



APPROPRIATE ASSESMENT

Project

This document relates to the Appropriate Assessment process undertaken for proposed bridge repairs in Bruree, Co. Limerick

Ecology Research and Solutions Ltd.

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Statement of Competence

The Managing Director of Ecology Research and Solutions Limited is Rory Dalton. Rory is an independent ecological consultant with a decade of experience across a range of disciplines including aquatic ecology, habitats, mammals, and birds. He also carries out a range of species-specific and research-based studies. He graduated from University College Cork with a BSc. Hons in Environmental and Earth Science, after which he spent three years working with a leading ecological consultancy in Limerick. He then set up his own company and has been running it since. Sectors he works in include, conservation, solar farms, wind farms, roads and bridges, grid connections, housing, greenways, instream civil works, drinking water etc. The projects he is involved with range in size from small bridge surveys to the largest wind energy project in the country and the largest water quality project in Europe. He carries out work for a number of State Bodies, Semi-State Bodies, Engineering Consultants, Ecology Consultants, Environmental Consultants and Laboratories

1. Introduction

Ecology Research and Solutions was commissioned by Limerick City and County Council to prepare a document for the Appropriate Assessment process for maintenance works on the bridge that crosses the River Maigue in Bruree, Co.Limerick.

1.1 Appropriate Assessment Process

An Appropriate Assessment is undertaken to establish if any proposed plan or project is likely to have a significant effect or impact on any site that has been designated under: the E.U. Habitats Directive (92/43/EEC) i.e. SAC; or the E.U. Birds Directive (79/409/EEC as amended 2009/147/EC) i.e. SPA. Collectively, SAC's and SPA's are known as Natura 2000 sites. The need to undertake one or more stages of this process has arisen from Articles 6(3) and 6(4) of the aforementioned Habitats Directive; where the former Article is primarily concerned with the protection of sites from likely significant effects and the latter allows derogation from such protection in very specific circumstances involving imperative reasons of overriding public interest.

Article 6(3) of the Habitats Directive requires that:

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

And Article 6(4) of the Habitats Directive requires that:

"If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, the Member State shall take all compensatory

measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted.”

In Stage 1, a screening process is undertaken to identify whether significant impacts on a Natura 2000 site are likely to arise from the project or plan in question. If significant impacts are likely to occur or if it is unclear whether significant impacts are likely to occur, then the process moves on to Stage 2 where an AA considers potential mitigation measures for adverse impacts. If it is considered that mitigation measures will not be able to satisfactorily reduce potential adverse impact on a Natura 2000 site then an assessment of alternative solutions is considered in Stage 3. This is then followed by Stage 4 in the event that adverse impacts remain and the proposed activity or development is deemed to be of Imperative Reasons of Overriding Public Interest (IROPI), allowing an assessment of compensatory measures to be considered. The outcome of a Stage 2 and higher assessment is presented in a report known as a Natura Impact Statement (NIS). While an AA NIS is provided by the advocate of the plan or project in question, the AA NIS itself is undertaken by the competent authority.

1.2 Methodology

Documents associated with the proposed project and relevant ecology databases were consulted as part of this assessment, with a site survey also undertaken. Furthermore, the following guidelines were used in the completion of this assessment;

- DEHLG (2009, as amended 2010). Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities. Department of the Environment, Heritage and Local Government, Dublin.
- EC (2002). 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. Environment Directorate-General of the European Commission.
- EC (2018). Managing Natura 2000 sites: The Provisions of Article 6 of the Habitats Directive 92/43/EEC. Environment Directorate-General of the European Commission.
- OPR (2021). Appropriate Assessment Screening for Development Management. OPR Practice Note PN01. Office of the Planning Regulator, March 2021.

Screening for Appropriate Assessment (Stage 1)

The Screening Stage of Appropriate Assessment is used to identify whether the Plan, either alone or in combination with other plans or projects, is likely to have a significant effect on a Natura 2000 site. Plans or projects that are directly connected with or necessary to the management of a European Site do not require AA (DEHLG, 2009). This report follows European Commission (2002) guidance which recommends that screening should follow a four-step process as outlined below:

1. Determine whether the plan is directly connected with or necessary to the management of the site.
2. Describe the plan and other plans and projects that, ‘in combination’, have the potential to have significant effects on a European site.
3. Identify the potential effects on the European site.
4. Assess the significance of any effects on the European site.

Screening can result in the following possible outcomes:

- AA is not required,
- No potential for significant effects and thus AA is not required,
- Significant effects are certain, likely, or uncertain and thus the project must proceed to Stage 2 (NIS) or be rejected.

Appropriate Assessment (AA) (Stage 2)

In this stage, the impact of the project or plan (either alone or in combination with other projects or plans) on the integrity of the Natura 2000 site is considered with respect to the conservation objectives of the site and to its structure and function. The Commission guidance on Natura 2000 (EC, 2018) states that: The integrity of the site involves its constitutive characteristics and ecological functions. The decision as to whether it is adversely affected should focus on and be limited to the habitats and species for which the site has been designated and the site's conservation objectives. Stage 2 includes any mitigation measures necessary to avoid, reduce or offset negative effects. The proponent of the plan or project is required to submit a Natura Impact Statement, i.e. the report of a targeted professional scientific examination of the plan or project and the relevant Natura 2000 sites, to identify and characterise any possible implications for the site in view of the site's conservation objectives, taking account of in-combination or cumulative effects. This should provide information to enable the competent authority to carry out the appropriate assessment. If the assessment is negative, i.e. adverse effects on the integrity of a site cannot be excluded, then a wider search for alternative solutions may need to be considered – Stage 3 - or the plan or project abandoned. The AA is carried out by the competent authority and is supported by the NIS. Stage 2 involves the following:

1. Information on the plan or project and the Natura 2000 site(s)

Adequate information on the plan/project and the Natura 2000 site(s), including identification of the conservation objectives of the Natura 2000 site(s) and the aspects of the plan or project (alone and in combination with other plans and projects) that will affect those objectives, must be collated to complete the AA.

2. Impact Prediction

The types of impacts should be identified (direct, indirect, short-term, long-term, construction, operational, decommissioning effects, cumulative effects etc).

3. Assessment of Significance

Following impact prediction, it is necessary to assess whether there will be adverse effects on the integrity of the site, as defined by the conservation objectives and status of the site. The precautionary principle should be applied. The focus of the NIS should be on demonstrating objectively that there will be no adverse effects on the integrity of the Natura 2000 site resulting from the construction, operation, or decommissioning stages of the project or the implementation of the plan. Where this cannot be demonstrated, adverse effects must be assumed.

4. Mitigation Measures

Mitigation measures may be proposed so that significant effects on the integrity of the Natura 2000 site are avoided. If no residual adverse effects remain, then the plan or project may proceed.

5. AA Conclusion

The competent authority must produce an AA Conclusion Statement. If the competent authority considers that residual adverse effects remain, then the plan or project may not proceed without continuing to Stage 3 of the AA process.

Field Survey

Date: 9/06/2024

Surveyors: Rory Dalton and Michael O'Connor

Weather: Calm and mild, Temperature 16°C.

Initial site investigation in order to gain an understanding of the ecology of the site and triage for further surveying.

Date: 11/06/2024

Surveyors: Tadhg Healy and Michael O'Connor

Weather: Calm and mild, Temperature 14°C.

All arch barrels of the bridge were inspected using a Bosch GIC 120C inspection camera. The camera head is 8mm wide. Bats are known to use holes no smaller than 10mm in order to roost. Based on this, the camera head was used as a guide as to which cracks in the bridge to inspect for bat activity. All holes that were deemed suitable as a roost were inspected on the day.

No bats were observed to be using any of the cracks in the bridge for roosting.

A follow up emergence survey was conducted the same evening, in case any roosting bats were missed using the inspection camera.

No bats were observed emerging from the bridge. 8 Daubenton's were found to be flying and feeding in and around the bridge, but none were observed roosting or emerging from the bridge.

During the inspection under the bridge a number of active bird nests were found in the cracks located in the arch barrels of the bridge.

Otter spraints and footprints were found under the first arch, if approached from the south of the bridge.

2. Description of the Site and Proposed works

2.1 Description and Location of the Site

The proposed project is due to take place in small village of Bruree in Co. Limerick. Bruree is a small rural village situated approximately 6km northwest of Killmallock. The general land use in the surrounding area is agriculture. The works are to take place on the bridge section of the L51804 that crosses the River Maigue in the village.

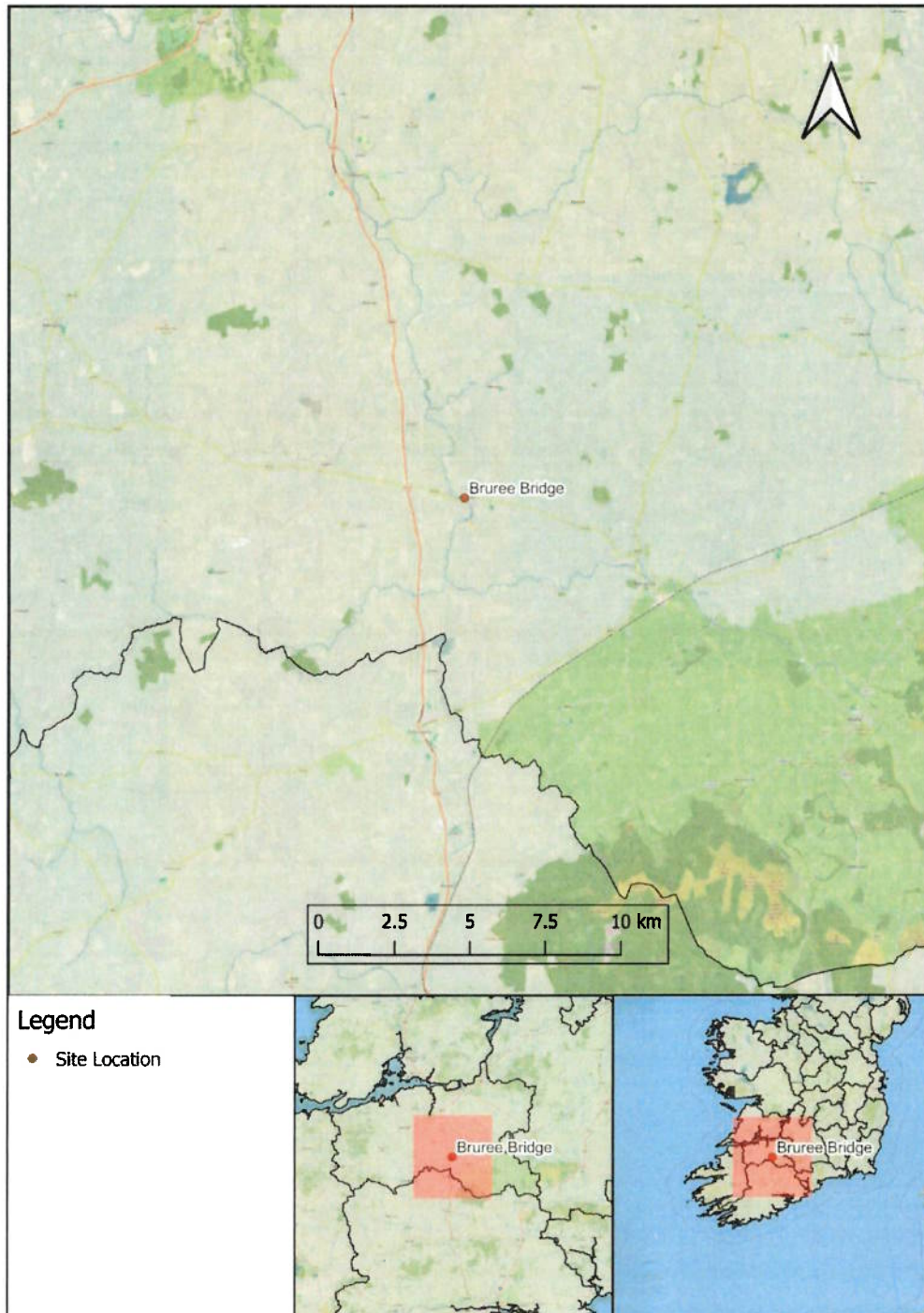


Figure 1. Map of site location.

2.2 Proposed Works

Problems with structure

A number of longitudinal cracks are present in each of the arch barrels that make up the bridge. These are present on the left- and right-hand sides of the arch barrels, from 45-60cm in from the edges .



Figure 2. Longitudinal cracks in the arch barrels.

The masonry cutwaters are damaged between arch 6 & 7 and between arch 5 & 6, see figure 3 figure 4.



Figure 3. Damaged cutwaters on the upstream side.



Figure 4. Damaged cutwater on the downstream side.

Outline Construction Methodology

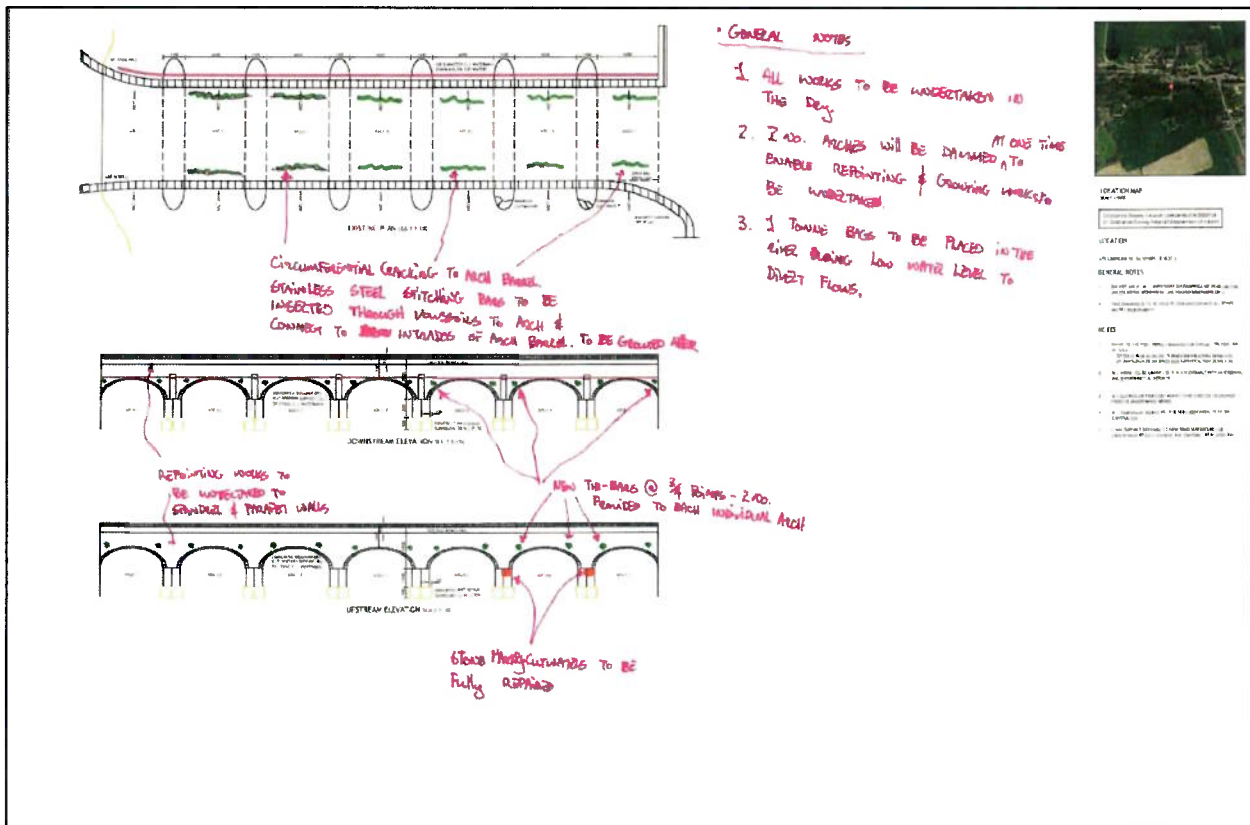


Figure 5. Drawing of planned repairs

- In order to repair the longitudinal cracks in the arch barrels stainless steel stitching will be inserted through the voussoirs in the arch and connected to the intrados, after a high strength cement/grout mix will be used. It will be sprayed under high pressure into the cracks. All other cracks will then be pointed.
- All spandrel and parapet walls will be repointed.
- Tie bars will be inserted into each arch, there will be two in each arch, their positions can be seen above in figure 5.
- The two damaged masonry breakwaters will be repaired.

3. Natura 2000 Sites and Proposal

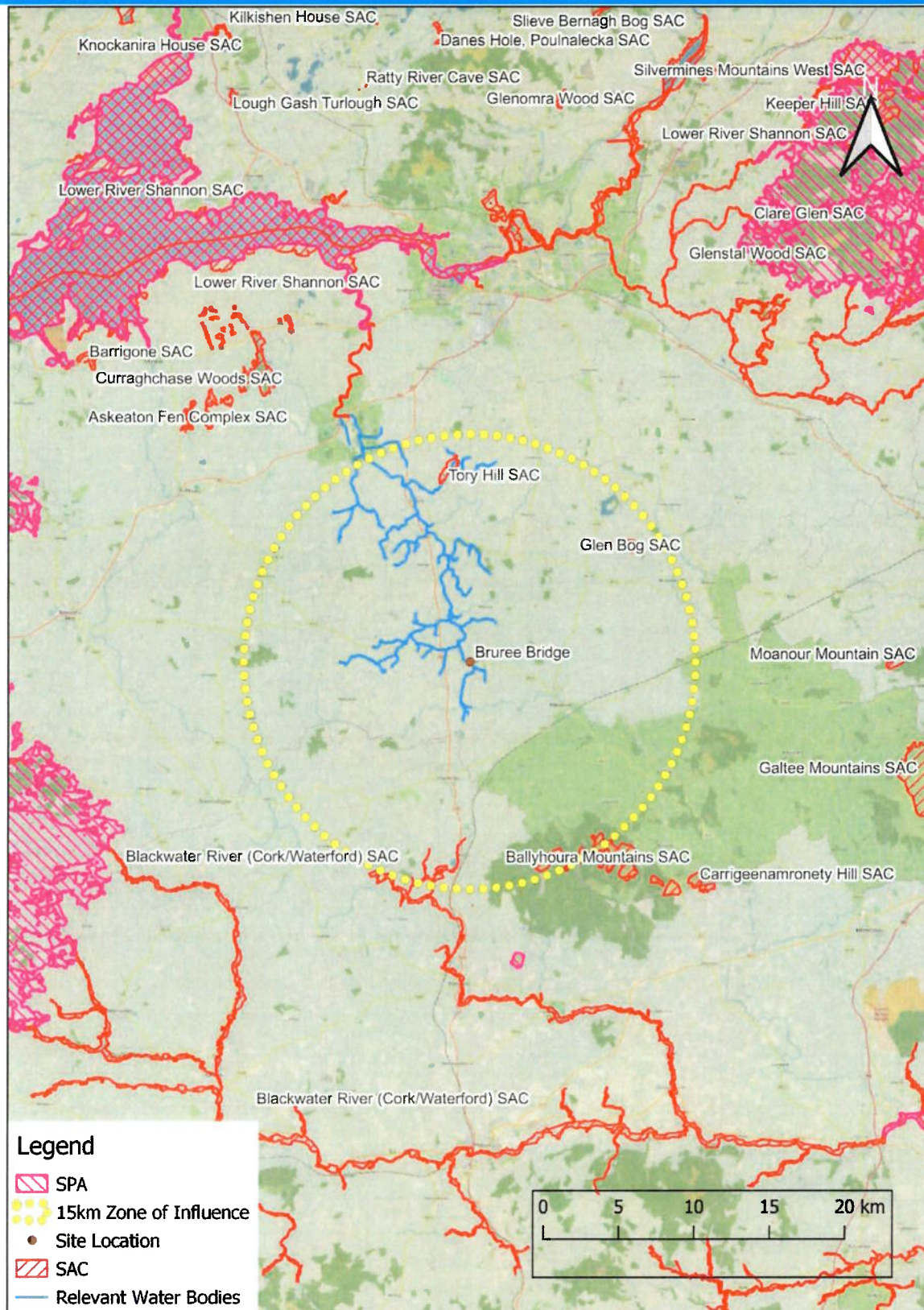


Figure 6. Map of 15km zone of influence, showing Natura 2000 sites that fall within it.

3.1 Natura 2000 Sites within the Zone of Influence

Natura Site	Distance between study site and Natura 2000 site	Hydrological/ecological connection?
Lower River Shannon SAC (002165)	~18km	Yes, 22.5km channel length
Glen Bog SAC (001430)	~13km	No
Tory Hill SAC (000439)	~11km	No
Blackwater River (Cork/Waterford) SAC (002170)	~11.5km	No
Ballyhoura Mountains SAC (002036)	~13.5km	No

3.2 Natura 2000 Sites and their Designations

Natura Site	Qualifying Interests	Distance	Connections (Source-Pathway-Receptor)
Lower River Shannon SAC (002165)	Sandbanks which are slightly covered by sea water all the time [1110] Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Coastal lagoons [1150] Large shallow inlets and bays [1160] Reefs [1170] Perennial vegetation of stony banks [1220] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glaucopuccinellietalia maritimae</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]	18km over land, 22.5km channel length	Connected hydrologically

Natura Site	Qualifying Interests	Distance	Connections (Source-Pathway-Receptor)
	Water courses of plain to montane levels with the <i>Ranunculus fluitans</i> and <i>Callitriche-Batrachium</i> vegetation [3260] <i>Molinia</i> meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinia caerulea</i>) [6410] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salix alba</i>) [91E0] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Salmo salar</i> (Salmon) [1106] <i>Tursiops truncatus</i> (Common Bottlenose Dolphin) [1349] <i>Lutra lutra</i> (Otter) [1355]		
Glen Bog SAC (001430)	Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salix alba</i>) [91E0]	13km	No Hydrological Connection
Tory Hill SAC (000439)	Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210] Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> [7210] Alkaline fens [7230]	11km	No Hydrological Connection
Blackwater River (Cork/Waterford) SAC (002170)	Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Perennial vegetation of stony banks [1220]	11.5km	No Hydrological Connection

Natura Site	Qualifying Interests	Distance	Connections (Source-Pathway-Receptor)
	Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (Glaucopuccinellietalia maritima) [1330] Mediterranean salt meadows (Juncetalia maritimi) [1410] Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-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] Margaritifera margaritifera (Freshwater Pearl Mussel) [1029] Austropotamobius pallipes (White-clawed Crayfish) [1092] Petromyzon marinus (Sea Lamprey) [1095] Lampetra planeri (Brook Lamprey) [1096] Lampetra fluviatilis (River Lamprey) [1099] Alosa fallax fallax (Twait Shad) [1103] Salmo salar (Salmon) [1106] Lutra lutra (Otter) [1355] Trichomanes speciosum (Killarney Fern) [1421]		
Ballyhoura Mountains SAC (002036)	Northern Atlantic wet heaths with Erica tetralix [4010] European dry heaths [4030] Blanket bogs (* if active bog) [7130]	13.5km	No Hydrological Connection

3.3 Natura 2000 Sites excluded from further assessment

Natura 2000 Site	Rationale for exclusion from further assessment
Tory Hill SAC (000439)	The site of the proposed works is 11km from the site of the SAC. The Qualifying Interests will not be affected by the works due to the small scale and nature of the development. There is no hydrological connection to the site and the nature of the works have no potential to cause negative impacts to the SAC.
Glen Bog SAC (001430)	The construction works are due to take place 13km away from this SAC. The Qualifying Interests will not be affected by the works due to the small scale and nature of the development. There is no hydrological connection to the site and the nature of the works have no potential to cause negative impacts to the SAC.
Blackwater River (Cork/Waterford) SAC (002170)	This SAC exists in a different catchment and is over 11.5km away from the construction works. Due to the small scale of the works, lack of a hydrological connection and any other means for the works to harm the SAC, no negative impacts are envisioned.

3.4 Sites Included for Further Assessment

Natura 2000 Site	Rationale for further assessment
Lower River Shannon SAC (002165)	The site has a hydrological connection to the Lower River Shannon SAC. This project has the potential to impact on water quality, which has the potential to negatively affect a number of the qualifying interests of the SAC. Explained in more detail in section 4 Natura 2000 Sites and Potential Impacts below.

4. Natura 2000 Sites and Potential Impacts

4.1 Lower River Shannon SAC

This very large site stretches along the Shannon valley from Killaloe in Co. Clare to Loop Head/ Kerry Head, a distance of some 120 km. The site thus encompasses the Shannon, Feale, Mulkear and Fergus estuaries, the freshwater lower reaches of the River Shannon (between Killaloe and Limerick), the freshwater stretches of much of the Feale and Mulkear catchments and the marine area between Loop Head and Kerry Head. The vast majority of the surface area is estuarine, however, the site also encompasses extensive river corridors, and so as a whole the site is varied in nature.

This site is of great ecological importance. It is designated for 11 marine/estuarine habitats, two terrestrial habitats, one freshwater habitat, 5 freshwater species, one marine mammal, and one semi-aquatic mammal. It includes the largest estuarine habitat in the country.

Qualifying Interests of Site	Assessment of Potential Impacts	Mitigation Required
Sandbanks which are slightly covered by sea water all the time [1110] Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Coastal lagoons [1150] Large shallow inlets and bays [1160] Reefs [1170] Perennial vegetation of stony banks [1220] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows [1330] Mediterranean salt meadows [1410]	These habitats do not exist within the footprint of the works, but instead exist out in the Shannon Estuary. The scale and nature of the works, the distance to the estuary (over 30km), in combination with the method in which it is being carried out ensure no significant negative impacts are envisaged for these habitats.	No

Water courses of plain to montane levels with the Ranunculus fluitans and Callitriche-Batrachion vegetation [3260]	This habitat does not exist within the footprint of the works, and so direct disturbance will not be an issue. Additionally, it does not exist within the stream channel directly downstream. Within the SAC, small pockets of this habitat exist, but are not sensitive to the minor levels of sediment that a project like this is capable of producing. As such likely significant effects are not expected.	No
Molinia meadows on calcareous, peaty or clayey-silt-laden soils [6410]	This habitat does not exist within the site, nor is it the type of habitat that could be damaged due to being hydrologically connected to a project of this size and nature.	
Alluvial forests with Alnus glutinosa and Fraxinus excelsior [91E0]	This habitat does not exist within the site.	No
Freshwater Pearl Mussel [1029]	This species does not exist within the Mague catchment as the water chemistry is not within the required parameters.	
Brook Lamprey [1096]	All of these species have the potential to be negatively affected by water quality issues they may arise as a result of the project taking place, without relevant mitigation measures being put in place. In order to fix the cracks in the arches of the bridge, a cementitious grout mix will be injected into the voids in the bridge under high pressure. As the mix will be injected under pressure, there is a potential risk of the mixture escaping out other cracks and into the watercourse. When lime in cement reacts with water it creates a solution with a high pH of 12 to 13, this has the potential to negatively impact aquatic organisms. Either directly through burns, or indirectly by raising the pH of the water and interfering with cellular processes. Additionally, during the repairs of the abutment's/piers, silts/sediments could be released which have the potential to clog vital spawning gravels of the salmon and the lamprey species found in the River Mague. These silts/sediments could also clog gravels where juvenile freshwater pearl mussel spend their first few years of life, potentially suffocating and killing them.	Yes, potentially
River Lamprey [1099]		
Salmon [1106]		
Sea Lamprey [1095]		
Common Bottlenose Dolphin [1349]	This species exists out in the estuary and as such no negative effects are envisaged.	No
Lutra lutra (Otter) [1355]	Otter is known to use the area, however, no holt or feature likely to be used as a holt was found within or near the works area during the initial site walkover. Due to the nature of the works, taking place during the day and passage under the bridge being available at all times, there is no need for mitigations to protect the otter from direct impacts. There is however the potential for indirect impacts due to the possibility of a reduction in prey availability due to ill treatment of the river with regard to water quality.	Yes

4.4 Cumulative Impacts

Just downstream of the works at The Mill Bruree, planning has been granted for works that are as follows “deepening of head race, construction of water chamber and water pipe, and the construction of a turbine

house". If this project was to commence without mitigations in place there would be scope for these projects to have cumulative negative impacts on the Lower River Shannon SAC located downstream of the site.

5. Conclusion

The proposed works on the bridge in Bruree must move to the next stage of the appropriate assessment process, because there is scientific uncertainty as to the absence of significant effects with regard to the Lower River Shannon SAC. Further assessment is required to determine whether the project is likely to adversely affect the integrity of the Natura 2000 site. This assessment will be presented in a Natura Impact Statement (NIS).

6. Natura Impact Statement

6.1 Assessment of Effects

Site-specific conservation objectives (CO's) are available for Lower River Shannon SAC. For the conservation interests identified as being potentially affected for each Natura 2000 site at Stage 1, the potential for impacts to each individual conservation objective have been assessed in the following sections. These tables determine the need for mitigation through Stage 2 NIS.

Conservation Interest	Attribute/Measure	Target	Assessment of Potentially Significant Effects	Mitigation Required
European otter <i>Lutra lutra</i>	Distribution	No significant decline	Considering the scale of the proposed works, and the absence of breeding sites, the proposed works will not have a significant impact on the distribution of otter.	No
	Extent of terrestrial habitat	No significant decline. Area mapped and calculated as 596.8ha above high water mark (HWM); 958.9ha along river banks/ around ponds	The habitats along the southern and northern banks are of limited breeding value to otter. As such, no significant impact on the extent of terrestrial habitat for otter will occur.	No
	Extent of marine habitat	No significant decline. Area mapped and calculated as 4,461.6ha	There will be no reduction in the extent of marine habitat. Therefore, no impact will occur on the extent of marine habitat available for otter.	No
	Extent of freshwater (river) habitat	No significant decline. Length mapped and calculated as 500.1km	There will be no reduction in the extent of freshwater habitat. Therefore, no impact will occur on the extent of freshwater habitat available for otter.	No
	Extent of freshwater (lake/lagoon) habitat	No significant decline. Area mapped and calculated as 125.6ha	The proposed works are not located within a lacustrine habitat. Therefore, no impact will occur on the extent of lake habitat for the species.	No
	Couching sites and holts	No significant decline	There are no suitable holts or couching sites nearby. Otters use the bridge as otter spraints were found on under the first arch if approached from the south side.	No

Conservation Interest	Attribute/Measure	Target	Assessment of Potentially Significant Effects	Mitigation Required
			They should still be able to pass under the bridge as all the arches won't be blocked at the same time. And do damage will be done to any potential holts or couches.	
	Fish biomass available	No significant decline	The proposed works may result in the reduction of water quality which could reduce prey availability for otter.	Yes
	Barriers to connectivity	No significant increase.	The proposed works will not result in any barrier that would impede the movement of otter upstream or downstream of the proposed works. Therefore, the distribution extent of the population will not be impacted.	No
Brook lamprey <i>Lampetra planeri</i>	Distribution	Access to all water courses down to first order streams	This project will not impede the movement of brook lamprey, therefore, their distribution and access to all water courses will not be interfered with.	No
	Population structure of juveniles	At least three age/size groups of brook/river lamprey present	Lamprey can be present as juveniles for several years after hatching from eggs, and as adults before spawning. Brook Lamprey tends to spawn at the downstream end of pools, but often in smaller rivers and in slightly shallower and slower flowing water building a nest in sandy or gravelly sediment. The construction phase of the project could potentially result in sediment release during repairs and silt up clean gravels downstream and reduce oxygen levels to the eggs. Therefore, there is potential for this conservation objective to be negatively affected.	Yes
	Juvenile density in fine sediment	Mean catchment juvenile density of brook/river lamprey at least 2/m ²	Juveniles live buried in silt beds. The construction phase of the project could potentially result in release of pollutants in the main channel and affect the quality of the water associated with the silt beds. Therefore, based on the precautionary principle, there is potential for this conservation objective to be negatively affected	Yes
	Extent and distribution of spawning habitat	No decline in extent and distribution of spawning beds	The construction phase of the project could potentially result in sediment release from excavations and silt up clean gravels in the main channel and reduce oxygen levels to the eggs. Therefore, there is potential for this conservation objective to be negatively affected.	Yes
	Availability of juvenile habitat	More than 50% of sample sites positive	Juvenile habitat consists of silt beds in slower-flowing reaches of the river. The project will not affect the stability of the substrate. The construction phase of the project could potentially result in release of pollutants in the main channel and affect the quality of the water associated with the silt beds. Therefore, based on the precautionary principle, there is potential	Yes

Conservation Interest	Attribute/Measure	Target	Assessment of Potentially Significant Effects	Mitigation Required
			for this conservation objective to be negatively affected.	
River Lamprey <i>Lampetra fluviatilis</i>	Distribution	Access to all water courses down to first order streams	Passage through the section of river under the bridge will be maintained at all times throughout the works, allowing lamprey to move freely upstream.	No
	Population structure of juveniles	At least three age/size groups of brook/river lamprey present	Lamprey can be present as juveniles for several years after hatching from eggs, as adults before migration to sea and upon return migration for several months before spawning. The construction phase of the project could potentially result in sediment release during repairs and silt up clean gravels downstream and reduce oxygen levels to the eggs. Therefore, there is potential for this conservation objective to be negatively affected.	Yes
	Juvenile density in fine sediment	Mean catchment juvenile density of brook/river lamprey at least 2/m ²	Juveniles live buried in silt beds. The construction phase of the project could potentially result in release of pollutants in the main channel and affect the quality of the water associated with the silt beds. Therefore, based on the precautionary principle, there is potential for this conservation objective to be negatively affected.	Yes
	Extent and distribution of spawning habitat	No decline in extent and distribution of spawning beds	The construction phase of the project could potentially result in sediment release and silt up clean gravels in the main channel and reduce oxygen levels to the eggs. Therefore, based on the precautionary principle, there is potential for this conservation objective to be negatively affected.	Yes
	Availability of juvenile habitat	More than 50% of sample sites positive	Juvenile habitat consists of silt beds in slower-flowing reaches of the river. The project will not affect the stability of the substrates. The construction phase of the project could potentially result in release of pollutants in the main channel and affect the quality of the water associated with the silt beds. Therefore, based on the precautionary principle, there is potential for this conservation objective to be negatively affected.	Yes
Atlantic Salmon <i>Salmo salar</i>	Distribution: extent of anadromy (% of river accessible)	100% of river channels down to second order accessible from estuary	There will be no barrier to fish pass created during the works, as only two arches will be blocked at one time, allowing the salmon free movement upstream.	No
	Number of adult spawning fish	Conservation Limit (CL) for each system consistently exceeded	Atlantic Salmon require clean gravels for spawning. Potential sediment run off as a result of the proposed repairs site could result in gravels becoming unsuitable for spawning.	Yes

Conservation Interest	Attribute/Measure	Target	Assessment of Potentially Significant Effects	Mitigation Required
	Salmon fry abundance (Number of fry/5 minutes electrofishing)	Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 min sampling	There is potential for water quality impacts and therefore a potential effect on juvenile salmon.	Yes
	Out-migrating smolt abundance (Number)	No significant decline	Any impacts on numbers of young salmon as outlined above will affect out-migrating smolt abundance.	Yes
	Number and distribution of redds (Number and occurrence)	No decline in number and distribution of spawning redds due to anthropogenic causes	This section of river has no suitable spawning gravels, but downstream gravels could be impacted by silts/sediments released during the works.	Yes
	Water quality (EPA Q value)	At least Q4 at all sites sampled by EPA	The proposed works have the potential to introduce sediment and pollutants to the watercourse as a result of the proposed works, reducing water quality.	Yes

6.2 Mitigation Measures

6.2.1 Working in the dry

A “dry cell” will be created to facilitate works on the arches of the bridge. The works at specific locations along the bridge will need to be staged to allow for this, as only a portion of the river can be sealed off at a time, with flow conveyed through vacant spans. Two spans will be blocked at a time and work carried out on them. To do this, the river just upstream of the works and again just downstream will be blocked using large “tonne-bag” sandbags, along with a number of small sandbags to fill smaller gaps and create the seal around the works areas. It may be necessary to adjust the plan outline of the barrier dependent on flows around it, in order to achieve safe access to the works area.

Sand used in the sandbags is to be non-calcareous and will not contain any petrochemicals. The water will then be electro-fished and any fish species present removed and placed in the river proper. Water within the closed off areas will be pumped out into the river. The pump will remain in situ on standby, for deployment if necessary, in the event that water re-enters the sealed-off area during the works, in which case it will be pumped out if at risk of being contaminated by the works.

The dry cell will then be lined with plastic to capture any cement and sediment that is used during the repairs in each section. These will then be disposed of by a registered waste disposal company.

6.2.2 Cement/Grout Control and Wheel Washing

Wet cement/grout pollution is silty and very alkaline (high pH) and can have a serious effect on watercourses and aquatic life. Cement/grout should not enter water. The following measures will be implemented regarding cement/grout:

- Cement/grout filling of the cracks shall not be carried out during forecasted periods of heavy rainfall. Weather forecasts will be monitored during the construction phase. The 24 hours advance meteorological forecasting service from Met Éireann will be used;

- To reduce the volume of cementitious water, only concrete chutes will be washed down onsite, at the landward side of the berm along the river;
- It is recommended that washout of cement trucks be carried out at an appropriate distance of 50m away from drains or watercourses and appropriately treated;
- No disposal of cement remnants will be permitted elsewhere on site; and
- Water residue from the wheel wash will be fed through an interceptor/filter prior to discharging from the site to a grassed area away from the Mague River.

A concrete operator trained and experienced with a proven track record in working in rivers will be used to undertake concrete works.

6.2.3 Waste management

Any waste generated during removal of loose pointing and paints, or any lubricants/oils will be collected and stored in proper waste containers at the site compound within a prefabricated bunded storage unit and will be removed and disposed of appropriately by the contractor for disposal to licensed landfill or to recycling.

There will be no discharge of effluent or waste-water on site.

6.2.4 Timing

It is important that the water barrier is functional at all times during the proposed repair works. The River Mague drains a catchment of approximately 1000km². The large catchment area and the fact the river is large and meandering by the time it flows through Bruree, allows ample time between rainfall events and the river rising significantly enough to overflow the sand bag barriers. This lag time between rainfall and the river rising allows plenty of time for the dry cells to be cleared of cement and sediment, in the event that the rainfall is predicted to continue to a level that could threaten the integrity of the dry cell. Ideally the works should be undertaken when the river is or close to the 95% ile flow, with reference to the OPW's gauging station located in Bruree.

6.2.5 Disruption to breeding

Although neither of the sites have optimal or even reasonable lamprey/salmonid spawning habitat within or adjacent to them, the potential for disruption is still there in the form of incidence of suspended solids into the river system. In order to mitigate against disruption to lamprey (brook and river) during the breeding season, works shall be carried out outside their breeding season. In order to mitigate against disruption to salmonids, works shall be completed before their breeding season commences.

A number of bird nests were found in cracks in the arch barrel.

To avoid disruption to breeding birds and lamprey/salmonids it is recommended that the works take place outside the breeding times of these species, which is ideally in September.

6.2.6 Spread of invasive plants

Prior to being deployed for the current works, all machinery to be used for the works shall be washed thoroughly in the designated washing area in the Contractors Yard. A power washer is to be used, with particular attention to be paid to the tracks and bucket of the excavator, trailer decks and the wheels of any vehicles to be used. The site ecologist will inspect all plant when it arrives onsite and any remaining dirt with the potential to contain seed/rhizomes will be removed.

6.2.7 Ecological clerk of works

In order to ensure the delivery of the mitigations set out within the current report, and hence that there are no impacts to the conservation interests of the Natura 2000 network, a suitably qualified and experienced ecologist shall monitor the works.

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