Appendix D

Glebe Bridge - Ecological Impact Assessment

Carlow & Wexford Bridges Rehabilitation Contract

Refurbishment of Glebe Bridge WX-N11-003.00

Ecological Impact Assessment (EcIA)

April 2016

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Refurbishment of Glebe Bridge

Ecological Impact Assessment (EcIA)

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Refurbishment of Glebe Bridge

Ecological Survey Report

TABLE OF CONTENTS

1. INTRODUCTION 1
1.1 Background 1
1.2 Location/Site Description 1
1.3 Description of the Proposed Works 1
1.4 Legislative Context 2
1.5 Objectives 2
2. METHODOLOGY 3
2.1 Scope of EcIA 3
2.2 Consultation 3
2.3 Desk Study 3
2.4 Field Surveys 4
2.5 Survey Limitations 4
2.6 Impact Assessment 4
3. RESULTS 5
3.1 Designated Sites 5
3.2 Habitats 8
3.3 Protected Species 8
3.4 Invasive Alien Species 9
3.5 Water Quality 9
4. IMPACT ASSESSMENT 10
4.1 Designated Sites 10
4.2 Habitats 10
4.3 Protected Species 10
4.4 Invasive Alien Species 11
4.5 Water Quality 11
4.6 Mitigation, Compensation, Enhancement and Monitoring 11
4.7 Cumulative Effects 11
5. CONCLUSIONS 12
6. REFERENCES 13

APPENDIX A Slaney River Valley SAC & Wexford Harbour and Slobs SPA Site Synopses & Conservation Objectives

1. INTRODUCTION

1.1 Background

Roughan & O'Donovan-AECOM Alliance (ROD-AECOM) has been appointed by Transport Infrastructure Ireland (TII) and the National Roads Design Office (NRDO) of Kildare County Council to undertake refurbishment works to four bridges (three in County Carlow and one in County Wexford) as part of the Carlow & Wexford Bridges Rehabilitation Contract. This report provides for an Ecological Impact Assessment (EcIA) of the proposed works with regard to Glebe Bridge in County Wexford.

1.2 Location/Site Description

Glebe Bridge (EIRSPAN structure number WX-N11-003.00) carries the N11 national road across Edermine Stream at Irish Transverse Mercator (ITM) Grid Reference 698202, 634600. The Edermine Stream System drains mixed pasture and arable farmland south of Enniscorthy and discharges into the River Slaney. Streams in the system are tree-lined along much of their length and have been subject to canalisation in some places.

1.3 Description of the Proposed Works

Glebe Bridge is a single-span masonry arch bridge. The structure has been extended by the addition of a single-span reinforced concrete structure to the east of the original arch. The masonry arch has a square span of 3.685 m and an overall width of 11.66 m. The concrete structure has a span of 3.05 m and an overall length of 27.36 m. The out-to-out width of the structure is 39.02 m.

The findings of the Principal Inspection undertaken in 2015 stated that the structure was in poor condition, with some significant defects to the structure observed, as follows:

- The embankments were found to be in fair condition with erosion of the river bank observed over an 11 m length;
- A number of significant circumferential cracks (up to 40 mm wide) were observed extending from abutment to abutment *via* the arch barrel; and,
- A number of significant cracks were observed in the reinforced concrete abutments.

The following works are proposed with regard to this bridge:

- Repairs/reshaping and provision of rock armour to the downstream embankments that have been eroded/scoured away;
- Repairs to cobbled riverbed where it has broken up approximately 2 m downstream of the structure, which may include casting a concrete invert slab in the river channel over a 2–3 m length at this location;
- Repointing/pressure-grouting of wide cracks in the arch barrel;
- Resin-injecting of cracks in the concrete section of the structure;
- The installation of grouted tie-back anchors at the downstream end of the structure to prevent the outlet spandrel wall (headwall) from overturning (this will involve coring through the spandrel wall and inserting an anchor through which grout can be pumped); and,
- Vegetation clearance on the embankment above the masonry arch section of bridge.

The works will likely commence in August 2016 and will conclude within 16 weeks. In-stream activities will be required as part of the works in order to repair the embankments and cobbled riverbed and to gain access underneath the bridge. Tracked coring plant may be required at the masonry end for the installation of tie rods and pattress plates.

1.4 Legislative Context

The National Biodiversity Plan is a framework for the conservation and protection of Ireland's biodiversity. Its overall objective is to secure the conservation, enhancement (where possible) and sustainable use of biological diversity in Ireland and to contribute to conservation and sustainable use of biodiversity globally. This is implemented through legislative instruments concerned with nature conservation. The Planning and Development Act, 2000 (No. 30 of 2000) and the European Communities (Environmental Impact Assessment) Regulations, 2006 (SI No. 659/2006), as amended, are particularly important and include provisions directly concerned with the protection of the natural heritage and biodiversity.

The Wildlife Acts, 1976–2012 comprise the principle mechanism for the legislative protection of wildlife in Ireland. It outlines strict protection for species that have significant conservation value. In summary, the Acts protect species from injury, disturbance and damage to breeding and resting sites. All species that are provided for in these Acts must, therefore, be a material consideration in the planning process. Important national legislation for the protection of habitats and wild plants is the Flora (Protection) Order, 2015 (SI No. 356/2015). It makes it illegal to cut, uproot or damage a listed species in any way or to alter, damage or interfere in any way with their habitats. This protection applies wherever the listed plants are found.

The European Communities (Birds and Natural Habitats) Regulations 2011 (SI No. 477/2011) lists priority habitats and species that are of international importance and require protection and transposes into Irish law Directives 2009/147/EC (Birds Directive) and 92/43/EEC (Habitats Directive). This protection is, in part, afforded through the designation of areas that represent significant populations of listed species within a European context (Natura 2000 sites). An area designated for bird species is classed as a Special Protection Area (SPA) and an area designated for other protected species and habitats is classed as a Special Area of Conservation (SAC). Species listed on Annex I of the Birds Directive and habitats and/or species listed on Annexes I and II, respectively, of the Habitats Directive have full European protection in Natura 2000 sites. Species listed on Annex IV of the Habitats Directive are strictly protected wherever they occur, whether inside or outside the Natura 2000 network. Annex I habitats that occur outside of SACs are considered to be of national and international importance and, under Regulation 27(4)(b) of the aforementioned regulations, the planning authority has a duty to avoid pollution or deterioration of these habitats.

The International Union for the Conservation of Nature (IUCN) provides a global approach for evaluating the conservation status of species to inform and catalyse action for biodiversity conservation through the Red List of Threatened Species. In Ireland, a checklist of protected and rare species has been collated by Kingston (2012).

1.5 Objectives

This report presents the findings of a desk study and ecological survey work undertaken to assess the potential ecological impacts that the proposed works may have on protected sites, fauna, flora and priority habitats within the zone of influence. The "zone of influence" for a project is the area over which ecological features may be subject to significant effects as a result of the proposed works and associated activities (CIEEM, 2016). The present document provides for an ecological assessment of Glebe Bridge itself with regard to structural features with potential to support a bat roost and of Edermine Stream at this location with regard to potential sensitive ecological receptors, *e.g.* White-clawed Crayfish, European Otter and floating river vegetation. It also provides an assessment of invasive alien species (IAS) subject to restrictions under the European Communities (Birds and Natural Habitats) Regulations, 2011 within the zone of influence of the proposed works. This information is provided identify the need for further specialist ecological surveys, the requirement for a Screening for Appropriate Assessment (AA) and to inform the method statement for the proposed works.

2. METHODOLOGY

2.1 Scope of EcIA

The scope of this assessment includes all features of ecological interest, *i.e*. designated sites, protected habitats and species, other species of conservation importance and IAS occurring within the zone of influence of the proposed works. Defining the zone of influence considered the ecological sensitivities and coherence of the Edermine Stream System and potential indirect effects on designated sites downstream. Typically, the area over which ecological features may be subject to significant effects as a result of small-scale refurbishment works would be highly localised However, due to the ecological and hydrological links beyond the works area, the zone of influence was established using a precautionary approach and includes the extent of hydrological connectivity, *i.e*. the Edermine Stream System sub-basin catchment (see Figure 3.1).

2.2 Consultation

Comments and information with regard to the ecology of the area within the zone of influence of the proposed works were requested from the following agencies:

- National Parks & Wildlife Service (NPWS)
- Inland Fisheries Ireland (IFI)
- An Taisce (Mr Tomás Bradley)
- Wexford County Council (no response)

Observations and data regarding water quality were requested from the South Eastern River Basin District (SERBD) Project, which supports the implementation of Directive 2000/60/EC (Water Framework Directive).

A response highlighting elements of the works that may be of particular concern to fisheries was received from Mr Donnachadh Byrne, Senior Fisheries Environmental Officer at IFI. Mr Byrne noted that the Edermine Stream System is an important salmonid tributary of the River Slaney and may also support populations of other Annex II species. Mr Byrne stressed the need to comply fully with the *Guidelines on Protection of Fisheries during Construction Works in and adjacent to Waters* (IFI, 2016) and, noting the significant in-stream activities required as part of the works, requested an on-site meeting with the author of this report. This meeting has been scheduled for early May 2016.

2.3 Desk Study

In advance of any field survey, a desk study of existing information relevant to the site was carried out on 15th February 2016. The purpose of the desk study was to review information available in the public domain and to obtain information held by statutory and non-statutory consultees. As part of the information gathering process, the desk study identified recent and historical records of protected species within and adjacent to the site. It was conducted using the following sources:

- National Biodiversity Data Centre (NBDC) Biodiversity Maps (online);
- Ordnance Survey Ireland (OSi) vector mapping;
- OSi aerial photography;
- NPWS designated area shapefiles, conservation objectives, management plans and other data for designated areas in the vicinity;
- NPWS data on Annex I habitats, any other habitat data available and species of conservation interest;
- NPWS (2013) *The Status of EU Protected Habitats and Species in Ireland. Volume 2 & 3: Article 17 Assessments*. Department of Arts, Heritage and Gaeltacht, Dublin.

ArcView software was used with OSi maps and publicly available NPWS shapefiles to identify the boundaries of designated sites, *i.e*. Natura 2000 sites and other sites of national conservation importance, *e.g*. Natural Heritage Areas (NHAs) and proposed Natural Heritage

Areas (pNHAs), in relation to the proposed works (see Figure 3.1). In addition, publicly available records from the National Biodiversity Data Centre (NBDC) provided information with regard to protected species and IAS in the zone of influence. Water quality information was obtained from the Environmental Protection Agency (EPA) mapping system, ENvision, which is also publicly available online.

2.4 Field Surveys

The site of the proposed works and immediate vicinity were inspected by a suitably qualified ecologist on 16th February 2016. This inspection included a preliminary assessment of the bridge structure with regard to its potential to support roosting bats using criteria outlined in Collins (2016), an appraisal of the riverine habitat downstream of the bridge with regard to habitat suitability to support breeding and resting places of European Otter *Lutra lutra* and life stages of White-clawed Crayfish *Austropotamobius pallipes*. The site was also inspected for the presence of both aquatic and terrestrial IAS. The presence of protected species and IAS identified in the desk study were a material consideration during the site assessment.

The methodology used to assess the aquatic and riparian habitats at Glebe Bridge was based on the standardised River Habitat Survey (RHS) used by the Environment Agency for England and Wales. The major deviations from the RHS were the omission of the ten 1 m transects across the river and the classification of habitats according to Fossitt (2000) rather than those prescribed in the RHS manual.

2.5 Survey Limitations

The appropriate standard survey methods for habitat mapping described in Smith *et al*. (2011) were followed. However, biases and/or limitations, *e.g*. seasonality, associated with these methods could potentially affect the results. Furthermore, while every effort was made to provide a comprehensive description and assessment of ecological conditions at the site, it is unlikely that one survey can achieve full characterisation due to temporal variation.

The optimal time of year for broad habitat surveys is considered to be between May and September. It is, however, recognised that this defined season is a compromise, suitable for the vast majority of species, but possibly too early or too late for some species. The present survey was carried out in February, which is suboptimal for recording many plant species as it is outside of the main growth season.

In addition, White-clawed Crayfish surveys are highly ineffective in the period from November to March, inclusive, when water temperatures are consistently below 10°C and Crayfish are inactive. Therefore, only a Crayfish habitat suitability assessment was practical. Weather conditions during the days leading up to and on the day of the survey were suboptimal for surveying for Otter as there was heavy rain, potentially washing away signs such as prints and spraints.

2.6 Impact Assessment

Assessment of the value of the relevant ecological receptors and of the nature, magnitude, extent, duration and reversibility of any impacts potentially arising from the proposed works was carried out in accordance with National Roads Authority (NRA) *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (NRA, 2009) and the Chartered Institute of Ecology and Environmental Management (CIEEM) *Guidelines for Ecological Impact Assessment in the UK and Ireland* (CIEEM, 2016).

3. RESULTS

Following a review of existing ecological data in relation to the site and surrounding area and a field survey, the following ecological features were deemed most relevant to the proposed works in the context of EcIA:

- Slaney River Valley SAC [000781] and Wexford Harbour and Slobs SPA [004076];
- Likely presence of bat species, including Daubenton's Bat *Myotis daubentonii* in the immediate vicinity of the bridge;
- High likelihood of works within a territory occupied by Eurasian Otter *Lutra lutra*;
- Presence of physical habitat of at least local importance (higher value) for White-clawed Crayfish *Austropotamobius pallipes*;
- Presence of IAS, particularly Japanese Knotweed *Fallopia japonica* and other aquatic and riparian plants subject to restrictions in the immediate vicinity.

3.1 Designated Sites

Two designated sites occur within the zone of influence of the proposed works. They are the Slaney River Valley SAC [000781] and Wexford Harbour and Slobs SPA [004076]. The closest proximities of Glebe Bridge to these sites are 125 m and 450 m, respectively, with the confluence of Edermine Stream with the River Slaney being located approximately 500 m downstream. The Qualifying Interests (QIs) and Special Scientific Interests (SCIs) for which these sites have been designated are shown in Table 3.1 below. As part of the Natura 2000 network, both sites are considered to be of international importance.

Table 3.1 Designated sites occurring within the zone of influence of the proposed works.

Site name	Qualifying Interests/Special Scientific Interests	Proximity
Slaney River Valley SAC [000781]	Freshwater Pearl Mussel (*Margaritifera margaritifera*) [1029] Sea Lamprey (*Petromyzon marinus*) [1095] Brook Lamprey (*Lampetra planeri*) [1096] River Lamprey (*Lampetra fluviatilis*) [1099] Twaite Shad (*Alosa fallax*) [1103] Atlantic Salmon (*Salmo salar*) [1106] Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] European Otter (*Lutra lutra*) [1355] Common (Harbour) Seal (*Phoca vitulina*) [1365] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)* [91E0] *Priority habitats at risk of extinction in the Member State	125 m
Wexford Harbour and Slobs SPA [004076]	Little Grebe *Tachybaptus ruficollis* [A004] Great Crested Grebe *Podiceps cristatus* [A005] Cormorant *Phalacrocorax carbo* [A017] Grey Heron *Ardea cinerea* [A028] Bewick's Swam *Cygnus columbianus* [A037] Whooper Swam *Cygnus cygnus* [A038] Light-bellied Brent Goose *Brenta bernicla hrota* [A046] Shelduck *Tadorna tadorna* [A046] Wigeon *Anas penelope* [A050] Teal *Anas crecca* [A052] Mallard *Anas platyrhynchos* [A053]	450 m

	Pintail *Anas acuta* [A054] Scaup *Aythya marila* [A062] Goldeneye *Bucephala clangula* [A067] Red-breasted Merganser *Mergus serrator* [A069] Hen Harrier *Circus cyaneus* [A082] Coot *Fulica atra* [A125] Oystercatcher *Haematopus ostralegus* [A130] Golden Plover *Pluvialis apricaria* [A140] Grey Plover *Pluvialis squatarola* [A141] Lapwing *Vanellus vanellus* [A142] Knot *Calidris canutus* [A143] Sanderling *Calidris alba* [A144] Dunlin *Calidris alpina* [A149] Black-tailed Godwit *Limosa limosa* [A156] Bar-tailed Godwit *Limosa lapponica* [A157] Curlew *Numenius arquata* [A160] Redshank *Tringa totanus* [A162] Black-headed Gull *Chroicocephalus ridibundus* [A179] Lesser Black-backed Gull *Larus fuscus* [A183] Little Tern *Sterna albifrons* [A195] Greenland White-fronted Goose *Anser albifrons flavirostris* [A395] Wetlands [A999]	

The boundaries of the Slaney River Valley SAC and Wexford Harbour and Slobs SPA, as well as other designated sites in the area, in relation to the site and zone of influence of the proposed works and the Edermine Stream System are shown in Figure 3.1 overleaf.

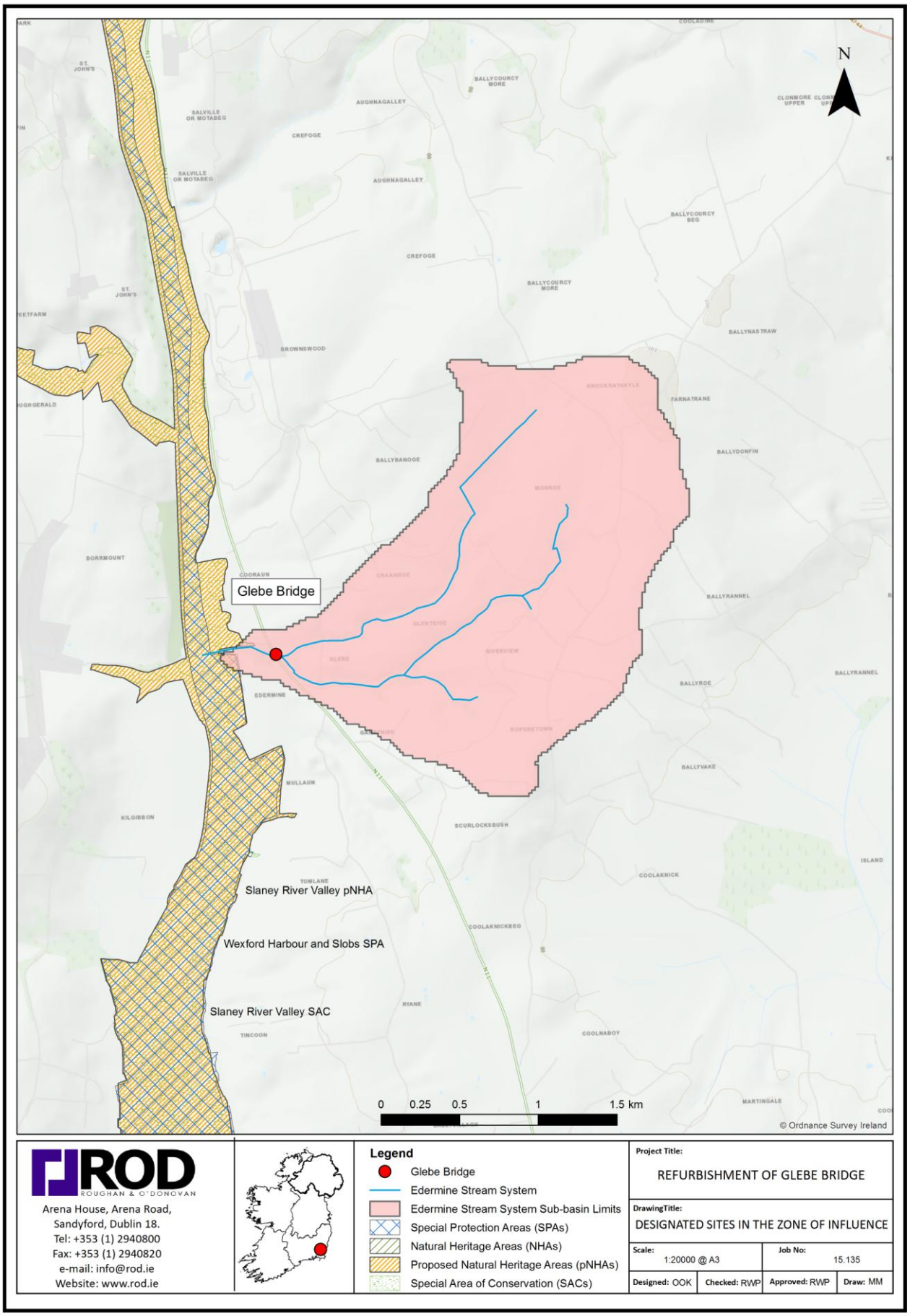

Figure 3.1 The locations of designated sites in relation to the zone of impact of the proposed works.

3.2 Habitats

Despite being located just above sea level, Edermine Stream at Glebe Bridge was classified as an upland/eroding river (FW2) owing to the prevalence of erosion over deposition evident at the site. At a riffle downstream of the bridge, the stream had bankfull and wetted widths of about 5.0 m and 2.0 m, respectively, and was approximately 0.10 m deep. The flow-type was almost entirely rippled, though broken and broken standing waves were present in places and the flow was smooth in the concrete (upstream) section of the bridge. The field survey focussed on the area downstream of Glebe Bridge, where the substrate was dominated by coarse gravel near the middle of the channel and sand closer of the banks. Some exposed bedrock and boulders were also present, as were unvegetated mid-channel and side bars. The bank profile was steep (> 45°) or vertical/undercut throughout most of the site, though some natural berms were also present. There were embankments on both sides of the stream near the bridge and these had been subject to erosion. The predominant valley from was a shallow vee, though the valley sides were steeper upstream of the bridge.

The bank vegetation varied considerably throughout the site, from bare (bare earth/rock) to in the most eroded sections to complex (four or more vegetation types) where the banks are more stable. A treeline (WL2) was present downstream of the bridge between the stream and the L205 local road. Overhanging boughs shading the stream channel were present throughout the site, as were exposed bankside and underwater tree roots.

Upstream of the Glebe Bridge, the major land-use on the eastern side of the stream was tilled land (BC3) and improved agricultural grassland (GA1), while the western side, which formed the embankment of the N11 national road, was dominated by (mixed) broadleaved woodland (WD1). Downstream of the bridge, land-use on the southern side of the stream was dominated by scattered trees and parkland (WD5) with some (mixed) broadleaved woodland (WD1) nearer the bridge, while on the northern side, (mixed) broadleaved woodland (WD1) and the L2050 local road, classified as buildings and artificial surfaces (BL3), dominated. The N11 national road, the bridge itself and associated masonry walls, were classified as buildings and artificial surfaces (BL3). The verge on either side of the road on approach to the bridge was classified as dry meadows and grassy verges (GS2).

3.3 Protected Species

Analysis of *Biodiversity Maps* (NBDC, 2016) showed that four bat species had been recorded in the same 1 km square as Glebe Bridge, all in 2003. They were Leisler's Bat *Nyctalus leisleri*, Common Pipistrelle *Pipistrellus pipistrellus sensu lato*, Soprano Pipistrelle *Pipistrellus pygmaeus* and Brown Long-eared Bat *Plecotus auritus*. The possibility of the occurrence of Daubenton's Bat *Myotis daubentonii* was also considered. The closest record for this species was approximately 4 km to the west of the site in 2008 (NBDC, 2016). This resource did not show any records for other protected species in the vicinity of Glebe Bridge.

The location of the bridge in a rural area and its close proximity to trees, woodland and a watercourse were considered favourable features in the bat roost suitability assessment. In addition, the masonry arch section of the bridge provided surfaces and crevices that would be suitable for roosting. Given the suitability of the bridge structure for bat roosting and the existing records for a variety of bat species in the vicinity of the bridge, Glebe Bridge was considered to be of at least local importance (higher value) for this species. However, further survey work in the form of an emergence survey will be required in order to confirm the presence or absence of Daubenton's Bat and other bat species at the site.

European Otter is listed on Annexes II and IV of the Habitats Directive and protected in Ireland under the Wildlife Acts, 1976–2012. The species is listed as near threatened on the Irish Red List (Marnell *et al*., 2009). A Regulation 39 threat response plan has been prepared to establish a system of strict protection for Otter in the Republic of Ireland (NPWS, 2009). No Otter or evidence of Otter, *e.g*. prints, spraints or holts, were recorded during the survey. However, the site was considered to contain suitable habitat for foraging and commuting. The presence of busy national and local roads at the site was considered likely to discourage the establishment of natal holts. Therefore, the site was assessed as being of low importance for breeding, but at least local importance (lower value) for foraging and commuting.

White-clawed Crayfish are listed on Annexes II and V of the Habitats Directive and protected in Ireland under the Wildlife Acts, 1976–2012. During the field survey, the stream showed physical habitat traits favourable to all life stages of Crayfish. These included heterogeneity of the substrate and shading of the channel by overhanging trees. These features support Crayfish by providing adequate refuges from predators and flood conditions. While there were no existing records for Crayfish found in the desk study and no Crayfish were observed during the field survey, the presence of physical suitable habitat suggested that Edermine Stream could support a population of at least local importance (higher value).

3.4 Invasive Alien Species

Analysis of the aforementioned maps showed that there were existing records for Himalayan Balsam *Impatiens glandulifera* and Canadian Waterweed *Elodea canadensis* in the zone of influence of the proposed works. Himalayan Balsam had been recorded approximately 500 m downstream at the confluence with the River Slaney in 2007. Canadian Waterweed had been recorded in the same hectad as the bridge in 1957.

During the field survey, neither of these two species were observed. However, a large stand of Japanese Knotweed *Fallopia japonica* was identified on the western embankment of the N11 immediately south of the bridge. Cherry Laurel *Prunus laurocerasus* was also abundant on the embankment above the masonry arch section of the bridge. An IAS survey carried out by ROD-AECOM on 1st April 2016 identified both Japanese Knotweed and Cherry Laurel, as well as Montbretia *Crocosmia* × *crocosmiflora* and Rhododendron *Rhododendron* sp., in close proximity to the site of the proposed works (ROD-AECOM, 2016). As part of this survey, the locations and extents of these species were recorded and mapped. An IAS Risk Assessment report was prepared, recommending that an invasive species management plan (ISMP) be prepared for the site in advance of the proposed refurbishment works.

3.5 Water Quality

A number of searches were made relating for data relating to water quality at the site. These searches included the Environmental Protection Agency (EPA) interactive online map viewer (EPA, 2016) and river water quality reports. No reports on water quality in Edermine Stream could be found. Similarly, no results were obtained during the consultation process.

During the fields survey, it was noted that the water in the stream was discoloured, which would suggest that it was unlikely to be of good status. However, more reliable data will be required in order to establish the true water quality status of the stream.

IMPACT ASSESSMENT

3.6 Designated Sites

Owing to the scale and nature of the proposed works, particularly the extensive in-stream activities anticipated, as well as their close proximity to the Slaney River Valley SAC and Wexford Harbour and Slobs SPA and hydrological connectivity to these Natura 2000 sites, direct pathways of risk between the proposed works and the QIs of the SAC and SCIs of the SPA are considered highly likely to exist.

Furthermore, given the connectivity of habitats and potential connectivity of populations of certain species, especially migratory species such as Atlantic Salmon *Salmo salar*, between the site of the proposed works and the SAC and SPA, the potential for indirect pathways of risk has also been considered and have been identified with regard to Freshwater Pearl Mussel, the three lamprey species, Atlantic Salmon and European Otter. These pathways of risk were identified based on the requirement for in-stream activities only 125 m upstream of the SAC and 450 upstream of the SPA on a watercourse that is likely to be important for their ecological integrity.

Considering the above and having regard to the Conservation Objectives (COs) set out for the QIs of the Slaney River Valley SAC and the SCIs of the Wexford Harbour and Slobs SPA (see Appendix A), significant adverse effects on these European designated sites arising from the proposed works cannot be ruled out at this stage.

3.7 Habitats

Extensive in-stream activities will be required in order to repair the embankments and replace the cobbled bed of the stream underneath the bridge, which has become severely scoured. Best practice guidelines (IFI, 2016) will be strictly adhered to in order to ensure that the risk of construction materials entering the river is minimised. Close consultation will be maintained with IFI throughout the planning and construction stages. Headroom under the refurbished bridge will be same as that under the existing bridge and there will be no change to the area of riverbed shaded by the bridge. Assuming both strict adherence to best practice guidelines and close consultation with IFI, no significant effects on the aquatic habitat in the vicinity of Glebe Bridge or in the extended zone of influence are anticipated.

Encroachment of the works area into the bank habitats will be required. While no sensitive riparian habitats were identified during the field survey, it should be noted that this survey was carried during a sub-optimal season for habitat survey. Therefore, further survey work will be required at a more appropriate time of year in order to thoroughly assess the habitats likely to be affected by the proposed works. There will be no land-take from surrounding land during either the construction or operational phases of the proposed works. Furthermore, habitats in the surrounding land are all subject to moderate to intensive management. Therefore, no significant effects are anticipated.

3.8 Protected Species

The most likely impact of the proposed works on bats potentially roosting in Glebe Bridge and/or the surrounding area is noise disturbance and light pollution during the construction phase. This impact is most likely to be short-term and reversible. Standard best practice guidelines as outlined in *Guidelines for the Treatment of Bats during the Construction of National Road Schemes* (NRA, 2006) should be followed in order to ensure that impacts on bats are minimised. Potential longer-term, operational-phase impacts on bats arise from the regrouting of cracks in the masonry arch section of the bridge. This constitutes a potential permanent loss of bat roosts, which must be considered a significant adverse effect on bats. Emergence surveys will be required in order to determine the presence/absence of bats at Glebe Bridge and determine appropriate mitigation measures with regard to the proposed refurbishment works.

There will be no loss or degradation of Otter habitat arising from the proposed works. A slight negative impact due to noise and vibration disturbance from machinery is anticipated during

the construction phase, but this impact will be short-term and fully reversible. Despite this, a pre-construction inspection will be required to ensure that no holts have been established in close proximity to the proposed works area between the time of the previous survey and commencement of works.

There is unlikely to be any significant loss of physical habitat suitable for White-clawed Crayfish as a result of the proposed works. Depending on the type of substrate reinstated underneath the masonry arch section of the bridge and the rock armour reinforcement of the embankments, the number of refuges for Crayfish may increase as a result of the works. Furthermore, the works are considered unlikely to give rise to any hydromorphological, hydrochemical or ecological alterations that would lead to significant negative effects on the Crayfish population at the local level or above.

3.9 Invasive Alien Species

Owing to the considerable extent of Japanese Knotweed and other IAS subject to restrictions under the European Communities (Birds and Natural Habitats) Regulations, 2011 at the site of the proposed works (ROD-AECOM, 2016), there is considered to be significant potential for further spread of these species within the area and contamination of material transferred off-site. Therefore, an ISMP should be prepared for the site in relation to the proposed works and strictly adhered to during the construction stage. This plan should continue to be implemented and its success or otherwise monitored during the operational phase.

3.10 Water Quality

Owing to the inclusion of extensive in-stream activities as part of the proposed works, there is potential for significant adverse impacts on water quality in the Edermine Stream System, especially through the input of fine sediment into the watercourse and mobilisation of the substrate. However, given strict observance of current best practice guidelines (IFI, 2016) and seasonal constraints, any residual impacts are considered unlikely to be significant.

3.11 Mitigation, Compensation, Enhancement and Monitoring

Other than the strict adherence to prescribed best practice guidelines for the treatment of the ecological features highlighted in this report and close consultation with relevant authorities, *i.e*. IFI, so as to avoid/minimise any potential impacts, no specific mitigation measures are proposed in relation to the ecology of the site of the proposed works.

It has not been possible at this stage to rule out significant changes in the distribution of IAS with potentially significant adverse effects on native biodiversity in a local or wider context. Therefore, as an enhancement measure, the ISMP recommended both in this report and in ROD-AECOM (2016) should be prepared prior to commencement of works. This plan should be implemented and monitored by the competent authority, *i.e*. Kildare County Council.

3.12 Cumulative Effects

A key feature of EcIA, EIA and AA is the assessment of the potential for proposed works to have significant effects both on their own and in combination with other plans or projects. An assessment of potential cumulative effects with other plans or projects of the proposed works has not been carried out at this stage of the ecological assessment. In order to accurately determine the potential for cumulative effects, such an assessment should be carried out in consultation with Wexford County Council and An Bord Pleanála.

4. CONCLUSIONS

It has been concluded, in light of existing baseline data and ecological surveys carried out by suitably qualified ecologists, that the proposed refurbishment of Glebe Bridge is likely to give rise to significant adverse effects on habitats and species of conservation importance and water quality in the Edermine Stream System. Specifically, the extensive in-stream activities required as part of the works are considered likely to impact negatively upon Atlantic Salmon *Salmo salar* and, potentially, lamprey species (*Petromyzon marinus* and *Lampetra* spp.). It will, therefore, be necessary to seek continued close consultation with the relevant authority, *i.e*. Inland Fisheries Ireland, throughout the planning and construction stages in order to avoid and/or minimise these impacts.

Considering the nature of the proposed works and their close proximity to the Slaney River Valley SAC and the Wexford Harbour and Slobs SPA, potentially significant adverse effects on the Qualifying Interests of the those sites arising from the proposed works cannot, in light of the Conservation Objectives of those sites, be ruled out at this stage. It has, therefore, been concluded that Stage 1: Screening for Appropriate Assessment should be undertaken with regard to these sites before consent for the works is sought. No other Natura 2000 or other designated sites are considered likely to be affected by the proposed works.

Glebe Bridge and the surrounding area has been assessed as having high potential to host roosting bats and it has not been possible at this stage to rule out significant negative impacts on bat species, especially Daubenton's Bat *Myotis daubentonii*, arising from the construction stage of the proposed works. Therefore, specialist surveys are recommended to determine whether or not bats are present at the bridge. *Guidelines for the Treatment of Bats during the Construction of National Road Schemes* (NRA, 2006) should be followed in order to ensure that any potential impacts on bats are minimised.

It has been concluded that there are not likely to be significant negative impacts White-clawed Crayfish *Austropotamobius pallipes* as a result of the proposed works. However, potential disturbance impacts on European Otter *Lutra lutra* during the construction stage have been identified and, therefore, a pre-construction inspection will be required to ensure that no holts or resting places have been established within 150 m of the site between the time of the field survey and commencement of works.

A number of invasive alien species are present at the site, most notable Japanese Knotweed *Fallopia japonica*, which is subject to restrictions under the European Communities (Birds and Natural Habitats) Regulations, 2011 and occurs over a large extent of the likely works area. Therefore, this report concurs with ROD-AECOM (2016) insofar as that an invasive species management plan should be prepared for the site in relation to the proposed refurbishment works and that this plan be implemented and monitored by Kildare County Council.

Finally, in order to comply fully with prescribed standards for Ecological Impact Assessment, a cumulative impact assessment must be carried out so as to assess the potential for significant effects to arise from the works in combination with other plans and projects.

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APPENDIX A

Slaney River Valley SAC & Wexford Harbour and Slobs SPA
Site Synopses & Conservation Objectives