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# **EIAR Chapter 5 Biodiversity, Species & Habitats**

## **Suir Island Infrastructure Links**



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## Document Control Sheet

Project Name: Suir Island Infrastructure Links  
Project Number: 20\_071  
Report Title: EIAR Chapter 4 Biodiversity, Species and Habitats  
Filename: RPT-20\_071-033

<b>Issue No.</b>	<b>Issue Status</b>	<b>Date</b>	<b>Prepared by</b>	<b>Checked by</b>
0	Final	22.09.2023	HB	LP

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## 5 Biodiversity, Species & Habitats

### 5.1 Introduction

This Chapter of the EIAR has considered the potential biodiversity impacts associated with the Construction and Operational Phases of the proposed Suir Island Infrastructure Links development. The purpose of the study is to assess the possible significance of the receiving natural environment and to identify and evaluate the significance of the effect of the development on this environment and suggest appropriate ameliorative measures that will avoid, minimise and/or compensate for any potential significant impacts to biodiversity.

A detailed description of the proposed development is provided in Chapter 2 Project Description and Planning Policy Context.

This Chapter has been prepared by Mr. Pat Doherty of Doherty Environmental Consultants Limited (DEC Ltd.). Refer to Chapter 1 for details on relevant qualifications and experience. The assessment has been carried out having regard to best practice and guidelines relating to biodiversity/ecological impact assessment, and in the context of similar infrastructural projects.

### 5.2 Methodology

#### 5.2.1 Guidance

##### ***CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal (2022)***

The ‘CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine’<sup>1</sup> (the CIEEM Guidelines’), published by the Chartered Institute of Ecology and Environmental Management (“CIEEM”), are the acknowledged reference on ecological impact assessment and reflect the current thinking on good practice in ecological impact assessment across the UK and Ireland. They are consistent with the British Standard on Biodiversity, which provides recommendations on topics such as professional practice, proportionality, pre-application discussions, ecological surveys, adequacy of ecological information, reporting and monitoring. These CIEEM Guidelines have the endorsement of the Institute of Environmental Management and Assessment (“IEMA”), the Chartered Institute of Water and Environmental Management (CIWEM), Northern Ireland Department of the Environment (DoENI), Scottish Natural Heritage (SNH), The Wildlife Trusts and other leading environmental organisations.

##### ***Guidelines for Information to be Contained in Environmental Impact Assessment Reports (2022)***

The Environmental Protection Agency (EPA) ‘Guidelines on the information to be contained in Environmental Impact Assessment Reports’, which were published in 2022, were prepared in accordance with the 1992 Environmental Protection Agency Act (Section 72), which requires the EPA to prepare guidelines on information to be contained in environment impact assessment reports.

The Guidelines have been drafted with the primary objective of improving the quality of EIARs with a view to facilitating compliance with the EIA Directive (Directive 2014/52/EU). By doing so they contribute

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<sup>1</sup> CIEEM (2018 v 1.1) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester. Version 1.1. Updated September 2019 – Available online at: <https://cieem.net/wp-content/uploads/2018/08/ECIA-Guidelines-Sept-2019.pdf> (Accessed August 2019).

to a high level of protection for the environment through better informed decision-making processes. They are written with a focus on the obligations of developers who are preparing EIARs.

The Guidelines are also intended to provide all parties in the EIA process, including competent authorities (CAs), with an authoritative reference to be regarded when considering an EIAR.

### ***TII Guidelines for Ecological Assessment of National Road Schemes (2009)***

The aim of this document is to provide guidance on the assessment of impacts on the natural environment during the planning and design of national road schemes. Since their publication in 2009 the guidelines have been used to inform the approach to ecological impact assessment not just for national road schemes but for a variety of infrastructural development. Of particular relevance is the approach set out in these guidelines for valuing ecological resources. This approach is relied upon in this chapter.

## **5.2.2 Site Investigations**

DEC Ltd. was commissioned in September 2020 to undertake an assessment of the proposed Suir Island Infrastructure Links development. A desktop survey was undertaken to gather existing baseline information for the project site and surrounding area.

A range of on-site field surveys were completed to inform the baseline biodiversity conditions at and surrounding the project site.

Field surveys were undertaken by DEC Ltd. during October and November 2020; monthly during April to July 2021; October & November 2021; monthly during June to September 2022; and again during April and May 2023.

Habitat and vegetation surveys were completed during the above surveys. Surveys for the presence of non-volant mammals, with particular attention given to identifying the presence of otters and their field signs within and in the immediate vicinity of the proposed development footprint were completed during the above surveys.

Surveys for the presence of overwintering bird species, with particular attention given to the presence of non-breeding season waterbird species were completed during the non-breeding season months listed above. Breeding bird surveys were completed by DEC during the 2021 breeding bird season between April and June and again during the 2022 breeding season between June and August. Non-breeding season bird surveys were completed during the 2020 non-breeding bird season in September 2020 and during the 2021 and 2022 non-breeding bird season in October and November 2021.

Bat surveys were undertaken during the 2021 and 2022 bat activity season, which comprises the months of late March to November inclusive.

Non-volant mammals surveys including manual searches for field signs and camera trap surveys were completed during 2021, 2022 & 2023.

## **5.2.3 Desk Study Methodology**

A desktop assessment was carried out to collate available information on the ecological baseline of Suir Island. The desk study was initiated at the inception of the project in September 2020 prior to the commencement of field surveys. Consultation was undertaken with relevant statutory and non-statutory agencies. As part of the desk study the following research was also undertaken:

- A Review of the Suir Island Masterplan with particular focus given to Appendix G: Tree Survey and Preservation Plan; Appendix J: Annex 1 Habitats and Annex II Species; and Appendix L: Appropriate Assessment Screening of the Masterplan.

- A review of the Tipperary County Council planning files using myplan/.ie for previously published and available Environmental Impact Statements (EISs)/ Environmental Impact Assessment Reports (EIARs)/Ecological Impact Assessment Reports prepared for previous planning applications in the surrounding area. Where such reports were identified baseline ecology information was reviewed to identify any sensitive biodiversity receptors previously identified as occurring in the surrounding area.
- A review of the National Biodiversity Database and the NPWS database for protected species to collate records of previously observed rare, threatened or protected species within close proximity to the proposed site. Rare and threatened species are those listed as such under a variety of sources including Plant Atlas 2020 (Stroh et al., 2020); Birds of Conservation Concern in Ireland (Gilbert et al., 2021) and Ireland Red List series publications (e.g. Marnell et al. 2019); Wyse-Jackson et al. (2016); King et al. (2011); Regan et al. (2010). Protected species are those species that are afforded statutory protection under national legislation. Search for records held by the National Biodiversity Data Centre (NBDC) website for the four tetrads W6775 (within which the majority of the proposed development footprint and landholding are located); W6774 (within which the southern boundary of the proposed development footprint and landholding are located); W6674 (to the west of the proposed development); and W6675 (to the northwest of the proposed development) was completed.;
- A review of the NPWS online database to identify the presence or otherwise of designated conservation areas (i.e., SPAs, SACs, NHAs etc.);
- A review of Site-specific Conservation Objectives (SSCO) mapping, published by the NPWS, for SACs and SPA.
- A review of the NPWS (NPWS, 2019) Article 17 Report was completed to gathering information for the current range and distribution of species protected under the EU Habitats Directive with respect to the project site;
- A review of inland Fisheries Ireland scientific investigations and publications pertaining to the River Suir.
- A review of the online BCI Batlas;
- A review of the bat landscape classification was also completed. A landscape conservation guide for Irish bat species was published in 2011 (Lundy et al., 2011). This study identified core areas of favourable habitat for bat species in Ireland. The publication was reviewed to identify the species whose core sustenance zone overlap with the proposed site.
- A review of the New Atlas of the British and Irish Flora (Preston et al., 2002)
- A review of the New Atlas of Breeding Birds in Britain and Ireland: 2007 – 2011 (Balmer et al, 2012).
- Review of aerial photography, satellite imagery and historical mapping for the proposed site.

Further desk study was completed during October 2022 and March to April 2023 to update, where required, biodiversity data collated from the above sources.

## 5.2.4 Field Survey Methods

### *Habitat Surveys*

Habitat surveys were carried out in during October 2021, June 2021, July 2022, September 2022, April 2023 and May 2023. These surveys were completed to identify, describe, map and evaluate habitats and to verify information gathered at the desk study stage. The basis of the Habitat Survey was an Extended Phase 1 Habitat Survey which identifies habitats to Level 3 of the Fossitt Guide to Habitats in Ireland and also records field signs indicating the presence of non-volant mammals, records all bird species seen and heard during the phase 1 habitat survey; records the potential for habitats within the survey area to function as breeding/resting/foraging habitat for protected species; and records any other

species noted during the phase 1 habitat survey. A further description of targeted surveys for fauna is provided in the subsequent sections below. The habitat survey was undertaken in accordance with the Heritage Council's Draft Best Practice Guidance for Habitat Survey and Mapping. Habitats were classified using Fossitt's Guide to Habitats in Ireland (2000) which classifies habitats according to a hierarchical framework with Level 1 habitats representing broad habitat groups, Level 2 representing habitat sub-groups and Level 3 representing individual habitats. The field survey focused on identifying Level 3 habitats.

In this report, scientific and common names for higher plants follow those in the Botanical Society of the British Isles (BSBI) standard list, published on its website [www.bsbi.org.uk](http://www.bsbi.org.uk). Scientific and common names for bryophytes follow Smith (2004). Scientific and common names of mammals follow Whilde (1993).

### ***Bird Surveys***

Habitat suitability for breeding birds was assessed during the multidisciplinary extended phase 1 habitat survey of the proposed development site during surveys in October and November 2021. Following this, five dedicated breeding bird surveys were undertaken within the proposed development site and Suir Island area to the east of the proposed development footprint during the 2021 (between April and July inclusive) and 2022 (Between June and September inclusive) breeding bird seasons. The methodology followed an adapted version of the Breeding Bird Survey (BBS) methodology as detailed in Gilbert et al. (1998). Transects were undertaken which covered the site and a representation of each habitat type within the lands. These included transects along the northern side of the River Suir at The Quay, the southern side along Raheen Road and along sections of the southern and northern bridges and the promenade/path along the existing berm. Random point counts were complete in woodland habitat to the east of the project site. The above methods were considered appropriate for establishing the breeding bird assemblage at and surrounding the project site. No suitable breeding habitat for kingfisher occurs along the river banksides at Suir Island and to the north and south of the island. There are no structures within the project site and the structures occurring to the west of the project site on Suir Island were inspected for their potential to support barn owl. These structures are of low potential to support barn owl.

All bird species seen or heard within the site (including those flying overhead) were recorded and their location and activity noted onto suitably scaled maps.

The British Trust for Ornithology's Breeding Bird Status Code was used to identify the presence of non-breeding; possible; probable and confirmed breeding for all bird species of medium (Amber-listed) and high (Red-Listed) conservation concern. The field signs used to assign the BTO breeding status code are summarised as follows:

- Non-breeding behaviour includes a bird recorded flying over; a species observed but suspected to be still on migration; a species observed but suspected to be a summering non-breeder.
- Possible breeding behaviour include a species observed during the breeding season in suitable nesting habitat or a singing male present in suitable breeding habitat.
- Probably breeding behaviour such as a pair observed in suitable nesting habitat; a permanent territory presumed through registration of territorial behaviour on at least two different days a week or more part at the same place or many individuals on one day; a courtship and display; agitated behaviour; or nest building was not observed during the breeding bird surveys.
- Confirmed breeding behaviour such as distraction-display; a used nest; recently fledged young; adults entering or leaving a nest-site; adults carrying a faecal sac or food; a nest containing eggs; or a nest with young seen or heard, was not observed during the breeding bird survey.



### **Bat Surveys**

An appraisal of habitats occurring within the project site for their potential to support bat species was completed during the field surveys in October 2020. These appraisals involved the inspection of trees occurring along the proposed alignment of the project and adjacent to it within the project site during the daytime for field signs indicating the presence of bats, and the presence of preferred roost features on mature trees occurring within the project site to function as bat tree roosts. The assessment of trees and the presence of preferred roost features were identified in accordance with the methods outlined by Collins et al., 2016. No structures occur within the footprint of the project site. Structures occur on Suir Island to the west of the project site within the boundary of Suir Island Gardens. These are dilapidated structures. A daytime inspection of these structures was completed during October 2021, July 2022 and September 2022 for field signs indicating the presence of roosting bats. These buildings within Suir Island Gardens were assessed for their potential to function as bat roosts with reference to features that are typically associated with bat roosts in buildings. Kelleher and Marnell (2022) outlined a series of factors associated with buildings that are more or less likely to support bat roosts. These factors are provided in Table 5-1 below.

*Table 5-1: Factors affecting the potential of buildings to support bat roosts*

<b>Potential</b>	<b>Description</b>
<b>Increase Potential</b>	<ul style="list-style-type: none"> <li>Disused or little used; largely undisturbed</li> <li>Large roof void with unobstructed flying spaces</li> <li>Large dimension roof timbers with cracks, joint and holes</li> <li>Uneven roof covering with gaps, though not too draughty and cool</li> <li>Entrances that bats can fly in through</li> <li>Hanging tiles or wood cladding, especially on south-facing walls</li> <li>Rural setting</li> <li>Close to woodland and/or water</li> <li>Pre-20<sup>th</sup> century or early 20<sup>th</sup> century construction</li> <li>Roof warmed by the sun</li> </ul>
<b>Decrease Potential</b>	<ul style="list-style-type: none"> <li>Urban setting or highly urbanised area with few feeding places</li> <li>Small or cluttered roof void</li> <li>Heavily disturbed</li> <li>Modern construction with few gaps around soffits or eaves</li> <li>Prefabricated with steel sheet materials</li> <li>Active industrial premises</li> <li>Cool, shaded, light or draughty roof voids</li> </ul>

Dedicated bat activity surveys were completed on site. This involved roost emergence surveys at structures within Suir Island Gardens to the west of the project site during the 2021 and 2022 bat activity seasons as well as continuous static detector monitoring at the project site to monitor bat foraging activity levels along and in the vicinity of the project site. Continuous night time monitoring was completed between the 19th May and 10th June 2021 and again between the 7th and 14th July 2022.

Song Meter Mini Full Spectrum bat detectors were deployed on site to monitor bat activity. The static bat detectors were positioned within woodland habitat to the east of the project site during monitoring in 2021 and were positioned along the alignment of the southern and northern bridges on Suir Island during 2022. Figure 5-1 shows the location of the static bat detector locations (as well as the location taken up during the roost emergence surveys at structures on Suir Island Gardens to the west of the project site). The static detectors were mounted at a height of 4m above the ground and were set to recorded bat activity continuously throughout each night, with recording commencing at 30 minutes prior to sunset and 30 minutes after sunrise. A total of 19 nights of continuous bat monitoring in the vicinity of the static bat detector locations MP1 and MP2 and a total of 15 nights at MP3 was completed on site.

Bat calls recorded by the SM4 Bat detectors during the automatic bat monitoring sessions were analysed using Kaleidoscope Pro (v. 5.1.9i) software. Kaleidoscope automatic bat identification software was used to assign bat calls to species level. Bat calls assigned to *Myotis* species were grouped together under the *Myotis* genus.

### ***Non-volant Mammal Surveys***

A survey for field signs indicating the presence of otters or other protected non-volant mammal species such as Irish stoat and badgers was undertaken during the field surveys. The survey for non-volant mammals included a search of Suir Island and the riparian corridor along the River Suir north and south banks 150m upstream and downstream of the proposed bridge crossings. This survey was undertaken during the daytime and particular attention was given to habitat features normally associated with otters. Any mammal field signs typical of otter activity were recorded during the surveys. These field signs, as described in Neal & Cheeseman (1998) and Bang & Dahlstrom (2001) include:

- mammal breeding and resting places, such as setts, holts, couches, lairs;
- pathways;
- prints;
- spraints and faecal deposits;
- latrines (and dung pits used as territorial markers);
- prey remains and feeding signs (snuffle holes);
- hair; and
- scratch marks
- Camera traps (Bushnell Trophy Cam HD E3) were erected at two locations along the proposed bridge alignments at the north and south side of Suir Island to monitor for non-volant mammals activity during 2021. A third camera trap was installed at a location identified as a potential otter couch during initial field survey in October 2020. This camera trap was also installed during 2021. Figure 5-1 shows the location of camera traps. The camera trap locations were selected to provide coverage of potential otter habitat along the riparian fringe of the River Suir. The three cameras were installed between August and November 2021. One camera trap was position on the northern bank of the canal looking northwest towards the northern bridge crossing. The camera was strapped to a tree within the “backwater” flood channel depression between the northern bank of Suir Island and the embankment to the north. The camera trap on the southern side was strapped low (height of 0.5m) to a tree facing southeast towards the river and steps leading to the river. The camera trap along the north bankside of Suir Island at the potential otter couch location (approximately 115m to the east of the proposed development) was strapped to a tree at a height of approximately 0.5m facing northwest. Additional camera trap surveys were completed during April and May 2023 at the location of two newly established mammal entrances. These entrances were observed during surveys in April 2023 and were not noted to be present on the island prior to this time. The location of the 2023 camera traps are also shown on Figure 5-1. The camera to the east was positioned opposite a mammal entrance

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towards the eastern end of the island. The second camera trap was positioned at an entrance towards the centre of the island. A number of mammal entrances were noted at this location during April 2023 and the camera trap was positioned at an entrance where indications of recent mammal traffic (e.g. bare and smooth path at the entrance) were noted.

Limitations in the effectiveness of trail cameras to record otters have been reported in previous studies (Lerone et al. 2011 & 2015) as body surface temperatures of otters emerging from water do not differ from surrounding ambient temperatures. In order to overcome this limitation each of the three trail cameras, in addition to being set to trigger via heat sensitive motion detection, were set to record still photo images at one-minute intervals through each night of recording.

All photographs logged by each of the cameras were reviewed for the presence of otters.

### **Fisheries**

Extensive fisheries surveys and investigations have been completed along the stretch of the River Suir by Inland Fisheries Ireland between 2014 and 2021 (see Rooney *et al.*, 2014; O’Gorman *et al.*, 2015; Gallagher *et al.* 2017; 2019; 2020; 2022). Previous fisheries investigations were also completed along this stretch of the River Suir in 1998; 2000; and 2002 (EG Pettit & co., 2005). The findings of the fisheries investigations have been relied upon to inform this biodiversity chapter.

### **White-clawed Crayfish**

A 100m stretch of the River Suir south channel (approximately 50m upstream and downstream of the south bridge crossing) was searched for the presence of crayfish. The search was undertaken along both the north and south bank of the channel during August 2021. The survey of these stretches of stream followed the guidance outlined in Praey (2003) for carrying out manual searches of watercourses for crayfish. The suitability of the stretches of watercourses surveyed was assessed in terms of its potential to support crayfish. A viewing aid, in the form of a bathyscope, was used during the survey. Waders and bathyscope equipment were cleaned and disinfected prior to the completion of this survey.

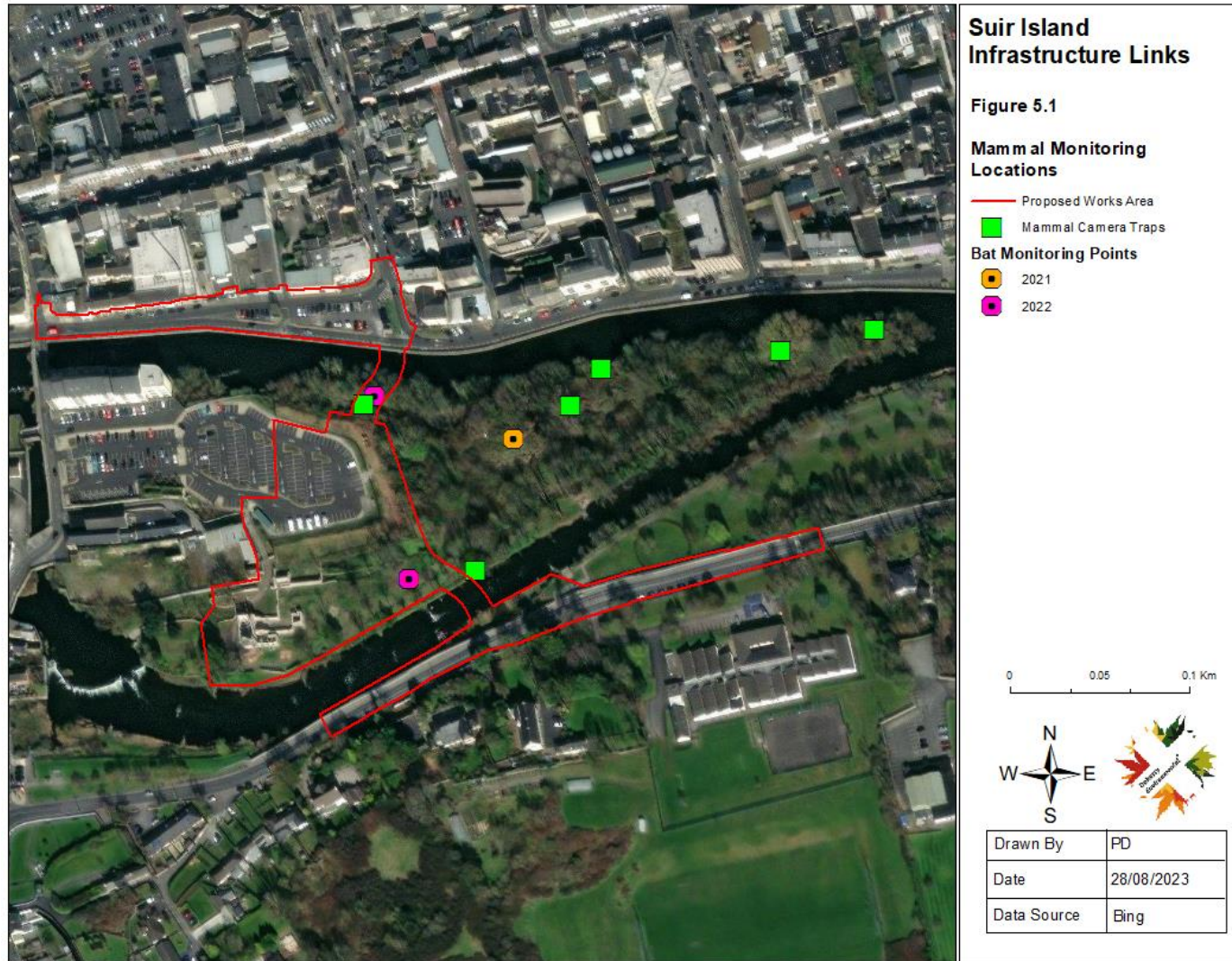


Figure 5-1: Mammal Monitoring locations

## 5.2.5 Biodiversity Receptor Evaluation

### Habitats

The nature conservation value of habitats and ecological sites occurring within the proposed site are based upon an established geographic hierarchy of importance as outlined by the National Roads Authorities (NRA, 2009). The outline of this geographic hierarchy is provided below and this has been used to determine ecological value in line with the ecological valuation examples provided by the NRA (see NRA, 2009). The geographic evaluation hierarchy is as follows:

- International Sites (Rating A);
- National Importance (Rating B);
- County Importance (Rating C);
- Local Importance (higher value) (Rating D); and
- Local Importance (lower value) (Rating E)

Importance	Criteria
<b>International Importance (Rating A)</b>	<ul style="list-style-type: none"> <li>• 'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation.</li> <li>• Proposed Special Protection Area (pSPA).</li> <li>• Site that fulfils the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended).</li> <li>• Features essential to maintaining the coherence of the Natura 2000 Network.</li> <li>• Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive.</li> <li>• Resident or regularly occurring populations (assessed to be important at the national level) of the following:               <ul style="list-style-type: none"> <li>○ Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or,</li> <li>○ Species of animal and plants listed in Annex II and/or IV of the Habitats Directive.</li> </ul> </li> <li>• Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971).</li> <li>• World Heritage Site (Convention for the Protection of World Cultural &amp; Natural Heritage, 1972).</li> <li>• Biosphere Reserve (UNESCO Man &amp; The Biosphere Programme).</li> <li>• Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979).</li> <li>• Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979).</li> <li>• Biogenetic Reserve under the Council of Europe.</li> <li>• European Diploma Site under the Council of Europe.</li> <li>• Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).</li> </ul>
<b>National Importance (Rating B)</b>	<ul style="list-style-type: none"> <li>• Site designated or proposed as a Natural Heritage Area (NHA).</li> <li>• Statutory Nature Reserve.</li> <li>• Refuge for Fauna and Flora protected under the Wildlife Acts.</li> <li>• National Park.</li> </ul>



	<ul style="list-style-type: none"> <li>• Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park.</li> <li>• Resident or regularly occurring populations (assessed to be important at the national level) of the following: <ul style="list-style-type: none"> <li>• Species protected under the Wildlife Acts; and/or,</li> <li>• Species listed on the relevant Red Data list.</li> <li>• Site containing 'viable areas' of the habitat types listed in Annex I of the Habitats Directive.</li> </ul> </li> </ul>
<b>County Importance (Rating C)</b>	<ul style="list-style-type: none"> <li>• Area of Special Amenity.</li> <li>• Area subject to a Tree Preservation Order.</li> <li>• Area of High Amenity, or equivalent, designated under the County Development Plan.</li> <li>• Resident or regularly occurring populations (assessed to be important at the County level) of the following: <ul style="list-style-type: none"> <li>• Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;</li> <li>• Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;</li> <li>• Species protected under the Wildlife Acts; and/or</li> <li>• Species listed on the relevant Red Data list.</li> </ul> </li> <li>• Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance.</li> <li>• County important populations of species; or viable areas of semi-natural habitats; or natural heritage features identified in the National or Local BAP; if this has been prepared.</li> <li>• Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county.</li> <li>• Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.</li> </ul>
<b>Local Importance (Higher Value) (Rating D)</b>	<ul style="list-style-type: none"> <li>• Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared.</li> <li>• Resident or regularly occurring populations (assessed to be important at the Local level) of the following: <ul style="list-style-type: none"> <li>• Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;</li> <li>• Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;</li> <li>• Species protected under the Wildlife Acts; and/or</li> <li>• Species listed on the relevant Red Data list.</li> </ul> </li> <li>• Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality.</li> <li>• Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.</li> </ul>
<b>Local Importance (Lower Value) (Rating E)</b>	<ul style="list-style-type: none"> <li>• Sites containing small areas of semi-natural habitat that are of some local importance for wildlife.</li> <li>• Sites or features containing non-native species that is of some importance in maintaining habitat links.</li> </ul>

### **Birds**

The evaluation of the avifauna recorded at the project site during the baseline surveys is also informed by the approach detailed by Percival (2003). This approach defines the sensitivity of a species and bird assemblage as the ecological importance and nature conservation interest at the site being assessed. The ecological importance and nature conservation interest is determined by a number of factors including:

- whether the species is on Annex 1 of the EC Birds Directive;
- whether the area being assessed is subject to any nature conservation designations;
- whether the species is particularly ecologically sensitive: this includes larger birds of prey and rare breeding birds (including divers, common scoter, hen harrier, golden eagle, red-necked phalarope, roseate tern and chough);
- whether the site contains species at nationally important numbers (>1% of Irish population);
- whether the site contains species at regionally important numbers (>1% of regional population, with the region usually taken as the county); and
- whether the species is subject to special conservation measures, e.g. as red or amber species on the BirdWatch Ireland's (Newton et al. 1999) list of Birds of Conservation Concern.

The determination of sensitivity is summarised, as per Percival (2003), in Table 5-2 below.

*Table 5-2: Criteria for Ranking Bird Sensitivity*

<b>Sensitivity</b>	<b>Determining Factor</b>
<b>Very High</b>	Species listed as qualifying interests for SPAs and other statutorily protected nature conservation areas.
<b>High</b>	Species that contribute to the integrity of an SPA but which are not listed as qualifying interests for which the site is designated. Ecologically sensitive species including the following: Red Grouse; hen harrier; and golden eagle. Species present in nationally important numbers (>1% Irish population).
<b>Medium</b>	Species on Annex 1 of the EC Birds Directive Species present in regionally important numbers (>1% regional (county) population) Other species on BirdWatch Ireland's red list of Birds of Conservation Concern
<b>Low</b>	Any other species of conservation interest, including species of BirdWatch Ireland's amber list of Birds of Conservation Concern does not cover above.

### **Bats**

The approach outlined by Kepel (2011) to quantifying bat activity has been used to evaluate the level of bat activity recorded at and surrounding the proposed development site and the importance of the proposed development site and surrounding area as a foraging resource for bats. EcoBat the online bat activity analysis tool provided by the Mammal Society also provides another standardised method for evaluating bat activity levels recorded during bat surveys. However at the time of writing this tool was not available due to maintenance upgrades being undertaken by the Mammal Society.

The Kepel approach is based on assigning the number of bat passes recorded per hour per night of each monitoring session to an activity category. Kepel has assigned the number of passes per hour to three activity categories. These activity categories are as follows:

- Pipistrelle species and Leisler's bat: Low = <3.5 passes per hour; Moderate = 3.6 – 6.5 passes per hour; High = >6.5 passes per hour.
- All Other Bat species: Low = <4.0 passes per hour; 4.1 to 10 passes per hour; high = >10 passes per hour.

The median bat pass per hour per night for each species recorded during bat activity surveys has been used to assign bat activity levels in line with the Kepel approach. Median bat pass per hour per night is used during this analysis as it is recognised as providing a more accurate representation of activity, as bat activity levels between nights can be highly variable and thus the median provides a more reliable value than the mean or maximum (Lintott & Matthews, 2018).

### ***Non-Volant Mammals***

The nature conservation value of non-volant mammal populations recorded during field surveys has been assigned in accordance with the criteria set out by the TII 2009 guidance document.

## **5.2.6 Impact Assessment Methodology**

The 'zone of influence' for a development is the area over which ecological features may be subject to significant impacts as a result of the Development and associated activities. The Zone of Influence (Zol), or distance over which a likely significant effect may occur will differ across the Ecological Receptors identified for the proposed Development, depending on the potential impact pathway(s). The results of both the desk study and the suite of ecological field surveys undertaken has established the habitats and species present at and surrounding the Site. The Zol is then informed and defined by the sensitivities of each of the ecological receptors present, in conjunction with the nature and potential impacts associated with the Development.

The Zol of the proposed development in relation to terrestrial habitats is generally limited to the footprint of the proposed development, and the immediate environs. Disturbances to the hydrological regime of wetland/aquatic habitats from impact sources can often result in impacts occurring at distances beyond the immediate adjacent areas of the impact source. For instance the distances over which aqueous pollutants are likely to remain at concentrations that have potential to result in perturbations to water quality and associated wetland/terrestrial habitats is difficult to quantify. The potential for such effects to occur are also highly site-specific and related to the predicted magnitude of any pollution event. The impact of a pollution event will depend on the volumes of discharged waters, concentrations and types of pollutants (in the case of the proposed development these being comprised of sediment, hydrocarbons, cement-based products and other related construction solutions), volumes of receiving waters, and the sensitivity of the ecology of the receiving waters. With respect to the Development, this includes all freshwater habitats and fauna at and downstream of the Development that have been identified as ecological receptors.

The Zol for terrestrial mammals in terms of potential impacts to breeding and resting places is 150m from the Development. This distance is in line with the maximum distance for potential disturbance to terrestrial mammals (otters and badgers) as specified by TII guidance documentation (NRA, 2009 a & b).

The Zol for birds is species-specific and relates to the assemblage of avifauna recorded at Suir Island and their sensitivity to disturbance. Nature Scotland (2022) have published a review of disturbance distances for a range of bird species listed on Annex 1 of the EC Birds Directive. The habitat occurring at Suir Island is not suitable for many of these species e.g. waders, geese etc.. However suitable breeding and foraging habitat for wildfowl such as mallard; suitable foraging habitat for kingfisher; and suitable breeding and foraging habitat for songbirds/passerines occur at Suir Island. Both mallard and kingfisher are listed on Annex 1 of the EC Birds Directive and disturbance distances have been assigned for both these species in the Nature Scotland (2022) publication. The only passerine species for which



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Nature Scotland (2022) have assigned disturbance distances are crested tit and crossbill. For the purposes of this assessment and defining the Zol for birds the disturbance distance for crested tit and crossbill is applied for the range of passerines occurring at Suir Island.

The disturbance distance sensitivity assigned for mallard is medium between 50m to 500m; for kingfisher is low to medium <50m to 500m; and for passerines (based on crested tit and crossbill) is <50m. In light of the above the Zol of the proposed development for birds is up to 500m.

The Zol for herpetofauna is considered to be limited to the direct habitat loss arising from the Development.

### **Identification & Characterisation of Effects**

When describing the scale of ecological impacts reference should be made to the following characteristics:

- Positive or negative
- Extent: the size of the affected area/habitat and/or the proportion of a population affected by the effect
- Duration: the period of time over which the impact will occur. The EPA's guidelines on information to be included in Environmental Impact Assessment Reports (EPA, 2022) sets out the following terms for defining the duration of an impact: Momentary Effects - effects lasting from seconds to minutes; Brief Effects - effects lasting less than a day; Temporary Effects - effects lasting less than a year; Short-term Effects - effects lasting one to seven years; Medium-term Effects - effects lasting seven to fifteen years; Long-term Effects - effects lasting fifteen to sixty years; Permanent Effects - effects lasting over sixty years.
- Frequency & Timing: how often the effect will occur; particularly in the context of relevant life-stages or seasons; and,
- Reversibility: will the effect be permanent or temporary. Will an impact reverse, either spontaneously or as a result of a specific action.

The assessment describes those characteristics relevant to understanding the ecological effect and determining the significance, and as such it does not need to incorporate all stated characteristics (CIEEM, 2018 v.1.1).

### **Significant Effects on Ecological Receptors**

For the purpose of Ecological Impact Assessment, a 'significant effect', is an effect to an ecological feature from an impact, that either supports or undermines biodiversity conservation objectives for those ecological features which have been identified as important. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/local nature conservation policy). As such, effects can be considered significant in a wide range of geographic scales from international to local. Consequently, 'significant effects' should be qualified with reference to the appropriate geographic scale (CIEEM, 2018 v.1.1).

In order to predict likely ecological impacts and effects, the assessor must take account of the relevant aspects of the ecosystem structure and function, which include (CIEEM, 2018 v.1.1):

- The resources available (e.g. territory, prey availability, habitat connectivity etc.);
- Environmental processes (e.g. eutrophication, drought, flooding etc.);
- Ecological processes and relationships (e.g. population / vegetation dynamics, food webs etc.);

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- Human influences (e.g. fertilisation, turbary, grazing, burning etc.);
  - Historical context (natural range, trends etc.);
  - Ecosystem properties (e.g. the carrying capacity, fragility etc.); as well as,
  - Other environmental influences such as air quality, hydrology, water quality, nutrient inputs and salinity etc.

The determination of significance is made in line with the terminology set out in the EPA's guidelines on information to be included in Environmental Impact Assessment Reports. These criteria are as follows:

- No change – no discernible change in the ecology of the affected features
- Imperceptible effect - An effect capable of measurement but without noticeable consequences
- Not Significant - An effect which causes noticeable changes in the character of the environment but without significant consequences.
- Slight effect - An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
- Moderate effect - An effect that alters the character of the environment that is consistent with existing and emerging trends.
- Significant effect - An effect which, by its character, its magnitude, duration or intensity alters a sensitive aspect of the environment
- Very Significant - An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment
- Profound effect - An effect which obliterates sensitive characteristics

### ***Integrity***

The integrity of an ecological receptor refers to the coherence of the ecological structure and function that enables the ecological receptor to be sustained (NRA, 2009). The term 'integrity' is most often used when determining impact significance in relation to designated areas for nature conservation (e.g. SACs, SPAs or pNHA/NHAs) but can often be the most appropriate method to use for non-designated areas of biodiversity value where the component habitats and/or species exist with a defined ecosystem at a given geographic scale.

An impact on the integrity of an ecological site or ecosystem is considered to be significant if it moves the condition of the ecosystem away from a favourable condition: removing or changing the processes that support the sites' habitats and/or species; affect the nature, extent, structure and functioning of component habitats; and/or, affect the population size and viability of component species.

### ***Conservation Status***

An impact on the conservation status of a habitat or species is considered to be significant if it will result in a change in conservation status.

As per the definitions provided in the EU Habitats Directive, the conservation status of a habitat is favourable when:

- Its natural range and areas it covers within that range are stable or increasing
- 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
- The conservation status of its typical species is favourable as defined below under species

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The conservation status of a species is favourable when:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis

According to the TII/CIEEM methodology, if it is determined that the integrity and/or conservation status of an ecological feature will be impacted on, then the level of significance of that impact is related to the geographical scale at which the impact will occur (i.e. local, county, national, international). In some cases, an impact may not be significant at the geographic scale at which the ecological feature has been valued but may be significant at a lower geographical level. For example, a particular impact may not be considered likely to have a negative effect on the overall conservation status of a habitat which is considered to be internationally important. However, an impact may occur at a lower geographic scale on this internationally important habitat. Under such a scenario, such an impact on an internationally important habitat is considered to be significant only at the lower scale e.g. local, county, rather than international scale.

### ***Cumulative Effects***

Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location (CIEEM, 2018 v.1.1). Different types of actions can cause cumulative impacts and effects. As such, these types of impacts may be characterised as;

- Additive/incremental – in which multiple activities/projects (each with potentially insignificant effects) add together to contribute to a significant effect due to their proximity in time and space (CIEEM, 2018 v.1.1); and,
- Associated/connected – a development activity ‘enables’ another development activity e.g. phased development as part of separate planning applications. Associated developments may include different aspects of the project which may be authorised under different consent processes. It is important to assess the potential impacts of the ‘project’ as a whole and not ignore impacts that fall under a separate consent process (CIEEM, 2018 v.1.1).

### ***Residual Effects***

After characterising the potential impacts of the Development and assessing the potential effects of these impacts on the ‘Important ecological features’, mitigation measures are proposed to avoid and / or mitigate the identified ecological effects. Once measures to avoid and mitigate ecological effects have been finalised, assessment of the residual impacts and effects should be undertaken to determine the significance of their effects on the ‘Important ecological features’.

## **5.3 Receiving Environment**

### **5.3.1 Site Overview**

The site is centred on Suir Island at the centre of Clonmel. On the north side of the project area at The Quay urban land use associated with the town centre of Clonmel dominates the land cover. To the south of the project site Raheen Road and Denis Burke Park dominate the land cover. The River Suir north and south channel separate Suir Island from The Quay and Raheen Road to the north. Suir Island is a low-lying island, historically consisting of four islands: Little Island, Suir Island, Willow Island and Stretches Island. It has been an important crossing point since medieval times, linking the Anglo-Norman walled town of Clonmel to County Waterford on the southern side of the river. The island is accessible from the town centre via the Old Bridge to the islands’ northwest. The ruins of Suir Island House

(Protected Structure) are located at the southwestern corner of the island. The site is replete with remnants of industrial and architectural heritage such as walls, steps, paving slab details, gate piers and other fragments, all of which enhance the site's character. Industry at Suir Island dates back to the 18th Century with mills, factories, warehouses and other structures occupying a significant portion of the island. Today remnants of these structures contribute to the island's particular and unique character. Suir Island House (Protected Structure) is listed on the National Inventory of Archaeological Heritage. The north-western portion of the island is given over to urban land use with car parking and existing buildings occurring. A flood berm surrounds the car park on the island to the east, south and north. East of the flood berm the island is dominated by woodland habitats in the form of scrub and broad-leaved woodland.

The project site at the west of Suir Island is prone to flooding, while the eastern end of the island, to the east of the project site, experiences regular flooding and under more extreme conditions the Suir Island Gardens site to the west can be submerged.

### 5.3.2 Designated Conservation Areas

The Lower River Suir SAC surrounds the project site with portions of the project occurring within the boundary of this SAC. The proposed northern and southern bridge sections occur within the boundary of the Lower River Suir SAC. Approximately 43m of the northern bridge section is located within the SAC boundary while approximately 47m of the southern bridge section is located within the SAC boundary. The extent of the Suir Island Infrastructure Links within the SAC is indicated on Figure 5-2.

The Lower River Suir SAC is the only European Site occurring within or in proximity to the proposed development. All other European Sites are located at a remote distance from the proposed development site and are not connected to it via pathways such as hydrological pathways. For instance, the next most proximate European Site to the proposed development site is the Nier Valley Woodlands SAC, located approximately 8.5km to the south (see Figure 5-3).

There are no SPAs occurring in the wider area surrounding the project site, with the nearest being the Dungarvan Harbour SPA, located approximately 30km to the south of the project site. This SPA is designated for its role in supporting populations of overwintering waterbirds such as wildfowl and waders. None of these species for which this SPA is designated have been recorded at or in the vicinity of Suir Island and there is no suitable habitat occurring in the vicinity of the project site for the special conservation interest bird species of this SPA. Furthermore the project site is located outside the published foraging distance range of these species (SNH, 2016).

There are no NHAs occurring at or in the vicinity of the project site and the nearest NHA to the proposed development site is the Slievenamon Bog NHA, located approximately 10km to the northeast. There are no pathways connecting the proposed development site to this NHA.

There are no pNHAs occurring at or in the vicinity of the proposed development site and the nearest pNHA is the Marlfield Lake pNHA, located approximately 3km to the west of the project site. There are no pathways connecting the proposed development site to this pNHA.

All NHAs and pNHAs occurring within the wider area of the proposed development site are shown on Figure 5-4.

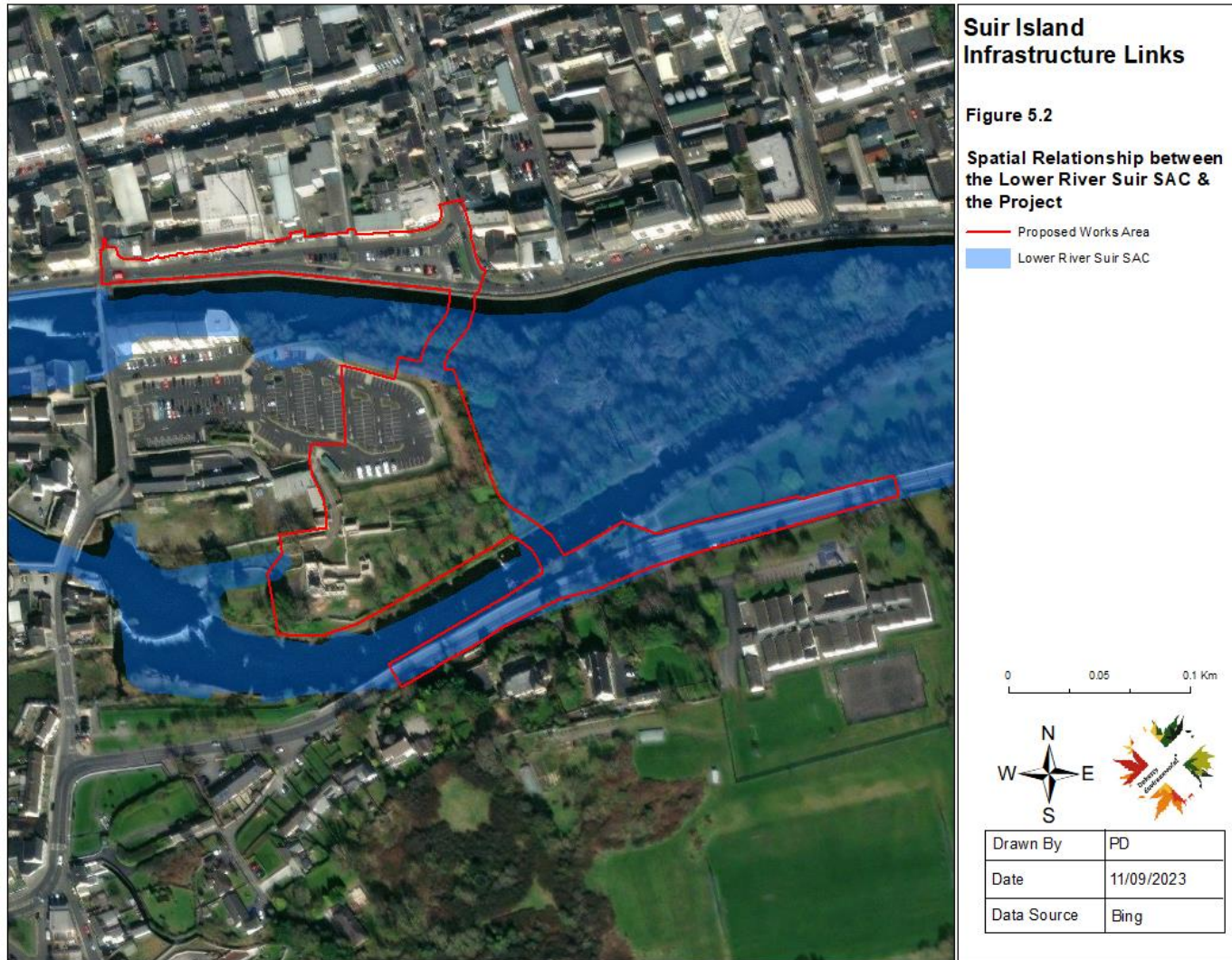


Figure 5-2: Spatial Relationship between the Lower-River Suir SAC & proposed development

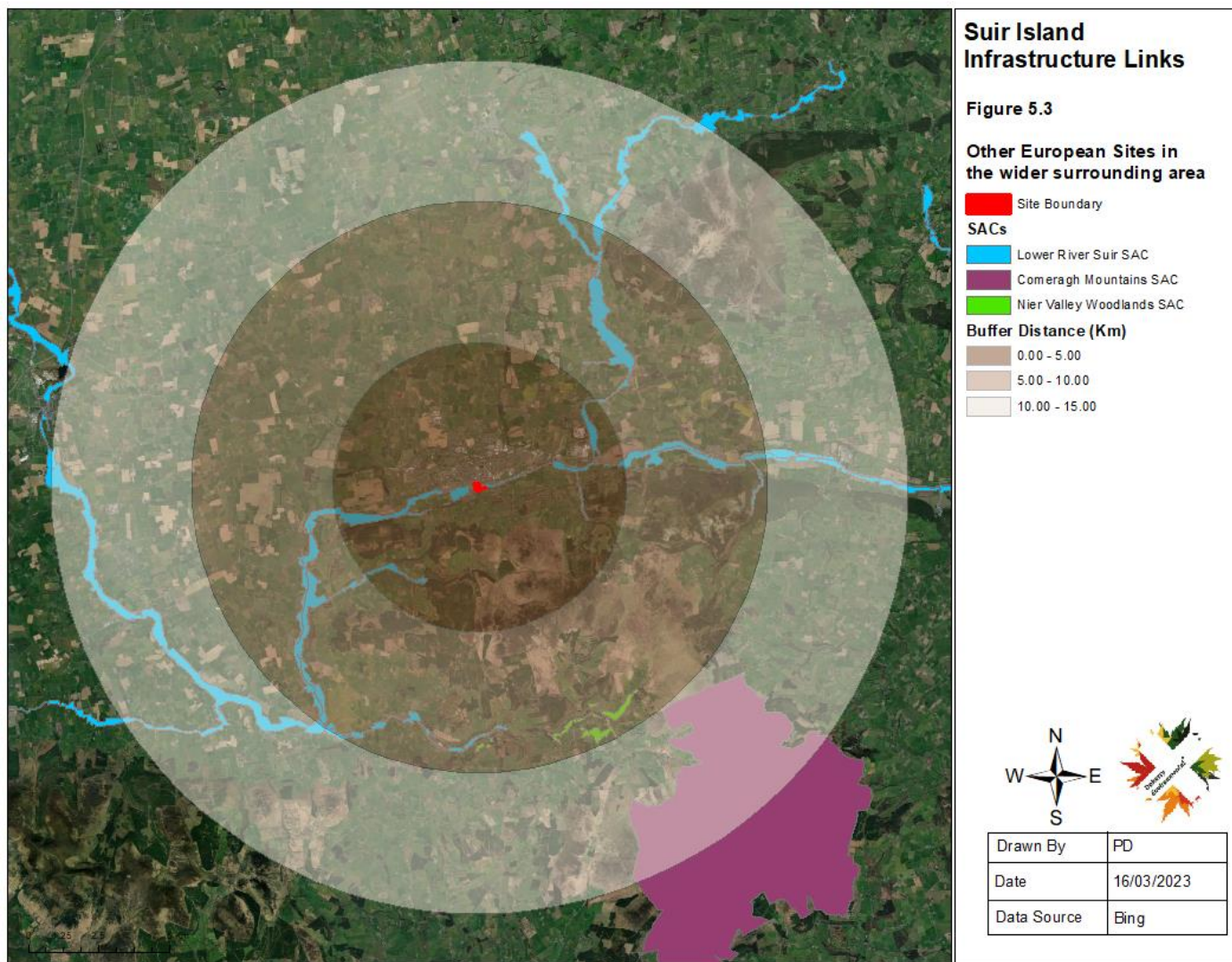


Figure 5-3: Other European Sites in the wider surrounding area

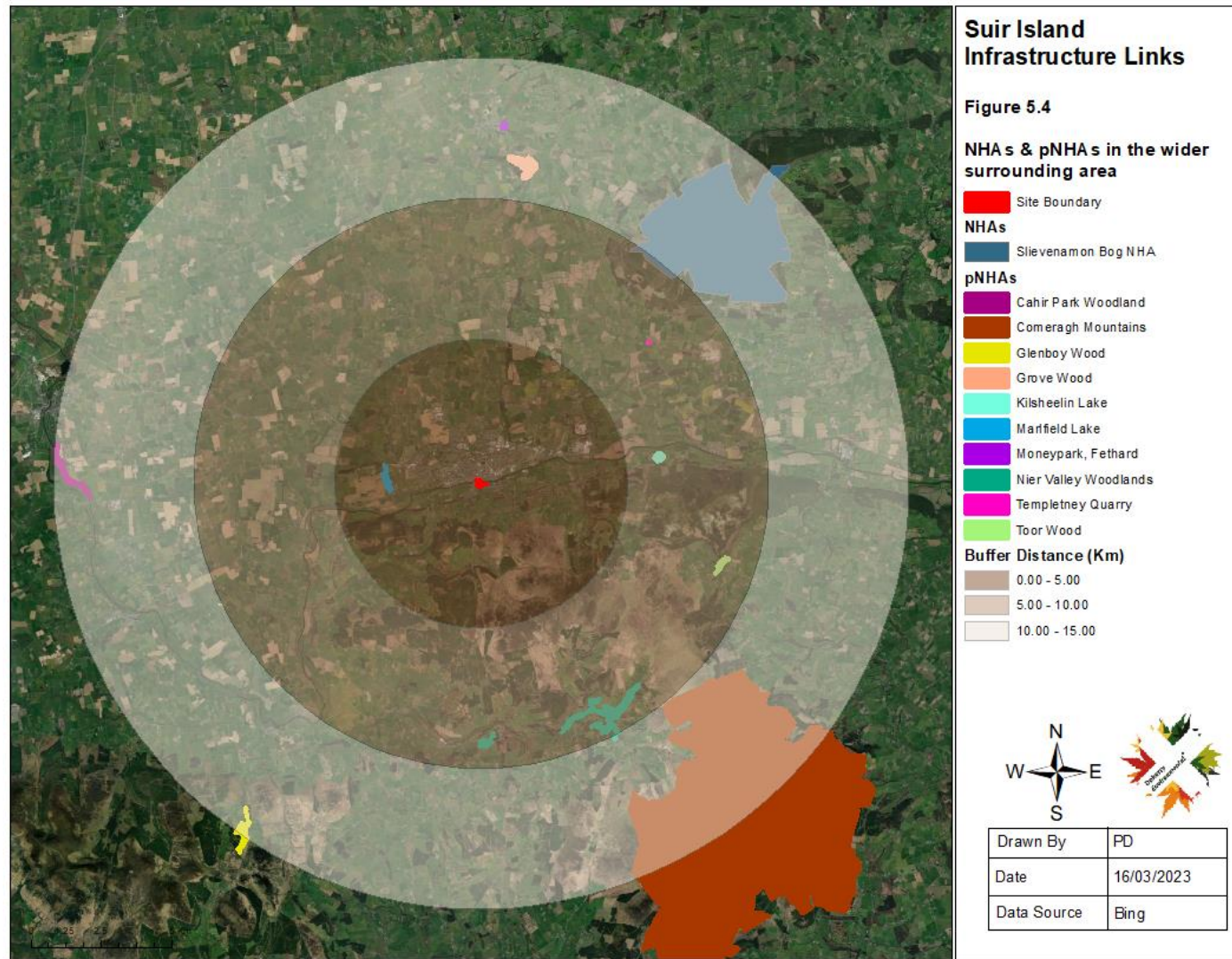


Figure 5-4: NHAs & pNHAs in the wider surrounding area

### 5.3.3 Rare, Threatened or Protected Species

A search of the National Biodiversity Data Centre (NBDC) for records of rare and/or threatened species previously identified within and in the vicinity of the project site was completed in July 2023. All records held by the NBDC for an area of search surrounding the proposed development site and the wider surrounding area were downloaded from the NBDC. The extent of this area of search is shown on Figure 5-5, and this includes all lands within a 500m distance of the project site. The 500m buffer distance is underpinned by the zone of influence of the project for fauna, as outlined in Section 5.2.6 above. The area of search for species records along the River Suir, as shown on Figure 5-5 was extended to a distance of 1km upstream and downstream of the project site. As noted in Section 5.2.6 above it is acknowledged that the zone of influence for freshwater habitats and species can extend further downstream, depending upon those factors outlined in Section 5.2.6. However it is considered that those freshwater species occurring in the immediate vicinity of the project site will be most at risk in the event of impacts to freshwater habitats and water quality and as such the area of search was limited to a distance of 1km.

The rare, threatened and protected species identified as occurring within this area of search are listed in Table 5-4 below and a comment on the project site's potential to support these species is also provided. It is noted that the majority of bird species in Ireland are afforded protection under the Wildlife Acts as amended. However only those species that have been identified as rare, threatened (i.e. Amber or Red listed species on the Birds of Conservation Concern in Ireland) and protected under EU legislation are listed in Table 5-3 below. In addition to the rare, threatened or protected species, records for non-native invasive species occurring within the area of search are also listed on Table 5-3 and a comment on their presence or potential to occur within the project site is also set out.



*Figure 5-5: Area of Search shown in Red for Records of Rare, Threatened or Protected species held by the NBDC.*



*Table 5-3: Records of rare, threatened or protected & potential for project description site to support these species*

Species Group	Species name	Date of last record	Designation	Potential for the proposed development footprint to support the species
<b>amphibian</b>	Common Frog (Rana temporaria)	10/12/2002	Protected Species: Wildlife Acts	Suitable habitat in backwater depressions at north side of the island in depressions to east of proposed development site. Suitable wet woodland to the east.
<b>bird</b>	Barn Swallow (Hirundo rustica)	29/07/2016	Protected Species: Wildlife Acts; Threatened Species: Birds of Conservation Concern - Amber List	Suitable foraging habitat
<b>bird</b>	Common Starling (Sturnus vulgaris)	20/05/2016	Protected Species: Wildlife Acts; Threatened Species: Birds of Conservation Concern - Amber List	Suitable habitat
<b>bird</b>	Common Swift (Apus apus)	19/06/2016	Protected Species: Wildlife Acts; Threatened Species: Birds of Conservation Concern - Amber List	Suitable foraging habitat. Suitable nesting habitat in the old mill buildings to the west
<b>bird</b>	House Sparrow (Passer domesticus)	20/05/2016	Protected Species: Wildlife Acts; Threatened Species: Birds of Conservation Concern - Amber List	Suitable foraging habitat. Suitable nesting habitat in the old mill buildings to the west
<b>bird</b>	Mute Swan (Cygnus olor)	18/12/2015	Protected Species: Wildlife Acts; Threatened Species: Birds of Conservation	Suitable foraging and nesting habitat to the east in fringing woodland habitat

Species Group	Species name	Date of last record	Designation	Potential for the proposed development footprint to support the species
			Concern - Amber List	
bird	Sand Martin (Riparia riparia)	21/05/2016	Protected Species: Wildlife Acts; Threatened Species: Birds of Conservation Concern - Amber List	Suitable foraging habitat
flowering plant	Cornflower (Centaurea cyanus)	16/08/2020	Threatened Species: Regionally Extinct	Limited suitable habitat. Associated with arable land and open unshaded conditions. Suitable conditions present along the berm embankment and along the southern bankside of the River Suir south channel.
insect - hymenopteran	Large Red Tailed Bumble Bee (Bombus (Melanobombus) lapidarius)	28/05/2021	Threatened Species: Near threatened	Suitable habitat occurs within vegetated areas of Suir Island.
terrestrial mammal	Eurasian Pygmy Shrew (Sorex minutus)	02/04/2017	Protected Species: Wildlife Acts	Suitable habitat in woodland and riparian fringing habitat.
terrestrial mammal	European Otter (Lutra lutra)	31/07/2018	Protected Species: EU Habitats Directive    Protected Species: EU Habitats Directive >> Annex II    Protected Species: EU Habitats Directive >> Annex IV    Protected Species: Wildlife Acts	Suitable habitat along the River Suir and fringing riparian habitat of Suir Island.
terrestrial mammal	West European Hedgehog (Erinaceus europaeus)	10/07/2017	Protected Species: Wildlife Acts	Suitable habitat in woodland and riparian fringing habitat.

Species Group	Species name	Date of last record	Designation	Potential for the proposed development footprint to support the species
<b><i>Non-native Invasive Species</i></b>				
<b>flowering plant</b>	Giant Hogweed (Heracleum mantegazzianum)	30/06/2009	Third Schedule European Communities (Birds and Natural Habitats) Regulations 2011	Present on Suir island and subject to ongoing treatment by Tipperary County Council. Not recorded within the footprint of the project during site surveys (see Figure 5-6).
<b>flowering plant</b>	Japanese Knotweed (Fallopia japonica)	06/09/2021	Third Schedule European Communities (Birds and Natural Habitats) Regulations 2011	Present on Suir island and subject to ongoing treatment by Tipperary County Council. Not recorded within the footprint of the project during site surveys (see Figure 5-6).
<b>flowering plant</b>	Butterfly-bush (Buddleja davidii)	25/06/2021	-	Present on Suir island and subject to ongoing treatment by Tipperary County Council. Recorded within the project footprint during site surveys (see Figure 5-6).
<b>flowering plant</b>	Common Broomrape (Orobanche minor)	26/06/2020	-	
<b>flowering plant</b>	Himalayan Honeysuckle (Leycesteria formosa)	25/06/2021	-	Present on Suir Island and recorded within the project footprint during site surveys (see Figure 5-6).
<b>flowering plant</b>	Japanese Honeysuckle (Lonicera japonica)	26/02/2005	-	
<b>flowering plant</b>	Least Duckweed (Lemna minuta)	25/07/2007	-	Lemna species recorded in stagnant mill race during site surveys and species is

Species Group	Species name	Date of last record	Designation	Potential for the proposed development footprint to support the species
				likely to be present at this location (see Figure 5-6).
<b>flowering plant</b>	Pampas-grass (Cortaderia selloana)	26/02/2005	-	Not recorded on Suir Island.
<b>flowering plant</b>	Sycamore (Acer pseudoplatanus)	25/06/2021	-	Present throughout Suir Island and within the project footprint during site surveys.
<b>fungoid</b>	Aphanomyces astaci	31/05/2017	-	Freshwater species responsible for crayfish plague. Has been previously recorded along the River Suir between Clonmel and Carrick-on-Suir.
<b>terrestrial mammal</b>	Eastern Grey Squirrel (Sciurus carolinensis)	30/10/2018	Third Schedule European Communities (Birds and Natural Habitats) Regulations 2011	Not recorded on Suir Island during site surveys. Suitable habitat present on the island and within the project footprint.
<b>terrestrial mammal</b>	Greater White-toothed Shrew (Crocidura russula)	14/10/2019	-	Not recorded on Suir Island during site surveys. Suitable habitat present on the island and within the project footprint.

#### 5.3.4 Habitats

The habitats occurring within the landholding in which the proposed development is located have been identified to Level 3 of the Guide to Habitats in Ireland (2000). Figure 5-6 provides a habitat map showing the location and extent of habitats occurring within the landholding. The following sub-sections describe each of the habitats occurring within the landholding.

##### ***Eroding River FW1***

The River Suir channel to the south and north of Suir Island is an example of a lowland depositing river. A high bed gradient occurs along the section of the river channels to the north and south of the island resulting in high flow rates and eroding conditions. Instream habitats area dominated by fast flowing riffles and glide habitat. The presence of exposed rock along the southern channel installed as part of the canoe slalom has led to an increase in riffle habitat along this section of the river. The river bed consists of gravel and cobble.

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#### Nature conservation value

The River Suir and the example of eroding river occurring to the north and south of Suir Island and to be crossed by the proposed pedestrian bridges form part of the Lower River Suir SAC and are of international conservation value (Rating A).

#### **Canal Millrace FW3**

The canal millrace supports a stand of stagnant water at the western extent of the millrace as shown on Figure 5-6. To the east the millrace is ephemeral and subject to complete drying out during drier periods. The section to the west where stagnant water persists throughout the year is colonised by excessive microphyte growth in the form of *Lemna* species and *Callitriche* species. The surface of the water is entirely colonised by these species during the growing season resulting in low light penetration and low oxygen levels within the millrace. Due to the stagnant condition in the millrace it is of limited potential for supporting aquatic fauna.

#### Nature conservation value

The nature conservation value of the millrace is representative of a habitat of Local importance (lower value) (Rating E).

#### **Reed & Large Sedge Swamp FS1**

A minor stand of reed and large sedge swamp occurs along the southern bankside of the River Suir adjacent to the Raheen Road. This small example of fringing reed swamp has developed since the completion of the canoe slalom course and the installation of slalom rocks upstream and downstream of this habitat. The vegetation is dominated by *Phragmites australis* and *Phalaris arundinacea* with *Glyceria fluitans* and *Urtica dioica* also frequent. Other species occurring include *Mentha aquatica*, *Lythrum salicaria*, *Angelica sylvestris*, *Epilobium hirsutum* and *Calystegia sepium*.

#### Nature conservation value

The example of reed and large sedge swamp habitat occurring along the right-hand bankside of the south channel of the river Suir is limited in extent and relatively species poor. Overall this example of reed and large sedge swamp is representative of a restricted example of a semi-natural habitat and is considered to be of local importance (higher value) (Rating D).

#### **Amenity grassland GA2**

The examples amenity grassland occurring within the project site are restricted to the southern bankside of the River Suir within Dennis Burke park. This is an intensively managed grassland habitat that is subject to routine and frequent management. It supports a grassland sward of *Festuca rubra*, *Agrostis* species, *Poa* species and commonly occurring herbs such as *Ranunculus repens*, *Trifolium repens*, *Trifolium pratense*, *Taraxacum officinalis* agg. and *Bellis perennis*.

#### Nature conservation value

The amenity grassland habitat occurring within the project site is representative of an intensively managed grassland habitat of low diversity supporting high levels of human activity. It is considered to be representative of habitat of Local importance (lower value).

#### **Dry meadows and grassy verges GS2**

The examples of dry meadows and grassy verges habitat occurring within the project site occur along the flood berm embankment and verging existing trails along the southern side of Suir Island.

The vegetation occurring along the berm includes dense stands of *Cirsium arvense* along with spreading and prostrate *Rubus fruticosus* agg. . other species occurring include *Stachys sylvatica*, *Vicia sepium*, *Trifolium repens*, *Trifolium pratense*, *Ranunculus repens*, *Calystegia sepium*, *Lotus corniculatus*,

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*Sonchus arvensis*, *Plantago lanceolata*, *Bellis perennis*, *Tripleurospermum inodorum*, *Rumex acetosa*, *Juncus inflexus*, *Festuca rubra*, *Agrostis stolonifera*, *Dactylus glomerata* and *Poa trivialis*.

Vegetation occurring along the grassy verge bounding the existing paths to the north of the River Suir south channel includes *Arrhenatherum elatius*, *Brachypodium sylvaticum*, *Anthoxanthum odoratum*, *Poa trivialis*, *Agrostis stolonifera*, *Dactylus glomerata*, *Alopecurus pratensis*, *Taraxacum officinalis* agg., *Trifolium pratense*, *Senecio jacobaea*, *Urtica dioica*, *Tussilago farfara*, *Rubus fruticosus* agg., *Cirsium arvense*, *Cirsium vulgare*, *Geranium robertianum*, *Orobanche hederæ*, *Petasites fragrans*, *Senecio jacobaea*, *Plantago lanceolata*, *Epilobium hirsutum*, *Centaurea nigra*, *Conium maculatum*, *Aquilegia vulgaris*, *Securigera varia*, and *Vinca major*. The latter species, which is introduced forms a shrub layer along the northern bankside of the River Suir in places. Other non-native species occurring along this habitat include *Chamerion angustifolium*, *Leycesteria formosa*, *Prunus laurocerasus* and *Clematis vitalba*.

#### Nature conservation value

The example of grassy verge habitat occurring along the berm supports consists of a sward of commonly occurring species that have recently colonised the berm. The sward is dominated in places by spreading *Cirsium arvense* and *Rubus fruticosus* agg. and is of low conservation interest. This example of dry grassy verge is of Local importance (lower value) (Rating E).

The example of grassy verge habitat occurring along the existing track trail on the northern bankside of the River Suir southern channel is generally colonised by commonly occurring species along with stands of non-native species such as *Vinca major*. The presence of other less common species such as *Aquilegia vulgaris* and *Orobanche hederæ* merits further comment. *Aquilegia vulgaris* is a native species and locally common in Ireland. The Atlas of the British and Irish Flora notes that its distribution has increase since the 1962 Atlas presumably because of garden escapes, with the native distribution now totally obscured. The earliest records for *Aquilegia vulgaris* held by the Atlas for the hectad S22 in which the project site is located is from 1970 onwards. Given the above and the former presence of gardens and greenhouses on the island it is likely that the stands of *Aquilegia vulgaris* are associated with former cultivation. *Orobanche hederæ* is an occasional to locally common species in Ireland. There are 9 records held of this species within the hectad in which the project site is located. All are from tetrads occurring along the River Suir. These records have been recorded from 1987 onwards with no earlier records reported on the Atlas of the British and Irish Flora. The Atlas notes that elsewhere within its range in the British Isles this species has been recorded with increasing frequency in artificial habitats, including gardens, where it was probably introduced.

Considering the variety of species occurring within this habitat, some of which are non-native and of low to medium invasiveness, while others are occasional to locally common, this habitat is considered to be of local importance (higher value) (Rating D).

#### **Mixed broad-leaved woodland WD1**

The examples of mixed broad-leaved woodland occurring within the project site are restricted to Suir Island. These are dominated by stands of mature *Acer pseudoplatanus* with *Aesculus hippocastanum* also abundant. Dense stands of *Prunus laurocerasus* occur in the understorey and around the edges of the examples of this habitat to the east and north of the flood embankment berm. The woodland is regenerating with abundant *Acer pseudoplatanus*. Other species occurring within this woodland include *Crataegus mongyna*, *Ilex aquifolium*, *Ulmus glabra*, *Laurus nobilis*, *Fraxinus excelsior*, *Fagus sylvatica*, *Salix* species and the non-native *Buddleja davidii*.

The understorey of the woodland to the east of the berm is depauperate, as a result of previous ground disturbance and the presence of a dense *Acer pseudoplatanus* canopy. Species occurring within the herb layer and at the edges of the woodland include *Urtica dioica*, *Rubus fruticosus* agg., *Calystegia*

*sepium*, *Arrhenatherum elatius*, *Anisantha sterilis*, *Elytrigia repens*, *Petasites hybridus* and *Aegopodium podagraria*. The understorey of the woodland habitat includes *Orobanche hederaceae*, *Hedera helix*, *Heracleum sphondylium*, *Crococsmia x crocosmiiflora*, *Angelica sylvestris*, *Geum urbanum*, *Brachypodium sylvaticum*, *Equisetum arvense*, *Rumex obtusifolius*, *Anthriscus sylvestris*, *Cardamine pratensis*, *Viola riviniana*, *Viola odorata*, *Anthriscus sylvestris*, *Stachys sylvatica*, *Geranium robertianum*, *Carex remota*, *Angelica sylvestris* and *Urtica dioica*.

#### Nature conservation value

This woodland habitat is dominated by non-native tree species in the form of *Acer pseudoplatanus*, *Aesculus hippocastanum*, *Fagus sylvatica* and *Prunus laurocerasus* amongst others. Nevertheless this habitat provides resting, breeding and foraging resources for a range of wildlife occurring at the island and is therefore considered to be of local importance (higher value) (Rating D).

#### **Riparian Woodland WN5**

The riparian woodland to the northeast and east of Suir Island, outside the footprint of the project site is more abundant in native species and whilst still frequently occurring the dominance of *Acer pseudoplatanus* and other non-native species is reduced. However there is widespread regeneration of *Acer pseudoplatanus* seedlings in the shrub layer and it is likely that this species will in time become dominant in the absence of active habitat management. The riparian woodland occupies the sections of the island that are mostly likely to be frequently inundated. Willows are abundant and include *Salix cinerea*, *Salix aurita*, *Salix triandra*, *Salix fragilis* and *Salix viminalis*. *Alnus glutinosa* is present but not frequently in this woodland. Other species occurring include *Populus sp.*, *Ulmus glabra* and *Aesculus hippocastanum*. The sub-canopy shrub layer supports *Sambuca nigra* and *Euonymus europaeus*. The non-native *Cornus sericea* is also present. In the ground layer *Filipendula ulmaria*, *Phalaris arundinacea*, *Urtica dioica*, *Brachypodium sylvaticum*, *Lycopus europaeus*, *Anthriscus sylvestris*, *Oenanthe crocata* and *Angelica sylvestris* all occur. Stands of *Heracleum mantegazzianum* and *Fallopia japonica* occur at the edges of this habitat.

#### Nature conservation value

Examples of riparian woodland habitat, dominated by willows with frequent ash and alder can have links to the EU Habitats Directive Annex 1 habitat alluvial woodland (91E0) (Perrin, 2021). O'Neill & Barron (2013) also noted that ash and alder riparian woodland are the most common type of this Annex 1 habitat occurring in Ireland. For woodland habitats to qualify as an example of alluvial woodland, it needs to pass a number of structure and function criteria of which there are a total of 10 and 8 are required to be passed for the woodland to be representative of this habitat (O'Neill & Barron, 2013). The 10 criteria include the presence of target and other positive indicator species; the low abundance or absence of negative indicator tree species; low abundance of negative indicator herb and shrub species; low abundance of negative indicator regenerating seedlings; comprise a structured canopy; be free of grazing pressure. The riparian woodland habitat on the island passes the criteria for the presence of positive indicator species with target species such as *Salix cinerea*, other *Salix* species, *Fraxinus excelsior* and the presence (albeit low) of *Alnus glutinosa* within the woodland, Other positive indicator herb species presence include *Filipendula ulmaria*, *Mentha aquatica*, *Phalaris arundinacea*, *Angelica sylvestris*, *Carex remota*, *Lycopus europaeus*, *Ranunculus repens* and *Urtica dioica*. However negative indicator species, particularly in the form of *Acer pseudoplatanus*, are present within this habitat and are considered to occupy greater than 10% of the cover within the woodland canopy. Negative indicator species also dominate the shrub layer with stands of *Acer pseudoplatanus* seedlings as well as *Fallopia japonica* and *Heracleum mantegazzianum* occurring. Overall the example of riparian woodland is considered to fail at least three of the criteria for alluvial woodland (91E0), namely negative indicator species, negative species regeneration and native shrub layer cover. In light of this the structure and function conditions required for this woodland to qualify as an example of alluvial woodland are failed.

Notwithstanding this the example of riparian woodland is representative of a semi-natural wet woodland habitat that are becoming increasingly rare in Ireland (Kelly & Iremonger, 1997) and its presence on the island is of conservation interest. This habitat is considered to be of county importance (Rating C).

#### ***Riparian/Mixed Broad-leaved woodland Mosaic***

Examples of riparian/mixed broad-leaved woodland mosaic habitat occurs along a “backwater” depression between an island ridge on the northern bankside of the Suir Island and the main body of the island to the south. The woodland habitat is also present along the southern side of the island. This habitat is dominated by mature non-native broadleaved species comprising *Acer pseudoplatanus*, *Fagus sylvatica* and *Aesculus hippocastanum*. Riparian woodland tree species such as *Salix cinerea*, *Salix aurita*, *Salix triandra* and *Salix fragilis* along with some *Fraxinus excelsior* also occur along with other non-native shrub species such as *Buddleja davidii*, *Prunus laurocerasus* and *Buxus sempervirens* occur. Overall this habitat is dominated by non-native species and is not representative of a native woodland habitat type.

The example of this habitat occurring in the backwater at the northern side of the island supports a hydrophilous understorey with *Phalaris arundinacea*, *Phragmites australis*, *Lycopus europaeus*, *Angelica sylvestris*, *Lythrum salicaria*, *Mentha aquatica*, *Oenanthe crocata*, *Petasites hybridus*, *Rorippa amphibia*, *Iris pseudocorus*, *Solanum dulcamara*, *Myosotis scorpioides*, *Stachys sylvatica* and *Symphytum officinale* occurring.

The shrub and herb layer occurring within the example of this habitat occurring to the south of the island is similar to that described for the mixed broad-leaved woodland above.

#### Nature conservation value

This woodland habitat supports a mix of native and non-native species. The presence of *Symphytum officinale* in the wetter backwater depression in the herb layer in the northern example of this habitat is of interest. This has an occasional distribution in Ireland. This woodland habitat provides important resting, breeding and foraging habitat for a range of fauna. It is considered to be of local importance (higher value) (Rating D).

#### ***Scrub WS1***

The scrub habitat occurring on the island is dominated by stands of *Rubus fruticosus agg.*, *Sambuca nigra*, *Buddleja davidii*, *Prunus laurocerasus*, *Ulex europeus*, *Fallopia japonica* and *Salix* spp. It supports dense stands other herbaceous species such as *Cirsium arvense*, *Calystegia sepium*, *Aegopodium podagraria*, *Heracleum mantegazzianum*, *Urtica dioica* and *Clematis vitalba* in places. It is representative of a pioneering habitat that has colonised previously managed garden areas of Suir Island.

#### Nature conservation value

The scrub habitat is an example of a pioneering habitat that has developed in areas of the previous Suir Island garden. Sections of the habitat have been colonised by *Fallopia japonica* as well as dense stands of other herbaceous species. This habitat is considered to be of Local importance (lower value) (Rating E).

#### ***Recolonising bare ground ED3***

Areas of recolonising bare ground occur surrounding the Suir Island House. This habitat has colonised areas of previous garden that have been disturbed in the recent past. Species occurring within this habitat include *Tussilago farfara*, *Senecio jacobaea*, *Scrophularia auriculata*, *Rumex crispus*, *Rumex obtusifolius*, *Sonchus arvensis*, *Tripleurospermum inodorum*, *Ulex europeus*, *Calystegia sepium*,



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*Urtica dioica*, *Cirsium arvense* and the non-native *Conyza canadensis*, *Buddleja davidii* and *Clematis vitalba*.

#### Nature conservation value

The recolonising bare ground habitat occurring within the project site is a pioneering habitat supporting a number of non-native species of medium-impact invasiveness. This habitat is considered to be of Local importance (lower value) (Rating D).

#### **Other Habitats**

Other habitats occurring on Suir Island and within or adjacent to the project site include buildings and artificial surfaces (BL3), stonewalls (BL1) and exposed rocks along the southern canal of the River Suir which have been installed as part of the canoe slalom course. These habitats support little vegetation cover. They are considered to be of Local importance (lower value) (Rating E) from a botanical perspective.

#### **Non-native Invasive Species**

Both high-impact and medium-impact non-native invasive species have been identified as occurring on Suir Island. The location of non-native invasive species occurring on the island are shown on Figure 5.6. The high-impact species include *Fallopia japonica* and *Heracleum mantegazzianum*. Stands of these species have been identified to the east of the flood berm on Suir Island. The stands of *Fallopia japonica* and *Heracleum mantegazzianum* occurring on the island have been subject to ongoing chemical treatment by Tipperary County Council.

The medium-impact non-native invasive species occurring on Suir Island and within the footprint of the proposed development include *Buddleja davidii*, *Clematis vitalba* and *Leycesteria formosa*. *Prunus laurocerasus* also occurs within the footprint and is widespread and frequently occurring on the island to the east of the flood berm. The low-impact *Petasites fragrans* also occurs throughout the island and study area. The non-native invasive species *Conyza canadensis* also occurs within the proposed development in the vicinity of the millrace.

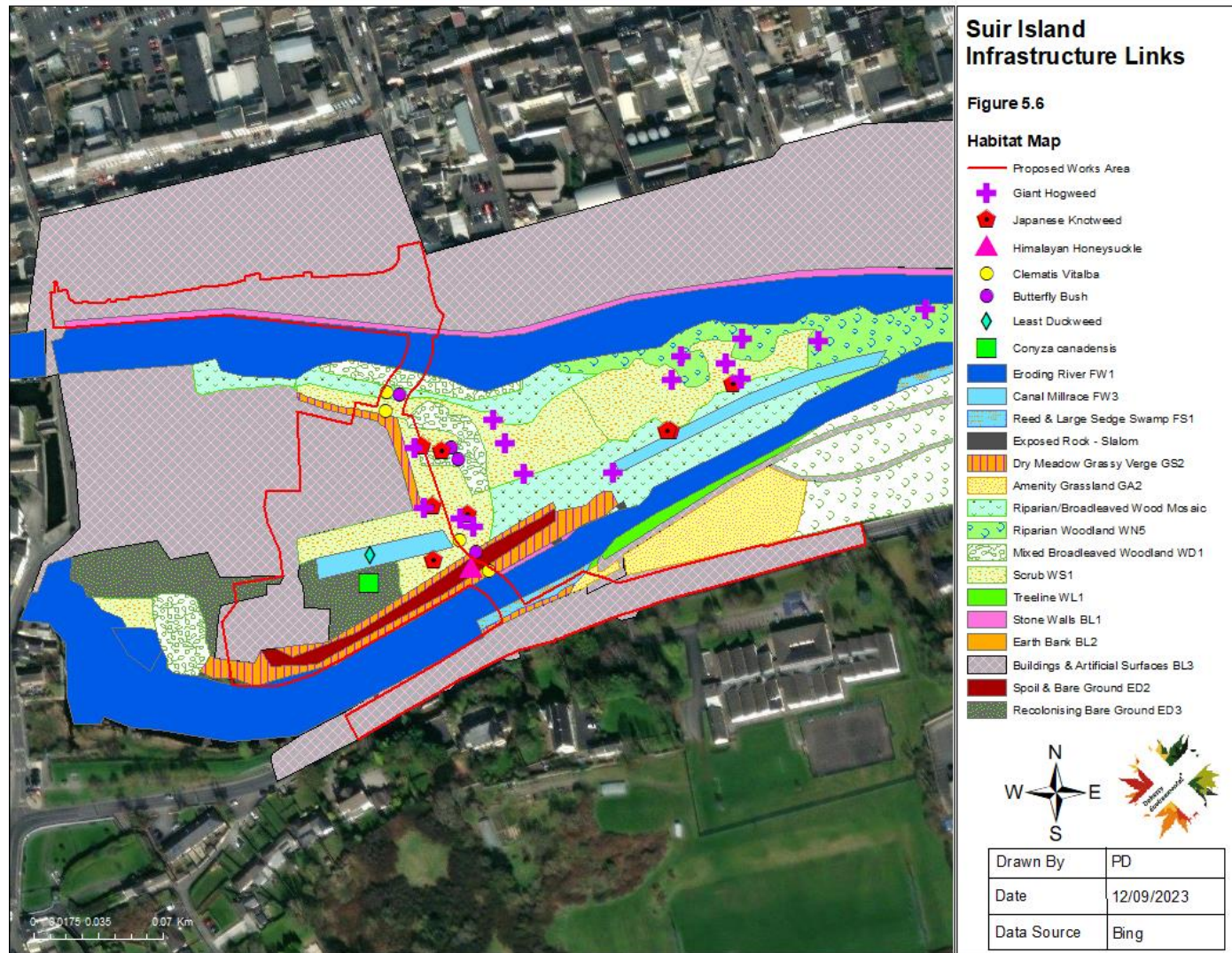


Figure 5-6: Habitat map

### 5.3.5 Fauna

#### *Birds*

A range of bird species were seen and heard on site during the site field surveys completed during the 2021 and 2022 breeding bird season. A total of Species recorded during surveys are listed on Table 5-4 below along with their breeding status, which has been assigned in accordance with the BTO categorisation of breeding status (see **Section 5.2.4** above).

*Table 5-4: Recorded Bird Species, Breeding Status & Conservation Status*

Species	BTO Breeding Status	BOCCI Status
Blackbird	Confirmed	Green
Blackcap	Probably	Green
Blue Tit	Probably	Green
Buzzard	Non-Breeding	Green
Chaffinch	Confirmed	Green
Chiffchaff	Probably	Green
Coal Tit	Probably	Green
Dipper	Non-Breeding	Green
Dunnock	Probably	Green
Grey wagtail	Probably	Green
Goldcrest	Probably	Green
Goldfinch	Probably	Green
Great Tit	Probably	Green
Greenfinch	Confirmed	Amber (Breeding)
Heron	Non-Breeding	Green
Hooded Crow	Non-Breeding	Green
House Sparrow	Probably	Amber (Breeding)
Long-Tailed Tit	Probably	Green
Mallard	Confirmed	Green
Magpie	Probably	Green
Mute swan	Non-Breeding	Amber
Moorhen	Confirmed	Green
Pheasant	Non-Breeding	Green
Robin	Probably	Green
Rook	Non-Breeding	Green
Song Thrush	Probably	Green

<b>Starling</b>	Non-Breeding	Amber (Breeding)
<b>Stonechat</b>	Probably	Green
<b>Swallow</b>	Non-Breeding	Amber (Breeding)
<b>Tree sparrow</b>	Probably	Green
<b>Willow warbler</b>	Probably	Green
<b>Wood Pigeon</b>	Non-Breeding	Green
<b>Wren</b>	Probably	Green

As listed in Table 5-4 above the majority of species recorded on Suir Island during surveys are green listed species of low conservation concern. Five amber-listed species as per the Birds of Conservation Concern in Ireland (BoCCI) were recorded during surveys. These include greenfinch, house sparrow, mute swan, starling and swallow. Greenfinch, house sparrow and starling are likely to breed on Suir Island. Swallow is also likely to be breed on Suir Island in structures to the west of the island and the project site. Mute swam was not recorded breeding on site and was observed at Suir Island during the winter and breeding season. No mute swan nests were observed on the island.

Whilst records for the presence of kingfisher are held for the area of search (see Figure 5-5) no kingfisher were recorded along the stretch of the River Suir to the north and south of Suir Island during field surveys. Kingfishers require vertical or near vertical banksides for nesting and no suitable nesting habitat for this species occurs along the low and gently sloping banks of the River Suir at Suir Island.

#### Nature Conservation Value

No bird species that are representative of high; or very high sensitivity (as classified in Table 5-2 above) were identified as relying on the proposed development site as a breeding site during bird surveys in 2021 or 2022.

Five species of medium conservation concern (amber-listed) and 28 species of low conservation concern (green-listed) were recorded. While the diversity of species occurring on the island is high the sensitivity of the bird population recorded here is classed as low as per Table 5-2 above.

In light of the above it is considered that the proposed development footprint is representative of a site of low sensitivity for birds. Nevertheless, given the diversity of species occurring the bird assemblage is representative of a receptor of local importance (higher value) (Rating D).

#### **Non-volant mammals**

No breeding or resting places of protected non-volant mammals were recorded within the project site or immediately surrounding the project site. Previous walkover surveys completed during August 2017 for the Suir Island Masterplan (2019) reported the presence of an otter holt and sprainting site on the eastern side of the island. No signs of an otter holt at the eastern end of the island were identified during field surveys between 2020 and 2022. A potential otter couch was identified along the northern boundary of the island, approximately 115m to the east of the project site during an initial field survey completed in October 2020. Otter prints were identified on exposed muds along the northern bankside of the island approximately 200m to the east of the project site. However no evidence indicating the presence of otters was recorded at this location during the camera trap survey completed between August and November 2021. On the southern bankside of the island otter spraints were recorded on the steps leading to the river during the 2022 field surveys.

The camera trap installed along the “backwater” depression supporting riparian/mixed broad-leaved woodland habitat did not record any movements of otter activity during the monitoring between August and November 2021. No images of otters were captured from the camera trap installed on the southern side of the island.

No field signs of badger were observed on site during surveys for protected non-volant mammals.

During field surveys in April 2023 two newly established mammal breeding/resting places were noted on the island (see Figure 5-1 for location). The mammal camera traps installed to monitor activity at this location did not identify the presence of any mammals using the entrance towards the eastern end of the island. The camera trap installed to monitor activity at the mammal resting place towards the centre of the island recorded the presence of an adult fox, with images captured of a fox entering and existing the entrance.

Smaller mammals such as hedgehog, shrew etc. are likely to occur within woodland habitats.

#### Nature Conservation Value

Evidence of otter using Suir Island was recorded during field surveys between 2020 and 2022. A holt was previously confirmed to be present on the eastern end of the island during surveys in 2017. The location of this holt site is approximately 275m to the east of the project site. The otter population occurring along the River Suir are a qualifying feature of interest of the Lower River Suir SAC and are therefore of international nature conservation value (Rating A).

Suir Island is likely to support other native and protected smaller mammal species, such as hedgehog, and pygmy shrew and is considered to be of local importance (higher value) (Rating D) for these species.

#### **Bats**

##### ***Bat Habitat Classification***

A review of the national bat landscapes classification layer on Biodiversity Ireland maps by the NBDC shows that the landholding has been assigned a suitability index of 35.33 for all bat species. This is representative of a landscape of medium-high suitability for all bat species. The bat landscapes classification layer assigns an index rating for individual bat species as follows:

- Soprano pipistrelle: Index – 46 – indicative of high landscape suitability for Soprano pipistrelle
- Common pipistrelle: Index – 52 – indicative of high landscape suitability for Common pipistrelle.
- Nathusius pipistrelle: Index – 2 – indicative of low landscape suitability for Nathusius pipistrelle.
- Brown long-eared bat: Index – 56 – indicative of high landscape suitability for brown long-eared bat.
- Leisler's bat: Index – 53 – indicative of high landscape suitability for Leisler's bat.
- Lesser horseshoe bats: Index – 1 – indicative of low landscape suitability for lesser horseshoe bats.
- Daubenton's bat: Index – 35 – indicative of medium to high landscape suitability for Daubenton's bat.
- Natterer's bat: Index – 43 – indicative of high landscape suitability for Natterer's bat.
- Whiskered bat: Index – 30 – indicative of medium to high landscape suitability for Whiskered bat.

### ***Bat Roost Potential***

There are no structures occurring within the footprint of the proposed bridges, promenade/path or the sections of the project site occurring on The Quay and at Raheen Road. Structures occur in the Suir Island garden area. The derelict Suir Island house is the only structure occurring within the site of Suir Island Gardens. The old mill tower is located adjacent to the western boundary of the Suir Island Garden. Both these structures are derelict and draughty. There is no roof remaining on Suir Island house and all voids are exposed. The chimney represents the only remaining section of the structure that provides some shelter. The interior of the mill tower is also draughty and exposed to daylight from open voids. A corrugated sheet provides the roofing for this structure. The derelict and draughty conditions of these buildings along with the absence of a roof on Suir Island House and the corrugated roof on the mill tower combine to limit the potential for these structures to support roosting bats.

No trees occurring along the footprint of the Suir Island Infrastructure Links development upon Suir Island support preferred bat roost features. All trees occurring within the footprint of the project are generating thin single to multi-stemmed species that do not support suitable crevices, cracks or dense ivy cover that could be used by bats for roosting.

One mature sycamore tree located along Raheen Road within the project site supports a crevice where a limb has been removed. This crevice has been inspected for the presence of roosting bats and field signs indicating their presence. No bats or field signs were found at this tree.

### ***Roost Emergence Survey***

Roost emergence surveys were completed at Suir Island House and the mill tower on the 19th May 2021, 9th June 2021, 7th July and 28th July 2022. No bats were observed emerging from these structures during these roost surveys.

The mill warehouse buildings to the west of the project site on Suir Island are known to support pipistrelle maternity roosts (E.G. Pettit & Company, 2005) and Soprano pipistrelle and Common pipistrelle were observed emerging from these buildings during surveys.

### ***Foraging Survey***

The results of the bat activity monitoring survey completed between the 19<sup>th</sup> May and 10<sup>th</sup> June 2021 are provided in Table 5-5 below, while the results of the monitoring completed at MP1 and MP2 during the 2022 monitoring are provided in Table 5-6 and 5-7 below.

*Table 5-5: Results of Bat Monitoring May – June 2021*

Date	MYSP	NYCLEI	PIPIPI	PIPPYG	PLEAUR	Total/Night
20210519	4	11	639	2,147	2	2,803
20210520	3	11	668	3,131	4	3,817
20210521	1	7	1,340	2,115		3,463
20210522	0	57	1,146	3,774	3	4,980
20210523	1	4	458	911	3	1,377
20210524	0	9	1,734	3,163	2	4,908
20210525	1	18	579	1,404	2	2,004
20210526	3	88	390	1,474	2	1,957
20210527	0	10	80	128		218

<b>20210528</b>	1	118	370	1,808	5	<b>2,302</b>
<b>20210529</b>	26	95	255	1,010	9	<b>1,395</b>
<b>20210530</b>	20	102	135	702	4	<b>963</b>
<b>20210531</b>	2	126	641	1,534	18	<b>2,321</b>
<b>20210601</b>	16	59	503	1,378	17	<b>1,973</b>
<b>20210602</b>	9	128	504	1,541	9	<b>2,191</b>
<b>20210603</b>	12	7	1,458	2,288	7	<b>3,772</b>
<b>20210604</b>	6	23	679	1,291	4	<b>2,003</b>
<b>20210605</b>	8	121	438	729	2	<b>1,298</b>
<b>20210606</b>	7	90	521	1,589	6	<b>2,213</b>
<b>20210607</b>	5	32	1,115	2,393	6	<b>3,551</b>
<b>20210608</b>	2	78	1,351	2,001	6	<b>3,438</b>
<b>20210609</b>	2	41	1,290	2,019	7	<b>3,359</b>
<b>Total/Species</b>	<b>129</b>	<b>1,235</b>	<b>16,294</b>	<b>38,530</b>	<b>118</b>	

MySp = Myotis species; Nyclei – Leisler's bat; Pippip = Common pipistrelle; Pippyg = Soprano pipistrelle; Pleaur = brown long-eared bat

*Table 5-6: Results of Bat Monitoring MP1 (North Side of Suir Island) during July 2022*

Date	MYSP	NYCLEI	PIPIPI	PIPPYG	PLEAUR	Total/Night
<b>20220707</b>	0	164	699	479	0	<b>1,342</b>
<b>20220708</b>	1	159	673	535	3	<b>1,371</b>
<b>20220709</b>	0	225	388	445	0	<b>1,058</b>
<b>20220710</b>	0	368	224	378	0	<b>970</b>
<b>20220711</b>	1	64	217	364	0	<b>646</b>
<b>Total/Species</b>	<b>2</b>	<b>980</b>	<b>2,201</b>	<b>2,201</b>	<b>3</b>	

*Table 5-7: Results of Bat Monitoring MP2 (South Side of Suir Island) during July 2022*

Date	MYSP	NYCLEI	PIPIPI	PIPPYG	PLEAUR	Total/Night
<b>20220707</b>	7	41	67	1,547	0	<b>1,662</b>
<b>20220708</b>	2	28	111	1,500	0	<b>1,641</b>
<b>20220709</b>	18	16	49	1,535	1	<b>1,619</b>
<b>20220710</b>	7	12	46	1,512	0	<b>1,577</b>
<b>20220711</b>	5	23	94	1,529	0	<b>1,651</b>
<b>20220712</b>	1	16	88	1,489	0	<b>1,594</b>
<b>20220713</b>	2	2	14	457	0	<b>475</b>

<b>Total/Species</b>	<b>42</b>	<b>138</b>	<b>469</b>	<b>9,569</b>	<b>1</b>	
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#### Nature Conservation Value

The project site is located in an area of high bat habitat potential for a number of bat species. No roost sites were identified as occurring within the project site. A roost site for pipistrelle species occurs at the Mill buildings to the west of the project site. High levels of foraging activity by Soprano pipistrelle, Common pipistrelle and Leisler's bat were recorded during monitoring sessions. Low levels of foraging activity for all other species were recorded.

The presence of Soprano pipistrelle, Leisler's bat and Common pipistrelle foraging within and surrounding the project site is not unexpected. Common pipistrelle and Soprano pipistrelle are widespread and commonly occurring throughout the country and is "commonly encountered during bat surveys" (NPWS, 2019). Common pipistrelle is also "very general in its habitat preference, foraging in woodland, riparian habitats and parkland, along linear features in farmland, and in towns and cities" (NPWS, 2019). The national population of this species is increasing and no existing pressures or threats to the conservation status of this species at a national level have been identified. Overall the future prospects for this species in terms of range, population and habitat are Good (NPWS, 2019). Leisler's bat is also abundant in Ireland, being identified as one of the most common and widespread species in Ireland. It prefers to forage over parkland, cattle pasture, meadows, tree crowns over and along woodland habitats (Russ, 2012) as well as urban areas (NPWS, 2019). The national population of this species is increasing and the overall the future prospects for this species in terms of range, population and habitat are Good (NPWS, 2019). Existing threats to this species, as identified by the NPWS, include wind energy development and the deliberate or accidental exclusion of Leisler's bats from roosts in houses.

The woodland habitats on Suir Island provide an important foraging habitat and resource for the Soprano pipistrelle, Common pipistrelle and Leisler's bat that rely on them. They are important in the context of sustaining the roost at the mill buildings to the west of the project site. In light of the above the bat population that relies on Suir Island and the woodland and riparian habitats is considered to be of county importance (Rating C).

#### **Amphibians**

Common frog were recorded on Suir Island within the woodland habitats to the east of the project site. There is suitable habitat for common frog occurring along the "backwater" depression at the northern side of the island. The habitat occurring along the canal is of low potential for supporting common frogs and other amphibians owing to the stagnant conditions and the likely poor oxygen conditions in the water.

#### Nature Conservation Value

The amphibian population supported by Suir Island is considered to be of local importance (higher value) (Rating D).

#### **Aquatic Fauna**

##### **White-clawed Crayfish**

The section of the River Suir upstream, downstream and surrounding Suir Island supports a population of white-clawed crayfish (E.G. Pettit & Company, 2005; Crayfish EPA Data 2008; RPS 2013; Suir Island Masterplan, 2019). White-clawed crayfish are listed as qualifying feature of interest of the Lower River Suir SAC. No white-clawed crayfish were observed as occurring along the southern channel during bathyscope and refuges surveys. Notwithstanding this, there are known records for the presence of



crayfish downstream of Old Bridge between the bridge and the weir as well as other records downstream at Thomas Bridge and further upstream at Marlfield.

In Ireland white-clawed crayfish utilises a broad spectrum of habitats extending from the smallest streams and drains to large rivers and medium-sized lakes wherever there is sufficient lime. The species prefers relatively cool temperatures and adequate dissolved oxygen and lime, although tolerating significant fluctuations in these parameters (Lyons & Kelly-Quinn, 2003; Demers et al., 2006; Reynolds et al., 2002; Souty-Grosset et al., 2006). Habitat heterogeneity is important (Smith et al., 1996); juveniles live among submerged tree roots, gravel or macrophytes, while larger crayfish must have stones to hide under, or an earthen bank in which to burrow (Holdich & Rogers, 2000; Demers et al., 2003; Gallagher et al., 2006). Brooding females in particular require undisturbed shelter over a prolonged winter-spring period. Habitat conditions in line with these requirements occur along the River Suir surrounding, upstream and downstream of Suir Island. The species is omnivorous, with juveniles more reliant than adults on animal foods (Reynolds & O’Keeffe, 2005). Indicating its keystone status, white-clawed crayfish have a marked impact on stands of charophytes and on most macroinvertebrates in caged experiments in an Irish lake (Matthews et al., 1993). White-clawed crayfish faces an existential threat from twin impacts of non-indigenous crayfish species (NICS) and Crayfish Plague which is a water-borne disease specific to freshwater crayfish caused by the oomycete *Aphanomyces astaci* (NPWS, 2019b). *Aphanomyces astaci* and crayfish plague were reported as occurring along the River Suir between Clonmel and Carrick-on-Suir in 2017 and was confirmed as the cause of death for large numbers of dead, white-clawed crayfish along this stretch of the river<sup>2</sup>.

### Lamprey Species

Lamprey species are widely distributed in the Suir catchment (O’Connor, 2007) and sea lamprey in particular are known to spawn along the river at Suir Island and downstream of Suir Island (E.G. Pettit & Company, 2005). The section of the River Suir surrounding Suir Island and downstream of the island supports spawning redds for lamprey species and has been identified by Inland Fisheries Ireland as 1 of a total of 16 sea lamprey spawning “hotspot” in Ireland (O’Gorman et al., 2015). The hotspot occurring at Clonmel is the only hotspot occurring along the River Suir or within the Suir catchment. Annual monitoring of sea lamprey activity at this hotspot has been undertaken by the IFI since 2014. The monitoring includes annual visits by Inland Fisheries Ireland staff to identify and count the number of sea lamprey redds. The results of the annual monitoring at Clonmel are summarised in Table 5-8 below. No results are provided 2019 and 2020.

Table 5-8: Results of Sea Lamprey Annual Monitoring

Year	No. Sea lamprey Redds	Details
2014	2	<p>Located upstream of Gashouse Bridge (referred to by O’Gorman et al. (2015) as the Old Waterford Road Bridge.</p> <p>2 redds were noted along the town quays downstream of the bridge on the 19<sup>th</sup> June 2014. No redds were noted on the 3<sup>rd</sup> July during a second site visit.</p>

<sup>2</sup> <https://www.npws.ie/news/crayfish-plague-river-suir-between-clonmel-and-carrick-suir-water-users-urged-take-precautions#:~:text=News-,Crayfish%20Plague%20on%20River%20Suir%20between%20Clonmel%20and%20Carrick%20on,take%20precautions%20due%20to%20outbreak&text=All%20water%20users%20are%20being,and%20Carrick%20on%20Suir.>

<b>2015</b>	None recorded	None recorded during two site visits on the 12 <sup>th</sup> June and 29 <sup>th</sup> July 2015.
<b>2016</b>	None recorded	
<b>2017</b>	None recorded	
<b>2018</b>	5	Five redds recorded during a visit on the 25 <sup>th</sup> June 2018.
<b>2021</b>	1	The Clonmel hot-spot location was surveyed on the 10 <sup>th</sup> , 16 <sup>th</sup> , 23 <sup>rd</sup> , and 30 <sup>th</sup> June 2021. One sea lamprey redd was observed during each of these visits.

Inland Fisheries Ireland have completed 5 float-over surveys along the River Suir between its confluence of the River Nier and Carrick-on-Suir between 2000 and 2017. Inland Fisheries Ireland complete the float-over surveys to identify the presence of sea lamprey redds. The most recent float-over surveys completed along the River Suir were in 2013 and 2017. The results from the 2013 float-over survey recorded sea lamprey redds from three locations, between Cahir and Ardfinnan (a significant distance upstream of the proposed development site); at Clonmel along the north channel of the River Suir between the town and Suir Island (i.e. along the stretch of the river crossed by the north bridge); and downstream of the proposed development site, near the village of Kilsheelin (Rooney *et al.*, 2014). Approximately 18 sea lamprey redds were recorded along the north channel of the River Suir between Clonmel town and Suir Island during this survey. Ronney *et al.* (2014) noted that the very low number of redds (n=1) upstream of Clonmel points to possible issues with sea lamprey migration or capacity to pass the weir structures at Clonmel.

The results of the most recent float-over survey, completed in 2017, are described by Gallagher *et al.*, (2017) with two redds being recorded downstream of Clonmel and a further two being recorded further downstream at Kilsheelan. The location of the sea lamprey spawning redds identified during 2017 and the location of suitable spawning habitat, where sea lamprey nests were not identified are shown on Figure 5-7. Gallagher *et al* noted that the number of redds recorded during the 2017 survey was extremely low and was consistent with the small numbers and absence of spawning sea lamprey between 2015 and 2017.

Sea lamprey enter estuaries from the sea and migrate upstream in April-June to spawn in June and July in the freshwater reaches of the River Suir. Adult fish do not show a marked fidelity to natal waters and will penetrate long distances into fresh water to spawn (Bergstedt and Seelye 1995). They spawn in well-gravelled areas on bed material of similar size to that used by Atlantic salmon. The ammocoetes live in marginal silty area where they gradually develop over several years. They then begin to metamorphose to the adult starting in July. This takes about 3 months after which they migrate to the lower estuary in about October, where they commence their parasitic life on fish. Sea lamprey as well as river and brook lamprey are sensitive to instream barriers and their passage upstream can be more easily obstructed than other species such as Atlantic salmon. The weirs at Clonmel are known pose obstacles to the upstream migration of lamprey, with Lady Blessington Weir and Old Bridge weir both being identified as a complete barrier for adult lamprey passage upstream (Gallagher, et al., 2017) and have been identified by Rooney et al. (2013) as the likely reason for low numbers of spawning sea lamprey upstream of Clonmel.

The upstream migration of River Lamprey is less well-defined than Sea lamprey and is thought to commence in August and continue over the winter months until the spawning season in spring with two peaks in migration occurring, first in the August-November period and then a second in Spring (March-

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April) (Aquatic Services Unit, 2010). Metamorphosed young adults begin their downstream migration over an extended period from late winter to early summer. Surveys for spawning River Lamprey were completed by Inland Fisheries Ireland at Clonmel between 25<sup>th</sup> March and 23<sup>rd</sup> April 2021. Spawning River Lamprey were identified as present at the Clonmel site with a total of 18 redds being identified (Gallagher *et al.*, 2022).

Brook lamprey are not anadromous and their migration may involve relatively short journeys for adults to upstream areas with suitable spawning gravels. Maitland (1980) has reported that the brook lamprey is the only lamprey species to be found above impassable barriers. Given their small size, brook lamprey may be impeded by substantially smaller barriers than those impeding river- or sea lamprey. Even the smallest such discontinuity may impede brook lamprey adult migration. Thus, the presence of barriers may lead to genetically isolated populations of brook lamprey.

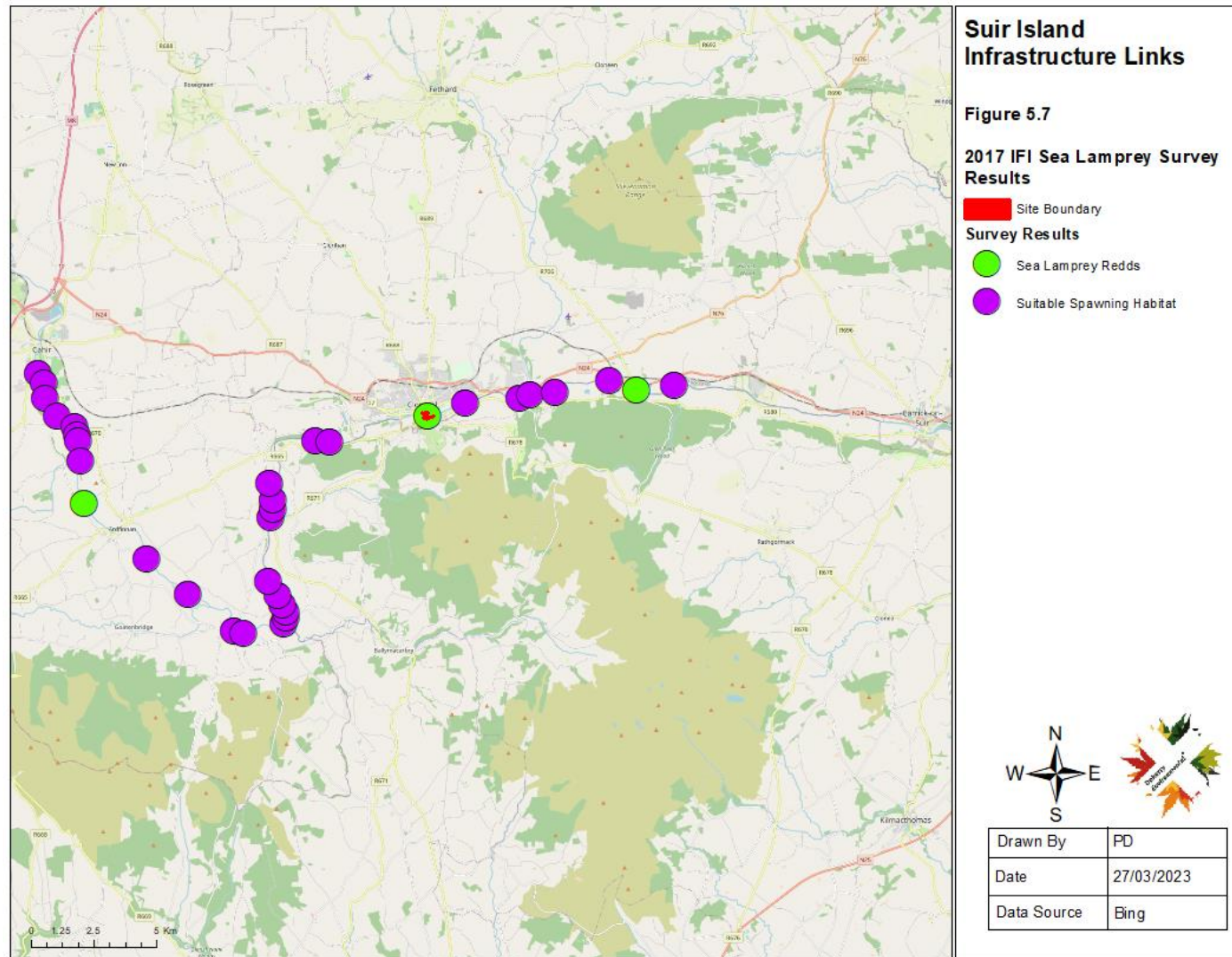


Figure 5-7: 2017 IFI Sea Lamprey Survey Results

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### ***Atlantic salmon***

The Suir is one of Ireland's most important salmonid rivers and salmon spawn throughout the very extensive headwater streams and tributary rivers of the Suir system. Until recently, salmon were fished by snap-net teams in the upper estuary and middle estuary while in the lower estuary drift nets were deployed in a significant commercial fishery for the species. The lower sections of the river from Clonmel and downstream are used as a migratory channel for adult salmon returning to spawn, spent species returning to sea and smolts running to sea. The main smolt run is between March and mid-June, while the inward adult migration is from July to October and again in December. Peak adult migration numbers have been reported to occur during December (Aquatic Services Unit, 2010). For both adults and smolts, high river flows are often associated with larger movements. While smolts will not delay their journey once they initiate it and continue directly to sea, the summer-autumn returnees will often spend extended periods in holding station in the estuary depending on flow.

Instream conditions along the River Suir upstream of Old bridge and the project site are impounded by the weir Lady Blessington and Old Bridge Weirs (on the north and south channels of the river respectively) and has a long, flat glide-pool area. The depth of the mid-channel during low flow conditions is estimated to be approximately 2m. The instream conditions occurring in the vicinity of the Suir Island are outlined in **Section 5.3.4** above.

Suitable spawning habitat occurs along both the north and south channel of the River Suir either side of Suir Island. Atlantic salmon spawning habitat has been identified along the south channel of the River Suir to the south of Suir Island, downstream of Gashouse Bridge and in the shallows upstream of Sir Thomas's Bridge. Previous fisheries surveys have recorded the presence of 0+ and 1+ salmon at these locations. In addition 1+ juvenile salmon have also been recorded along the north channel of the River Suir on the north side of the island. Adult salmon have also been recorded upstream of Suir Island and the Old Bridge in the impounded stretch of the river.

A previous assessment of the obstacle to Atlantic salmon passage upstream by both the Old Bridge and Lady Blessington Weirs has been completed by Gallagher et al., (2017). This assessment identified the Lady Blessington Weir as representing high-impact partial barrier to upstream adult passage, whilst the Old Bridge was identified as a low-impact partial barrier to upstream adult passage.

### ***Other Species***

Other species known to rely on the stretch of the River Suir surrounding Suir Island and upstream and downstream of the island include brown trout, eel, flounder, perch, gudgeon, stone loach, minnow and three-spined stickleback.

A large population of eel has been recorded upstream of the Old Bridge in the backwater on the north side of Moore's Island.

### ***Nature Conservation Value***

The south and north channel of the River Suir surrounding Suir Island as well as the sections of the river upstream and downstream of the island support important spawning habitat for a range of fish species, including Atlantic salmon and sea lamprey, both of which are listed as qualifying features of interest of the Lower River Suir SAC. In addition the river supports populations of brook and river lamprey and white-clawed crayfish, all of which are listed as qualifying features of interest of the Lower River Suir SAC. Other fish species are also supported by this stretch of the River Suir. Given the importance of this stretch of the River Suir for five qualifying features of interest of the Lower River Suir SAC, the population of these species supported by this stretch of the river are considered to be of international nature conservation value (Rating A).

## 5.4 Impact Assessment

### 5.4.1 Identification of Ecological Receptors

Table 5-9 below lists and evaluates the ecological features identified as occurring within the Zol of the Development and identifies those which are considered to be ecological receptors following the

*Table 5-9: Evaluation of Ecological Features Identified at and surrounding the Development*

Ecological Feature	Evaluation	Ecological Receptor?
<b>National and Local Designated Sites*</b>		
<b>Lower River Suir SAC</b>	International conservation value (Rating A)	Yes – International Importance (Rating A).  Assessment of this ecological feature is provided in the NIS for the Development.
<b>Habitats</b>		
<b>Eroding River FW1</b>	International conservation value (Rating A)	Yes - International Importance (Rating A)
<b>Millrace FW3</b>	Local importance (lower value) (Rating E)	No
<b>Reed &amp; Large Sedge Swamp FS1</b>	Local importance (higher value) (Rating D)	Yes
<b>Amenity grassland GA2</b>	Local importance (lower value) (Rating E)	No
<b>Dry meadows and grassy verges GS2</b>	Local importance (higher value) (Rating D)	Yes
<b>Mixed broad-leaved woodland WD1</b>	Local importance (higher value) (Rating D)	Yes
<b>Riparian Woodland WN5</b>	County value (Rating C)	Yes
<b>Scrub WS1</b>	Local importance (lower value) (Rating E)	No
<b>Recolonising bare ground (ED3)</b>	Local importance (lower value) (Rating E)	No
<b>Species</b>		
<b>Otters</b>	International value (Rating A)	Yes
<b>Bats</b>	Local importance (higher value) (rating D)	Yes
<b>Other mammals</b>	Local importance (higher value) (Rating D)	Yes
<b>Birds</b>	Local importance (higher value) (Rating D)	Yes

<b>Herpetofauna</b>	Local importance (higher value) (Rating D)	Yes
<b>White-clawed crayfish</b>	International value (Rating A)	Yes
<b>Atlantic salmon</b>	International value (Rating A)	Yes
<b>Lamprey species</b>	International value (Rating A)	Yes

## 5.4.2 Construction Impacts

### *Designated conservation area*

A detailed examination of the potential construction phase impacts of the proposed development to European Sites is set out in the Natura Impact Statement for the project, submitted as part of the application for the purposes of Article 6[3] of the Habitats Directive. Sections of the project are located within the boundary of the Lower River Suir SAC. As outlined in **Section 5.3.2** above these include approximately 43m of the northern bridge section and approximately 47m of the southern bridge section are located within the SAC boundary. In addition to this, Pier P01, a portion of Pier P02, Pier P03 and Abutment A04 are located within the SAC boundary.

In addition to these permanent features of the proposed Suir Island Infrastructure Links other temporary construction phase structures are also located within the boundary of the SAC. These include the access ramp and associated pre-cast temporary box culvert to Pier P01 from the construction compound within the existing car park and sheet piling areas surrounding Pier P01, P02 and P03.

No Annex 1 habitats of the Lower River Suir SAC occur at or under the footprint of the above permanent and temporary elements of the project and there will be no loss or disruption to Annex 1 habitats a result of the project.

All of the permanent and temporary elements of the project as listed above will be situated outside the permanent channel of the River Suir and no instream works will be required for the project. This will avoid the potential for physical loss of instream habitat and disturbance/disruption to instream habitats and particularly the spawning habitats of Atlantic salmon, sea lamprey and the refuges of white-clawed crayfish.

No breeding or resting sites in the form of holts or couches that are relied upon by otters are located within the footprint of the proposed development or within 150m of the development footprint. As such there will be no potential for the project to result in the loss of otter breeding or resting sites and given that no such sites occur within 150m of the project there will be no potential for disturbance to such sites.

In the absence of an appropriate approach to the construction phase the potential will exist for the project to result in the discharge of potential polluting substances to the River Suir. The main contaminants arising from construction activities and runoff includes the following:

- Increase of silt and sediment loading arising from construction site runoff and erosion of stockpiles or unprotected embankments. Elevated silt loading can lead to long-term damage of aquatic ecosystems by overloading spawning grounds and gravel beds. Increase silt loads reduces aquatic plant growth, limits dissolved oxygen capacity and overall reduces the ecological quality with the most critical period associated with low-flow conditions. Other pollutants in the watercourse can bind to silt which can lead to increased bioavailability of these pollutants.
- Spillage of cementitious products such as concrete, grout and epoxies. Cementitious based products are highly alkaline and extremely corrosive which can result in significant impact to

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watercourses by altering the pH, smothering stream beds and physically damaging fish through chemical burning and clogging of gills.

- Accidental Spillage of hydrocarbons from construction plant and storage depots.
- Faecal contamination arising from inadequate treatment of on-site, construction compound ablation and washing facilities.

The discharge of such pollutants to the river and the Lower River Suir SAC has the potential to result in a short to long-term significant impact at the international scale. Such an impact has the potential to result in adverse effects to freshwater invertebrates including white-clawed crayfish, plant life and on all life stages of salmonid and lamprey fish. The effects of such discharges to fish species such as Atlantic salmon, lamprey species and brown trout include:

- The settlement of silt on spawning redds resulting in the infilling of intra-gravel voids and the smothering of eggs and newly hatched fish.
- Increase in turbidity and water colour resulting in a reduction in light penetration and perturbation to instream salmonid habitats.
- The settlement of silt on river beds can smother and displace macroinvertebrates, reducing the prey resource for fish species.
- Suspended solids can settle in pool and riffle habitats resulting in a reduction in the availability and quality of rearing habitat for fish.
- Silt-laden runoff can result in a reduction in transparency, impairing the ability of fish and otters to find food.
- Suspended solids can abrade or clog salmonid fish gills. Whilst high concentrations of suspended solids are required to clog fish gills, small concentrations can result in abrasion to gills and create the potential for infection.

The clearance of vegetation and soils and the exposure of underlying subsoils can result in the mobilisation of nutrients stored within soils and the generation of nutrient-laden surface water runoff (Tuukkanen, 2017; Monteverde, 2022). Potential nutrient mobilisation is not just associated with runoff from exposed soils. Inputs of suspended solids can also contribute to nutrient enrichment in receiving waters as a result of the release of nutrient bound to sediments following mobilisation (Sharpley et al., 1992; Ballantine et al. 2006). This degree to which sediment loss contributes to nutrient enrichment is dependent on the type of soil. Soils / subsoils will contribute varying degrees of loading of various compounds and nutrients, including Nitrogen (N) and Phosphorous (P) compounds, which are attributed to nutrient enrichment, or excessive loading of N and P in waters. The release of such sediment in silt-laden surface water runoff from works at the project site will have the potential to contribute to nutrient inputs to receiving waters along the River Suir. As noted in Table 7-4 of EIAR Chapter 7 the River Suir is currently classified as a potentially eutrophic waterbody and any nutrient inputs arising from silt-laden runoff to the River Suir will have the potential to contribute towards an increase in primary productivity leading to eutrophication and decreasing oxygen saturation. High oxygen levels in freshwaters are critical for all life stages of sensitive aquatic fauna such as Atlantic salmon and lamprey species. Such changes in the trophic status of this watercourse has the potential to contribute towards the degradation of freshwater habitat conditions and their potential to support Atlantic salmon, lamprey species, white-clawed crayfish and otters.

Plant equipment and vehicles associated with excavation, material transport, and construction activities introduce the risk of hydrocarbon (fuel and oil) spillages and leaks, particularly in relation to regular refuelling which in turn implies the requirement of a fuelling station or will be supplied by fuel tanker scheduled to refuel the plant machinery directly. Similar to suspended solids arising from excavation activities, hydrocarbons accidentally introduced to the environment will ultimately drain to the River Suir.

Hydrocarbons are a pollutant risk due to their toxicity to all flora and fauna organisms. Hydrocarbons chemically repel water and sparingly dissolve in water. The majority of hydrocarbons are light non-aqueous phase liquids (L-NAPL's) which means that they are less dense than water and therefore float



on the water's surface. Hydrocarbons adsorb ('stick') onto the majority of natural solid objects they encounter, such as vegetation, animals, and earth materials such as soil. They burn most living organic tissue, such as vegetation, due to their volatile chemistry. They are also a nutrient supply for adapted micro-organisms, which can deplete dissolved oxygen at a rapid rate and thus kill off water-based vertebrate such as Atlantic salmon and invertebrate life. Hydrocarbons are known to bioaccumulate in salmonids (e.g. McCain *et al.* 1990), with Atlantic salmon known to be physically affected by short term exposure leading to loss of condition, and also known to avoid areas containing hydrocarbons (e.g. Maynard and Weber 1981) leading to the effective loss of habitat or migration routes for the species.

The Development has the potential to result in the accidental spillage or deposition of construction materials such as cementitious materials into soils and in turn impact on surface water runoff, or accidental spillages directly intercepted by the River Suir.

Depending on the material in question, the introduction of such materials can lead to a local change in hydrochemistry and impact on the aquatic ecology of the receiving waterbody. For example, the introduction of cementitious material (concrete / cement / lean mix etc.) can lead to changes in soil and water pH, and increased concentrations of sulphates and other constituents of concrete. Fresh or wet concrete is a much more significant hazard when compared to old or set concrete which is considered inert in comparison, however it should also be noted that any construction materials or non-natural materials deposited, even if inert, are considered contaminants.

### **Habitat Loss**

The habitats, habitat area and percentage of the habitat in terms of their overall extent within the project site, which will be lost to the permanent and temporary footprint of the project are outlined in Table 5-10 below.

*Table 5-10: Assessment of Habitat Loss*

<b>Habitat</b>	<b>Area lost to the Permanent footprint (m<sup>2</sup> &amp; % habitat)</b>	<b>Area lost to the Temporary footprint (m<sup>2</sup> &amp; % habitat)</b>	<b>Significance of Impact</b>
<b>Mixed broad-leaved woodland;</b>	2.7m <sup>2</sup> and 0.09% of mapped habitat as shown on Figure 5-6 to Pier P01	46m <sup>2</sup> and 1.5% of mapped habitat as shown on Figure 5-6 to the sheet piled area around Pier P01	The permanent loss of this habitat to the Pier P01 will represent a negligible area of this habitat and slight negative impact at the local scale. The impact will be irreversible and permanent.  The temporary loss of this habitat to the sheet piling area around Pier P01 will represent a negligible area of this habitat and a slight negative impact at the local scale. The impact will be of a temporary to short-term duration and will be reversible.
<b>Dry meadows and grassy verges</b>	195 m <sup>2</sup> or 6.7% mapped habitat as shown on Figure 5-	226m <sup>2</sup> or 7.8% of mapped habitat as	The permanent loss of this habitat to the abutment A01 will represent a negligible area of

	<p>6 to the promenade.</p> <p>4.5 m<sup>2</sup> or 0.15% mapped habitat as shown on Figure 5-6 to Abutment A02.</p> <p>2.7 m<sup>2</sup> or 0.09% mapped habitat as shown on Figure 5-6 to Pier P03</p> <p>A total of 202m<sup>2</sup> or 6.9% of this habitat will be permanently lost during the construction phase.</p>	<p>shown on Figure 5-6 to the temporary access;</p> <p>27m<sup>2</sup> or 0.8% mapped habitat as shown on Figure 5-6 to the sheet piling area around Pier P03.</p> <p>A total of 8.6% of this habitat will be temporarily lost during the construction phase. Note that all areas of permanent habitat loss are located within this overall area of temporary habitat loss.</p>	<p>this habitat and slight negative impact at the local scale. The impact will be irreversible and permanent.</p> <p>The temporary loss of this habitat to the access track and sheet piling area will represent a negligible area of this habitat and a slight negative impact at the local scale. The impact will be of a temporary to short-term duration and will be reversible..</p>
<b>Riparian woodland/broad-leaved woodland mosaic</b>	None	24m <sup>2</sup> or 0.35% to the temporary access track to Pier P01	The temporary loss of this habitat to the construction phase access ramp to Pier P01 will represent a negligible area of this habitat and slight negative impact at the local scale. The impact will be reversible and of a short-term duration.
<b>Reed and large sedge swamp</b>	None	19m <sup>2</sup> or 1.3% mapped habitat as shown on Figure 5-6 to the sheet piling area around Pier P03.	The temporary loss of this habitat to the sheeting piling area around pier P03 will represent a negligible area of this habitat and a slight negative impact at the local scale. The impact will be of a temporary to short-term duration and will be reversible.

### ***Plant Species of Local Interest***

Plant species of local interest identified as occurring within the footprint of the permanent and/or temporary works include *Orobancha hederaceae*, *Aquilegia vulgaris* and *Symphytum officinale*. In the absence of appropriate mitigation measures the project will have the potential to result in the loss or reduction of these features which are considered to be of local importance (higher value). This will represent an impact of moderate negative and permanent significance.

### ***Spread of Non-Native Invasive Species***

A number of non-native invasive plant species have been identified as occurring within and in the vicinity of the project footprint on Suir Island. These include *Heracleum mantegazzianum*, *Fallopia japonica*, *Buddleja davidii*, *Leycesteria formosa*, *Prunus laurocerasus*, *Clematis vitalba* and *Conyza canadensis*. *Heracleum mantegazzianum*, *Fallopia japonica* and *Prunus laurocerasus* are species of high-impact

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invasiveness while the other species listed above are of medium-impact invasiveness. In the absence of mitigation measures there will be potential for the construction works to result in the spread of these species. The presence of the works adjacent to the River Suir which can act as a vector for the spread of these species also have the potential to increase the risk of their spread downstream.

### ***Birds***

The proposed development will result in the loss of minor areas of grassland scrub and woodland habitats that have the potential to support a range of bird species. Given the negligible scale of permanent and temporary loss of these habitats and the continued presence of suitable breeding habitat for bird species on the island the construction phase is not predicted to have the potential to result in significant impacts to breeding birds as a result of the direct loss of habitat.

Furthermore it is noted that the majority of the bird species occurring at Suir Island are passerine species that are typically short-lived with high reproduction rates and are not generally considered to be sensitive to construction effects (Langston et al., 2012). It is also noted that bird species occurring in urban environments display high levels of habituation to human activities and are less sensitive to disturbance (Nature Scotland, 2022). However, in the absence of appropriate mitigation measures and the consideration of birds during the breeding season, construction works could result in disturbance to breeding territories of other bird species of medium and low conservation concern. Potential impacts include disturbance to nest and injury to eggs and chicks and the loss of nesting and foraging habitat. Given the low sensitivity rating of the proposed development footprint for bird species such potential impacts will be representative of low magnitude impacts.

Overall the proposed development footprint is considered to be of an area of low sensitivity for all other species and the loss of these habitats will represent a slight negative impact at the local scale. This impact will be temporary and reversible.

### ***Non-volant mammals***

No breeding sites or resting places of protected terrestrial non-volant mammals such as otters or badgers were noted within or immediately adjacent to the project site. As such the construction phase of the project will not have the potential to result in significant disturbance to non-volant terrestrial mammals.

No otter holts or couches or evidence indicating the presence of otters and couches were recorded during field surveys within 150m of the project and specifically within 150m of the proposed pier and abutment locations where piling works will be undertaken. As such the construction works will not have the potential to result in disturbance to the resting/breeding sites of otters.

Potential impacts to water quality of the River Suir have been identified above. In the event of the emission of contaminants to the river the potential will exist for indirect impacts to otters.

The potential for the construction phase to result in disturbance to otters in general (i.e. while foraging and or commuting) will be minor. This is due to the crepuscular foraging behaviour of otters along the river (Green et al., 1984; Carss et al., 1990; Carss. 1995), which will not overlap with daytime construction works. Furthermore the stretch of the river occurring at Suir Island flows through an urban setting which is subject to regular human activity, and it is likely that otters are already habituated to human activity in this area.

### ***Bats***

The project will not result in any direct or indirect disturbance to bat roosts.

The project will result in the loss of the grassland, scrub and small areas of woodland habitat supporting trees that do not have potential to support roosting bats. The extent of woodland and scrub habitat to

be lost will represent a slight impact in the context of the existing woodland foraging habitat available for bats (see Table 5-10 above). This in turn will represent an effect of slight, negative and permanent significance for the local bat population.

Construction phase lighting is not predicted to have the potential to result in disturbance to bats. Construction phase lighting will be required between the months of late October to late March where low light/dusk/dark conditions overlap with the construction hours. These times of the year will be outside the bat activity season and as such there will be no potential for significant light disturbance to bats.

### **Amphibians**

The project will not result in the permanent loss of wetland habitats that support common frogs. There will be a temporary loss of riparian/mixed broad-leaved woodland habitat to the access track at the “backwater” channel to the south of Pier P01 during the construction phase. This will represent a negligible magnitude impact to this species of local importance (higher value) and an impact of imperceptible and temporary significance.

### **Aquatic Fauna**

The impacts to aquatic fauna that could arise during the construction phase comprise water quality impacts and impacts associated with noise and vibration generated during construction works. As the project will not involve any instream works there will be no direct loss or disturbance to instream habitats upon which aquatic fauna such as white-clawed crayfish, Atlantic salmon and lamprey species rely.

In the event that the project results in perturbations to the water quality of the River Suir during the construction phase the potential will exist for significant negative temporary to long-term impacts at the international scale to aquatic fauna supported by the river. The effect of such impacts to aquatic fauna have been described above under the assessment of construction phase impacts to designated conservation areas.

Noise and vibration in waters can result in detrimental effects to fish that include behavioural change, auditory tissue damage, which can be temporary, i.e. temporary threshold shift (TTS), or permanent, i.e. permanent threshold shift (PTS), non-auditory tissue damage and death. During the construction phase of the project the main source of noise and vibration will arise during piling for the installation of bridge piers and abutments. The provisional piling type envisaged for the project consists of end bearing piles, that will be rotary bored and cast in-situ. Provisionally, 3 No. end bearing piles will be required at each of the abutment locations on the berm, North Plaza and Raheen Road and 2 No. piles for pier foundations. The nearest pile or abutment to the river channel will be abutment A01 at approximately 5.5m from the river bank on The Quay and pier P03 at approximately 3.8m from the river bankside of the southern channel.

Sound level exposure (SEL) is used as metric to assess the impact of noise on fish. Guideline values for the rate of SEL at which fish are at risk of being injured by piling activities have been established by the California Department of Transport’s *Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish* (Caltrans, 2015) and have been summarized by the Aquatic Services Unit (2010). It is noted that the guideline values are based on hammer or impact piling as opposed to low vibration core piling which will be used of this project. The SEL guides are based on a cumulative sound level exposure ( $SEL_{cumulative}$ ) which adds all the SEL outputs from individual pile strikes for the total number of strikes required to drive the pile. The low guideline value for ( $SEL_{cumulative}$ ) to fish as outlined by Caltrans (2015) is 183 dB.

The design of the approach to the piling works will use rotary bored low vibration piling that will not involve any high impact strikes or hammering. This coupled with the set-back distances of the pile locations from the river at all pier and abutment locations, as well as the presence of the bedrock and overburden, road formation and masonry block work of the quay wall and other road and subsurface

material between the piling locations and the river at the nearest pile locations at pier P03 and abutment A01, will ensure that no noise or vibration associated with the piling will have the potential to cause injury to fish (i.e. will not exceed the low guide value of the 183 dB within adjacent waters) within the river channel adjacent to the piling locations. Given this assessment the piling operations associated with the project will not have the potential to result in any detrimental impacts to aquatic fauna such as Atlantic salmon, lamprey species or white-clawed crayfish and will not have the potential to cause a barrier to the movement of lamprey during piling operations.

The illumination of the river channel by lighting will have the potential to result in obstacles to the movement of migrating fish species and could also result in their displacement for lit areas of the river. Mitigation measures are outlined in Section 5.5 below that aim to minimise the impact of any construction lighting on the river channel during hours of work in darkness.

The construction phase of the project is not predicted to have the potential to result in shading of the river and instream habitat for aquatic fauna. The effects of shading on aquatic fauna are considered as part of the operation phase impacts in **Section 5.4.2** below.

### 5.4.3 Operational Impacts

#### ***Designated conservation areas***

A detailed examination of the potential construction phase impacts of the proposed development to European Sites is set out in the Natura Impact Statement for the project, submitted as part of the application for the purposes of Article 6[3] of the Habitats Directive . There will be no direct impacts to the Lower River Suir SAC during the operation phase.

Indirect impacts to the Lower River Suir SAC will not arise during the operation phase. The proposed pedestrian and cyclists bridge would be lightly trafficked and the application of salts and grits to mitigate ice/snow conditions is not expected. Salts/grits could be applied to hardstanding surfaces on the North Plaza and South Arrival Point, which will be contained in the existing drainage system, and which is subsequently treated by the Clonmel Waste Water Treatment Plant before being discharged into the Suir River. The predicted impact of pollutants discharged into the watercourse from the proposed hardstand surfaces is considered *Temporary* and *Imperceptible*.

The risk of pollution to both surface and groundwater resulting from accidental spillage is considered negligible, as the bridge crossing would only accommodate pedestrians and cyclists. It is not anticipated that any chemicals or hydrocarbons will ever be transported across the bridge. Accidental spillage on the North Plaza and South Arrival Point would be contained behind the flood protection walls and existing sewer utilities network. Accidental spillage risk is considered *Temporary* and *Imperceptible*.

#### ***Habitats***

The operation phase of the development will not result in any further habitat loss within the project site.

During the operation of the proposed infrastructure, the increased area of hard standing at the project site will have the potential to lead to changes in the volume and nature of site runoff. Such changes have been assessed as part of the hydrology assessment of the project (EIAR Chapter 7) have represent an imperceptible and permanent impact to the receiving River Suir.

#### ***Birds***

The potential for the operation phase of the project to result in disturbance to the local bird assemblage will be restricted in its extent due to the nature of the proposed development which will involve pedestrian and cycling activities which will not generate significant levels of ongoing disturbance to birds relying on surrounding woodland habitats to east of the project site.

#### ***Non-volant mammals***

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There will be no potential for the operation phase of the project to result in direct physical disturbance to otters or their holts and couches.

There will be no loss of otter foraging, commuting or breeding/resting habitat during the operation phase. The project will result in any loss of instream habitat or any perceptible loss of riparian habitat for otters.

As outlined above the operation phase will not have the potential to result in perturbations to water quality in the River Suir.

Disturbance during the operation phase is expected to be minimised as recreational use will be predominantly confined to day time while otter foraging and commuting activity will be predominantly confined to dusk and night time hours.

It is also noted in the NPWS Threat Response Plan for otters that “little evidence has come to light in recent studies to suggest that disturbance by recreation is a significant pressure” for otters. This statement is also supported by Chanin’s (2003) review of a number of studies that found otters were not significantly disturbed by human activity (Jefferies, 1987; Durbin 1993; Green & Green, 1997). Based on these and other studies Chanin concluded that the recovery of the otter population in the UK was not being impeded by human disturbance. Otters have also been shown to demonstrate high levels of plasticity to the presence of humans and associated human activity in areas supporting high value foraging resources (MacDonald & Mason, 1992), such as those supported by the River Suir and Suir Island.

The Irish Wildlife Manual 23 reported that no significance difference was found between sites with and without human recreational disturbance and stated that the lowest percentage occurrence of otters was found at the sites with the lowest recorded disturbance.

Based on the scientific evidence cited above that has investigated the potential for recreational activity and human presence to disturb otters, as well as the absence of holts and couches within or immediately adjacent to the project site, it is predicted that the operation phase of the project will not have the potential to result in significant ongoing disturbance to the local population of this species occurring along the River Suir.

### ***Bats***

Bat species occurring in the vicinity of the project site are known to be sensitive to artificial lighting. The project has been designed to minimise disturbance from artificial night time lighting to the existing woodland, riparian and river habitat occurring within and adjacent to the project site. This approach will minimise the potential for lighting to alter foraging habitat for bats at Suir Island. The measures that have been incorporated into the design to minimise the effects of lighting on bats are outlined in **Section 5.5.2** below.

### ***Amphibians***

No operation phase impacts are predicted for amphibians.

### ***Aquatic Fauna***

As outlined above the operation phase will not have the potential to result in perturbations to water quality in the River Suir and as such there will be no potential for negative impacts to aquatic fauna during the operation phase as a result of water quality perturbations.

As no elements of the project will be positioned instream along the River Suir there will be no potential for the project to result in the loss of instream habitats for aquatic fauna during the operation phase,

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changes in hydrological regime or the installation of physical barriers to the movement of fish and other aquatic fauna along the River Suir to the north and south of Suir Island.

Inappropriate lighting designs or regimes can cause disturbance to or form a barrier to connectivity for nocturnal species. An inappropriate lighting design for the operation phase has the potential to affect the migration, spawning and/or activity pattern of fish, white-clawed crayfish and other aquatic fauna. Specifically, light spill onto the water during hours of darkness may cause spawning Sea Lamprey, River Lamprey and Atlantic Salmon to avoid the area in the vicinity of the bridge that are illuminated, effectively preventing these species from moving past the structure or establishing redds in these sections of the river. The lighting design for the project will ensure that there is no change in the extent of light spill on to the north and south channel of the river during the operation phase. Further details of the lighting to be provided is outlined in **Section 5.5.2** below.

Owing to the narrow width of the bridge (i.e. 4m wide along both the north and south bridge) and the freeboard of c. 4m between the bridge soffit levels and the river base flow levels, the bridge will not cause significant shading of the channel and, therefore, there will be no effect of shading on the spawning habitats and movements of Atlantic salmon sea lamprey, other lamprey species and white-clawed crayfish occurring along the sections of the river at and under the bridges.

#### 5.4.4 Cumulative Impacts

It is proposed to develop Suir Island (Willow Island) Gardens as a public amenity. Within the red line site boundary, there is a development proposal adjacent to the Suir Island Infrastructure Links proposed development. The Suir Island Gardens proposed development is being submitted through the Part 8 planning application process. The nature and extent of the proposed development works at Suir Island Gardens will comprise of the provision of open lawns; landscape planting to include the provision of 40 new native trees along with herb and shrub planting; seating and picnic areas; provision of both hard and soft pathways; new entrance gate and associated cladding on adjoining walls; formal and informal children's play areas throughout the site; securing of Suir Island House (a Protected Structure) with decorative grills at ground floor level; external feature lighting fitted to walls of Suir Island House (a Protected Structure); ancillary site development works that shall include site drainage for the hard landscaped areas, provision of water supply for the play area and wash down purposes, provision of electrical supply for the external feature lighting, and removal and reconstruction of a short section of boundary wall and all associated site works.

The habitats occurring within the gardens area are of low nature conservation value being dominated by recolonising bare ground, spreading scrub and spoil and bare ground. The existing areas of woodland habitat occurring at the gardens will be enhanced through the provision of additional tree planting and planting of additional herbs and shrubs. The works associated with the gardens will not overlap with the construction phase of the Suir Island Infrastructure Links proposed development. Furthermore these works associated with the garden will be minor in scale and will be associated with the re-landscaping of the garden.

The final lighting design to be provided as part of the garden project will be underpinned by a design that minimizes the impact of lighting to nocturnal species. The lighting design will also require to ensure that the lighting provided as part of the garden project does not result in any changes in lux levels along the riparian habitat of the River Suir to the south of the gardens and also within woodland habitats to the east. This design, in combination with the sensitive lighting design that will be implemented for the current Suir Island Infrastructure Links proposed development will ensure that both projects do not combine to result in significant changes to the baseline night time light environment and associated lux levels along the River Suir, its riparian habitats and within woodland habitat to the east of both projects.

A review of the Tipperary County Council Planning portal was completed in March 2023 to identify other projects in the vicinity of Suir Island so that an assessment of potential for the proposed development to combine with these other projects to result in cumulative impacts to biodiversity receptors could be undertaken. The assessment on the projects is summarised in Table 5-11.

*Table 5-11: Examination of Project's Potential to Combine with Other Projects*

Project Planning Ref. & Brief Description	Overview	Assessment
<p><b>2260538- refurbishment of a brownfield site</b></p>	<p>This project comprises a mixed-use development at the former meat factory within which a section of the current proposed development is located. This project includes for the provision of a riverside walk, which represents the current proposed development, as well as the provision of 93 no. residential dwellings, 2 no. local retail units and a cafe. The 93 no. residential dwellings are in the form of 30 no. two storey houses, 21 no. three storey duplex apartments and a four and five storey apartment building containing 42 no. apartments (three of which are duplex). All duplex and apartments have balconies or ground floor terraces. The 2 no. retail units and the café are located on the ground floor of the apartment building. Open space provided on site consists of a central public open space (1,610sq.m), public plaza (c.200sq.m) as well as a riverside walk (3,000sq.m) along the south of the site bound by the River Suir. Residents of the apartment building will also have access to a communal roof garden at fourth floor level. The proposed development will include the reduction in height and alterations to the existing stone boundary wall on Abbey Road and removal of the remaining boundary walls onto Abbey Road and Convent Road and increase permeability through the site. A single vehicular access</p>	<p>An Ecological Impact Assessment (EclA) and Natura Impact Statement have been prepared for this project. of the SACs qualifying features of interest.</p> <p>The assessment of this project found that “six aquatic species could be open to some impact though a significant effect is not likely”.</p> <p>Notwithstanding this assessment mitigation measures are set out in the EclA and NIS to protect water quality and it is concluded that “once the required mitigation measures are in place and operative there is no likelihood that this development will have significant impact on the integrity and functioning of the Natura 2000 site network, in particular the Lower River Suir SAC and its management objectives.” The assessment for this project ultimately concludes that once all mitigation measures are implemented there will be no potential for it to combine with other projects to result in adverse impacts to biodiversity receptors. On basis of this conclusion there will be no potential for the Suir Island Infrastructure project to combine with this other project to result in adverse cumulative effects to biodiversity receptors.</p>



	is proposed off Abbey Road and there will be dedicated pedestrian/cycle access points to both Abbey Road and Convent Road, all associated car parking including car parking on Abbey Road and Convent Road, footpaths and alterations to road markings on Abbey Road and Convent Road, landscaping and boundary treatments, bin storage and bicycle storage structures, public lighting, ESB sub-station and all associated site development works, including alterations to existing site levels and retaining walls/structures and the removal/decommissioning of existing utility structures and services on site.	
<b>201521 – retention of works to an existing dwelling</b>	retention of the revised elevations of the existing dwelling, the minor modifications to the footprint, single-storey rear extension and front porch to same, domestic garage and all associated site development works	The works associated with this retention application were already completed at the time of the application and are now in place. There will be no potential for this minor project to combine with the current project to result in cumulative adverse effects to biodiversity receptors.
<b>20597 – construction of fencing and gates</b>	construction of a 2.4m high powder coated mesh fence and gates to enclose the existing ballcourt	This is a minor project that will not result in potential risks to biodiversity receptors. There will be no potential for the current project to combine with this other project to result in cumulative adverse effects to the biodiversity receptors identified in Section 5.4.1 above.
<b>18600733 – installation of roof-top solar panels</b>	installation of approximately 438m <sup>2</sup> (74kW) of solar PV panels on the hotel's roof	This is a minor project that will not result in potential risks to biodiversity receptors. There will be no potential for the current project to combine with this other project to result in cumulative adverse effects to the biodiversity receptors identified in Section 5.4.1 above.
<b>19600729 – redevelopments works</b>	(1) Redevelopment of their existing lands to provide: (a) new crossover arrangement at eastern end of site	A screening for Appropriate Assessment and EIA was prepared for this project and it was

<p><b>to an existing service station and oil depot</b></p>	<p>to provide access for service station and access/egress for oil depot; (b) dedicated HGV parking, fuelling and marshalling area including relocation of oil tanker offloading point and HGV hi-speed fuel pump; (c) car/LCV parking areas for service station; (d) relocation of drive-thru automatic brush wash with associated screens; (e) demolition of existing canopy, pump islands and underground tanks; (f) provision of 4 no. fuel pump islands with canopy over and link-back to forecourt building and new underground fuel storage tanks; (g) construction of extension to existing forecourt building to provide a store (54.48 sq.m) and deli/cafe prep area (17.76 sq.m); (h) revised internal layout including change of use from office, stores and welfare facilities to provide new deli/cafe seating area, office, stores and welfare facilities; (i) sale of specially prepared hot and cold food for consumption both on and off the premises from the deli-cafe area of forecourt building; (j) provision of revised fenestration and elevational changes to existing forecourt building; (k) ancillary signage for development, both illuminated and non-illuminated; (l) all associated site works including bin compound; (m) revised road markings at east &amp; west crossovers on Waterford Road and (2) Permission for Retention of extensions and alterations (area 31.31 sq.m) to forecourt building previously approved under Plan File No. 02/759.</p>	<p>determined by the Planning Authority that likely significant effects to the Lower River Suir SAC and the environment, as a result of the implementation of this project, alone or in-combination with other plans or projects, will not arise. Given this determination it is concluded that the current project will not have the potential to combine with this project to result in cumulative adverse effects to the biodiversity receptors identified in Section 5.4.1 above.</p>
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<b>19601295 – retention of a constructed mixed user building</b>	retention of certain changes to an as constructed mixed user building granted under planning application reference number PA892, the items to be retained are as follows: (i) a stair core linking all apartments (ii) an existing third storey apartment and (iii) some window and door arrangements and all associated site works.	The works associated with this retention application were already completed at the time of the application and are now in place. There will be no potential for this minor project to combine with the current project to result in cumulative adverse effects to the biodiversity receptors identified in Section 5.4.1 above.
<b>19600102 development at a site known as the former Clonmel Meat Factory</b>	The development comprised the demolition and clearance of all existing buildings and structures on site and levelling of the site together with all associated site development works. A perimeter wall will be maintained on all sides of the site, including along Abbey Road (R884) and Convent Road (R665). The purpose of the proposed works is to clear and secure the site following on from a fire.	A screening for Appropriate Assessment and EIA was completed by the Planning Authority for this project and it was determined by the Planning Authority that this project did not, alone or in-combination with other plans or projects, have the potential to result in likely significant effects to the Lower River Suir SAC or any other European Sites. On the basis of this determination there is no potential for the current project to combine with this project to result in cumulative adverse effects to the biodiversity receptors identified in Section 5.4.1 above.
<b>Clonmel Urban/Public Realm Design</b>	The overarching objectives of the Clonmel Urban Design Project are to;  Transform Clonmel Town Centre making it more attractive to its population and citizens for the next 50 years; Provide a new 21 <sup>st</sup> century canvas upon which retail and other urban uses appropriate to modern town centre requirements can be enabled to flourish, develop and progress; Create a new town centre environment which is attractive to residents and businesses whilst enhancing the visitors experience, confirming Clonmel's reputation as a destination town; Retain as many shoppers and recreational users as possible, and maximise this to the greatest possible extent;	A screening for Appropriate Assessment and EIA was completed by the Planning Authority for this project and it was determined by the Planning Authority that this project did not, alone or in-combination with other plans or projects, have the potential to result in likely significant effects to the Lower River Suir SAC or any other European Sites. On the basis of this determination there is no potential for the current project to combine with this project to result in cumulative adverse effects to the biodiversity receptors identified in Section 5.4.1 above.

	<p>Create new opportunities for businesses – including new night life opportunities, new event spaces, new eating and socialising spaces, a café culture, new pop-up market spaces etc; Enhance the surrounding environment to showcase the town`s rich historical heritage</p> <p>These objectives will be achieved by:</p> <p>Providing a bespoke, modern public realm design which compliments and respects the existing historical heritage and strengths of Clonmel Town; Creating additional public realm space, achieved by increasing footpath widths, creating new multi-functional public realm space at key locations, which aim to make the public realm safer and more inclusive for all users (modifying surfaces for the visually impaired and disabled users); Making the public realm area more appropriate to the needs of users (smart technology); Making it easier to circulate around the town with good access to parking and facilities within easy reach; Improving identified linkages between the town centre with tourist and heritage sites within Clonmel, such as the Museum, West Gate, the proposed Suir Island Amenity Park, the River Suir, and Dowd`s Lane (location for proposed future Bulmer`s Visitor Centre).</p>	
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## 5.5 Mitigation and Monitoring Measures

### 5.5.1 Construction

#### *Ecological Clerk of Works*

An Ecological Clerk of Works (ECoW) as well as a Project Landscape Architect will be appointed prior to the commencement of construction. The ECoW will be an ecologist with experience of baseline ecological surveys, pre-construction surveys and construction phase supervision. The ECoW will be

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responsible for completing pre-construction surveys and supervising construction works during the construction phase.

Pre-construction surveys required in advance of the construction phase will include as a minimum:

Otter surveys along the River Suir and Suir Island. Surveys to be completed will pay particular attention to identifying the presence/absence of otter holts/couches within 150m of piling locations.

Non-native invasive plant species surveys: An up-to-date non-native invasive plant species survey of the project site and adjacent areas will be completed during the growing season immediately prior to the commencement of construction works.

Surveys for the presence of plant species of local conservation interest. These surveys shall be completed during the growing season immediately prior to the commencement of the construction phase. The surveys shall be completed to identify the stands of *Symphytum officinale*, *Orobancha hederata* and *Aquilegia vulgaris* occurring within the works area of the project site. The survey shall also aim to confirm the presence/absence of *Centaurea cyanus* within the works area during the growing season immediately prior to the commencement of construction works.

The ECoW will ensure that best practice construction methods and mitigation measures detailed in this EIAR and accompanying planning documentation including the Construction Environmental Management Plan (CEMP) and Natura Impact Statement are implemented in full.

The ECoW will be responsible for ensuring that the construction phase contractor is aware of key biodiversity receptors, such as the Lower River Suir SAC, the presence of populations of white-clawed crayfish, spawning habitat for Atlantic salmon and lamprey, the presence of otters and high value bat foraging and breeding bird habitat. The ECoW will inspect the construction works throughout the construction phase and will pay particular attention to the implementation of all biodiversity related mitigation measures.

The ECoW will provide monitoring inspection reports during the construction phase and will also provide a close-out report following the completion of the contract construction works.

Where necessary the ECoW will liaise with relevant authorities such as Tipperary County Council, the IFI and the NPWS with respect to construction phase activities that relate to biodiversity.

As part of the ECoW terms of appointment, the ECoW will be vested with the authority to stop works where activities have been identified on site that are not in accordance with the mitigation measures outlined in this EIAR, the Natura Impact Statement and/or the CEMP prepared for the planning application for the proposed development and/or any Conditions/Restrictions in any Approval.

### ***Protected Species Licensing***

Based on current knowledge, there is no requirement for protected species licences have been identified for biodiversity receptors that may require such licences to permit disturbance to breeding or resting sites. The ECoW will be required to complete pre-construction surveys in advance of the commencement of construction works and based upon the results of these surveys the ECoW will establish whether or not there is a need at that stage for protected species licences. An example of where such a need could arise is where an otter holt becomes established in the immediate vicinity of the proposed constructed works.

### ***Measures to Minimise Impacts to Habitat***

As noted in Section 5.4.2 above there will be temporary loss of broad-leaved woodland, riparian woodland, dry meadows and grassy verges and reed and large sedge swamp to the construction phase infrastructure. Once the temporary construction infrastructure that will result in the temporary land take in these habitats is removed, the contractor will be required to undertake reinstatement works so that

these habitats can be reinstated over the short-term duration (i.e. up to 7 years). For the woodland habitats this will require the replanting of the temporary footprint with tree species typical of these habitats. Given that the areas of woodland to be reinstated will be located under the new bridge section shade tolerant species, which already occur in the woodland habitat, such as *Ilex aquifolium*, *Sambuca nigra*, and *Salix aurita* will be used to reinstate woodland. The contractor will be required to engage with the project ECoW and an experienced landscaper during the reinstatement of woodland habitat.

The area of dry meadows and grassy verges will be reinstated with a herb layer consisting of native species already occurring on the island. The construction phase landscaper will be required to collect seed from native herbs and grasses occurring within the dry meadows and grassy verges habitat and reseed this area of the site.

The area of reed and large sedge swamp will be reinstated with a hydrophilous herb layer consisting of native species already occurring within the habitat along the southern bankside of the River Suir. The construction phase landscaper will be required to collect seed from native hydrophilous herbs and grasses occurring within the reed and large sedge swamp habitat and reseed this area of the site.

#### ***Measures to Minimise Impacts to Plant Species of Local Interest***

Plants of local conservation interest that are identified as occurring within the footprint of the construction works will be removed and translocated to an alternative suitable location on Suir Island outside the footprint of the project site. During the baseline surveys these plant species have been identified as *Orobancha hederarum*, *Aquilegia vulgaris* and *Symphytum officinale*. The translocation of these plants will be undertaken under the supervision of the project ECoW. The project ECoW will direct the contractor to excavate the plants as turves that will be a minimum of 0.5m x 0.5m to a depth of 0.3m. The plants will be translocated to a suitable receptor location on the island with conditions similar to those occurring at the original site.

#### ***Measures to Minimise Impact to Breeding Birds***

Where possible vegetation to be cleared onsite will be completed outside the nesting bird season between March and August inclusive. Where it is not possible to time such works outside these months then a survey of hedgerow/treeline/grassland vegetation and habitats for the presence of nesting birds will be required to be completed prior to the commencement of vegetation removal by an experienced ecologist. This will involve a detailed inspection of the vegetation to be removed for the presence of nest. Particular attention will be required to be given to establishing the presence of red or amber listed bird species. In the event that nests are identified, vegetation clearance/removal will be postponed until it is confirmed that the nest sites are no longer active or after the breeding bird season terminates. While the nest is active an appropriate exclusion zone will be implemented around the nest by the ECoW and the contractor will be advised of the exclusion zone. In the event that it is not possible to postpone such works, then they will only be allowed to proceed following consultation with the NPWS, and where required, upon receipt of a licence from the Department/NPWS permitting the destruction of the nests.

Noise mitigation measures will be implemented during the construction phase and these measures are detailed in Chapter 10 of this EIAR. The noise mitigation measures will be implemented with the aim of minimising noise levels throughout the construction phase. The implementation of these measures will also minimise the potential for noise disturbance to bird species, as well as other fauna occurring in the vicinity of the site.

#### ***Measures to Minimise the Impact of Artificial Lighting during the Construction phase***

All working hours will occur within daylight hours between the months of April to October. From late October to mid-March working hours will hours of darkness between 7am and 8am and between 5pm and 7pm. Outside of working hours all artificial lighting that has the potential to cast light on the river will be turned off. In addition during the months of late March=October to mid-March artificial lighting that casts

light onto the river channel will not be used and will be turned off. In effect this will require any works in the vicinity of the river during these months to be completed during daylight hours. It is further noted that works near the river associated with the installation of piers and abutments and the landing of the bridge superstructures will be completed between the months of April to October, during the time of year when precipitation is low and the risk of flooding is minimised.

### ***Measures to Safeguard Water Quality of the River Suir***

The management of surface water during the construction phase will adhere to the recommendations of the CIRIA guides Control of Water Pollution from Construction Sites (2001) and Control of Water Pollution from Linear Construction Projects (2006)

During construction key requirements for control of chemical pollution risk will include:

- Storage – all equipment, materials and chemicals will be stored away from any watercourse. Chemical, fuel and oil stores will be sited on impervious bases and within a secured bund of 110% of the storage capacity, within the lay down area;
- The integrity and water tightness of all the bunding structures and their resistance to penetration by water or other materials stored therein shall also be tested and demonstrated.
- All fuel oil fill areas will have an appropriate spill apron.
- Vehicles and refuelling – standing machinery will have drip trays placed underneath to prevent oil and fuel leaks causing pollution. Where practicable, refuelling of vehicles and machinery will be carried out on an impermeable surface in designated areas, well away from any surface watercourse;
- Maintenance – maintenance to construction plant will not be permitted on site unless vehicles have broken down necessitating maintenance at the point of breakdown. All necessary pollution prevention measures will be put in place prior to commencement of maintenance in this instance;
- Concrete - Wet concrete operations would not be carried out within watercourses or adjacent to watercourses. Runoff from wastewaters or contaminated storm water will be directed to drains installed as part of the surface water management plan;
- Mess, sanitation and welfare facilities will be required during construction and will be located at the construction compound. Foul effluent will make use of chemical facilities with periodic removal for offsite disposal.

Care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces will be within the main excavation site which limits the potential for any offsite impacts. Soil material excavated on site will be transferred directly to a dumper truck. The excavated material will be stored temporarily on site with the main temporary site compound on Suir Island. The storage of excavated material will be positioned within the temporary site compound a minimum of 50m from the River Suir. Excavated made ground will be stored separately from soil material.

During construction works there will be potential for the pooling of surface water or groundwater within excavations or with sheet piled working areas. On The Quay at the north side of the proposed development any surface water pooling within excavations or sheet piled areas will be pumped from these areas and discharged to the existing foul sewer system. The surface water will be pre-treated by passing the surface water through a mobile settlement and clarification treatment tank (e.g. a silt buster). The treated surface water will then be conveyed from the mobile silt tank via a lay flat that will be connected to the foul sewer system. This approach will eliminate the potential for discharge of surface water generated within excavation and sheet piled areas on The Quay to the River Suir.

On Suir Island any surface water pooling within excavations or sheet piled areas will be pumped from these areas, via a lay flat to a mobile settlement and clarification treatment tank. The treated water will then be conveyed from the treatment tank, via a lay flat and discharged over level vegetated ground on Suir Island to the east of the flood berm. This will provide for the dispersal and attenuation of surface water over vegetated ground cover and will avoid the discharge of surface water from these working areas on Suir Island to the River Suir.

On the south side of the proposed development site, adjacent to Raheen Road any surface water pooling within excavations or sheet piled areas will be pumped from these areas and discharged to the existing foul sewer system. The surface water will be pre-treated by passing the surface water through a mobile settlement and clarification treatment tank (e.g. a silt buster). The treated surface water will then be conveyed from the mobile silt tank via a lay flat that will be connected to the foul sewer system. This approach will eliminate the potential for discharge of surface water generated within excavation and sheet piled areas on The Quay to the River Suir.

Any minor ingress of groundwater and collected rainfall in the excavation will be pumped out during construction in accordance with the approach described in the above paragraphs. It is estimated that the inflow rate of groundwater will be moderate to fast according to the available field data logs. Extensive monitoring will be adopted to ensure that the water is of sufficient quality to discharge to the foul sewer network and vegetated ground on Suir Island. The use of additional settlement and silt traps and an oil interceptor (if required) will be adopted if the monitoring indicates the requirements for the same with no excess silt or contaminated water permitted to discharge to the sewer. Due to the very low permeability of the glacial subsoils and the relative shallow nature for excavations, infiltration to the underlying aquifer is not anticipated.

#### ***Measures to Safeguard Water quality during Earthworks***

Site preparation, excavations and levelling works are required to facilitate the construction of the two pedestrian bridges, construction of path/ promenade, bike cycle path, road improvements, landscape works and associated works. Excavated soils will be disposed off-site to a licenced facility by a licenced contractor. Contractors shall be required to submit and adhere to a method statement indicating the extent of areas likely to be affected and demonstrating that this is the minimum disturbance necessary to achieve the required works.

According to onsite investigations, the bedrock vulnerability is 'Moderate' to 'High' across the proposed development site. The deposition of infill soil would increase the overburden thickness and thus may even decrease the groundwater vulnerability. Furthermore, the proposed development will be covered by concrete and other impermeable material which will act as a protective layer to the underlying geology and bedrock.

Temporary storage of soil will be carefully managed in such a way as to prevent any potential negative impact on the receiving environment and the material will be stored within the temporary site compound on Suir Island, away from any open surface water drains and a minimum distance of 50m away from the River Suir. Movement of material will be minimised in order to reduce degradation of soil structure and generation of dust. All excavated material will be temporarily stored adjacent to the trench prior to disposal off-site.

Although there is no evidence of historical contamination in the proposed development area, all excavated materials will be visually assessed for signs of possible contamination such as staining or strong odours. Site investigations classified the subsoils as 'inert'. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of possible contaminants in order to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be disposed of by a licensed waste disposal contractor.



Stockpiles have the potential to cause negative impacts on air and water quality. The effects of soil stripping and stockpiling will be mitigated against through the implementation of appropriate earthworks handling protocol during construction. It is anticipated that any stockpiles will be formed within the boundary of the site and there will be no direct link or pathway from this area to any surface water body. Overburden material will be protected from exposure to wind by storing the material in sheltered parts of the site, where possible.

#### ***Measures to Safeguard against the Release of Hydrocarbons***

To control and contain any potential hydrocarbon and other harmful substances spillage by vehicles during construction, it is recommended where possible to refuel plant equipment off the development site, thus mitigating this potential impact by avoidance. However, given the remote nature of the Site, this is not likely to be a practical measure for all equipment.

If fuelling must occur on site, then a discrete “fuel station” will be designated for the purpose of safe fuel storage and fuel transfer to vehicles. This fuel station will be bunded to 110% volume capacity of fuels stored at the site. The bunded area will be drained by an oil interceptor and drainage of same will be controlled by a pent stock valve that will be opened to discharge storm water from the bund. A suitably qualified management company will take responsibility for management and maintenance of the oil interceptor and associated drainage on a regular basis, including decommissioning following construction.

Despite the management of refuelling and fuel storage, there remains the risk of leakage from vehicles and plant equipment during construction activity. The plant equipment used on site will require regular mechanical checks and audits to prevent spillage of hydrocarbons on the exposed ground (during construction).

Soils contaminated with hydrocarbons will be removed and stored in a temporary bund before being disposed of off-site in an appropriate manner. Oily or impacted runoff will be contained and pumped through a treatment tanks / settlement tank with in line GAC filters before treated water is discharged.

In the event of an accidental spill during the construction or operational phase of the Development, contamination occurrences will be addressed immediately, this includes the cessation of works in the area of the spillage until the issue is resolved. In this regard, spill kits will be kept in each vehicle associated with the Development i.e. spill kits will be readily available to all operators. Spill kits will contain a minimum of; oil absorbent granules, oil absorbent pads, oil absorbent booms, and heavy-duty refuse bags (for collection and appropriate disposal of contaminated matter). No materials contaminated or otherwise will be left on the Site. Spill kits will also be established at proposed construction areas, for example; a spill kit will be established and mobilised as part of the sheet piled area materials and equipment. Suitable receptacles for hydrocarbon contaminated materials will also be at hand.

Once the above measures are implemented the risk of hydrocarbon contamination intercepting the surface water network will be significantly reduced, however there remains a level of risk, and therefore both precautionary measures and emergency response protocols as specified in the OCEMP will be implemented on site.

#### ***Measures to Safeguard against the Release of Cement-Based Products***

The Contractor is obliged to implement the following control measures to avoid the release of cement-based pollutants:

- No batching of wet-cement products will occur on site. Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place;
- Where possible, pre-cast elements for culverts and concrete works will be used;

- No washing out of any plant used in concrete transport or concreting operations will be allowed on-site;
- Where concrete is delivered on site, only the chute shall be cleaned, using the smallest volume of water possible. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water is to be tanked and removed from the site to a suitable, non-polluting, discharge location;
- Use weather forecasting to plan dry days for pouring concrete;
- Ensure pour site is free of standing water, and plastic covers will be ready in case of sudden rainfall event.
- Disposal of raw or uncured waste concrete will be controlled to ensure that watercourses or other sensitive areas will not be impacted
- No cement will be required for works associated with horizontal directional drilling under watercourses and no cement will be stored in the vicinity of watercourses during such works.

#### ***Measures to Safeguard against the Release of Other Pollutants***

All precautions will be taken to avoid spillages of diesel, oil or other polluting substances during the construction phase. The Contractor is obliged to implement the following measures to prevent contamination of watercourses:

- No refuelling of construction vehicles or plant will take place within the 50m surface water buffer zone.
- Undertaking refuelling of plant, equipment and vehicles will only be undertaken on impermeable surfaces.
- No maintenance of construction vehicles or plan will take place along the proposed route, except in a case of emergency.
- All potentially hazardous chemicals, fuel, hydraulic oils and lubricants will be stored in bunded areas (in accordance with established best practice guidelines) at the Contractor's Temporary Compound.
- In order to reduce the risk of contamination arising as a result of spills or leakages, all fuels, chemicals, liquid and solid waste will be stored on impermeable surfaces.
- If there is a requirement to store hazardous chemicals on site, they will be stored within a bunded, locked COSHH container, with upkeep and security ensured by the contractor.
- All tanks and drums are to be bunded in accordance with established best practice guidelines.
- Re-fuelling of construction equipment and the addition of hydraulic oil or lubricants to vehicles / equipment will take place in designated bunded areas within the main construction compound and not on-site where reasonably practicable. If it is not possible to bring machinery to the refuelling point, fuel will be brought to site by a 4x4 in a double skinned bowser with drip trays. The bowser/4x4 will be fully stocked with spill kits and absorbent material, with delivery personnel being fully trained to deal with any accidental spills. The bowser will be bunded appropriately for the fuel usage volume for the time period of the construction.
- The plant and machinery used will be regularly inspected for leaks and fitness for purpose.
- Spill kits will be readily available to deal with accidental spillage at all times.
- A segregated waste storage will be available at the substation construction site.
- All existing road drains/culverts will be temporarily blocked during the drilling works to ensure that sediment or accidental spills do not reach any local watercourses.
- An inventory of all chemicals on site will be kept. It will include:
  - Procedures for storage of all materials listed
  - Location details of all materials listed
  - Volume and description of all substances stored on-site

- Waste disposal records, including copies of all Waste Transfer Notes (WTN) detailing disposal routes and waste carriers used. Where waste is being shipped abroad, a copy of the Trans Frontier Shipping (TFS) document must be obtained from Dublin City Council and kept on site along with details of the final destination and any relevant permits, licences or other relevant documentation.
- Chemical storage details will be part of routine site audits.
- Only where absolutely necessary should any hazardous waste be stored on site. If so, Hazardous Waste should be stored in a COSHH store. Only trained operatives should handle hazardous substances. Please note that COSHH data sheets are NOT risk assessments and all risk assessment should be carried out separately. All stored hazardous waste will be clearly labelled. All of these will be regularly inspected for visual signs of leaks or something that would impact on their capacity – e.g. where a drip tray is full of rainwater.

### ***Measures to Safeguard against the Release of Sewerage***

A self-contained port-a-loo system with an integrated waste holding tank will be used on site for toilet facilities. This will be maintained by the service contractor as required and will be removed from the site on completion of the construction phase.

### ***Measures to Safeguard against Impacts during Piling Works***

In order to avoid the potential for adverse impacts to instream habitats, spawning locations of sea lamprey, river lamprey, Atlantic salmon and other fish species and white-clawed crayfish during the operation phase the method of piling to be implemented will be based on rotary piling techniques. This approach to piling will eliminate the potential for high impact (noise and vibration inducing) strikes or hammering. This coupled with the set-back distances of the pile locations from the river at all pier and abutment locations, as well as the presence of the bedrock and overburden between the river and the pile locations at piers and abutments, will ensure that no noise or vibration associated with the piling will have the potential to cause injury to fish (i.e. will not exceed the low guide value of the 183 dB within adjacent waters) within the river channel adjacent to the piling locations.

In addition the timing of all piling works will be timed to occur outside the most sensitive time of the year when Atlantic salmon and lamprey species spawn along the section of the River Suir at Suir Island. River lamprey spawn along this section of the River Suir during spring time, between March and April (Gallagher et al., 2022); sea lamprey usually spawns in late May or June, when the water temperature reaches at least 15°C (Maitland, 2003) and surveys of sea lamprey spawning along this section of the River Suir coincides with this timeframe (Gallagher et al., 2019, 2020, 2022). Atlantic salmon spawn along this section of the River Suir during the winter and spring between November and March. In view of these spawning timeframes and taking into account the time of year when river flows are typically low, all piling works will be timed to be undertaken between mid-July and September.

In addition to the above the approach to the rotary piling will include a slow start-revving up procedure. This will involve slowly starting rotary piling and revving up the piling over a 30-minute period. This slow start period will allow noise-sensitive species to move away from the piling area and avoid injury.

The use of rotary bored piling will also ensure that vibration levels associated with this piling will be low and will not present a risk of undermining the integrity of adjacent river banks and their collapse.

In order to eliminate the potential for sheet piling installation works to result in river bank instability and collapse the sheet piling to be used will consist of interlocking steel panels, which will be driven through the overbank materials prior to any excavations occurring near the riverbanks. The interlocking/retaining nature of the sheetpiling will protect the riverbanks from destabilising during the piling operations and subsequent works within the sheet piled working area.

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With the implementation of the above measures it is concluded that the piling works during the construction phase will not result in adverse effects to Annex 2 fish species, white-clawed crayfish or otter supported by the stretch of the River Suir surrounding Suir Island.

***Measures to Safeguard against Impacts from Construction Phase Artificial Lighting***

All working hours will occur within daylight hours between the months of April to October. From late October to mid-March working hours will be hours of darkness between 7am and 8am and between 5pm and 7pm. Outside of working hours all artificial lighting that has the potential to cast light on the river will be turned off. In addition, during the months of late October to mid-March artificial lighting that casts light onto the river channel will not be used and will be turned off. In effect this will require any works in the vicinity of the river during these months to be completed during daylight hours. It is further noted that works near the river associated with the installation of piers and abutments and the landing of the bridge superstructures will be completed between the months of April to October, during the time of year when precipitation is low and the risk of flooding is minimised.

### **5.5.2 Operation**

***Measures to Minimise the Effect of Artificial Lighting to Fauna***

The following measures will be implemented to minimise the impact of artificial night lighting to bats, other nocturnal species and aquatic fauna:

The final lighting design will avoid light spill to the River Suir and the design will be required to demonstrate no change in light conditions on the river.

The lighting design for the bridge sections will be based upon the best practice guidelines for bats and lighting prepared by the Institute of Lighting Professionals and Bat Conservation Trust.

The following key requirements will be incorporated into the lighting design:

Lighting will be controlled via movement sensors which will be triggered by human activity as people walk or cycle by at night. This lighting regime will reduce the overall time that the lighting is in use which could in turn reduce impacts on bats and insects. In addition to this a Central Monitoring System will be installed allowing lights to be monitored remotely and individually controlled. Bespoke dimming regimes can be installed or particular lighting units switched off or dimmed during periods of low-level use.

All luminaires will lack UV elements and only LED luminaires will be used.

Metal halide fluorescent have not been used in the design.

A warm white spectrum light will be used to reduce blue light component

The luminaires should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats.

Other features that have been incorporated into the public lighting design include the following:

Lighting will be based on movement sensors and so will not be on all the time.

The spacing between light columns has been maximised in order to avoid excessive illumination along the greenway.

The height of lighting columns has been minimised to a height of 5m to reduce lighting within a great heights where foraging bats will be active.

The lights have been designed to minimise light spill and no light will spill onto the river channel, ensuring the potential impacts of lighting to aquatic fauna are avoided. Only luminaires with an upward light ratio of 0% and with good optical control have been included in the lighting design

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All luminaires should always be mounted on the horizontal – no upward tilt.

### ***Monitoring of Habitat Reinstatement***

Ongoing monitoring of habitat reinstatement areas and translocated plants as specified above will be completed during the operation phase of the project. The monitoring of the four areas of habitat reinstatement in the broad-leaved woodland, riparian woodland, dry meadows and grassy verges and reed and large sedge swamp as well as the locations for translocated plants will be completed by an experience ecologist appointed by Tipperary County Council. The monitoring will be undertaken during the growing season, between the months of June and August during years 1, 2, 3, 5 and 7 of the operation phase. The ecologist will assess the reinstatement of the habitats and where growth failure of desired species is identified the ecologist will set out remedial actions with the aim of establishing growth of desired species and habitat enhancement.

### ***Habitat Enhancement***

In order to enhance the quality of habitat occurring within the project site and the adjacent Suir Island the following habitat enhancement measures are recommended:

Bird nest boxes will be erected on appropriately trees occurring within or adjacent to the project site. The trees that will support nest boxes will be selected by the construction phase ECoW.

Bat boxes will be erected on appropriately trees occurring within or adjacent to the project site. The trees that will support nest boxes will be selected by the construction phase ECoW.

### ***Riparian Woodland Habitat Enhancement***

As part of the overall management of Suir Island Tipperary County Council will undertake habitat management of the riparian woodland on the island. The extent of riparian woodland as mapped on Figure 5.6 Habitat Map will be managed as a Disturbance Sensitive Zone. Recreational use of this habitat will not be encouraged. Activities within this woodland will be confined to habitat management measures and the ongoing removal of non-native trees and their replacement with native, positive indicator species. Non-native trees will be selected for removal with *Acer pseudoplatanus* and *Prunus laurocerasus* being targeted for removal. Other non-native trees occurring in this habitat include *Fagus sylvatica* and *Aesculus hippocastanum*. These species are of cultural value owing to their origin as part of the landscaping of the island during the 1800's. *Acer pseudoplatanus* selected for removal will be hand cut into sections by a tree surgeon to prevent damage to the woodland ground layer. Cut wood will be left in log piles to limit damage to native ground flora. The removal of semi-mature to mature *Acer pseudoplatanus* will be undertaken over the longer term with the aim of avoiding large gaps in the canopy layer. The location and number of trees to be selected for removal on an annual basis will be overseen by personnel with expertise in landscaping and woodland management. As a guide a maximum of 4 – 5 isolated trees with diameter at breast height (dbh) >7cm and <30cm should be removed annually. Canopy layer regeneration in gaps will be established by replacing non-native trees removed with native positive indicator species in the form of alder or oak. Alder and oak seed will be collected from native woodland sites the wider locality. A nursery stock of alder and oak will be established. Seed for the nursery stock will be collected from the Alluvial woodland habitat occurring at Marlfield Lake pNHA, short distance to the west of Clonmel. This is the nearest example of an established Alluvial woodland to Suir Island. The Alluvial woodland at this location supports stands of alder and oak. Alder and oak seedlings from the nursery stock will be used for replanting.

Holly and willows will be used for under planting in the shrub layer. All felling operations should be scheduled between the months of September to early November, outside the bird breeding season and at a time when disturbance to bats will be minimised.

Monitoring of all areas cleared of non-native invasive species trees (e.g. *Acer pseudoplatanus*) and shrubs (e.g. *Prunus laurocerasus*) will be undertaken by Tipperary County Council and regrowth of these undesirable species will be manually removed by cutting or pulling. The removal of non-native

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regeneration will be undertaken during the months of April – May. The application of herbicide such as glyphosate will be used as a last resort to treat regrowth of non-native species. Where glyphosate is to be applied, it will be done so by spot spraying the target plant. No blanket spraying of glyphosate will be permitted as part of the treatment of non-native species regrowth.

Of particular importance is the removal of all non-native invasive seedlings and saplings. All non-native saplings and seedlings in the sub-canopy shrub layer will be removed by cutting, stump treatment or by pulling.

The overall aim of the woodland habitat enhancement will be the achievement of targets set out for Alluvial woodland habitat attributes outlined in the Lower River Suir SAC site-specific conservation objectives (NPWS, 2017). Monitoring of the success of the woodland habitat enhancement measures set out above will be undertaken every 5 years.

### **5.6 Residual Impacts**

With the implementation of all mitigation measures the residual impact of the project will be confined to the permanent loss of negligible areas of mixed broadleaved woodland, dry meadows and grassy verges and scrub habitat to the footprint of piers, abutments and the promenade/path. This residual impact will represent an effect of negligible permanent significance.

The design of lighting as per the specifications set out in this chapter will ensure that the lighting regime provided during the operation phase of the project does not result in ongoing disturbance to sensitive receptors such as bats, nocturnal invertebrates and aquatic fauna.

### **5.7 Difficulties in Compiling Information**

There were no difficulties in compiling the information set out in this Biodiversity Chapter.

### **5.8 References**

Rooney, S.M., O’Gorman, N.M., Cierpial, D. and King, J.J. (2014) National Programme: Habitats Directive and Red Data Book Species Executive Report 2013. Inland Fisheries Ireland, Swords Business Campus, Swords, Co. Dublin, Ireland.

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