

Ecological Impact Assessment

Pedestrian and Cycle Bridge, Celbridge, Co. Kildare

Prepared for National Transport Authority

By Karen Banks MCIEEM

16th February 2022



Coolnacaheragh
Lissacreasig
Macroom
Co. Cork
Tel: 0834218641
Email: greenleafecology@outlook.com

Ecological Impact Assessment

Celbridge Pedestrian and Cycle Bridge

Revision Control Table

Revision	Description	Prepared by	Checked by	Date
D1	Ecological Impact Assessment	KB	KB	13/12/2021
F1	Ecological Impact Assessment	KB	KB	16/02/2022

Contents

1	Introduction	1
1.1	Statement of Competence	1
1.2	Location of Proposed Development.....	1
1.3	Project Background	2
1.4	Project Elements	4
1.4.1	Proposed Pedestrian and Cycle Bridge.....	4
1.4.2	Works to Existing Road Bridge	8
1.4.3	Road and Footpath Upgrades	8
1.4.4	Other Associated Works	9
1.4.5	Demolition	9
1.4.6	Construction Methodology and Programme	9
1.4.7	Surface Water Management.....	11
1.4.8	Environmental Management Measures	11
1.5	Operational Phase.....	11
2	Methodology.....	12
2.1	Relevant Policy and Legislation.....	12
2.2	Study Area and Zone of Influence.....	13
2.3	Desk Study	13
2.4	Field Surveys	14
2.4.1	Bat Survey	14
2.4.2	Otter Survey	16
2.5	Aquatic Ecology.....	17
2.5.1	Macroinvertebrate Survey.....	17
2.5.2	Habitat Assessments	18
2.6	Impact Assessment Criteria	22
2.7	Survey Constraints	23
3	Receiving Environment	24
3.1	Designated Sites.....	24
3.2	Terrestrial Ecology.....	27
3.2.1	Habitats.....	27
3.2.2	Species	27
3.3	Aquatic Ecology.....	34
3.3.1	Desktop Study	34
3.3.2	Review of Records for Annex II Aquatic Species	35
3.3.3	Field Survey Results	36

3.3.4	Consultation	37
3.4	Summary of Ecological Evaluation	38
4	Potential Impacts of the Proposed Development	39
4.1	Construction Phase	39
4.1.1	Designated Sites	39
4.1.2	Terrestrial Habitats.....	40
4.1.3	Species	40
4.1.4	Aquatic Ecology	41
4.2	Operational Phase.....	42
4.2.1	Designated Sites	42
4.2.2	Terrestrial Habitats.....	42
4.2.3	Species	42
4.2.4	Aquatic Ecology	42
4.3	Cumulative Impacts with Other Plans and Projects in the Area	43
5	Mitigation.....	47
5.1	Construction Phase	48
5.1.1	Invasive Species.....	52
5.2	Operational Phase.....	53
5.3	Monitoring.....	54
5.4	Residual Impacts	54
6	Conclusion.....	55
7	References.....	56

Appendices

- Appendix A Geographical Reference for Ecological Assessment
- Appendix B NBDC Protected and Invasive Species Records from a 2km Radius of the Site

List of Figures

Figure 1-1: Aerial photograph of location of proposed development showing existing bridges in Celbridge.....	2
Figure 1-2: Elevation of South Western Side of Existing River Liffey Road Bridge.....	3
Figure 1-3: Footpath and Existing Pedestrian Bridge (Looking north on the River Liffey Road Bridge). 3	
Figure 1-4: Single Span, Triangular Open-Web Truss Bridge Design -View from Abbey Lodge Car Park5	
Figure 1-5: Site boundary of Proposed Development (shown in red). (Source: dhb Architects).....	6
Figure 1-6: Elevation of Proposed Pedestrian and Cycle Bridge	7
Figure 1-7: Plan of Proposed Pedestrian and Cycle Bridge	7

Figure 3-1: European and Nationally Designated Sites within 5km of the Proposed Works, Celbridge	26
Figure 3-2: Himalayan Balsam on left bank 5m upstream of proposed footbridge.....	29
Figure 3-3: Himalayan Balsam on right bank 5m upstream of proposed footbridge.....	29
Figure 3-4: Japanese knotweed found along the mill race on left and right bank 235m upstream from proposed pedestrian and cycle bridge.....	30
Figure 3-5: Giant Rhubarb found along the mill race on right bank 365m upstream of the proposed pedestrian and cycle bridge.....	30
Figure 3-6: Location of IAPS at the Proposed Site and its Environs	31
Figure 3-7: Dry Arch at the Western End of the Existing Road Bridge	33

List of Tables

Table 2-1: Suitability of Habitats for Bats	15
Table 2-2: EPA Biotic Index (Q-value) and Equivalent WFD Water Quality Status Classes	18
Table 3-1: International and National Designated Sites within 5km of the Proposed Pedestrian Bridge	24
Table 3-2: Habitats Present within the Proposed Scheme Area	27
Table 3-3: Bat Records from the Proposed Site and Its Environs.....	32
Table 3-4: EPA codes for waterbodies with connectivity to the proposed site	34
Table 3-5: Summary of EPA Q-Values within the Liffey River from 2010-2019 (The closest station to the proposed pedestrian and cycle bridge is highlighted in bold)	35
Table 3-6: Summary of WFD Status for Liffey Water Bodies (The water body the proposed pedestrian and cycle bridge is within is highlighted in bold)	35
Table 3-7: Ecological Features within the Zone of Influence of the Proposed Development	38
Table 4-1: Other Projects and Plans that could result in potential cumulative impacts	43
Table 5-1: Table of Construction Phase Mitigation Measures.....	48
Table 5-2: Table of Operational Phase Mitigation	53

1 Introduction

Greenleaf Ecology was commissioned by the National Transport Authority (NTA) to undertake an Ecological Impact Assessment (EclA) of the proposed pedestrian and cycle bridge and associated works over the River Liffey in Celbridge, Co. Kildare (hereafter referred to as 'the proposed development').

The purpose of this EclA is to:

- Establish baseline ecological data for the proposed development site;
- Determine the ecological value of the identified ecological features;
- Identify, describe and assess the likely significant effects of the proposed development on ecological features; and
- Propose effective mitigation measures to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on ecological features.

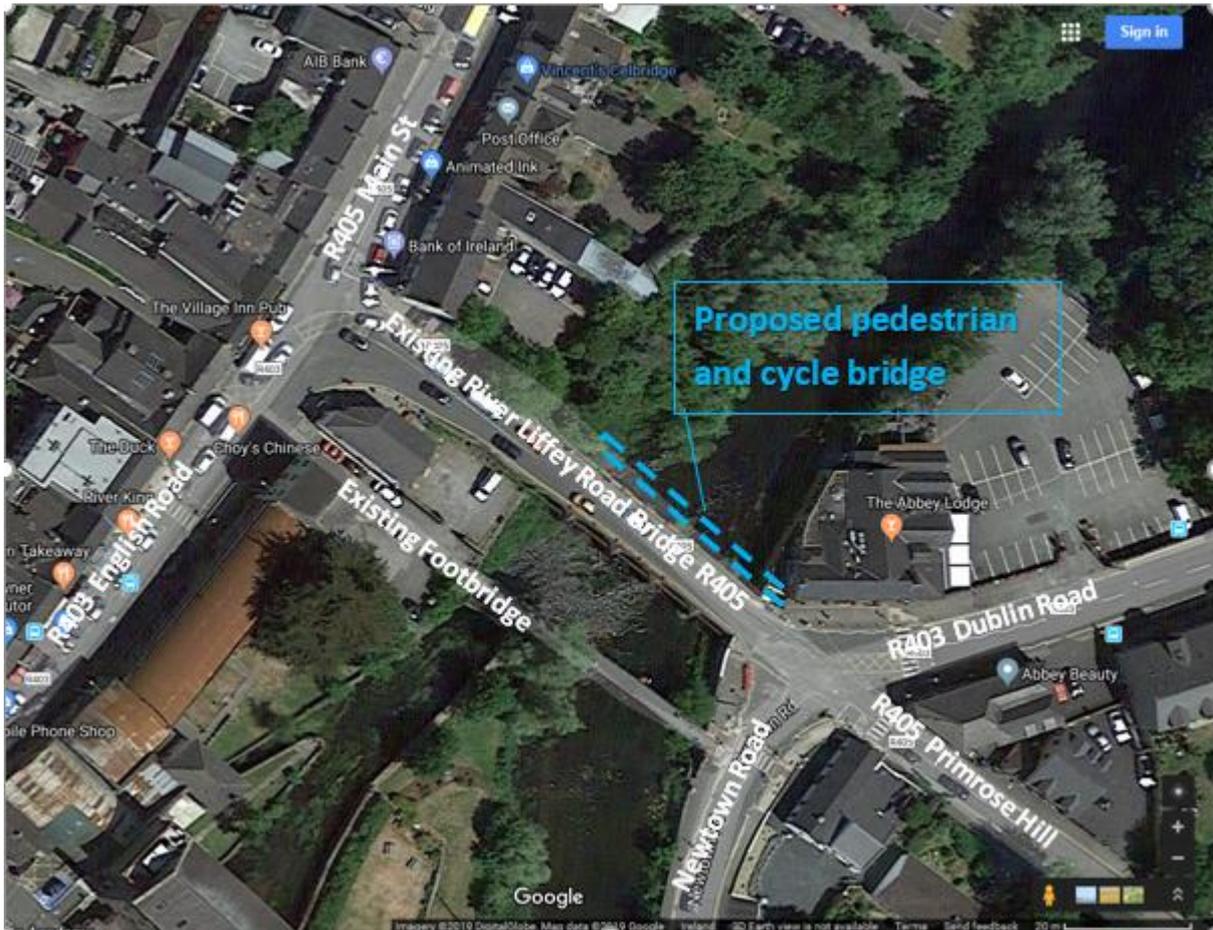
1.1 Statement of Competence

This screening for Ecological Impact Assessment (EclA) has been prepared by Karen Banks. Karen is an ecologist with 15 years' experience in the field of ecological assessment. She holds a BSc (Hons) in Environment and Development from Durham University, and is a full member of the Chartered Institute of Ecology and Environmental Management. Karen has extensive experience in the production of Ecological Impact Assessments (EclA) including those for transport infrastructure, small to large scale housing and mixed-use developments, flood alleviation schemes and wind farms. Aquatic ecology assessment was undertaken by Senior Ecologist, Letizia Cocchiglia, BSc. PhD, who has 8 years' experience in the preparation of Ecological Impact Assessment reports.

1.2 Location of Proposed Development

The location of the proposed development is within the centre of the town of Celbridge as depicted in the aerial photograph in Figure 1-1. There is an existing River Liffey Bridge which forms part of the R405 regional road and allows vehicles to cross the River Liffey in a northwest/southeast direction as seen in Figure 1-1. There is also an existing pedestrian bridge to the south west of the existing road bridge. The proposed cycle and pedestrian bridge will be located directly adjacent to and downstream of the existing river Liffey road bridge.

Figure 1-1: Aerial photograph of location of proposed development showing existing bridges in Celbridge



1.3 Project Background

In order to increase the capacity of the street space within Celbridge it is crucial that the use of sustainable transportation modes is promoted and in order to do this improved provisions for pedestrians, cyclists and public transport services must be made.

There is an existing River Liffey road bridge which forms part of the R405 regional road and facilitates vehicles to cross the River Liffey in a northwest/southeast direction. The River Liffey road bridge provides a vehicular crossing point via the R405 Dublin Road over the River Liffey within Celbridge town. This is a six-arch rubble stone road bridge over the river dating from the 1800s as seen in Figure 1-2. The proposed pedestrian and cycle bridge is to be constructed to the north east (downstream) of the existing road bridge. This location was selected as the preferred location for a pedestrian and cycle crossing in the 2018, Clifton Scannell Emerson Associates Consulting Engineers (CSEA) Options Report. The proposed location of the pedestrian and cycle bridge stretches from bank to bank of the River Liffey and includes landing areas for the bridge in the former Bank of Ireland car park (north side) and adjacent to the Abbey Lodge public house (south side).

Figure 1-2: Elevation of South Western Side of Existing River Liffey Road Bridge



The existing River Liffey road bridge has two narrow traffic lanes and a footpath of limited width on one side only (north eastern side). There is a second pedestrian bridge (which is also used by cyclists) to the south west of the vehicular bridge, see Figure 1-3 below. It is noted from the Celbridge Liffey Crossing - Pedestrian and Cycle Improvements - Options Report (CSEA, 2019) that these limited crossing points are a significant constraint to the efficient movement of private, public and commercial road users within the town. The Celbridge Local Area (LAP) 2017-2023 notes that the bridge remains a major cause of congestion to traffic flow in the town. The Celbridge Liffey Crossing - Pedestrian and Cycle Improvements - Options Report (CSEA, 2019) also notes the town suffers from significant traffic congestion, particularly during peak travel periods, associated, to a significant degree, to the fact that the town has only this single road bridge.

Figure 1-3: Footpath and Existing Pedestrian Bridge (Looking north on the River Liffey Road Bridge)



Problems also arise for other road users where the narrow width of the footpath, in close proximity to narrow traffic lanes with high traffic flows, creates safety issues for pedestrians using the road bridge. There is an existing pedestrian bridge to the south west of the existing road bridge as seen in the left of Figure 1-3. This pedestrian route provides passage from Main Street (north of the River Liffey) to the predominantly residential area to the south of the river, however it is not direct and is of insufficient width at places. For cyclists, no facilities exist on the crossing and cyclists are required to share the traffic lanes or to use the existing pedestrian bridge.

RPS was commissioned by the NTA to conduct a constraints and environmental options selection report for Celbridge Liffey Crossing. The purpose of the Environmental Constraints and Options Selection Study was to

identify the key environmental constraints within the Study Area and to examine the options from an environmental perspective. The constraints and environmental options was based on the feasible options as identified in *Celbridge Liffey Crossing – Pedestrian and Cycle Bridge - Options Report* (CSEA, 2019). The options were assessed in a systematic manner in order to identify the preferred option from an environmental perspective. The outcome of Environmental Constraints and Options Selection Study fed into an overall multi criteria analysis under the headings; Economy, Safety, Accessibility and Social Inclusion, Integration and Physical Activity which has formed the basis for further consultation and design development. The result is the NTA proposing the new pedestrian and cycle bridge, which is the subject of this EclA as the preferred option.

1.4 Project Elements

The proposed development will comprise of the elements described below within the site boundary shown on Figure 1-5. The main contract works are expected to take four months and the advance contract works to take 6 weeks therefore the total expected construction period is approx. 6 months.

1.4.1 Proposed Pedestrian and Cycle Bridge

The proposed development comprises a pedestrian and cycle bridge from the footpath adjacent to the former Bank of Ireland car park in Celbridge to the footpath outside the Abbey Lodge public house. The bridge will span over the River Liffey for approximately 50m. It will be constructed directly adjacent to the existing road bridge as shown in Figure 1-4.

The design and construction comprise a single-span, inclined, open-web truss bridge structure with a modular deck and glass guarding, for pedestrian and cycle crossings only as seen in Figure 1-4. The deck will be a minimum of 3.5m in width and will also function as a viewing platform and public space. The structure will bear on landings on each bank and will have no structural incidence on the existing road bridge (i.e. there is no requirement for structures or construction works in the River Liffey (see Figure 1-6). The supports at the ends of the proposed pedestrian and cycle bridge, located at former Bank of Ireland (north bank of River Liffey) and Abbey Lodge (south bank of River Liffey), will require piled abutments (again, these structures are not located in the River Liffey).

Celbridge Pedestrian and Cycle Bridge: Ecological Impact Assessment

Figure 1-4: Single Span, Triangular Open-Web Truss Bridge Design -View from Abbey Lodge Car Park



Celbridge Pedestrian and Cycle Bridge: Ecological Impact Assessment

Figure 1-5: Site boundary of Proposed Development (shown in red). (Source: dhb Architects)

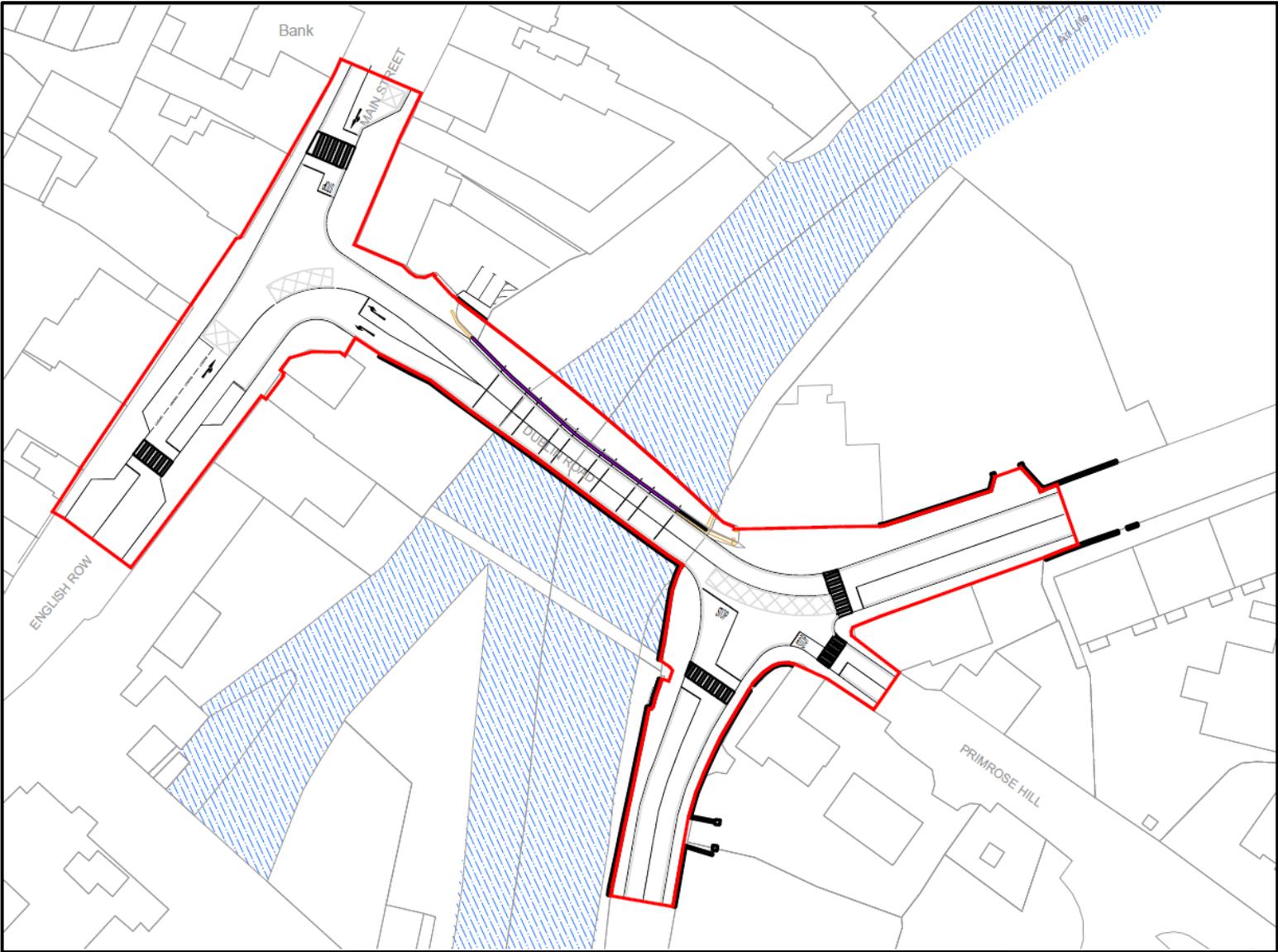


Figure 1-6: Elevation of Proposed Pedestrian and Cycle Bridge

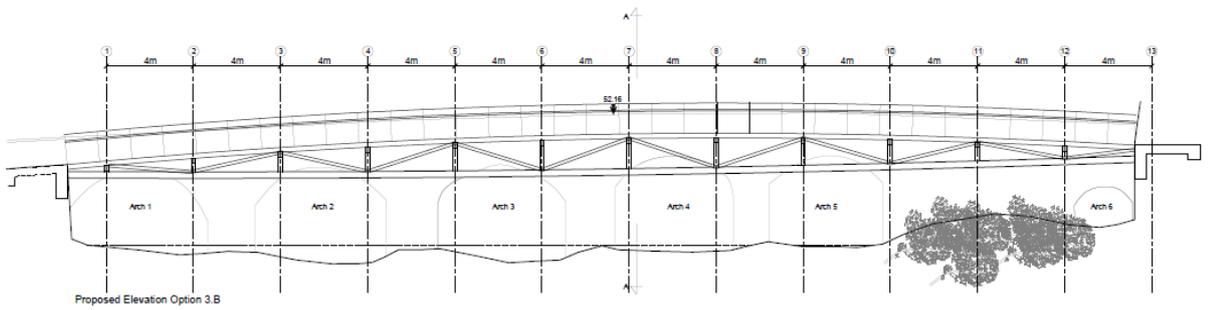
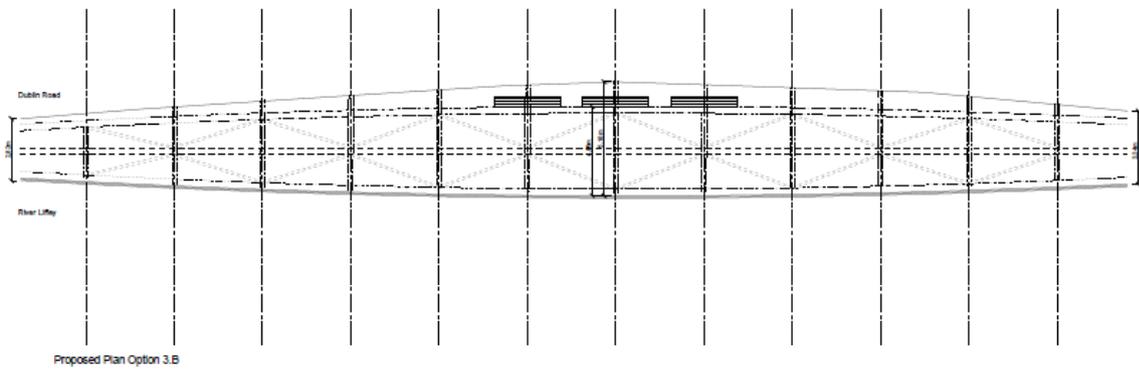


Figure 1-7: Plan of Proposed Pedestrian and Cycle Bridge



The bridge structure (see Figure 1-7) will consist of hollow-section steel inclined open-web trusses supporting purlins and a modular deck structure. The deck will consist of prefabricated planks in a non-slip, low-maintenance material.

The guarding on the river side will consist of inclined panels of security glass 1.4m high with a handrail. On the existing bridge side, the stone parapet will provide the guarding. A 75mm gap between the edge of the deck and the existing bridge will be maintained.

Benches will be provided for public amenity at the widest point of the new structure.

Lighting will consist of LED strip lighting incorporated into the new handrail and illuminating the deck. This system will meet the design requirements for respecting wildlife, especially bat habitats and will be energy efficient.

The depth of the structure (from top chord to bottom chord) will be as shallow as possible, with the depth of structure below the deck level being approximately 1.65m, to avoid obstructing the arches of the stone bridge in the event of a flood.

The river bed will not be impacted by the foundations. The works to the riverbank will be the modification of the top of the retaining walls to tie both ends of the bridge in and the construction of the abutments.

There is no proposed landscaping due to site constraints in this confined urban setting.

No excavation within the riverbed or instream works are required as the bridge will be a clear span structure over the river channel.

Approximately 20m² of permanent land take is required from the Bank of Ireland car park on the north western bank of the River Liffey – including removal of the stub wall and railing, an existing large London Plane tree and an area of planting. There are a number of willow trees on the left bank over which the pedestrian and cycle bridge will span that will need to be trimmed to a reduced height to allow for the installation of the bridge. Car parking spaces may need to be reconfigured, however, the current number of spaces can be maintained. The existing car park is approximately 350m². The 20m² required for these works is made up of approximately 17m² of flowerbed and 3m² from car parking spaces. The car park can continue to operate during the works. It is likely that a larger area of the car park would be used temporarily in order to facilitate construction of the bridge. Since October 2021 the Bank of Ireland premises is no longer operational as a bank and its future use is unknown.

Approximately 19m² of permanent land take will be required from Abbey Lodge on the south eastern bank of the River Liffey, 3.5m² of building and 15.5m² of yard – including 2.5m² of stone wall, gate, gate piers, foul manholes, an outfall from the building and gas connections to the building. These works will require the foul and gas connections to the building to be reconfigured prior to the proposed development works to disable the existing connections. The grease trap for the building will also need to be relocated in advance of the bridge works. This will both facilitate the Abbey Lodge operationally and is also likely to be required in order to install the bridge foundations. These works will take in the order of six weeks to complete.

The 3.5m² required from the building forms part of a 24m² extension to the original building. This extension currently houses customer toilets for the Abbey Lodge. However, there are alternative better quality facilities within the building and the toilets are not required for the operation of this business. In January 2020, the owners of the Abbey Lodge received planning permission from Kildare County Council (KCC) to provide a new customer entrance into the premises from this location. The existing toilets in the extension would become an entrance hallway into the building. The amendments required in order to facilitate the bridge structure would result in the front wall and new entrance doors being rebuilt along a setback line to those shown on their planning drawings.

Once constructed, the bridge deck will drain directly to the river using a crossfall across the bridge deck. All other surface water drainage will drain to the existing road drainage network.

1.4.2 Works to Existing Road Bridge

The proposed development will also require the removal of the narrow footpath on the existing road bridge, the rerouting of telecoms services and the addition of a rubbing strip kerb in lieu of the footpath at the base of the existing rubble-stone parapet wall. The existing road bridge is a protected structure.

There will be the removal of approx. 6m length x 1.1 – 1.5m high of bridge parapet wall and 2.2m return in rubble stonework (outside the Abbey Lodge) in order to allow access to the proposed pedestrian and cycle bridge on the southern side. Additionally, the 4.2m wide front wall and a 1m return of a side extension to the Abbey Lodge will be removed to facilitate access to the bridge.

On the downstream façade of the existing bridge, a Protected Structure, localised maintenance works will consist of the removal of vegetation, repointing of stonework where vegetation has been removed, and repointing of the parapet wall as required by the introduction of two new openings in the parapet wall.

No instream works or land take from within the river is required.

1.4.3 Road and Footpath Upgrades

There will be a requirement to pave and widen existing pathways along the R405 in the site boundary shown on Figure 1-5. These widened paths will be surfaced in silver granite flags.

Associated minor road works will include the realignment of kerbs at the bridge ends and the installation of a zebra crossing with belisha beacons and flashing amber signals to Main Street (outside the former Bank of Ireland building).

1.4.4 Other Associated Works

1.4.4.1 Site Investigations

As part of an advance contract, site investigations will be undertaken at the proposed locations of the two foundations for the proposed pedestrian and cycle bridge either side of the River Liffey. This will involve drilling two boreholes to inform the structural design.

1.4.4.2 Bridge Maintenance

As part of an advance contract, the existing road bridge will require localised advance maintenance works. These works will include the clearance of growth from the bridge piers and arches on the downstream façade and repointing of the stonework where required by the removal of vegetation.

Such works, which are expected to take two to three weeks, will be carried out from a floating pontoon. Scaffolding may be required on the floating pontoon and there may be a requirement for scaffolding poles to extend to the river bed.

1.4.5 Demolition

There is a 24m² single storey extension to the Abbey Lodge with a flat roof and a door to the side yard. A section of wall (approximately 4.2m wide front wall and approximately 1m of the side wall return) of the Abbey Lodge will need to be demolished and rebuilt in a new location 1m set back from the current wall line. Due to the confined space and proximity to the adjoining building and parapet wall the demolition will be undertaken using hand operated power tools. The demolition will result in the production of masonry rubble, broken glass, waste timber and debris from the flat roof, none of which will be hazardous. The resulting demolition waste will be disposed of offsite at an appropriate licensed facility.

In addition to the modification works to the Abbey Lodge building, there will be a requirement to remove 11m of wall along the road edge (comprising 5m of bridge parapet wall and 6m of wall within the Abbey Lodge yard) and 2.2m of return from the wall on the road edge to the building line. The wall to Abbey Lodge side yard is 1.43m high and 0.51m deep and the main pier is 1.47m high and 0.63 x 0.62m. There are also two smaller piers and a pedestrian gate which will be demolished. The demolition will result in the production of masonry rubble which will not be hazardous. The resulting demolition waste will be disposed of offsite at an appropriate licensed facility.

1.4.5.1 Accommodation Works to Abbey Lodge

Accommodation works to Abbey Lodge will be required to have taken place in advance of the main construction works. These would take in the order of six weeks to complete. A new grease trap, gas and foul connection would be completed prior to the existing ones being removed so the disruption to the business operations would be minimal and final accommodation works to the former Bank of Ireland car park will be required upon completion of the main bridge works.

1.4.6 Construction Methodology and Programme

1.4.6.1 Advance Contract Works

As referred to in Section 1.4.4, advance contract works will include site investigations, some localised bridge maintenance works and accommodation works to Abbey Lodge.

1.4.6.2 Main Contract Works

It is expected that the main construction works to the proposed pedestrian and cycle bridge structure will be carried out in one construction phase over an expected four month construction period commencing in 2022.

The proposed pedestrian and cycle bridge will require piled foundations for the abutments at either end, requiring excavation of approximately 2.0m x 3.0m wide and 1.5m deep on each side of the river. These will be vertical piles and will be installed from road level with no disturbance to the existing bank except for low levels of vibration. Reinforced concrete abutments will then be constructed on top of the piles prior to the installation of the bridge.

The primary truss structure will be assembled remote from the river (e.g. in the Abbey Lodge car park) and be lifted into place in one piece. The individual sections will arrive to the car park on articulated trucks in lengths of approximately 16.0m (approximately eight loads). The pieces will be assembled into the full span in the eastern side of the car park using a large mobile crane and temporary supports (approximately 10 people would be required on site to complete the assembly). On completion of the assembly of the individual segments a large mobile crane will be set up in the north of the car park. The structure will be slewed out in a counter clockwise direction over the river and positioned into its final location adjacent to the existing road bridge. As the crane will generate large point loads, it is likely that 4 sections of the existing asphalt surface will need to be removed and backfilled to an approximate depth of 1.0m with stone. This will be reinstated on completion of the works.

The piling and concrete works for the abutments of the pedestrian and cycle bridge will likely take place over the course of approximately four-six weeks. The assembly of the bridge remote from the river will likely take approximately two weeks. The lifting in of the bridge will require one day with at least one day in advance for setting up the crane. The road will likely be subject to a full closure for health and safety reasons during the crane lift due to the scale of the lift which could take up to 6 hours.

The total construction time accounting for site clearance, demolition, piling, concreting, bridge assemble, bridge installation and finishing and tying in will take in the order of four months not including the fabrication of the individual segments of the bridge itself which will be done off site. Prior to commencement of works, the compounds will be set up and traffic management measures will be put in place.

The main phases applicable to the main construction phase of this project will include:

- Establishment of site office and compounds at the former Bank of Ireland car park and the Abbey Lodge car park;
- Mobilisation of construction plant;
- Implementation of bio security measures;
- Site clearance and preparation;
- Establishment of appropriate traffic control measures to provide adequate separation and protection of work areas from live traffic on the R405;
- Excavation to formation level for foundations and footpath tie-ins;
- Establishment of the crane on site, lifting in of the bridge structure, securing of the bridge structure in place;
- Placing of secondary steel, decking and other surface features of the bridge;
- Construction of footpaths to tie-in to the bridge structure; and
- Hard landscaping works following the completion of principal bridge related works.

1.4.6.3 Temporary Construction Compound

Two temporary construction compounds will be located within the former Bank of Ireland car park and the Abbey Lodge car park.

Materials and plant required for the works are anticipated to be stored in the compounds at a minimum setback distance of 10m from the river bank. All storage areas will be appropriately bunded where required. Fuelling of plant is anticipated to be in a designated fuelling area within the compound¹. The compound will provide for the following:

- Welfare/office facilities for site staff;
- Plant/machinery parking/storage area;
- Fuel storage/refuelling area;
- Segregated waste area; and
- Construction staff parking.

1.4.7 Surface Water Management

During construction, where surface water drainage arises, it will be contained and managed to ensure no run-off from works enters either the river or the existing road network. Once constructed, the surface water drainage will drain to the existing road drainage network.

1.4.8 Environmental Management Measures

The Contractor will be required to prepare a Construction Environmental Management Plan (CEMP) and will be required to implement industry best practice pollution prevention measures in accordance with guidance documents (for example CIRIA Guideline Document C532 Control of Water Pollution from Construction Sites) during construction in order to control the risk of pollution to surface waters.

1.5 Operational Phase

Once the proposed development is constructed, there will be no further activities required for the operation of the proposed development. The pedestrian and cycle bridge and upgraded footpaths will form part of the transport network in Celbridge. There will be a requirement for ongoing maintenance such as cleaning or repairs and replacement of lighting associated with the new pedestrian and cycle bridge and the belisha beacons and flashing amber signals of the zebra crossing.

¹ Whilst the implementation of such measures will assist in minimising impacts on the local environment, the implementation of these measures has not been taken into consideration in Appropriate Assessment Screening report when reaching a conclusion as to the likely impact of the proposed development on European sites.

2 Methodology

2.1 Relevant Policy and Legislation

This report has been prepared with regards to the following legislation, policy documents and guidelines as relevant:

- CIEEM (2017) Guidelines for Ecological Report Writing. Chartered Institute of Ecology and Environmental Management, Winchester;
- CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester;
- DoEHLG (2010) Appropriate Assessment of Plans and Projects in Ireland Guidance for Planning Authorities. Department of the Environment, Heritage and Local Government;
- European Communities (2000) Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg. European Commission;
- EC (2021) Assessment of plans and projects in relation to Natura 2000 sites - Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg;
- EC (2007) Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission. European Commission;
- EC (2013) Interpretation Manual of European Union Habitats. Version EUR 28. European Commission;
- EPA (2017) Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports. Environmental Protection Agency;
- EPA (2003), Advice Notes on current practice in the preparation of Environmental Impact Statements. Environmental Protection Agency;
- Fossitt, J., 2000. A Guide to Habitats in Ireland. The Heritage Council, Kilkenny;
- HA (2001) DMRB Volume 10 Section 4 Part 4 - Ha 81/99 - Nature Conservation Advice in Relation to Otters. The Highways Agency;
- National Parks and Wildlife Service (NPWS) (2013) The Status of EU Protected Habitats and Species in Ireland. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland;
- NPWS (2014) Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters. Department of Arts, Heritage and Gaeltacht.
- NRA (2008) Environmental Impact Assessment of National Road Schemes – A Practical Guide Rev. 1. National Roads Authority;
- NRA (2009) Guidelines for the Assessment of Ecological Impacts of National Road Schemes Rev. 2. National Roads Authority;
- NRA (2008) NRA Guidelines on Ecological Surveying Techniques for Protected Flora and Fauna on National Road Schemes). National Roads Authority; and
- NRA Environmental Assessment and Construction Guidelines (both adopted and draft versions).

This EclA was also completed in accordance with the following legislation:

- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Habitats Directive) and Directive 2009/147/EC (codified version of Directive (79/409/EEC as amended (Birds Directive)) – transposed into Irish law as European Communities (Birds and Natural Habitats) Regulations 2011;
- European Communities (Environmental Impact Assessment) Regulations, 1989 to 2006;

- European Communities (Environmental Liability) Regulations, 2008 (S.I. No. 547 of 2008);
- European Communities (Quality of Salmonid Waters) Regulations, 1988 (S.I. No. 84 of 1988);
- Flora Protection Order, 2015;
- Planning and Development Act, 2000 (as amended);
- Roads Acts 1993 to 2007(as amended);
- Water Framework Directive (2000/60/EC); and
- Wildlife Acts.

2.2 Study Area and Zone of Influence

Determination of this project's Zone of Influence (Zoi) was achieved by assessing all elements of the proposed project against the ecological features within the project footprint, in addition to all ecological receptors that could be connected to and subsequently impacted by the project through impact pathways. To this end, the Zoi extends outside of the proposed pedestrian and cycle bridge footprint to include ecological features connected to the project through proximity and connectivity through features such as watercourses. Following consideration of the characteristics of the proposed works, as described in Section 1.3 and Section 1.4, the Zoi for significant impacts to fauna is considered to extend no more than 150m from the proposed development to take account of disturbance during construction. The aquatic ecology desk top study area encompassed the entire reach of the River Liffey.

2.3 Desk Study

The following sources of published material were consulted as part of the desk study for the EclA:-

- Review of the National Parks & Wildlife Service (NPWS) natural heritage database for designated areas of ecological interest and sites of nature conservation importance within and adjacent to the study area;
- Review of Ordnance Survey maps and ortho-photography;
- Review of the National Biodiversity Data Centre (NBDC) database² for records of rare and protected species within a 2km radius of the proposed development site, including:
 - Annex I habitats, Annex II species and their habitats, and Annex IV species and their breeding sites and resting places (wherever they occur) as identified in the EU Habitats Directive;
 - The presence of species of flora and fauna as identified and strictly protected under the European Communities (Birds and Natural Habitats) Regulations, 2011; and
 - Species of fauna and flora which are protected under the Wildlife Acts, 1976-2000 'Protected species and natural habitats' as defined in the Environmental Liability Directive (2004/35/EC) and European Communities (Environmental Liability) Regulations, 2008;
- Review of the Kildare County Development Plan 2017-2023;
- Review of the Celbridge Local Area Plan 2017-2023;
- 1:50,000 Ordnance Survey (OS) Map; Discovery Series;
- Environmental Protection Agency mapping (<https://gis.epa.ie/EPAMaps/>);
- Environmental Impact Assessment Portal (<https://www.housing.gov.ie/planning/environmental-assessment/environmental-impact-assessment-eia/eia-portal>);
- Celbridge Biodiversity Action Plan 2021-2025; ;
- RPS (2015) Celbridge River Crossing Feasibility Report;
- NTA & CSEA (2019) Celbridge Liffey Crossing - Pedestrian and Cycle Improvements - Options Report;
- NTA & CSEA (2019) Celbridge Liffey Crossing - Pedestrian and Cycle Bridge - Options Report; and
- NTA & CSEA (2021) Celbridge Liffey Crossing - Pedestrian and Cycle Bridge - Options Selection Report.

² Search undertaken on 08/11/2021

2.4 Field Surveys

A walkover survey of the site of the proposed development was carried out by ecologist Ms Karen Banks on 10th of September 2019 and 13th of June 2021. A further walkover survey by an aquatic ecologist was undertaken on 22nd October 2019.

Areas highlighted during the desktop assessment, for example, the riparian zone of the River Liffey, were investigated further, and a habitat survey was carried out. Habitats on site were classified in accordance with the Heritage Council publication 'A Guide to Habitats in Ireland' (Fossitt, 2000). The classification is a standard scheme for identifying, describing and classifying wildlife habitats in Ireland. The classification is hierarchical and operates at three levels, using codes to differentiate habitats based on the plant species present. Species recorded in this report are given both their Latin and common names, following the nomenclature as given in the 'New flora of the British Isles' (Stace, 2010).

A survey for invasive species was also conducted during the ecology walkover surveys in September 2019 and June 2021 and also during the aquatic survey undertaken in October 2019 (see Section 2.4). These surveys included the identification and mapping of Invasive Alien Species (IAS). This survey was conducted in accordance with the NRA publication "Guidelines for the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads".

The site walkovers undertaken in 2019 and 2021 also included an assessment of the presence, or likely presence, of protected species. The survey was conducted in accordance with the standard protected species survey guidelines contained in the National Roads Authority publication 'Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes' (2008). The surveys were conducted for areas of habitat that might support birds or protected mammals in addition to recording any field signs, such as well-used pathways, droppings, places of shelter and features or areas likely to be of particular value as foraging resources. Any badger setts present were recorded during the site walkover, along with potential pine marten den sites and otter holts. In addition, the suitability of the habitat for pygmy shrew, hedgehog, hares, Irish stoat, pine marten, amphibians and invertebrates were recorded.

2.4.1 Bat Survey

A preliminary bat roost assessment was undertaken on 10th September 2019 and 13th June 2021 in accordance with the following guidelines:-

- Bat Conservation Ireland, (2010). *Guidance notes for Planners, Engineers, Architects, and Developers*;
- BTHK. (2018). *Bat Roosts in Trees – A Guide to Identification and Assessment for Tree-Care and Ecology Professionals*. Pelagic Publishing, Exeter UK;
- Collins, J. (ed.) (2016). *Bat Surveys for Professional ecologists: Good Practice Guidelines (3rd ed.)*. The Bat Conservation Trust, London; and
- Kelleher, C. & Marnell, F. (2006). *Bat Mitigation Guidelines for Ireland*.

2.4.1.1 Preliminary Roost Assessment

Trees

The trees within the footprint of proposed site and accessible areas of the banks of the River Liffey within 150m of the proposed site were surveyed for potential roost sites and signs of bats. A detailed inspection of the exterior of trees was undertaken to look for features that bats could use for roosting (Potential Roost Features, or PRFs) from ground level. The aim of the survey was to determine the actual or potential presence of bats and the need for further survey and/or mitigation.

A detailed inspection of each tree within the site was undertaken. The inspection was carried out in daylight hours from ground level, and information was compiled about the tree, PRFs and evidence of bats. All trees,

or groups of trees, with PRFs were numbered and a description of each PRF observed was recorded. PRFs that may be used by bats include:

- Rot holes;
- Hazard beams;
- Other horizontal or vertical cracks or splits (e.g. frost cracks) in stems or branches;
- Lifting bark;
- Knotholes arising from naturally shed branches or branches previously pruned back to the branch collar;
- Man-made holes (e.g. flush cuts) or cavities created by branches tearing out from parent stems;
- Cankers in which cavities have developed;
- Other hollows or cavities;
- Double leaders forming compression forks with included bark and potential cavities;
- Gaps between overlapping stems or branches;
- Partially detached ivy with stem diameters in excess of 50mm; and
- Bat or bird boxes.

Signs of a bat roost (excluding the actual presence of bats), include:

- Bat droppings in, around or below a PRF;
- Odour emanating from a PRF;
- Audible squeaking at dusk or in warm weather; and
- Staining below the PRF.

It should be noted that bats or bat droppings are the only conclusive evidence of a roost and many roosts have no external signs. This survey and evaluation was undertaken at ground level. Trees were categorised according to the highest suitability PRF present. The criteria for categorisation of suitability for bats is described further in Table 2-1.

Structures

The existing footbridge and road bridge at the proposed site were subject to a visual inspection for evidence of, and potential for bats. The exterior of the structures was visually assessed for potential bat access points and evidence of bat activity using binoculars, a high powered torch and an endoscope where appropriate (Explorer Premium 8803 with 9mm camera). Features such as crevices and small gaps in the bridge structure, such as between the stone work, which had potential as bat access points into the bridge were inspected. Evidence that these features/ access points were actively being used by bats includes staining within the gaps, urine staining and bat droppings. Indicators that potential access points are not actively used by bats include general detritus and cobwebs within the access point. A note of potential features used by bats was made where present.

Table 2-1: Suitability of Habitats for Bats

Suitability	Description: Roosting Habitats	Commuting and Foraging Habitats
Negligible	Negligible habitat features on site likely to be used by roosting bats.	Negligible habitat features on site likely to be used by commuting or foraging bats.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e.	Habitat that could be used by small numbers of commuting bats such as gappy hedgerow or un-vegetated stream, but isolated, i.e., not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone

Suitability	Description: Roosting Habitats	Commuting and Foraging Habitats
	unlikely to be suitable for maternity or hibernation). A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential.	tree (not in a parkland situation) or a patch of scrub.
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only- the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.	Continuous, high quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland. Site is close to and connected to known roosts.

2.4.2 Otter Survey

Otter surveys were conducted on 10th of September 2019 and 13th of June 2021 at the footprint of the proposed site and for a distance of c.150m upstream and downstream of the proposed site.

The river banks were searched for field signs including:

- Sleeping and resting places including holts, couches and natal dens;
- Breeding sites;
- Spraints;
- Pathways/ trails;
- Slides;
- Hairs;
- Footprints; and
- Food remains.

Natal dens tend to be well hidden and therefore can be hard to locate. Survey for natal dens was undertaken by searching for field signs including:

- A heavily used path or paths from the water into dense cover or an enclosed structure;
- Bedding within the structure which may consist of grass, ferns or reeds (bedding may also be present in other types of resting places);
- A latrine containing a large number of spraints at the den or within 2m of it (however, it is important to note that there are often no droppings at a natal den as the female will excrete in the water to ensure that there are no signs of occupation near the natal den);
- A cub play area which may be a well-worn area around a tree or on a bank; and
- Different sized otter prints.

2.5 Aquatic Ecology

An aquatic ecology site visit was undertaken on 22nd October 2019. A kick sample and site specific survey for salmonids and lamprey at the proposed site was not possible on the day of survey owing to flood conditions and coloured water. A visual inspection from the river bank at the proposed site was undertaken by an experienced aquatic ecologist (Ms Letizia Cocchiglia) on 22nd October 2019 and a detailed desk top assessment was undertaken. The fisheries potential is well known within the River Liffey and has been sampled by IFI. In addition, an EPA WFD monitoring site is located at Celbridge beside the proposed footbridge. This site has been regularly sampled by the EPA and a Q-value assigned since the 1970's to 2019. This information supplied by both IFI and the EPA has been used to inform the aquatic report and characterise the habitat, along with the expertise of the aquatic ecologist (Ms Letizia Cocchiglia).

2.5.1 Macroinvertebrate Survey

2.5.1.1 Q-value

As noted above, it was not possible to undertake macroinvertebrate sampling at the proposed site due to flood conditions at the time of survey. However, EPA data on Q-values is available for the proposed site, therefore, the methodology for Q-value assignment is provided here for context.

Q-values and water quality classes are assigned using a combination of habitat characteristics and the structure of the macroinvertebrate community within the waterbody. Individual macroinvertebrate taxa are ranked for their sensitivity to organic pollution and the Q-value is determined based on their relative abundance within a sample and reflects the average water quality at a location.

The Environmental Quality Ratio (EQR) represents the relationship between the values of the biological parameters observed for a body of surface water and the values for these parameters in the reference conditions applicable to that body. The ratio is expressed as a value between zero and one, with high ecological status represented by values close to one and bad ecological status by values close to zero. In Ireland it is calculated as Observed Q-value/Reference Q-value (i.e., Q5). The EQR allows comparison of water quality status across the European Union as each Member State has an EQR value for 'High'; 'Good' etc., based on an intercalibration of boundaries between water quality categories e.g., 'High-Good'.

The Q-value is assigned on a scale of 1 to 5 with a Q5 representing high quality pristine conditions and a Q1 representing bad seriously polluted conditions. The intermediate values (Q1-2, 2-3, 3-4 etc.) denote transitional conditions. The scheme mainly reflects the effects of organic pollution (i.e. deoxygenation and eutrophication) but where a toxic effect is apparent or suspected the suffix '0' is added to the biotic index (e.g. Q1/0, 2/0 or 3/0). An asterisk after the Q value (e.g. Q3*) indicates heavy siltation of the substratum.

EPA indices, EPA water quality status and Water Framework Directive (WFD) status are interpreted in Table 2-2.

Table 2-2: EPA Biotic Index (Q-value) and Equivalent WFD Water Quality Status Classes

Biotic Index	EQR ³	EPA Quality Status	WFD ⁴ Status
Q5	1.0	Unpolluted	High
Q4-5	0.9	Unpolluted	High
Q4	0.8	Unpolluted	Good
Q3-4	0.7	Slightly Polluted	Moderate
Q3	0.6	Moderately Polluted	Poor
Q2-3	0.5	Moderately Polluted	Poor
Q2	0.4	Seriously Polluted	Bad
Q1-2	0.3	Seriously Polluted	Bad
Q1	0.2	Seriously Polluted	Bad

(colour coding as employed under the WFD as specified in Schedule 3 of S.I. No 272 of 2009: High – blue, Good – green, Moderate – yellow, Poor – orange, and Bad – red)

INDICATOR GROUP
Group A - Very Pollution Sensitive
Group B - Moderately Pollution Sensitive
Group C - Moderately Pollution Tolerant
Group D - Very Pollution Tolerant
Group E - Most Pollution Tolerant

2.5.2 Habitat Assessments

A habitat assessment was not possible due to the high colour from the flood event. As noted previously, a habitat rating is assigned based on the professional experience and knowledge of the aquatic ecologist and a detailed desktop review; the methodology for the basis of these ratings is presented below.

The habitat assessment would include surveys for a general river habitat survey, crayfish/lamprey/salmonid habitat potential and invasive aquatic species. The general physical characteristics and hydromorphological features of each site would be recorded including substrate, flow types and aquatic vegetation during surveys. All sites would be assessed in terms of:

- Stream width and depth;
- Substrate type, listing substrate fractions in order of dominance;
- Flow type, listing prevalence of flow types in the area;
- Instream vegetation, listing plant species occurring and their percentage coverage of the stream bottom at the sampled area;

³ EQR = Environmental Quality Ratio (Observed/Reference)

⁴ WFD = Water Framework Directive (EPA, 2006)

- Dominant bankside vegetation, listing the main species overhanging the watercourse;
- Estimated cover by bankside vegetation, and estimated shading of the sampling site, and
- The degree of siltation recorded on a scale of clean, slight, moderate and heavy, prior to kick sampling.

The rating of habitat for salmonids, crayfish and lamprey is on a scale of None/Poor/Fair/Good/Very Good/Excellent. This rating assesses the physical suitability of the habitat; the presence/ absence/ density of the species in question will also depend on present and historical water quality and accessibility of the section to these species.

A rating of:

- **'None'** indicates that the ecologist carrying out the assessment regards it as impossible that the watercourse could support the species in question in the relevant life stage.
- **'None – Poor'** indicates that it is regarded as possible but extremely unlikely that the stream could support the species in the relevant life stage.
- **'Fair'** indicates that it is possible that the stream section could support the species in question.
- **'Good'** indicates that the ecologist considers it possible and likely that the stream could support the species in question.
- **'Very Good'** indicates that the stream certainly could support the species.
- **'Excellent'** indicates that the ecologist regards the stream as the ideal habitat for the species in question.

2.5.2.1 Criteria used for Assessment of White-clawed Crayfish Habitat Quality

The habitat quality rating for white-clawed crayfish is assigned based on the professional experience and knowledge of the aquatic ecologist and a detailed desktop review; the methodology for the basis of assessment is detailed in the following paragraphs.

Assessment of the quality of crayfish habitat is based on published information on the habitat criteria for crayfish (Holdich 2003, Peay 2002 and Peay 2003) as well as the surveyor's personal experience in aquatic sampling and research. The white-clawed crayfish occurs in areas with relatively hard, mineral-rich waters on calcareous and rapidly weathering rocks. Crayfish are found in a wide variety of environments, including canals, streams, rivers, lakes, reservoirs and water-filled quarries and are typically found in watercourses 0.75 m to 1.25 m deep, but the species may occur in very shallow streams (about 5 cm of water) and in deeper, slow-flowing rivers (2.5 m). They occupy cryptic habitats under rocks and submerged logs, among tree roots, algae and macrophytes, although they usually emerge to forage. Juveniles, in particular may also be found among cobbles and detritus such as leaf litter. Adults may burrow into suitable substrates, particularly in the winter months. The presence of juveniles and a varied size range of adults are indicative of a breeding population.

White-clawed crayfish may be found associated with:

- Undermined, overhanging banks;
- Sections exhibiting heterogeneous flow patterns with refuges;
- Under cobbles (juveniles) and rocks in riffles, and under larger rocks in pools;
- Among roots of woody vegetation, accumulations of fallen leaves and boulder weirs;
- Under water-saturated logs;
- Slow-flowing glides and pools (provided there are refuges), localised velocity of 0.1m/s or less;
- Loose boulders (>25cm) or other similarly sized material;
- Boulders or large cobbles in groups with crevices between them;
- Deep crevices in bedrock;
- Underlying substrate of fine gravel/sand with some pebbles;

- Submerged refuges in stable banks (e.g., natural crevices, stone block reinforcement or stable slightly undercut banks with overhanging vegetation, large tree roots, etc);
- Unmortared stone revetting which protects banks from erosion; and
- Stands of submerged and emergent aquatic plants.

2.5.2.2 *Criteria used for Assessment of Lamprey Habitat Quality*

The habitat quality rating for lamprey species is assigned based on the professional experience and knowledge of the aquatic ecologist and a detailed desktop review; the methodology for the basis of assessment is detailed in the following paragraphs.

Each surveyed location would be rated for its quality to support lamprey. Assessment of the quality of lamprey habitat is based on published information on the habitat criteria for lamprey (Maitland, 2003) as well as the surveyor's personal experience in lamprey sampling. General habitat requirements are discussed for the three lamprey species that occur in Ireland (river, brook and sea lamprey). Lamprey habitat preferences change with the stages of their life cycle. They show a preference for gravel-dominated substratum for spawning similar to salmonids. After hatching, lamprey larvae (ammocoetes) swim or are washed downstream by the current to areas of sandy silt in still or slow flowing water where they burrow and spend the next few years in tunnels. Lampreys therefore require mainly silt and sand dominated substratum for nursery habitat. Other important environmental characteristics for optimal ammocoete habitat are shallow waters with low velocity, and the presence of organic detritus.

Suboptimal habitat supporting only a few individuals may consist of a few square centimetres of suitable silt in an open, comparatively high-velocity, boulder-strewn streambed.

The following summarises the ecological requirements of lamprey:

- Spawning habitat is broadly similar to that favoured by salmonids. Usually occurs at the tails of pools where the gravels have been deposited from upstream and the scouring of pools but the current is still reasonably fast with some water flow through the substrate;
- Larval nursery beds are at the edges of streams and rivers, well away from the main current, and that the current over them is often not only very slow, but is actually a backwater in reverse of the main current;
- Water depth in nursery areas is typically 0.1 to 0.5 m with silty/sandy substrate;
- Channelization can be damaging to lampreys, mainly through destruction of their habitat. The removal of areas of riffle and associated spawning gravels, and the dredging of essential nursery silt beds, may entirely eliminate lampreys from a river; and
- Dams/weirs can be obstacles to upstream migration of sea lamprey.

2.5.2.3 *Criteria used for Assessment of Salmonid Habitat Quality*

The habitat quality rating for salmonids is assigned based on the professional experience and knowledge of the aquatic ecologist and a detailed desktop review; the methodology for the basis of assessment is detailed in the following paragraphs.

Assessment of the quality of salmonid (salmon and trout) spawning, nursery and adult habitat is based on published information on the habitat criteria of salmonids (Bjorn & Reiser 1991, Hendry & Cragg-Hine 2003), water quality criteria listed in the Salmonid Regulations and the surveyor's personal experience in fish sampling and research. Habitat features important to the lifecycle of salmonids include; stream width, depth, flow type, substrate type, vegetation cover, gradient and altitude. These habitat requirements can vary during the life stages of salmonids and the proximity of juvenile habitat to spawning gravels may be significant to their utilisation. The more diverse the stream habitat in terms of substrate, flow rate, depth,

riparian vegetation, light conditions etc., the richer the biological community is likely to be, and the more suitable it is likely to be for salmonids.

The presence of overturned gravels lighter in colour compared to the rest of surrounding substrate is used to indicate the presence of salmonid redds. Excessive fine sediment can be detrimental to the survival of eggs by limiting the amount of dissolved oxygen to diffuse across the egg membrane. The presence of 10% fine sediment can reduce egg survival to hatching to 43% (Cocchiglia et al., 2012). Fine sediment content of substrate is assessed visually and high levels present indicate reduce spawning habitat quality.

Permanent stream structures such as culverts, dams, bridge abutments, perched aprons and weirs can present an obstacle to upstream migration to spawning sites. Salmon can surmount obstacles 2–3 m high, providing there is an adequate pool in front of the obstruction. The presence of obstacles is also considered during a habitat survey as well as cumulative impact of many small obstacles.

The habitat rating assigned applies to the salmonid species *Salmo salar* which is considered to be more sensitive and less tolerant of pollution than *Salmo trutta*. Optimal habitat for brown trout is noted.

The following summarises ecological requirement of salmonids:

- Salmon spawning is likely to occur where the gradient of a river is 3% or less;
- Typical spawning sites are the transitional areas between pool and riffle where flow is accelerating and depth decreasing, where gravel of suitable coarseness is present and interstices are kept clean by up-welling flow;
- Salmon fry and parr occupy shallow, fast-flowing water with a moderately coarse substrate with cover;
- Deep or slow-moving water, particularly when associated with a sand or silt substrate, does not support resident juvenile salmonids;
- Suitable cover for juveniles includes areas of deep water, surface turbulence, loose substrate, large rocks and other submerged obstructions, undercut banks, overhanging vegetation, woody debris lodged in the channel, and aquatic vegetation;
- Adults require holding pools immediately downstream of spawning gravels in which they can congregate prior to spawning;
- Cover for adult salmon waiting to migrate or spawn can be provided by overhanging vegetation, undercut banks, submerged vegetation, submerged objects such as logs and rocks, floating debris, deep water and surface turbulence; and
- EPA Q-value of Q4 or higher.

Water Quality Criteria within the Salmonid Regulations S.I. 293/1988:

- pH $\geq 6 \leq 9$;
- Dissolved Oxygen ≥ 9 mg/l (50% off the time);
- Temperature downstream of point thermal discharge not exceed (a) 21.5°C or (b) 10°C from 1st Nov to 30th Apr during reproductive season; and
- Sediment ≤ 25 mg/l (annual average).

2.5.2.4 Compliance with the Water Framework Directive (2000/60/EC)

The potential for the proposed development to impact upon water quality is assessed in the context of the EU WFD (Directive 2000/60/EC). The WFD established a framework for the management of water resources throughout the EU. The WFD overarching goal is to achieve at least good ecological status and good chemical status for all surface waters by 2015, or by 2021/2027 via extended deadlines. The WFD aims are specified in Article 1:

- Prevent further deterioration and protect and enhance the status of aquatic ecosystems and associated wetlands;
- Promote the sustainable consumption of water;
- Reduce pollution of waters from priority substances and phasing out of priority hazardous substances;
- Prevent the deterioration in the status and to progressively reduce pollution of groundwater; and
- Contribute to mitigating the effects of floods and droughts.

The WFD established four core environmental objectives to be achieved for surface waters which include rivers, lakes, transitional and coastal waters (out to 1 nautical mile):

- Prevent deterioration;
- Protect, enhance and restore good status by 2015;
- Protect and enhance artificial and heavily modified water bodies (aim to achieve Good Ecological Potential and good surface water chemical status); and
- Progressively reducing pollution from priority substances and ceasing or phasing out emissions, discharges and losses of priority hazardous substances.

Environmental objectives are set for each water body in the River Basin Management Plan for Ireland 2018 – 2021 and are based on scientific evidence, extensive surface water quality monitoring, and risk characterisation undertaken by the EPA. The target in most cases is for a river to be of at least good status (Q4).

2.6 Impact Assessment Criteria

The information gathered from desk study and survey has been used to make an ecological impact assessment (EclA) of the proposed development upon the identified ecological features. The EclA has been undertaken following the methodology set out in CIEEM (2018). EclA is based upon a source-pathway-receptor model, where the source is defined as the individual elements of the proposed development that have the potential to affect identified ecological features. The pathway is defined as the means or route by which a source can affect the ecological features. An ecological feature is defined as the species, habitat or ecologically functioning unit of natural heritage importance. Each element can exist independently, however an effect is created where there is a linkage between the source, pathway and feature.

A significant effect is defined in CIEEM (2016) as:

“an effect that either supports or undermines biodiversity conservation objectives for ‘important ecological features’.... or for biodiversity in general”.

Further, BS 42020:2013 states that if an effect is sufficiently important to be given weight in the planning balance or to warrant the imposition of a planning condition, e.g. to provide or guarantee necessary mitigation measures, it is likely to be “significant” in that context at the level under consideration. The converse is also true: insignificant effects would not warrant a refusal of permission or the imposition of conditions.

The geographical reference used for ecological valuation follows NRA (2009) *Guidelines for the Assessment of Ecological Impacts of National Road Schemes Rev. 2.*, as detailed in Appendix A.

Ecological features might also be important because they play a key functional role in the landscape as ‘stepping stones’ for migratory species to move during their annual migration cycle, as well as for species to

move between sites, to disperse populations to new locations, to forage, or move in response to climate change.⁵ Features of lower ecological value are not assessed.

2.7 Survey Constraints

Terrestrial Ecology

All terrestrial ecology surveys were undertaken within the appropriate timeframes and in suitable conditions. No constraints on terrestrial ecology survey information gathered to inform this EclA are noted.

Aquatic Ecology

As noted in Section 2.5, an aquatic ecology site visit was undertaken on 22nd October 2019. A kick sample and site specific survey for salmonids and lamprey at the proposed site was not possible on the day of survey owing to flood conditions and coloured water. A visual inspection from the river bank at the proposed site was undertaken by an experienced aquatic ecologist (Ms Letizia Cocchiglia) on 22nd October 2019 and a detailed desk top assessment was undertaken. The fisheries potential is well known within the River Liffey and has been sampled by IFI. In addition, an EPA WFD monitoring site is located at Celbridge beside the proposed pedestrian and cycle bridge. This site has been regularly sampled by the EPA and a Q-value assigned since the 1970's to 2019. This information supplied by both IFI and the EPA has been used to inform the aquatic assessment and characterise the habitat, along with the expertise of the aquatic ecologist (Ms Letizia Cocchiglia). In view of the availability of high quality desk top information for the proposed site and its environs, no significant constraints on aquatic ecology survey information gathered to inform this EclA are noted.

⁵ Ref Article 10 of the Habitats Directive: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31992L0043:EN:HTML>

3 Receiving Environment

3.1 Designated Sites

A review of European designated sites within a 5km radius of the proposed development was undertaken (www.npws.ie). Special Areas of Conservation (SACs) are sites of international importance due to the presence of Annex I habitats and / or Annex II species listed under the EU Habitats Directive. Special Protection Areas (SPAs) are designated for birds based on the presence of internationally significant populations of listed bird species.

A review of nationally designated sites was also undertaken. Natural Heritage Areas (NHAs) are sites deemed to be of national ecological importance and are afforded protection under the Wildlife Acts. The proposed Natural Heritage Area (pNHA) have not been statutorily proposed or designated, however they do have some protection under agri-environmental farm planning schemes such as Rural Environment Protection Scheme (REPS 3 and 4) and Agri Environmental Options Scheme (AEOS), Forest Service requirement for NPWS approval for afforestation grants in pNHA lands and recognition of the value of pNHAs by Planning and Licensing Authorities.

There is one European site within 5km of the proposed site. The proposed site is located c.4.07km south-west of Rye Water Valley/ Carton SAC and pNHA. A review of nationally designated sites indicates that there are no Natural Heritage Areas within 5km of the proposed development. There are four proposed Natural Heritage Area (pNHAs) within 5km of the proposed development, the closest of which is the Grand Canal, which is located c.2.6km to the south-east of the proposed site. As noted previously, Rye Water Valley/ Carton SAC is also designated as a pNHA. A list of designated sites recorded within 5km of the proposed development is presented in Table 3-1. European Sites and proposed Natural Heritage Areas are illustrated in Figure 3-1.

A Screening for Appropriate Assessment Report (RPS, 2021) addressing likely significant effects on European designated sites (SACs and SPAs) within a 15km radius of the proposed development is provided as a separate report with the current planning application.

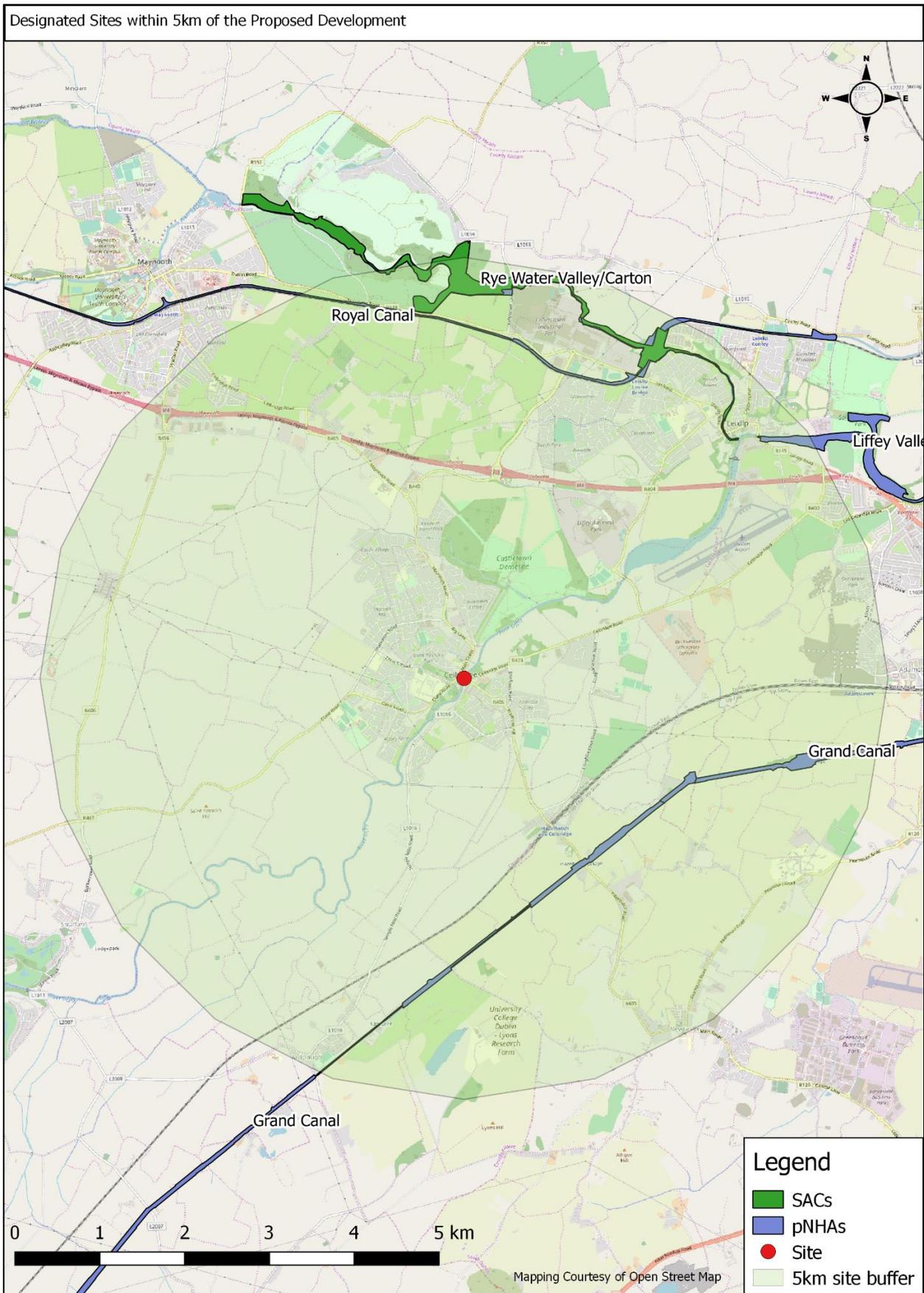
Table 3-1: International and National Designated Sites within 5km of the Proposed Pedestrian Bridge

Site Name and Code	Qualifying Interests/ Conservation Interest	Distance from Proposed Works (km) ⁶	Connectivity
Rye Water Valley/ Carton SAC and pNHA (001398)	Petrifying springs with tufa formation (Cratoneurion)* [7220] Narrow-mouthed Whorl Snail (<i>Vertigo angustio</i>) [1014] Desmoulin's Whorl Snail (<i>Vertigo moulinsiana</i>) [1016]	4.07km	This SAC is located on the Rye Water River, which flows into the River Liffey c.4.8km downstream of the proposed site therefore there is no potential for transport of deleterious substances in surface water from the proposed site to this SAC and pNHA. Both the proposed site and this SAC are within the Dublin Ground

⁶ Distance measured “as the crow flies”

Site Name and Code	Qualifying Interests/ Conservation Interest	Distance from Proposed Works (km) ⁶	Connectivity
			Waterbody; there is potential remote hydrogeological connectivity
Liffey Valley pNHA (000128)	The Liffey Valley site is situated along the River Liffey between Leixlip Bridge on the Kildare-Dublin border and downstream of the weir at Glenaulin, Palmerstown, Co. Dublin. The river is a Salmon river and there are a series of weirs along the river between Palmerstown and Leixlip. The site is important because of the diversity of the habitats within the site, ranging from aquatic to terrestrial. A number of rare and threatened plant species have been recorded from the site.	4.5km	5.1km downstream
Royal Canal pNHA (002103)	The Royal Canal is a man-made waterway linking the River Liffey at Dublin to the River Shannon near Tarmonbarry. A number of different habitats are found within the canal boundaries - hedgerow, tall herbs, calcareous grassland, reed fringe, open water, scrub and woodland. The ecological value of the canal lies more in the diversity of species it supports along its linear habitats than in the presence of rare species. It crosses through agricultural land and, therefore, provides a refuge for species threatened by modern farming methods.	3.8km	There is no connectivity via surface water, groundwater or any other pathway
Grand Canal pNHA (002104)	The Grand Canal is a man-made waterway linking the River Liffey at Dublin with the Shannon at Shannon Harbour and the Barrow at Athy. A number of different habitats are found within the canal boundaries - hedgerow, tall herbs, calcareous grassland, reed fringe, open water, scrub and woodland. The ecological value of the canal lies more in the diversity of species it supports along its linear habitats than in the presence of rare species. It crosses through agricultural land and therefore provides a refuge for species threatened by modern farming methods.	2.6km	There is no connectivity via surface water, groundwater or any other pathway

Figure 3-1: European and Nationally Designated Sites within 5km of the Proposed Works, Celbridge



3.2 Terrestrial Ecology

3.2.1 Habitats

A description of the habitats recorded at the proposed site is presented below.

3.2.1.1 Buildings and Artificial Surfaces (BL3)

The proposed development is located in the centre of the town of Celbridge. As such, built land is the predominant habitat present in the form of roads, domestic dwellings and businesses.

One London Plane (*Platanus x hispanica*) tree has been planted within the car park of the former Bank of Ireland to the north of the River Liffey.

3.2.1.2 Lowland Depositing Rivers (FW2)

The proposed pedestrian and cycle bridge will cross the River Liffey. The banks of the River Liffey (FW2) are lined by riparian woodland (WN5) comprising Grey Willow (*Salix cinerea*), Alder (*Ulnus glutinosa*), Sycamore (*Acer pseudoplatanus*), Ash (*Fraxinus excelsior*) and Weeping Willow (*Salix x sepulcralis*). Herbs present on the river banks include Nettle (*Urtica dioica*), Yellow Iris (*Iris pseudacorus*), Creeping Buttercup (*Ranunculus repens*), Water Mint (*Mentha aquatica*), Willowherb (*Epilobium* spp) and locally abundant Bramble (*Rubus fruticosus* agg.).

The habitats recorded within the site and their conservation value are summarised in Table 3-2.

The aquatic ecology of the River Liffey at the proposed site is described in Section 3.3.

Table 3-2: Habitats Present within the Proposed Scheme Area

Habitat	Conservation Evaluation ⁷	Rationale
Buildings and artificial surfaces (BL3)	Negligible	The built land present in the study area is of little value to wildlife.
Lowland Depositing River (FW2)	Local Interest (Higher Value)	The River Liffey provides suitable habitat for a range of terrestrial and aquatic flora and fauna, including otter, salmonids and lamprey.
Riparian woodland (WN5)	Local Interest (Higher Value)	The riparian woodland provides suitable habitat for foraging and commuting bats, otter and bird species.

3.2.2 Species

This section describes the species that have been recorded historically within 2km of the proposed development, species recorded during the site surveys and also the potential for the proposed site to support protected species. Species records extracted from the National Biodiversity Data Centre (NDBC) database are included in Appendix B.

3.2.2.1 Amphibians

The NBDC hold records of common frog from the vicinity of the proposed development, last recorded in 2020 c.1km south-east of the site. There is potential for amphibians to shelter in areas of long vegetation on the banks of the River Liffey. There is no suitable breeding habitat for amphibians within the footprint of the proposed development, however, areas of still water around the Mill Centre, located c.100m to the south-

⁷ In accordance with NRA (2009) Guidelines for the Assessment of Ecological Impacts of National Road Schemes Rev. 2. National Roads Authority

west of the site, may support suitable breeding habitat. No evidence of amphibians were observed during the site surveys.

3.2.2.2 Birds

A number of protected species of bird have been recorded within 2km of the proposed site (see Appendix B). No Annex I bird species were recorded during the site walkovers undertaken in 2019 and 2021. A total of four bird species were recorded during the site walkover, namely Grey Heron, Mallard, Wood Pigeon and Blackbird. All of these species are considered to be of least conservation priority (Green listed) on the Birds of Conservation Concern (BoCCI) list.

No Kingfisher or other riverine species of bird were recorded nesting at the proposed site and its environs during the course of the site surveys.

3.2.2.3 Flora

The NBDC database does not hold any records of rare or protected species of vascular plants within 2km of the proposed site. No rare or protected species of plants were recorded within the site during the course of the site surveys.

3.2.2.4 Invasive Species

The NBDC database holds records of three invasive species included in the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011), namely Canadian Waterweed (*Elodea canadensis*), Indian/ Himalayan Balsam (*Impatiens glandulifera*) and Japanese Knotweed (*Fallopia japonica*). Cherry Laurel (*Prunus laurocerasus*), which is considered to be a 'High Impact' species by Invasive Species Ireland, but is not listed in the Third Schedule, has also been recorded in the vicinity of the proposed site.

Several plant species, both invasive Third schedule and non - Third schedule were recorded during the site surveys undertaken in 2019 and 2021.

Himalayan Balsam was recorded 5m upstream from the proposed development. It was located along both banks with one specimen on the left bank (Figure 3-2) growing out through the existing pedestrian bridge. On the right bank Himalayan Balsam was growing along the water's edge up to where the bankside meets the river walls (Figure 3-3). Further upstream along the Liffey, Himalayan Balsam was found on the right bank, with Cherry Laurel and Montbretia located along the roadside in close proximity.

Further IAPS were found along the mill race upstream of the proposed footbridge. Two large stands of Japanese knotweed were recorded on both banks along the mill race 235m upstream of the proposed footbridge (Figure 3-4). A Butterfly Bush (Buddleja) was found along the millrace 285m upstream of the proposed footbridge on the right bank. Giant Rhubarb was also noted along the right bank of the mill race 365m upstream of the proposed footbridge (Figure 3-5).

A map detailing the location of all IAPS is included below (Figure 3-6).

Celbridge Pedestrian and Cycle Bridge: Ecological Impact Assessment

Figure 3-2: Himalayan Balsam on left bank 5m upstream of proposed footbridge



Figure 3-3: Himalayan Balsam on right bank 5m upstream of proposed footbridge



Celbridge Pedestrian and Cycle Bridge: Ecological Impact Assessment

Figure 3-4: Japanese knotweed found along the mill race on left and right bank 235m upstream from proposed pedestrian and cycle bridge

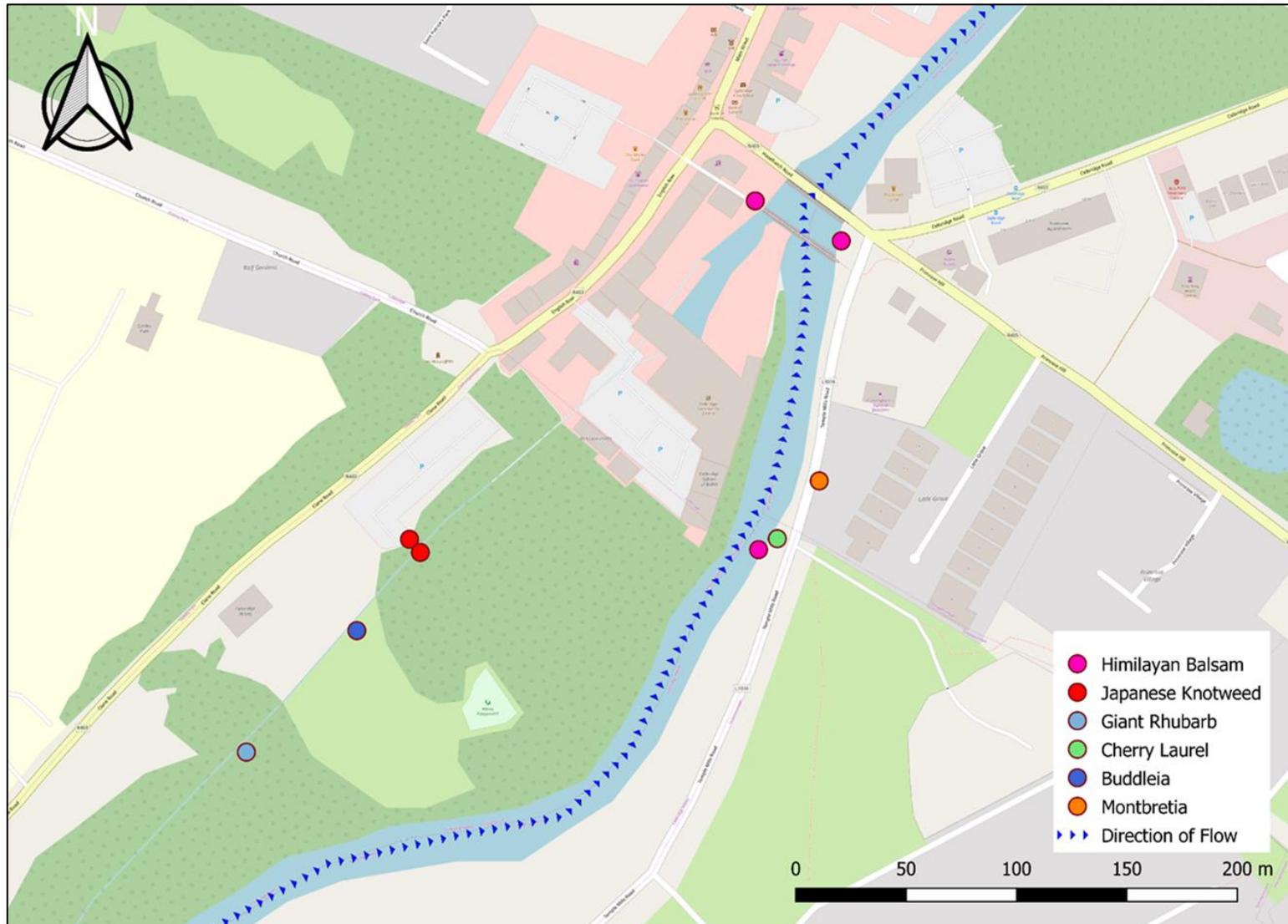


Figure 3-5: Giant Rhubarb found along the mill race on right bank 365m upstream of the proposed pedestrian and cycle bridge



Celbridge Pedestrian and Cycle Bridge: Ecological Impact Assessment

Figure 3-6: Location of IAPS at the Proposed Site and its Environs



3.2.2.5 Invertebrates

There are no historical records of protected species of invertebrates in the vicinity of the proposed site on the NBDC database. No protected species of invertebrate were recorded during the course of the site surveys undertaken in 2019 and 2021.

3.2.2.6 Molluscs

There are general records of Narrow-mouthed Whorl Snail (*Vertigo (Vertilla) angustior*) from the 10km OS Grid Square within which the proposed site is situated (N93). Habitats occupied by Narrow-mouthed Whorl Snail include dunes, damp grassland, fen and marsh, salt marsh and flood plain (NPWS, 2019). As such, the habitats present at the proposed site are not suitable to support this species.

3.2.2.7 Bats

A review of existing bat records within 2km of the proposed footbridge (sourced from Bat Conservation Ireland’s National Bat Records Database and the National Lesser Horseshoe Bat Database) reveals that, currently, six of the ten known Irish bat species have been observed within a 2km radius. These include brown long-eared (*Plecotus auritus*), Daubenton’s bat (*Myotis daubentonii*), Leisler’s bat (*Nyctalus leisleri*), natterer’s bat (*M. nattereri*), pipistrelle sp. (*Pipistrellus sensu lato*) and soprano pipistrelle (*P. pygmaeus*).

A Leisler’s bat roost has been identified c.0.7km to the north-east of the proposed pedestrian and cycle bridge and a pipistrelle roost has been recorded c.0.6km to the west of the proposed site.

The bat landscape association model (Lundy et al, 2011) suggests that the proposed site is part of a landscape that is of moderate to high suitability for bats including common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*P. pygmaeus*), brown long-eared (*Plecotus auritus*), Leisler’s (*Nyctalus leisleri*), Daubenton’s (*Myotis daubentonii*), natterer’s (*M. nattereri*) and whiskered bat (*M. mystacinus*). The proposed site and its environs are of low suitability for Nathusius’ pipistrelle (*Pipistrellus nathusii*) and is outside of the distribution range for lesser horseshoe bat (*Rhinolophus hipposideros*) (Roche et al, 2014). There is highly suitable bat foraging habitat along the River Liffey and the riparian habitat along the river banks.

Table 3-3 below outlines records of each bat species within the proposed site and its wider environs.

Table 3-3: Bat Records from the Proposed Site and Its Environs⁸

Common Name	Scientific Name	Within 2km Radius of the Site	Known Roosts within 2km of the Site	Source
Pipistrelle	<i>Pipistrellus sensu lato</i>	Present	√	Bat Conservation Ireland
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	Present	No records	Bat Conservation Ireland
Nathusius’ pipistrelle	<i>Pipistrellus nathusii</i>	No records	No records	Bat Conservation Ireland
Leisler’s bat	<i>Nyctalus leisleri</i>	Present	√	Bat Conservation Ireland
Brown long-eared bat	<i>Plecotus auritus</i>	Present	No records	Bat Conservation Ireland
Daubenton’s bat	<i>Myotis daubentonii</i>	Present	No records	Bat Conservation Ireland
Natterer’s bat	<i>Myotis nattereri</i>	Present	No records	Bat Conservation Ireland
Whiskered bat	<i>Myotis mystacinus</i>	No records	No records	Bat Conservation Ireland

⁸ <https://maps.biodiversityireland.ie/Map>

Common Name	Scientific Name	Within 2km Radius of the Site	Known Roosts within 2km of the Site	Source
Lesser horseshoe bat	Rhinolophus hipposideros	No records	No records	Bat Conservation Ireland/ NPWS
Brandt's bat	Myotis brandtii	No records	No records	Bat Conservation Ireland

Preliminary Bat Roost Assessment

No trees with bat roosting potential were recorded at the proposed site and its immediate environs.

The existing footbridge is constructed of concrete with metal handrails. No features likely to be used as roosting or resting places for bats were recorded within the bridge structure. This bridge is classified as Grade 0.⁹

The existing road bridge over the River Liffey is a 5 span masonry arch bridge. The arches had been 'shotcreted' (i.e., sprayed with concrete) and stonework to the parapet had been fully pointed and did not support any potential roosting features for bats. As such, the main structure of the road bridge is classified as Grade 0. However, there is a dry arch to the west of the road bridge that was inaccessible for inspection but may have bat roosting potential (Figure 3-7).

Figure 3-7: Dry Arch at the Western End of the Existing Road Bridge



3.2.2.8 Otter

The NBDC database holds records of otter from Hazelhatch, c.1.8km to the south-east of the proposed site, last recorded in 2011.

One otter spraint was recorded under the existing footbridge during the site survey undertaken in 2019, indicating the presence of foraging otter. No otter holts were recorded in the vicinity of the proposed site during the 2019 and 2021 surveys.

⁹ *0 = no potential (no suitable crevices); 1 = crevices present may be of use to bats; 2 = crevices ideal for bats but no evidence of usage; and 3 = evidence of bats (e.g. bats present, droppings, grease marks, urine staining, claw marks or the presence of bat fly pupae) (Billington and Norman, 1997)

3.2.2.9 Other Mammals

The NBDC hold records of badger, red squirrel and hedgehog from a 2km radius of the proposed site. No evidence of badger, red squirrel and hedgehog was recorded within the study area during the course of the site surveys. The habitats present at the proposed site are not suitable to support these species.

3.3 Aquatic Ecology

3.3.1 Desktop Study

3.3.1.1 Water Bodies

The River Liffey rises in the Wicklow Mountains c.92km upstream of the proposed development. The main land use as it flows from the mountains towards the development is coniferous plantations, improved grassland, tillage and urban towns. From its source between Kippure and Tonduff mountains, the Liffey flows through Pollaphuca Reservoir which was established in the 1930's. It flows out of the reservoir through the Pollaphuca generating station and into the lower reservoir and generating station at Golden Falls, upstream of Ballymore Eustace. It then flows through an agricultural landscape passing through a number of towns (Kilcullen, Newbridge, Sallins and Clane) before reaching Celbridge. A short distance downstream of Celbridge it flows through Leixlip Reservoir and is joined by the Ryewater river. It then continues through the heart of Dublin city where it is considerably constrained by quay walls. The Liffey is then joined by the outflow from the Royal and Grand Canals, the River Dodder from the south and the River Tolka to the north. The Liffey flows past Dublin Port and through the north and south Bull Walls flowing out to sea in Dublin Bay c.30km downstream of the proposed development. The Grand Canal lies 2.5km east of the proposed development.

The proposed development overlies the Dublin groundwater body which is moderately productive only in local zones. Groundwater is generally unconfined with flow towards the coast and also towards the River Liffey and Dublin city (GSI 2004). EPA codes for these waterbodies are shown below in Table 3-4.

Table 3-4: EPA codes for waterbodies with connectivity to the proposed site

EPA Water Body Name	Water Body Type	EPA Code	EPA Water Body Code	Approximate Distance downstream from the proposed site
Liffey_150	River	09L01	IE_EA_09L011900	0km
Leixlip Reservoir	Lake	09_69	IE_EA_09_69	2.5km
Liffey_160	River	09L01	IE_EA_09L012040	4.8km
Liffey_170	River	09L01	IE_EA_09L012100	7.7km
Liffey_180	River	09L01	IE_EA_09L012350	8.5km
Liffey_190	River	09L01	IE_EA_09L012360	17.5km
Dublin	Groundwater	-	IE_EA_G_008	0km

3.3.1.2 Surface Water Quality and Risk Characterisation

Macroinvertebrate sampling for Q-value determination has been conducted within the Liffey as part of EPA's Water Framework Directive monitoring. EPA sample locations cover most of the Liffey River from Sally's Gap in the Wicklow mountains to Island Bridge in Dublin city centre and includes a sampling site at Celbridge (EPA code RS09L011700). Table 3-5 displays the results from the last three monitoring cycles at Celbridge including up and downstream of the town. In summary, the EPA station at Celbridge bridge and upstream remained a Q4 (Good) from 2010-2019. The station downstream of

the proposed development was Q3 (Moderate) in 2010 and 2013 but improved to a Q4 (Good) in 2016 and 2019.

Table 3-5: Summary of EPA Q-Values within the Liffey River from 2010-2019 (The closest station to the proposed pedestrian and cycle bridge is highlighted in bold)

River	Station Code	Station Name	Easting	Northing	2010	2013	2016	2019
Liffey	RS09L011600	Straffan Turnings Lr (RHS & Mid)	292451	229184	4	4	4	4
	RS09L011700	Br in Celbridge	297359	232864	4	4	4	4
	RS09L011900	Leixlip Br (RHS)	300825	235806	3	3	4	4

The River Liffey is split into many water bodies. The proposed footbridge is located within Liffey_150 but is just near the border of Liffey_140. The overall WFD status for the Liffey_150 and 140 for 2013-2018 is 'Good' status. A summary of the WFD status for the Liffey is shown below in Table 3-6.

The risk status for Liffey_150 is currently under review within the Liffey Catchment Assessment 2010-2015 (EPA 2018). The Risk status for the upstream water body (Liffey_140) is "Not at Risk".

Table 3-6: Summary of WFD Status for Liffey Water Bodies (The water body the proposed pedestrian and cycle bridge is within is highlighted in bold)

EPA Waterbody Name	Code	Risk	WFD Status 2010-2012	WFD Status 2010-2015	WFD Status 2013-2018
Liffey_140	IE_EA_09L011700	Not at Risk	Good	Good	Good
Liffey_150	IE_EA_09L011900	Review	Poor	Poor	Good

3.3.2 Review of Records for Annex II Aquatic Species

3.3.2.1 Freshwater Pearl Mussel (*Margaritifera margaritifera*)

The presence of the freshwater pearl mussel is not known from the Liffey catchment. There are no historic records of freshwater pearl mussels on the Liffey. A freshwater pearl mussel survey was not conducted as part of this aquatic survey.

3.3.2.2 Salmon (*Salmo salar*), River, Brook & Sea Lamprey (*Lampetra fluviatilis*, *Lampetra planeri* & *Petromyzon marinus*)

The Liffey is not a designated salmonid river under S.I. No. 293/1988 - European Communities (Quality of Salmonid Waters) Regulations, 1988. Downstream of Celbridge the Leixlip dam is a significant barrier to salmonid migration, however there is a fish pass in place and salmonid records upstream indicate fish can migrate up past the dam water permitting. Interestingly Leixlip is translated as Salmon Leap from Norse.

An electric-fishing survey was conducted by Inland Fisheries Ireland (IFI) in the River Liffey approximately 8.55km downstream of proposed pedestrian and cycle bridge in 2014 at Lucan. Salmon was the most commonly encountered species with 154 specimens found during the 2014 survey, this is similar to the 159 recorded in the same area during a 2009 survey. Lamprey were also recorded but the species of lamprey was not confirmed in the IFI report, most likely river or brook lamprey, brown trout (*Salmo trutta*) were also found at this station (Kelly et al. 2015).

An IFI survey in 2008 found salmon within the Liffey at Kilcullen c.45.68km upstream of the proposed development (Kelly et al. 2009). Brown trout were the most common species recorded followed by salmon. No lamprey species were found at this site during the IFI survey. Further upstream still at Ballyward Bridge before the Liffey enters the Pollaphuca reservoir no salmon were present with brown trout being the most common fish species encountered in 2009 (Kelly et al. 2009).

From the National Biodiversity Data Centre (NBDC) mapping and a review of IFI reports there are no records of sea lamprey within the River Liffey. An OSPAR document does note that evidence of sea lamprey redd (nest) construction (this information came from Eastern Regional Fisheries Board (ERFB, now IFI) staff on the Liffey). There were no sightings of adult sea lamprey associated with this record. The same document notes that ERFB staff recorded a sea lamprey in both the River Glyde and the River Vartry in 2007. When an ERFB record from the Avoca catchment is added, this points to a penetration of all the major east-coast catchments by *Petromyzon marinus* (OSPAR 2009). It is not indicated where and when the Liffey record is from but likely lower downstream the catchment before the barrier at Leixlip dam. There is a historical record of sea lamprey at Island Bridge from 1906 (O’Riordan 1965).

Eel and lamprey sp. were recorded by IFI in 2009 and 2014 within the Liffey at Lucan c.8.52km downstream of the proposed footbridge. Eel (*Anguilla anguilla*) are classified as Critically Endangered on the Ireland Red List No.5 for Amphibians, Reptiles & Freshwater Fish (Kelly et.al 2014). Eel was also found at Kilcullen Br.A in 2008 and 2013 (Kelly et.al 2009).

The Dublin City Biodiversity Action Plan 2015-2020 lists brook, river and sea lamprey as known or previously recorded within the River Liffey (DCC, 2015).

The presence of salmon would be assumed within the Liffey at Celbridge. For the migratory species of lamprey (sea or river) the dam at Leixlip may act as a barrier to further upstream migration. Isolated populations of the non-migratory brook lamprey may be present within the Liffey at Celbridge.

3.3.2.3 White-clawed Crayfish (*Austropotomobius pallipes*)

A review of the NBDC maps indicates that there are records of white-clawed crayfish within the River Liffey. The nearest record is less than 50m upstream of the proposed pedestrian and cycle bridge and was recorded by the EPA in 2016 (N973328, EPA 2016) (www.biodiversityireland.ie). Information supplied by the EPA also shows that crayfish were found from the station at Leixlip Bridge as far upstream as Ballymore Eustace in 2019 (EPA, information request). This includes the station at Celbridge. The presence of crayfish at the proposed pedestrian and cycle bridge is confirmed by both historic and 2019 EPA records. This population within the Liffey would be deemed to be important considering the crayfish plague which has affected so many other catchments in Ireland has so far not affected the River Liffey.

3.3.3 Field Survey Results

3.3.3.1 Celbridge Pedestrian and Cycle Bridge

The River Liffey at the location of the proposed development is approximately 25m wide. During the site survey it was not possible to take the depth as the river was in flood during the survey. No Q-Value survey or a habitat assessment of the river substrate was carried out due to the flood and high colour of the water. However, EPA Q-Value data (see Section 3.3.1.2) and descriptions of substrate are available at the location of the proposed development. Also water quality data was taken 500m upstream where probes could be safely placed into the water to gather data. Instream aquatic vegetation that was visible consisted of *Apium nodiflorum* and *Sparangium erectum*. Bankside vegetation is described below.

The left bank of the channel slightly upstream of the existing footbridge is a former mill race facilitating the former Celbridge Mill. The proposed cycle and pedestrian bridge would be located to the north east of the existing arch road bridge which is located 15m downstream from this mill race. The Liffey here is confined with artificial walls along both banks and gabion basket reinforcement on the left bank.

Immediately upstream of the existing footbridge there is very narrow riparian margin as the river is confined with walls, buildings and the Newtown road. On the left bank between the mill race and the Liffey there is an 'island area' with willow trees (*Salix* sp.) and amenity grass where wildfowl were seen resting. Further upstream on both banks there is a narrow (<1-3m) but continuous riparian tree line consisting of Ivy (*Hedera helix*), Willow (*Salix* sp) and Sycamore (*Acer pseudoplatanus*). Downstream of the existing road bridge the river is also confined by walls with a small willow dominated flooded island. Further downstream the riparian margins also support a continuous tree line and the surrounding landscape becomes agricultural as the Liffey's leaves Celbridge town.

Instream substrate was not visible during the survey owing to flood conditions. However, a description of the substrate was available from the EPA in July 2019 at EPA station (Br in Celbridge. RS09L011700). This station is a few metres upstream of the proposed development. Substrate was clean of silt consisting of 30% coarse gravel, 25% cobble, 20% fine gravel, 15% boulder and 10% sand. This information was used to inform the habitat assessment.

The Liffey here is dominated with cobble/gravel and no silt indicating the potential for suitable spawning gravels along this section and would be expected to provide suitable salmonid and lamprey spawning habitat. Flow velocity at the time of sampling was very high due to a flood. A Q4 was assigned by the EPA in 2016 and 2019 indicating appropriate water quality for salmonids and as a result salmonid and lamprey spawning habitat was rated as Very Good.

For juvenile salmonids a continuous albeit narrow tree line provides excellent overhanging vegetation along the margins of each bank. Instream vegetation and boulder/cobble provide good cover. A Q4 was assigned by the EPA in 2016 indicating appropriate water quality for salmonids in this section giving the potential for juvenile salmonids a rating of Very Good.

Lamprey nursery habitat was difficult to assess given the flood conditions. Lamprey either river or brook are known to occur within the Liffey. The confined nature of the main channel of the Liffey would make areas of slow flow/backwater limited at the survey site. Suitable habitat may be present within the slower flowing millrace. A habitat rating for nursery habitat however could not be assigned based on limited information and flood conditions at the time of survey.

Crayfish are known to be present within the Liffey upstream of the proposed development. Records indicate sparse but continuous population as far upstream of Ballymore Eustace. Crayfish habitat was rated as Very Good with boulders and instream detritus present to provide food and shelter.

3.3.4 Consultation

In December 2021 the IFI were consulted on the proposed development and proposed mitigation. The IFI's response noted that the River Liffey supports a regionally significant population of Atlantic salmon (*Salmo salar*), a species listed under Annex II and V of the EU Habitats Directive in addition to Brown trout, eel and many other sensitive species. The Liffey system is also known to contain populations of all three species of Lamprey found in Ireland. All three Irish Lamprey species are listed as Annex II species under the EU Habitats Directive.

3.4 Summary of Ecological Evaluation

Table 3-7 summarises all identified ecological features. Ecological features have been identified as being at risk of potentially significant impacts via a source-pathway-receptor link. Ecological features are valued as being of local ecological importance (higher value) or above as per the criteria set out in Appendix A.

Table 3-7: Ecological Features within the Zone of Influence of the Proposed Development

Site/ Habitat/ Species	Ecological Value ¹⁰	Ecological Feature
European Site	International. The proposed site supports hydrogeological connectivity to Rye Water/ Carton SAC.	Yes
Natural Heritage Area	National. The proposed site supports hydrological connectivity to the Liffey Valley pNHA.	Yes
Buildings and artificial surfaces (BL3)	Negligible	No
Lowland depositing rivers (FW2)	The River Liffey supports salmonid, crayfish and lamprey habitat and is considered to be of County Importance.	Yes
Riparian woodland (WN5)	The trees lining the River Liffey provide suitable habitat for foraging and commuting bats, otter and birds.	Yes
Amphibians & Reptiles	No evidence of amphibians and reptiles was recorded within the site.	No
Avifauna	Avifauna as they occur within the proposed site are considered to be of local importance (higher value).	Yes
Bats	A high diversity of bat species have been recorded at the proposed site and its environs. However, potential roosting habitat at the site is limited to a dry arch of the existing road bridge. The River Liffey and its associated riparian habitat provides good foraging habitat for bats. Bats, as they occur at the site, are considered to be of Local Importance (higher value).	Yes
Otter	Otter forage along the River Liffey and an otter spraint was observed under the existing footbridge. Otters are considered to be of Local Importance (higher value) as they occur at the site.	Yes
Other mammals	No evidence of other protected species of mammal was observed within the site and there is limited suitable habitat for other mammals within the proposed site.	No
Salmonid	The River Liffey at the proposed site supports very good salmonid spawning and juvenile habitat.	Yes
White-clawed Crayfish	The River Liffey supports White-clawed Crayfish.	Yes
Lamprey	The River Liffey at the proposed site supports very good lamprey spawning habitat.	Yes
Freshwater pearl mussel	The presence of the freshwater pearl mussel is not known from the Liffey catchment.	No

¹⁰ In accordance with NRA (2009) Guidelines for the Assessment of Ecological Impacts of National Road Schemes Rev. 2. National Roads Authority

4 Potential Impacts of the Proposed Development

This section identifies the potential impact of the proposed development on habitats and species of conservation value (i.e. ecological features as outlined in Table 3-7) that have been identified as present, or that have the potential to be present, within the zone of influence of the proposed development.

4.1 Construction Phase

The ecological features that, in the absence of mitigation, may potentially be impacted by the construction phase of the proposed development and the significance of these impacts are set out in the following sections.

4.1.1 Designated Sites

Potential impacts on European sites are considered in the Screening for Appropriate Assessment (AA) report accompanying the Planning Application (AA Screening, Greenleaf Ecology, 2021). The screening for AA concluded that the proposed Pedestrian and Cycle Bridge, Celbridge, Co. Kildare either alone or in-combination with other plans and/or projects, does not have the potential to significantly affect any European Site, in light of their conservation objectives. Therefore, a Stage 2 Appropriate Assessment is deemed not to be required.

There are four pNHAs within a 5km radius of the proposed pedestrian and cycle bridge, namely Rye Water Valley/Cartron pNHA, Liffey Valley pNHA, Royal Canal pNHA and Grand Canal pNHA. Rye Water Valley/Cartron pNHA is also designated as an SAC and so is considered within the screening for AA.

The Liffey Valley pNHA, located c.5.1km downstream of the proposed development is of national importance due to its diversity of aquatic and terrestrial habitats. The River Liffey is a salmon bearing river but is not a designated salmonid river under S.I. No. 293/1988 - European Communities (Quality of Salmonid Waters) Regulations, 1988. No instream works, excavation from within the riverbed or land take from within the river is required as the proposed bridge will be a clear span structure over the river channel. The proposed bridge will require piled foundations for the abutments at either end, requiring excavation of approximately 2.0m x 3.0m wide and 1.5m deep on each side of the river. These will be vertical piles and will be installed from road level with no disturbance to the existing bank except for low levels of vibration. Reinforced concrete abutments will then be constructed on top of the piles prior to the installation of the bridge. The primary truss structure will be assembled remote from the river and be lifted into place in one piece. There is potential for the proposed works to result in adverse impacts on water quality within the River Liffey as a result of sediment laden runoff during excavation and spillage of deleterious substances such as hydrocarbons and concrete. Sediment loss to watercourses (if this was to occur) could give rise to increased bottom sedimentation, which can adversely impact aquatic habitat quality. Elevated concentration of suspended solids within the water column are negative to water quality, potentially damaging the gills of salmonid fish and/or benthic macroinvertebrates, smothering macroinvertebrate habitats and fish nursery areas when deposited. Juvenile fish, if present, would be more susceptible to gill damage than older fish as a result of any temporary increases in suspended solids. Hydrocarbon spills from poorly secured or non-bunded fuel storage areas, leaks from vehicles or plant or spills during re-fuelling can all give rise to the escape of hydrocarbons from construction sites to water courses. These spills, if they occurred, can give rise to tainting of fish downstream or, if large enough, fish and invertebrate kills. Concrete spills, or release of concrete wash-out water to nearby watercourses is potentially toxic to instream fauna and can cause fish and invertebrate kills in high concentration. However, in view of the proposed works design (i.e., no instream works, clear span design) and methodology as summarised above, and detailed in Section 1.3 and Section 1.4, the likelihood of significant sediment, hydrocarbon or concrete

loss is low. In consideration of the nature, size and scale of the proposed works, export of sediment and small amounts of potentially damaging waterborne pollutants (e.g., wet cement and hydrocarbons) during the construction phase may have a temporary adverse effect on water quality locally but would not have a significant effect on the River Liffey pNHA c.5.1km downstream of the proposed works.

There are no connecting pathways between the proposed pedestrian and cycle bridge and the remaining 2 pNHAs within a 5km radius.

4.1.2 Terrestrial Habitats

4.1.2.1 Riparian Woodland

Proposed works to riparian woodland is limited to trimming of willow trees on the left bank (Bank of Ireland) over which the bridge will span to a reduced height to allow for the installation of the bridge. This will not result in a significant adverse effect on riparian woodland habitat.

4.1.3 Species

4.1.3.1 Avifauna

Breeding birds are protected under the Wildlife Acts. It is an offence to disturb birds while on their nest, or to wilfully take, remove, destroy, injure or mutilate their eggs or nests.

The proposed development will require the removal of the London Plane tree planted in the car park of the Bank of Ireland and trimming of Willow trees on the left bank over which the bridge will span that may potentially support bird species. If the tree works are not timed appropriately, nests containing eggs or young chicks could be destroyed. This would result in a temporary adverse effect on birds at the local level.

Indirect effects on birds associated with the proposed development may include potential visual and noise disturbance during the construction works. In the absence of mitigation this impact would be temporary and reversible.

No Annex I or birds of High concern on the Birds of Conservation Concern (BoCCI) list were noted during the course of the site surveys.

4.1.3.2 Bats

Loss of Roosting Habitat

The proposed works will require the removal of the London Plane tree planted in the car park of the Bank of Ireland and trimming of Willow trees on the left bank over which the bridge will span. No features of suitability for roosting bats were recorded within these trees. No trees with bat roosting potential were recorded at the proposed site and its immediate environs.

The existing footbridge and the main existing road bridge over the River Liffey do not support any potential roosting features for bats. There is a dry arch to the west of the road bridge which may have bat roosting potential. However, no works are proposed to the dry bridge arch, therefore there will be no loss of roosting habitat.

Loss of Foraging Habitat

As detailed above, there will be no loss of riparian woodland as a result of the proposed works (proposed works are limited to trimming of willow trees), therefore there will be no loss of bat foraging and commuting habitat.

Lighting

Studies have found that Leisler's bat and pipistrelle bats can congregate around white mercury street lights and white metal halide lamps feeding on the insects attracted to the light. However, lighting can cause avoidance of an area for commuting bats and can prevent or reduce foraging for some species, including *Myotis* species¹¹. Further, even bat species that have been shown to opportunistically forage in lit conditions have subsequently been recorded being impacted by artificial lighting. In cities, for example, common pipistrelles have been recorded avoiding gaps that are well lit, thereby creating a barrier effect¹². Temporary lighting required during the construction phase may cause disturbance to bats commuting through or feeding at the proposed site. This would be a temporary adverse effect that would be significant at the local level.

4.1.3.3 Otter

There is potential for temporary visual and noise disturbance to otters foraging in the River Liffey in the vicinity of the site during construction. However, otters are generally nocturnal, with a peak of activity occurring around dawn and dusk, therefore the main activity period for otter is outside standard construction working hours. In view of this, and in consideration of the abundance of available habitat along the River Liffey upstream and downstream of the site, disturbance impacts would not be expected to have a significant adverse effect on otters.

There is potential for a reduction in water quality to have an adverse effect on aquatic organisms in the River Liffey. However, any reduction in water quality is likely to be temporary and localised. The high mobility and large foraging range of otter means that they are likely to be able to accommodate such localised changes in prey distribution and abundance.

Given the existing high level of visual and noise disturbance, the proposed site would be less favourable as a place of shelter for otter. Nonetheless, the potential for disturbance to the breeding or resting place for otter as a result of the proposed works cannot be excluded. This would be a significant adverse effect at the local level.

4.1.3.4 Invasive Species

As detailed in Section 3.2.2.4, a number of invasive alien plant species (IAPS) were recorded during the site surveys. One IAPS was recorded in the immediate environs of the proposed site: Himalayan Balsam was recorded 5m upstream from the proposed development. Therefore, there is potential for the proposed works to result in the spread of invasive plant species listed in the Third Schedule.¹³

4.1.4 Aquatic Ecology

The River Liffey at the proposed site supports salmonid spawning and juvenile habitat, lamprey spawning habitat and white-clawed crayfish. As noted in Section 4.1.1, no instream works, excavation from within the riverbed or land take from within the river is required as the proposed bridge will be a clear span structure over the river channel. The proposed bridge will require piled foundations for the abutments at either end, requiring excavation of approximately 2.0m x 3.0m wide and 1.5m deep on each side of the river. These will be vertical piles and will be installed from road level with no disturbance to the existing bank except for low levels of vibration. Reinforced concrete abutments will then be constructed on top of the piles prior to the installation of the bridge. The primary truss structure will be assembled remote from the river and be lifted into place in one piece. There is

¹¹ Stone E.L. (2013) Bats and Lighting: Overview of current evidence and mitigation.

¹² Bat Conservation Trust and Institute of Lighting Professionals (2018) Guidance Note 08/18: Bats and artificial lighting in the UK. ILP, Rugby

¹³ <http://www.irishstatutebook.ie/eli/2011/si/477/made/en/print>

potential for the proposed works to result in adverse impacts on water quality within the River Liffey as a result of sediment laden runoff during excavation, debris during maintenance and spillage of deleterious substances such as hydrocarbons and concrete, as detailed in Section 4.1.1. However, any reduction in water quality is likely to be temporary and localised.

There is potential for river bed disturbance during the bridge maintenance from the pontoon and also potential requirement for poles in the river bed. Although only temporary, such works have the potential to impact on spawning gravels from disturbance or from sediment impacting on spawning gravels downstream.

In view of the proposed project design (i.e. no instream works, clear span bridge design), works methodology as summarised above, and detailed in Section 1.3 and Section 1.4, the likelihood of significant sediment, hydrocarbon or concrete loss is low. In consideration of the nature, size and scale of the proposed works, potential impacts as a result of the export of sediment and small amounts of potentially damaging waterborne pollutants (e.g., wet cement and hydrocarbons) during the construction phase would be limited to a temporary adverse, but not significant, effect on aquatic habitats, salmon, lamprey species and white-clawed crayfish locally.

4.2 Operational Phase

The ecological features that, in the absence of mitigation, may potentially be impacted by the operational phase of the proposed development and the significance of these impacts are set out in the following sections.

4.2.1 Designated Sites

No adverse effects on designated sites will occur during the operational phase.

4.2.2 Terrestrial Habitats

4.2.2.1 Riparian Woodland

No adverse effects on riparian woodland will occur during the operational phase.

4.2.3 Species

4.2.3.1 Avifauna

Avifauna at the proposed footbridge are habituated to disturbance from traffic and human presence. As such, no disturbance effects on avifauna will occur during the operational phase.

No adverse effects on avifauna will occur during the operational phase.

4.2.3.2 Bats

There is potential that lighting proposed for the development will increase light levels in the vicinity of the proposed footbridge. As noted in Section 4.1.3.2, increased lighting may reduce the availability of feeding sites for bats and can create a barrier effect. In the absence of mitigation, this would result in a long-term adverse effect on bats at the local level.

4.2.3.3 Otter

No adverse effects on otter will occur during the operational phase.

4.2.3.4 Invasive Species

There will be no disturbance to, or spread of, invasive species during the operational phase.

4.2.4 Aquatic Ecology

There is no new drainage proposed. The proposed pedestrian and cycle bridge will have a crossfall that it allows surface water to drain to the river. The footpaths at both ends of the proposed bridge

will drain to existing road drainage network. Therefore there is no potential for impacts on aquatic ecology from surface water drainage.

There is potential that lighting proposed for the development will increase light levels in the vicinity of the proposed pedestrian and cycle bridge. Artificial light spill onto watercourses may potentially interfere with the circadian behaviour of aquatic organisms and may affect both predator avoidance and feeding in salmonids. Street lighting, for example, can delay and disrupt the dispersal of Atlantic salmon.¹⁴ In the absence of mitigation, inappropriate lighting may result in a long-term adverse effect on Atlantic salmon, lamprey species and White-clawed crayfish, which would be significant at the local level.

4.3 Cumulative Impacts with Other Plans and Projects in the Area

Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location.¹⁵ A search of Kildare County Council planning enquiry map viewer was conducted for developments that may have in-combination effects on ecological features with the proposed development. Plans relevant to the area were searched in order to identify any elements of the plans that may act cumulatively or in-combination with the proposed development. Projects included in Table 4-1 are planning applications submitted to Kildare County Council¹⁶ over the past 24 months that are within the vicinity of the proposed development. The search excluded retention applications (i.e. typically local-scale residential or commercial developments where an impact has already occurred), incomplete, withdrawn, and refused applications. Furthermore, a search of An Bord Pleanála’s website was completed to identify any relevant applications, including Strategic Infrastructure Development (SID) and Strategic Housing Development (SHD) in the past three years or in close proximity to the proposed development.

It is concluded that there will be no negative in-combination effects between the proposed works and plans or project in the area.

Table 4-1: Other Projects and Plans that could result in potential cumulative impacts

Plan / Programme/Policy	Key Objectives/Policies/Proposals	Potential for In-combination Effects and Mitigation
River Basin Management Plan 2018-2021	The project should comply with the environmental objectives of the Irish RBMP which are to be achieved generally by 2021. Ensure full compliance with relevant EU legislation; Prevent deterioration; Meet the objectives for designated protected areas; Protect high-status waters; and Implement targeted actions and pilot schemes in focused sub-catchments aimed at (1) targeting water bodies close to meeting their objective and (2)	The implementation and compliance with key environmental policies, issues and objectives of this management plan will result in positive in-combination effects to European sites. The implementation of this plan will have a positive impact for biodiversity. It will not contribute to in-combination or cumulative impacts with the proposed development.

¹⁴ Springer International Publishing Switzerland 2016 R. Karlicek et al. (eds.), Handbook of Advanced Lighting Technology, DOI.

¹⁵ CIEEM (2018). Guidelines For Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine

¹⁶ Kildare County Council (kildarecoco.ie) accessed 10/12/2021

Plan / Programme/Policy	Key Objectives/Policies/Proposals	Potential for In-combination Effects and Mitigation
	addressing more complex issues that will build knowledge for the third cycle.	
<p>Inland Fisheries Ireland Corporate Plan 2021 -2025</p> <p>The Inland Fisheries Act 2010.</p>	<p>To place the inland fisheries resource in the best sustainable position possible for the benefit of future generations. To protect, manage and conserve Ireland’s inland fisheries and sea angling resources and to maximise their sustainability and natural biodiversity.</p> <ul style="list-style-type: none"> • To sustainably develop and improve fish habitats. • To protect, maintain and enhance Ireland’s wild fish populations. • To actively engage with stakeholders in the continued stewardship of our shared resource. • To play a leadership role in achieving our climate action and biodiversity goals. • To value our people and support their development and performance. • To foster a culture of value for money and evaluation of performance in a measurable, transparent and accountable manner. <p>Harness the power of innovation to continue to deliver a modern fisheries service.</p>	<p>The implementation and compliance with key environmental issues and objectives of this corporate plan will result in positive in-combination effects to European sites. The implementation of this corporate plan will have a positive impact for biodiversity of inland fisheries and ecosystems. It will not contribute to in-combination or cumulative impacts with the proposed works.</p>
<p>Celbridge Local Area Plan 2017-2023</p>	<p>The LAP notes congestion is a significant problem in the town centre and one of the key priorities of this Plan is the provision for enhanced crossings of the River Liffey. There are a number of objectives which promote the footbridge as follows:</p> <p>TCEO1.3: To ensure that town centre expansion sites are supported by direct walking and cycle links to the Main Street.</p> <p>MTO1.6: To facilitate a new pedestrian/cycling bridge across the Liffey linking to Celbridge Town Centre, in conjunction with any new development at Donaghcumper and new residential areas to the south.</p> <p>MTO1.9: To upgrade existing pedestrian and cycle facilities across the River Liffey.</p> <p>MTO3.12: To facilitate the construction of a new vehicular river crossing between the Clane Road and Newtown Road within either of the two protected corridors, as</p>	<p>All developments within the Celbridge Local Plan area are required to comply with the following Objective of the Celbridge Local Area Plan 2017-2023:</p> <p>NHO1.1: To ensure an Appropriate Assessment, in accordance with Article 6(3) and Article 6(4) of the Habitats Directive and with DEHLG guidance (2009), is carried out in respect of any plan or project not directly connected with or necessary to the management of a Natura 2000 site to determine the likelihood of the plan or project having a significant effect on a Natura 2000 site, either individually or in combination with other plans</p>

Plan / Programme/Policy	Key Objectives/Policies/Proposals	Potential for In-combination Effects and Mitigation
	<p>indicated on Map 8.1, subject to environmental assessment.</p> <p>MTO3.13: To protect from development a route for a potential new road (including a new bridge over the River Liffey) between Clane Road (near the Celbridge North Kildare Educate Together School) and Hazelhatch Park.</p>	<p>or projects and to ensure that projects which may give rise to significant cumulative, direct, indirect or secondary impacts on Natura 2000 sites will not be permitted (either individually or in combination with other plans or projects) unless for reasons of overriding public interest.</p> <p>Adherence with this Objective will ensure that local planning applications and subsequent grant of planning comply with the core strategy of proper planning and sustainability and with the requirements of relevant EU Directives and environmental considerations, there is no potential for adverse in combination effects on biodiversity.</p>
<p>Planning Ref: 211314 Abbey Lodge: Adjacent to the proposed works on the south eastern landing point.</p>	<p>For the change of use of the existing ground floor beer garden area to a coffee shop (c.59.9m²) with the removal of the existing rails and the enclosing of the area with glazing on the west, north and east elevations and the creation of an outside seating area ancillary to the proposed coffee shop, the removal of a portion of the existing low stone wall and railing along the western boundary along with all other necessary ancillary site development works. This is a protected structure. Grant Date: 04/11/2020.</p>	<p>Adherence to the overarching policies and objectives of the Kildare County Development Plan 2017 - 2023 ensure that local planning applications and subsequent grant of planning comply with the core strategy of proper planning and sustainability and with the requirements of relevant EU Directives and environmental considerations, there is no potential for adverse in combination effects on biodiversity.</p>
<p>Planning Ref: 2066 Abbey Lodge: Adjacent to the proposed works on the south eastern landing point.</p>	<p>Extension of public bar on ground floor into existing toilets and store area, provision of unisex accessible toilet, provision of beer garden area with access on to it from extended bar area, provision of new entrance on the south west corner of the building, adjacent to the bridge, alterations to windows on north west elevation and all associated site works and services. This is a protected structure. Grant Date: 19/06/2020.</p>	<p>Adherence to the overarching policies and objectives of the Kildare County Development Plan 2017 - 2023 ensure that local planning applications and subsequent grant of planning comply with the core strategy of proper planning and sustainability and with the requirements of relevant EU Directives and environmental considerations, there is no potential for adverse in</p>

Plan / Programme/Policy	Key Objectives/Policies/Proposals	Potential for In-combination Effects and Mitigation
		combination effects on biodiversity.
<p>Planning Ref: 20232 c. 530m east of the proposed works</p>	<p>A new two storey, part single storey, 4 bed dwelling with connection to existing site services and all associated site works</p>	<p>Adherence to the overarching policies and objectives of the Kildare County Development Plan 2017 - 2023 ensure that local planning applications and subsequent grant of planning comply with the core strategy of proper planning and sustainability and with the requirements of relevant EU Directives and environmental considerations, there is no potential for adverse in combination effects on biodiversity.</p>
<p>Planning Ref: 20306504 c. 1.9km north of the proposed works</p>	<p>Ardstone Homes Ltd: STRATEGIC HOUSING DEVELOPMENT (ABP Decision) The demolition of an existing agricultural structure on site and the provision of a new vehicular access onto the R405 Regional Road (Celbridge-Maynooth) to serve the proposed residential development that consists of 372 no. new residential units. A childcare facility is proposed at ground floor level of Apartment Block B (approx. 191sqm GFA) A total of 633 no. car parking spaces and 340 no. bicycle parking spaces are proposed. The proposed development also includes the provision of 2 no. ESB sub-stations, site and infrastructural works including foul and surface water drainage, attenuation areas, open space, boundary walls and fences, landscaping, lighting, internal roads, cycle paths, footpaths, and cycle and pedestrian connections to the R405 and the R449 Regional Roads. Grant Date: 03/09/2020.</p>	<p>The EIAR notes that no significant adverse impacts are predicted as a result of this development. Adherence to the overarching policies and objectives of the Kildare County Development Plan 2017 - 2023 ensure that local planning applications and subsequent grant of planning comply with the core strategy of proper planning and sustainability and with the requirements of relevant EU Directives and environmental considerations, there is no potential for adverse in combination effects on biodiversity.</p>
<p>Planning Ref: 20307100 c. 1.8km north of the proposed works</p>	<p>Crodaun Development: STRATEGIC HOUSING DEVELOPMENT (ABP Decision 467 Residential Units. 199 No. Houses, 216 No. Apartments, 52 No. Duplexes, Childcare Facility, gym, café and retail unit and associated site works. Grant Date: 08/09/2020</p>	<p>The EIAR notes that no significant adverse impacts are predicted as a result of this development. Adherence to the overarching policies and objectives of the Kildare County Development Plan 2017 - 2023 ensure that local planning applications and subsequent grant of planning comply with the core strategy of proper planning and sustainability and with</p>

Plan / Programme/Policy	Key Objectives/Policies/Proposals	Potential for In-combination Effects and Mitigation
		the requirements of relevant EU Directives and environmental considerations, there is no potential for adverse in combination effects on biodiversity.
<p>Planning Ref: 211256 1.8km to the north west.</p>	<p>Power Capital Renewable Energy Limited: Application for a 10 year permission for development on lands in the townland of Griffinrath, Celbridge. The development will consist of the construction of a solar PV farm with an operational life of 35 years comprising approximately 75,984 No. photovoltaic panels on ground mounted frames within a site area of 44.21 hectares and associated ancillary development including 10 No. transformer stations, approximately 124 No. string-inverters, 1 No. onsite 38kV substation building, 1 No. 40ft storage container building, 7 No. CCTV security cameras mounted on 4 metre high poles and perimeter security fencing (2 metres high), the construction of an internal hardcore access road between the solar panels and the site access, localised improvements to an existing agricultural access from the adjoining L5065 road to facilitate construction and operational phase access and, the installation of a 38kV underground electricity cable from the onsite 38kV substation to the 110kV Griffinrath substation ca. 0.75km to the southeast. A Natura Impact Statement has been prepared in respect of the proposed development. Currently at further information stage.</p>	<p>The Ecological Assessment for the proposal concludes that the site is currently of low ecological value and that the proposed development will not have any direct or indirect adverse impacts on the conservation objectives of any Natura 2000 sites or any notable/protected flora and fauna. Adherence to the overarching policies and objectives of the Kildare County Development Plan 2017 - 2023 ensure that local planning applications and subsequent grant of planning comply with the core strategy of proper planning and sustainability and with the requirements of relevant EU Directives and environmental considerations, there is no potential for adverse in combination effects on biodiversity.</p>

5 Mitigation

As with any development, all measures necessary should be taken to ensure comprehensive protection of local ecological features, in the first place by complete impact avoidance and as a secondary approach through mitigation by reduction and remedy.

A comprehensive construction method statement must be prepared by the contractor and reviewed and approved by the relevant statutory authorities e.g. Kildare County Council, as necessary before any works take place. This will be informed by the specific mitigation measures detailed in Table 5-1 and the guidance documents and best practice measures listed below:

- H. Masters-Williams et al (2001) Control of water pollution from construction sites. Guidance for consultants and contractors (C532). CIRIA.

- Murnane et al (2002) Control of Water Pollution from Construction Sites - Guide to Good Practice. SP156.
- IFI (2016) Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters. Inland Fisheries Ireland, Dublin.

5.1 Construction Phase

Table 5-1: Table of Construction Phase Mitigation Measures

Objective(s)	Measure	Details of Mitigation
Riparian Woodland	Timing of works	Where practicable, no clearance of trees on site will occur during the bird breeding season from 1st March to 31st August. Pre-construction bird surveys will take place prior to works commencing where works during the breeding season are unavoidable. If any active nests are discovered then work in the immediate vicinity of the nest will cease and an appropriate buffer zone will be established which will be left in place until it has been confirmed that the young have fledged.
Avifauna	Timing of works	Where practicable, no clearance of trees on site will occur during the bird breeding season from 1st March to 31st August. Pre-construction bird surveys will take place prior to works commencing where works during the breeding season are unavoidable. If any active nests are discovered then work in the immediate vicinity of the nest will cease and an appropriate buffer zone shall be established which will be left in place until it has been confirmed that the young have fledged.
Bats	Appropriate use of lighting	Where construction lighting is required, lighting will be directed away from the existing dry arch in the road bridge and all woodland and aquatic habitats to be retained. Directional lighting (i.e. lighting which only shines on the proposed project and not nearby countryside) will be used to prevent overspill. This will be achieved by the design of the luminaire and by using accessories such as hoods, cowls, louvres and shields to direct the light to the intended area only.
Otter	Pre-construction survey	<p>Pre-construction otter surveys will be undertaken prior to the commencement of any works in order to identify any changes in otter activity and holt locations since surveys for this report were completed to address possible impacts on otters. It is also important to ensure that no new holts have been created in the intervening period.</p> <p>The removal of otters from affected holts, and the subsequent destruction of these holts, can only be conducted under a Section 25 derogation under the 1997 Habitats Regulations. Derogations are also required for any works likely to cause disturbance to active breeding holts (when present within c.150m of a project /scheme).</p> <p>In the event of otter holts being identified within proximity to the proposed works area, the following mitigation measures are proposed to ensure no disturbance of the local otter population during the construction phase of the proposed works (NRA 2008):</p> <ul style="list-style-type: none"> • No works should be undertaken within 150m of any holts at which breeding females or cubs are present. Following consultation with NPWS, works closer to

Objective(s)	Measure	Details of Mitigation
		<p>such breeding holts may take place – provided appropriate mitigation measures are in place, e.g. screening and/or restricted working hours on site.</p> <ul style="list-style-type: none"> • No wheeled or tracked vehicles (of any kind) should be used within 20m of active, but non-breeding, otter holts. Light work, such as digging by hand or scrub clearance should also not take place within 15m of such holts, except under licence. • The prohibited working area associated with otter holts should, where appropriate, be fenced with temporary fencing prior to any possibly invasive works. Appropriate awareness of the purpose of the enclosure should be conveyed through notification to site staff and sufficient signage should be placed on each exclusion fence. All contractors or operators on site should be made fully aware of the procedures pertaining to each affected holt. • Where holts are present in close proximity to invasive construction works but are determined not to require destruction, construction works may commence once recommended alternative mitigation measures to address otters have been complied with.
Aquatic Ecology	<p>Good practice during construction; Appointment of an EcCoW. Agree method statements with IFI in advance of works.</p>	<ul style="list-style-type: none"> • Implementation of the measures outlined in the <i>“Guidelines on protection of fisheries during construction works in and adjacent to waters”</i> (IFI, 2016). All method statements for the works will be developed to adhere to the measures outlined in these guidelines. • An Ecological Clerk of Works (EcCoW) will be appointed to supervise advance bridge maintenance works and as required during the construction phase. The EcCoW will be given the power to monitor and stop works if necessary. • In advance of all works, IFI will be consulted on the proposed construction method statements and any further requirements stipulated will be adhered to.
Control of sediment loss	<p>Best practice during construction (silt control measures)</p>	<ul style="list-style-type: none"> • The Contractor will be required to implement industry best practice pollution prevention measures in accordance with guidance documents (for example CIRIA 2001 Guideline Document C532 Control of Water Pollution from Construction Sites, during construction in order to control the risk of pollution to surface waters. • There will be no direct discharge of surface water from any element of the works without suitable attenuation and treatment. • Excavations: Water will be prevented from entering local excavations. Personnel and/or plant will not disturb water in a local excavation. The means of dewatering excavations in the event there is ingress will include settlement tanks or a silt buster stream if required to ensure that any dewaterings do not increase background suspended solids levels in the

Objective(s)	Measure	Details of Mitigation
		<p>receiving environment. No excavations will be required within the river channel itself.</p> <ul style="list-style-type: none"> • Spoil heaps: Spoil heaps will be located, protected and stabilised in a way that will avoid the risk of contamination of drainage systems and local watercourses. • Site roads will be kept free from dust and mud deposits. In dry weather dust suppression measures will be utilised. • Excavated material will be segregated into inert, non-hazardous and/or hazardous fractions. • The excavation and handling of inert material will be carefully managed in such a way as to prevent any potential negative impact on the receiving environment. • Silty water management: Water will not be pumped directly into the Liffey or surface water drains. Adequate provision for dealing with very silty water will be put in place (see “Excavations” in first paragraph above).
<p>Avoid hydrocarbon loss to water</p>	<p>Best practice during construction (hydrocarbons)</p>	<ul style="list-style-type: none"> • Routine practice and procedures to prevent pollution of the environment will apply throughout the duration of the construction phase. These include: • A CEMP will be prepared and implemented by the appointed Contractor. • During the construction stage, standard construction and site management practices will be implemented by the Contractor through the CEMP. • All material including oils, solvents and paints will be stored within temporary bunded areas or dedicated bunded containers. • Refuelling will take place in a designated bunded area away from surface water gullies, drains and water bodies, in the event of refuelling outside of this area, fuel will be transported in a mobile double skinned tank. • All machinery and plant used will be regularly maintained and serviced and will comply with appropriate standards to ensure that leakage of diesel, oil and lubricants is prevented. • Spill kits and hydrocarbon absorbent packs will be available and drip trays will be used during refuelling. • Ongoing monitoring of the water receptors throughout the works. • Mobile plant will be refuelled in the construction compounds, on an impermeable surface away from any drains or watercourses. A spill kit will be available at this location. • Hoses and valves will be checked regularly for signs of wear and turned off and securely locked when not in use. • Generators, diesel pumps and similar equipment will be placed on drip trays to collect minor spillages. These will be checked regularly, and any accumulated oil removed for disposal.

Objective(s)	Measure	Details of Mitigation
		<ul style="list-style-type: none"> • Fuel will be stored in the temporary construction compound, which will be located within the former Bank of Ireland car park or Abbey Lodge car park. All chemical and fuel filling locations will be protected from potential spillages through the provision of appropriate protection measures including bunded areas and double skinned bowser units with spill-kits. • Protection measures will be put in place to ensure that all hydrocarbons used during the construction phase are appropriately handled, stored and disposed of in accordance with the TII/NRA document "Guidelines for the crossing of watercourses during the construction of National Road Schemes".
Avoid concrete loss to water	Best practice during construction (concrete)	<ul style="list-style-type: none"> • Best practice will be employed in bulk-liquid concrete management addressing pouring and handling; secure shuttering / form-work and using adequate curing times. • Where shuttering is used, measures will be put in place to prevent against shutter failure and control storage, handling and disposal of shutter oils. • Disposal of raw or uncured waste concrete will be controlled using approved waste disposal and/or concrete wash-out pits to ensure that seepage to drains from the site is avoided. • Cement dust must be controlled as it is alkaline and harmful if enough of it settles on drainage water and is transported to nearby watercourses. Activities which result in the creation of cement dust must be controlled by dampening down areas. • In the event of a spillage on site, the material will be contained (using an absorbent material such as sand or soil or commercially available booms). All spillages will be reported to the project manager who will inform the relevant authorities in the event of a significant occurrence. No concrete works will take place over the river channel itself. • Implementation of An Environmental Incident and Emergency Response Plan including spill prevention control procedures. In the event of a spillage on site, the material will be contained (using an absorbent material such as sand or soil or commercially available booms). All spillages will be reported to the project manager who will inform the relevant authorities in the event of a significant occurrence.
Protection of river bed disturbance	Best practice during maintenance	<ul style="list-style-type: none"> • All works will be undertaken in accordance with the IFI guidance (Guidelines On Protection Of Fisheries During Construction Works In And Adjacent To Waters (IFI, 2016); • Bridge maintenance works will be conducted from July to Sept in accordance with the IFI 2016 guidance (i.e. outside salmonid spawning season); • The pontoon will be position under the work area to catch falling debris from the arches. Netting will be used to catch falling debris; and

Objective(s)	Measure	Details of Mitigation
		<ul style="list-style-type: none"> The Contractor will be required to agree the method statement for the works with the IFI in advance of works taking place.

5.1.1 Invasive Species

The Third Schedule IAS species Himalayan Balsam is located upstream of the proposed works.

The proposed works shall be sited to avoid all Third Schedule¹⁷ invasive non-native species. Great care will be taken at all times to ensure that plant material (i.e. fragments of stems, leaves and roots) is not spread while carrying out the proposed works.

The infested area shall be fenced-off and appropriate signage erected by a suitably qualified ecologist/ IAS management specialist.

The contractor shall include measures to avoid the spread of IAS within the CEMP. The IAS measures within the CEMP will contain the intended construction methodology for avoiding the spread of viable reproductive material of Himalayan Balsam and other species (i.e. leaves, stems and roots) and will follow best practice guidance documents. The CEMP shall include appropriate biosecurity measures to avoid the introduction of invasive alien plant species into the site. Management options for the control of Himalayan Balsam are as follows:

There are four main management options for Himalayan Balsam:

1. Best practice avoidance and biosecurity measures;
2. Physical or mechanical control;
3. Chemical control;
4. Excavation and burial on-site or disposal off-site.

The Himalayan Balsam is located upstream of the existing road bridge. As such, the current preferred option is avoidance. A pre-construction IAS survey shall be undertaken to establish the location of IAS in relation to the footprint of the works. Following the results of the pre-construction survey, should avoidance not be feasible, physical control of the infestation can be undertaken.

The Himalayan Balsam infestation at the proposed site is small. Hand pulling of Himalayan Balsam is considered to be the most effective treatment option for smaller stands as the species is shallow rooted (10-15cm). It is also the best method where the species occurs in mixed-stands of vegetation (Figure 3-3).

Hand pulling should be carried out in late April or May¹⁸ when plants can be easily identified but will not have developed seedpods. The plant stems should be gripped 0.5 metres above ground and carefully pulled which will normally remove the entire root. While the species does not spread by vegetative means, e.g. from fragments of root or stem, uprooted plants left in moist conditions can re-root from nodes on the stem. The plants removed should be placed in an area away from any watercourses and covered with light blocking material e.g. jute. By blocking out light the plants will degrade naturally, eliminating the potential to re-root or set seed. The infested area should be

¹⁷ <http://www.irishstatutebook.ie/eli/2011/si/477/made/en/print>

¹⁸ As indicated in Plate 1, the Himalayan Balsam at this site was not in flower during the survey undertaken on 14th June 2021

regularly monitored for new growth during this time. It is still possible to hand-pull isolated plants after they have flowered, but the plant tops should be covered with a plastic bag to prevent seed spread.

General Protective Measures

In addition to the measures outlined above for Himalayan Balsam, the following best practice avoidance measures shall be implemented by the Contractor which will help to contain and/or prevent the introduction of invasive species on the site as follows:

- All plant and equipment employed for the proposed development (e.g. diggers, tracked machines, footwear etc.) shall be thoroughly cleaned down using a power washer unit, and washed into a dedicated and contained area prior to arrival on site and on leaving site to prevent the spread of invasive aquatic/riparian species such as Japanese knotweed *Fallopia japonica* and Himalayan Balsam *Impatiens glandulifera*. A sign off sheet shall be maintained by the Contractor to confirm cleaning;
- Material gathered in the dedicated and contained clean down area shall be appropriately treated as contaminated material on site;
- For any material entering the site, the supplier shall provide an assurance that it is free of invasive species;
- Ensure all site users are aware of invasive species measures and prevention and treatment methodologies;
- Provision of toolbox talks before works begin on the site; and
- Adequate site hygiene signage shall be erected in relation to the management of non-native invasive material.

The Contractor will be required to prepare and implement an Invasive Species and Biosecurity Plan, which incorporates the above measures.

5.2 Operational Phase

Table 5-2: Table of Operational Phase Mitigation

Objective(s)	Measure	Details of Mitigation
Bats and aquatic species	Appropriate use of lighting. No disturbance to Potential Bat Roosting Habitat.	The bridge lighting has been designed to illuminate the deck of the pedestrian bridge. The lighting design will avoid illuminating important habitat for bats and aquatic species, i.e. the river and river banks. In accordance with Bat Conservation Trust & Institute of Lighting Professional Guidelines (2018), the following specifications will be followed when selecting the lighting luminaires: All luminaires should lack UV elements when manufactured. LED luminaires will be used where feasible. A warm white spectrum will be adopted to reduce blue light component Luminaries will feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats. Only luminaires with an upward light ratio of 0% and with good optical control should be used. There should be no upward or downward tilt of the luminaire. Potential roosting habitat at the site is limited to a dry arch of the existing road bridge. However, no works are proposed to the dry bridge arch. Should the situation change, a suitably qualified ecologist should be consulted in advance of any works.

5.3 Monitoring

The mitigation measures provided in Section 5.1 and Section 5.2 are routinely applied in development projects. Therefore, no monitoring to test the efficacy of the biodiversity mitigation measures provided for the proposed Pedestrian and Cycle Bridge, Celbridge is required.

5.4 Residual Impacts

With the effective implementation of the mitigation built in to the project design and the specific mitigation measures provided in Section 5 of this report, no significant residual impacts on terrestrial and aquatic ecology are expected to occur as a result of the proposed pedestrian and cycle bridge.

6 Conclusion

Provided that the mitigation measures provided in Section 5 of this report are effectively implemented, there will be no significant adverse ecological effects as a result of the proposed Pedestrian and Cycle Bridge, Celbridge, Co. Kildare.

7 References

- Altringham, J. (2003) *British Bats* The New Naturalist Series 93. Harper Collins.
- Bailey, M. and Rochford J. (2006) *Otter Survey of Ireland 2004/2005*. Irish Wildlife Manuals, No. 23. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.
- Bat Conservation Ireland, (2010). *Guidance notes for Planners, Engineers, Architects, and Developers*.
- Bat Conservation Trust & Institution of Lighting Professionals (2018). *Guidance Note 08/18: Bats and artificial lighting in the UK. Bats and the Built Environment Series*.
- Bibby, C.J., Burgess, N.D., Hill, D.A. and Mustoe, S.H. (2000). *Bird Census Techniques (Second Edition)*. Academic Press, London.
- Billington, G. E. & Norman, G. M. (1997). *A report on the survey and conservation of bat roosts in bridges in Cumbria, Kendal*. English Nature.
- Biodiversity Ireland National Biodiversity Data Centre Mapping System. Available: <http://maps.biodiversityireland.ie>. Last accessed 08.11.2021.
- Bruce-White, C. & Shardlow, M. (2011) *A Review of the Impact of Artificial Light on Invertebrates*. Buglife, The Invertebrate Conservation Trust.
- Chanin, P. (2003). *Ecology of the European Otter*. Conserving Natura 2000 Rivers Ecology Series No. 10. English Nature, Peterborough.
- Chanin P (2003) *Monitoring the Otter Lutra Lutra*. Conserving Natura 2000 Rivers Monitoring Series No. 10, English Nature, Peterborough.
- Chilibeck, B., G. Chislett, and G. Norris (1992) *Land development guidelines for the protection of aquatic habitat*. Department of Fisheries and Oceans, Canada. Habitat management division. Ministry of Environment Lands and Parks. Integrated Management Branch.
- CIEEM (2018) *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine*. The Chartered Institute for Ecology and Environmental Management.
- Collins, J. (ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn)*. The Bat Conservation Trust, London.
- Crowe, O., Coombes, R.H., O'Sullivan, O., Tierney, T.D., Walsh, A.J. and O'Halloran, J. (2014). *Countryside Bird Survey Report 1998-2013*. BirdWatch Ireland, Wicklow.
- Environmental Protection Agency online environmental information portal (<https://gis.epa.ie/EPAMaps/>).
- EPA (2002) *Guidelines on the information to be contained in Environmental Impact Statements*. Prepared by CAAS (Environmental Services), Environmental Protection Agency, Wexford.
- European Commission. (2000) *Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC*.
- Fossitt, J.A. (2000) *A Guide to Habitats in Ireland*. The Heritage Council, Kilkenny.

Geological Survey of Ireland (2011). GIS datasets Public Viewer. Online at http://spatial.dcenr.gov.ie/imf/imf.jsp?site=GSI_Simple

Gilbert et al (2021). Birds of Conservation Concern in Ireland (2020-2026). *Irish Birds* 43: 1-22.

Kelleher, C. & Marnell, F. (2006). Bat Mitigation Guidelines for Ireland.

Levasseur, M., Bergeron, N.E., Lapointe, M.F., & Bérubé, F. (2006). Effects of silt and very fine sand dynamics in Atlantic salmon (*Salmo salar*) redds on embryo hatching success. *Can. J. Fish. Aquat. Sci.* 63; pp. 1450-1459.

Lynas, P., Newton, S.F. and Robinson, J.A. (2007). The status of birds in Ireland: an analysis of conservation concern. *Irish Birds* 8: 149- 166.

Matthews, F. et al (2015) Barriers and Benefits: Implications of Artificial Night Lighting for the Distribution of Common Bats in Britain and Ireland. *Phil. Trans. R. Soc. B* 370 20140124.

McGarrigle, M.L., Bowman, J.J., Clabby, K.J., Cunningham, P., MacCárthaigh, M., Keegam, M., Cantrell, B., Lehance, M., Clenaghan, C. and Toner, P.F. (2002) Water Quality in Ireland 1998 2000. Environmental Protection Agency, Wexford, Ireland.

National Roads Authority (now TII) (2006a): Guidelines for the Protection and Preservation of Trees, Hedgerows and Scrub Prior to, During and Post Construction of National Road Schemes. Dublin: National Roads Authority.

National Roads Authority (2006): Guidelines for the Treatments of Bats Prior to the Construction of National Road Schemes. National Roads Authority, Dublin.

NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 3: Species Assessments. Unpublished Report, National Parks and Wildlife Services, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

NRA (2009) Guidelines for the Assessment of Ecological Impacts of National Road Schemes Rev. 2. National Roads Authority.

NRA (2008) NRA Guidelines on Ecological Surveying Techniques for Protected Flora and Fauna on National Road Schemes). National Roads Authority.

Roche et al. (2014) Irish Bats in the 21st Century. Bat Conservation Ireland.

Smith, G. F., O'Donoghue, P., O'Hora, K., Delaney, E., 2011. Best Practice Guidance for Habitat Survey and Mapping. The Heritage Council, Kilkenny.

Solbe, J. (1988) Water quality for Salmon and Trout. Atlantic Salmon Trust.

Stone E.L. (2013) Bats and Lighting: Overview of current evidence and mitigation.

Appendix A Geographical Reference for Ecological Assessment

Ecological Valuation
<p>International Importance:</p> <p>‘European Site’ including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation.</p> <p>Proposed Special Protection Area (pSPA).</p> <p>Site that fulfils the criteria for designation as a ‘European Site’ (see Annex III of the Habitats Directive, as amended).</p> <p>Features essential to maintaining the coherence of the Natura 2000 Network.</p> <p>Site containing ‘best examples’ of the habitat types listed in Annex I of the Habitats Directive.</p> <p>Resident or regularly occurring populations (assessed to be important at the national level) of the following:</p> <p>Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or</p> <p>Species of animal and plants listed in Annex II and/or IV of the Habitats Directive.</p> <p>Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971).</p> <p>World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972).</p> <p>Biosphere Reserve (UNESCO Man & the Biosphere Programme, 1971).</p> <p>Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979).</p> <p>Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979).</p> <p>Biogenetic Reserve under the Council of Europe.</p> <p>European Diploma Site under the Council of Europe.</p> <p>Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).</p>
<p>National Importance:</p> <p>Site designated or proposed as a Natural Heritage Area (NHA).</p> <p>Statutory Nature Reserve.</p> <p>Refuge for Fauna and Flora protected under the Wildlife Acts.</p> <p>National Park.</p> <p>Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park.</p> <p>Resident or regularly occurring populations (assessed to be important at the national level) of the following:</p> <p>Species protected under the Wildlife Acts; and/or</p> <p>Species listed on the relevant Red Data list.</p> <p>Site containing ‘viable areas’ of the habitat types listed in Annex I of the Habitats Directive.</p>
<p>County Importance:</p> <p>Area of Special Amenity.</p> <p>Area subject to a Tree Preservation Order.</p> <p>Area of High Amenity, or equivalent, designated under the County Development Plan.</p> <p>Resident or regularly occurring populations (assessed to be important at the County level) of the following:</p> <p>Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;</p> <p>Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;</p> <p>Species protected under the Wildlife Acts; and/or</p> <p>Species listed on the relevant Red Data list.</p> <p>Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance.</p> <p>County important populations of species or viable areas of semi-natural habitats or natural heritage features identified in the National or Local BAP, if this has been prepared.</p> <p>Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county.</p>

Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.

Local Importance (higher value):

Locally important populations of Priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared;

Resident or regularly occurring populations (assessed to be important at the Local level) of the following:

Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;

Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;

Species protected under the Wildlife Acts; and/or

Species listed on the relevant Red Data list.

Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality;

Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.

Local Importance (lower value):

Sites containing small areas of semi-natural habitat that are of some local importance for wildlife;

Sites or features containing non-native species that are of some importance in maintaining habitat links.

Appendix B NBDC Protected and Invasive Species Records from a 2km Radius of the Site

Species Name	Record Count	Date Last Recorded	Protection
Common Frog (<i>Rana temporaria</i>)	9	04/03/2020	Annex V, Wildlife Acts
Barn Owl (<i>Tyto alba</i>)	4	31/12/2011	Wildlife Acts, Red List
Barn Swallow (<i>Hirundo rustica</i>)	6	31/12/2011	Wildlife Acts, Amber List
Black-headed Gull (<i>Larus ridibundus</i>)	3	31/12/2011	Wildlife Acts, Red List
Common Coot (<i>Fulica atra</i>)	7	19/10/2020	Wildlife Acts, Amber List
Common Grasshopper Warbler (<i>Locustella naevia</i>)	1	31/07/1991	Wildlife Acts, Amber List
Common Kestrel (<i>Falco tinnunculus</i>)	4	31/12/2011	Wildlife Acts, Amber List
Common Kingfisher (<i>Alcedo atthis</i>)	4	31/12/2011	Wildlife Acts, Annex I Bird Species, Amber List
Common Linnet (<i>Carduelis cannabina</i>)	4	31/12/2011	Wildlife Acts, Amber List
Common Snipe (<i>Gallinago gallinago</i>)	2	31/12/2011	Wildlife Acts, Amber List
Common Starling (<i>Sturnus vulgaris</i>)	9	31/12/2011	Wildlife Acts, Amber List
Common Swift (<i>Apus apus</i>)	5	28/07/2016	Wildlife Acts, Amber List
Corn Crake (<i>Crex crex</i>)	1	31/07/1972	Wildlife Acts, Annex I Bird Species, Red List
Eurasian Curlew (<i>Numenius arquata</i>)	1	31/07/1972	Wildlife Acts, Red List
Eurasian Teal (<i>Anas crecca</i>)	1	31/12/2011	Wildlife Acts, Amber List
Eurasian Tree Sparrow (<i>Passer montanus</i>)	2	31/12/2011	Wildlife Acts, Amber List
Eurasian Woodcock (<i>Scolopax rusticola</i>)	2	31/12/2011	Wildlife Acts, Amber List
Great Cormorant (<i>Phalacrocorax carbo</i>)	1	31/12/2011	Wildlife Acts, Amber List
Great Crested Grebe (<i>Podiceps cristatus</i>)	3	31/12/2011	Wildlife Acts, Amber List
Grey Partridge (<i>Perdix perdix</i>)	1	31/07/1972	Wildlife Acts, Red List
Herring Gull (<i>Larus argentatus</i>)	1	31/12/2011	Wildlife Acts, Red List
House Martin (<i>Delichon urbicum</i>)	4	31/12/2011	Wildlife Acts, Amber List
House Sparrow (<i>Passer domesticus</i>)	8	31/12/2011	Wildlife Acts, Amber List
Lesser Black-backed Gull (<i>Larus fuscus</i>)	1	31/12/2011	Wildlife Acts, Amber List
Little Egret (<i>Egretta garzetta</i>)	2	31/12/2011	Wildlife Acts, Annex I Bird Species
Little Grebe (<i>Tachybaptus ruficollis</i>)	5	19/10/2020	Wildlife Acts, Amber List
Mallard (<i>Anas platyrhynchos</i>)	11	19/10/2020	Wildlife Acts
Mew Gull (<i>Larus canus</i>)	2	31/12/2011	Wildlife Acts, Amber List
Mute Swan (<i>Cygnus olor</i>)	8	19/10/2020	Wildlife Acts, Amber List
Northern Lapwing (<i>Vanellus vanellus</i>)	3	31/12/2011	Wildlife Acts, Red List
Peregrine Falcon (<i>Falco peregrinus</i>)	1	31/12/2011	Wildlife Acts, Annex I Bird Species
Rock Pigeon (<i>Columba livia</i>)	4	31/12/2011	Wildlife Acts,

Sand Martin (<i>Riparia riparia</i>)	2	31/12/2011	Wildlife Acts, Amber List
Sky Lark (<i>Alauda arvensis</i>)	3	31/12/2011	Wildlife Acts, Amber List
Spotted Flycatcher (<i>Muscicapa striata</i>)	2	31/12/2011	Wildlife Acts, Amber List
Stock Pigeon (<i>Columba oenas</i>)	2	31/12/2011	Wildlife Acts, Amber List
Tufted Duck (<i>Aythya fuligula</i>)	3	19/10/2020	Wildlife Acts, Amber List
Water Rail (<i>Rallus aquaticus</i>)	2	31/12/2011	Wildlife Acts, Amber List
Yellowhammer (<i>Emberiza citrinella</i>)	5	31/12/2011	Wildlife Acts, Red List
Freshwater, White-clawed Crayfish (<i>Austropotamobius pallipes</i>)	1	01/09/2016	Annex II, Annex V, Wildlife Acts
<i>Arthurdendyus triangulatus</i>	1	09/08/2016	High Impact Invasive Species
Canadian Waterweed (<i>Elodea canadensis</i>)	1	02/05/2007	High Impact Invasive Species, Regulation S.I. 477 (Ireland)
Cherry Laurel (<i>Prunus laurocerasus</i>)	3	14/02/2020	High Impact Invasive Species
Indian Balsam (<i>Impatiens glandulifera</i>)	5	16/08/2020	High Impact Invasive Species, Regulation S.I. 477 (Ireland)
Japanese Knotweed (<i>Fallopia japonica</i>)	1	29/07/2020	High Impact Invasive Species, Regulation S.I. 477 (Ireland)
Narrow-mouthed Whorl Snail (<i>Vertigo (Vertilla) angustior</i>)	2	11/04/1968	Annex II, Wildlife Acts
American Mink (<i>Mustela vison</i>)	1	10/07/2017	High Impact Invasive Species, Regulation S.I. 477 (Ireland)
Brown Long-eared Bat (<i>Plecotus auritus</i>)	3	18/05/2008	Annex IV, Wildlife Acts
Brown Rat (<i>Rattus norvegicus</i>)	1	01/04/2014	High Impact Invasive Species, Regulation S.I. 477 (Ireland)
Daubenton's Bat (<i>Myotis daubentonii</i>)	4	12/09/2007	Annex IV, Wildlife Acts
Eastern Grey Squirrel (<i>Sciurus carolinensis</i>)	5	05/12/2014	High Impact Invasive Species, EU Regulation No. 1143/2014, Regulation S.I. 477 (Ireland)
Eurasian Badger (<i>Meles meles</i>)	7	31/12/2011	Wildlife Acts
Eurasian Red Squirrel (<i>Sciurus vulgaris</i>)	2	21/04/2017	Wildlife Acts
European Otter (<i>Lutra lutra</i>)	1	17/10/2011	Annex II, Annex IV, Wildlife Acts
House Mouse (<i>Mus musculus</i>)	1	23/12/2015	High Impact Invasive Species
Lesser Noctule (<i>Nyctalus leisleri</i>)	9	16/07/2008	Annex IV, Wildlife Acts
Natterer's Bat (<i>Myotis nattereri</i>)	4	12/09/2007	Annex IV, Wildlife Acts
Pipistrelle (<i>Pipistrellus sensu lato</i>)	10	06/05/2014	Annex IV, Wildlife Acts
Soprano Pipistrelle (<i>Pipistrellus pygmaeus</i>)	6	18/05/2008	Annex IV, Wildlife Acts
West European Hedgehog (<i>Erinaceus europaeus</i>)	15	21/10/2020	Wildlife Acts