



Natura Impact Statement

Suir Island Infrastructure Links

Doherty Environmental Consultants Ltd.

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Suir Island Infrastructure Links

Natura Impact Statement

This report is prepared for and on behalf of
Tipperary County Council .

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1 INTRODUCTION

Doherty Environmental Consultants (DEC) Ltd. has been commissioned by Tipperary County Council to prepare a Natura Impact Statement (NIS) to inform an Appropriate Assessment (AA), to be undertaken by the competent authority under Article 6(3) of the EU Habitats Directive, Council Directive 92/43/EEC, as transposed into national legislation by *inter alia* Part XAB of the Planning and Development Act 2000 as amended (the “Planning and Development Act”), for the proposed Suir Island Infrastructure Links project. This Natura Impact Statement provides an examination of the project and its potential to result in adverse impacts to the Lower River Suir SAC. Figure 1.1 shows the location of the Suir Island Infrastructure Links project.

In accordance with Article 6(3) of the Habitats Directive, as transposed into Irish law by *inter alia* Part XAB of the Planning and Development Act, a Screening Report for Appropriate Assessment (AA) was prepared to assess whether it could or could not be excluded, on the basis of objective information, that the project, either individually or in combination with other plans or projects, was likely to have a significant effect on any European Sites.

The Screening Report for Appropriate Assessment was prepared by DEC Ltd. on behalf of Tipperary County Council and is provide as Appendix 1 to this NIS. The Screening Report for Appropriate Assessment concluded, on the basis of objective information and in view of best scientific knowledge and the conservation objectives of the European Sites occurring within the zone of influence of the project, that, in the absence of appropriate mitigation, it could not be excluded at the screening stage that the project individually or in combination with other plans or projects, will have a significant effect on one European Site, namely, the Lower River Suir SAC.

The conclusion of the Screening Report was informed by a precautionary approach and adopted a worst-case scenario.

On the basis of that conclusion, it has been determined that AA is required in order to assess the implications of the project for the Lower River Suir SAC.

This NIS provides an examination, analysis and evaluation of the likely impacts from the Project, both individually and in combination with other plans and projects, in view of best

scientific knowledge and the conservation objectives of the European Site concerned. It also prescribes conditions and/or restrictions by appropriate mitigation to ensure that the Project will not have adverse effects on the integrity of the Lower River Suir SAC. The NIS provides complete, precise and definitive findings, capable of removing all reasonable scientific doubt as to the absence of adverse effects on the integrity of the European sites concerned.

1.1 SUMMARY OF SCREENING REPORT FOR APPROPRIATE ASSESSMENT

The Screening Report prepared for the Suir Island Infrastructure Links project identified three European Sites, comprising three SACs within a wider area of the project. All other European Sites are located at a significant distance from the project site and are not connected to it via source-impact-receptor (SPR) pathways. These three European Site are shown on Figure 1.2 and comprise the Lower River Suir SAC, the Comeragh Mountains SAC and the Nier Valley Woodlands SAC.

The Comeragh Mountains SAC and the Nier Valley Woodlands SAC were not identified as being located within the zone of influence of the project based on the distance separating the project from these two SACs (c. 10km and 8.5km respectively); the location of these two SACs in separate surface water sub-catchments to the project site; and the absence of source-impact-receptor (SPR) pathways connecting the project to these SACs.

Elements of the project are located within the boundary of the Lower River Suir SAC. The proposed northern and southern bridge sections of the project 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 relationship between the Suir Island Infrastructure Links project and the Lower River Suir SAC boundaries are shown on Figure 1.3 below.

The Lower River Suir SAC is selected as an SAC for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[1330] Atlantic Salt Meadows

[1410] Mediterranean Salt Meadows

[3260] Vegetation of flowing waters

[6430] Hydrophilous Tall Herb Communities

[91A0] Old Oak Woodlands

[91E0] Alluvial Woodland*

[91J0] Yew Woodlands*

[1029] Freshwater Pearl Mussel (*Margaritifera margaritifera*)

[1092] White-clawed Crayfish (*Austropotamobius pallipes*)

[1095] Sea Lamprey (*Petromyzon marinus*)

[1096] Brook Lamprey (*Lampetra planeri*)

[1099] River Lamprey (*Lampetra fluviatilis*)

[1103] Twaité Shad (*Alosa fallax*)

[1106] Atlantic Salmon (*Salmo salar*)

[1355] Otter (*Lutra lutra*)

During the screening of the project it was found that the construction phase of the project has the potential to result in:

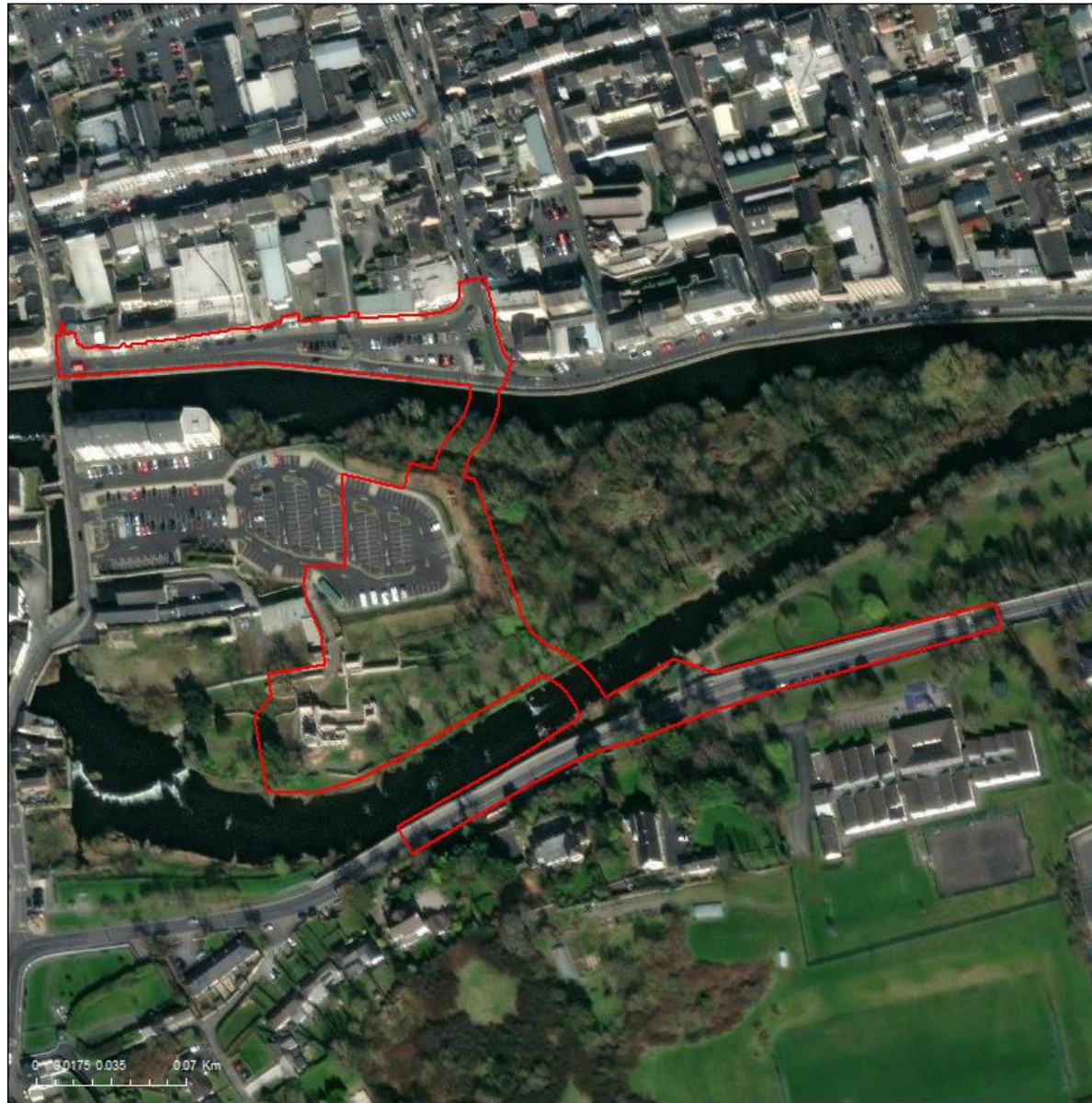
- Perturbations to water quality;
- the generation of noise/vibration and light emissions with the possibility for associated disturbance to qualifying species
- the disturbance of qualifying species as a result of construction works

- the spread of non-native invasive plant species during the construction phase
- human presence and activity during the operation phase with the possibility for associated disturbance to qualifying species
- the generation of light emissions during the operation phase with the possibility for associated disturbance to qualifying species

With these potential impacts identified, the screening exercise then examined which qualifying features of interest of the Lower River Suir SAC occur within the zone of influence of the project and are potentially at risk of being affected by these impacts. On foot of this exercise the following qualifying features of interest of the Lower River Suir SAC were identified as being at risk:

- Alluvial woodland
- Vegetation of flowing waters;
- Hydrophilous tall herb fringe;
- White-clawed crayfish;
- Migratory fishes in the form of sea lamprey; brook lamprey; river lamprey; Atlantic salmon and twaite shad;
- freshwater pearl mussel
- otter

Given the potential risks posed by the project to these qualifying features of interest of the Lower River Suir SAC, the Screening Report concluded that a NIS was required to evaluate further the potential for these impacts to result in adverse effects to this European Site and where necessary prescribe mitigation measures to avoid such adverse effects.



Suir Island Infrastructure Links

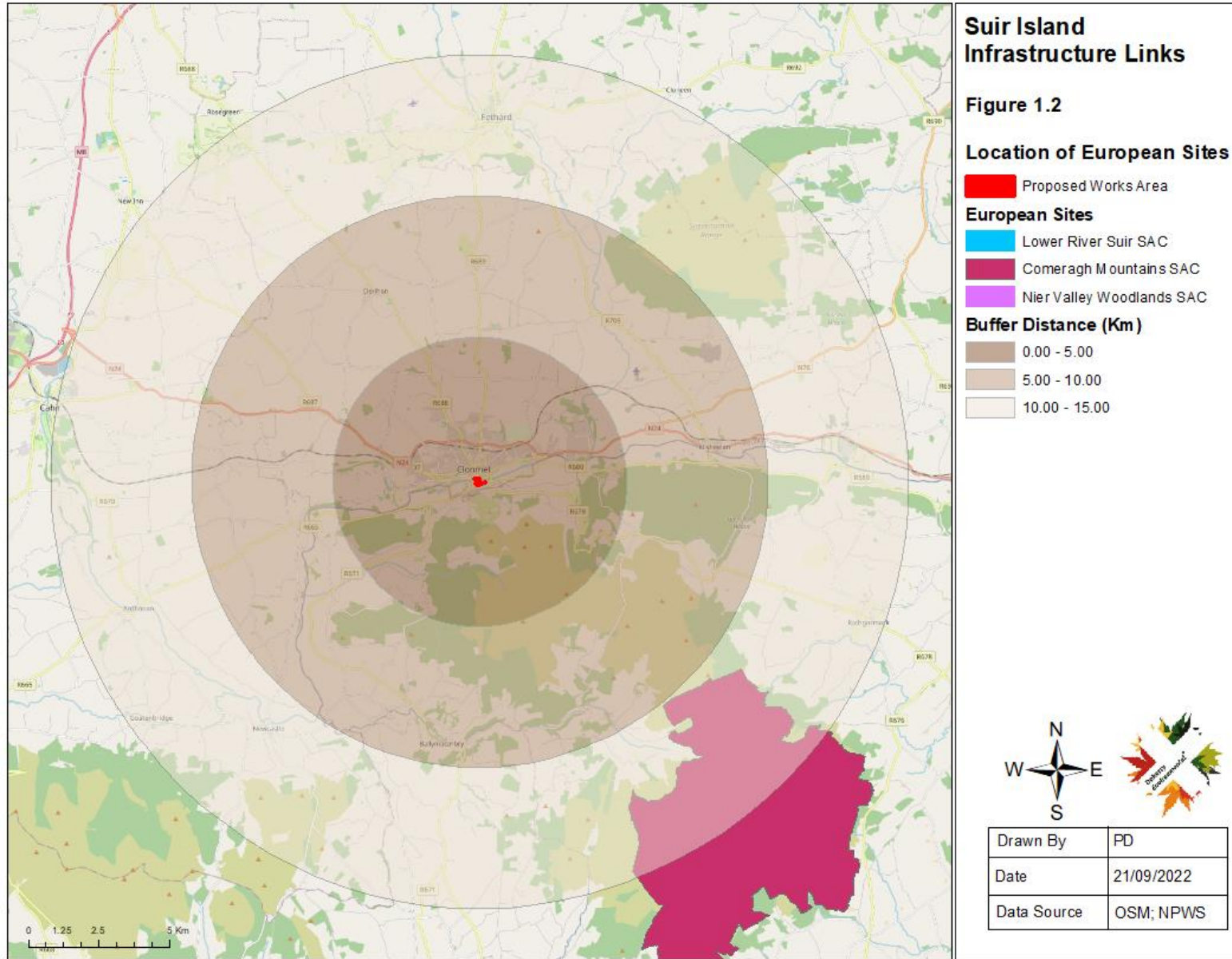
Figure 1.1

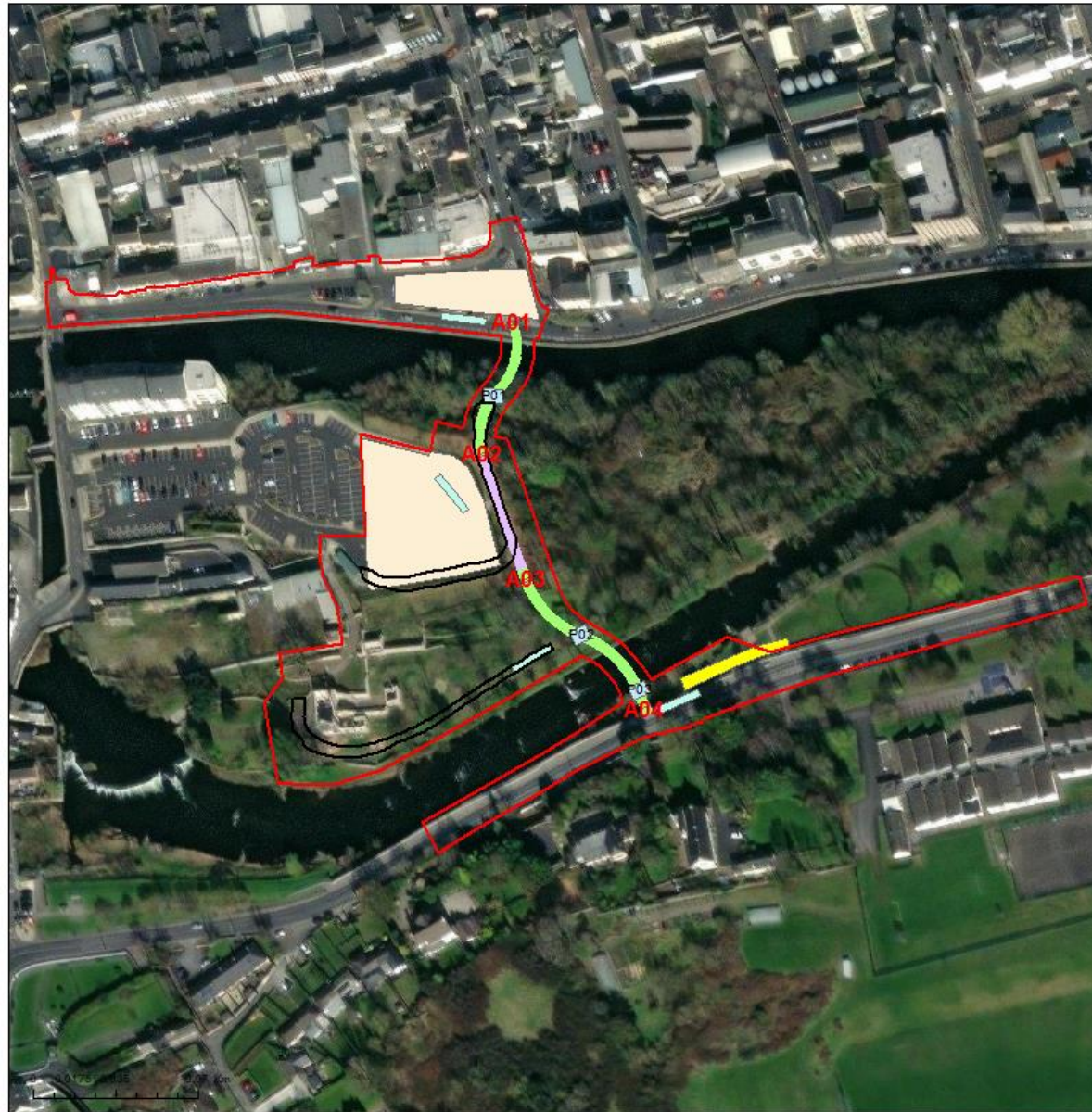
Site Location

— Proposed Works Area



Drawn By	PD
Date	12/09/2023
Data Source	Bing





Suir Island Infrastructure Links

Figure 1.3
Project Site & Elements & Lower River Suir SAC

- Proposed Works Area
- Temporary Access Ramp
- Crane Locations
- Sheet Piled Working Area
- Piers
- Abutments
- Promenade
- Bridges
- Temporary Bridge Assembly Area
- Temporary C Construction Compound

Drawn By	PD
Date	12/09/2023
Data Source	Bing

1.2 GUIDANCE

This NIS has been undertaken having regard to National and European guidance documents including: *Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities* (DEHLG 2010) and *Assessment of Plans and Projects Significantly Affecting Natura 2000 sites – Methodological Guidance of the Provisions of Article 6(3) and (4) of the Habitats directive 92/43/EEC*.

The following guidance documents were also of relevance during this the preparation of this NIS:

- *Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities* (2010). DEHLG.
- *Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites – Methodological Guidance of the Provisions of Article 6(3) and (4) of the Habitats Directive 92/42/EED*. European Commission (2021).
- *Managing Natura 2000 Sites – The provisions of Article 6 of the Habitats directive 92/43/EEC*. European commission (2018).

This NIS presents the findings of an examination, analysis and evaluation of the project to inform a Stage 2 Appropriate Assessment of the project.

1.2.1 Stage 2: Appropriate Assessment

The EC Guidance Assessment Criteria for a Stage Two Appropriate Assessment provides the following steps:

1. the collection of information on the project and on the European Sites concerned;
2. An assessment of the implications of the project in view of the site's conservation objectives, individually or in combination with other plans or projects;
3. An evaluation as to whether the project can have adverse effects on the integrity of European Sites;

4. The consideration of conditions and/or restrictions including mitigation measures in the carrying out of the project (including their monitoring).

This NIS addresses each of these items, through the following sections provided below.

1.3 SCIENTIFIC INVESTIGATIONS

A range of scientific site investigations have been completed for the project and these are relied upon in this Natura Impact Statement. The primary investigations include ecological field surveys and hydrological field surveys.

Desk-based investigations were completed to identify pathways connecting the proposed project to European Sites. Datasets used to assist with the desk-based investigations include:

- NPWS European Sites and site-specific conservation objectives datasets;
- EPA Rivers and Lakes dataset;
- EPA surface water catchment and sub-catchment datasets;
- Inland Fisheries Ireland scientific investigations & publications
- NPWS Article 17 Habitats and Species datasets;
- OSI Geohive and OSI Historic townlands online mapping portal; and
- National Biodiversity Data Centre (NBDC) online mapping portal.
- NPWS Protected Species Dataset for the proposed development site and surrounding area.

The ecological field surveys that have been completed and that have informed this Natura Impact Statement include:

- Habitats and vegetation surveys and mapping as well as the recording of the presence of fauna at the proposed development site completed during October 2020, June 2021, July 2022, September 2022, April and May 2023. 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.
- Examples of habitat types that have been documented as having links to or being representative of Annex 1 habitats were targeted for further surveying to determine whether or not they are representative of an Annex 1 habitat. Riparian woodland occur to the east of and within the footprint of the project site. Perrin (2021) has identified a link between riparian woodland, that is dominated by willows with frequent ash and alder, with the Annex 1 priority habitat Alluvial woodland. 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. In addition the background information provided for the Suir Island Masterplan suggested that the alluvial woodland habitat to the eastern end of Suir Island corresponds with the Annex 1 Alluvial woodland habitat, due to the low lying area of the island and frequently inundated and supporting mature willow species and localised ash. To determine whether the riparian woodland habitats occurring within the study area is representative of this Annex 1 priority habitat the vegetation community associated with this habitat was classified. The classification of the riparian woodland was completed using the Irish Vegetation Classification ERICA software. Perrin (2021) lists eight woodland communities that have links to the Annex 1 priority habitat Alluvial woodland. Perrin (2021) also noted the Fossitt woodland

category to which each of these communities are linked. A description of the ecology of each of these communities is also provided by Perrin. Of the eight woodland communities occurring in Ireland that have links to Alluvial woodland only one, the *Salix cinerea* – *Urtica dioica* woodland community is identified as being representative of the Fossitt habitat Riparian Woodland (WN5). However, an additional 5 woodland communities that are representative of Fossitt woodland WN6 or WN6 mosaic habitats are described as occurring along rivers. These woodland habitats include: *Fraxinus excelsior* – *Galium palustre* woodland; *Alnus glutinosa* woodland; *Fraxinus excelsior* – *Iris pseudocorus* woodland; *Salix cinerea* – *Galium palustre* woodland; and *Betula pubescens* – *Rubus fruticosus* agg. woodland. A total of six 20m x 20m monitoring points were completed within the riparian woodland habitat on Suir Island to the east of the proposed development. A species-list was compiled for each monitoring stop and the species list recorded were inputted into ERICA so that the woodland community best represented by the species occurring at each monitoring stop was identified. Where woodland communities at monitoring stops were identified as being representative of any of the six woodland communities listed above then an assessment of this woodland condition and their representativeness of Alluvial woodland was completed. The condition assessment was completed with respect to the structure and function criteria set out for the alluvial woodland Annex 1 habitat by O'Neill & Barron, (2013).

- Ornithological surveys which included non-breeding season and bird transect surveys completed during October and November 2021 and October and November 2022; breeding bird surveys adapted from the methods used for 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.
- Bat surveys completed during the 2021 and 2022 bat activity seasons

- 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 ⁽¹⁾ and Bang & Dahlstrom ⁽²⁾, 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. A third camera trap was installed at a location identified as a potential otter couch during initial field survey in October 2020. 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

(1) Neal, E., & Cheeseman, C., (1996). 'Badgers'. Poyser Natural History, London.

(2) Bang, P., & Dahlstrom, P., 'Animal Tracks and Signs'. Oxford University Press, Oxford.

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.

- 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.

Detailed geotechnical, hydrological, air, noise and landscape site investigations were also completed at the proposed development between 2020 and 2022. The methods used during the completion of these site investigations are described in full in Chapter 6, 7, 8, 9 and 14 of the Suir Island Infrastructure Links EIAR (CSEA, 2023).

2 PROJECT DESCRIPTION

2.1 OVERVIEW OF THE PROJECT

The proposed development is located in the centre of Clonmel town, with the development encompassing areas located on The Quay, Quay Steet, and New Quay (i.e. The Quays), Suir Island and Raheen Road.

The proposed development will consist of:

- Two pedestrian bridges, the first bridge linking the proposed North Plaza on The Quay/Quay St/Sarsfield St Junction to Suir Island, and the second bridge connecting Suir Island to Raheen Road.
- The pedestrian bridges will be 4-metre-wide consisting of a double curvature alignment, which allow users to discover Suir Island ‘from up high’ by walking seamlessly between the trees while linking the project elements (North Plaza, the berm embankment, and the south riverbank) along one sinuous route. The first bridge follows the geometry of Sarsfield Street and arrives on the island following the line of the berm embankment, which then links onto the second bridge facilitating a link to Denis Burke Park on Raheen Road, creating a direct connection for pedestrians/cyclists between the park and the Town Centre.
- Provision of a new public open space called the North Plaza which will be aligned with Sarsfield Street. The steps and ramp will be visible from O’Connell Street creating a new landmark in the town of Clonmel and will encourage pedestrian movement towards the River Suir. The bicycle access ramp is designed to be as transparent as possible so as not to block the view of Suir Island from Sarsfield Street.
- Modification of traffic direction and carriageway width around the North Plaza and The Quay and Quay St.
- Provision of a bus stop on the western side of the North Plaza located on Quay Street with five benches providing comfortable facilities for public transport users.
- Upgrading of the existing 2-metre-wide sidewalk along Quay Street into a 4-metre-wide shared pedestrian/cycle path which will provide unencumbered access to the proposed plaza area underneath the elevated access ramp.
- Provision of a sloping landscaped terrace with public seating, located inside the hairpin-shaped access ramp leading up to the northern bridge crossing.
- Provision of three benches and a 9-metre-long stepped promenade seating area integrated into the circular-shaped plaza.

- Planting of various native tree species around the North Plaza to integrate the proposed development with the existing scenery of Suir Island and complement the visual experience of users.
- Provision of a pedestrian path or promenade along the existing berm embankment across Suir Island linking the two pedestrian bridges, to facilitate access between Denis Burke Park on Raheen Road and the proposed North Plaza on The Quay.
- Construction of a pedestrian/bicycle ramp from the link promenade onto Suir Island Carpark. The ramp is fully integrated into the landscape by using the existing slope of the berm.
- Construction of three sets of steps connecting the link promenade to Suir Island carpark and the eastern end of Suir Island.
- Provision of a mini public space within Suir Island Carpark at the entrance to the proposed Suir Island Gardens.
- Provision of a south arrival point for the second bridge connecting Suir Island to the Raheen Road. The South Arrival Point will consist of one access ramp to the east and one set of steps to the west, integrated with the bridge landing level and running parallel to the footpath. These elements will be located outside the existing flood barrier.
- Road improvements for the safety of pedestrians/cyclists at the South Arrival Point, including the footpaths being widened and the road narrowed to accommodate 3.0-metre-wide lanes. Removal of three carparking spaces from the southern edge of the road to allow for wider footpaths.
- Installation of two uncontrolled pedestrian crossings positioned at either ends of the proposed access ramp and flight of steps to provide traffic calming at the South Arrival Point. This bridge arrival point will be located close to the school entrance of Raheen College, providing safe and convenient access for the schoolchildren.

- Access ramps and steps are located behind the flood barriers to allow access even during flood events.
- Construction of a new foul pumping station to be located within Suir Island car park which will facilitate future Irish Water connections. Wastewater will be pumped 0.1km approx. via rising main along the proposed bridge linking Suir Island to the proposed North Plaza where it will connect into the existing public network along The Quay.
- Ancillary site development works to include, but not limited to, surface water drainage, lighting and associated electrical works, hard and soft landscaping, road works to include surfacing and line marking, landscaping and installation of street furniture.
- All associated site works.

Figure 1.3 above provides an overview of key elements of the project comprising the northern bridge, southern bridge, abutments, piers and pedestrian path/promenade. The entire project including the elements associated with The Plaza to be provided at the Quay and the Southern Arrival Point along Raheen Road are shown in full on drawing no. 20_071_CSE_00_XX_DR_C_2251, which is provided as Appendix 2 to this Natura Impact Statement.

2.2 DETAILS OF THE PROPOSED DEVELOPMENT

2.2.1 Proposed Bridge Structures

This section highlights the preliminary design of the proposed bridges and foundations. Refer to Drawings 20_071-CSE-GEN-XX-DR-C-2260 to 2262 for the bridge design drawings included in Volume C of Suir Island Infrastructure Link EIAR (CSEA, 2023).

The construction of the bridges will follow the high-level sequence summarised below:

- Construction of encased bored piles at six locations for the abutments and pier which will be founded on competent bedrock.
- Insitu concrete poured pile caps and piers will be constructed during dry-weather periods to allow access to the work areas. Localised sheet-piling around the works areas will be utilised

to provide protection for up to the 50% Annual Exceedance Probability or 1-in-2-year recurrence interval summer flood events.

- Provision of haul roads on the island for accessibility of machinery for pile construction and installation of bridges.
- Reinforced concrete piers will be constructed up to the soffit levels of the proposed bridges.
- The superstructures for the bridges will consist of prefabricated steel sections, which will be transported to site by exceptional road convoys which will require appropriate licensing and approval.
- The prefabricated steel sections will be assembled at 3 No. locations, namely the North Plaza, Suir Island Carpark site compound and a temporary assembly platform within Denis Burke Park.
- The bridge sections shall be installed by heavy-duty cranes in approx. 30m length sections which will place the sections on top of the completed abutment and pier structures.
- For the northern bridge, a crane will lift half of the footbridge from the North Plaza along the northern river bank while another crane will lift the other half of the footbridge from the Suir Island Carpark.

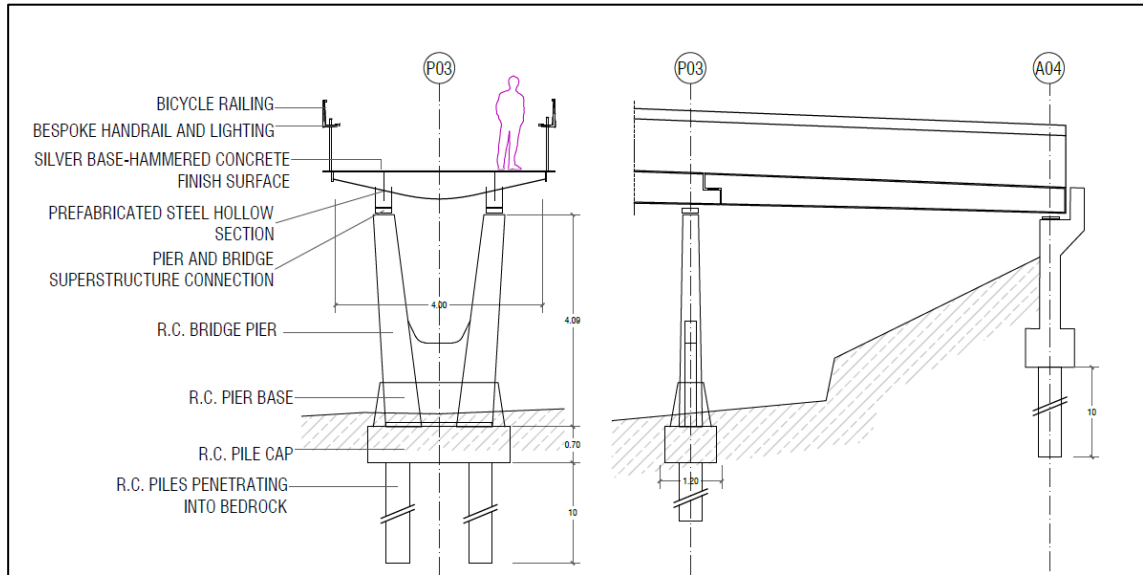
2.2.2 Foundations

Geological site investigations were completed in March 2022, which included 6 No. rotary boreholes at the abutments and pier locations to determine the depths to competent bedrock. The bridge foundations will consist of concrete encased piled foundations, with the piers and abutment structures constructed on reinforced concrete pile caps. Refer to Figure 2-12 for the positions and Table 2-2 for the details of the boreholes.

2.2.3 Bridge Substructures

The proposed bridge substructures will consist of reinforced concrete piers/abutments, constructed on top of the reinforced concrete pile caps. A typical section of the substructures is shown in Figure 2.1.

Figure 2.1: Typical section of bridge pier and abutments



2.2.4 Bridge Superstructures

The Northern Bridge crossing, connecting the North Plaza to Suir Island, will span over the Suir River for a total distance of 60m. The northern bridge abutment, access ramp and steps will be constructed behind the existing flood protection wall. A minimum clearance of 300mm is proposed above the demountable flood protection barriers and the soffit level of bridge superstructure. The demountable barrier provides flood protection for the 1% Annual Exceedance Probability event plus a 20% Climate Change allowance. The northern bridge abutment on Suir Island will be constructed on top of the existing flood protection berm.

Additional bridge parameters are summarised in Table 2.1, with dimensions measured from the North Plaza abutment to Pier No. 1 and then to the abutment constructed on top of the existing flood protection berm located on Suir Island.

Table 2.1: North Bridge parameters

Parameter	Value
Bridge deck top walkway width	4m
Span (total)	60.0m
Span between supports	34.1m and 26.0m
Bridge deck levels (top)	21.20mOD, 20.84mOD, 20.56mOD
Bridge deck levels (soffit)	20.70mOD, 20.05mOD, 20.05mOD
Bridge deck to river channel invert	5.93m (max) and 3.14m (min)
Bridge deck soffit clearance above flood protection structure	300mm to demountable barrier installed on top of permanent flood defence wall

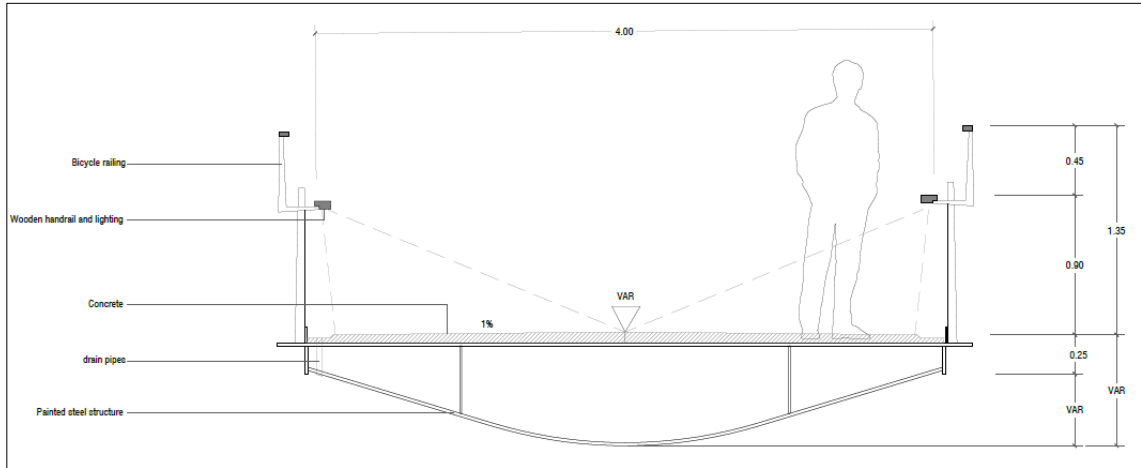
The Southern Bridge crossing, connecting Suir Island to Raheen Road and Denis Burke Park, will span the Suir River Slalom Course and Millrace for a total distance of 75m. The Suir Island abutment will be constructed on top of the flood protection berm and the Raheen Road abutment will be integrated into the existing concrete flood protection wall. The 2 No. support piers will be located on both banks of the Slalom Course. Table 2.2 summarises additional parameters for the South Bridge, with dimensions measured from the Suir Island abutment to Pier 1 to Pier 2 and to the Raheen Road abutment.

Table 2.2: South Bridge parameters

Parameter	Value
Bridge deck top walkway width	4m
Span (total)	75.0m
Span between supports	33.1m, 35.0m, 6.9m
Bridge deck levels (top)	21.05mOD, 21.57mOD, 20.30mOD, 20.20mOD
Bridge deck levels (soffit)	20.60mOD, 20.59mOD, 19.87mOD, 19.73mOD
Bridge deck to river channel invert	6.97m (max) and 3.01m (min)
Bridge deck soffit clearance above flood protection structure	Bridge deck level to tie into top of existing concrete flood protection wall

The proposed bridge deck or superstructure will consist of prefabricated steel sections, which will be transported to site and craned onto the completed bridge substructures/supports. A typical section through the proposed bridge superstructure is shown in Figure 2.2.

Figure 2.2: Typical bridge superstructure cross section

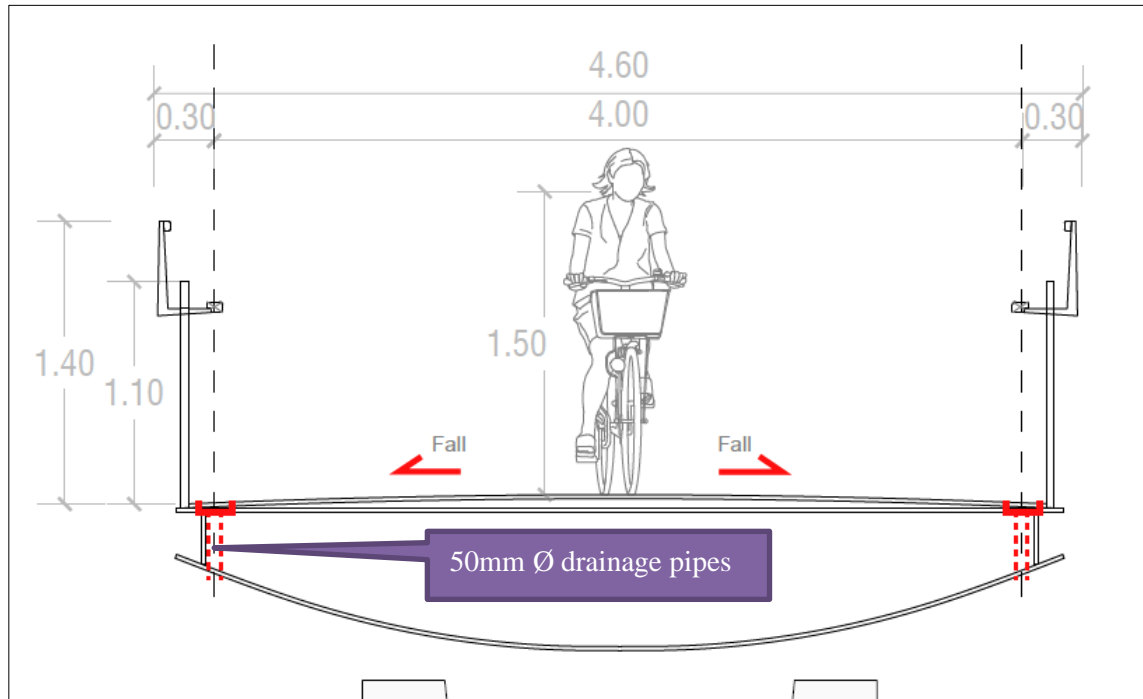


The proposed bridge decks or superstructures will consist of prefabricated steel sections, which will be transported to site via abnormal load convoys via road networks and craned onto the completed bridge substructures/supports.

2.2.5 Bridge Surfacing and Drainage

The proposed bridge surfacing will consist of bush-hammered concrete surfacing, which will provide sufficient traction for pedestrians and cyclists in wet conditions. The bridge deck will be sloped to ensure water is drained to side-channels, which will be drained by downpipes discharging into the River Suir. The downpipes will be installed at intervals along the proposed bridges as shown in Figure 2.3.

Figure 2.3: Indicative sketch of the proposed bridge drainage arrangement



2.2.6 Suir Island Embankment

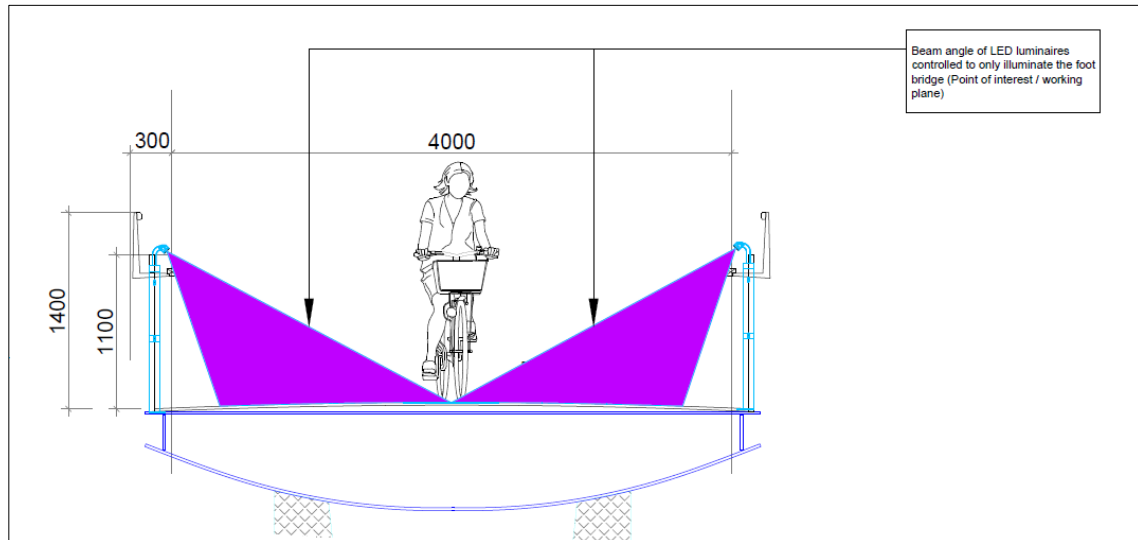
The existing flood defence embankment located on Suir Island will be utilised as the pedestrian link between the Northern and Southern bridge crossings and will provide access to and from the Suir Island car park via the proposed access ramp and three sets of steps. The embankment crest levels will be raised with a filler clay material to tie into the proposed bridges walkway levels. The proposed walkway surfacing and layer build-up is of a cellular confinement system filled with uniformly graded crushed stone to minimise settlement potential and a flexible surface type such asphalt-cement or brick paving.

2.2.7 Public Lighting

Lighting proposals for Bridges, Access Ramps and Steps

A durable, energy-efficient illumination solution which provides a safe and well-lit environment for pedestrians, cyclists has been developed for the proposed footbridges, access ramps and steps, which will be illuminated by a bespoke balustrade LED handrail as indicated in Figure 2.4.

Figure 2.4: Typical detail of bespoke LED handrail



The primary aim of the bespoke balustrade LED handrail is to minimise light-pollution by ensuring that the bridge walkway is illuminated for pedestrian safety, but with no light spilling over, above or below the bridge.

The lighting will be controlled via Passive Infrared (PIRs) sensors. The PIRs will have the ability to detect the presence of any person who comes into the detection zone of the PIR and illuminate the section of the LED balustrade accordingly. Several light-dimming options have been proposed for the illumination of the pedestrian bridges. Refer to the Suir Island Public Realm – Stage 1 Electrical Report compiled by Douglas Carroll Consulting Engineers for a detailed lighting assessment.

North Plaza – Alterations to Public Lighting Infrastructure

The redevelopment of the existing car park into the North Plaza will require the removal of 3 existing public lighting poles, located adjacent to the eastern ingress/egress points to the existing car park. As the handrails located on the North Bridge access steps and ramp will be illuminated, it is not required to replace the removed public lighting poles.

Raheen Road – Alterations to Public Lighting Infrastructure

The narrowing of Raheen Road will require the removal of one existing public lighting pole, which will be replaced by the bespoke balustrade lighting on the access ramp and steps leading up to the southern bridge crossing and one lighting pole to be relocated to match the realigned pedestrian walkway.

2.2.8 Utilities

The underground and overhead utilities were mapped for the Suir Island Infrastructure Links development using services record data followed up with site reconnaissance. The following utility providers were contacted to request services records:

- Gas Networks Ireland;
- ESB (Electricity Supply Board);
- Irish Water;
- EIR;
- Local Authority (Public Lighting, Stormwater, Drainage and Traffic); and
- Telecoms/ Cable TV/ Broadband: eir, BT Ireland, COLT, ENET, Virgin Media, Magnet Networks.

Responses were received from all providers with the exception of Magnet Networks and Virgin Media. COLT confirmed that they do not have any services in the area. No overhead services are present. The following services have been identified at the Quays and location of the proposed North Plaza:

- Gas Network Ireland services;
- ESB Medium Voltage (MV)/ Low Voltage (LV), lighting, underground;

- Irish Water watermains;
- Local Authority (Sewer mains, traffic cables, public lighting); and
- Telecom/ Cable TV/ Broadband (eir, ENET and BT Ireland).

The public lighting, power and other services listed in Table 2.3 will require diversion as part of the Suir Island Infrastructure Links proposed works.

Table 2.3: Existing Services Impacted by the Proposed Development

The Quays (Proposed North Plaza)
Foul Sewer for Public Toilet Facility
Surface Water
Public Lighting Underground
ESB Underground
Suir Island
None
Raheen Road
Bord Gais
Public Lighting Underground
Watermains
eir

2.2.9 Surface water Drainage

The surface water drainage proposals for the Suir Island Infrastructure Links development should be read in conjunction with the drawings and reports included in of the Suir Island Infrastructure Links RPT-20_071-059 Engineering Planning Report (CSEA, 2023b). The proposed surface water networks were modelled using Innovyze MicroDrainage software to size the proposed pipe networks and calculate the surcharge levels for extreme rainfall events.

- **North Plaza**

The redevelopment of the existing car park and realignment of The Quays will require the removal of nineteen (19) existing road gullies, which will be replaced by seventeen (17) gullies along the proposed kerblines. Additionally, slotted drains will be installed along the widened pedestrian walkways and along the kerblines located in Sarsfield Street and The Quay Street. The proposed surface water utilities will be connected to the existing OQ-02 manhole located in front of the proposed access steps leading up to the North Bridge. Slot-drains and gullies are proposed along one side of the bridge access ramp and at the bottom of the steps. Three (3) slot drains and two (2) new road gullies will be connected to the existing OQ-01 manhole or connected pipelines adjacent to OQ-01 as shown on the drawing at the intersection with New Quay and the proposed North Plaza.

- **Suir Island**

Three (3) existing gullies located on the southern kerbline of the carpark will be removed to allow for the construction of the 2m-wide pedestrian path leading to the access steps to the link promenade. A new 225mm diameter surface water pipeline is proposed along this pedestrian path, which will be connected to seven (7) new gullies to drain the southern portion of the carpark. The proposed network will drain to the existing manhole SI-01, which is connected to the existing surface water pump station and/or the 600mm diameter outfall pipeline which discharges into the Little Island Millrace.

- **Raheen Road**

Five (5) existing gullies will be removed due to the proposed narrowing of the road lane widths and widening of the pedestrian walkway. The existing surface water pipeline draining towards Old Bridge Road surface water pump station will be extended further east with a proposed 300mm diameter and 225mm diameter pipeline which will require 4 No. additional manholes. A total of twenty-three (23) new road gullies are proposed along the narrowed Raheen Road. Slotted drains are proposed on the access ramp and at the bottom of the bridge access steps which will be connected to the proposed surface water pipeline.

2.2.10 Water Supply

No alterations or improvements to the existing water supply network is required for the Suir Island Infrastructure Links proposed development.

2.2.11 Landscaping and Furniture

A sloping landscaped terrace with public seating will be provided on the North Plaza, located inside the hairpin-shaped access ramp leading up to the northern bridge crossing, offering unencumbered views of the plaza area. Three benches and a 9-metre-long stepped promenade seating area will also be provided and integrated into the circular-shaped plaza, offering exceptional views for users of the proposed development. The planting of various native tree species around the North Plaza will integrate the proposed development with the existing scenery of Suir Island and complement the visual experience of users.

2.3 DESCRIPTION OF THE CONSTRUCTION PHASE

2.3.1 Duration of the Construction phase

The construction of the project will be progressed as a single construction contract with the construction phase of approximately 18 months. It is proposed that the construction period will start in early summer (May), to ensure that foundations are constructed when the River Suir water-level is at its lowest, which will ensure safe access and minimise flood risk when constructing temporary sheet piling .

2.3.2 Working Hours

The timing of construction activities, core working hours and the rate of progress of construction works are a balance between efficiency of construction and minimising nuisance and significant effects. The core construction working hours for the proposed development will be:

- 7am – 7pm: Monday to Friday;
- 8am – 2pm: Saturday (Approval required by Tipperary County Council)

The contractor may require a period of up to one hour before and one hour after core working hours for start-up and shut down activities in working areas. Activities permitted may include deliveries and unloading of materials, movement of staff to their place of work, maintenance and general preparation works. The use of plant or machinery likely to cause disturbance, other than for piling, will not be permitted outside of the core working hours.

The working hours for piling are as below:

- Mondays to Fridays: 08:00am to 18:00pm
- Saturdays, Sunday and Bank Holidays: Not permitted

It may be necessary in exceptional circumstances to undertake certain activities outside of the construction core working hours. Any construction outside of the construction core working hours will be agreed by the contractor in advance with Tipperary County Council and scheduling of such works shall have regard to nearby sensitive receptors.

In the case of work required in an emergency or which if not completed would be unsafe or harmful to workers, the public or local environment, Tipperary County Council will be informed as soon as reasonably practicable of the reasons and likely duration and timing (outside of the core working hours).

2.3.3 Construction Sequence

The sequence of work for the construction phase will be as follows:

- Stage 1 – Site establishment, clearance and construction of temporary structures
- Stage 2 – Construct piles and pile-caps
- Stage 3 – Construct reinforced concrete piers and abutments
- Stage 4 – Land bridge superstructure sections on supports
- Stage 5 – Construct bridge landings, stairs, and ramps

- Stage 6 – Complete bridge ancillary works and works for the North Plaza, Suir Island and Raheen Road
- Stage 7 – Site clearance, rehabilitation, and landscaping

2.3.3.1 Stage 1: Vegetation Clearance Site Establishment & Construction of Temporary Structures

Vegetation clearance within the construction footprint will be completed in advance of the commencement of the construction works. The vegetation clearance will be completed outside the breeding bird season between the months of September and February inclusive.

Temporary construction compound sites will be required in the vicinity of the development.

The following areas are proposed as potential locations of site compounds:

- Suir Island Parking Area – Utilisation of the existing Suir Island Parking area will act as the main construction compound and would provide minimal disruption to the population with a total area of approximately 2,865 m² ; and
- The Quays carpark – The existing parking area on the North Plaza that will be developed, can be temporarily used as a storage area for bridge deck sections and construction plant consisting of an approximate area of 1,020 m².
- Temporary bridge assembling compound located in Denis Burke Park adjacent to the proposed southern bridge crossing.

The proposed main site compound on the Suir Island, as presented on Figure 1.3 above, will include offices, materials storage areas, plant storage and parking for site and staff vehicles. The site is likely to remain in place for the duration of the contract but may be scaled up or down during particular activities on site.

The proposed bridge superstructure will be manufactured off-site and transported via abnormal loads to site in sections, where the steel bridge sections will be temporarily stored and assembled on the North Plaza, Suir Island and the western extent of Dennis Burke Park.

The contractor will erect hoarding of a minimum 2.4m in height around the site compound and all work areas on Suir Island. The hoarding shall be a high gloss printed finish with information and graphics about the project or as otherwise agreed with TCC.

The following temporary structures will be required to ensure safe access for construction equipment and protection against flooding whilst working in close proximity of the Suir River banks:

- (i) Traffic accommodation for works located in North Plaza and Raheen Road;
- (ii) Access ramp will be constructed over the existing flood protection berm on Suir Island, for access from the site compound to the North Bridge Pier 01 constructed from granular material to provide a hardstanding surface for construction equipment. A bottomless culvert will be installed to provide a crossing of the back-water flood channel between the embankment and Suir Island. The back-water flood channel remains dry and does not convey flowing water during ebb flows. It conveys flowing water only during flood events. The pre-cast bottomless box culvert will be 2.4m in width and will span the floor of the backwater channel. Sheet piling will be installed adjacent to the east and west elevations of the box culvert abutment. Once bottomless culvert and the sheet piling are in place the void between the existing bank slopes to the north and south of the box culvert will be filled in with granular material. The presence of the sheet pile will restrict the loss of an granular material to the back-water flood channel area;
- (iii) Sheet piling around North Bridge Pier 1 and South Bridge Pier 2 and Pier 3 located on the northern and southern bank of the Suir River south channel. The sheet piles will be installed and removed mechanically. The sheet piled working area will be approximately 46m². The sheet pile P01 will be located on the northern embankment between the main channel of the River Suir to the north and the “back-water” flood channel to the south of the embankment. The sheet pile will be located approximately 2m back from the northern bank of the embankment. Pier P01 and the associated sheet piling area will be access via a temporary access ramp that will be provided for the construction phase. The access ramp will be constructed of a granular material to provide a temporary hardstand surface for construction equipment. The sheet pile P02 will be situated at the south of Suir Island approximately 6.5m back from the river channel. The sheet pile P03 will be situated to the south of the River Suir south channel,

adjacent to Raheen Road. It will be situated approximately 2.5m back from the river bankside.

In addition and as described above sheet piling will also be installed to the west and east of the temporary access ramp to Pier 01, both to the north and south of the bottomless box culvert that will provided access to Pier 01.

Details of the above described temporary construction structures are shown on Drawing 20_071-CSE-GEN-XX-DR-C-2460, provided as Volume C of the Suir Island Infrastructure Links EIAR (CSEA, 2023).

2.3.3.2 Stage 2: Construction Piles & Pile Caps

The construction of piles and pile caps will be required in the following areas:

- I. North Bridge Abutment 1 on the North Plaza (The Quay);
- II. North Bridge Pier 1 on Suir Island;
- III. North Bridge Abutment 2 on the northern corner of the existing flood protection berm (Suir Island);
- IV. South Bridge Abutment 3 on the southern corner of the existing flood protection berm (Suir Island);
- V. South Bridge Pier 2 located on Suir Island;
- VI. South Bridge Pier 3 located on the southern bank of the Suir River, in front of the existing flood protection wall located on Raheen Rd.

Cased piles will be used to prevent the use of bentonite and will be cast using ready-mix concrete trucks transported to site and pumped into the casings due to restricted access for concrete trucks. No batching plants will be allowed on site. Upon completion of the reinforced concrete piles, the piles shall be cut to the correct elevation and reinforced concrete pile caps will be constructed, that acts as the platform for the bridge piers and abutments. Refer to Figure 1.3 showing the locations of the pier and abutment structures.

2.3.3.3 Stage 3: Construct Reinforced Concrete Piers & Abutments

The reinforced concrete piers and abutments will be constructed in the areas listed above, to support the bridge deck superstructure. Special concrete to steel bridge isolating bearing connections will be required on piers and abutments to accommodate any movement of the bridge superstructure. The piers and abutments will be cast with ready-mix concrete transported to site and pumped into the formwork.

2.3.3.4 Stage 4: Land Bridge Superstructure

The bridge superstructure will be constructed as follows:

- i. The steel bridge superstructure will be prefabricated in sections at an off-site premises and transported to the site in abnormal load convoys via road networks;
- ii. The bridge sections will be assembled on site on the North Plaza, Suir Island and the western most point of Dennis Burke Park (temporary bridge assemble area);
- iii. Following the completed assemblies of the bridge superstructure sections, it will be landed on the support abutments and piers in lengths of approximately 30m (4 No.lifts in total).

The procedure for landing the bridge superstructure and crane access is shown on Drawing 20_071-CSE-00-XX-DR-C-2453 provided as Volume C of the Suir Island Infrastructure Links EIAR (CSEA, 2023), which will consist of the following:

- I. North Bridge – Section 1 will span from Abutment 1 to Pier 1 located on Suir Island with the crane stationed on the North Plaza behind the existing flood protection wall;
- II. North Bridge – Section 2 will span from Pier 1 to Abutment 2 located on the existing flood protection berm with the crane stationed in the site compound area;
- III. South Bridge – Section 1 will span from Abutment 3 to Pier 2 with the crane positioned on Suir Island next to the southern river reach;
- IV. South Bridge – Section 2 will span from Pier 2 to Pier 3 with the craned stationed in the temporary assembly area located on the southern bank of the Suir River.

2.3.3.5 Stage 5: Construct Bridge Landings, Ramps & Stairs

Following to completed bridge superstructure, the following can be completed:

- I. North Plaza access steps, ramp and landings;
- II. Suir Island access steps, ramp and landings;
- III. Raheen Road access steps, ramp and landings.

2.3.3.6 Stage 6: Complete Bridge Ancillary Works & North Plaza/Raheen Rd. Surfacing

The following ancillary works will be constructed to complete the bridge crossings:

- I. North Bridge and North Plaza handrails and surfacing;
- II. Suir Island flood protection berm filling, surfacing retaining walls;
- III. Suir Island ramp filling and surfacing;
- IV. South Bridge and Raheen Road handrails;

The following works will be completed prior to the final surfacing on the North Plaza, Suir Island car park and Raheen Road:

- I. Construction of the proposed surface water drainage systems as shown on Drawings 20_071-CSE-GEN-XX-DR-C-2501 to 2504 provided as Volume C of the Suir Island Infrastructure Links EIAR (CSEA, 2023).
- II. Construction and commissioning of new reinforced concrete pump station, emergency storage and control kiosk including power supply/telemetry for future Suir Island foul drainage requirements;
- III. Installation of the 125mm diameter foul sewer rising main across North Bridge and connection to an existing DN300 foul sewer pipeline line located on the New Quay which drains to the main DN900 foul pipeline;

The purpose of the proposed foul sewer system and pumping station is to upgrade the existing foul sewer system on Suir Island, which consists of septic tanks with raw sewerage overflows to the river. The proposed upgrading is shown on Drawing 20_071-CSE-GEN-XX-DR-C-2501 and 2502 provided as Volume C of the Suir Island Infrastructure Links EIAR (CSEA, 2023).

Following the completion of the bridge structures and the Suir Island foul sewer connection, the surfacing works can be completed on the North Plaza, Suir Island and Raheen Road.

2.3.3.7 Stage 7: Site Clearance, Rehabilitation & Landscaping

Upon completion of the key works described in Stage 1 to Stage 6 above, the following sequence of works will occur:

- I. All temporary access roads, construction platforms and temporary flood protection sheet piling must be removed and reinstated to pre-construction conditions. Flood protection sheet piles can be removed following the completion of Stage 5;
- II. Landscaping will be completed on the North Plaza and Suir Island as per the Landscaping Consultant/Architect specifications;
- III. All construction areas not scheduled for landscaping shall be rehabilitated as per the Construction Environmental Management Plan (CEMP), Natura Impact Statement (NIS) and planning conditions. Habitat rehabilitation will be undertaken within the footprint of the temporary access to Pier 01, within the footprint of the sheet pile at Pier 02; and within the footprint of the sheet pile surrounding Pier 03. Native woodland species in the form of willows and alder will be planted on the bank slopes of the south embankment and north bank of Suir Island along the temporary access to Pier 01. Grassland habitat will be reinstated within the footprint of the sheet pile surrounding Pier 02. Hydrophilous herb species and dry meadow grassland herb species will be planted within the sheet piled area surrounding Pier 03. The habitat rehabilitation in these areas will be overseen by the construction phase Ecological Clerk of Works and will be monitored during the operation phase by an experienced ecologist appointed by Tipperary County Council.

2.3.4 Construction Materials

Exposed concrete elements will have smooth uniform texture appearance using a suitable proprietary formwork liner system. C50/60 concrete (i.e. cylindrical strength of 50 N/mm² and cube strength of 60 N/mm²) is proposed for all substructure elements with the exception of the piles (C40/50). The pile cap/pier concrete will include a minimum of 50% ground granulated blast furnace slag (GGBS) cement replacement which will increase durability in a marine environment. Durability requirements are shown in Table 2.4 for the various concrete elements.

Reinforcement shall be carbon steel high yield and comply with Irish Standard I.S. EN 10080:2005 and British Standard BS 4449:2005 (Grade B500B) in the bridge piles, pile caps and south abutment structure.

Stainless steel reinforcement (grade 1.4162 to EN 10088) or increased concrete strengths in combination with increased cover shall be used for the external layers of links and main reinforcement in the pier elements (tidal river and splash zones) and north and south abutments. In the event carbon steel reinforcement is fixed to stainless steel reinforcement within the piers, a minimum of 120mm (100+Δc) cover shall be provided to the carbon steel reinforcement. No additional separation measures are proposed.

Table 2.4: Durability requirements for concrete elements

Element	Governing Exposure Class	Cover * C_{nominal}	Concrete Grade
Piles	Steel encased	75mm	40/50
Pile Caps	XS2	60mm	50/60
Abutments/Piers	XS2	60mm	50/60
Stairs, Ramps	XS1	50mm	40/50

Structural Steelwork Grades and Finishes

Surface preparation and protection against corrosion shall be provided in accordance with the Transport Infrastructure Ireland (TII) Design Manual for Roads and Bridges (DMRB). The intended protection system for structural steel will be a glass flake system which provides a long-term corrosion protection to the steel structure in accordance with the TII Specification for Roadworks. Steel plates will be steel to a minimum grade of S355 to European Standard EN 10025.

3 BASELINE DESCRIPTION

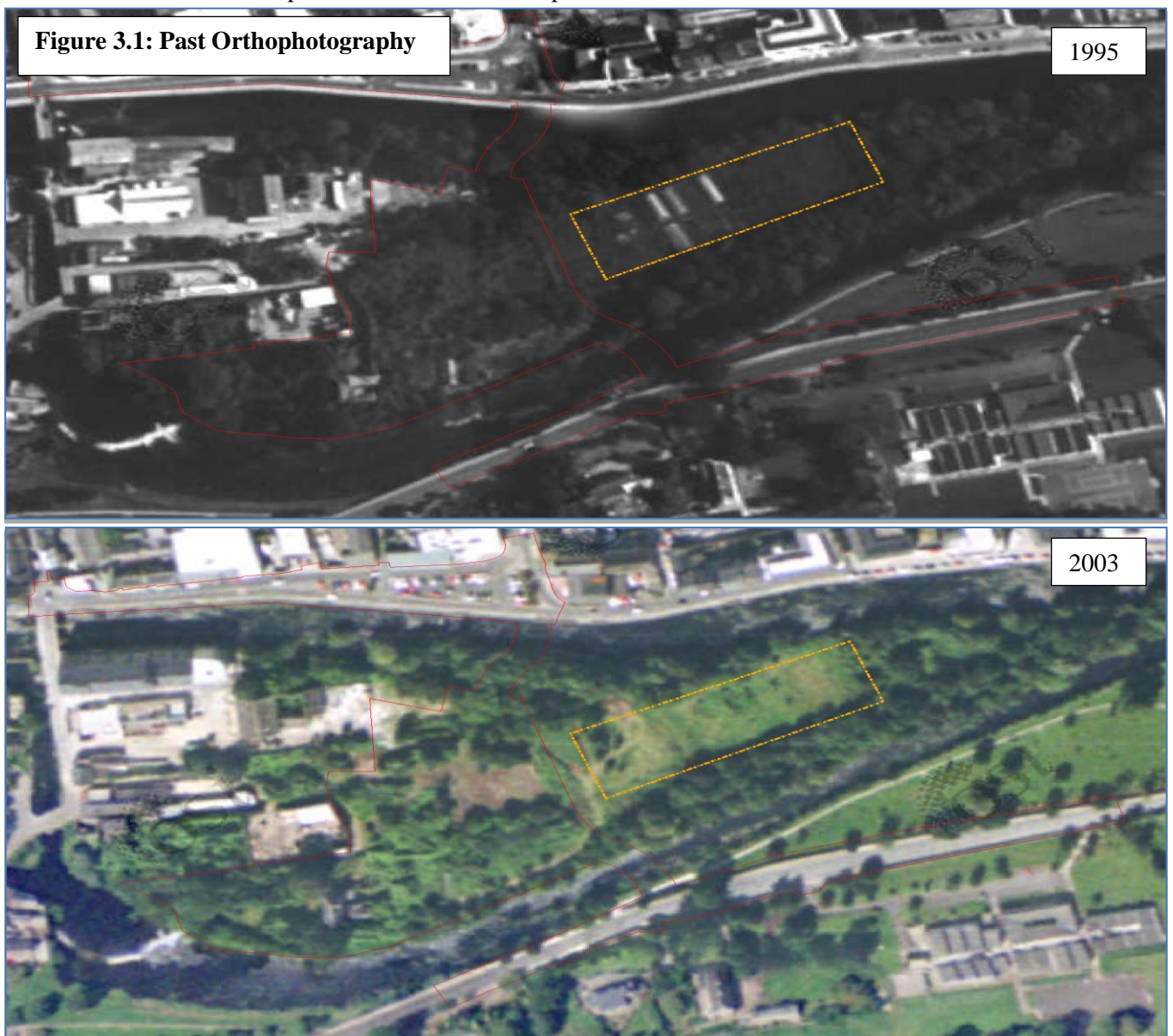
The following sub-sections provide a description of the baseline biodiversity comprising habitats, vegetation and fauna occurring at the project site and a description of the features of interest of the Lower River Suir SAC examined as part of this Natura Impact Statement. The description of the baseline conditions set out in this section are based upon the findings of the scientific investigations listed in Section 1.3 above.

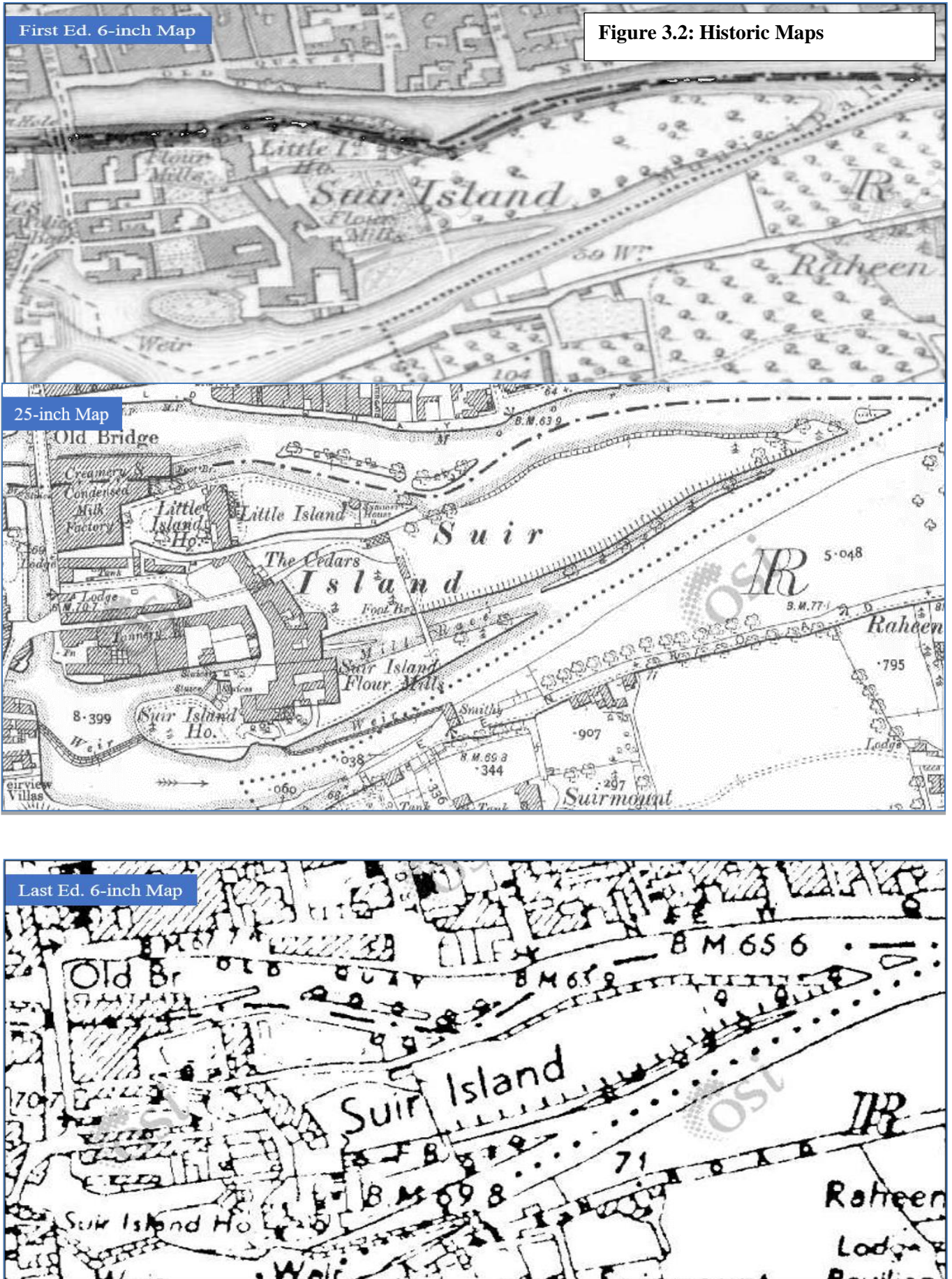
3.1 PROJECT SITE

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 and south respectively. The south channel of the River Suir at Suir Island is used as a canoe shalom course and access to the river is provided via ramps on both Suir Island and on the south side of the river at Dennis Burke park. 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 northwestern 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 central portion of the island to the east of the flood berm was previously used as a commercial garden with green houses, tilled land and flower beds. The occurrence of the

garden area at this location is apparent on orthophotography imagery from 1995 and 2003 (see Figure 3.1). There are now informal paths running through the island, on drier ground nearer the southern side of the island. The historical mapping for Suir Island shows that the east of the island was devoid of established woodland cover with all historical maps published between 1843 and 1954 showing an absence of established woodland cover on the island (see Figure 3.2). The first edition 6-inch historic map shows the presence of scattered trees in the eastern end of the island and formal lines of trees along the north and south bankside of the island. The 25-inch map from 1904 shows the island to be largely devoid of tree cover, whilst the last edition 6-inch map from 1954 indicates the presence of little tree cover.





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.

3.2 HABITATS AT THE PROJECT SITE

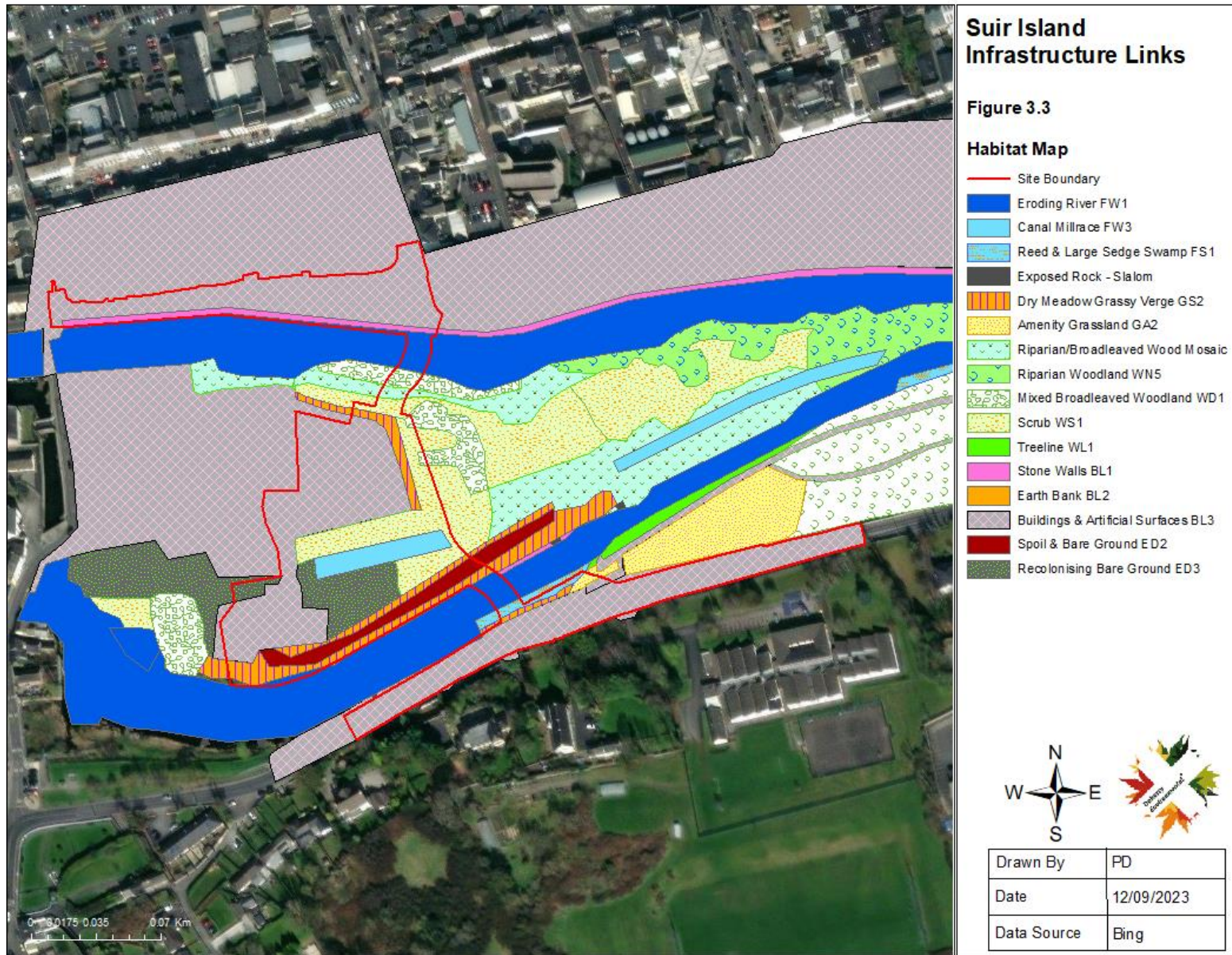
The habitats occurring within the landholding in which the proposed development is located and the surrounding areas have been identified to Level 3 of the Guide to Habitats in Ireland (2000). Figure 3.3 provides a habitat map showing the location and extent of habitats occurring within the landholding. The following sub-sections describe each of the habitats occurring within the landholding.

3.2.1 *Eroding/Lowland River FWI*

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.

Macrophytes and bryophytes noted as occurring within the river adjacent to Suir Island include water-crowfoot species such as *Ranunculus penicillatus*, *Ranunculus peltatus* and *Fontanalis antipyretica*. Whilst these species form part of the vegetation community associated with the Annex 1 habitat vegetation of flowing waters (3260), the flora diversity is low and the community is dominated by water crowfoot species. The NPWS (2019a) note that crowfoot dominated reaches that are low in diversity are of low conservation value and are generally indicative of poor condition.

Vegetation of flowing waters is a qualifying habitat of the Lower River Suir SAC and has been identified as occurring within the zone of influence of the project. Whilst the examples of water crowfoot dominated vegetation occurring along the sections of the River Suir at Suir Island are species-poor and not representative of this Annex 1 habitat type (NPWS, 2019a), the distribution of this habitat along the Lower River Suir SAC has not been identified and as outlined in the Screening Report for Appropriate Assessment, it is considered that this habitat



occurs within the zone of influence of the project downstream along the main channel of the River Suir.

3.2.2 Canal Millrace FW3

The canal millrace supports a stand of stagnant water at the western extent of the millrace as shown on Figure 3.3. 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.

3.2.3 Reed and Large Sedge Swamp FSI

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*.

3.2.4 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*.

3.2.5 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*, *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*, *Orobancha hederaceae*, *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*.

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 *Orobancha hederaceae* 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.

3.2.6 *Mixed Broad-leaved woodland WDI*

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 hederæ*, *Hedera helix*, *Heracleum sphondylium*, *Crocsmia 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*.

3.2.7 *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 abundant, the dominance of *Acer pseudoplatanus* and other non-native species is reduced. This habitat is buffered from the project site by 100m. This woodland is relatively recent in origin, and is likely to have become

established during the latter half of the 1900's. This is indicated by the historical mapping and orthophotography for Suir Island as summarised in Section 3.1 above. 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 most 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 taller 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.

As noted in Section 1.3 above riparian woodland habitat can have links to the EU Habitats Directive Annex 1 habitat alluvial woodland (91E0). The riparian woodland occurring to the east of the project at Suir Island was classified to Irish Vegetation Community level. Appendix 3 to this Natura Impact Statement provides the results of the Irish Vegetation Classification Woodland Survey completed on the island. The vegetation communities recorded within this woodland habitat include examples of transitional WL3D *Salix cinerea* – *Urtica dioica* woodland. The transitional nature of this habitat was identified following analysis completed by ERICA Irish Vegetation Classification software (see Appendix 3). The WL3D woodland community is identified by Perrin (2021) as having links to the Annex 1 habitat Alluvial woodland. A condition assessment of the areas of WL3D woodland was completed in accordance with O'Neill & Barron (2013) and this resulted in this woodland habitat failing to meet the structure and function criteria for this Annex 1 habitat. This woodland habitat is also of relatively recent origin, becoming established in the latter half of the 1900's. However it is noted that the Lower River Suir SAC conservation objectives for Alluvial woodland seek to restore the favourable conservation condition of this habitat within the SAC and as such, with the implementation of active habitat management of riparian woodland there is potential for the establishment of alluvial woodland in the eastern and northern sections of the Suir Island, to the east of the project site. Given this potential, the riparian woodland habitat occurring to the east of the island is treated in this Natura Impact Statement as an example of priority Alluvial

woodland and impacts to this habitat are considered with respect to the Lower River Suir SAC conservation objectives for Alluvial woodland.

3.2.8 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.

3.2.9 Scrub WSI

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.

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

3.2.11 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.

3.2.12 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 4.4. The high-impact species include *Fallopia japonica*, *Heracleum mantegazzianum* and *Prunus laurocerasus*. Stands of *Fallopia japonica* and *Heracleum mantegazzianum* 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. *Prunus laurocerasus* also occurs within the footprint and is widespread and frequently occurring on the island to the east of the flood berm.

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*. 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.

3.3 FAUNA AT THE PROJECT SITE

A detailed description of all fauna recorded at the project site during baseline field surveys provided in the accompanying EIAR for the proposed development. This section provides a description of the relevant Annex 2 species that are listed as qualifying features of interest of the Lower River Suir SAC and that occur at or in the wider vicinity/downstream of the project site.

3.3.1 *White-clawed crayfish*

White-clawed crayfish occur throughout the freshwater sections of the River Suir and the section of the river upstream, downstream and surrounding Suir Island supports a population of white-clawed crayfish. 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, held by the NPWS and NBDC 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. Based upon the results of field surveys, as described in Section 1.3 above, 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).

3.3.2 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 3.1 below. No results are provided 2019 and 2020.

Table 3.1: Results of Sea Lamprey Annual Monitoring

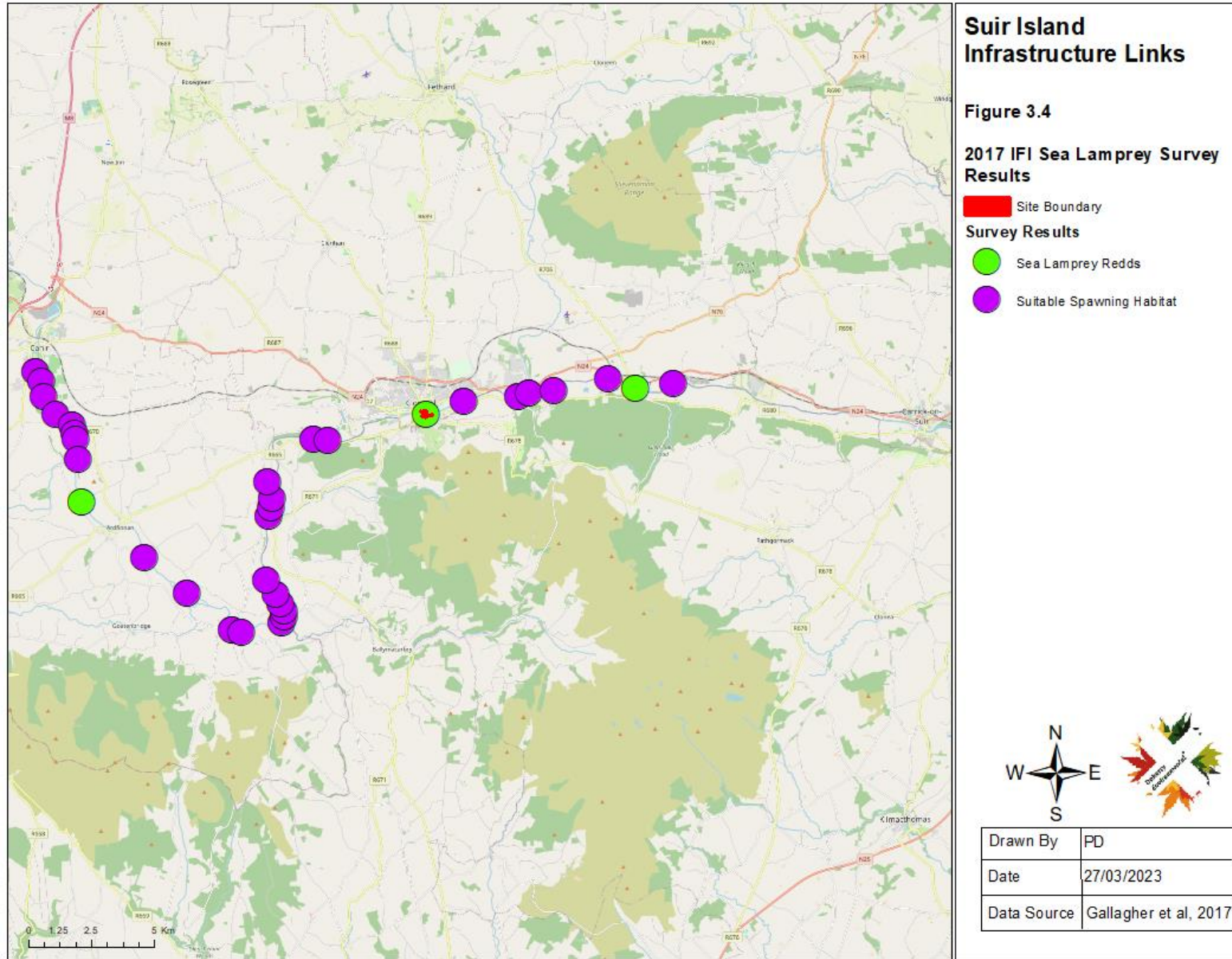
Year	No. Sea lamprey Redds	Details
2014	2	Located upstream of Gashouse Bridge (referred to by O’Gorman et al. (2015) as the Old Waterford Road Bridge. 2 redds were noted along the town quays downstream of the bridge on the 19 th June 2014. No redds were noted on the 3 rd July during a second site visit.
2015	None recorded	None recorded during two site visits on the 12 th June and 29 th July 2015.

2016	None recorded	
2017	None recorded	
2018	5	Five redds recorded during a visit on the 25 th June 2018.
2021	1	The Clonmel hot-spot location was surveyed on the 10 th , 16 th , 23 rd , and 30 th 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. The float-over surveys are completed by Inland Fisheries Ireland 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 3.4. 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. Such silty substrate habitat is not present along the section of the River Suir adjacent to the proposed development. 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 to 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-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 25th March and 23rd 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.

3.3.3 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 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 4.5.1 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 (E.G. Petit & Company, 2005) 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. Comprehensive fisheries surveys were completed by Inland Fisheries Ireland in 2018 at 10 monitoring sites along the River Suir from upstream of Cashel to Kilsheelan (Inland Fisheries Ireland, 2018c). Two of these sites, at Knocklofty and Loughtally are located along the stretch of the River Suir, upstream of the project site, between Marlfield and Clonmel. A further two monitoring sites are located downstream of Clonmel town at Ferryhouse and Kilsheelan Bridge. Atlantic salmon were recorded at each of these monitoring sites. In addition to Atlantic salmon other species recorded at these monitoring sites include brown trout, European eel and flounder. Lamprey species were not recorded at any of these sites during this monitoring.

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.

3.3.4 Otters

Otters are known to occur at and along the stretch of the River Suir surrounding downstream and upstream of Suir Island.

No breeding or resting places of otters were recorded within the project site or immediately surrounding the project site. Previous walkover surveys completed during August 2017 for the Suir Island Masterplan reported the presence of an otter holt and sprainting site on the eastern side of the island, approximately 300m to the east of the project site. 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 also identified on exposed muds along the northern bankside of the island at this location. However, no evidence indicating the presence of otters or their reliance on this location as a resting place was recorded 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” flood channel 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.

3.3.5 Twait Shad

Twait Shad are a migratory member of the herring family which spawns in freshwater. It is an iteroparous species, i.e. individuals can spawn multiple times over their lifespan (Rooney & King, 2015, IFI, 2018a). Adult shad move from the sea into estuaries in spring and are commonly recorded congregating in Barrow estuary in March and occasionally in February

(Doherty et al., 2004; Gallagher et al., 2016). Upstream migration from the estuaries peaks at water temperatures of 10-14°C (IFI, 2018a). In the River Suir they spawn over gravels in calm waters, just above the top of tidal waters, at Inistioge towards the end of April and are present until early June (Bracken & Kennedy, 1967). There are no records of shad occurring upstream of Inistioge. The spawning habitat is characterised by stones with some larger rocks and at least fair water flows at low water. The spent adults commence their migration to the lower estuary immediately after spawning. During the breeding season, large numbers of adult shad move up and down the estuary with the tide but all adults return to sea by the end of the summer. The movements and ecology of twaite shad during their residency in estuaries are not fully understood (IFI, 2018a) and are the subject of ongoing research (IFI, 2018b). However, based on a review of data from other rivers (in Europe and the UK – Aprahamina et al, 2003) the fry emerge after about 3 to 5 days and commence their gradual move down the estuary feeding on crustacean plankton (Aprahamian, 1989) and appear in the outer estuary in the late summer and autumn. Most juveniles move to the lower estuary during their first summer and migrate to sea at end of their second year.

3.3.6 Freshwater Pearl Mussel

Freshwater pearl mussel are not present along the main channel of the River Suir at or downstream of Suir Island. Records of freshwater pearl mussel are held by the NPWS (1987 to 2006 records) for the main channel of the River Suir to the south of Marfield approximately 3km upstream from Suir Island. There are no records held for the presence of freshwater pearl mussel along the main channel of the River Suir in the vicinity of or downstream of Suir Island. The mapped distribution of freshwater pearl mussel within the Lower River Suir SAC, as set out in the NPWS conservation objectives is restricted to the Clodiagh Sub-catchment which is located within a separate sub-catchment to the project site.

3.4 CONSERVATION OBJECTIVES

Site-specific conservation objectives (SSCOs) have been published for the Lower River Suir SAC. The aim of the site-specific conservation objectives for this SAC is to maintain and/or restore the favourable conservation condition of the qualifying habitats and qualifying species for which these sites have been designated.

Favourable conservation status of habitats is achieved when:

- its natural range, and area 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, and
- the conservation status of its typical species is favourable

The favourable conservation status of species will be achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats
- 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

The conservation objectives for Lower River Suir SAC seek to:

maintain favourable conservation condition of the Annex 1 habitats vegetation of flowing waters and hydrophilous tall herb fringe;

maintain favourable conservation condition of the Annex 2 species white-clawed crayfish and otters; and

restore the favourable conservation condition of lamprey species, Atlantic salmon and twaite shad.

3.4.1 Site-Specific Conservation Objectives

As noted above SSCOs have been published by the NPWS for the Lower River Suir SAC (NPWS Version 1, 2017). The SSCOs for the qualifying features of interest of the Lower River Suir SAC occurring within the zone of influence of the project are outlined in Table 3.2 below.

Table 3.2: Site-Specific Conservation Objectives for the Lower River Suir SAC Qualifying Species occurring within the Zone of Influence of the Project

Qualifying Feature	Attribute	Target
Lamprey species	Distribution (extent of anadromy for sea lamprey) &/or barriers to movement	Access to all watercourses down to first order streams for river lamprey. Greater than 75% of main stem length of rivers accessible from the estuary.
	Population structure of juveniles	At least three age/size groups present
	Juvenile density in fine sediment	Mean catchment juvenile density of at least 2/m ² for brook lamprey and 1/m ² for sea lamprey
	Extent and distribution of spawning habitat	No decline in distribution and extent of spawning beds.
	Availability of juvenile habitat	More than 50% of sample sites positive
White-clawed crayfish	Distribution: rivers	No reduction from baseline.
	Distribution: Lough Gill	No reduction from baseline.
	Population structure: recruitment	Juveniles and/or females with eggs in all occupied tributaries and occupied parts of Lough Gill and associated waterbodies
	Negative indicator species	No alien crayfish species
	Disease	No instances of disease
	Water quality	At least Q3-4 at all sites sampled by EPA
	Habitat quality: heterogeneity	No decline in habitat heterogeneity or habitat quality
Atlantic salmon	Distribution (extent of anadromy)	100% of river channels down to second order from the estuary.
	Adult spawning fish	Conservation limit consistently exceeded
	Salmon fry abundance	Maintain or exceed 0+ fry mean catchment wide abundance threshold value. Currently set at 17 salmon fry/5 min sampling.
	Out-migrating smolt abundance	No significant decline
	Number and distribution of redds	No decline in numbers or distribution
	Water quality	At least Q4
Twait Shad	Distribution: extent of anadromy	Greater than 75% of main stem length of rivers accessible from estuary
	Population structure: age classes	More than one age class present
	Extent and distribution of spawning habitat	No decline in extent and distribution of spawning habitats
	Water quality: oxygen levels	No lower than 5mg/l

Qualifying Feature	Attribute	Target
	Spawning habitat quality: Filamentous algae; macrophytes; sediment	Maintain stable gravel substrate with very little fine material, free of filamentous algal (macroalgae) growth and macrophyte (rooted higher plants) growth
Otters	Distribution	No significant decline
	Extent of terrestrial habitat	No significant decline
	Extent of marine habitat	No significant decline
	Extent of freshwater habitat (river)	No significant decline
	Extent of freshwater habitat (lakes)	No significant decline
	Couching sites and holts	No significant decline
	Fish biomass	No significant decline
	Barriers to connectivity	No significant increase
Freshwater pearl mussel	Distribution	Maintain at 10.4km
	Population size	Restore to 10,000 adult mussels
	Population structure: recruitment	Restore to least 20% of population no more than 65mm in length; and at least 5% of population no more than 30mm in length.
	Population structure: adult mortality	No more than 5% decline from previous number of live adults counted; dead shells less than 1% of the adult population and scattered in distribution.
	Habitat extent	Restore suitable habitat in more than 8.8km in the Clodiagh system and any additional stretches necessary for salmonid spawning
	Suitable habitat condition	Restore condition of suitable habitat.
	Water quality: macroinvertebrate and phytobenthos (diatoms)	Restore water quality- macroinvertebrates: EQR greater than 0.90; phytobenthos: EQR greater than 0.93.
	Substratum quality: filamentous algae (macroalgae), macrophytes (rooted higher plants)	Restore substratum quality- filamentous algae: absent or trace (<5%); macrophytes: absent or trace (<5%).
	Substratum quality: sediment	Restore substratum quality- stable cobble and gravel substrate with very little fine material; no artificially elevated levels of fine sediment.
	Substratum quality: oxygen availability	Restore to no more than 20% decline from water column to 5cm depth in substrate.
	Hydrological regime: flow variability	Maintain appropriate hydrological regimes.
	Host fish	Maintain sufficient juvenile salmonids to host glochidial larvae.

Qualifying Feature	Attribute	Target
Vegetation of Flowing Waters	Habitat distribution	No decline, subject to natural processes.
	Hydrological regime: river flow	Maintain appropriate hydrological regimes
	Hydrological regime: groundwater discharge	Maintain natural tidal regime
	Substratum composition: particle size range	The substratum should be dominated by the particle size ranges, appropriate to the habitat sub-type (frequently sands, gravels and cobbles)
	Water quality	Maintain appropriate water quality to support the natural structure and functioning of the habitat
	Typical species	Typical species of the relevant habitat sub-type should be present and in good condition
	Floodplain connectivity	The area of active floodplain at, and upstream of, the habitat, necessary to support all sub-types of the habitat, should be maintained.
	Fringing habitat: hectares and condition	Maintain the area and condition of fringing habitats necessary to support the habitat and its sub-types
Hydrophilous tall-herb	Habitat distribution	No decline, subject to natural processes
	Habitat area	Area stable or increasing, subject to natural processes
	Hydrological regime	Maintain appropriate hydrological regimes
	Vegetation structure	30-70% of sward is between 40 and 150cm in height
	Vegetation composition: broadleaved herb:grass ratio	Broadleaf herb component of vegetation between 40 and 90%
	Vegetation composition: typical species	At least 5 positive indicator species present
	Vegetation composition: negative indicator species	Negative indicator species, particularly non-native invasive species, absent or under control- NB Indian balsam (<i>Impatiens glandulifera</i>), monkeyflower (<i>Mimulus guttatus</i>), Japanese knotweed (<i>Fallopia japonica</i>) and giant hogweed (<i>Heracleum mantegazzianum</i>).
Alluvial woodland	Habitat area	Area stable or increasing, subject to natural processes, at least 32.9ha for sites surveyed.
	Habitat distribution	No decline, surveyed locations shown on Map 5 of the site-specific conservation objectives. It is noted that further un-surveyed areas are present within the SAC, for example at islands below Carrick-on-Suir, at Shanbally (Coillte LIFE project site), Tibberaghny Marshes, along the lower stretches of the more westerly of the Suir tributaries and along both banks of the Suir as far east as the Dawn River (NPWS internal files).
	Woodland size	Area stable or increasing. Where topographically possible, "large" woods at least 25ha in size and "small" woods at least 3ha in size
	Woodland structure: cover and height	Diverse structure with a relatively closed canopy containing mature trees; subcanopy layer with

Qualifying Feature	Attribute	Target
		semimature trees and shrubs; and well-developed herb layer
	Woodland structure: community diversity and extent	Maintain diversity and extent of community types.
	Woodland structure: natural regeneration	Seedlings, saplings and pole age-classes occur in adequate proportions to ensure survival of woodland canopy
	Hydrological regime: flooding depth/height of water table	Appropriate hydrological regime necessary for maintenance of alluvial vegetation.
	Woodland structure: dead wood	At least 30m ³ /ha of fallen timber greater than 10cm diameter; 30 snags/ha; both categories should include stems greater than 40cm diameter (greater than 20cm diameter in the case of alder (<i>Alnus glutinosa</i>))
	Woodland structure: veteran trees	No decline
	Woodland structure: indicators of local distinctiveness	No decline
	Vegetation composition: native tree cover	No decline. Native tree cover not less than 95%
	Vegetation composition: typical species	A variety of typical native species present, depending on woodland type, including alder (<i>Alnus glutinosa</i>), willows (<i>Salix</i> spp.), oak (<i>Quercus</i> spp.), ash (<i>Fraxinus excelsior</i>) and birch (<i>Betula pubescens</i>)
	Vegetation composition: negative indicator species	Negative indicator species, particularly non-native invasive species, absent or under control

These site-specific conservation objectives for the qualifying features of interest of the SAC are used in Section 4 below to facilitate an examination of the project's potential to undermine these objectives and thereby result in adverse effects on the integrity of the SAC in view of its conservation objectives.

4 EXAMINATION OF POTENTIAL IMPACTS TO EUROPEAN SITE

4.1 HABITAT LOSS & DAMAGE

The habitats that will be lost to the footprint of the proposed development are detailed in Table 4.1 below.

Table 4.1: Habitats Lost to the Footprint of the Proposed development

Habitat	Area lost to the Permanent footprint (m ² & % habitat)	Area lost to the Temporary footprint (m ² & % habitat)	Significance of Impact
Mixed broad-leaved woodland	2.7m ² and 0.09% of mapped habitat as shown on Figure 5-6 to Pier P01	46m ² and 1.5% of mapped habitat as shown on Figure 5-6 to the sheet piled area around Pier P01	The mixed broad-leaved woodland that will be lost to the footprint of the project is not representative of a qualifying habitat of the Lower River Suir SAC. 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.
Dry meadows and grassy verges	195 m ² or 6.7% mapped habitat as shown on Figure 5-6 to the promenade. 4.5 m ² or 0.15% mapped habitat as shown on Figure 5-6 to Abutment A02. 2.7 m ² or 0.09% mapped habitat as shown on Figure 5-6 to Pier P03 A total of 202m ² or 6.9% of this habitat will be permanently lost during the construction phase.	226m ² or 7.8% of mapped habitat as shown on Figure 5-6 to the temporary access; 27m ² or 0.8% mapped habitat as shown on Figure 5-6 to the sheet piling area around Pier P03. 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.	The dry meadows and grassy verges habitat that will be lost to the footprint of the project is not representative of a qualifying habitat of the Lower River Suir SAC. The permanent loss of this habitat to the abutment A01 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 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.

Habitat	Area lost to the Permanent footprint (m ² & % habitat)	Area lost to the Temporary footprint (m ² & % habitat)	Significance of Impact
Riparian woodland/broad-leaved woodland mosaic	None	24m ² or 0.35% to the temporary access track to Pier P01	The riparian woodland/broad-leaved woodland that will be lost to the footprint of the project is not representative of a qualifying habitat of the Lower River Suir SAC. 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.
Reed and large sedge swamp	None	19m ² or 1.3% mapped habitat as shown on Figure 5-6 to the sheet piling area around Pier P03.	The reed and large sedge swamp that will be lost to the footprint of the project is not representative of a qualifying habitat of the Lower River Suir SAC. 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.

In summary, none of the habitats listed on Table 4.1 above are representative of a qualifying habitat of the Lower River Suir SAC and no qualifying habitats of this SAC occur within the footprint of the project site and the project will not involve any instream works that could result in the loss of instream habitats such as vegetation of flowing waters or spawning habitat relied upon by lamprey species or Atlantic salmon.

No habitats relied upon by otters will be lost to the footprint of the proposed development.

4.2 SURFACE WATER RUNOFF

The potential impacts that may arise as a result of the project relate to the discharge of contaminated surface water from the project site during the construction phase to the River Suir catchment.

Earthworks and excavations associated with the construction phase will have the potential to generate particulate/silt-laden runoff from the works area and for this runoff to be discharged to the River Suir. In the absence of appropriate surface water management during the construction phase runoff from material and spoil stockpiles will also have the potential to entrain particulate matter and result in the loss of particulate matter/sediment to the River Suir.

The degree to which inorganic solids are entrained in runoff is related to the particle sizing of the soil components. Smaller inorganic particles (e.g., clay) will be easily entrained and will remain in suspension for a longer period than larger particles (silt / sand) and will require lower flow rates and longer retention rates to settle out of the water column when given the opportunity.

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.

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 (whether surface water or groundwater). Hydrocarbons adsorb ('stick') onto the majority of natural solid objects they encounter, such as vegetation, animals, and earth materials such as soil.

From a land and soils perspective, the naturally occurring chemical in crude oil and gasoline products-Polycyclic Aromatic Hydrocarbons or (PAHs), can burn most living organic tissue, such as vegetation, due to their volatile chemistry. From a hydrological standpoint, 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 and invertebrate life.

Potential incidents or accidental release contaminants at the Site will likely be short lived or temporary, however the potential impacts to downstream receptors can be long lasting, or permanent.

The discharge of such pollutants will have the potential to result in reductions in water quality in the River Suir with consequent negative impacts to sensitive species such as Atlantic salmon, white-clawed crayfish and lamprey species.

4.3 DUST EMISSIONS

Dust emissions during the construction phase have been identified as the greatest potential impact to air quality during this phase of the proposed development (see Suir Island Infrastructure Links EIAR, Chapter 8, CSEA (2023)). Such emissions will have the potential to contribute inputs of fine particulate matter to the river and freshwater habitats.

Best practice guidelines for the assessment of air quality impacts (IAQM, 2014). states that dust impacts to vegetation can occur up to 50m from the site and 50m from site access roads, up to 500m for the site entrance. Following the IAQM guidelines the Lower River Suir SAC within and adjacent to the proposed development footprint is classed as a highly sensitive receptor to dust emissions. Dust deposition impacts on ecology can occur due to chemical or physical effects. This includes reduction in photosynthesis due to smothering from dust on the plants and chemical changes such as changes in acidity in freshwater habitats. Often impacts will be reversible once the works are completed, and dust deposition ceases.

4.4 WASTEWATER/SANITATION CONTAMINANTS

The project has the potential to result in the accidental leakage of wastewater or chemicals associated with waste water sanitation onto soils, and along preferential surface flow pathways to the River Suir. Waste water and waste water sanitation chemicals are pollutant risks due to their potential impact on the ecological productivity or chemical status of surface water systems, and toxicity to water-based flora and fauna. The level of risk posed by such facilities is dependent on the condition and upkeep of the facilities that are put in place, and the chemical agents used if applicable.

The worst-case scenario/s associated with waste water sanitation is the potential for sanitation chemical, particularly related to porta-loos, accidentally spilling or leaking and being intercepted by surface water drainage features and in turn surface water networks associated with the proposed development.

4.5 SPREAD OF NON-NATIVE INVASIVE SPECIES

A number of non-native invasive plant species have been identified as occurring on Suir Island during baseline surveys. High impact invasive species occurring on the island include *Fallopia japonica* and *Heracleum mantegazzianum* while other medium impact invasive species occurring comprise *Buddleja davidii*, *Leycesteria formosa*, *Prunus laurocerasus*, *Clematis vitalba* and *Conyza canadensis*. The River Suir can function as a vector for the spread of these species downstream and the carrying out of construction works adjacent to the River Suir will have the potential to increase the risk of their spread downstream.

4.6 NOISE & VIBRATION

During the construction phase of the proposed development, a variety of items of plant will be in use, such as road pavers, piling rigs, dumper trucks, compressors, and generators. Due to the nature of daytime activities undertaken on a construction site, there is potential for generation of significant levels of noise. The construction activities can be broadly separated into two groups. The first is the construction of the bridge footings and installation of prefabricated structural elements. This will comprise of piling bridge foundations, construction of concrete piers and assembly and installation of steel structural elements. The second activity will be general construction of footpaths, improvements to footpaths along the Quays and Raheen Road, construction of the public plaza, facilities and ancillary infrastructure.

Piling has been identified as the activity with the potential to generate the highest levels of noise emissions (see Chapter 9, Suir Island Infrastructure Links EIAR (CSEA, 2023)).

Rotary bored piling will be required to be undertaken during the installation of abutments A01 to A04 and for piers P01 to P03. The nearest pier 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.

In addition to rotary bored piling for the piers and abutments, sheet piles will be installed as a temporary construction phase element to provide for a dry working area around Pier 01 to 03. The distances of these sheet piles from the bankside are set out in Section 3.3.3.2 above.

In the event that piling methods generate high levels of noise and vibration, associated emissions could result in disturbance to adjacent instream spawning habitat and disturbance, injury or fatalities of lamprey species and Atlantic salmon.

In the event that the installation of the sheet piles and the rotary bored piling operations generate high levels of vibration, these operations could also undermine the stability of the banksides posing a risk of bankside collapse into the river.

4.7 LIGHT & SHADE

Lighting will be provided during both the construction phase and operation phase of the project. The provision of inappropriate lighting could result in the illumination of instream and riparian habitats with associated disturbance to Annex 2 fish species, white-clawed crayfish and otters.

In addition the bridges have the potential to cast a shadow on the river below and instream habitats and the effects of this shading was identified during the screening as requiring further examination for its potential to result in disturbance to instream habitats and spawning lamprey species, Atlantic salmon and white-clawed crayfish.

4.8 HUMAN PRESENCE

During the construction phase the potential for site operatives, plant and machinery to result in disturbance to otters was identified as requiring further examination.

The operation phase will generate pedestrian traffic along the proposed Suir Island Infrastructure Links. The presence of people and associated activity has been identified during the screening of the project as requiring further examination for its potential to result in disturbance to the otter population of the SAC.

Whilst the proposed development will not provide any formal access to Suir Island to the east of the promenade, the presence of the bridges and promenade will facilitate access to this area of the island. As noted in Section 4.1 above an informal pathway runs east from the flood berm, and the proposed promenade location, along the southern side of the island to the defunct millrace. The informal path is restricted to drier ground that is less prone to flooding. Established informal paths do not lead into wetter areas of riparian woodland along the northern

bankside and eastern end of the island. Ground conditions in this habitat are wet, frequently flooded and muddy. These conditions along with dense vegetation cover including an impenetrable layer of *Rubus fruticosus* agg. and *Urtica dioica* throughout the herb shrub and herb layer act as a barrier to the movement of people within this habitat.

In light of this any increases in informal human activity on the island to the east of the proposed development will not result in an increase in activity and associated disturbance within the riparian woodland habitat.

4.9 POTENTIAL IMPACT EFFECTS FOR QUALIFYING FEATURES OF INTEREST

4.9.1 *Qualifying Fish Species*

The discharge of contaminated surface water runoff to the River Suir will have the potential to result in negative impacts to invertebrates, plant life and on all life stages of salmonid and lamprey fish. The potential adverse effects of contaminated runoff to fish species including salmon, lamprey and twaite shad 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.
- 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, which can in turn create the potential for infection.

As noted above the rotary bored piling associated with the installation of the abutments and piers will generate noise and vibration during installation works. 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.

Sound exposure level (SEL) is used as a metric to assess the impact of noise on fish. Following a literature search no guidelines values for the rate of SEL at which fish are at risk of being injured by piling has been identified. 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, 2020). It is noted that the guideline values are based on hammer or impact piling as opposed to non-impact pile driving such as rotary bored piling which will be undertaken during piling for the bridge abutments and piers. 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 (2020) is 183 dB for fish less than 2 grams and 187 dB for fish larger than 2 grams.

The proposed rotary bored piling method has been selected with the aim of minimising the levels of noise and vibration that will be generated during piling. The rotary bored piling which will use a low vibration drill to form the pilot borehole will not involve any high impact strikes or hammering. The noise levels associated with piling, as per the guidance set out in BS 5228-1:2009+A1:2014, will be 83 dB L_{Aeq} at 10m. This is significantly below the low guideline value of 183 dB set out by Caltrans (2020). Given the low vibration that is predicted to be generated during piling, 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 at the nearest pile locations at pier P03 and abutment A01, as well as at Pier 01 and Pier 02, 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 rotary bored piling operations associated with the project will not have the potential to result in any detrimental impacts to Annex 2 fish species and will not have the potential to cause a barrier to the movement of lamprey, Atlantic salmon and other fish species during piling operations.

As noted above rotary bored piling will use a low vibration drill that will result in low vibration levels at very close distances to the piling rig. The vibrations levels associated with the piling are based on rotary bored piling using a 600mm pile diameter for bored piling into soft ground over rock taken from BS 5228 – Part 2: *Vibration* has been referenced (BS 5228:2 Table D.6, Ref. No. 106). The associated vibration levels are summarised below:

- 0.54mm/s at a distance of 5m, for auguring;
- 0.22mm/s at a distance of 5m, for twisting in casing;
- 0.42mm/s at a distance of 5m, for spinning off, and;
- 0.43mm/s at a distance of 5m, for boring with rock auger.

These vibration levels are typically below a level which would cause any disturbance to surrounding overburden and will not have the potential to undermine the adjacent bankside and result in bankside collapse to the river.

The installation of sheet piles around Pier 01 to Pier 03 will require works closer to the river bankside than the works associated with the rotary bored piling. As outlined in Section 3.3.3.2 above the sheet pile at Pier 01 will be approximately 2m from the Suir Island northern bank while the sheet pile at Pier 02 will be approximately 2.5m from the River Suir (south channel) southern bank. In the absence of a sensitive approach, installation of the sheet piles at these locations will have the potential to result in the destabilisation of the river bankside and the collapse of bankside overburden to the river. Such a collapse will result in the input of sediment to the river will potential impacts to fish spawning habitat and crayfish foraging and refuge habitat as detailed above.

Any illumination of the river during the construction phase or operation phase as a result of artificial lighting will have the potential to result in the disruption to Atlantic salmon and lamprey species which spawn and/or migrate along this stretch of the River Suir. Studies have shown that artificial light at night has the potential to disrupt fry dispersal from spawning redds and migratory pattern of Atlantic salmon smolts leaving natal streams (Jägerbrand et al., 2021). Confusion of migratory fish such as Atlantic salmon and lamprey species by artificial lighting resulting in excessive energy loss and reductions in migratory success have also been reported

(Hölker et al., 2010). Illumination also increases the risk of predation of Atlantic salmon and lamprey species, which disperse from spawning redds and natal streams at night time as a predator avoidance tactic.

The presence of the bridges spanning the river during the operation phase of the project is not predicted to have the potential to result in shading of the river and instream habitat for aquatic fauna. 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 detrimental effect of shading on the spawning habitats and movements of Atlantic salmon and lamprey species.

4.9.2 White-clawed Crayfish

The threats and pressures to white-clawed crayfish in Ireland relate to the spread of pathogens and invasive crayfish species (NPWS, 2019b). The NPWS (2019b) do not list negative impacts to water quality of freshwater bodies as a pressure or threat to this species, however they do include water quality as attribute defining the favourable conservation status of this species and have set a biological water quality target of a minimum of Q3-4 for the white-clawed crayfish population of the Lower River Suir SAC. Demers & Reynolds (2002) suggested that white-clawed crayfish can occur in water that is rated as moderately polluted, while Holdich (2003) pointed to poor water quality as a limiting factor in achieving the favourable conservation status of this species. Overall, it is considered that any perturbations to water quality as a result of the project will have the potential to undermine the favourable conservation condition of crayfish within the SAC.

Any noise, vibration or light emissions arising from the project to instream habitats adjacent to piling works and under the proposed bridge sections will have the potential to result in disturbance to white-clawed crayfish.

4.9.3 Otters

The main pressure affecting this species in Ireland is pollution, particularly from organic pollution resulting in fish kills and accidental deaths as a result of road traffic and fishing gear (NPWS, 2019b). The NPWS also list diffuse and point source pollution of freshwaters as a

likely indirect impact to otters through changes in prey abundance. However, the NPWS conclude that these threats are considered to produce local impacts only and are not of significance for the national otter population. Nevertheless, such impacts have the potential to be of local significance in the context of a population supported by an SAC river catchment. As such in the event of pollution, arising from construction activities to suitable otter foraging habitat, the potential will exist for indirect impacts to the conservation status of otters within the SAC, by way of reductions in the abundance of prey species.

No otter breeding or resting sites are located in the vicinity of the proposed development and none were identified as occurring within 150m of the proposed development, which represents the area in which such sites (i.e. natal holts, holts and couches) are susceptible to disturbance (NRA, 2009). The absence of breeding and resting site in the form of holts and couches within 150m of the proposed development will eliminate the potential for the project to result in disturbance to such sites.

The construction phase of the proposed development has the potential to result in short-term disturbance to otters that use the stretch of the river at and adjacent to the project site for foraging. This disturbance may relate to noise, visual disturbance, the presence of site operatives or construction phase lighting.

The fringes of Suir Island to the east of the proposed development provide suitable riparian shelter habitat for otters and otters have previously been recorded using the eastern tip of Suir Island (approximately 300m to the east of the proposed development) as a holt site in 2017. While the project will not provide for any formal access to Suir Island, east of the existing flood berm that will support the promenade, the presence of the new infrastructure will facilitate access to this area of the island. Informal tracks are present through the south of the island to the east of the flood berm and an increase in informal recreational activity, such as walking/dog walking will be restricted to these existing paths and the south side of the island. This is considered to be the case given the presence of dense, thorny scrub and wet and muddy ground conditions elsewhere to the east of the flood berm. The increase in informal walking/dog-walking along these existing informal paths has the potential to result in disturbance to this area of the island and undermine its potential to function as suitable riparian shelter habitat for otters.

4.9.4 Freshwater Pearl Mussel

No suitable freshwater pearl mussel habitat has been mapped by the NPWS as occurring at or downstream of the Suir Island. The mapped areas of suitable habitat for this species and the distribution of this species within the Lower River Suir SAC is restricted to the Clodiagh River catchment. Pearl mussels require specific habitat conditions for the survival of viable populations. The principal habitat requirements are oligotrophic, well-oxygenated waters of high-water quality with low levels of sedimentation and a firm substrate of gravels and sand. Pearl mussels also require a healthy stock of juvenile salmonids to host glochidia during the larval stage of their life-cycle. Salmonids are sensitive to pollution. Impacts include damage to gills leading to increased susceptibility to disease; reduction in foraging activity, degradation of redds and reduced survival rates for early-stage life cycles.

Any migration of excessive silt-laden water and suspended solids or other pollutants such as hydrocarbons or cementitious materials from the project site to the Suir catchment could contribute towards adverse effects the host salmonid population occurring in the Suir catchment, with associated impacts to the salmonid stocks occurring within the Clodiagh sub-catchment that are relied upon by freshwater pearl mussel.

4.9.5 Hydrophilous Tall Herb Fringe

Threats to this habitat include surface water pollution, changes to water body conditions and modification of cultivation practices (European Environment Agency, 2013). While the current assessment of this habitat at a national level does not include these threats in the list of threats and pressures affecting this habitat it is considered that the vegetation community supported by this habitat is sensitive to pollution and particularly excessive nutrient inputs to freshwater bodies. Such runoff could combine with other sources of nutrient inputs to these rivers to undermine their potential to support examples of this habitat downstream of the project site.

As noted above a range of non-native invasive plant species occur on Suir Island and within or in the vicinity of the proposed development footprint. Whilst these species are terrestrial in nature, they do have the potential to colonise terrestrial fringes of riparian habitats and will therefore have the potential to infest examples of this Annex 1 habitat downstream of the project site.

4.9.6 Vegetation of Flowing Waters

This habitat is sensitive to changes in hydrological and morphological conditions, eutrophication and other water pollution. Forestry activities that have the potential to generate pollution of surface waters are listed by the NPWS (2019a) as a threat to the favourable conservation condition of this habitat.

It is noted that none of the non-native invasive plant species occurring within the project site are aquatic in nature and they will not have the potential to result in instream infestations downstream along the River Suir.

4.9.7 Alluvial Woodland

The NPWS (2019a) have identified the presence of non-native invasive species and other problematic and undesirable species as a threat to this habitat. Soil pollution and overgrazing were also identified as a threat to this habitat. As this habitat is periodically inundated by the annual rise of river levels (NPWS, 2019a), an accidental pollution event during construction and/or operation, of a sufficient magnitude, could potentially negatively affect the water quality of this habitat, impacting the vegetation within the habitat, and therefore impacting habitat area, habitat distribution, woodland size and woodland structure. In addition, in the event that the project results in the dispersal of non-native invasive species the potential will exist for the project to contribute towards the existing threat posed by non-native invasive species establishment in examples of this habitat.

4.10 IN-COMBINATION EFFECTS

The potential for the project to result in cumulative impacts to European Sites in combination with other projects and existing threats and pressures identified to the Lower River Suir SAC are considered below.

4.10.1 Other Projects

A comprehensive review of all other project occurring in the vicinity of the project has been completed by undertaking a review of the Tipperary County Council online planning applications portal and identifying all recently approved and live planning applications in the vicinity of the River Suir, upstream and downstream of the project site. Relevant project

identified during this review are listed in Table 4.2 below and are examined for their potential to result in likely significant effects to the Lower River Suir SAC. In addition to the planning application projects to Tipperary County Council as listed in Table 4.2, Tipperary County Council have also applied for Part VIII planning for the refurbishment of the Suir Island gardens adjacent to the Suir Island Infrastructure Links project. 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 project. Furthermore, these works associated with the garden will be minor in scale and will be associated with the re-landscaping of the garden. There will be no potential for the works to result in disturbance to qualifying habitats of the Lower River Suir SAC. The garden refurbishment works will not require any instream works and there will be no potential for physical disturbance or damage to instream spawning habitats relied upon by Atlantic salmon or lamprey species. Given that the nature of the works for the garden will be small in scale and will not have the potential to pose a risk to the water quality of the River Suir there will be no potential for the current project to combine with this project to result in cumulative adverse effects to the water quality of the River Suir. The section of Suir Island that will be refurbished and open to the public does not support breeding sites for otters. In addition, 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 in areas supporting high value foraging resources (MacDonald & Mason, 1992), such as those supported by the River Suir and Suir Island. In light of this, the proposed use of the gardens during the operation phase, which will be during daylight hours, and the crepuscular/nocturnal activity regime of otters along the River Suir there will be no potential for garden project to result in disturbance to otters or combine with the construction phase or operation phase of the current Suir Island Infrastructure Links project to result in cumulative disturbance effects to otters.

Given the above along with the small-scale works associated with the garden refurbishment and the expected completion of these works in advance of the commencement of the Suir Island Infrastructure Links construction phase there will be no potential for both projects to combine to result in cumulative adverse effects to the Lower River Suir SAC and the features of interest occurring within the zone of influence of the project.

Table 4.2: Examination of the Project’s Potential to Combine with Other Projects

Project Planning Ref. & Brief Description	Overview ³	Assessment
201521 – retention of works to an existing dwelling	retention of the revised elevations of the existing dwelling, the minor modifications to the footprint, single-storey rear extension and front porch	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

³ The source of the overview description for the majority of the projects listed in Table 8.2 are taken from Tipperary County Council Planning Enquiry System (ePlan) (<https://www.tipperarycoco.ie/planning-and-building/planning-information-and-advice/planning-enquiry-system-eplan>)

	to same, domestic garage and all associated site development works	current project to result in cumulative adverse effects to the Lower River Suir SAC and the qualifying features of interest occurring within the current projects zone of influence.
20597 – construction of fencing and gates	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 the conservation status of the qualifying features of interest of the Lower River Suir SAC occurring along the stretch of the SAC adjacent to this project and the current project. There will be no potential for the current project to combine with this project to result in cumulative adverse effects to the SACs and its features of interest occurring in the surrounding area.
18600733 – installation of roof-top solar panels	installation of approximately 438m ² (74kW) of solar PV panels on the hotel's roof	This project is representative of a minor land use project that will not have the potential to result in risks to the conservation status of the qualifying features of interest of the Lower River Suir SAC occurring along the stretch of the SAC adjacent to this project and the current project. There will be no potential for the current project to combine with this project to result in cumulative adverse effects to the SACs and its features

		of interest occurring in the surrounding area.
<p>19600729 – redevelopments works to an existing service station and oil depot</p>	<p>(1) Redevelopment of their existing lands to provide: (a) new crossover arrangement at eastern end of site 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</p>	<p>A screening report for Appropriate Assessment was prepared for this project and it was determined by the Planning Authority that likely significant effects to the Lower River Suir SAC and all other European Sites, 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 Lower River Suir SAC and its features of interest occurring within the zone of influence of the current project.</p>

	<p>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 & 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>19601295 – retention of a constructed mixed user building</p>	<p>retention of certain changes to an as constructed mixed user building granted under planning application</p>	<p>The works associated with this retention application were already completed at the time of the application and are now in place.</p>

	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	There will be no potential for this minor project to combine with the current project to result in cumulative adverse effects to the Lower River Suir SAC and the qualifying features of interest occurring within the current projects zone of influence.
19600102 development at a site known as the former Clonmel Meat Factory	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 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 Lower River Suir SAC and its features of interest occurring within the zone of influence of the project.
Clonmel Urban/Public Realm Design	The overarching objectives of the Clonmel Urban Design Project are to; Transform Clonmel Town Centre making it more attractive to its population	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,

	<p>and citizens for the next 50 years; Provide a new 21st 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; 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</p>	<p>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 on the Lower River Suir SAC and its features of interest occurring within the zone of influence of the current project.</p>
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	<p>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</p>	
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	future Bulmer's Visitor Centre).	
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4.10.2 Existing Threats & Pressures

Existing threats and pressures to the Lower River Suir SAC have been reported by the NPWS in the Natura 2000 – Standard Data Form for the SAC. These threats and pressures are classed as low, medium and high and are identified as originating inside or outside the SAC. The following high and medium threats and pressures have been identified for the Lower River Suir SAC:

A08: Fertilisation (High, Outside)

E01: Urbanisation; human habitation (High, Inside & Outside)

E03: Discharges (High, Inside & Outside)

H01: Pollution to surface waters (High, Inside & Outside)

J02:12:02: Dykes and flood defence in inland water systems (High, Inside & Outside)

J02.01: Landfill, land reclamation and drying out (Medium, Inside & Outside)

Of the above identified threats and pressures to the Lower River Suir SAC, those that are relevant in terms of combining with the potential risks posed by the project to the freshwater system of the SAC is fertilisation, urbanisation; human habitation; discharges; and pollution to surface waters.

In the absence of appropriate safeguards the project will have the potential to result in perturbations and disturbance to freshwater habitats and species of the Lower River Suir SAC and will therefore have the potential to combine with these identified threats and pressures to the SAC. The potential impact of such water quality perturbations to the features of interest of the SAC within the zone of influence of the project have been outlined in Section 4.2 to 4.4 and 4.9.1 to 4.9.7 above.

5 DESCRIPTION OF HOW THE PROJECT COULD POTENTIALLY AFFECT THE LOWER RIVER SUIR SAC CONSERVATION OBJECTIVES

Table 5.1 lists the Conservation Objectives attributes and targets for each of qualifying features of interest of the Lower River Suir SAC occurring within the zone of influence of the project and examines how the project, in the absence of mitigation, will have the potential to result in adverse effects to these attributes and targets.

Table 5.1: Examination of Potential for Effects to the SSCOS of Qualifying Features of Interest occurring within the Zone of Influence of the Project

Attribute No.	Attribute	Target	Examination of Potential for Effects
Lamprey Species			
1	Distribution (extent of anadromy for sea lamprey) &/or barriers to movement	Access to all watercourses down to first order streams for brook lamprey. Greater than 75% of main stem length of rivers accessible from the estuary.	Activities associated with the construction phase of the project will not have the potential to undermine this attribute in terms of the creation of physical barriers to the movement of lamprey. However as noted in Section 4.7 above, the impact of artificial light at night and illumination of the River Suir with inappropriate construction phase or operation phase lighting will have the potential to result in an effective barrier to the movement of lamprey species. As such in the absence of appropriate designs artificial lighting provided for the project will have the potential to undermine the target of this attribute.
2	Population structure of juveniles	At least three age/size groups present	<p>The preferred spawning habitat for lamprey is gravel-dominated substratum typical of eroding watercourses and exemplified by the stretches of the River Suir at Suir Island. After hatching the larvae swim or are washed downstream and settle in areas of preferred juvenile habitat, which consist of muddy, sandy silt substrate. The juvenile stage of the lifecycle of lamprey species is generally restricted to depositing freshwater and estuarine environments where the substratum supports areas of sandy silt. Such habitats are considered to be located a significant distance downstream of the project site.</p> <p>However suitable spawning habitat for lamprey species along the stretch of the River Suir at the project site and lamprey and particularly sea lamprey are known to spawn along this stretch of the river. In the event of negative impacts to lamprey spawning habitat at and immediately downstream of the project site, such as the impacts outlined in Section 4.7 above, the potential will exist for indirect impacts to the later life-cycle juvenile stage of this species with consequent effects for population structure.</p>

Attribute No.	Attribute	Target	Examination of Potential for Effects
3	Juvenile density in fine sediment	Mean catchment juvenile density of at least 2/m ² for brook lamprey and 1/m ² for sea lamprey	As set out for attribute no. 2 above in the event of negative impacts to lamprey spawning habitat, the potential will exist for an indirect and temporally delayed impact to the density of juveniles occurring within suitable juvenile habitat downstream. Such an impact will be derived from a reduction in suitable spawning habitat and lamprey larvae moving downstream to juvenile habitats.
4	Extent and distribution of spawning habitat	No decline in distribution and extent of spawning beds.	The project will have the potential to generate perturbed surface water runoff. The discharge of such waters to the River Suir could have the potential to undermine the condition of lamprey spawning habitat at and downstream of the project site. Lamprey species show a preference for gravel-dominated substratum for spawning and the release of silt to such habitat will clog pore spaces and undermine the status of such habitat to support spawning lamprey.
5	Availability of juvenile habitat	More than 50% of sample sites positive	Given that the location of suitable juvenile habitat for lamprey are located a significant distance downstream in depositing and estuarine sections of the SAC the potential for the project to result in negative impacts to the availability of this habitat will not arise.
White-clawed crayfish			
6	Distribution	No reduction from baseline.	In the event that the project causes pollution to the River Suir, it could undermine the status of this waterbodies to support crayfish.
8	Population structure: recruitment	Juveniles and/or females with eggs in all occupied tributaries.	In the event that the construction phase of the project causes pollution to the River Suir it will have the potential to undermine the population structure of crayfish occurring within this waterbody at and downstream of the project site.
9	Negative indicator species	No alien crayfish species.	The project will not have the potential to result in the introduction of alien crayfish species. The project will not result in any instream works or the use of any machinery watercraft etc instream that could result in the spread of these non-native invasive species.
10	Disease	No instances of disease.	As per attribute no. 9 the project is not predicted to have the potential to result in the spread of crayfish disease within the catchment.

Attribute No.	Attribute	Target	Examination of Potential for Effects
11	Water quality	At least Q3-4 at all sites sampled by EPA.	In the event that the project causes pollution to the River Suir, it will have the potential to adversely affect water quality downstream.
12	Habitat quality: heterogeneity	No decline in habitat heterogeneity or habitat quality.	In the event that the construction phase of the project results in the discharge of silt-laden surface water to the River Suir, it will have the potential to undermine crayfish habitat heterogeneity.
Atlantic Salmon			
13	Distribution (extent of anadromy)	100% of river channels down to second order from the estuary.	Activities associated with the construction phase of the project will not have the potential to undermine this attribute in terms of the creation of physical barriers to the movement of Atlantic salmon. However as noted Section 4.7 above, the impact of artificial light at night and illumination of the River Suir with inappropriate construction phase or operation phase lighting will have the potential to result in an effective barrier to the movement of Atlantic salmon. As such in the absence of appropriate designs artificial lighting provided for the project will have the potential to undermine the target of this attribute.
14	Adult spawning fish	Conservation limit consistently exceeded	The provision of inappropriate lighting, the potential risks to water quality and the potential for physical damage and fatalities as a result of inappropriate piling works will all have the potential to combine to undermine the numbers of adult spawning fish at spawning habitat at and in the immediate vicinity of the project site or upstream of the project site. While the risks associated with perturbations to water quality and piling works will be temporary, being associated with the construction phase only, and will cease to exist during the operation phase, the continued illumination of the stretch of the river with inappropriate lighting during the operation phase will have the potential to undermine the target of this attribute.
15	Salmon fry abundance	Maintain or exceed 0+ fry mean catchment wide abundance threshold value. Currently set	The project's potential to undermine the targets for this attribute will be mediated by construction generated pollution impacts comprising contaminated surface water discharges and noise/vibration emissions and construction phase and operation phase lighting emissions on spawning success and survival of juvenile salmon within the River Suir.

Attribute No.	Attribute	Target	Examination of Potential for Effects
		at 17 salmon fry/5 min sampling.	
16	Out-migrating smolt abundance	No significant decline	The project's potential to undermine the targets for this attribute will be mediated by construction generated pollution impacts comprising contaminated surface water discharges and noise/vibration emissions and construction phase and operation phase lighting emissions on spawning success and survival of juvenile salmon within the River Suir.
17	Number and distribution of redds	No decline in numbers or distribution	The project's potential to undermine the targets for this attribute will be mediated by construction generated pollution impacts, particularly the potential release of silt-laden runoff, to the River Suir and the spawning habitat supported by the adjacent sections of the river. Salmon redds require high levels of dissolved oxygen and low levels of siltation. Excess silt on the river bed will reduce oxygen levels in redds and decrease the suitability of river beds to support spawn.
18	Water quality	At least Q4	In the event that the project causes pollution to the River Suir as a result of contaminated surface water runoff from areas of construction works, it will have the potential to adversely affect water quality of these waterbodies.
Twaite Shad			
19	Distribution: extent of anadromy	Greater than 75% of main stem length of rivers accessible from estuary	Development projects can result in barriers to the movement of Twaite Shad and consequent changes to their distribution within river systems where they have the potential to result in: Physical obstruction to the movement of twaite shad along a river channel; and Changes to the hydraulic regime (i.e. flow velocities) of a river that impedes movement. Given the project will not have the potential to result in such effects to the River Suir downstream of the project and given the nearest location of twaite shad approximately 20km downstream (at spawning habitat at Carrick-on-Suir) of the nearest point of the project there will be no potential for the project to result in changes to the distribution of shad within the SAC.

Attribute No.	Attribute	Target	Examination of Potential for Effects
20	Population structure: age classes	More than one age class present	Given that twaite shad are not reliant on the freshwater section of the River Suir at or within the circa 20km stretch of the river downstream from the project site there will be no potential for project to undermine the population age structure of shad within the SAC.
21	Extent and distribution of spawning habitat	No decline in extent and distribution of spawning habitats	The spawning habitat for this species along the River Suir is located at Carrick-on-Suir a remote distance from the project site. There will be no potential for the project to negatively affect the extent or distribution of spawning habitat for Twaite Shad.
22	Water quality: oxygen levels	No lower than 5mg/l	While the project is located at a significant distance from the sections of the River Suir relied upon by shad, in the event that the project results in a significant pollution event to the River Suir, it could combine with other existing sources of pollution to the river with adverse impacts to water quality downstream.
23	Spawning habitat quality: Filamentous algae; macrophytes; sediment	Maintain stable gravel substrate with very little fine material, free of filamentous algal (macroalgae) growth and macrophyte (rooted higher plants) growth	As detailed for Attribute No. 22 above in the event that the project results in a significant pollution event, the potential will exist for the project to combine with other sources of pollution to the River Suir to result in the discharge of sediment or nutrients to the systems, thus contributing to water quality issues downstream.
Otter			
24	Distribution	No significant decline	Negative effects to water quality as a result of project activities will have the potential to affect the otter foraging resource of the River Suir, which in turn will have the potential to displace otters from areas suffering from poor water quality within the SAC. Such effects will have the potential to adversely affect the distribution of this species within the SAC.
25	Extent of terrestrial habitat	No significant decline	The project will not result in the loss of any terrestrial habitat used by otters. There will be no loss of instream habitats or riparian habitats relied upon by otters.

Attribute No.	Attribute	Target	Examination of Potential for Effects
26	Extent of marine habitat	No significant decline	As per attribute no. 24 above negative impacts to water quality will have the potential to undermine the potential for the River Suir at and downstream of the project site to support otters.
27	Extent of freshwater habitat (river)	No significant decline	As per attribute no. 24 above negative impacts to the water quality of River Suir will have the potential to undermine its potential to support otters.
28	Couching sites and holts	No significant decline	<p>No breeding or resting places for otters occur within 150m of the project site. This 150m distance represents the distance at which otter holts and the otters using them are susceptible to disturbance effects (NRA, 2009). The nearest previously identified holt to the project site was located over 300m to the east of the project site. No signs of an otter holt were observed at this location during surveys completed between 2020 and 2022. A potential otter couch was identified approximately 115m to the east of the project site during field surveys in 2020. This potential couch site was subject to further survey between August and November 2021 and no otter activity was recorded at this location, indicating that this area is not relied upon by otters as a couching site. Based on the surveys completed at the project site and Suir Island no couching or holt sites are located within the 150m potential disturbance zone surrounding the project site. As such the construction phase of the project will not have the potential to undermine this target.</p> <p>The operation of the project will have the potential to result in increase informal activity within Suir Island to the east of the flood berm and the proposed promenade. This activity will be restricted to the south of the island due to the presence of dense, thorny vegetation and wet and muddy ground conditions occurring towards the north and eastern end of the island. No otter couch or holt sites were identified during surveys along southern bankside and riparian fringe during field surveys and as such informal activity that may be indirectly facilitated by the proposed development will not have the potential to result in a decline in or disturbance to couch or holt sites.</p> <p>In addition 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</p>

Attribute No.	Attribute	Target	Examination of Potential for Effects
			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 in areas supporting high value foraging resources (MacDonald & Mason, 1992), such as those supported by the River Suir and Suir Island. In light of this, the proposed use of the gardens during the operation phase, which will be during daylight hours, and the crepuscular/nocturnal activity regime of otters along the River Suir there will be no potential for garden project to result in disturbance to otters or combine with the construction phase or operation phase of the current Suir Island Infrastructure Links project to result in cumulative disturbance effects to otters.
29	Fish biomass	No significant decline	As per attribute no. 24 above the project will have the potential to undermine the water quality of the River Suir. Any adverse impacts to the water quality of the river will have the potential to result in a decrease in fish biomass (i.e. through mortalities resulting from a pollution event) and undermine the target for this attribute. noise and vibration emissions during the construction phase and inappropriate lighting and illumination of the river during the construction phase and operation phase will also have the potential to result in disruption to fish species and their behaviour which could in turn interfere with the predator-prey balance for otters and prey fish species.
30	Barriers to connectivity	No significant increase	Activities associated with the construction phase of the project will not have the potential to undermine this attribute. The project is located outside of the River Suir, will not result in instream works and will not result any barriers to the movement of otters throughout the SAC.
Freshwater pearl mussel			
31	Distribution	Maintain at 10.4km	There will be no potential for the project to undermine this attribute and adversely affect the distribution of freshwater pearl mussel beds within the Clodiagh

Attribute No.	Attribute	Target	Examination of Potential for Effects
			catchment given its location in a separate surface water sub-catchment to the project site.
32	Population size	Restore to 10,000 adult mussels	The project has been identified as having the potential to result in adverse effects to the salmonid population of the Lower River Suir SAC by way of perturbation to water quality and potential disturbance to salmonid spawning beds. In the event that the project has the potential to contribute towards a reduction in the salmonid population of the River Suir system it could in turn contribute towards a reduction in the freshwater pearl mussel host fish population. A reduction in the host fish population of adult mussel will have the potential to contribute towards undermining the target for the freshwater pearl mussel population within the Clodiagh catchment.
33	Population structure: recruitment	Restore to least 20% of population no more than 65mm in length; and at least 5% of population no more than 30mm in length.	AS per attribute no 32 above any contribute towards a reduction in salmonid host fish population could undermine the target for recruitment within the Clodiagh freshwater pearl mussel population.
34	Population structure: adult mortality	No more than 5% decline from previous number of live adults counted; dead shells less than 1% of the adult population and scattered in distribution.	There will be no potential for the project to undermine this attribute and contribute to adult mortality within the Clodiagh catchment given its location in a separate surface water sub-catchment to the project site.
35	Habitat extent	Restore suitable habitat in more than 8.8km in the Clodiagh system and any additional	There will be no potential for the project to undermine this attribute and contribute to a reduction in habitat extent within the Clodiagh catchment given its location in a separate surface water sub-catchment to the project site.

Attribute No.	Attribute	Target	Examination of Potential for Effects
		stretches necessary for salmonid spawning	
36	Suitable habitat condition	Restore condition of suitable habitat.	There will be no potential for the project to undermine this attribute and contribute to a diminution of suitable habitat condition within the Clodiagh catchment given its location in a separate surface water sub-catchment to the project site.
37	Water quality: macroinvertebrate and phytobenthos (diatoms)	Restore water quality- macroinvertebrates: EQR greater than 0.90; phytobenthos: EQR greater than 0.93.	There will be no potential for the project to undermine this attribute and contribute to a diminution in water quality within the Clodiagh catchment given its location in a separate surface water sub-catchment to the project site.
38	Substratum quality: filamentous algae (macroalgae), macrophytes (rooted higher plants)	Restore substratum quality- filamentous algae: absent or trace (<5%); macrophytes: absent or trace (<5%).	There will be no potential for the project to undermine this attribute and contribute to a diminution in substratum quality, with respect to an increase in filamentous algae within the Clodiagh catchment given its location in a separate surface water sub-catchment to the project site.
39	Substratum quality: sediment	Restore substratum quality- stable cobble and gravel substrate with very little fine material; no artificially elevated levels of fine sediment.	There will be no potential for the project to undermine this attribute and contribute to a diminution in substratum quality, with respect to an increase in sediment within the Clodiagh catchment given its location in a separate surface water sub-catchment to the project site.
40	Substratum quality: oxygen availability	Restore to no more than 20% decline	There will be no potential for the project to undermine this attribute and contribute to a diminution in substratum quality, with respect to a decline in oxygen availability

Attribute No.	Attribute	Target	Examination of Potential for Effects
		from water column to 5cm depth in substrate.	within the Clodiagh catchment given its location in a separate surface water sub-catchment to the project site.
41	Hydrological regime: flow variability	Maintain appropriate hydrological regimes.	There will be no potential for the project to undermine this attribute and contribute to a change within the hydrological regime within the Clodiagh catchment given its location in a separate surface water sub-catchment to the project site.
42	Host fish	Maintain sufficient juvenile salmonids to host glochidial larvae.	As per attribute no. 32 above project has been identified as having the potential to result in adverse effects to the salmonid population of the Lower River Suir SAC by way of perturbation to water quality and potential disturbance to salmonid spawning beds. In the event that the project has the potential to contribute towards a reduction in the salmonid population of the River Suir system it could in turn contribute towards a reduction in the salmonid population required to host glochidial larvae.
Hydrophilous Tall Herb Fringe			
43	Habitat distribution	No decline, subject to natural processes	The project will not have the potential to result in a change to the distribution of this habitat downstream of the project site within the SAC.
44	Habitat area	Area stable or increasing, subject to natural processes	In the event that the project results in the release of excessive concentrations of potentially polluting substances to the River Suir, the potential will exist for the project to combine with other sources of water quality pressures and threats to these catchments (such as agricultural activities) to result in negative impacts to the examples of this habitat occurring downstream of the project site.
45	Hydrological regime	Maintain appropriate hydrological regimes	The project will not result in any changes to river flow and will not have the potential to result in changes to the hydrological regime of the River Suir.
46	Vegetation structure	30-70% of sward is between 40 and 150cm in height	Non-native invasive plant species occur within and adjacent to the footprint of the project. The construction phase will have the potential to result in the mobilisation and spread of plant fragments and seeds of these species and the River Suir could function as a vector for their conveyance downstream. In the event that such species become established in downstream stretches of the SAC supporting this habitat, the

Attribute No.	Attribute	Target	Examination of Potential for Effects
			potential will exist for changes to the structure of this habitat with associated adverse consequences for the targets of this attribute.
47	Vegetation composition: broadleaved herb:grass ratio	Broadleaf herb component of vegetation between 40 and 90%	In the event that the project facilitates the spread and establishment of non-native invasive plant species downstream within examples of this habitat, there will be potential for adverse changes to the ratio of broadleaved herbs to grass species.
48	Vegetation composition: typical species	At least 5 positive indicator species present	An increase in the concentration of potentially polluting substances to the River Suir or the spread of non-native invasive plant species within examples of this habitat will have the potential to result in the changes to abundance of positive indicator species of this habitat downstream of the project.
49	Vegetation composition: negative indicator species	Negative indicator species, particularly non-native invasive species, absent or under control- NB Indian balsam (<i>Impatiens glandulifera</i>), monkeyflower (<i>Mimulus guttatus</i>), Japanese knotweed (<i>Fallopia japonica</i>) and giant hogweed (<i>Heracleum mantegazzianum</i>).	An increase in the concentration of potentially polluting substances to the River Suir could result in an increase in negative indicator species within this habitat downstream of the project. Two of the species listed opposite occur on Suir Island with <i>Heracleum mantegazzianum</i> and <i>Fallopia japonica</i> occurring (or previously occurring) in close proximity to the project site. In the event that the project results in the spread of these species downstream the potential will be existing for it to undermine the targets of this attribute.
Vegetation of Flowing Waters			
50	Habitat area	Area stable or increasing, subject to natural processes	Any adverse effects to the water quality of the River Suir will have the potential to result in a reduction in the extent of suitable riverine habitat within the SAC to support this qualifying habitat.

Attribute No.	Attribute	Target	Examination of Potential for Effects
51	Habitat distribution	No decline, subject to natural processes.	For the reasons outlined for Attribute no. 38 the project will have the potential to result in a decline in the distribution of this habitat within River Suir.
52	Hydrological regime: river flow	Maintain appropriate hydrological regimes	The project will not result in any instream works and will not change the nature of the hydrological regime of the River Suir.
53	Hydrological regime: tidal influence	Maintain natural tidal regime	The project will not have the potential to influence the tidal regime of this SAC.
54	Hydrological regime: groundwater discharge	Maintain appropriate hydrological regimes	The project will not have the potential to influence input of freshwater seepage to examples of this habitat occurring upstream and downstream of the project site.
55	Substratum composition: particle size range	The substratum should be dominated by the particle size ranges, appropriate to the habitat sub-type (frequently sands, gravels and cobbles)	The release of silt during the construction phase from the project site to the River Suir will have the potential to undermine the quality of substratum in watercourse downstream of the project to support this habitat. The potential for the discharge of sediment fines to river beds to result in the abundant growth of commonly occurring and species poor stands of crowfoot vegetation has been identified by the NPWS (NPWS, 2019a)
56	Water quality: nutrients	The concentration of nutrients in the water column should be sufficiently low to prevent changes in species composition or habitat condition	Any inadvertent discharge of pollutants to the River Suir during construction will have the potential to undermine this target.
57	Vegetation composition: typical species	Typical species of the relevant habitat sub-type should be present and in good condition	Any inadvertent discharge of pollutants to the River Suir during construction will have the potential to undermine this target.

Attribute No.	Attribute	Target	Examination of Potential for Effects
58	Floodplain connectivity	The area of active floodplain at and upstream of the habitat should be maintained	The project will not result in any changes to the existing river floodplain habitat within the River Suir.
59	Fringing habitat	Maintain marginal fringing habitat that support the typical species and vegetation composition of the habitat	The conservation objectives for the SAC state that “riparian habitats (including those along lake shores), particularly natural/semi-natural woodlands and wetlands, are an integral part of the structure and functioning of river systems, even where they do not form part of a natural floodplain. Fringing habitats can contribute to the aquatic food web (e.g. allochthonous matter such as leaf fall), provide habitat (refuge and resources) for certain life-stages of fish, birds and aquatic invertebrates, assist in the settlement of fine suspended material, protect banks from erosion and contribute to nutrient cycling. Shade may also be important in suppressing algal growth in enriched rivers and moderating temperatures. Equally, fringing habitats are dependent on rivers/lakes, particularly their water levels, and support wetland communities and species of conservation concern (see Mainstone et al. (2016)). Alluvial and riparian woodland is important for the rivers in Lower River Suir SAC”. The project will not result in the loss of significant examples of natural/semi-natural woodland or wetland habitats. There will be a minor and temporary loss of riparian/mixed woodland mosaic habitat along the southern bankside of the north channel of the River Suir at Suir Island during the construction phase of the project. Once the bridge is in place the vegetation along the bankside will recolonise the construction footprint. Recolonisation will be undertaken with native species of Suir Island such that the extent of negative indicator, non-native woodland species in this area is reduced.
Alluvial woodland (Riparian Woodland)			
60	Habitat area	Area stable or increasing, subject to natural processes, at	As this habitat is periodically inundated by the annual rise of river levels (NPWS, 2019a), an accidental pollution event during construction the construction phase, of a sufficient magnitude, could potentially negatively affect the water quality of this

Attribute No.	Attribute	Target	Examination of Potential for Effects
		least 32.9ha for sites surveyed.	habitat, impacting the vegetation within the habitat, and therefore impacting habitat area, habitat distribution, woodland size and woodland structure.
61	Habitat distribution	No decline, surveyed locations shown on Map 5 of the site-specific conservation objectives. It is noted that further un-surveyed areas are present within the SAC, for example at islands below Carrick-on-Suir, at Shanbally (Coillte LIFE project site), Tibberaghny Marshes, along the lower stretches of the more westerly of the Suir tributaries and along both banks of the Suir as far east as the Dawn River (NPWS internal files).	The project will not result in a decline in the distribution of Alluvial woodland within the Lower River Suir SAC. No example of Alluvial woodland or riparian woodland (WN5) habitat occurs within the footprint of the proposed development and there will be no loss of this habitat arising from the project.
62	Woodland size	Area stable or increasing. Where topographically possible, "large"	There will be no reduction in size of the extent of riparian woodland habitat occurring on Suir Island as a result of the project.

Attribute No.	Attribute	Target	Examination of Potential for Effects
		woods at least 25ha in size and "small" woods at least 3ha in size	<p>The potential for the proposed development to indirectly facilitate an increase in informal recreational human activity, such as walking and dog-walking, in the area of Suir Island to the east of the flood berm has been identified above. Where such increases are predicted to occur they are expected to arise to the south of the island along an existing informal path on dry ground that leads from the flood berm to the millrace. Areas of the island that support riparian woodland are fronted by impenetrable dense, thorny scrub cover and occur on wet and muddy ground. Due to these conditions increased levels of informal human activity that could result in disturbance to riparian woodland and a reduction in size, as a result of trampling etc will not arise.</p> <p>It is further noted that measures for the future management of habitats to the east of the flood berm and promenade, that will be implemented by Tipperary County Council are outlined in Section 8 below. The implementation of these measures will provide for the retention of conditions, such as dense shrub cover, fronting and within riparian woodland, that will minimise the potential for recreational activity within this habitat.</p>
63	Woodland structure: cover and height	Diverse structure with a relatively closed canopy containing mature trees; subcanopy layer with semimature trees and shrubs; and well-developed herb layer	<p>The proposed development will not result in changes to the woodland structure, in terms of cover and height within the woodland.</p> <p>Measures for the future management of riparian woodland on the island are set out as mitigation measures in Section 8 below. These measures will promote the establishment of native species shrub layers and sub-canopy layers, which will over time facilitate the establishment of a native riparian woodland, more representative of Alluvial woodland.</p>
64	Woodland structure: community diversity and extent	Maintain diversity and extent of community types.	For the reasons set out for attribute no. 62 above the proposed development will not result in any change to the woodland structure in terms of community diversity and extent.

Attribute No.	Attribute	Target	Examination of Potential for Effects
			Currently the diversity and community types occurring within the riparian woodland are not all representative of Alluvial woodland habitat (see Appendix 3). The implementation of positive habitat management by Tipperary County Council within riparian woodland, as set out as mitigation measures in Section 8 below, will have the potential to increase the extent of community types representative Alluvial woodland within the examples of riparian woodland on the island.
65	Woodland structure: natural regeneration	Seedlings, saplings and pole age-classes occur in adequate proportions to ensure survival of woodland canopy	<p>For the reasons set out for attribute no. 62 above the proposed development will not result in any change to the woodland structure in terms of community diversity and extent.</p> <p>Currently the seedling under-storey is dominated by <i>Acer pseudoplatanus</i>, which is a non-native species and a negative indicator species of Alluvial woodland. The implementation of positive habitat management by Tipperary County Council within riparian woodland, as set out as mitigation measures in Section 8 below, will have the potential to increase the extent of community types representative Alluvial woodland within the examples of riparian woodland on the island.</p>
66	Hydrological regime: flooding depth/height of water table	Appropriate hydrological regime necessary for maintenance of alluvial vegetation.	As outlined in Section 6.1.1 of Screening Report for Appropriate Assessment, the proposed development will not have the potential to result in changes to the hydrological regime of the River Suir or changes to flood events that occur along this section of the river. On this basis the project will not have the potential to undermine the target of this attribute.
67	Woodland structure: dead wood	At least 30m ³ /ha of fallen timber greater than 10cm diameter; 30 snags/ha; both categories should include stems greater than 40cm diameter (greater than 20cm diameter in the case	For the reasons set out for attribute no. 62 above the project will not have the potential to undermine the targets of this attribute.

Attribute No.	Attribute	Target	Examination of Potential for Effects
		of alder (<i>Alnus glutinosa</i>)	
68	Woodland structure: veteran trees	No decline	For the reasons set out for attribute no. 62 above the project will not have the potential to undermine the targets of this attribute.
69	Woodland structure: indicators of local distinctiveness	No decline	For the reasons set out for attribute no. 62 above the project will not have the potential to undermine the targets of this attribute.
70	Vegetation composition: native tree cover	No decline. Native tree cover not less than 95%	<p>For the reasons set out for attribute no. 62 above the project will not have the potential to undermine the targets of this attribute.</p> <p>Currently the extent of native tree cover within the riparian woodland habitat is estimated to be significantly below the target threshold of 95% tree cover. The implementation of positive habitat management by Tipperary County Council within riparian woodland, as set out as mitigation measures in Section 8 below, will have the potential to increase the extent of community types representative Alluvial woodland within the examples of riparian woodland on the island.</p>
71	Vegetation composition: typical species	A variety of typical native species present, depending on woodland type, including alder (<i>Alnus glutinosa</i>), willows (<i>Salix</i> spp.), oak (<i>Quercus</i> spp.), ash (<i>Fraxinus excelsior</i>) and birch (<i>Betula pubescens</i>)	<p>For the reasons set out for attribute no. 62 above the project will not have the potential to undermine the targets of this attribute.</p> <p>The typical native species occurring within the riparian woodland habitat occur in association with a range of non-native species, dominated by <i>Acer pseudoplatanus</i>. The implementation of positive habitat management by Tipperary County Council within riparian woodland, as set out as mitigation measures in Section 8 below, will have the potential to increase the cover of typical native species representative Alluvial woodland within the examples of riparian woodland on the island.</p>
72	Vegetation composition:	Negative indicator species, particularly non-native invasive	As outlined in Section 5.5 above the project will have the potential to result in the spread of non-native invasive species. Any works promoting the dispersal of non-

Attribute No.	Attribute	Target	Examination of Potential for Effects
	negative indicator species	species, absent or under control	<p>native invasive species could result in their spread within the riparian woodland to the east of the site.</p> <p>Mitigation measures are set out in Section 8 below for the control of non-native invasive species within the project site during the construction phase.</p> <p>In addition it is noted that Tipperary County Council are actively engaged in a non-native invasive species eradication programme for Fallopia japonica and Heracleum mantegazzianum on Suir Island to the east of the project site. This programme will continue until the eradication of these species from the island are confirmed.</p> <p>Furthermore, the implementation of positive habitat management by Tipperary County Council within riparian woodland, as set out as mitigation measures in Section 8 below, will have the ongoing control of non-native invasive species within areas of riparian woodland.</p>

6 A DESCRIPTION OF HOW THE INTEGRITY OF THE SITE IS LIKELY TO BE AFFECTED BY THE PROJECT

EU Guidelines (2021) recommend as part of a Stage 2 Appropriate Assessment that a checklist of site integrity is carried out (see Table 6.1). This aids in establishing the nature of potential adverse effects to the integrity of the European Sites, as defined by the conservation objectives of special conservation interests occurring within the sphere of influence of the project.

Table 6.1: Checklist of Site Integrity

Conservation Objectives	
Does the Project have the potential to:	
Cause delays in progress towards achieving the conservation objectives of the site?	Yes. In the absence of construction phase mitigation that aim to prevent deleterious emissions, the project will have the potential to undermine the targets of conservation objectives. The discharge of polluted surface water to the River Suir during the construction phase will have the potential to undermine the status of aquatic habitats to support otters, qualifying fish species and white-clawed crayfish. Noise/vibration emissions associated with inappropriate piling works will have the potential to result in disturbance to spawning habitat and physical damage or even fatalities to fish species. Light emissions to the river will have the potential to disturb spawning habitat and result in changes to the behaviour of fish species that could undermine their populations and result in changes to otter-prey fish dynamics. The project will also have the potential to undermine the potential for the River Suir downstream of the project site to support examples of the vegetation of flowing water and hydrophilous tall herb fringe qualifying habitats.
Interrupt progress towards achieving the conservation objectives of the site?	Yes. See response to first question above.
Disrupt those factors that help to maintain the favourable conditions of the site?	Yes. See response to first question above.
Interfere with the balance, distribution and density of key species that are the indicators of the favourable condition of the site?	Yes. See response to first question above.
Cause changes to the vital defining aspects (e.g. nutrient balance) that determine how the site functions as a	Yes. See response to first question above.

habitat or ecosystem?	
Change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site?	Yes. See response to first question above.
Interfere with predicted or expected natural changes to the site (such as water dynamics or chemical composition)?	Yes. For example the discharge of potentially contaminated surface water from the project site could result in a decrease in the diversity of key fauna communities supported by the River Suir, upon which otters, qualifying fish species and white-clawed crayfish rely.
Reduce the area of key habitats?	Adverse water quality effects to the River Suir as a result of the project could reduce the area of suitable habitat available for freshwater dependent qualifying species of the SAC and the extent and distribution of Vegetation of Flowing Waters and hydrophilous tall herb fringe qualifying habitats.
Reduce the population of key species?	Yes. See response to questions above.
Change the balance between key species?	Yes, adverse impacts to the water quality of the River Suir will have the potential to alter key invertebrate communities, relied upon by qualifying fish species in the catchment downstream. Light emissions to the river will have the potential to result in changes to the balance between otters and their prey fish species.
Reduce diversity of the site?	Yes. See response to the question above.
Result in fragmentation?	No.
Result in loss or reduction of key features (e.g. tree cover, tidal exposure, annual flooding, etc.)?	The release of pollution to the River Suir could result in the loss of suitable foraging/spawning habitat for the otter, lamprey and white-clawed crayfish population. Light emissions could result in disturbance to and loss of suitable spawning habitat for Atlantic salmon and lamprey species.

7 A DESCRIPTION & EVALUATION OF MITIGATION MEASURES FOR THE PROJECT

All construction phase mitigation measures outlined in this NIS and as imposed in any Conditions and/or Restrictions in any Approval by the Competent Authority, will be included in the Contractor's contract of works. The outline Construction and Environment Management Plan (OCEMP) prepared for the construction phase of the project, which is provided under separate cover as part of the planning application documents for the project, will be implemented and in operation to check equipment, materials storage and transfer areas, drainage structures and their attenuation ability on a regular basis, to ensure that the measures in place are operating effectively, prevent accidental leakages, and identify potential breaches in the protective retention and attenuation network and other environmental safeguards during the construction phase so that all necessary protective measures can be implemented to prevent pollution to the aquatic environment.

During the construction phase the contractor will be required to appoint an Ecological Clerk of Works (ECoW). 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 responsible for completing pre-construction surveys and supervising construction works and advising on the implementation of biodiversity enhancement measures that will be commenced during the construction phase. The ECoW will be required to have experience in monitoring construction phase surface water drainage infrastructure and water quality.

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.

An Invasive Species Management Plan has been prepared for the proposed development and is provided as Appendix 4 to this Natura Impact Statement. During the pre-construction and construction phase the ECoW will be required to supervise the implementation of all measures set out in the Invasive Species Management Plan.

The ECoW will ensure that best practice construction methods and mitigation measures detailed in this Natura Impact Statement and associated documents 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 including 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 as appropriately 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 Natura Impact Statement and associated documents and as imposed in any Conditions and/o Restrictions in any Approval by the Competent Authority, for the proposed development.

7.1 PROTECTED SPECIES LICENCING

In the preparation of this NIS, no requirement for protected species derogation 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.

7.2 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 a earthworks handling protocol during construction. 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.

7.3 RELEASE OF HYDROCARBONS

To control and contain any potential hydrocarbon and other harmful substances spillage by vehicles during construction, it is proposed to refuel plant equipment off the development site, thus mitigating this potential impact by avoidance. 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.

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, including the cessation of works in the area of the spillage until the issue is resolved. 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.

Both precautionary measures and emergency response protocols as specified in the OCEMP will be implemented on site.

7.4 CONTROL OF WATER DURING CONSTRUCTION

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 within sheet piled working areas. All excavations and sheet-piled working areas will contain suitable sumps for the collection and removal of water. 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. Aska Sykes Ltd Dirt-Box and Dirt-Bags systems or similar approved). 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. All pumps will be fitted with suitable screens and/or sifts to reduce the intake of silt. This approach will eliminate the potential for discharge of surface water generated within excavation and sheet piled areas to the River Suir. An indication of the layouts and details for the above described de-watering controls is provided as Figure 7.1 below.

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.

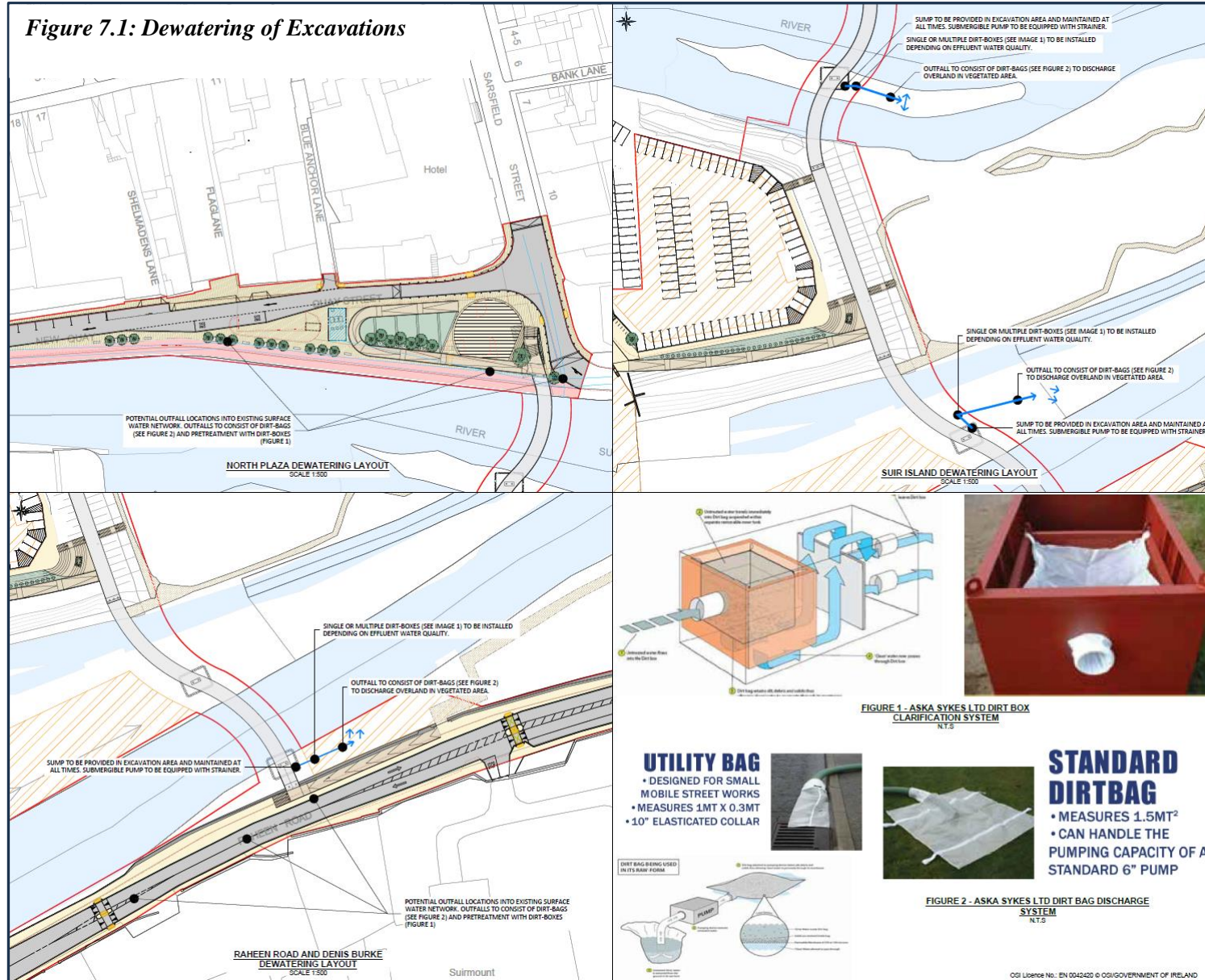
7.5 RELEASE OF SEWERAGE

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.

No wastewater will be generated as a result of the project during the operation phase.

7.6 RELEASE OF CEMENT-BASED POLLUTANTS

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 need 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.

7.7 RELEASE OF OTHER POLLUTANTS

The following measures are proposed to prevent contamination of watercourses:

- No refuelling of construction vehicles or plant will take place within the 50m surface water buffer zone.
- 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.
- 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.

7.8 PREVENTION OF ADVERSE 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.

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.

With the implementation of the above measures and as imposed in any Conditions and/o Restrictions in any Approval by the Competent Authority, 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.

7.9 PREVENT ADVERSE IMPACTS 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 as the potential to cast light on the river will be turned off. In addition, during the months of late Mid-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 the risk of flooding is minimised.

7.10 PREVENT ADVERSE IMPACTS OF ARTIFICIAL LIGHTING DURING THE OPERATION PHASE

The following measures will be implemented to minimise the impact of artificial night lighting to light sensitive species which include Annex 2 fish 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 for the bridge sections has been designed in accordance with the best practice guidelines for bats and lighting prepared by the Institute of Lighting Professionals and Bat Conservation Trust. The design of the lighting in line with these measures will also ensure that a sensitive approach to lighting has been adopted for all other light sensitive species, including Annex 2 fish species and white-clawed crayfish.

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 will in turn reduce impacts on light sensitive fauna including Annex 2 fish species. 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

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

7.11 PREVENT THE SPREAD OF NON-NATIVE INVASIVE SPECIES

An Invasive Species Management Plan has been prepared for the project and is provided as Appendix 4 to this Natura Impact Statement. The following sub-sections summarise elements of this Invasive Species Management Plan.

7.12 SITE HYGIENE

7.12.1.1 Cleaning of Plant & Equipment Prior to Arrival On-Site

Prior to arrival on site, the Contractor's vehicles and equipment must be thoroughly cleaned. High-pressure steam cleaning, with water > 40 degrees C, is recommended for vehicles and equipment where reasonably feasible. Many roadside garages provide these facilities. If it is not possible to steam clean the equipment, a normal power hose must be used. After cleaning, a visual inspection of the equipment will be carried out to ensure that all adherent material and debris has been removed.

Cleaning should not be undertaken on the site or near watercourses. Each field vehicle must carry a 'disinfection box'. This should contain Virkon Aquatic or another proprietary disinfectant, a spraying mechanism, cloths or sponges, a scrubbing brush and protective gloves. Protective gloves must be worn when using any disinfectant solution.

It is recommended to apply disinfectant to the undercarriage and wheels of any vehicles used after cleaning if the vehicles have been used in streams or rivers (this does not apply to vehicle or machinery use in wetlands or peatland areas). Disinfectants must be used strictly in accordance

with the manufacturer's instructions. They must be disposed of safely, and never close to open waters such as drains etc.

Footwear should be dipped in or scrubbed with a disinfectant solution (e.g. 1% solution of Virkon Aquatic or another proprietary disinfection product) and thoroughly dried afterwards if used in streams or rivers. This does not apply to footwear for use in wetlands or peatland areas. Please note that it is not intended that any vehicles will enter water courses in the course of the construction or operation of the Project. Accordingly, this measure is precautionary only. Disinfectants must be used strictly in accordance with the manufacturer's instructions. They must be disposed of safely and never close to open waters such as drains etc.

7.12.1.2 Cleaning & Decontaminating Vehicles & Equipment Onsite

Pre-Cleaning

Brushing (Physical Removal)

Used in conjunction with another physical removal method such as vacuuming, or when in the field, this method is moderately effective in removing the majority of plant material from equipment and gear. Brushing will remove most surface soil, plant material, and foreign matter. If there is a nap to fabric, such as upholstery or carpeting, brush with the nap rather than against it. Brushing against the nap could further embed small seeds into the material.

A combination of soft and stiff bristles of varying length is recommended for use on carpeting or components made of rubber, nylon, or plastic. Bristles of medium length and stiffness are desired for removal of soil and other matter from fabrics and upholstery. Stiff bristles are recommended for the tread of wheels that become encrusted with soil and mud. Metal bristles may also be used to remove soil or concrete in treads, but heavier wear and tear to the equipment will result.

High-pressure compressed air blasting may be used to assist soil removal.

Follow up with vacuuming, high-pressure air blasting, or high-pressure wash is recommended, as applicable.

Vacuuming (Physical Removal)

Vacuumping equipment with a brush attachment is suggested to remove most loose particle matter, but care should be taken because small seeds may become further embedded in materials. To prevent contained plant and soil matter from being re-deposited or re-dispersed following the cleaning process, collected matter should be double bagged and disposed of in a sanitary landfill. Follow up with water washing, high-pressure air blasting, or high-pressure wash is recommended as applicable.

Water Washing with High-Pressure Wash and With or Without Thermal Treatment

General water washing with high-pressure wash or thermal treatment is the most effective method for removing residual foreign materials, although small and embedded seeds are capable of persisting. Where known invasive materials are present, wastewater can be treated or filtered, and the waste materials double bagged and disposed of in a sanitary landfill.

High-Pressure Wash

Improvement in the design of high-pressure washing makes it the most effective means of cleaning heavily soiled and contaminated items. Not all items are capable of withstanding the pressure of this treatment, and it should only be used where applicable.

There are many models of high-pressure washers, from simple hand-held nozzles to laser guided, robotic control systems. In some cases, containment and operation sheds are portable. The water systems can be fresh or recycled and use hot or cold water.

Selecting a Wash down Location

To avoid re accumulation of soil on cleaned vehicles, a paved area for washing, off-loading, and staging vehicle cleaning operations, with paved roads between should be used. This type of facility will often not be a viable option for activities in remote areas. Elevating the washing area enables cleaning personnel to access the underside of vehicles and equipment, where contaminants are otherwise difficult to reach.

Water runoff, potentially carrying soil, seeds, animals and petroleum contaminants, must be managed with the use of berms or other containment. Silt fence installed along perimeters of work

areas can also aid in preventing spread of contaminated materials outside of the washdown location.

The area must be large enough to safely accommodate all vehicles and personnel before, during, and after cleaning operations.

7.12.1.3 Best Management Practice

Do not locate the cleaning site adjacent to storm water drains that allow untreated effluent to enter surface water bodies.

General Standard Measures:

- Set up the best staging area possible for cleaning operations. A paved area with accommodations to elevate vehicles or otherwise allow easy access to the undersides of vehicles and equipment is the best setting. Otherwise, using geotextile access and exit areas, bermed water recovery areas, and portable vehicle lifts are the next best option.
- Equipment of all types should be cleaned at the location of last use. If this is not possible, arrange for cleaning at a facility that is specially designed for equipment cleaning.
- Preclean equipment that contains heavy accumulations by hand to reduce water demand.
- Make pressurized water available with pressure and nozzles capable of removing all soil and debris.
- Do not allow wash waters to flow into storm drains because these drains often directly flow untreated into surface water bodies.
- At remote sites, install silt fence or otherwise contain materials left behind. Monitor sites closely and eradicate exotic species.
- Clean vehicles and equipment thoroughly and ensure that they remain clean when leaving the site. Follow up cleaning operations with final inspections.
- Clean, drain, and dry all equipment.

Plant Inspection

All plant leaving site will be inspected to ensure it is clean. A record of all inspections will be maintained by the main contractor's Site Agent.

Inspections will focus on identifying the presence or otherwise of fragment in the following locations of plant equipment.

Rubber Tyred Vehicles

- Crevices in upper surface and panels
- Tyres, rims
- Spare tyre mounting area
- Bumpers
- Front and rear quarter panels
- Around and behind grills
- Bottom of radiator vent openings
- Brake mechanisms
- Transmission
- Stabiliser bar
- Shock absorbers
- Front and rear axles
- Beds
- Suspension units
- Exhaust systems
- Light casings and mirrors

Tracked Vehicles

- Crevices in upper surface and panels
- Top of axles and tensioners
- Support rollers
- Between rubber or gridded areas
- Beneath bumpers
- Hatches
- Under casings

- Grills
- Beneath seats
- Beneath floor mats
- Upholstery
- Beneath foot pedals
- Inside folds of gear shift cover

7.13 HABITAT REHABILITATION

Habitat reinstatement will be implemented in habitats that will be temporarily disturbed during the construction phase. These habitats comprise broad-leaved woodland/riparian woodland mosaic, dry meadows and grassy verges and reed and large sedge swamp.

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 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.

Ongoing monitoring of habitat reinstatement areas 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 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.

7.14 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 4.3 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 will 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 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.

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.

7.15 EVALUATION OF MITIGATION MEASURES

The mitigation measures and environmental safeguards proposed for the construction phase of the project are taken from established best practice guidelines that have been successfully implemented for a wide range of project-level infrastructural developments. These measures have undergone extensive and rigorous monitoring for their effectiveness at development sites where they have previously been applied to ensure adverse environmental impacts are avoided.

The best practice guidance that have informed the mitigation measures and environmental safeguards proposed in this NIS and that will be adhered to throughout the construction and operation of the proposed development include:

- The Good Practice Guidance notes proposed by EA/SEPA/EHS:
- PPG1: General Guide to the Prevention of Water Pollution
- PPG2: Above ground oil storage tanks
- PPG4: The disposal of sewage where no Main Drainage is Available
- PPG5: Works In, Near or Liable to Affect Watercourses
- PPG10: Working at Construction and Demolition Sites.
- PPG21: Pollution Incident Response Planning
- PPG26: Dealing with Spillages on Highways
- CIRIA Environmental Good Practice on Site
- CIRIA Control of Water Pollution from Construction Sites. Technical Guidance C648
- CIRIA SuDS Manual Technical Guidance C697
- Managing Geotechnical Risk: Improving productivity in UK building and construction. Clayton C.R.I., 2001
- Development on Unstable Land. Department of Environment (DOE), UK

Multiple projects of similar nature and scale have been completed in recent years in the Republic of Ireland, where the mitigation measures for piling operations have been successfully implemented resulting in the avoidance of impacts to aquatic fauna and river bank integrity.

8 CONCLUSION

It has been concluded that, with the implementation of all mitigation measures, the potential for impacts to occur will be eliminated and any potential for adverse impacts to the Lower River Suir SAC can be ruled out.

Based upon the information provided in this NIS, it can be concluded by the competent authority that the project will not, alone or in-combination with other plans or projects, result in significant adverse effects to the integrity and conservation status of European Sites in view of their Conservation Objectives and on the basis of best scientific evidence and there is no reasonable scientific doubt as to that conclusion.

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APPENDIX 1: SCREENING REPORT FOR APPROPRIATE ASSESSMENT



Suir Island Infrastructure Links

Screening Statement in Support of Appropriate Assessment

Doherty Environmental Consultants Ltd.

September 2023

Suir Island Infrastructure Links

Screening Statement for Appropriate Assessment

Document Stage	Document Version	Prepared by
Final	1	Pat Doherty MSc, MCIEEM

This report has been prepared by Doherty Environmental Consultants Ltd. with all reasonable skill, care and diligence. Information report herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

This report is prepared for Tipperary County Council and we accept no responsibility to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.

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1. INTRODUCTION

Tipperary County Council has commissioned Doherty Environmental Consultants Ltd. to complete a Stage 1 Screening for Appropriate Assessment for the proposed development of the Suir Island Infrastructure Links project at Suir Island, Clonmel, Co. Tipperary.

The locations of the Suir Island Infrastructure Links project are shown on Figure 1.1.

This Screening Report for Appropriate Assessment forms Stage 1 of the Habitats Directive Assessment process and is being undertaken in order to comply with the requirements of the Habitats Directive Article 6(3). The function of this Screening Report is to identify the potential for the project to result in likely significant effects to European Sites and to provide information so that the competent authority can determine whether a Stage 2 Appropriate Assessment is required for the project.

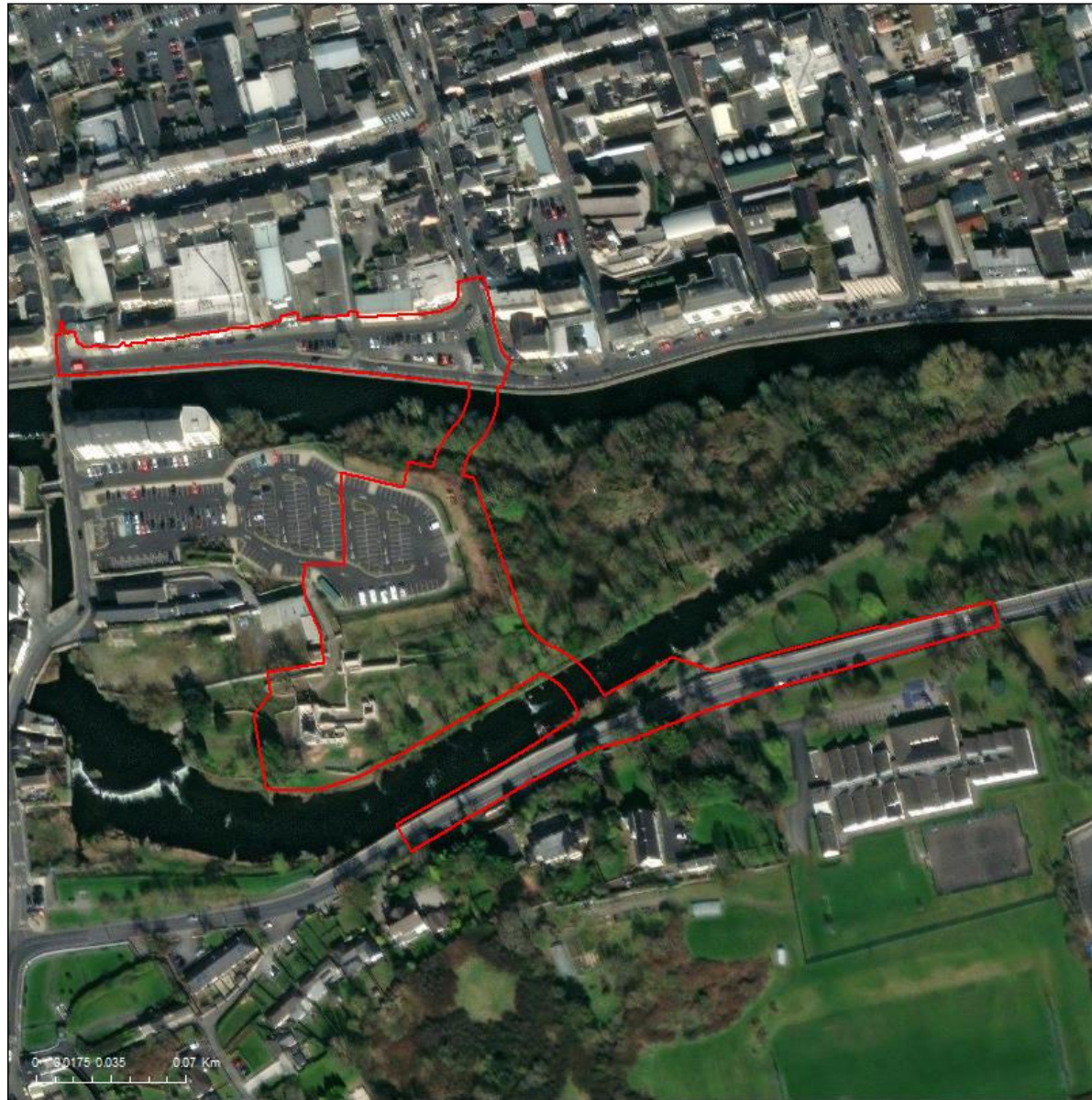
1.1 LEGISLATIVE CONTEXT

This Screening Report for Appropriate Assessment is being prepared in order to enable the competent authority to comply with Article 6(3) of Council Directive 92/43/EEC (The Habitats Directive). It is prepared to assess whether or not the project alone or in combination with other plans and projects is likely to have a significant effect on any European Site in view of best scientific knowledge and in view of the conservation objectives of the European Sites and specifically on the habitats and species for which the sites have been designated.

1.1.1 *Requirement for an Assessment under Article 6 of the Habitats Directive*

According to Regulation 42(1) of the European Communities (Birds and Natural Habitats) Regulations 2011 – 2015, the competent Authority has a duty to:

- Determine whether the proposed Project is directly connected to or necessary for the management of one or more European Sites; and, if not,



Suir Island Infrastructure Links

Figure 1.1

Site Location

— Proposed Works Area



Drawn By	PD
Date	12/09/2023
Data Source	Bing

- Determine if the Project, either individually or in combination with other plans or projects, would be likely to have a significant effect on the European Site(s) in view of best scientific knowledge and the Conservation Objectives of the site(s).

This Report contains a Screening for Appropriate Assessment and is intended to assess and address all issues regarding the construction and operation of the Proposed development and to inform and allow the competent authority to comply with the Habitats Directive. Article 6(3) of the Habitats Directive defines the requirements for assessment of projects and plans for which likely significant effects on European Sites may arise. The European Communities (Birds and Natural Habitats) Regulations, 2011 – 2015 (the Habitats Regulations) transpose into Irish law Directive 2009/147/EC (the Birds Directive) and Council Directive 92/43/EEC (the Habitats Directive) lists habitats and species that are of international importance for conservation and require protection. The Habitats legislation requires competent authorities, to carry out a Screening for Appropriate Assessment of plans and projects that, alone or in combination with other plans or projects, would be likely to have significant effects on European Sites in view of best scientific knowledge and the Site’s conservation objectives. This requirement is transposed into Irish Law by Part 5 of the Habitats Regulations and Part XAB of the Planning and Development Act, 2000 (as amended).

1.2 SCREENING METHODOLOGY

This Screening Report has been prepared in order to comply with the legislative requirements outlined in Section 1.1 above and aims to establish whether or not the proposed development, alone or in combination with other plans or projects, would be likely to have significant effects on European Sites in view of best scientific knowledge and the Site’s conservation objectives. In this context “likely” means a risk or possibility of effects occurring that **cannot** be ruled out based on objective information and “significant” means an effect that would undermine the conservation objectives of the European sites, either alone or in-combination with other plans and projects (Office of the Planning Regulator (OPR), 2021) .

The nature of the likely interactions between the Plan and the Conservation Objectives of European Sites will depend upon the:

- the ecological characteristics of the species or habitat, including their structure, function, conservation status and sensitivity to change; *and/or*

- the character, magnitude, duration, consequences and probability of the impacts arising from land use activities associated with the project, in combination with other plans and projects.

This Screening Report for Appropriate Assessment has been undertaken with reference to respective National and European guidance documents: Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities (DEHLG 2010) and *Assessment of Plans and Projects Significantly Affecting Natura 2000 sites – Methodological Guidance of the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC*; Office of the Planning Regulator – OPR Practice Note PN01: *Appropriate Assessment Screening for Development Management*, and recent European and National case law. The following guidance documents were also of relevance during the preparation of this Screening Report:

- Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities (2010). DEHLG.
- Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites – Methodological Guidance of the Provisions of Article 6(3) and (4) of the Habitats Directive 92/42/EEC. European Commission (2021).
- Managing Natura 2000 Sites – The provisions of Article 6 of the Habitats Directive 92/43/EEC. European commission (2018).

The EC (2002) guidelines outline the stages involved in undertaking a Screening Report for Appropriate Assessment for projects. The methodology adopted during the preparation of this Screening Report is informed by these guidelines and was undertaken in the following stages:

1. Describe the project and determine whether it is necessary for the conservation management of European Sites;
2. Identify European Sites that could be influenced by the project;
3. Where European Sites are identified as occurring within the zone of influence of the project identify potential effects arising from the project and screen the potential for such effects to negatively affect European Sites identified under Point 2 above; and
4. Identify other plans or projects that, in combination with the project, have the potential to affect European Sites.

2. PROJECT DESCRIPTION

The Suir Island Infrastructure Links proposed site is located in the centre of Clonmel, with the development encompassing areas located on The Quay/Quay St./Sarsfield St. Junction, Suir Island and Raheen Road.

The proposed development will consist of:

- Two pedestrian bridges, the first bridge linking the proposed North Plaza on The Quay/Quay St/Sarsfield St Junction to Suir Island, and the second bridge connecting Suir Island to Raheen Road.
- Provision of a new public open space called the North Plaza which will be aligned with Sarsfield Street. The steps and ramp will be visible from O'Connell Street creating a new landmark in the town of Clonmel and will encourage pedestrian movement towards the River Suir. The bicycle access ramp is designed to be as transparent as possible so as not to block the view of Suir Island from Sarsfield Street. This plaza is an ideal setting for impromptu performances and social gathering.
- Modification of traffic direction and carriageway width around the North Plaza and The Quay and Quay St.
- Provision of a bus stop on the western side of the North Plaza located on Quay Street with five benches providing comfortable facilities for public transport users.
- Upgrading of the existing 2-metre-wide sidewalk along Quay Street into a 4-metre-wide shared pedestrian/cycle path which will provide unencumbered access to the proposed plaza area underneath the elevated access ramp.
- Provision of a sloping landscaped terrace with public seating, located inside the hairpin-shaped access ramp leading up to the northern bridge crossing, offering unencumbered views of the plaza area.
- Provision of three benches and a 9-metre-long stepped promenade seating area integrated into the circular-shaped plaza, offering exceptional views of the proposed development.
- Planting of various native tree species around the North Plaza to integrate the proposed development with the existing scenery of Suir Island and complement the visual experience of users.
- Installation of a 4-metre-wide curved pedestrian bridge, which allow users to discover the island 'from up high' by walking seamlessly between the trees while linking the

project elements (Sarsfield Street, the berm embankment, and the south riverbank) along one sinuous route. The first bridge follows the geometry of Sarsfield Street and arrives on the island following the line of the berm embankment, which then links onto the second bridge facilitating a link to Denis Burke Park on Raheen Road, creating a direct connection for pedestrians/cyclists between the park and the Town Centre.

- Provision of a pedestrian path or promenade along the existing berm embankment across Suir Island linking the two pedestrian bridges, to facilitate access between Denis Burke Park on Raheen Road and the proposed North Plaza on The Quay.
- Construction of a pedestrian/bicycle ramp from the link promenade onto Suir Island Carpark. The ramp is fully integrated into the landscape by using the existing slope of the berm.
- Construction of three sets of steps connecting the link promenade to Suir Island carpark and the eastern end of Suir Island.
- Provision of a mini public space within Suir Island Carpark at the entrance to the proposed Suir Island Gardens.
- Provision of a south arrival point for the second bridge connecting Suir Island to the Raheen Road. The South Arrival Point will consist of one access ramp to the east and one set of steps to the west, integrated with the bridge landing level and running parallel to the footpath. These elements will be located outside the existing flood barrier.
- Road improvements for the safety of pedestrians/cyclists at the South Arrival Point, including the footpaths being widened and the road narrowed to accommodate 3.0-metre-wide lanes. Removal of three carparking spaces from the southern edge of the road to allow for wider footpaths.
- Installation of two uncontrolled pedestrian crossings positioned at either ends of the proposed access ramp and flight of steps to provide traffic calming at the South Arrival Point. This bridge arrival point will be located close to the school entrance of Raheen College, providing safe and convenient access for the schoolchildren.
- Access ramps and steps are located behind the flood barriers to allow access even during flood events.
- Construction of a new foul pumping station to be located within Suir Island car park which will facilitate future Irish Water connections. Wastewater will be pumped 0.1km approx. via rising main along the proposed bridge linking Suir Island to the proposed North Plaza where it will connect into the existing public network along The Quay.
- Ancillary site development works to include, but not limited to, surface water drainage, lighting and associated electrical works, hard and soft landscaping, road works to include surfacing and line marking, landscaping and installation of street furniture.

- All associated site works.

3. DESCRIPTION OF THE PROJECT SITE

Suir Island is located in the centre of Clonmel. The ruins of Suir Island House (Protected Structure) are located at the southwestern corner of the island and to the west of the proposed Suir Island Infrastructure Links development. 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 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 Infrastructure Links site can be submerged.

The site has been recently cleared to facilitate conservation works. The headrace and tailrace are partially watered with vegetation re-colonising on the drier areas following the site clearance. The watered areas of the headrace and tailrace are subject to prolonged periods of dry conditions. The habitat within the garden area is representative of recolonising bare ground and buildings and artificial surfaces. Scattered trees also occur throughout the garden site. A tree survey of Suir Island was completed in 2017 and notable trees within the site include a mature lime and a mature oak. Selective removal has occurred for conservation and maintenance works since the tree survey was completed.

The habitats occurring along the southern bankside of Suir Island support stands of species-poor herb vegetation that is not representative of the Annex 1 habitat hydrophilous tall herb fringe. The species include native hydrophilous species such as *Valeriana officinalis*, *Ranunculus flammula*, *Lotus corniculatus*, *Eupatorium cannabinum* along with *Urtica dioica*, *Scrophularia nodosa* and a range of non-native (non-invasive) ornamental herbs and shrubs.

The habitat occurring along the northern bankside of Suir Island supports a stand of linear riparian woodland habitat dominant by non-native species such as cherry laurel, horse chestnut, beech, sycamore and *Buddleja*.

The existing berm embankment along which a pedestrian path or promenade will be provided to connect the two bridges supports dry meadows and grassy verge habitat.

Non-native invasive plant species are known to occur to the west and outside the boundary of the project site. These species include Japanese Knotweed and Giant Hogweed both of which are categorised as high-impact invasive species. Winter heliotrope, ranked as a low-impact invasive species and traveller's joy and Himalayan honeysuckle, both of which are ranked as medium-invasive species are present on the island and within the footprint of the project. Tipperary County Council have implemented a non-native invasive plant species eradication programme and treatment of these stands was recorded during 2021 and 2022 will continue throughout the 2023 growing season.

Riparian woodland occurs to the east of Suir Island and the east of the proposed Suir Island Infrastructure Links development site. Examples of riparian woodland habitat where willows are dominant and ash and alder are frequent can have links to the Annex 1 habitat alluvial woodland (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. A high number of negative indicator tree species, such as sycamore, horse chestnut and cherry laurel, occur within the riparian woodland habitats of the island and their dominance increasing towards the west of the island nearer the proposed Suir Island Infrastructure Links project. Where negative indicator species, such as cherry laurel, sycamore and horse chestnut are dominant the woodland is not considered to be representative of the Annex 1 habitat alluvial woodland.

Otters, which are a qualifying species of the Lower River Suir SAC, are known to occur along the main channel of the River Suir to the north and south of the island. Previous survey work completed in August 2017 for Tipperary County Council during the preparation of the Suir Island Masterplan identified the presence of an otter holt at the eastern end of Suir Island.

Other qualifying species of the Lower River Suir SAC that are known to occur along the main channel of the River Suir in the vicinity of Suir Island include white-clawed crayfish, Atlantic salmon and lamprey species.

The lands occurring along the northern bankside of the River Suir within the project site are representative of urban land cover in the form of buildings and artificial surfaces. The land

cover along the southern bankside of the River Suir and to the south of the river are comprised of a small area of fringing reed and large sedge swamp, dry meadows and grassy verges, which give way to the south to a concrete flood wall and the Raheen Road, which are representative of buildings and artificial surfaces.

4. IS THE PROJECT DIRECTLY CONNECTED WITH OR NECESSARY FOR THE CONSERVATION MANAGEMENT OF EUROPEAN SITES?

Given the description of the proposed project in Section 3.1 above it is clear that the project is not directly connected with or necessary for the management of any European Sites.

5. IDENTIFY EUROPEAN SITES LIKELY TO BE INFLUENCED BY THE PROJECT

5.1 WITHIN/ADJOINING EUROPEAN SITES

In order to identify European Sites that could potential be located within the zone of influence of the project, the current digital mapping (shapefile) of European Sites in Ireland¹, as published by the NPWS, was reviewed to identify the European Sites that could conceivably be connected to the project site via pathways. During this review, elements of the proposed development were identified as occurring within and adjoining one European Site, the Lower River Suir SAC. The main channel of the River Suir which will be crossed by the proposed bridge crossings and sections of Suir Island, within the boundary of the project site, also occur within the boundary of the Lower River Suir SAC. As such the proposed northern and southern bridge crossing 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 SAC boundary also overlaps the section of the Raheen Road to the south of the river that falls within the project site boundary.

¹ Current SAC shapefile layer dated April 2022; current SPA shapefile layer dated October 2021

The extent of the Suir Island Infrastructure Links within the SAC is indicated on Figure 5.1.

Given that Lower River Suir SAC overlaps with/adjoins the project site it is considered to occur within its zone of influence.

5.2 SOURCE-PATHWAY-RECEIVER MODEL

Aside from the Lower River Suir SAC discussed in Section 5.1 above, only two other European Sites occur within the wider area surrounding the project site. These are the Comeragh Mountains SAC and the Nier Valley Woodlands SAC. The Comeragh Mountains SAC is located approximately 10km to the southeast of the project site. The Nier Valley Woodlands SAC are located approximately 8.5km to the south of the project site. No SPAs occur in the wider area surrounding the project site, with the nearest site, the Dungarvan Harbour SPA, being located approximately 30km to the south.

Current guidance (OPR, 2021) informing the approach to screening for Appropriate Assessment defines the zone of influence of a proposed development as the geographical area over which it could affect the receiving environment in a way that could have significant effects on the Qualifying Interests of a European site. It is recommended that this is established on a case-by-case basis using the Source-Pathway-Receptor (SPR) framework.

Under the SPR model the proposed development, the works associated with the construction and decommissioning phase and the operation of the proposed development represent the source of potential impacts.

Pathways that can arise as a result of develop projects and lead to offsite/downstream impacts are listed below and an appraisal of the potential for these pathways to connect the project to other European Sites and their qualifying features of interest (which represent the receptors under the SPR model) is also provided:

- Emissions to surface water: In the absence of a suitable design and control measures the proposed development will have the potential to result in emissions to surface waters. However aside from the Lower River Suir SAC there are no other European Sites connected to the project via a hydrological pathway and there will be no potential

for emissions to surface waters to function as a pathway between the project site and other European Sites.

- Emissions to groundwater: In the absence of a suitable design and control measures the proposed development will have the potential to result in emissions to ground, which in turn could ultimately result in groundwater base flows to the River Suir, The project site is located within the Clonmel Groundwater Body (IE_SG_G_040). However aside from the Lower River Suir SAC there are no other European Sites occurring within the is groundwater body and as such there will be no potential for emissions to groundwater to function as a pathway between the project site and other European Sites.
- Noise and vibration emissions: Noise and vibration emissions are considered to have the potential to result in negative impacts to biodiversity up to a 300m distance from the emission source. This distance is based on the maximum disturbance zone of 300m for wetland bird species, as specified by Cutts et al. (2013). Noise and vibration effects for other qualifying species as well as qualifying habitats of European Sites are less than 300m. For mammal species listed as qualifying features of interest for SACs this distance is set at 150m, as per the NRA (2009). For qualifying aquatic species a potential noise and vibration impact pathway will only arise where works such as piling or blasting are proposed at instream or bankside locations within adjoining SACs. Aside from the Lower River Suir SAC there are no European Sites occurring within 300m of the proposed development and the potential for noise and vibration emissions to function as a pathway connecting the project site to other European Sites is ruled out.
- Emissions to air: Air emissions that have been identified as arising from the proposed development relate to the generation of dust emissions during the construction phase. Dust emissions can have the potential to result in negative impacts to biodiversity up to 50m from the source of the emission. This is supported by the guidance outlined by Holman et al. (2014), which provides a risk assessment for ecological impacts arising from dust deposition. European Sites are ranked as high sensitive sites and the risk to high sensitive sites ranges from high (at less than 20m from source) and medium (at less than 50m from source), while low risks, representative of insignificant and de-minimis effects arise at distances greater than 50m from source. Aside from the Lower

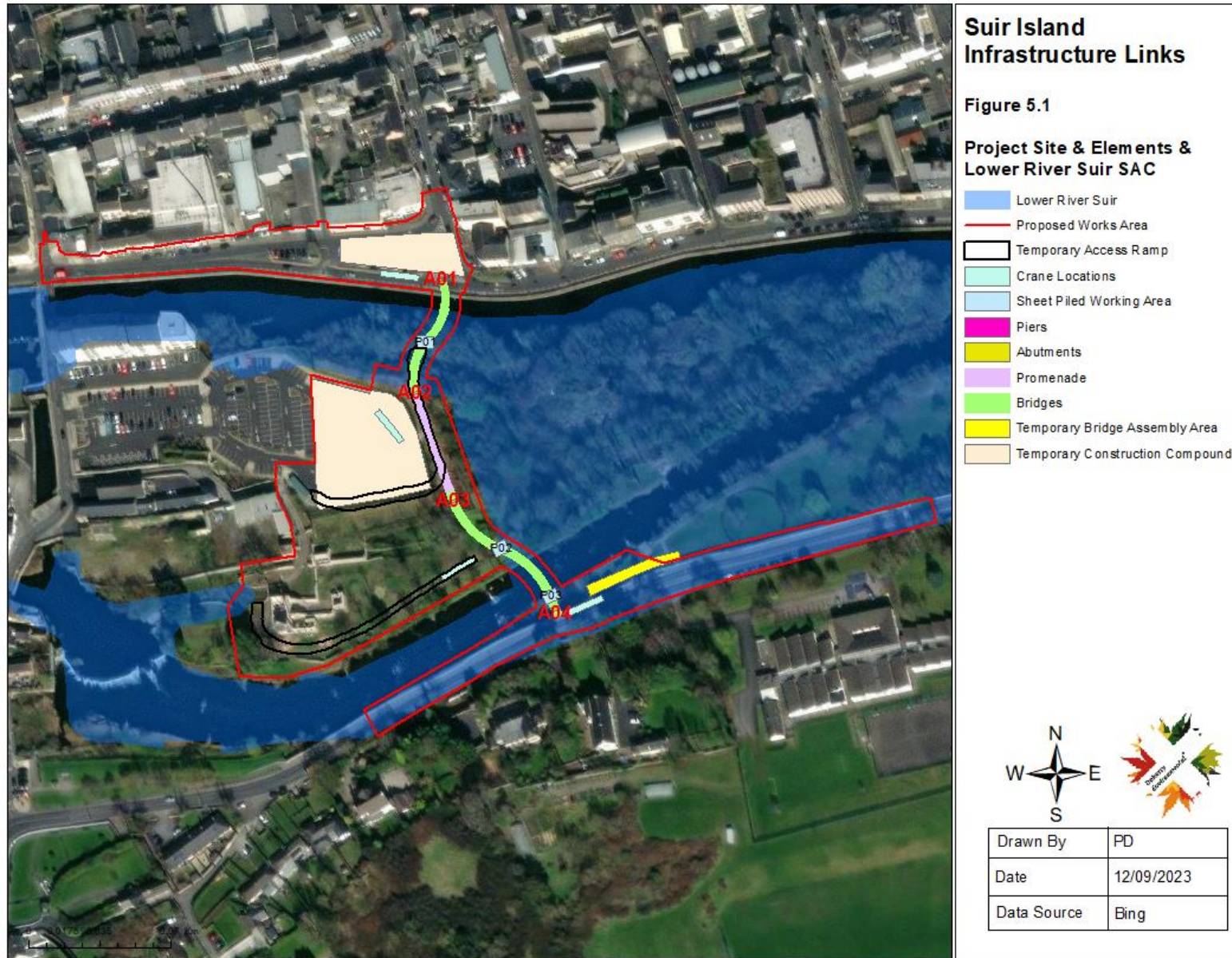
River Suir SAC, all other European Sites occur at a remote distance from the project site and will not be susceptible to any emissions to air that may arise during the construction of the project infrastructure. As such the potential for an air emission pathway to connect the project site to other European Sites is ruled out.

- Light emissions: the proposed development will include for the provision of night time beacon lighting on bridges. Given the distance separating the project from all other European Sites, aside from the Lower River Suir SAC, there will be no potential for light emission pathways to these other European Sites.
- Visual emissions: Certain qualifying species of European Sites can be sensitive to visual changes in the landscape and visual disturbance as a result of new structures. However given the distance between the project site and all other European Sites, aside from the Lower River Suir SAC, there will be no potential for visual emissions to these other Sites and a visual emission pathway is ruled out.
- Mobile Species Pathway: Development projects that are located outside of European Sites can also result in impacts to mobile qualifying species of European Sites in the event that such species rely on habitats occurring within the proposed development site. For the purposes of including such a scenario in the consideration of potential pathways this screening report refers to the reliance of mobile qualifying species of European Sites on the project site as a “mobile species pathway”. Mobile species pathways are considered for birds, mammals, freshwater and invertebrate species below:
 - Bird species: Scottish Natural Heritage (SNH, now Natural Scotland) guidance document “Assessing connectivity with Special Protection Areas (SPA) (2016) and McGuinness et al. (2015) for a range of waterbirds were used as the principal sources for establishing foraging range distances. Thaxter et al. (2012) for a range of other waterbird species. The maximum foraging range set out in these publications for any species is 25km. Given that no SPAs occur within 25km of the project site there will be no potential for the project to overlap with the foraging range of any special conservation interest bird species listed in these publications. The maximum mean foraging range quoted for any species that is representative of a special conservation interest bird

species for SPAs in Ireland is by Thaxter et al. (2012) who identify a mean foraging range of c. 72km for lesser-black backed gull. There are 3 SPAs occurring within 72km of the project site that include lesser-black backed gull as a special conservation interest bird species. These are the Cork Harbour SPA, the Ballycotton Bay SPA and the Ballymacoda Bay SPA. The nearest of these is located approximately 50km to the southwest of the project site. lesser-black backed gull is species that is restricted to coastal areas and large lake habitats in Ireland. It is not reliant on lotic habitats, such as the River Suir or woodland or urban land cover that occur within and surrounding the project site. Given the absence of suitable habitat for this species at and surrounding the project site there will be no potential for a mobile species pathway to connect the project site to the populations of lesser-black backed gull support these three SPAs. Furthermore as the project site is located outside the published foraging range for all other special conservation interest bird species in Ireland there will be no potential for a mobile species pathway between the project site and any other SPAs.

- Otters: Otters are known to range widely over large territorial areas (Chanin, 2003) and across catchments (Harris & Yalden, 2008) with their home range size usually within a range of <5km to 15km depending on the quality of the foraging habitat and other resources. Aside from the Lower River Suir SAC no other European Sites within this distance range from the project site are designated for their role in supporting otters. As such there is no mobile species pathway for otters linking the project site to any other European Sites.
- Lesser horseshoe bats: For lesser horseshoe bats, associated SACs are included within the zone of influence of project where the project site was identified as occurring within the lesser horseshoe bats bat population core sustenance zone, which is defined as a 2.5km radius surrounding an SAC designated lesser horseshoe bat roost. No SACs designated for lesser horseshoe bats occurs within a 2.5km radius of the project site. As such this lesser horseshoe bat criteria did not result in the inclusion of SACs within the initial list of European Sites to be considered.

- Annex 2 Freshwater Fish & Invertebrate Species: SACs that include Annex 2 fish and invertebrate species as qualifying feature of interest are included within the zone of influence of a project where the project site is hydrologically connected to the relevant SAC. As outlined above under the examination of the hydrological pathway, no other SAC is connected via a hydrological pathway to the project site and as such there is no mobile species pathway connecting the project to other SACs that are designated for their role in supporting populations of Annex 2 fish species.
- Marsh fritillary: For marsh fritillary, associated SACs are included within the initial list of European Sites to be examined where suitable marsh fritillary habitat occurs within the proposed development footprint and where the project site is located within a 10km radius of a marsh fritillary population designated as a qualifying feature of interest of an SAC. There is an absence of suitable marsh fritillary within the proposed development footprint and no SACs within 10km of the project site are designated for marsh fritillary. As such this marsh fritillary criteria did not result in the inclusion of SACs within the initial list of European Sites to be considered.
- Human Disturbance Pathway: A project that results in an increase in human presence and associated recreational pressure within a European Site can result in disturbance to a European Site and its qualifying features of interest. The potential for a human disturbance pathway, through which the proposed development could generate activity within European Sites and result in disturbance to qualifying habitats or species is identified as a potential pathway requiring examination. The location of the project site within and adjacent to the Lower River Suir SAC has been established in the foregoing sections and given this shared location and addition access that will be provided by the project to Suir Island there will be potential for disturbance to this SAC. However, given the remote distance between the project site and all other European Sites there will be no potential for the project to result in an increase in human activity and associated disturbance in any other European Sites.



Using the SPR model all potential pathways that could connect the project site to other European Sites have been examined above and based upon this examination no other European Sites have been identified as occurring within the zone of influence of the project. As such the remainder of this screening exercise focuses on the Lower River Suir SAC, which is the only European Sites that has been identified as occurring within the zone of influence of the project.

In light of the above the remainder of this screening exercise examines the potential for the project to result in likely significant effects to Lower River Suir SAC.

5.3 OVERVIEW OF THE LOWER RIVER SUIR SAC

The Lower River Suir SAC consists of the freshwater stretches of the River Suir immediately south of Thurles, the tidal stretches as far as the confluence with the Barrow/Nore immediately east of Cheekpoint in Co. Waterford, and many tributaries including the Clodiagh in Co. Waterford, the Lingaun, Anner, Nier, Tar, Aherlow, Multeen and Clodiagh in Co. Tipperary. The Suir and its tributaries flow through the counties of Tipperary, Kilkenny and Waterford. The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[1330] Atlantic Salt Meadows

[1410] Mediterranean Salt Meadows

[3260] Vegetation of flowing waters

[6430] Hydrophilous Tall Herb Communities

[91A0] Old Oak Woodlands

[91E0] Alluvial Woodland*

[91J0] Yew Woodlands*

[1029] Freshwater Pearl Mussel (*Margaritifera margaritifera*)

[1092] White-clawed Crayfish (*Austropotamobius pallipes*)

[1095] Sea Lamprey (*Petromyzon marinus*)

[1096] Brook Lamprey (*Lampetra planeri*)

[1099] River Lamprey (*Lampetra fluviatilis*)

[1103] Twaite Shad (*Alosa fallax*)

[1106] Atlantic Salmon (*Salmo salar*)

[1355] Otter (*Lutra lutra*)

A review of the NPWS site-specific conservation objective published for the SAC does not indicate the presence of any Annex 1 habitat within the section of the SAC occurring at Suir Island. The extent of the Annex 1 habitat vegetation of flowing waters has not been mapped by the NPWS. The freshwater sections of the River Suir adjacent to Suir Island have the potential to support the Annex 1 habitat vegetation of flowing waters.

The presence of the Annex 1 habitat hydrophilous tall herb fringe has not been mapped by the NPWS as occurring along the river bankside surrounding Suir Island. The mapped location of this habitat, as published in the site-specific conservation objectives for the Lower River Suir SAC is located at a remote distance from Suir Island. The Article 17 2019 reporting by the NPWS has mapped the national distribution of this habitat in Ireland. All hectads known to support this habitat have been mapped. The nearest hectad supporting this habitat to Suir Island is approximately 20km to the east.

The NPWS conservation objectives have mapped the extent of alluvial woodland occurring within the SAC and these areas are located at a remote distance from the project site. the nearest example of this qualifying habitat to the project site is located approximately 27km downstream at Fiddown Island. Riparian woodland habitat occurs to the east of the proposed Suir Island Infrastructure Links and as noted above examples of this habitat type can have links to the

Annex 1 qualifying habitat alluvial woodland where stands of riparian woodland are dominated by willows with frequently occurring ash and alder (Perrin, 2021), or where the woodland canopy is dominated by ash and alder (O'Neill & Barron).

The section of the River Suir adjacent to Suir Island is known to support populations of otter and white-clawed crayfish. The freshwater fish species of this SAC are also known to occur along this stretch of the River Suir. The maintenance of good water quality is a key factor that underpins the favourable status of these species along the River Suir. The stretch of the River Suir adjacent to the project site is currently classed as a potentially eutrophic with the latest EPA Biological Q-value monitoring from 2017 at the Gashouse Bridge downstream of the project site reporting a Q-Value of Q3-4.

Freshwater pearl mussels' populations are a qualifying feature of interest of the SAC. The conservation objectives for the SAC target the mussel population of the Clodiagh sub-catchment, which is located in a separate sub-catchment to Suir Island (which is located in the Suir_SC_140 sub-catchments). The conservation objectives targets for the freshwater pearl mussel of the SAC are restricted to the Clodiagh sub-catchment. However, records of freshwater pearl mussel are held by the NPWS (1987 to 2006 records) for the main channel of the River Suir to the south of Marfield approximately 3km upstream from Suir Island. There are no records held for the presence of freshwater pearl mussel along the main channel of the River Suir in the vicinity of Suir Island.

5.4 CONSERVATION OBJECTIVES

Site-specific conservation objectives for the Lower River Suir SAC have been published and are available at:

https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002137.pdf

6. EXAMINATION OF IMPACTS

6.1 EXAMINATION OF PROJECT ELEMENTS

The majority of the potential negative effects to the Lower River Suir SAC by the project will be associated with the construction phase. During construction the project will have the

potential to result in impacts to water quality within the River Suir; and generate disturbance to the receiving environment, including freshwater habitats and species of the Lower River Suir SAC occurring at and in the vicinity of Suir Island and the River Suir.

1.1.1 Surface Water Emissions

1.1.1.1 Construction Phase

Surface water generated during the construction phase will ultimately be discharged to the River Suir. Potentially contaminating materials, such as hydrocarbons, cement-base materials, other construction-related solutions and silt will occur on site during the construction phase and will have the potential to become entrained in and pollute surface drainage waters generated on site. This water will be discharged to the River Suir. In addition dust emissions during the construction phase have been identified as the greatest potential impact to air quality during this phase of the proposed development (see Suir Island Infrastructure Links EIAR, Chapter 8, CSEA (2023)). Such emissions will have the potential to contribute inputs of fine particulate matter to the river and freshwater habitats. While it is acknowledged that the volume of surface drainage waters discharging from the project site to the Lower River Suir will be low in the context of the receiving waterbody, in the absence of appropriate safeguards the potential will exist for the discharge of pollutants to perturb water quality.

Whilst the project will not involve any instream works within the River Suir channel it will require the installation of sheet piling around the three pier locations at Pier 01 to 03. The sheet piling around these locations will be located in close proximity to the bankside (e.g. approximately 2m from the north bankside of the River Suir embankment at Pier 01; approximately 6.5m from the Suir Island south bankside at Pier 02; and approximately 2.5m from the River Suir south bankside at Pier 03). In the absence of a sensitive approach to the installation of sheet piles the potential there may be potential for the destabilisation of the existing bankside and the slippage of bank material into the river. Such an event will result in the release of sediment to the river and could negatively affect water quality and the potential for sections of the river adjacent to the bankside to function as spawning habitat for lamprey species and Atlantic salmon.

Good water quality within the River Suir is required for the conservation of a range of qualifying features of interest of the Lower River Suir SAC such as Atlantic salmon, lamprey species, white-clawed crayfish and otters.

Given the potential for construction-related contaminants to negatively affect the water quality status of the River Suir, it is considered that, in the absence of appropriate safeguards, it cannot be objectively ruled out that the project will not have the potential to release such substances to the River Suir and that these substances will not have the potential to undermine the conservation status of features of interest of the Lower River Suir SAC.

1.1.1.2 Operation Phase

The proposed development will not result in an increase in areas of hardstand at the North Plaza or Southern Arrival Point. These areas currently consist of impermeable made ground in the form of buildings and artificial surfaces. Storm water from these areas will discharge into the surface water drainage infrastructure which will be directed to the River Suir, as per the baseline approach to surface water drainage management to the north and south of the river. In light of this there will be no perceptible change in surface water runoff rates from the North Plaza or Southern Arrival Point to the River Suir and there will be no potential for these elements of the proposed development to contribute to flooding or result in changes to the hydrological regime of the river Suir. It is also noted that interception of rainfall by the c. 500m² bridge deck will be imperceptible in terms of runoff reduction and this will not have the potential to result in changes to the hydrological regime of the River Suir.

During the operation phase the bridge and promenade infrastructure will function as a shared pedestrian and cycle bridge. It will not be used for vehicular transport and as such the potential for the generation of contaminated surface water runoff that is typical of vehicular roads will not arise. In addition, it is not proposed to treat the bridge or promenade with salts or grit during periods of cold weather with ice/snow conditions. Salts/grit could be applied to hardstanding surfaces on the North Plaza and Raheen Road (South Arrival Point), which will be discharged through the proposed and existing surface water drainage infrastructure to the River Suir. The proposed development does not result in an increased hardstanding area, thus not increasing the potential for salts/grit to be discharged to the river. In light of the above the operation phase of the project will not result in a change to baseline conditions and will not present a risk of likely significant effects to the water quality of the River Suir.

1.2.1 Wastewater Emissions

The project has the potential to result in the accidental leakage of wastewater or chemicals associated with construction phase sanitation facilities onto soils, and along preferential surface flow pathways to the River Suir. In addition, the existing public toilet on the north quay will be relocated below the proposed access ramp to the North Bridge located on the North Plaza.

It is proposed to relocate the existing public toilet on the north quay to below the access ramp to the North Bridge at the North Plaza. Wastewater generated at this public toilet drains to an existing 900mm sewerage pipe that conveys wastewater to the municipal wastewater treatment plant. The toilets are connected to this sewerage pipe via a manhole. Prior to the removal of the toilets they will be disconnected from the 900mm sewerage pipe. This will eliminate the risk for any accidental release of wastewater during the decommissioning of the existing toilet and the installation of the new toilet. As such this element of the project is not identified as having the potential to give rise to wastewater emissions and nor will it pose a risk to the water quality of the River Suir. As such this element of the project is screened out.

It is also proposed to provide a new foul pumping station on Suir Island so that infrastructure is in place that will facilitate the connection of existing dwellings on Suir Island to the municipal sewerage infrastructure and for the conveyance wastewater to the municipal wastewater treatment plant. Currently wastewater generated from these existing dwellings on Suir Island is considered to be released to the River Suir via a septic tank. The new pumping station will be provided below the existing car park area on Suir Island. The provision of the pumping station within the car park will not result in the loss of any Annex 1 habitats associated with the Lower River Suir SAC and nor will it result in the loss of any habitat relied upon qualifying species of this SAC. Furthermore all works associated with this element of the project will be completed within an existing car park that is subject to high levels of human activity and as such works associated with this element will not have the potential to result in disturbance to qualifying species such as otters and fauna in general. It is also noted that provision of the new pump station will have the potential to contribute towards an improvement water quality within the River Suir by eliminating the discharge of wastewater from septic tanks and instead redirect this wastewater to the municipal wastewater treatment plant. In light of the above this element of the project will not have the potential to give rise to likely significant effects to the Lower River Suir SAC.

1.3.1 Noise & Vibration Emissions

1.1.1.3 Construction phase

The construction phase will generate noise and vibration during works. Given the location of the proposed development within the Lower River Suir SAC and its role in supporting qualifying species such as otters, lamprey species, Atlantic salmon and white-clawed crayfish, all of which are known to rely on the section of the River Suir at the project site for either breeding and/or foraging, the potential for noise disturbance to these species cannot be ruled during the operation phase.

Sheet piles will be installed in close vicinity to the River Suir bankside and bored piling will be used for the construction of piers. The potential for these works to result in vibration effects that could undermine the integrity of adjacent river banksides cannot be ruled out at the screening stage and requires further examination as part of Natura Impact Statement of the project.

1.1.1.4 Operation Phase

Once operational, potential effects associated with the proposed development will be low in noise, i.e. people cycling and walking, limited vehicular activity at car parking areas, occasional maintenance works comprising management of surface, scheduled maintenance as necessary to the bridge structure and vegetation.

The North Plaza will function as an area of open space where people can gather and rest. People conversing at the North Plaza is the main noise source expected which will vary depending on the numbers congregated at any one time. Given the existing noise environment is dominated by road traffic noise and experiences a high baseline noise level at present, the proposed uses of this area will not contribute to any significant noise levels over and above those currently experienced from the car parking and urban environment.

The operation phase of the proposed development will also result in changes to vehicular traffic in the surrounding road network. Predicted changes in noise levels associated with vehicular traffic have been assessed as part of the Suir Island Infrastructure Links EIAR (CSEA, 2023) and it has been concluded that the changes in traffic will result in an imperceptible effect to existing baseline noise levels.

The operation phase of the proposed development will not generate vibration emissions.

In light noise generated during the operation phase are not identified as having the potential to result in likely significant effects to the Lower River Suir SAC and its associated qualifying features of interest.

1.4.1 Light Emissions & Shading

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.

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.

1.5.1 Disturbance

1.1.1.5 Construction Phase

The construction phase will result in the presence of construction site operatives, plant and machinery within and adjacent to the River Suir. Of the qualifying features of interest occurring within the zone of influence of the proposed development, otters is identified as the species most susceptible to disturbance during the construction phase. The potential impact of construction phase disturbance to otters requires further examination as part of the Natura Impact Statement for this project.

It is noted that there are no examples of a qualifying habitat of the Lower River Suir SAC occurring within or immediately adjacent to the proposed development or the construction

phase footprint. The potential for the examples of riparian woodland occurring approximately 100m to the east of the proposed development site to be representative of the Alluvial woodland qualifying habitat has been identified as requiring further examination as part of an Natura Impact Statement for the project. Notwithstanding this it considered that due to the buffer distance of approximately 100m between the project site and the associated construction footprint and the nearest example of riparian woodland there will be not potential for the project to result in disturbance to this habitat during the construction phase.

In summary further examination of construction works to result in disturbance to otters is required as part of an Natura Impact Statement for the project.

1.1.1.6 Operation Phase

The operation phase of the project will provide increased access to Suir Island and increase the potential for informal access to the island to the east of the promenade. The potential for such increased informal access to these part of the island to result in disturbance to otters requires further examination as part of the Natura Impact Statement for the project. In addition, in the event that the riparian woodland occurring to the east of the proposed development is found to be representative of the Annex 1 habitat Alluvial woodland, then increase informal human access to this area of the island could result in disturbance to this qualifying habitat. Further examination of the links between the riparian woodland and Alluvial woodland and the potential for disturbance to this Annex 1 habitat is required as part of the Natura Impact Statement for the project.

1.6.1 Spread of Non-native Invasive Species

Medium impact non-native invasive plant species have been identified within and in the vicinity of the project. As noted above these include traveller's joy and Himalayan honeysuckle. High impact non-native invasive species in the form of Japanese Knotweed and Giant Hogweed are present on Suir Island to the east of the project site. Construction works will have the potential to result in the spread of medium impact non-native invasive species within the SAC and without proper controls could result in the spread of high-impact non-native invasive species as well as potential to introduce new non-native invasive plant species to the construction footprint during works.

The operation phase will generate pedestrian traffic along the proposed Suir Island Infrastructure Links as well as providing lighting along the pedestrian routes at night time. Further examination of the potential for increased human activity to result in disturbance to the otter population of the SAC is required and it is considered that the potential for such disturbance to otter cannot be ruled out at the screening stage.

6.2 EXAMINATION OF FEATURES OF INTEREST OF THE LOWER RIVER SUIR SAC THAT COULD BE NEGATIVELY AFFECTED BY PROJECT ELEMENTS

Table 6.1 lists the qualifying features of interest of the Lower River Suir SAC; identifies the those features that occur in the vicinity of Suir Island and the proposed Suir Island Infrastructure Links; and provides an examination as to whether the project will have the potential to result in likely significant effects to qualifying features of interest of the SAC and their associated conservation objectives.

Table 6.1: Examination of likely significant effects to the qualifying features of interest of the Lower River Suir SAC

Qualifying feature of interest	Examination of likely significant effects
Atlantic salt meadows (<i>Glaucopuccinellietalia maritima</i>) [1330]	This qualifying habitat is located at a remote distance, over 75km downstream, from Suir Island and there will be no potential for the project to interact with this qualifying habitat and the attributes and associated targets that underpin the favourable conservation status of this habitat. Potential for likely significant effects to this habitat are screened out from further consideration.
Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]	This qualifying habitat is located at a remote distance, over 75km downstream, from Suir Island and there will be no potential for the project to interact with this qualifying habitat and the attributes and associated targets that underpin the favourable conservation status of this habitat. Potential for likely significant effects to this habitat are screened out from further consideration.

<p>Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260]</p>	<p>The extent of this habitat within the SAC has not been mapped as part of the site-specific conservation objective publication for the Lower River Suir SAC. Given the presence of freshwater habitat in the form of the main channel of the River Suir that will be spanned by the project and the possibility of this habitat occurring along this section of the River Suir or downstream, this qualifying habitat is considered to lie within the zone of influence of the project.</p>
<p>Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]</p>	<p>The extent of this habitat within the SAC has not been mapped as part of the site-specific conservation objective publication for the Lower River Suir SAC. As noted above the Article 17 (NPWS, 2019) national distribution mapping for this qualifying habitat indicates the closest examples of this habitat to Suir Island are located approximately 20km to the east. Given the presence of freshwater habitat in the form of the main channel of the River Suir that will be spanned by the project and the possibility of this habitat occurring along this section of the River Suir, this qualifying habitat is considered to lie within the zone of influence of the project.</p>
<p>Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]</p>	<p>This qualifying habitat is located at a remote distance from Suir Island. The nearest example is situated approximately 3.25km to the east of the project site. This example of Old oak woodland occurs along the Prison Stream tributary of the River Suir. There are no pathways connecting the project site to this nearest example of Old oak woodland and there will be no potential for the project to interact with this qualifying habitat and the attributes and associated targets that underpin the favourable conservation status of this habitat. Potential for likely significant effects to this habitat are screened out from further consideration.</p>
<p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p>	<p>No areas of Alluvial woodland that have been mapped as part of the published conservation objectives of the Lower River Suir SAC or as part of the NPWS 2019 Article 17 Habitat Digital Mapping dataset occur in close proximity to the project site. The nearest example of this habitat to the project is located approximately 27km downstream at Fiddown Island. Riparian woodland habitat occurs to the</p>

	<p>east of Suir Island. Examples of this habitat type, where willows are dominant and ash and alder are frequent (Perrin, 2021) or where ash and alder are dominant (O’Neill & Barron, 2013) can have links to and be representative of this Annex 1 habitat. The example of riparian woodland habitat occurring on the island is buffered from the project site by approximately 100m. The woodland habitat occurring within the footprint of the project site at the northern bankside of Suir Island is representative of a stand of woodland habitat dominated by a canopy of non-native species such as beech, sycamore, cherry laurel and horse chestnut. This woodland is not representative of the alluvial woodland qualifying habitat. The woodland habitat occurring along the southern section of the bridge within Suir Island is representative of scrub habitat. Nevertheless given the presence of riparian woodland to the east of Suir Island and its proximity to the project site, along with the presence of this habitat downstream along the freshwater sections of the River Suir, the potential for the project to result in likely significant effects cannot be ruled out at the screening stage. Further examination of the riparian woodland occurring to the east of the project site on Suir Island, whether it is representative of an example of this Annex 1 habitat and whether the project will result in likely significant effects to this qualifying feature of the SAC is required as part of a Natura Impact Statement of the project.</p>
<p>Taxus baccata woods of the British Isles [91J0]</p>	<p>The extent of this qualifying habitat within the Lower River Suir SAC has not been mapped as part of the SAC site-specific conservation objective publication. However the location of this woodland is referred to in the SAC Site Synopsis (dated 13.12.2013) and their locations have also been mapped as part of the NPWS 2019 Article 17 Habitat Digital Mapping dataset. The two stands of this woodland habitat occurring within the Lower River Suir SAC are described as being located at Cahir Park and Shanbally, Of these Cahir Wood is the closest to the project site and is located approximately 15km to the west of the project site. No example of this qualifying woodland habitat occurs on Suir Island. There will be no potential for the project to interact with this qualifying habitat and the attributes and associated targets that underpin the favourable conservation status of this habitat. Potential for likely</p>

	<p>significant effects to this habitat are screened out from further consideration.</p>
<p>Margaritifera margaritifera (Freshwater Pearl Mussel) [1029]</p>	<p>The freshwater pearl mussel populations for which the Lower River Suir SAC is designated is restricted to the Clodiagh River sub-catchment which is a separate sub-catchment to the sub-catchment in which Suir Island is located. This sub-catchment is drained by the River Clodiagh, which is a tributary of the River Suir. The confluence of the River Suir and River Clodiagh is located over 35km downstream of the project site. As such there will be no potential for the project to result in impacts to habitat conditions occurring within the Clodiagh River catchment. However it is noted that an attribute of the freshwater pearl mussel conservation objectives is the maintenance of suitable host fish densities within the Clodiagh sub-catchment. Salmonids represent the host fish upon which the larvae of freshwater pearl mussel rely. The salmonid population of the Clodiagh River is fed by migratory salmonids that use the main channel of the River Suir to access spawning habitat within the Clodiagh sub-catchment. Given the potential for the project to perturb water quality within the main channel of the River Suir this in turn could result in potential disturbance to migratory host salmonids using the river to access the Clodiagh sub-catchment. In light of this host fish attribute, it is considered that the freshwater pearl mussel population of the Clodiagh River occur within the zone of influence of the project.</p>
<p>Austropotamobius pallipes (White-clawed Crayfish) [1092]</p>	<p>White-clawed crayfish are known to occur along the River Suir surrounding Suir Island. There are records for the presence of this species upstream at Marfield and downstream of Suir Island at Thomas Bridge. Given the presence of populations of white-clawed crayfish along the main channel of the River Suir and the potential risks posed by the project to water quality and the freshwater habitat upon which this species relies, it is considered to occur within the zone of influence of the project.</p>
<p>Petromyzon marinus (Sea Lamprey) [1095]</p>	<p>Sea lamprey are known to occur along the River Suir surrounding Suir Island. Given the presence of populations of sea lamprey along the main channel of the River Suir and the potential risks posed by the project to water quality and</p>

	the freshwater habitat upon which this species relies, it is considered to occur within the zone of influence of the project.
Lampetra planeri (Brook Lamprey) [1096]	Brook lamprey are known to occur along the River Suir surrounding Suir Island. Given the presence of populations of brook lamprey along the main channel of the River Suir and the potential risks posed by the project to water quality and the freshwater habitat upon which this species relies, it is considered to occur within the zone of influence of the project.
Lampetra fluviatilis (River Lamprey) [1099]	River lamprey are known to occur along the River Suir surrounding Suir Island. Given the presence of populations of river lamprey along the main channel of the River Suir and the potential risks posed by the project to water quality and the freshwater habitat upon which this species relies, it is considered to occur within the zone of influence of the project.
Alosa fallax fallax (Twaite Shad) [1103]	Twaite shad is an anadromous species, spending most of its life in salt water and migrates to freshwater to spawn. The spawning grounds of twaite shad along the River Suir are located approximately 1km upstream of the old bridge in Carrick-on-Suir, approximately 20km downstream of the project site. Notwithstanding this distance, given the presence of a hydrological pathway connecting the project site to the spawning grounds of twaite shad and the potential risk posed by the project to water quality and the freshwater habitat of the River Suir this species is considered to occur within the zone of influence of the project
Salmo salar (Salmon) [1106]	Atlantic salmon are known to occur along the River Suir surrounding Suir Island. Given the presence of populations of Atlantic salmon along the main channel of the River Suir and the potential risks posed by the project to water quality and the freshwater habitat upon which this species relies, it is considered to occur within the zone of influence of the project.

Lutra lutra (Otter) [1355]	Otter is known to occur along the River Suir surrounding Suir Island. Given the presence of an otter population along the main channel of the River Suir and the potential risks posed by the project (e.g. diminution of water quality and the freshwater habitat upon which this species relies; disturbance) it is considered to occur within the zone of influence of the project. Furthermore it is considered that the potential for the operation phase of the project to result in disturbance to otters also requires examination as part of a Natura Impact Statement of the project.
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Table 6.1 provides an examination of the potential for likely significant effects to arise to the qualifying features of interest of the Lower River Suir SAC as a result of the project. As outlined in Table 6.1 there will be no potential for the project to result in likely significant effects to the following qualifying features of interest, which do not occur within the zone of influence of the project and are screened out at this stage from further examination as part of a Natura Impact Statement of the project:

- Atlantic salt meadows
- Mediterranean salt meadows
- Old oak woodland; and
- *Taxus baccata* woods.

The following qualifying features of interest of the Lower River Suir SAC have been identified as occurring within the zone of influence of the project and require further examination as part of a Natura Impact Statement of the project:

- Alluvial woodland;
- Vegetation of flowing waters;
- Hydrophilous tall herb fringe;
- White-clawed crayfish;
- Migratory fishes in the form of sea lamprey; brook lamprey; river lamprey; Atlantic salmon and twaite shad; and

- otter

6.3 POTENTIAL IN-COMBINATION EFFECTS

In the event that the project overlaps within other plan and/or projects and associated land use activities that are also connected to the Lower River Shannon SAC in the wider vicinity of the project site that can give rise to impacts to the features of interest occurring within the zone of influence of the project, the potential will exist for cumulative negative impacts to these receptors. In light of this an examination of the proposed developments potential to combine with other projects and land use activities in the surrounding area will be required to determine whether or not qualifying features of interest of the SAC that occur within the zone of influence of the project are at risk of adverse effects. This examination will be required to form part of the Natura Impact Statement of the project.

In addition, existing threats and pressures to the Lower River Suir SAC have been reported by the NPWS in the Natura 2000 – Standard Data Form for the SAC. These threats and pressures are classed as low, medium and high and are identified as originating inside or outside the SAC. The following high and medium threats and pressures have been identified for the Lower River Suir SAC:

A08: Fertilisation (High, Outside)

E01: Urbanisation; human habitation (High, Inside & Outside)

E03: Discharges (High, Inside & Outside)

H01: Pollution to surface waters (High, Inside & Outside)

J02:12:02: Dykes and flood defence in inland water systems (High, Inside & Outside)

J02.01: Landfill, land reclamation and drying out (Medium, Inside & Outside)

Of the above identified threats and pressures to the Lower River Suir SAC, those that are relevant in terms of combining with the potential risks posed by the project to the freshwater

system of the SAC is fertilisation, urbanisation; human habitation; discharges; and pollution to surface waters.

In the absence of appropriate safeguards the project will have the potential to result in perturbations and disturbance to freshwater habitats and species of the Lower River Suir SAC and will therefore have the potential to combine with these identified threats and pressures to the SAC and any other projects that may also have potential to result in similar pollution and disturbing effects to the SAC and its freshwater qualifying habitats and species.

7. SCREENING STATEMENT CONCLUSION: FINDING OF NO SIGNIFICANT EFFECTS

The proposed project has been screened for its potential to result in likely significant effects to surrounding European Sites. One European Site, the Lower River Suir SAC has been identified as occurring within the zone of influence of the project. The reason for identifying this SAC within the zone of influence of the project was due to the location of elements of the project within the SAC and the potential risk posed by the project to the freshwater qualifying habitats and qualifying species of this SAC.

For the reasons outlined above it is the considered view of the authors of this Screening Report for Appropriate Assessment that the potential for likely significant effects to European Sites cannot be ruled out at the Screening stage and that an Appropriate Assessment of the project is required. Based on this conclusion a Natura Impact Statement will be prepared to inform An Bord Pleanála during its Appropriate Assessment of the project and its potential to adversely impact the integrity of the Lower River Suir SAC, alone or in-combination with other plans or projects.

The Natura Impact Statement for this project will provide further examination and analysis of the project's potential to result in adverse impacts to the Lower River Suir SAC and where necessary will prescribe mitigation measures that will aim to eliminate the potential for the project to result in such adverse impacts to the integrity of this European Site.

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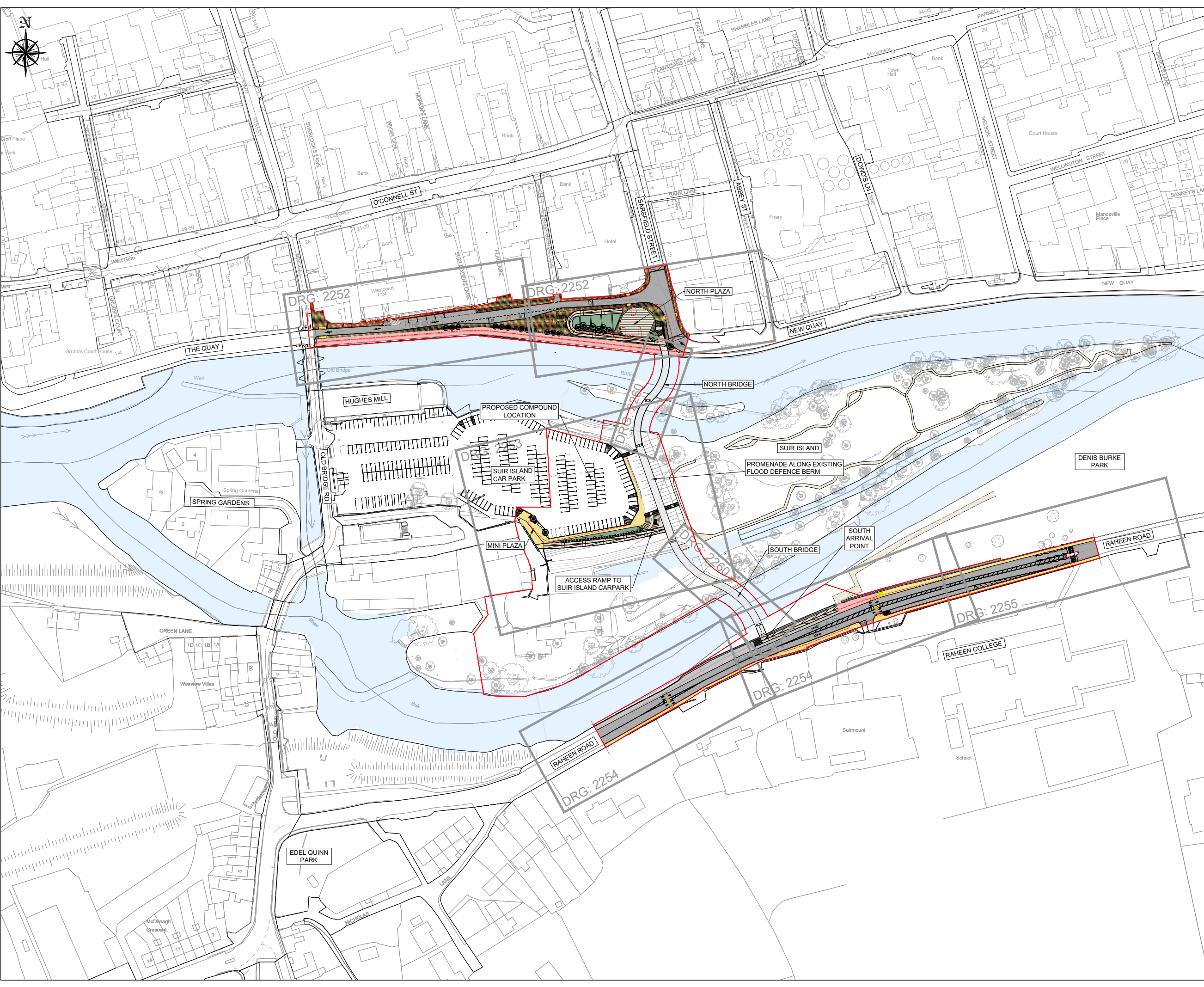
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APPENDIX 2: SCHEME DRAWING



DRAWING IS PRODUCED USING THE IRISH TRANSVERSE MERCATOR (ITM) GEOGRAPHIC COORDINATE SYSTEM **A1**

















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- LEGEND :**
-  SITE BOUNDARY
 -  PEDESTRIAN BRIDGES - STEEL STRUCTURE - BUSH - HAMMERED CONCRETE FINISH LAID ON A WATERPROOF SURFACE
 -  VARIOUS SIZES OF STONE PAVING TO FOOTPATH (LIGHT GREY GRANITE AND / OR SANDSTONE)
 -  STONE AGGREGATE PAVING TO FOOTPATH (SILVER / SANDSTONE)
 -  ASPHALT FINISH TO ROAD & SHARED SURFACE
 -  STONE AGGREGATE FINISH TO THE SHARED SURFACE FOR PEDESTRIANS AND BICYCLES (BEIGE/WHITE/LIGHT GREY)
 -  EXPOSED STONE AGGREGATE FINISH TO STEPS AND RAMP (BEIGE/WHITE/LIGHT GREY)
 -  GRASSED AND PLANTED AREAS
 -  TACTILE SURFACE TO PEDESTRIAN CROSSINGS
 -  STONE KERBS TO FOOTPATH
 -  STONE KERBS TO PLANTER BED
 -  EXISTING PATH LINE
 -  SELECTED BOLLARD
 -  PROPOSED PLANTING (SHRUBS / WILDFLOWER)
 -  PROPOSED TREE:
 BIG TREE-SALIX ALBA / SWEETGUM / RED MAPLE
 MEDIUM TREE-RIVER BIRCH / ALNUS GLUTINOSA / BETULA PUBESCENS
 CARPINUS BETULUS SMALL TREE-CRATAEGUS
 -  EXISTING TREE

Rev	Description	Drawn	Checked	Date
PL01	ISSUED FOR PLANNING	FO	LP	22.09.23

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TIPPERARY COUNTY COUNCIL

Client **SUIR ISLAND INFRASTRUCTURE LINKS**

Project **PREFERRED OPTION 01**

Dwg. Title **OVERALL PLAN**

Drawn By **FO** Date **SEPT 2023** **20_071**

Checked By **LP** Scale **1:1000 @ A1** CSEA Job No.

Project Code	Originator	Zone/Phase	Level	Type	Role	Dwg. No.
20_071	CSE	GEN	XX	DR	C	2251

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PL01 ISSUED FOR PLANNING
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**APPENDIX 3: RIPARIAN WOODLAND VEGETATION COMMUNITY
CLASSIFICATION & CONDITION ASSESSMENT**

APPENDIX 3: RIPARIAN WOODLAND VEGETATION COMMUNITY CLASSIFICATION & CONDITION ASSESSMENT

1.0 INTRODUCTION

This appendix provides the results of a survey to identify the vegetation community associated with riparian woodland habitat occurring along the fringe of Suir Island. The survey was completed in order to identify the woodland vegetation community as per the Irish Vegetation Classification (Irish Vegetation Classification) system.

Where woodland survey plots were found to be representative of or have links to the Annex 1 habitat Alluvial woodland, a condition assessment of this plot was completed to determine the conservation status of the woodland.

2.0 METHODOLOGY

Riparian woodland occur to the east of and within the footprint of the Suir Island Infrastructure Links project. Perrin (2021) has identified a link between riparian woodland, that is dominated by willows with frequent ash and alder, with the Annex 1 priority habitat Alluvial woodland. 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. In addition the background information provided for the Suir Island Masterplan suggested that the alluvial woodland habitat to the eastern end of Suir Island corresponds with the Annex 1 Alluvial woodland habitat, due to the low-lying area of the island and frequently inundated and supporting mature willow species and localised ash. To determine whether the riparian woodland habitats occurring within the study area is representative of this Annex 1 priority habitat the vegetation community associated with this habitat was classified. The classification of the riparian woodland was completed using the Irish Vegetation Classification ERICA software. Perrin (2021) lists eight woodland communities that have links to the Annex 1 priority habitat Alluvial woodland. Perrin (2021) also noted the Fossitt woodland category to which each of these communities are linked. A description of the ecology of each of these communities is also provided by Perrin. Of the eight woodland communities occurring in Ireland that have links to Alluvial woodland only one, the *Salix cinerea* – *Urtica dioica* woodland community is identified as being representative of the Fossitt habitat Riparian Woodland (WN5). However, an additional 5 woodland communities that are representative of Fossitt woodland WN6 or WN6 mosaic habitats are described as occurring along rivers. These woodland habitats include: *Fraxinus excelsior* – *Galium palustre* woodland; *Alnus glutinosa* woodland; *Fraxinus excelsior* – *Iris pseudocorus* woodland; *Salix cinerea* – *Galium palustre* woodland; and *Betula pubescens* – *Rubus fruticosus* agg. woodland.

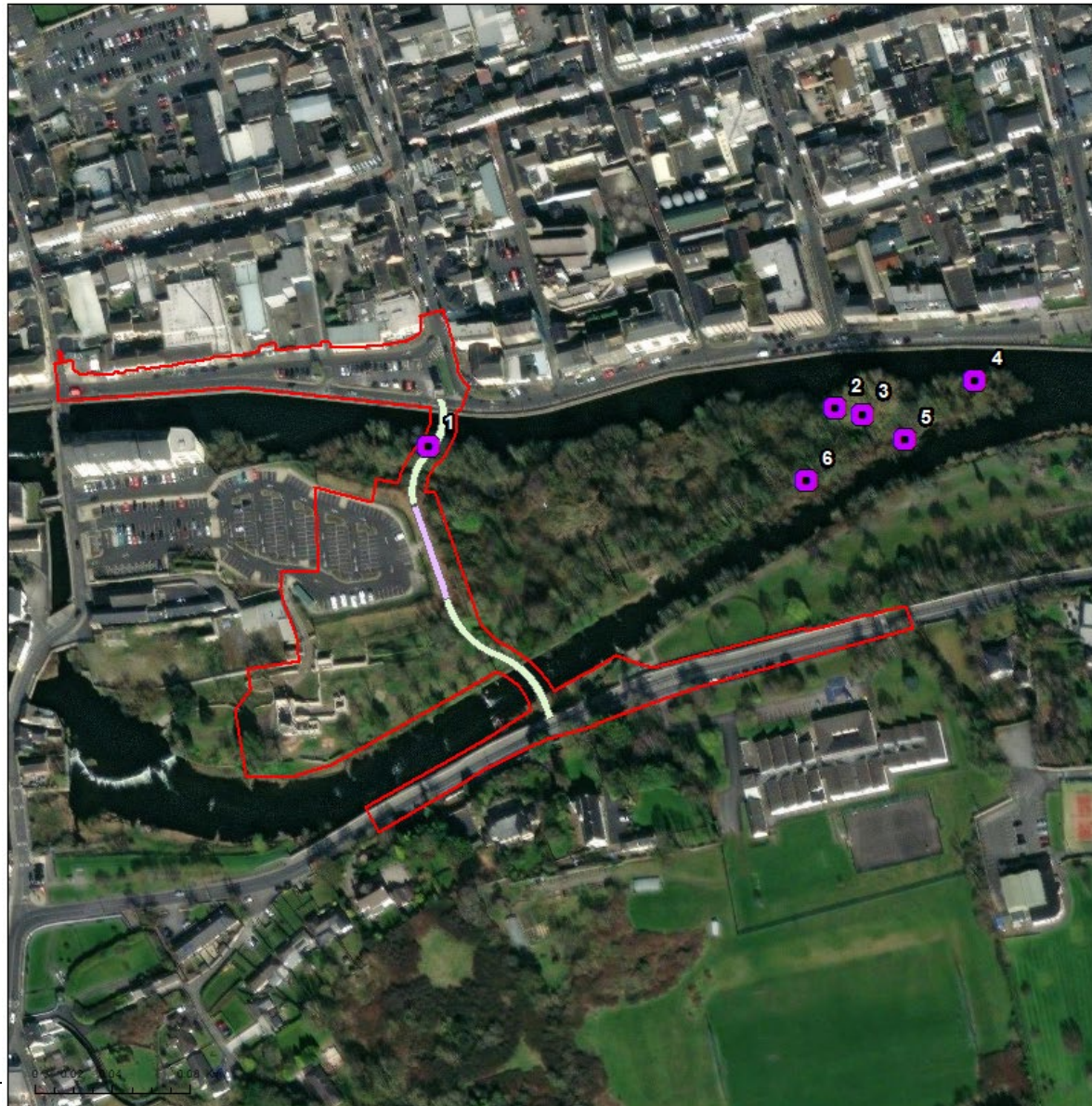
A total of six 20m x 20m monitoring points were completed within the riparian woodland habitat on Suir Island within and to the east of the proposed development. A species-list was compiled for each monitoring plot and the presence/absence of species recorded for each plot was inputted into ERICA. Presence/absence was denoted by 1 and 0 respectively. Once inputted ERICA software analysed the input data and the woodland community best represented by the species occurring at each monitoring plot was identified. Where woodland communities at monitoring plots were identified as being representative of any of the six woodland communities listed above then an assessment of this woodland condition and their representativeness of Alluvial woodland was completed. The condition assessment was completed with respect to the structure and function criteria set out for the alluvial woodland Annex 1 habitat by O'Neill & Barron, (2013).

3.0 RESULTS

The six survey plots within fringing woodland habitat of Suir Island where woodland vegetation was recorded are shown on Figure A3.1 below.

Table 3.1 lists the species recorded in each of the plots.

Table 3.2 provides the results of the ERICA analysis for each of the six monitoring stops.



Suir Island Infrastructure Links

Figure A3.1

Location of Monitoring Plots

- Monitoring Plots
- Site Boundary
- Promenade
- Bridges



Drawn By	PD
Date	12/09/2023
Data Source	Bing

Table 3.1: Species lists compiled for each Monitoring Plot

Plots	Species							
	Acer pseudoplatanus	Aesculus hippocastanum	Alnus glutinosa	Angelica sylvestris	Arum maculatum	Buddleja davidii	Buxus sempervirens	Caltha palustris
Plot 1	1	1	0	0	0	1	0	0
Plot 2	1	1	0	0	1	1	0	0
Plot 3	1	1	0	1	1	0	0	0
Plot 4	1	0	1	1	0	0	0	0
Plot 5	0	0	0	0	0	0	0	1
Plot 6	1	1	0	0	0	0	1	1
	Calystegia sepium	Cardamine flexuosa	Carex pendula	Carex remota	Cornus sanguinea	Crataegus calycina	Dryopteris filix mas	Equisetum fluviatile
Plot 1	0	0	0	0	0	1	0	1
Plot 2	1	1	0	1	1	0	1	0
Plot 3	0	0	1	0	0	0	1	0
Plot 4	0	1	1	1	1	1	0	0
Plot 5	1	0	0	0	0	0	0	0
Plot 6	0	0	1	1	0	0	0	1
	Fagus sylvatica	Filipendula ulmaria	Fraxinus excelsior	Fontinalis antipyretica	Fuchsia magellanica	Galium aparine	Geum urbanum	Glyceria fluitans

Plots	Species							
Plot 1	0	0	1	0	0	0	0	0
Plot 2	0	0	0	0	0	1	1	0
Plot 3	1	0	0	0	0	1	0	0
Plot 4	0	1	1	1	1	0	1	0
Plot 5	0	0	1	0	0	0	0	0
Plot 6	1	1	1	0	0	0	0	1
	Hedera helix	Heracleum sphondylium	Heracleum mantegazzianum	Mentha aquatica	Oenanthe crocata	Phragmites australis	Phyllostachys viridis	Polypodium vulgare
Plot 1	0	0	0	0	1	0	0	0
Plot 2	0	1	0	0	0	0	1	0
Plot 3	1	1	1	0	0	0	1	0
Plot 4	1	1	1	0	1	1	0	1
Plot 5	0	0	0	0	1	0	0	0
Plot 6	0	0	0	1	0	0	0	0
	Populus nigra	Prunus laurocerasus	Ranunculus ficaria	Ranunculus repens	Ribes nigrum	Ribes rubrum	Rumex obtusifolius	Rumex crispus
Plot 1	0	0	1	0	0	0	0	0
Plot 2	0	0	0	0	0	0	0	0

Plots	Species							
Plot 3	1	0	1	0	0	1	1	1
Plot 4	0	0	1	0	0	0	1	1
Plot 5	1	0	1	0	0	0	0	1
Plot 6	0	1	1	1	1	0	1	1
	Rubus fruticosus agg	Sambucus nigra	Salix cinerea	Salix fragilis	Taraxacum officinale agg	Ulmus glabra	Urtica dioica	Viola reichenbachiana
Plot 1	0	1	0	0	0	0	1	0
Plot 2	1	0	0	0	0	0	1	1
Plot 3	0	1	0	0	0	0	1	1
Plot 4	1	0	1	0	1	0	1	1
Plot 5	1	0	1	0	0	1	1	0
Plot 6	0	0	1	0	0	1	1	1

Table 3.2: Irish Vegetation Classification as per ERICA

Plot No.	Code	Community	Group	Division
Plot.1	FW3G	Equisetum fluviatile - Eleocharis palustris	Phragmites australis - Cladium mariscus	Freshwater
Plot.2	SC1F	Galium aparine - Urtica dioica	Rubus fruticosus agg. - Galium aparine	Scrub and wayside
Plot.3	SC1F	Galium aparine - Urtica dioica	Rubus fruticosus agg. - Galium aparine	Scrub and wayside
Plot.4	WL3D	Salix cinerea - Urtica dioica	Alnus glutinosa - Filipendula ulmaria	Woodland
Plot.5	N	None	None	None
Plot.6	FW3G	Equisetum fluviatile - Eleocharis palustris	Phragmites australis - Cladium mariscus	Freshwater

Of the IVC communities, only that at Plot No. 4, WL3D is identified by Perrin (2021) as having affinities to the Annex 1 habitat Alluvial woodland. The example of WL3D community occurring at Plot No. was identified to be a transitional habitat, which recognises the vegetation continuum of the community recorded between WL3D and other woodland community types.

A condition assessment of Plot No. 4 was completed to establish the conservation status of this woodland at this plot with respect to the criteria for the condition assessment of Alluvial woodland.

The Condition Assessment criteria are set out in Table 3.3 below, along with the results of the survey for Plot No. 4, the target values required for a “Pass” of each individual criteria and the final Pass/Fail mark.

Table 3.3: Condition Assessment of WL3D Habitat

Criteria	Results	Target Value	Result & Pass/Fail
Positive Indicator Species	7 positive indicator species present 3 Target species present - Fraxinus excelsior, Alnus glutinosa and Salix cinerea.	6 species plus at least 1 target species	Pass
Negative Indicator Species	Acer pseudoplatanus and Heracleum mantegazzianum. Total cover of species, Acer pseudoplatanus in particular is >10%	<10%	Fail
Negative Species Regeneration	Regeneration dominated by Acer pseudoplatanus	Absent	Fail
Median Canopy Height	<5m	>7m	Fail
Total Canopy Cover	>30%	>30% of Plot	Pass
Proportion of Target Species in Canopy	<50% at plot and <50% throughout island fringe.	>50%	Fail
Native Shrub Layer Cover	<10% - shrub dominated by regenerating Acer pseudoplatanus	10 / 50%	Fail

Criteria	Results	Target Value	Result & Pass/Fail
Native dwarf shrub/field layer height	c. 50cm (variable)	>20cm	Pass
Bryophyte cover	<1%	<1%	Pass
Grazing Pressure	No grazing	No overgrazing	Pass

For woodland habitats to qualify as an example of alluvial woodland at favourable conservation condition, its needs to pass 8 of the 10 criteria listed in Table 3.3 (O'Neill & Barron, 2013).

The condition assessment of the WL3D woodland plot has identified 5 criteria which Fail and 5 criteria which Pass the condition assessment. This assessment is indicative of an example of Alluvial woodland at unfavourable conservation status.

4.0 DISCUSSION & CONCLUSION

Of the 6 no. monitoring plots completed as part of the IVC community identification for fringing riparian woodland habitat, 1 no. plot, Plot no. 4 was identified as the woodland community WL3D. The WL3D woodland community is identified by Perrin (2021) as having links to the Annex 1 habitat Alluvial woodland. A condition assessment of the areas of WL3D woodland was completed in accordance with O'Neill & Barron (2013) and this resulted in this woodland habitat failing to meet the structure and function criteria for this Annex 1 habitat. This woodland habitat is also of relatively recent origin, becoming established in the latter half of the 1900's. However it is noted that the Lower River Suir SAC conservation objectives for Alluvial woodland seek to restore the favourable conservation condition of this habitat within the SAC and as such, with the implementation of active habitat management of riparian woodland there is potential for the establishment of alluvial woodland in the eastern and northern sections of the Suir Island, to the east of the project site. As part of the Suir Island Infrastructure Links project, it is recommended that habitat enhancement measures are implemented by Tipperary County Council to improve the conservation status and condition of alluvial woodland. Habitat enhancement and management measures have been set out as part of the EIAR for the Suir Island Infrastructure Links project and Tipperary County Council have committed to implementing these measures.

5.0 REFERENCES

O'Neill, F.H. & Barron, S.J. (2013) Results of monitoring survey of old sessile oak woods and alluvial forests. Irish Wildlife Manuals, No. 71. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Perrin, P.M. (2021). Irish Vegetation Classification (IVC). Community Synopsis. Woodland and Forests. Synopsis Version V2.0. <https://biodiversityireland.ie/projects/ivc-classification-explorer/#:~:text=ERICA%20is%20a%20web%20application,results%20can%20then%20be%20downloaded.>

APPENDIX 4: INVASIVE SPECIES MANAGEMENT PLAN



Suir Island Infrastructure Links Non-native Invasive Plant Species Management Plan

Doherty Environmental Consultants Ltd

12/09/2023

Suir Island Infrastructure Links

Non-native Invasive Plant Species Management Plan

Document Stage	Document Version	Prepared by
Final	1	Pat Doherty MSc, MCIEEM

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1.0 INTRODUCTION

This management plan outlines the measures to be implemented to prevent the spread of high risk and moderate risk non-native invasive species identified as occurring within and adjacent to the Suir Island Infrastructure Links project site.

Three high impact non-native invasive species, namely Japanese Knotweed (*Fallopia japonica*) and Giant Hogweed (*Heracleum mantegazzianum*) and Cherry Laurel (*Prunus laurocerasus*) has been recorded at the project site.

A further 3 non-native plant species, namely Butterfly bush (*Buddleja davidii*); Himalayan honeysuckle (*Leycesteria formosa*); and Old Mans Beard (*Clematis vitalba*), ranked at medium invasiveness, have also been recorded at the project site.

The location of stands of these non-native invasive species is shown on Figure 1.1. Cherry laurel, butterfly bush and Traveller's Joy are not mapped on Figure 1.1 as these species are widely distributed within scrub and woodland habitat of the project site and to the east of the project site on Suir Island.

Of the non-native invasive plant species occurring on Suir Island two, namely Japanese Knotweed and Giant Hogweed are listed as restricted plant species on the third schedule of the *European Communities (Birds and Natural Habitats) Regulations 2011* (SI 477/2011, as amended). Section 49(2) of the regulations state:

49(2) Save in accordance with a licence granted [by the Department of Housing, Local Government and Heritage], any person who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow in any place [a restricted non-native plant], shall be guilty of an offence.

Given that both species are listed on the third schedule of the regulations it is an offence under regulation 49(2) to cause their spread.

Section 49(3) state:

49(3) ... it shall be a defence to a charge of committing an offence under paragraph (1) or (2) to prove that the accused took all reasonable steps and exercised all due diligence to avoid committing the offence.

In recognition of these regulations, this management plan outlines the reasonable steps and due diligence that will be implemented during the construction phase to ensure compliance with the legislation.

2.0 OVERVIEW OF NON-NATIVE INVASIVE SPECIES

2.1 JAPANESE KNOTWEED

The location of the stands of Japanese Knotweed at the project site are shown on Figure 1.1. Stands of this species occur to the east of the project site on Suir Island.

F. japonica was originally introduced to the UK and Ireland as an ornamental plant but has spread extensively in the wild. It was first recorded in Ireland in 1902. With its rapid growth of more than 20mm a day, it forms dense clumps over 3m high which crowd out and prevent the growth of native plants.

All plants occurring in the British Isles are thought to be male sterile (Bailey & Connolly, 2002) and reproduction is almost entirely asexual with very little viable seed produced (0% to <2%) (Tiébré et al., 2007). It spreads through rhizomes and vegetatively in local areas. The rhizome root system, from which new plants grow, typically spread up to 3 metres away from the original plant (RICS, 2022). The plant spreads so rapidly not only through progression of its root system but because any fragments of its stem or root will grow to form a new plant (a piece as small as 2cm can regenerate). This can make it a very difficult plant to eradicate.

F. japonica will grow in any type of soil no matter how poor and is often found along railways, riverbanks, roads and particularly on derelict sites.

F. japonica has been categorised by the NBDC as a species of high impact invasiveness and has been attributed an invasiveness risk score of 20.

2.2 GIANT HOGWEED

Giant Hogweed is native species of the central and eastern Caucasus. In the UK this species was first recorded in 1817 when it was recorded on a seed list at Kew Botanic Gardens. It is a species found in bogs, fens, grassland, woodland, urban and agricultural areas and especially along riparian zones.

An average plant can bear approximately 20,000 seeds but plants with up to 100,000 seeds have been recorded and due to the very high number of seeds the reproductive potential of this species is very high.

After release from the umbel, seeds mature in a short-term persistent seed bank which is an important mechanism of population development. The majority of seeds (95%) are concentrated in the upper 5 cm soil layer. In autumn, the seed bank in dense stands contains up to 12,000 living seeds/m² (on average 6,700 were recorded). Some seeds in the seed bank are dead, some decay during winter, yet there are on average more than 2,000 living seeds/m² in spring, vast majority of which are ready to germinate because they have lost dormancy over winter.

The main biological and ecological characteristics of Giant Hogweed that make it such a successful invader can be summarized as follows:

- germination in early spring before the resident vegetation appears; • low mortality of plants once they become established;
- fast growth of rosettes allowing rapid development of populations and the ability to form dense cover and place leaves above the resident vegetation;
- stable proportion of plants that flower and produce seeds;
- ability of plants under stressful conditions to postpone flowering until a time when sufficient reserves are stored;
- flowering sufficiently early in the vegetation period, which makes it possible to complete the development of seeds;
- ability of self-pollination leading to production of viable seed; • high fecundity allowing a single plant to start an invasion;
- high density of seeds in the soil seed bank, with some seeds surviving for at least two years;
- efficient breaking of dormancy by cold temperatures during winter;

- extremely high percentage of germination regardless of where on the mother plant the seeds are produced.

These features, together with efficient seed dispersal by human activities, water and wind, give Giant Hogweed enormous invasion potential.

Besides the ecological problems, tall invasive hogweed species also represent a serious health hazard for humans. The plant exudes a clear watery sap, which contains several photosensitizing furanocoumarins (synonym for furocoumarins). In contact with the human skin and in combination with ultraviolet radiation, these compounds cause burnings of the skin. The content of furanocoumarins varies among plant parts, however, during the season skin contact should be avoided at any time even in the absence of sunlight (specifically ultraviolet radiation). The phototoxic reaction can be activated by ultraviolet radiation only 15 minutes after contact, with a sensitivity peak between 30 min and two hours. In addition, several furanocoumarins have been reported to be carcinogenic (i.e. they cause cancer) and teratogenic (i.e. they cause malformations in the growing embryo).

Giant Hogweed has been categorised by the NBDC as a species of high impact invasiveness and has been attributed an invasiveness risk score of 20.

2.3 CHERRY LAUREL

Cherry laurel is present within woodland habitats within the project site and to the east of the project site on Suir Island. It has infested areas of woodland resulting in the exclusion of other canopy species and shrub and ground layer flora.

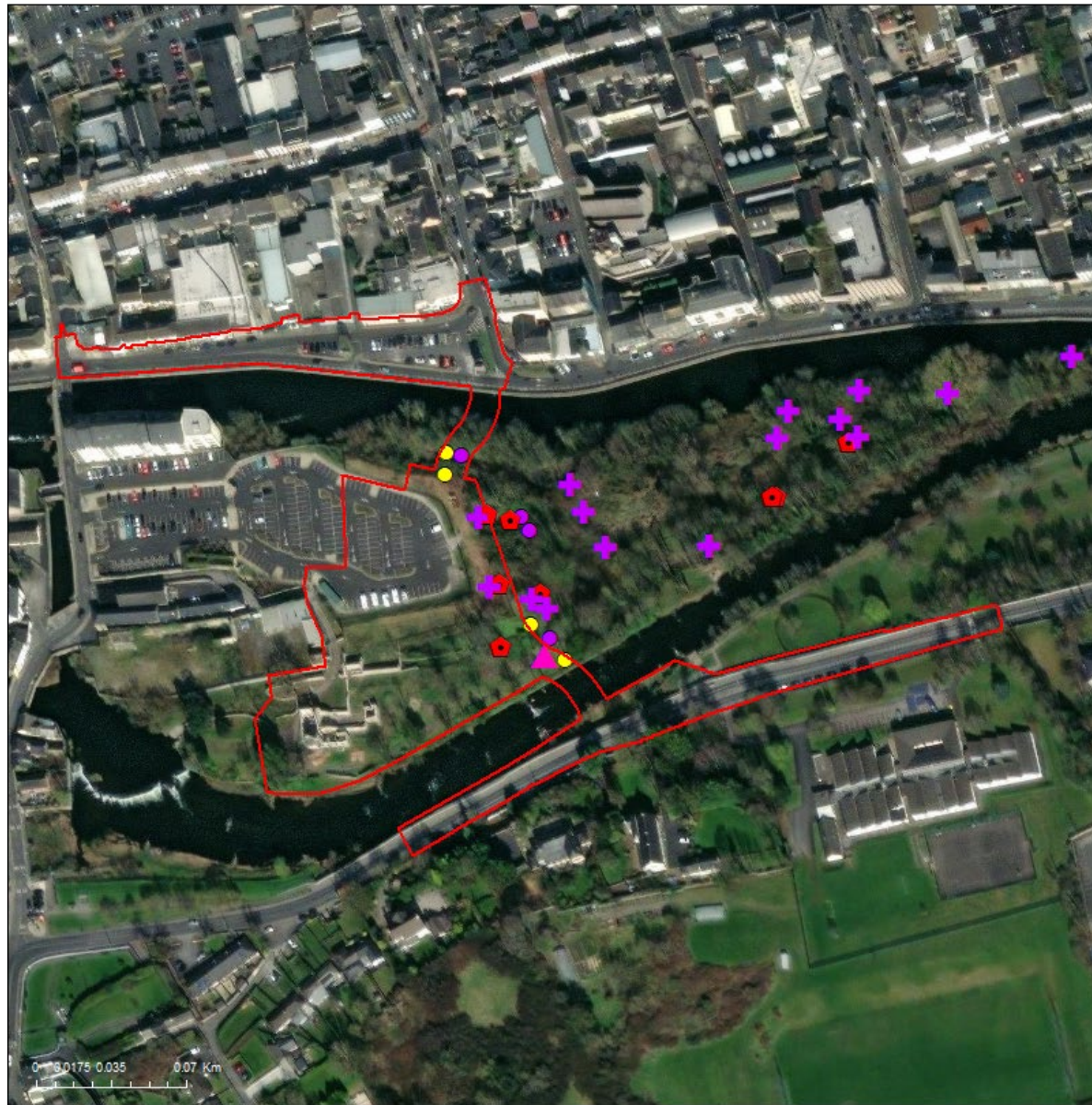
Prunus laurocerasus is a perennial evergreen shrub species that was first reported in the wild in Ireland in 1950. It occurs in woodland habitats as well as bogs, fens and grasslands. It spreads by layering and suckering and the fruit may be eaten and dispersed by birds (Reynolds, 2002). It outcompetes native species and suppresses regeneration by forming thick stands. It is not browsed as a forage plant by herbivores which enhances conditions for its spread (Maguire et al., 2008).

Prunus laurocerasus has been categorised by the NBDC as a species of high impact invasiveness and has been attributed an invasiveness risk score of 18.

2.4 HIMALAYAN HONEYSUCKLE

L. formosa was identified on the south side of Suir Island between the promenade and the River Suir. *L. Formosa* is native species of temperate Asia and was first recorded in Ireland in 1955. It was introduced as a garden ornamental and has since become established in Ireland. It is typically found in hedgerows and on waste or bare ground, such as that occurring at the subject site. The principal vector for its spread is by birds, particularly robins and chaffinches (Helenon et al. 2011), dispersing the fruit of this shrub.

There are no known documented impacts recorded for *L. formosa*, though it appears to be expanding its range in Britain (Preston et al., 2004) and Ireland (Reynolds, 2002). It forms dense thickets that can exclude native vegetation (Booy et al., 2015). It has been assessed as having a Medium Risk of impact as an invasive species by the NBDC (Invasiveness Risk Score of 14).



Suir Island Infrastructure Links

Figure 1.1

Distribution of Non-Native Invasive Plant Species

- Site Boundary
- ✚ Giant Hogweed
- ⬠ Japanese Knotweed
- ▲ Himalayan Honeysuckle
- Old-Man's Beard
- Butterfly Bush



Drawn By	PD
Date	12/09/2023
Data Source	Bing

2.5 BUTTERFLY BUSH

B. davidii is present within the project site at the edge of woodland to the north and south of the promenade. *B. davidii* is native to China and was first recorded in Ireland in the 1950's. It was introduced as a garden ornamental and is widely planted as a landscape garden ornamental throughout Ireland. It establishes readily on naturally or on anthropogenically disturbed sites such as quarries, urban waste grounds, abandoned cultivated areas, clearcut forests, along railway lines etc. (Tallent-Halsell & Watt, 2009).

In the UK and Ireland naturalised *B. davidii* plants retain seeds on the plant throughout winter and then release the seeds in early spring into summer (Tallent-Halsell & Watt, 2009). Large numbers of seeds are produced by each of the flowering spikes on the plant and the lightweight, winged nature of the seeds facilitates dispersal. Seeds can remain viable for three to five years. Plants also readily reproduce asexually from stem and root fragments and can regenerate from buried stems, stumps and roots soon after disruption.

No precise studies have been done on the level of impact of *B. davidii*, likely due to its long history of naturalisation (Talent-Hassell & Watt, 2009), but it is likely to displace native plants where it is present. It has been assessed as having a Medium Risk of impact as an invasive species by the National Biodiversity Centre (Invasiveness Risk Score of 15).

2.6 OLD-MAN'S BEARD

Clematis vitalba is native to Europe and has spread in Ireland as a garden escape. It was introduced as a garden ornamental and is widely planted as a landscape garden ornamental throughout Ireland. It establishes readily on naturally or on anthropogenically disturbed sites such as construction site, urban waste grounds and abandoned cultivated areas. It spreads by seed and can remain viable in the soil for 5 to 10 years. It has been assessed as having a Medium Risk of impact as an invasive species by the National Biodiversity Centre (Invasiveness Risk Score of 17).

3.0 AIMS & OBJECTIVES

The primary site management objective is to prevent the spread of the identified invasive species as a result of the proposed works during construction and the eradication of the

infestations prior to the commencement of the operation phase. The primary risk is perceived as during the construction period when the excavation of materials and presence of plant, machinery and site operative can facilitate the spread of the non-native invasive plant species identified on the project site.

The works will aim to avoid the spread of the non-native invasive plant species during construction works.

The management objectives are:

Objective 1. Prevention of further spread of non-native invasive plant species as a result of construction works.

Objective 2. Eradicate non-native invasive plant species prior to or during the construction phase.

3.1 LIMITATIONS AND THREATS TO SITE OPERATIONS

The presence of *Prunus laurocerasus*, *Clematis vitalba*, *Buddleja davidii* and *Leycesteria formosa* within the project site and the presence of Japanese Knotweed and Giant Hogweed to the east of the project site boundary will pose limitations for the initial phase of the project during site clearance and if not managed in an adequate approach could result in :

- Delays in scheduling of works, due to treatment of identified locations.
- Damage or potential damage caused by the plant.

It is highlighted that:

the use of trimmers, mowers or chippers on *Prunus laurocerasus*, *Buddleja davidii*, *Clematis vitalba* and *Leycesteria formosa* is not permitted. The construction team shall not cut, flail or remove the upright stems/leaves of these invasive plant species.

Any cutting and removal of these plant species will only be completed by a specialist contractor approved to carried out such works.

4.0 CONTROL REQUIREMENTS

The control and eradication of non-native invasive species within the project site will be completed in accordance with Transport Infrastructure Ireland (TII) publication “The Management of Invasive Alien Plant Species on National Roads – Technical Guidance” (2020).

The control measures to be applied for the control and eradication of non-native invasive species will be supervised by the construction phase ECoW, which will have experience with the control and eradication of non-native invasive species from development sites.

The location and extent of non-native invasive species occurring within the project site will be subject to up-to-date mapping during the growing season prior to the commencement of vegetation clearance. Where infestations of mature stands of non-native invasive species occur the boundary of these area will be mapped as a polygon which will be digitised and made available in shapefile and/or autocad format.

Where individual stems of non-native invasive species are identified during the up-to-date survey, these will be mapped as points, which will be digitised and made available in shapefile and/or autocad format.

The up-to-date maps will be provided to the vegetation clearance contractor prior to the commencement of vegetation clearance. As noted above the clearance of non-native invasive species will be supervised by the construction phase EcoW.

4.1 JAPANESE KNOTWEED

The stands of Japanese Knotweed, as indicated on Figure 1.1, occurring to the east of the project site are currently being treated by Tipperary County Council. Treatment is in place since spring 2021 and die-back of the stands of Japanese Knotweed were noted during field surveys at Suir Island during the summer of 2021 and 2022. Regrowth was identified during the growing season of 2023 and the locations of Japanese Knotweed are currently being targeted for chemical herbicide treatment by Tipperary County Council.

The treatment currently being applied by Tipperary County Council is based on chemical control as described in the TII (2020) guidelines. The chemical control will continue to be applied by Tipperary County Council until it is confirmed by the County Council that the infestation has been eradicated.

4.1.1 Management of Japanese Knotweed Inside the Construction Phase Footprint

In the event that Japanese Knotweed is identified as occurring within the footprint of the construction phase during the growing season preceding the commencement of construction works and vegetation clearance then the identified infestations will be required to be removed from the footprint of the works via physical control methods as described in the TII (2020) guidelines. Under such circumstances the physical control of Japanese Knotweed within the construction footprint will follow 1 of the following 3 options. All necessary licences and permits will be required to be in place prior to the commencement of physical treatment as per 1 of the following 3 options described below.

1. Onsite Deep Burial Cell

In accordance with TII guidelines (2020b) Japanese Knotweed can be disposed of at the site of origin within a burial cell. The Japanese Knotweed infestation and associated contaminated soil layer is required to be buried to a minimum depth of 5m. The infestation is required to be treated with a non-persistent herbicide prior to excavation. The contaminated material will be required to be covered by a proprietary root barrier membrane layer. The membrane will be required to be undamaged and sealed securely and have a manufacturer's guarantee that it will remain intact for at least 50 years, and be UV resistant. Once the membrane cover is in place the burial cell will be infilled with a minimum 5m depth of uncontaminated soil.

This management option will be implemented in accordance with the following steps:

- a) A tool-box talk will be provided by the ECoW to all site personnel prior to the commencement of physical treatment works.
- b) Access to Contaminated Area: Access to the contaminated area will be restricted to site personnel and machinery required to complete the excavations. Specified access routes

to the contaminated areas and burial cell will be defined and site personnel and machinery will be restricted to these access routes. Where the burial cell is located adjacent to the contaminated area the excavator will directly deposit the excavated contaminated material to the burial cell. Upon completion of removal of the contaminated material to the burial cell the excavator bucket, wheels and undercarriage will be washed down into the burial cell prior to covering and enclosure. Where the burial cell is located elsewhere on site the excavator will deposit the contaminated material into a dumper truck. The truck will be required to approach the contaminated area from the established access route. The trucks will be loaded by the site excavator. The trucks will not drive over any exposed or loose soil or excavations. This will ensure that the trucks and wheels do not come into contact with potentially contaminated soil from excavated areas. Upon completion of removal of the contaminated material to the burial cell the excavator and truck load space, wheels and undercarriage will be washed down into the burial cell prior to covering and enclosure.

- c) All personnel footwear, equipment, and vehicles will be washed down into the burial cell prior to exiting the delineated area for physical control works. This will ensure that all disinfected wash down water is contained within the burial and does not runoff to an area outside the burial cell. Virkon disinfectant will be used with all wash down waters during washing and cleaning of footwear, equipment, plant and vehicles. Upon completion of washing the cell will be covered and enclosed.

2. Onsite Shallow Burial Cell

Where burial onsite to a depth of 5m is not possible, the infestation will be treated with a non-persistent herbicide prior to excavation, excavated and then completely encapsulated in a proprietary root barrier membrane cell. The upper surface of the cell will be buried to the depth of at least 2m with uncontaminated soil.

This management option will be implemented in accordance with the Steps a to c outlined above for physical treatment option No. 1.

3. Disposal Offsite at a Licence Facility

In the event that Management Option No. 1 or No. 2 described above cannot be carried out on site then the contaminated Japanese Knotweed material occurring on site will be disposed of offsite to a licenced landfill facility. The steps required under this management option are as follows:

- d) Pre-excavation & Letter of Acceptance: The area of Japanese Knotweed infestation and associated underlying soil layer that will be treated as contaminated will be marked out prior to excavations.
- e) Soil samples have been taken from a the trial pit completed within the contaminated area. A WAC soil analysis of the soils will be completed to inform the provision of a letter of acceptance by the licenced landfill operator.
- f) A tool-box talk will be provided by the ECoW to all site personnel prior to the commencement of physical treatment works.
- g) Once a Letter of Acceptance is received by the licenced landfill operator it will be forwarded to the Minster for their information, as part of a licence application to permit the movement and disposal offsite of the contaminated material.
- h) Access to Contaminated Area: Access to the contaminated area will be restricted to site personnel and machinery required to complete the excavations. Specified access routes to the contaminated areas will be defined and site personnel and machinery will be restricted to these access routes. Trucks that will be loaded with contaminated material will approach the contaminated area from the established access route. The trucks will be loaded by the site excavator. The trucks will not drive over any exposed or loose soil or excavations. This will ensure that the trucks and wheels do not come into contact with potentially contaminated soil from excavated areas. As further precaution the truck wheels and undercarriage will be washed down prior to exiting the contaminated area.
- i) All personnel footwear, equipment, and vehicles will be washed down in the wash down area prior to exiting the contaminated area. All washings will be required to be directed to the existing contaminated area. This will ensure that all disinfected wash down water is contained within the existing contaminated area and does not runoff to

an area outside the contaminated area. Virkon disinfectant will be used with all wash down waters during washing and cleaning of footwear, equipment, plant and vehicles.

- j) **Excavation & Removal of Contaminated Material:** Excavations will be monitored by the ECoW. All contaminated soil will be deposited directly from the dig site into containers loaded onto trucks. Trucks will be loaded to a maximum levels of 100mm below the top side of the trucks. The loads will be covered by a tarpaulin and will be sealed prior to exiting the site. The trucks will be washed down and wheels and undercarriages will be disinfected with Virkon and inspected in the wash down area prior to leaving the wash down area. Trucks will proceed directly to the licenced landfill to be weighed. Weights will be recorded on consignment dockets and exit dockets will also be provided.

- k) The trucks at the licenced landfill site will enter and exit the disposal area on a clearly defined route and will be washed down and disinfected at the wash area, paying particular attention to wheels and undercarriage.

4.1.2 Management of Japanese Knotweed Outside the Construction Phase Footprint

In order to prevent any accidental interaction between construction works and any remaining stands of Japanese Knotweed outside of the construction phase boundary will be delineated with a physical barrier that will remain in place for the duration of the construction phase. This physical barrier, such as a post and rope fence will be installed prior to the commencement of site works and vegetation clearance. Construction phase site operatives, plant or machinery will be restricted to the construction footprint and will not move beyond the barrier delineating the construction footprint boundary. This will ensure that the potential for interaction between construction works and any remaining stands of Japanese Knotweed, outside the construction phase footprint will be avoided.

4.2 GIANT HOGWEED

The stands of Giant Hogweed, as indicated on Figure 1.1, are currently being treated by Tipperary County Council. Treatment is in place since spring 2021 and die-back of the stands of Giant Hogweed were noted during field surveys at Suir Island during the summer of 2021 and 2022. Regrowth was identified during the growing season of 2023 and the locations of

Giant Hogweed are currently being targeted for chemical herbicide treatment by Tipperary County Council.

The treatment currently being applied by Tipperary County Council is based on chemical control as described in the TII (2020) guidelines. The chemical control will continue to be applied by Tipperary County Council until it is confirmed by the County Council that the infestation has been eradicated.

4.2.1 Management of Giant Hogweed Inside the Construction Footprint

The management of Giant Hogweed inside the Construction Footprint will be required to follow the approach set out for Japanese Knotweed above.

4.2.2 Management of Giant Hogweed Outside the Construction Footprint

In order to prevent any accidental interaction between construction works and any remaining stands of Giant Hogweed outside the boundary of construction works, the construction footprint will be delineated with a physical barrier that will remain in place for the duration of the construction phase. This physical barrier, such as a post and rope fence will be installed prior to the commencement of site works and vegetation clearance. Construction phase site operatives, plant or machinery will be restricted to the construction footprint and will not move beyond the barrier delineating the construction footprint boundary. This will ensure that the potential for interaction between construction works and any remaining stands of Giant Hogweed will be avoided.

4.3 CHERRY LAUREL

No control is currently being applied for Cherry Laurel on Suir Island. The TII (2020) guidelines do not specify measures for the control of Cherry Laurel. However given that the growth of this species is similar to *Rhododendron ponticum* (for which control guidelines are provided) the approach to be implemented for the control of Cherry Laurel will follow that outlined for *Rhododendron ponticum*.

Large trunks and stems of established Cherry Laurel will be removed at their base by mechanically uprooting with machinery. This approach will only be applied to stands of Cherry

Laurel occurring within the construction footprint of the proposed development, where machinery is to be used.

Where Cherry Laurel occurs in other areas of the proposed development site, where ground clearance is not required to accommodate construction works and the permanent or temporary footprint of the proposed development site, then the approach to the removal of Cherry Laurel will be based on hand cutting larger trunks and stems using a chainsaw. The remaining stump will be subject to chemical treatment via the stem injection of herbicide.

All seedlings occurring within the project site will be hand pulled.

All Cherry Laurel cutting and removal will be completed during the non-breeding bird season during the months of January and February.

All Cherry Laurel cut material will mulched on site within a dedicated area for mulching in the temporary construction compound on Suir Island. The mulched material will be transported offsite for disposal at a local authority licenced waste disposal facility.

4.4 BUTTERFLY BUSH

In order to eradicate Butterfly Bush from the project site it will be removed during the non-flowering and non-seed bearing time of the year. As such stands of this plant will be removed between January and February. This will coincide with the time of year outside the breeding bird season.

Large trunks and stems of established Butterfly Bush will be removed at their base by mechanically uprooting with machinery. This approach will only be applied to stands of Butterfly Bush occurring within the construction footprint of the proposed development, where machinery is to be used.

Where Butterfly Bush occurs in other areas of the proposed development site, where ground clearance is not required to accommodate construction works and the permanent or temporary footprint of the proposed development site, then the approach to the removal of Butterfly Bush will be based on hand cutting larger trunks and stems using a chainsaw. The remaining stump will be subject to chemical treatment via the stem injection of herbicide.

All seedlings occurring within the project site will be hand pulled.

All Butterfly Bush cut material will mulched on site within a dedicated area for mulching in the temporary construction compound on Suir Island. The mulched material will be transported

4.5 HIMALAYAN HONEYSUCKLE

The stands of *Himalayan Honeysuckle* occurring within the subject site will be hand pulled or else removed by hand digging so that it is disposed of separately to other native vegetation that will be removed.

The *Himalayan Honeysuckle* that is removed will be mulched and disposed of as per the approach set out for Cherry Laurel and Butterfly Bush above.

4.6 OLD-MAN'S BEARD

The stands of *Old-man's Beard* occurring within the project site will be cleared during the winter months between January and February inclusive, outside the flowering and seed-bearing season. Given its presence throughout the project site the clearance of this species will coincide with the general vegetation clearance to be completed on site. between the January and February inclusive.

5.0 CONCLUSION

Six non-native invasive plant species were identified within the subject site during surveys between 2020 and 2023.

Measures have been outlined for the control and eradication of non-native invasive species within the site. The proposed approach to the control and eradication of these species is in line with best practice guideline recommendations (see TII, 2020) and the proper implementation of the approach outlined in this report will minimise the potential for the spread of these species during site clearance works and will seek to achieve their eradication from the subject site.

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