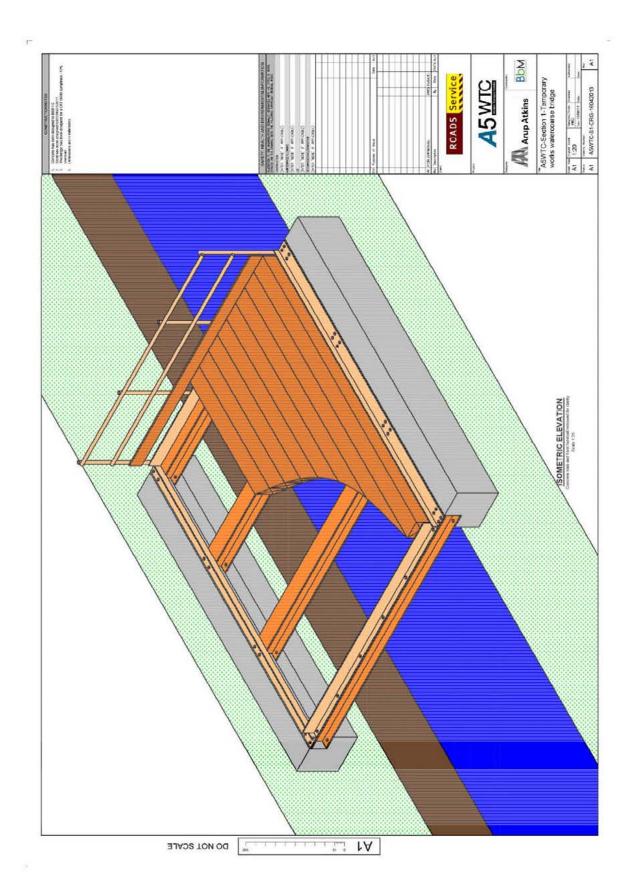


Appendix D – Watercourse Haul Road Crossing Details

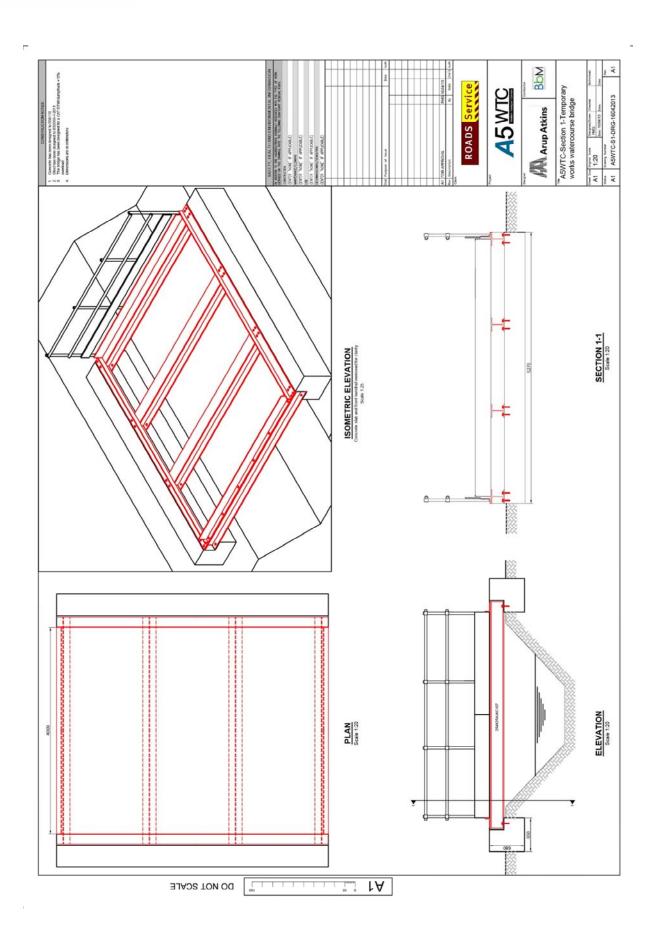














Appendix 7: Natura 2000 Data Forms



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Information Sheet on Ramsar Wetlands (RIS)

Categories approved by Recommendation 4.7, as amended by Resolution VIII.13 of the Conference of the Contracting Parties.

Note for compilers:

- The RIS should be completed in accordance with the attached Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands. Compilers are strongly advised to read this guidance before filling in the RIS.
- Once completed the RIS (and accompanying man(s)) should be submitted to the Ramsar Secretariat. Con

| ۷. | strongly urged to provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of maps. |
|--------------------|---|
| 1. | Name and address of the compiler of this form: FOR OFFICE USE ONLY. |
| | Joint Nature Conservation Committee Monkstone House City Road Peterborough Cambridgeshire PE1 1JY UK Telephone/Fax: +44 (0)1733 - 562 626 / +44 (0)1733 - 555 948 Email: PDD MM YY Designation date Site Reference Number Site Reference Number Site Reference Number |
| 2. | Date this sheet was completed/updated: |
| 2. | Designated: 02 February 1999 / updated 12 May 2005 |
| 3. | Country: |
| | UK (Northern Ireland) |
| 4. | Name of the Ramsar site: |
| | Lough Foyle |
| 5. Refe | Map of site included: er to Annex III of the Explanatory Notes and Guidelines, for detailed guidance on provision of suitable maps. |
| a) ł | nard copy (required for inclusion of site in the Ramsar List): yes ✓ -or- no □ |
| b) (| digital (electronic) format (optional): Yes |
| 6. | Geographical coordinates (latitude/longitude): 55 05 24 N 07 01 37 W |
| Nea Lou to t | General location: ude in which part of the country and which large administrative region(s), and the location of the nearest large town. arest town/city: Londonderry ugh Foyle is situated on the north coast of Northern Ireland immediately downstream and extending the north-east of the city of Londonderry. ministrative region: Derry; Derry City; Limavady |
| 8. | Elevation (average and/or max. & min.) (metres): 9. Area (hectares): 2204.36 Min. 0 Max. 10 Mean 0 |

| Ramsar Information Sheet: UK12014 | Page 1 of 9 | Lough Foyle |
|-----------------------------------|-------------|-------------|
|-----------------------------------|-------------|-------------|

10. Overview:

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland

The site is comprised of a large shallow sea lough which includes the estuaries of the rivers Foyle, Faughan and Roe. The site contains extensive intertidal areas of mudflats and sandflats, saltmarsh and associated brackish ditches.

11. Ramsar Criteria:

Circle or underline each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11).

1, 2, 3, 5, 6

Secretariat comment: The RIS provides information requiring the application of Criterion 4. This needs to be included in the next update.

12. Justification for the application of each Criterion listed in 11. above:

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

Ramsar criterion 1

This is a particularly good representative example of a wetland complex including intertidal sand and mudflats with extensive seagrass beds, saltmarsh, estuaries and associated brackish ditches.

This is a particularly good representative example of a wetland, which plays a substantial hydrological, biological and ecological system role in the natural functioning of a major river basin which is located in a trans-border position.

Ramsar criterion 2

The site supports an appreciable assemblage of rare, vulnerable or endangered species or sub-species of plant and animal. A range of notable fish species have been recorded for the Lough Foyle estuary and the lower reaches of some of its tributary rivers. These include allis shad *Alosa alosa*, twaite shad *A. fallax*, smelt *Osmerus eperlanus* and sea lamprey *Petromyzon marinus*, all of which are Irish Red Data Book species. In addition, important populations of Atlantic salmon *Salmo salar* migrate through the system to and from their spawning grounds.

Ramsar criterion 3

The site supports a diverse assemblage of wintering waterfowl which are indicative of wetland values, productivity and diversity. These include internationally important populations of Whooper Swan Cygnus cygnus, Light-bellied Brent Goose Branta bernicla hrota and Bar-tailed Godwit Limosa lapponica. Additional wildfowl species which are nationally important in an all-Ireland context are Red-throated Diver Gavia stellata, Great crested Grebe Podiceps cristatus, mute swan Cygnus olor, Bewick's Swan C. columbianus, Greylag Geese Anser anser, Shelduck Tadorna tadorna, Teal Anas crecca, Mallard Anas platyrhynchos, Wigeon A. penelope, Eider Somateria mollissima, and Redbreasted Merganser Mergus serrator. Nationally important wader species are Oystercatcher Haematopus ostralegus. Golden Plover Pluvialis apricaria, Grey Plover Pluvialis squatarola, Lapwing Vanellus vanellus, Knot Calidris canutus, Dunlin C. aplina, Curlew Numenius arquata, Redshank Tringa tetanus and Greenshank T. nebilaria.

Ramsar criterion 5

The site supports about 29000 migrating birds. Species and numbers are listed in section 20

Ramsar criterion 6 – species/populations occurring at levels of international importance.

Qualifying Species/populations (as identified at designation):

Species with peak counts in spring/autumn:

Whooper swan, Cygnus cygnus, 882 individuals, representing an average of 4.2%

Iceland/UK/Ireland of the population (5 year peak mean 1998/9-

2002/3)

Light-bellied brent goose, *Branta bernicla hrota*, 2270 individuals, representing an average of

East Canada/Ireland 11.3% of the population (5 year peak mean

1998/9-2002/3)

Species with peak counts in winter:

Bar-tailed godwit, Limosa lapponica lapponica, 2028 individuals, representing an average of

W Palearctic 1.6% of the population (5 year peak mean

1998/9-2002/3)

Contemporary data and information on waterbird trends at this site and their regional (sub-national) and national contexts can be found in the Wetland Bird Survey report, which is updated annually. See www.bto.org/survey/webs/webs-alerts-index.htm.

See Sections 19/20 for details of noteworthy species

Details of bird species occuring at levels of National importance are given in Section 20

13. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

a) biogeographic region:

Atlantic

b) biogeographic regionalisation scheme (include reference citation):

Council Directive 92/43/EEC

14. Physical features of the site:

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

| 0.11.0 | 1 1 |
|-----------------------------------|---|
| Soil & geology | sand, mud |
| Geomorphology and landscape | intertidal sediments (including sandflat/mudflat), estuary, |
| | lagoon |
| Nutrient status | no information |
| pH | no information |
| Salinity | brackish / mixosaline, saline / euhaline |
| Soil | no information |
| Water permanence | usually permanent |
| Summary of main climatic features | Annual averages (Carmoney, 1971–2000) |
| | (www.metoffice.com/climate/uk/averages/19712000/sites |
| | /carmoney.html) |
| | Max. daily temperature: 12.1° C |
| | Min. daily temperature: 5.9° C |
| | Days of air frost: 27.6 |
| | Rainfall: 993.0 mm |
| | Hrs. of sunshine: 1179.0 |

General description of the Physical Features:

Lough Foyle comprises a large, shallow sea lough that includes the estuaries of the rivers Foyle, Faughan and Roe. The site contains extensive intertidal mudflats and sandflats (with mussel *Mytilus edulis* beds), saltmarsh and associated brackish ditches.

15. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, general land use, and climate (including climate type).

Lough Foyle comprises a large, shallow sea lough that includes the estuaries of the rivers Foyle, Faughan and Roe. The site contains extensive intertidal mudflats and sandflats (with mussel *Mytilus edulis* beds), saltmarsh and associated brackish ditches.

The Foyle Basin comprises eastern Co. Donegal from Inishowen Head to Lough Derg, western Co. Derry from Binevenagh through to Fintona in West Co. Tyrone.

16. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

No special values known

17. Wetland types

Marine/coastal wetland

| Code | Name | % Area |
|------|-----------------------------------|--------|
| G | Tidal flats | 94.4 |
| Н | Salt marshes | 3.6 |
| J | Coastal brackish / saline lagoons | 2 |

18. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site.

The littoral communities found in Lough Foyle reflect the dominance of intertidal sands and muds. While rocky substrate is very limited, the extensive beds of common mussel *Mytilus edulis* provide a stable surface for acorn barnacle *Semibalanus balanoides* and edible periwinkle *Littorina littorea*. The polychaete green leaf worm *Eulalia viridis* is a common associate. The soft shores hold a range of invertebrates typical of mud and sand shores, with a number of species, such as the polychaete worm *Hediste diversicolor*, indicative of reduced salinity conditions. Balls Point has the highest diversity of sediment and community types in Lough Foyle and holds large populations of the bivalves sand gaper *Mya arenaria* and peppery furrow shell *Scrobicularia plana*.

The intertidal area consists of extensive mudflats, which support large beds of both common mussel *Mytilus edulis* and eelgrass *Zostera* spp. The latter are amongst the largest colonies of this vegetation type in Northern Ireland and includes two species, narrow-leaved eelgrass *Zostera angustifolia* and dwarf eelgrass *Z. noltei*. Large stands of saltmarsh vegetation occur along the foreshore, displaying a transitional sequence of community types. The lower colonising saltmarsh consists of a community dominated by common saltmarsh-grass *Puccinellia maritima*. As tidal influence declines up the shore, this is replaced by a 'middle-marsh' community, characterised by red fescue *Festuca rubra* and mud rush *Juncus gerardii*. Localised stands of sea club-rush *Bolboschoenus maritimus* and common reed *Phragmites australis* also occur. The uppermost saltmarsh features a community dominated by common couch *Elytrigia repens*. Just west of the Ballykelly Bank, on the large intertidal mudflats which form part of a larger creek network, the lower saltmarsh communities are replaced by extensive stands of common cord-grass *Spartina anglica*. Brackish dykes behind the shore support a maritime aquatic and swamp vegetation, including the rare reflexed saltmarsh-grass *Puccinellia distans* and spiral tasselweed *Ruppia cirrhosa*.

19. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 12. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

None reported

20. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 12. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present* – these may be supplied as supplementary information to the RIS.

Birds

Species currently occurring at levels of national importance: Species with peak counts in spring/autumn:

Great crested grebe, *Podiceps cristatus* cristatus, NW Europe

Great cormorant, *Phalacrocorax carbo carbo*, NW Europe

Eurasian wigeon, Anas penelope, NW Europe

Eurasian teal, Anas crecca, NW Europe

Mallard, Anas platyrhynchos platyrhynchos, NW Europe

Common eider, Somateria mollissima mollissima, NW Europe

Ringed plover, *Charadrius hiaticula*, Europe/Northwest Africa

Ruff, Philomachus pugnax, Europe/W Africa

Whimbrel , *Numenius phaeopus*, Europe/Western Africa

Common greenshank, *Tringa nebularia*, Europe/W Africa

Mew gull, Larus canus canus, Europe to N Africa

Species with peak counts in winter:

Red-throated diver, Gavia stellata, NW Europe

Slavonian grebe , $\it Podiceps$ $\it auritus$, Northwest Europe

Greylag goose, Anser anser anser, Iceland/UK, Ireland

Common shelduck, *Tadorna tadorna*, NW Europe

179 individuals, representing an average of 5.1% of the all-Ireland population (5 year peak mean 1998/9-2002/3)

102 individuals, representing an average of 2% of the all-Ireland population (5 year peak mean 1998/9-2002/3)

7259 individuals, representing an average of 5.8% of the all-Ireland population (5 year peak mean 1998/9-2002/3)

1232 individuals, representing an average of 1.8% of the all-Ireland population (5 year peak mean 1998/9-2002/3)

1214 individuals, representing an average of 2.4% of the all-Ireland population (5 year peak mean 1998/9-2002/3)

231 individuals, representing an average of 11.5% of the all-Ireland population (5 year peak mean 1998/9-2002/3)

199 individuals, representing an average of 1.5% of the all-Ireland population (5 year peak mean 1998/9-2002/3 - spring peak)

5 individuals, representing an average of 25% of the all-Ireland population (5 year peak mean 1998/9-2002/3)

6 individuals, representing an average of 40% of the all-Ireland population (5 year peak mean 1998/9-2002/3)

44 individuals, representing an average of 4.8% of the all-Ireland population (5 year peak mean 1998/9-2002/3)

3760 individuals, representing an average of 5.5% of the all-Ireland population (5 year peak mean 1998/9-2002/3)

14 individuals, representing an average of 1.4% of the all-Ireland population (5 year peak mean 1998/9-2002/3)

6 individuals, representing an average of 20% of the all-Ireland population (5 year peak mean 1998/9-2002/3)

67 individuals, representing an average of 1.7% of the all-Ireland population (5 year peak mean 1991/92-1995/96)

382 individuals, representing an average of 5.4% of the all-Ireland population (5 year peak mean 1998/9-2002/3)

Red-breasted merganser , Mergus serrator, NW & C Europe

Eurasian oystercatcher, *Haematopus ostralegus ostralegus*, Europe & NW Africa -wintering

Northern lapwing, *Vanellus vanellus*, Europe - breeding

Dunlin, *Calidris alpina alpina*, W Siberia/W Europe

Eurasian curlew, *Numenius arquata arquata*, N. a. arquata Europe

(breeding)

Common redshank, Tringa totanus totanus,

36 individuals, representing an average of 1.8% of the all-Ireland population (5 year peak mean 1998/9-2002/3)

2809 individuals, representing an average of 5.6% of the all-Ireland population (5 year peak mean 1998/9-2002/3)

3430 individuals, representing an average of 1.3% of the all-Ireland population (5 year peak mean 1998/9-2002/3)

4595 individuals, representing an average of 3.6% of the all-Ireland population (5 year peak mean 1998/9-2002/3)

2162 individuals, representing an average of 2.4% of the all-Ireland population (5 year peak mean 1998/9-2002/3)

1286 individuals, representing an average of 5.2% of the all-Ireland population (5 year peak mean 1998/9-2002/3)

Species Information

Nationally important species occurring on the site.

Fish.

Alosa alosa, Alosa fallax, Osmerus eperlanus, Petromyzon marinus

21. Social and cultural values:

e.g. fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values.

Aesthetic

Environmental education/interpretation

Fisheries production

Livestock grazing

Scientific research

Sport hunting

Tourism

22. Land tenure/ownership:

| Ownership category | On-site | Off-site |
|------------------------------------|---------|----------|
| Non-governmental organisation | + | |
| (NGO) | | |
| Local authority, municipality etc. | + | |
| National/Crown Estate | + | |
| Private | + | + |
| Public/communal | + | |

23. Current land (including water) use:

| Activity | On-site | Off-site |
|-----------------------------|---------|----------|
| Nature conservation | + | |
| Tourism | | + |
| Recreation | + | |
| Current scientific research | + | |
| Gathering of shellfish | + | |

| Bait collection | + | |
|-----------------------------|---|---|
| Hunting: recreational/sport | + | |
| Industrial water supply | + | |
| Sewage treatment/disposal | + | |
| Harbour/port | | + |
| Flood control | + | |
| Transport route | | + |
| Urban development | | + |

24. Factors adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

Explanation of reporting category:

- 1. Those factors that are still operating, but it is unclear if they are under control, as there is a lag in showing the management or regulatory regime to be successful.
- Those factors that are not currently being managed, or where the regulatory regime appears to have been ineffective so far.

NA = Not Applicable because no factors have been reported.

| Adverse Factor Category | Reporting Category | Description of the problem (Newly reported Factors only) | On-Site | Off-Site | Major Impact? |
|---|--------------------|--|---------|----------|---------------|
| Introduction/invasion of non-native plant species | 2 | | + | | + |
| | | | | | |

For category 2 factors only.

What measures have been taken / are planned / regulatory processes invoked, to mitigate the effect of these factors? Introduction/invasion of non-native plant species - Conservation Objectives for the site have been developed. These highlight the need for addressing the *Spartina* issue. Extent of *Spartina* extent being monitored. Future trials of selective herbicides to be undertaken ASAP.

Site to be assessed to determine effectiveness of Spartina spraying. Rotovating techniques may be trialed.

Is the site subject to adverse ecological change? YES

25. Conservation measures taken:

List national category and legal status of protected areas, including boundary relationships with the Ramsar site; management practices; whether an officially approved management plan exists and whether it is being implemented.

| Conservation measure | On-site | Off-site | |
|---|---------|----------|--|
| Site/ Area of Special Scientific Interest | + | | |
| (SSSI/ASSI) | | | |
| National Nature Reserve (NNR) | + | | |
| Special Protection Area (SPA) | + | | |
| Land owned by a non-governmental organisation | + | | |
| for nature conservation | | | |

| Management agreement | + | |
|--|---|---|
| Site management statement/plan implemented | + | |
| Other | | + |
| Area of Outstanding National Beauty (AONB) | + | |
| Special Area of Conservation (SAC) | + | |

26. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc.

No information available

27. Current scientific research and facilities:

e.g. details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

The site is occassionally used by local academic institutions.

28. Current conservation education:

e.g. visitor centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

A small education centre at Magilligan occasionally uses the Lough for study and research.

29. Current recreation and tourism:

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

Activities.

Magilligan Point is a popular recreation venue for bathing.

Facilities provided.

Discussions regarding a passenger ferry from Magilligan Point to Greencastle on the Southern Irish shores of the Lough have been on-going.

Seasonality.

During the summer months

30. Jurisdiction:

Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept. of Agriculture/Dept. of Environment, etc.

Department of the Environment (Northern Ireland), Environment and Heritage Service, Commonwealth House, Castle Street, Belfast, Northern Ireland, BT1 1GU

31. Management authority:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

Department of the Environment (Northern Ireland), Environment and Heritage Service,

Commonwealth House, Castle Street, Belfast, Northern Ireland, BT1 1GU

32. Bibliographical references:

Scientific/technical references only. If biogeographic regionalisation scheme applied (see 13 above), list full reference citation for the scheme.

Site-relevant references

Barne, JH, Robson, CF, Kaznowska, SS, Doody, JP, Davidson, NC & Buck, AL (eds.) (1997) *Coasts and seas of the United Kingdom. Region 17. Northern Ireland.* Joint Nature Conservation Committee, Peterborough. (Coastal Directories Series.)

Buck, AL & Donaghy, A (eds.) (1996) An inventory of UK estuaries. Volume 7. Northern Ireland. Joint Nature Conservation Committee, Peterborough

Cooper, EA, Crawford, I, Malloch, AJC & Rodwell, JS (1992) Coastal vegetation survey of Northern Ireland. (Contractor: University of Lancaster, Unit of Vegetation Science). Unpublished report to Department of the Environment (Northern Ireland), Belfast

Cranswick, PA, Waters, RJ, Musgrove, AJ & Pollitt, MS (1997) *The Wetland Bird Survey 1995–96: wildfowl and wader counts*. British Trust for Ornithology, Wildfowl and Wetlands Trust, Royal Society for the Protection of Birds & Joint Nature Conservation Committee, Slimbridge

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Please return to: Ramsar Secretariat, Rue Mauverney 28, CH-1196 Gland, Switzerland Telephone: +41 22 999 0170 • Fax: +41 22 999 0169 • email: ramsar@ramsar.org

Information Sheet on Ramsar Wetlands (RIS)

Categories approved by Recommendation 4.7, as amended by Resolution VIII.13 of the Conference of the Contracting Parties.

Note for compilers:

- The RIS should be completed in accordance with the attached Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands. Compilers are strongly advised to read this guidance before filling in the RIS.
- Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers are

| strongly urged to provide an electronic (MS Word) copy of the RIS a | and, where possible, digital copies of maps. |
|--|--|
| 1. Name and address of the compiler of this form: | FOR OFFICE USE ONLY. |
| | DD MM YY |
| Joint Nature Conservation Committee | |
| Monkstone House | |
| City Road | Designation date Site Reference Number |
| Peterborough | |
| Cambridgeshire PE1 1JY UK | |
| Telephone/Fax: +44 (0)1733 - 562 626 / +44 (0)17 | 733 _ 555 948 |
| Email: RIS@JNCC.gov.uk | 733 – 333 740 |
| Mild of the control o | |
| | |
| 2. Date this sheet was completed/updated: | |
| Designated: 05 January 1976 / Updated: May 2005 | |
| 3. Country: | |
| UK (Northern Ireland) | |
| 4. Name of the Ramsar site: | |
| | |
| Lough Neagh and Lough Beg | |
| 5. Map of site included: | |
| Refer to Annex III of the Explanatory Notes and Guidelines, for detailed | guidance on provision of suitable maps. |
| a) hard copy (required for inclusion of site in the Ramsar L | ist): yes ✓ -or- no □ |
| b) digital (electronic) format (optional): Yes | , , |
| | |
| 6. Geographical coordinates (latitude/longitude): | |
| 54 34 11 N 06 24 34 W | |
| 7. General location: | |
| Include in which part of the country and which large administrative region | on(s), and the location of the nearest large town. |
| Nearest town/city: Belfast | |
| Lough Neagh is situated in the centre of Northern Ireland. It | <u> </u> |
| United Kingdom, covering an area of 383 square km, with a | longest length of 30.5 km and narrowest |
| width of 12.1 km across the middle. | |
| Administrative region: Antrim; Armagh; Ballymena; Coo | okstown; Craigavon; Down; Dungannon; |
| Lisburn; Londonderry; Magherafelt; Tyrone | |
| 8. Elevation (average and/or max. & min.) (metres): 9. | Area (hectares): 50165.84 |
| Min. No information available | , |
| Max. No information available | |
| Mean No information available | |

Ramsar Information Sheet: Produced by JNCC: Version 3.0, 12.05.2005

10. Overview:

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland

Lough Neagh is situated in the centre of Northern Ireland. It is the largest freshwater lake in the United Kingdom covering an area of 383 km2 with a longest length of 30.5 km and narrowest width of 12.1 km across the middle. The lake is very shallow for its size, with a mean depth of 8.9 metres. At its deepest point it extends down to 34 metres. The 125 km shoreline is mostly exposed with wavebeaten rocks and stones but there are also some sheltered, sandy bays with better-developed marginal vegetation including some reedbeds.

This site also contains a smaller lake, Lough Beg (1,125 ha) to the north, as well as a small satellite lake, Portmore Lough (286 ha) which is situated to the east of Lough Neagh. Lough Beg (meaning 'little lough') is essentially a widening of the Lower Bann River just downstream from where it leaves Lough Neagh. Lough Beg is very shallow, with a mean depth of 1-2 metres and a surface area of km2. About 200 hectares of the west shore is unimproved wet grassland that is largely inundated with floodwater each winter.

Rivers flowing into Lough Neagh drain about 43% of Northern Ireland, plus part of County Monaghan in the Republic of Ireland.

11. Ramsar Criteria:

Circle or underline each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11).

1, 2, 3, 4, 5, 6

12. Justification for the application of each Criterion listed in 11. above:

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

Ramsar criterion 1

A particularly good representative example of natural or near-natural wetlands, common to more than one biogeographic region. The site is the largest freshwater lake in the United Kingdom. Lough Neagh a relatively shallow body of water supporting beds of submerged aquatic vegetation fringed by associated species-rich damp grassland, reedbeds, islands, fens, marginal swampy woodland and pasture. Other interesting vegetation types include those associated with pockets of cut-over bog, basalt rock outcrops and boulders, and the mobile sandy shore.

Ramsar criterion 2

Supports an appreciable assemblage of rare, vulnerable or endangered species or sub-species of plant or animal or an appreciable number of individuals of any one of these species. The site supports over 40 rare or local vascular plants which have been recorded for the site since 1970; the most notable are eight-stamened waterwort *Elatine hydropiper*, marsh pea *Lathyrus palustris*, Irish lady's tresses *Spiranthes romanzoffiana*, alder buckthorn *Frangula alnus*, narrow small-reed *Calamagrostis stricta* and holy grass *Hierochloe odorata*. The Lough and its margin are also home to a large number of rare or local invertebrates, including two aquatic and two terrestrial molluscs, a freshwater shrimp *Mysis relicta*, eight beetles, five hoverflies, seven moths and two butterflies. Of the rare beetles recorded two, *Stenus palposus* and *Dyschirius obscurus*, have their only known Irish location around the Lough. The Lough also supports twelve species of dragonfly.

Ramsar criterion 3

This site is of special value for maintaining the genetic and ecological diversity of a region becuse of the quality and peculiarities of its flora and fauna. The site regularly supports substantial numbers of individuals from particular groups of waterfowl which are indicative of wetland values, productivity and diversity. In addition, this site is of special value for maintaining the genetic and ecological diversity of Northern Ireland because of the quality and peculiarities of its flora and fauna. A large

Ramsar Information Sheet: UK12016 Page 2 of 10 **Lough Neagh and Lough Beg**

number of plants and animal species are confined or almost confined to this area within Northern Ireland.

Ramsar criterion 4

This site is of special value as the habitat of plants or animals at a critical stage of their biological cycles. The site supports an important assemblage of breeding birds including the following species with which occur in nationally important numbers: great crested grebe *Podiceps cristatus*, gadwall *Anas strepera*, pochard *Aythya ferina*, tufted duck *Aythya fuligula*, snipe *Gallinago gallinago* and redshank *Tringa totanus*. Other important breeding wetland species include shelduck *Tadorna tadorna*, teal *Anas crecca*, shoveler *Anas clypeata*, lapwing *Vanellus vanellus* and curlew *Numenius.arquata*.

Ramsar criterion 7

The site supports a population of pollan *Coregonus autumnalis*, one of the few locations in Ireland and one of the two known locations in the UK (the other is Lower Lough Erne). It is one of the most important species in Ireland in terms of faunal biodiversity since it occurs nowhere else in Europe, and the Irish populations are all well outside the typical range – the Arctic Ocean drainages of Siberia, Alaska and north-western Canada, where it is known as the Arctic cisco.

Ramsar criterion 5

Assemblages of international importance:

Species with peak counts in winter:

86639 waterfowl (5 year peak mean 1998/99-2002/2003)

Ramsar criterion 6 – species/populations occurring at levels of international importance.

Qualifying Species/populations (as identified at designation):

 ${\bf Species\ with\ peak\ counts\ in\ spring/autumn:}$

Tundra swan , *Cygnus columbianus bewickii*, NW Europe

the all-

Species with peak counts in winter:

Common goldeneye , $\it Bucephala\ clangula$

clangula, NW & C Europe

Common pochard, *Aythya ferina*, NE & NW Europe

Greater scaup, Aythya marila marila, W Europe

Tufted duck, Aythya fuligula, NW Europe

Whooper swan, Cygnus cygnus,

Whooper swan, Cygnus cygnus, Iceland/UK/Ireland

26 individuals, representing an average of 1% of the all-Ireland population (5 year peak mean

1998/9-2002/3)

6645 individuals, representing an average of 1.6% of the population (5 year peak mean

1998/9-2002/3)

20279 individuals, representing an average of

5.7% of the population (5 year peak mean

1998/9-2002/3)

3377 individuals, representing an average of 1% of the population (5 year peak maps 1908/0

of the population (5 year peak mean 1998/9-2002/3)

2002/3

17807 individuals, representing an average of

1.4% of the population (5 year peak mean

1998/9-2002/3)

1523 individuals, representing an average of 7.2% of the population (5 year peak mean

1998/9-2002/3)

Species/populations identified subsequent to designation for possible future consideration under

criterion 6.

Species with peak counts in spring/autumn:

Great cormorant, *Phalacrocorax carbo carbo*, 1628 individuals, representing an average of

NW Europe 1.3% of the population (5 year peak mean

1998/9-2002/3)

Mute swan, Cygnus olor, Britain 1874 individuals, representing an average of

4.9% of the population (5 year peak mean

1998/9-2002/3)

More contemporary data and information on waterbird trends at this site and their regional (subnational) and national contexts can be found in the Wetland Bird Survey Alerts report, which is updated annually. See http://www.bto.org/survey/webs/webs-alerts-index.htm.

13. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

a) biogeographic region:

Atlantic

b) biogeographic regionalisation scheme (include reference citation):

Council Directive 92/43/EEC

14. Physical features of the site:

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

| Soil & geology | sand, clay, peat, basalt | |
|-----------------------------------|---|--|
| Geomorphology and landscape | lowland, floodplain | |
| Nutrient status | highly eutrophic | |
| pH | no information | |
| Salinity | fresh | |
| Soil | no information | |
| Water permanence | usually permanent | |
| Summary of main climatic features | Annual averages (Aldergrove, 1971–2000) | |
| | (www.metoffice.com/climate/uk/averages/19712000/sites/a | |
| | ldergrove.html) | |
| | Max. daily temperature: 12.5° C | |
| | Min. daily temperature: 5.8° C | |
| | Days of air frost: 39.1 | |
| | Rainfall: 862.4 mm | |
| | Hrs. of sunshine: 1313.7 | |

General description of the Physical Features:

No information available

15. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, general land use, and climate (including climate type).

Lough Neagh is situated in the centre of Northern Ireland. It is the largest freshwater lake in the British Isles and is very shallow for its size.

Six major rivers flow into the Lough while the Lower Bann River provides the exit, carrying water from the north end of the Lough at Toome to the sea on the north coast of Northern Ireland.

Ramsar Information Sheet: UK12016 Page 4 of 10 **Lough Neagh and Lough Beg**

The rivers flowing into Lough Neagh drain about 43% of Northern Ireland, plus part of County Monaghan in the Republic of Ireland. There is no incursion of seawater into Lough Neagh.

Lough Beg and Portmore Lough are two smaller lakes associated with Lough Neagh. Lough Beg (1,125 ha) lies to the north of Lough Neagh at the start of the Lower Bann River and Portmore Lough (286 ha) flows into the south-east of Lough Neagh.

16. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

Flood water storage / desynchronisation of flood peaks

17. Wetland types

Inland wetland

| Code | Name | % Area |
|-------|--|--------|
| 0 | Freshwater lakes: permanent | 77.6 |
| U | Peatlands (including peat bogs swamps, fens) | 4 |
| W | Shrub-dominated wetlands | 2.1 |
| Xp | Forested peatland | 0.3 |
| Other | Other | 16 |

18. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site.

Most of the shoreline and shallow margin of the Lough is exposed to wave action and has a rocky or sandy character. The submerged and floating aquatic vegetation is confirmed to sheltered bays and inlets and includes very extensive stands of fennel-leaved pondweed *Potamogeton pectinatus* and slender-leaved pondweed *P. filiformis* intermixed with smaller quantities of additional species.

Swamp vegetation generally consists of a mosaic of small stands of common spike-rush *Eleocharis* palustris, reedmace *Typha latifolia*, branched bur-reed *Sparganium erectum*, flowering rush *Butomus umbellatus*, bulrush *Scirpus lacustris* and bottle sedge *Carex rostrata*. Locally, large stands of common reed *Phragmites australis* have developed.

The tall fen occurring along the water's edge mostly consists of a thin, generally species-poor band of reed canary-grass *Phalaris arundinacea*, hemlock water dropwort *Oenanthe crocata*, yellow loosestrife *Lysimachia vulgaris* and purple loosestrife *Lythrum salicaria*, but in places there are a number of more uncommon plant species.

Some of the Lough shore is fringed by a fragmented, swampy woodland of alder *Alnus glutinosa* and willow *Salix* spp. related to successive lowerings of water-levels. This woodland is among the best of its type in Northern Ireland. It is extensive and locally contains a diversity of plants including many notable species.

The remainder of the shore is mostly covered by a variety of grassland types ranging from improved and reseeded grassland to species-rich hay meadows, with the most characteristic type being wet marshy grassland with soft rush *Juncus effusus* and brown sedge *Carex disticha* as the most prominent species.

Ramsar Information Sheet: UK12016 Page 5 of 10 Lough Neagh and Lough Beg

19. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 12. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Nationally important species occurring on the site.

Higher Plants.

Elatine hydropiper, Spiranthes romanzoffiana, Calamagrostis stricta, Hierochloe odorata, Mentha pulegium, Lathyrus palustris, Frangula alnus, Carex elongata

20. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 12. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present* – these may be supplied as supplementary information to the RIS.

Birds

Species currently occurring at levels of national importance: Species regularly supported during the breeding season:

| species regularly supported during the breeding | seasun. |
|---|---|
| Black-headed gull, Larus ridibundus, N & C | 3269 apparently occupied nests, representing an |
| Europe | average of 6% of the all-Ireland population |
| | (Seabird 2000 Census) |
| Common tern, Sterna hirundo hirundo, N & E | 93 apparently occupied nests, representing an |
| Europe | average of 3% of the all-Ireland population |
| | (Seabird 2000 Census) |
| Lesser black-backed gull, Larus fuscus graellsii, | 451 apparently occupied nests, representing an |
| W Europe/Mediterranean/W Africa | average of 8.6% of the all-Ireland population |
| | (Seabird 2000 Census) |
| | |

Species with peak counts in spring/autumn:

| Common coot, | Fulica atra atra, | NW Europe | 5680 individuals, representing an average of |
|--------------|-------------------|-----------|--|
| | | | 22.7% of the all-Ireland population (5 year peak |

| Gadwall, Anas strepera strepera, NW Europe | 126 individuals, representing an average of 21% |
|--|---|
| | of the all-Ireland population (5 year peak mean |
| | 1998/9-2002/3) |

mean 1998/9-2002/3)

1998/9-2002/3)

| | 1998/9-2002/3) |
|---|--|
| Great crested grebe, Podiceps cristatus | 1227 individuals, representing an average of 35% |
| cristatus, NW Europe | of the all-Ireland population (5 year peak mean |
| _ | 1998/9-2002/3) |

| Lesser black-backed gull, Larus fuscus g | graellsii, | 1174 individuals, representing an average of 1.6% |
|--|------------|---|
| | | of the all-Ireland population (5 year peak mean |

| | 10000 2002(3) |
|--|--|
| Mallard, Anas platyrhynchos platyrhynchos, | 5136 individuals, representing an average of |
| NW Europe | 10.2% of the all-Ireland population (5 year peak |
| | mean 1998/9-2002/3) |

Red-breasted merganser, *Mergus serrator*, NW & C Europe 25 individuals, representing an average of 1.2% of the all-Ireland population (5 year peak mean 1998/9-2002/3)

Species with peak counts in winter:

| Common shelduck, Tadorna tadorna, NW | 138 individuals, representing an average of 1.9% |
|--------------------------------------|--|
| Europe | of the all-Ireland population (5 year peak mean |
| | 1998/9-2002/3) |

| Eurasian teal, Anas crecca, NW Europe | 1878 individuals, representing an average of 2.8% |
|---------------------------------------|---|
| | of the all-Ireland population (5 year peak mean |
| | 1998/9-2002/3) |

| Eurasian wigeon, Anas penelope, NW Europe | 3012 individuals, representing an average of 2.4% |
|---|---|
| | of the all-Ireland population (5 year peak mean |
| | 1998/9-2002/3) |

Ramsar Information Sheet: UK12016 Page 6 of 10 Lough Neagh and Lough Beg

European golden plover , *Pluvialis apricaria apricaria*, P. a. altifrons Iceland & Faroes/E Atlantic

Little grebe , *Tachybaptus ruficollis* , Europe to E Urals, NW Africa

Mew gull, Larus canus canus, Europe to N Africa

Northern lapwing, *Vanellus vanellus*, Europe - breeding

8249 individuals, representing an average of 4.1% of the all-Ireland population (5 year peak mean 1998/9-2002/3)

355 individuals, representing an average of 7.1% of the all-Ireland population (5 year peak mean 1998/9-2002/3)

765 individuals, representing an average of 1.1% of the all-Ireland population (5 year peak mean 1998/9-2002/3)

10968 individuals, representing an average of 4.3% of the all-Ireland population (5 year peak mean 1998/9-2002/3)

Species Information

Assemblage.

During the breeding season the site supports a diverse assemblage of waterfowl, including: Larus ridibundus, Podiceps cristatus, Anas strepera, Tringa totanus, Gallinago gallinago, Aythya fuligula, Aythya ferina, Anas clypeata, Larus fuscus and Larus canus.

Pollan Coregonus autumnalis

21. Social and cultural values:

e.g. fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values.

Aesthetic

Conservation education

Current scientific research

Fisheries production

Livestock grazing

Non-consumptive recreation

Sport fishing

Sport hunting

Tourism

Traditional cultural

Transportation/navigation

22. Land tenure/ownership:

| Ownership category | On-site | Off-site |
|------------------------------------|---------|----------|
| Non-governmental organisation | + | |
| Local authority, municipality etc. | + | |
| Private | + | |
| Public/communal | + | |

23. Current land (including water) use:

| Activity | On-site | Off-site |
|-----------------------------|---------|----------|
| Nature conservation | + | |
| Tourism | + | |
| Recreation | + | |
| Research | + | |
| Fishing: commercial | + | |
| Fishing: recreational/sport | + | |
| Rough or shifting grazing | + | |
| Hunting: recreational/sport | + | |
| Sewage treatment/disposal | + | |

Ramsar Information Sheet:UK12016Page 7 of 10Lough Neagh and Lough Beg

| Flood control | + | |
|---------------------------|---|---|
| Mineral exploration | + | |
| Domestic water supply | + | |
| Non-urbanised settlements | | + |

24. Factors adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

Explanation of reporting category:

- 1. Those factors that are still operating, but it is unclear if they are under control, as there is a lag in showing the management or regulatory regime to be successful.
- 2. Those factors that are not currently being managed, or where the regulatory regime appears to have been ineffective so far.

NA = Not Applicable because no factors have been reported.

| Adverse Factor Category | Reporting Category | Description of the problem (Newly reported Factors only) | On-Site | Off-Site | Major Impact? |
|-------------------------|--------------------|--|---------|----------|---------------|
| Eutrophication | 2 | The Lough drains some 40% of Northern Ireland and has been subject to severe eutrophication as a result of increased nutrient inputs from agricultural run-off and general domestic sewage from catchment housing and other developments. | + | | + |
| Pollution - fertilisers | 2 | The Lough drains some 40% of Northern Ireland and has been subject to severe eutrophication as a result of increased nutrient inputs from agricultural run-off and general domestic sewage from catchment housing and other developments. | + | | + |
| Pollution - fertilisers | 2 | other developments. The Lough drains some 40% of Northern Ireland and has been subject to severe eutrophication as a result of increased nutrient inputs from agricultural run-off and general domestic sewage from catchment housing and | + | | |

| For category | - 2 | 2 factors | onl | ٧. |
|--------------|-----|-----------|-----|----|
| | | | | |

What measures have been taken / are planned / regulatory processes invoked, to mitigate the effect of these factors? Eutrophication - Phosphate-stripping at appropriate sewage treatment works had begun to address the issue of eutrophication, but the nutrient problem has now been demonstrated to be predominantly due to non-point, agricultural, sources. Water Catchment Management Plan will be developed in context of the Water Framework Directive.

Pollution - fertilisers - Phosphate-stripping at appropriate sewage treatment works had begun to address the issue of eutrophication, but the nutrient problem has now been demonstrated to be predominantly due to non-point, agricultural, sources. Water Catchment Management Plan will be developed in context of the Water Framework Directive.

| Is the site subject to adverse ecological change? YES | |
|---|--|
|---|--|

Ramsar Information Sheet:UK12016Page 8 of 10Lough Neagh and Lough Beg

25. Conservation measures taken:

List national category and legal status of protected areas, including boundary relationships with the Ramsar site; management practices; whether an officially approved management plan exists and whether it is being implemented.

| Conservation measure | On-site | Off-site |
|--------------------------------|---------|----------|
| SSSI / ASSI | + | |
| NNR | + | |
| SPA | + | |
| Land owned by a NGO for nature | + | |
| conservation | | |
| Site management statement/plan | + | |
| implemented | | |
| SAC | + | |

26. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc.

No information available

27. Current scientific research and facilities:

e.g. details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

Fauna

Numbers of migratory birds and wildfowl and waders are monitored annually as part of the national Irish Wetland Birds Survey (I-WEBS) organised by the IWC Birdwatch Ireland, the National Parks and Wildlife Service (Ireland) and the Wildfowl and Wetlands Trust.

Miscellaneous.

The University of Ulster has a freshwater research laboratory on the shores of Lough Neagh.

28. Current conservation education:

e.g. visitor centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

The Lough Neagh Discovery Centre is located on the southern shores of Lough Neagh and is run by Craigavon Borough Council. School groups and other incidental visitors are also catered for at the nearby Environment and Heritage Service Warden's office/information centre.

29. Current recreation and tourism:

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

Activities, Facilities provided and Seasonality.

There is regular use of parts of the site for informal recreation.

30. Jurisdiction:

Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept. of Agriculture/Dept. of Environment, etc.

Department of the Environment (Northern Ireland), Environment and Heritage Service, Commonwealth House, Castle Street, Belfast, Northern Ireland, BT1 1GU

31. Management authority:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

Department of the Environment (Northern Ireland), Environment and Heritage Service, Commonwealth House, Castle Street, Belfast, Northern Ireland, BT1 1GU

32. Bibliographical references:

Scientific/technical references only. If biogeographic regionalisation scheme applied (see 13 above), list full reference citation for the scheme.

Site-relevant references

Ramsar Information Sheet: UK12016 Page 9 of 10 Lough Neagh and Lough Beg

- Cranswick, PA, Waters, RJ, Musgrove, AJ & Pollitt, MS (1997) *The Wetland Bird Survey 1995–96: wildfowl and wader counts*. British Trust for Ornithology, Wildfowl and Wetlands Trust, Royal Society for the Protection of Birds & Joint Nature Conservation Committee, Slimbridge
- Musgrove, AJ, Pollitt, MS, Hall, C, Hearn, RD, Holloway, SJ, Marshall, PE, Robinson, JA & Cranswick, PA (2001) *The Wetland Bird Survey 1999–2000: wildfowl and wader counts.* British Trust for Ornithology, Wildfowl and Wetlands Trust, Royal Society for the Protection of Birds & Joint Nature Conservation Committee, Slimbridge. www.wwt.org.uk/publications/default.asp?PubID=14
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Criteria for the designation of Wetlands of International Importance

| Group A of the criteria Sites containing representative, rare or unique wetland types | | Criterion 1: A wetland should be considered internationally important if it contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region. |
|--|--|--|
| | | Criterion 2: A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities. |
| | Criteria based on species and ecological communities | Criterion 3: A wetland should be considered internationally important if it supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region. |
| | | Criterion 4: A wetland should be considered internationally important if it supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions. |
| Group B of the | Specific criteria based | Criterion 5: A wetland should be considered internationally important if it regularly supports 20,000 or more waterbirds. |
| criteria Sites of international importance | on waterbirds | Criterion 6: A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird. |
| for conserving biodiversity | Specific criteria based on fish | Criterion 7: A wetland should be considered internationally important if it supports a significant proportion of indigenous fish subspecies, species or families, life-history stages, species interactions and/or populations that are representative of wetland benefits and/or values and thereby contributes to global biological diversity. |
| | | Criterion 8: A wetland should be considered internationally important if it is an important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend. |
| | Specific criteria based on other taxa | Criterion 9: A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of wetland-dependent non-avian animal species. |

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Appendix 8: Integrity of Site Checklists

Table A8. 1 Integrity of Site Checklist for Lough Foyle Ramsar Site

| Conservation Objectives | |
|---|--------------------|
| Does the project have potential to: | |
| Cause delays in progress towards achieving the conservation objectives of the site? | Yes /No |
| Interrupt progress towards achieving the conservation objectives of the site? | Yes /No |
| Disrupt those factors which help maintain the favourable conditions of the site? | Yes /No |
| Interfere with the balance, distribution and density of key species that are indicators of favourable conditions of the site? | Yes /No |

| Other Indicators | |
|--|--------------------|
| Does the project have potential to: | |
| Cause changes to the vital defining aspects (e.g. nutrient balance) that determine how the site functions as a habitat or ecosystems? | Yes /No |
| Change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site? | Yes /No |
| Interfere with predicted or expected natural changes to the site (such as water dynamics of chemical composition)? | Yes /No |
| Reduce the area of key habitats? | Yes /No |
| Reduce the population of key species? | Yes /No |
| Change the balance between key species? | Yes/No |
| Reduce the diversity of the site? | Yes/No |
| Result in disturbance that could affect population size or density of the balance between key species? | Yes /No |
| Result in fragmentation? | Yes/No |
| Result in loss or reduction of key features (e.g. tree cover, tidal exposure, annual flooding, etc)? | Yes /No |

Table A8.2 Integrity of Site Checklist for Lough Neagh & Lough Beg Ramsar

| Conservation Objectives | |
|---|--------------------|
| Does the project have potential to: | |
| Cause delays in progress towards achieving the conservation objectives of the site? | Yes /No |
| Interrupt progress towards achieving the conservation objectives of the site? | Yes /No |

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| Disrupt those factors which help maintain the favourable conditions of the site? | Yes /No |
|---|--------------------|
| Interfere with the balance, distribution and density of key species that are indicators of favourable conditions of the site? | Yes /No |

| Other Indicators | |
|--|--------------------|
| Does the project have potential to: | |
| Cause changes to the vital defining aspects (e.g. nutrient balance) that determine how the site functions as a habitat or ecosystems? | Yes /No |
| Change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site? | Yes /No |
| Interfere with predicted or expected natural changes to the site (such as water dynamics of chemical composition)? | Yes /No |
| Reduce the area of key habitats? | Yes /No |
| Reduce the population of key species? | Yes /No |
| Change the balance between key species? | Yes /No |
| Reduce the diversity of the site? | Yes /No |
| Result in disturbance that could affect population size or density of the balance between key species? | Yes /No |
| Result in fragmentation? | Yes /No |
| Result in loss or reduction of key features (e.g. tree cover, tidal exposure, annual flooding, etc)? | Yes /No |

