Comhairle Cathrach & Contae Luimnigh

Limerick City & County Council

Limerick City Greenway (UL to NTP)

Natura Impact Statement

July 2025

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EXECUTIVE SUMMARY

This report has been prepared to support a planning application to An Bord Pleanála made under Section 51(A) of the Roads Act (1993) (As amended). This report has been prepared by Ryan Hanley on behalf of Limerick City & County Council (LCCC).

The proposed Limerick City Greenway (University of Limerick (UL) to National Technology Park (NTP)) will be 4.25km long and will consist of a 3.3km long and 3.0-4.0m wide shared path on existing paths or in green fields, and 0.9km of separated 1.8m wide footpaths and 1.8-2.0m wide cycle lanes alongside the eastern and western sides of University Road and McLaughlan Road. The proposed Greenway will extend between the River Goody bridge and Plassey Park Road.

All elements of this project will be constructed for permanent local and visitor recreational use.

There will be no buildings constructed along the route.

Two concrete bridge decks will be replaced with wider steel decks, but the existing bridge supports will remain. One new steel and concrete bridge will replace a narrow reinforced concrete bridge. One new steel and concrete bridge will provide access to all and replace the function of a narrow reinforced concrete bridge with steps, but the exiting bridge will remain in place. One new steel and concrete bridge will be constructed alongside a narrow stone bridge. A new concrete ramp to Plassey Beach will replace stone steps, and a new concrete retaining wall will enable the existing gravel path at Plassey Beach to be widened to 3.5m.

The proposed Greenway will be constructed in Castletroy, Co. Limerick. It will extend eastwards from the existing Limerick Smarter Travel Cycle Route 2 to run along the southern bank of the River Shannon and provide a new connection between the existing Shannon Fields Greenway to UL path at Groody Bridge, and existing cycle lanes and footpaths on Plassey Park Road. It will also provide new connections to the IDA's National Technology Park (NTP) at Plassey, and the University of Limerick. This proposed Greenway east of Limerick city will extend existing cycle routes from the city further east and provide future links to Castleconnell and to Co. Clare.

The proposed Limerick City Greenway (UL to NTP) is included in Section 9.1.7 Greenway Cycle Network in the Limerick Shannon Metropolitan Area Transport Study (LSMATS) and is described as an '*Extension of the Shannon Fields Greenway to UL along the banks of River Shannon to the NTP and Annacotty*'. The Limerick Development Plan 2022-2028 (LDP) includes policies to deliver modal split (Objective TR 06), to promote '*walking, cycling or other non-motorised wheel-based transport modes for purposeful travel*' (Section 7.5.2), to encourage behavioural change (Objective TR 07), to provide walking and cycling infrastructure (Objective TR O8), and to promote sustainable patterns of transport use (Objective TR P4). This project will provide an accessible cycling and walking route for users of all abilities in accordance with the objectives in the LDP and LSMATS.

The project is not a class of development for which mandatory Environmental Impact Assessment (EIA) is required as specified in either Part 1 of Schedule 5 of the Planning and Development Regulations, 2001 (as amended) or in Part 2 of Schedule 5 of the Planning and Development Regulations, 2001 (as amended). The Formal EIA screening process was completed having regard to the Roads Act as amended by the EIA Directive 2014/52/EU. An EIA report has been prepared for this project. An AA Screening Report was prepared for this project. It concluded that a Natura Impact Statement (NIS) was required so an NIS has been prepared for this project.

The proposed Greenway will provide strategic, sustainable, and safe connectivity between Limerick city the University of Limerick, the National Technology Park, and connect community facilities, tourist attractions, and transport nodes (i.e., bus stations). This connectivity will benefit communities, businesses, and visitors.

The proposed works for the construction of the Limerick City Greenway (UL to NTP) will be on land for which specific planning objectives are in place. All applicable planning objectives have been examined and any risks to the meeting of same have been mitigated. As a result, the development of the proposed Greenway will not significantly impede development potential or zoning objectives of the land. The proposed development is consistent with planning policy at National, Regional and Local level and is in accordance with proper planning and sustainable development.

1 Introduction and Background to the Project

1.1 General Introduction

Ryan Hanley was commissioned by Limerick City and County Council (LCCC) to collate information to complete an Appropriate Assessment (AA) Screening for the proposed Limerick City Greenway (UL to NTP) Project. The AA Screening report identified and assessed potential likely significant effects which are likely to occur as a result of the proposed construction of the Greenway in the context of the Lower River Shannon SAC and its Qualifying Interests and Conservation Objectives. The AA Screening report concluded that in accordance with Article 6(3) of the Habitats Directive, the proposed works (i.e., the construction of the proposed Greenway) will result in likely significant effects on the European site, in the absence of mitigation having regard to the site's conservation objectives, and a Stage 2 Appropriate Assessment was deemed to be necessary, requiring the preparation of a Natura Impact Statement (NIS).

This NIS was prepared in accordance with the European Commission guidance document Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological Guidance on the provisions of Article 6(3) and 6(4) of the Habitats Directive 92/43EEC (EC, 2001), European Communities (2018) Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC, Office for the Official Publications of the European Communities, Luxembourg. European Commission and the Department of the Environment's Guidance on the Appropriate Assessment of Plans and Projects in Ireland (December 2009, amended February 2010).

In addition to guidance documents referenced above, the following relevant guidance was considered in the preparation of this report:

- DoEHLG Circular NPWS 1/10 & PSSP 2/10 Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities.
- DoEHLG (2010) Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities. Department of the Environmental Heritage and Local Government.
- European Commission (2000) Communication from the Commission on the Precautionary Principle. Office for Official Publications of the European Communities, Luxembourg. European Commission.
- European Commission (2001) Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Articles 6(3) and (4) of the Habitats Directive 92/43/EEC.
- European Commission (2013). Interpretation Manual of European Union Habitats. Version EUR 28. European Commission.
- European Commission (2018) Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC.
- EC (2007) Guidance document on Article 6(4) of the 'Habitats' Directive 92/43/EEC Clarification of concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission. European Commission.
- European Commission (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. Brussels, 28.9.2021C (2021) 6913 Final.
- European Union (Birds and Natural Habitats) Regulations 2011 to 2015.
- National Transport Authority (2023) Guidance for EIA and AA Screening of active Travel projects funded by the NTA.

- Office of the Planning Regulator (2021) Appropriate Assessment Screening for Development Management.
- Planning and Development Act 2000 (as amended).

The proposed Greenway forms part of a larger cycle network as outlined in the Limerick Shannon Metropolitan Area Transport Strategy 2022 and the Limerick Development Plan 2022-2028 (LDP). The focus of the LSMATS is to promote sustainable modes of transport including cycling (and walking) as realistic transport modes in the Limerick metropolitan area, making Limerick an attractive location for cyclists of all ages and abilities by proposing the development of a consistent, clear, and continuous network of urban and suburban cycle networks throughout the area.

1.1 Legislative Context

The Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora, better known as "The Habitats Directive", provides legal protection for habitats and species of European importance. Articles 3 to 9 provide the legislative means to protect habitats and species of Community interest through the establishment and conservation of an EU-wide network of sites known as Natura 2000. These are Special Areas of Conservation (SACs) designated under the Habitats Directive and Special Protection Areas (SPAs) designated under the Conservation of Wild Birds Directive (79/409/ECC) as codified by Directive 2009/147/EC.

Article 6(3) states:

"Any plan or project not directly connected with or necessary to the management of the [Natura 2000] site but likely to have a significant effect thereon, either individually or in combination with other plans and projects, shall be subjected to appropriate assessment of its implications for the site in view of the site's conservation objectives. In light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public."

Article 6(4) states:

"If, in spite of a negative assessment of the implications for the [Natura 2000] site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, Member States shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted."

1.2 The Aim of this Report

This NIS shall identify, in light of the best scientific knowledge in the field, all aspects of the works that have the potential, either individually or in combination with other plans or projects, to adversely affect the integrity of the Lower River Shannon SAC in the context of their Conservation Objectives. In order to facilitate the Competent Authority in its Appropriate Assessment of the proposed construction of the travel path, the NIS must contain complete, precise and definitive findings and include an examination, analysis, evaluations, findings and conclusions.

1.3 Statement of Authority

Breda Quinn is an Ecologist for Ryan Hanley, joining in 2021 and she compiled this NIS report. Breda has over 4 years' post graduate experience as a professional ecologist. Breda has completed many Appropriate Assessment Screenings, Natura Impact Statements, Ecological Impact Assessments (EIA), Environmental Impact Assessment Screenings, and Invasive Species Summary Reports across a range of

projects with Ryan Hanley. Breda has extensive field survey experience, with expertise in breeding and wintering bird surveying, bat activity surveys, and invasive alien plant species surveys.

Paola Rodolfi joined Ryan Hanley as an Environmental Scientist in 2022 and was co-author of this NIS report. Paola has over 10 years' experience in environmental management, preparing EIAR, NIS and other related reports. Her experience further includes carbon assessment calculations, sustainability reports and GIS analysis tools.

John O'Connor, M.Sc., B.Sc., CEnv., MIEnvSc., MCIEEM, PIEMA, QTS., Head of Environment & Ecology at Ryan Hanley, performed multidisciplinary surveys for the project. John is a Chartered Environmental Scientist and Principal Ecologist. He has over 20 years' experience in delivering Environmental and Ecological projects.

Trevor Stafford joined Ryan Hanley as Senior Ecologist in 2018 and reviewed this NIS report. Trevor has over 17 years' post graduate experience as a professional ecologist. Trevor has extensive field and technical experience in assessing the ecological impacts of plans and projects as required under EU Directives.

Brendan Larkin, BA, BAI, MBA, CEng, is Ryan Hanley's Lead Designer and Project Manager for the Limerick City Greenway (UL to NTP) project. Brendan has 22 years' experience in in the design, project management and construction stage supervision of water and wastewater engineering, greenways and cycle lanes, urban spaces, environmental and construction projects. Brendan has overall responsibility for this project.

1.4 Project Location

The proposed Limerick City Greenway (UL to NTP) will be 4.25km long and will consist of a 3.3km long and 3.0-4.0m wide shared path on existing paths or in green fields (refer to the orange and green lines on Figure 1 1), and 0.9km of separated 1.8m wide footpaths and 1.8-2.0m wide cycle lanes alongside the eastern and western sides of University Road and McLaughlan Road (refer to the blue lines on). The proposed Greenway will extend between the River Goody bridge and Plassey Park Road.

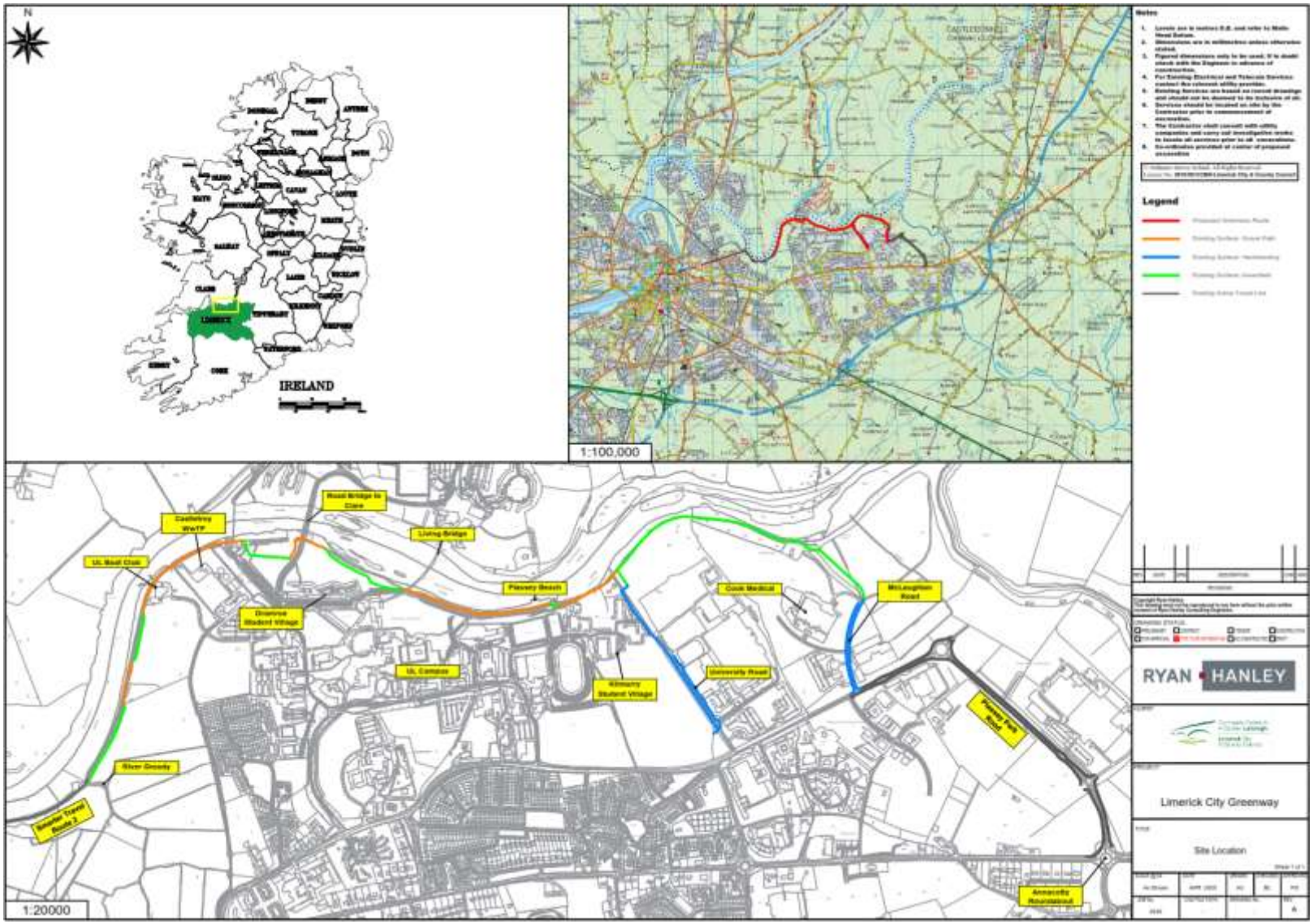

Figure 1-1: Location Map

2 Methodology and Report Structure

The approach taken in the preparation of this document is based on standard methods and follows best practice guidance as listed in Section 1.1.

2.1 Desk Study

A desk study was carried out to collate the available information on the ecological environment in the footprint of the proposed greenway construction works and wider study area. The AA GeoTool application (EPA mapping tool) was used to support the data gathering process during screening (Stage 1) and the appropriate assessment (Stage 2) (EC, 2021). The National Parks and Wildlife Service (NPWS) and the National Biodiversity Data Centre (NBDC), along with other sites, have been consulted in order to identify, confirm, and update existing records of Qualifying Interests and Special Conservation Interests and/or to identify the presence of suitable habitat for these species within the zone of influence of the proposed works:

- National Parks and Wildlife Service – online European Site information www.npws.ie;
- National Parks and Wildlife Service – Information on the status of EU protected habitats in Ireland (NPWS 2013a & 2013b);
- National Parks and Wildlife – Data Information Request;
- Environmental Protection Agency – Water Quality www.epa.ie; EPA mapping system http://gis.epa.ie; www.catchment.ie website;
- Information on www.wfdireland.ie and www.housing.gov.ie for the River Basin Management Plan 2018 – 2021 (RBMP, 2018);
- Water Action Plan 2024: A River Basin Management Plan for Ireland;
- Geological Survey of Ireland – Geology, soils and Hydrogeology www.gsi.ie;
- Information on the conservation status of birds in Ireland (Colhoun & Cummins, 2013);
- National Biodiversity Data Centre (NBDC) online database http://www.biodiversityireland.ie/; and
- The Heritage Council http://heritagemaps.ie.

The habitats and species of Qualifying Interest (QI) for SACs and SPAs were the main focus of the desktop studies and therefore, any supporting documentation on the NPWS website for the European Sites, was also consulted in order to identify and confirm records of habitats and species within the area. Aerial imagery was consulted in order to get a broad overview of the habitat types present within the vicinity of the proposed works.

The LCCC website (www.limerick.ie) was consulted for information on other plans/projects in the area, which could result when cumulative impacts are considered in combination with the proposed Greenway.

The following plans and projects were also reviewed and considered for in-combination effects:

- Limerick Development Plan 2022-2028
- EPA database for licenced activities; and
- Department of Housing, Planning, and Local Government – online land use mapping www.myplan.ie/en/index.html.

2.2 Consultations with Stakeholders

Consultation has been carried out during the project development with relevant stakeholders and consultees identified for this project. They are listed in the table below.

Table 2-1: Stakeholder Register

Date	Stakeholder	Document	Response
13/05/2021	LCCC Heritage	EIA Scoping Report	Recommended to engage Archaeologist and Architectural Conservation officer
03/06/2021	LCCC Archaeologist	EIA Scoping Report	Met Sarah on site to discuss the proposed Greenway and took on board her recommendations
04/06/2021	LCCC Architectural Conservation	EIA Scoping Report	Met Tom on site and he recommended conservation of Bridge 2. Asked if Plassey Mills and Troy Castle could also be conserved as part of the project
18/06/2021	Waterways Ireland	Letter, Design drawings, and EIA Scoping Report	No response
18/06/2021	Office of Public Works	Letter, Design drawings, and EIA Scoping Report	No response
18/06/2021	National Parks & Wildlife Service	Letter, Design drawings, and EIA Scoping Report	No response
18/06/2021	Inland Fisheries Ireland	Letter, Design drawings, and EIA Scoping Report	No response
18/06/2021	An Garda Siochana	Letter, Design drawings, and EIA Scoping Report	No response
21/06/2021	IDA Castletroy	Letter and EIA Scoping Report	Multiple responses. Primarily concerned about route along Mulcair River behind J&J campus. Coordination with IDA flood defence engineers
21/06/2021	UL Facilities	Letter and EIA Scoping Report	Multiple. Met Ger Manning on site on two occasions and presented the project to his Facilities team.
11/08/2022	An Bord Pleanála	Cover Letter, Planning Report, Site Location plan, Design and Cross Sections drawings, 3d photomontages	Met with ABP in October 2022
19/10/2022	President of UL	Letter explaining the route through UL	No response
18/11/2022	ESB	Letter explaining the project and locations of proposed connections to the ESB network	No response
20/06/2024	Breda Ingle	Update for planning application ABP-314351-22	Provided a timeline to ABP for submission in Q3 2024

Date	Stakeholder	Document	Response
26/08/2024	Office of Public Works	Query about Section 50 requirement for culverts	Response received. Section 50 assessment required throughout.
07/01/2025	IDA Castletroy	Stakeholder letter and Location map	No response
07/01/2025	UL Facilities	Stakeholder letter and Location map	No response
07/01/2025	Failte Ireland	Stakeholder letter and Location map	No response
07/01/2025	Waterways Ireland	Stakeholder letter and Location map	No response
07/01/2025	Inland Fisheries Ireland	Stakeholder letter and Location map	No response
07/01/2025	Environmental Protection Agency	Stakeholder letter and Location map	No response
07/01/2025	Dept. of Environment	Stakeholder letter and Location map	No response
07/01/2025	Dept. of Housing, Local Government and Heritage	Stakeholder letter and Location map	No response
07/01/2025	ESB	Stakeholder letter and Location map	No response
07/01/2025	Eirgrid	Stakeholder letter and Location map	No response
07/01/2025	Uisce Eireann	Stakeholder letter and Location map	No response
07/01/2025	An Taisce	Stakeholder letter and Location map	No response
25/03/2025	An Bord Pleanála	LCG determination for EIA report	No response
25/03/2025	LCCC Ecologist	Stakeholder letter and Location map	No response
25/03/2025	LCCC Archaeologist	Stakeholder letter and Location map	No response
25/03/2025	LCCC Conservation Officer	Stakeholder letter and Location map	No response
29/04/2025	OPW	OPW letter and Map	No response
30/04/2025	An Bord Pleanála	Letter and 2nd pre-application consultation meeting minutes, request to close pre-consultation process	Response received on 20th May 2025. Pre-consultation process closed.
20/05/2025	NPWS (DAU)	Letter re Bats and Public lighting, Location map	No response
17/06/2025	Rosa Donovan (Fisherman cottages)	Rosa Donovan letter with flood relief text and relevant drawings	No response
17/06/2025	Inland Fisheries Ireland	Letter regarding proposed construction works at riverbanks	No response
July 2025	IDA Castletroy	Letter notifying Stakeholder that Planning Application has been issued to ABP	Not yet issued to Stakeholder

Date	Stakeholder	Document	Response
July 2025	UL Facilities	Letter notifying Stakeholder that Planning Application has been issued to ABP	Not yet issued to Stakeholder
July 2025	Failte Ireland	Letter notifying Stakeholder that Planning Application has been issued to ABP	Not yet issued to Stakeholder
July 2025	Waterways Ireland	Letter notifying Stakeholder that Planning Application has been issued to ABP	Not yet issued to Stakeholder
July 2025	Inland Fisheries Ireland	Letter notifying Stakeholder that Planning Application has been issued to ABP	Not yet issued to Stakeholder
July 2025	Environmental Protection Agency	Letter notifying Stakeholder that Planning Application has been issued to ABP	Not yet issued to Stakeholder
July 2025	Dept. of Environment	Letter notifying Stakeholder that Planning Application has been issued to ABP	Not yet issued to Stakeholder
July 2025	Dept. of Housing, Local Government and Heritage	Letter notifying Stakeholder that Planning Application has been issued to ABP	Not yet issued to Stakeholder
July 2025	ESB	Letter notifying Stakeholder that Planning Application has been issued to ABP	Not yet issued to Stakeholder
July 2025	Eirgrid	Letter notifying Stakeholder that Planning Application has been issued to ABP	Not yet issued to Stakeholder
July 2025	Gas Networks Ireland	Letter notifying Stakeholder that Planning Application has been issued to ABP	Not yet issued to Stakeholder
July 2025	Uisce Eireann	Letter notifying Stakeholder that Planning Application has been issued to ABP	Not yet issued to Stakeholder
July 2025	An Taisce	Letter notifying Stakeholder that Planning Application has been issued to ABP	Not yet issued to Stakeholder
July 2025	Fire Service	Letter notifying Stakeholder that Planning Application has been issued to ABP	Not yet issued to Stakeholder
July 2025	HSE Ambulance	Letter notifying Stakeholder that Planning Application has been issued to ABP	Not yet issued to Stakeholder
July 2025	An Garda Siochana	Letter notifying Stakeholder that Planning Application has been issued to ABP	Not yet issued to Stakeholder
July 2025	UL Director of the Buildings and Estates department	Letter notifying Stakeholder that Planning Application has been issued to ABP	Not yet issued to Stakeholder

Date	Stakeholder	Document	Response
July 2025	OPW	Letter notifying Stakeholder that Planning Application has been issued to ABP	Not yet issued to Stakeholder
July 2025	Clare County Council	Letter notifying Stakeholder that Planning Application has been issued to ABP	Not yet issued to Stakeholder
July 2025	TII	Letter notifying Stakeholder that Planning Application has been issued to ABP	Not yet issued to Stakeholder
July 2025	NTA	Letter notifying Stakeholder that Planning Application has been issued to ABP	Not yet issued to Stakeholder
July 2025	Arts Council	Letter notifying Stakeholder that Planning Application has been issued to ABP	Not yet issued to Stakeholder
July 2025	Heritage Council	Letter notifying Stakeholder that Planning Application has been issued to ABP	Not yet issued to Stakeholder
July 2025	Southern Regional Assembly	Letter notifying Stakeholder that Planning Application has been issued to ABP	Not yet issued to Stakeholder
July 2025	Department of Transport	Letter notifying Stakeholder that Planning Application has been issued to ABP	Not yet issued to Stakeholder
July 2025	Dept. of Tourism, Culture, Arts, Gaeltacht, Sports and Media	Letter notifying Stakeholder that Planning Application has been issued to ABP	Not yet issued to Stakeholder
July 2025	Commissioner of Public Works in Ireland	Letter notifying Stakeholder that Planning Application has been issued to ABP	Not yet issued to Stakeholder

A pre-planning consultation meeting was held with An Bord Pleanála (the Planning Authority), and representatives of Limerick City and County Council (LCCC, the prospective applicant), and Ryan Hanley on 13th October 2022. A second pre-planning consultation meeting was held with An Bord Pleanála on 11th November 2024.

Presentations about the proposed design were provided to elected representatives on 21st July 2021 and 13th October 2022.

A public information event took place on 4th of August 2022 at the Kilmurry Village Hall in the University of Limerick campus. The project team's objectives for the Public Information Day was:

- To inform the public about the proposed Limerick City Greenway (UL to NTP);
- Inform the public of the process and answer questions; and
- Invite submissions on the design process.

A virtual consultation room was set up to allow community and public a chance access project material as well as to provide feedback and comments on the proposed design.

The proposed Greenway passes through public and private lands. The number of private properties that the proposed Greenway passes through has been kept to a minimum in order to minimise the number of land use agreements to be arranged to facilitate the works. Folios are registered to the following:

- Individual landowners;
- The University of Limerick (UL);
- Shannon Commercial Enterprises Designated Activity Company;
- The IDA (with lease agreements to companies including Johnson & Johnson Vision Care); and
- Limerick City and County Council (LCCC).

There are leaseholds and sublease-holds, owned by UL, a leasehold held by Holmes, O'Malley and Sexton Solicitors and sublease-hold held by Plassey Campus Centre Limited.

In advance of submission for planning for the proposed Greenway to An Bord Pleanála (APB), the design proposal was communicated to freeholders and tenants and when applicable, an agreement of no objection was received in writing from the freeholders and tenants regarding the proposed plans for the Limerick City Greenway (UL to NTP). Engagement with freeholders and tenants was carried out as early as possible, once the design was established, to ensure agreement is secured pre-planning and that feedback from stakeholders was collected and incorporated into the final detailed design.

Due to the non-invasive nature of the proposed Greenway and the amenity value it will add to the area, it is proposed that lands required for the proposed Greenway will be acquired by agreement, with land purchase if this cannot be achieved.

2.3 Field Walkover Surveys

Site Visits were made during 2020, 2021, 2022, 2023 and 2024 with a focus on habitats, mammals, bats, birds, and freshwater aquatic ecology occurring within the environs of the proposed scheme. The ecology of the area surrounding the proposed development was first assessed in terms of habitats, flora, fauna, and invasive species. The area over which the proposed development has the potential to result in effects to the Zone of Influence was determined by careful scientific analysis.

The surveys undertaken for the Limerick City Greenway (UL to NTP) Project includes:

- Preliminary multi-disciplinary walkover survey (04.11.2020 and 28.04.2022)
- Ecology habitat survey (14.05.2021 and 28.04.2022)
- Aquatic Ecology Appraisal (updated October 2023)
- WFD Assessment – RHAT survey (15.07.2024)
- Badger survey (15.05.2021 and 15.07.2024)
- Bat survey (19.07.21, 9.09.2021 to 21.09.2021 – 19.06.2024 and 10.07.2024)
- Breeding bird survey (June 2021, April and June 2022, and May and June 2023)
- Winter bird survey (5. No Site Visits – November 2021 to March 2022 and 6. No. Site Visits October 2023 to March 2024)
- Invasive Alien Plant Species survey (5.11.2020 and 14.05.2021 – 26.06.2024 and 03.07.2024)
- Otter survey (15.05.2021 and 08.07.2024)
- Tree survey and arboriculture impact assessment (26.05.21, 22.06.21 and 20.02.2024, 24.02.2024)

All surveys were undertaken by professional ecologists with the professional experience and necessary qualifications required to carry them out.

2.4 Report Structure

The information contained in this NIS is designed to allow the Competent Authority to assess 1) whether there will be any adverse effects on the integrity of a European Site and 2) the implications of the project, alone or in combination with other plans and projects, in view of the Sites Conservation Objectives.

In Section 3 of the report, the existing paths and bridges are defined, and the proposed development is fully described.

Following in from this is Section 4, a description of the baseline environment is provided including details of both desk studies and field surveys completed.

In Section 5, there is an evaluation of the European Site and its Qualifying Interests brought forward for Appropriate Assessment using Source » Pathway » Receptor method. The potential for the proposed development to result in significant effects on each of the Qualifying Interests (QIs) of the European Sites, is fully assessed and measures that are designed to mitigate any adverse effects, are described in Section 6.

Section 7 addresses residual effects following the implementation of mitigation measures, and a comprehensive assessment of the potential cumulative effects of the proposed works, when considered in combination with other plans and projects, is included in Section 8.

Finally, in Section 9, a concluding statement is made as to whether the proposed development has the potential to result in adverse effects on any European sites.

The assessment of potential adverse effects follows the Precautionary Principle as detailed in Article 191 of the Treaty on the Functioning of the European Union (EU). It aims at ensuring a higher level of environmental protection through preventative decision-making in case of a risk and underpins the Habitats Directive (DoEHLG 2010). The Precautionary Principle is the underlying concept of sustainable development which implies that prudent action be taken to protect the environment even in the absence of scientific certainty (DoEHLG 2010).

3 Description of the Proposed Development

3.1 Existing gravel path, green field, and roads

The proposed Limerick City Greenway (UL to NTP) will be constructed alongside the southern bank of the River Shannon between the River Groody bridge and east of Cook Medical in the IDA park. There will be links perpendicular to the river between Kilmurray Student Village and University Road, and between Cook Medical/McLaughlan Road and Plassey Park Road.

Refer to the Preliminary Design drawings in Appendix A for Chainages.

CH000 – CH300

The proposed route commences west from the existing River Groody bridge (Figure 3-1) at the confluence of the River Groody with the River Shannon.

Figure 3-1: Existing Bridge at River Groody

The proposed Greenway route will divert from and run adjacent to an existing narrow walking track along the southern bank of the River Shannon. The existing narrow path has a wooden fence along its sides and there have been complaints to LCCC from the public regarding the width of the path, especially in relation to the speed of cyclists and scooter users. For this reason a new 3.5m wide path is proposed to be constructed between CH0-300.

Figure 3-2: Start of proposed greenway in green field with existing path alongside

CH300-CH430

The proposed greenway will cross the land drain and rejoin the existing path which will be resurfaced but the existing path will remain the same. The path will avoid a small forest of trees that were planted to compensate for habitat loss when the Living Bridge that connects the UL Campus that is located in Co. Limerick and in Co. Clare was constructed. The path will cross the existing bridge at CH400.

Figure 3-3: Existing bridge at CH400

CH430-CH615

The proposed greenway will divert away from the existing path and run through a green field. It will cross a land drain.

CH615-CH795

The proposed greenway will rejoin the existing path and run in front of the UL Boat Club building, and the UL slipway. The existing ESB covered will be raised to match the level of the proposed greenway (approx. 150mm higher than existing).

Figure 3-4: Existing path to be resurfaced

The proposed greenway will continue along the existing paved path until the surface changes from paved to gravel surface. It will connect to an existing shared surface leading to the UL campus.

Figure 3-5: Paved path connects to shared path leading to UL

Figure 3-6: Existing Project information sign for Limerick Smarter Travel Cycle Route 2

Figure 3-7: Existing direction sign outside the UL Boat Club and slipway in background

There is existing public lighting along the existing path between the River Groody bridge and the UL Boat House. Refer to the black column and lantern in Figure 3-8.

Figure 3-8: Examples of existing Public Lighting Column and Lantern along Limerick Smarter Travel Cycle Route 2

East of the paved path towards the UL campus, the existing path surface changes from tarmac to gravel.

Figure 3-9: Path surface changes from paved to gravel and narrows to approximately 1.5m width

CH795

The path will cross a bridge over a land drain (Named as Bridge 1 for the purposes of this project). There is a stone parapet on the River Shannon side of the bridge and a metal railing on the opposite side. There are wooden fences leading to the bridge on the eastern and western approaches.

Figure 3-10: Existing Bridge No 1

Figure 3-11: Existing bridge over land drain (Bridge 1)

Figure 3-12: Existing abutment wall (proposed to be decommissioned)

CH795-CH950

The proposed greenway will continue eastwards and pass along the existing gravel path north of the Castletroy wastewater treatment plant. There is a northern access into the plant with an existing route over a culverted land drain that will be included in the proposed greenway path.

Figure 3-13: View south to the northern access gate of Castletroy Wastewater Treatment Plant

Figure 3-14: View facing east outside the Castletroy wastewater treatment plant

There are existing concrete railings alongside the narrow gravel path. The proposed path will avoid two trees with a potential for a bat roost at CH850. No bat roosts have been identified in these trees, but the trees will remain.

CH950-CH980

The existing path continues to an existing narrow stone bridge (named as Bridge 2 in this project). The surface changes from gravel to paved.

There are existing stone abutments and a high stone wall at Bridge 2.

Figure 3-15: Existing path and stone bridge along Shannon River leading to Bridge 2

Figure 3-16: View of Bridge 2 from the exiting paved path

The existing stone parapet that is missing in Figure 3-17 has been reset into position by LCCC since the photo was taken.

Figure 3-17: View of Bridge 2 from bank of drain

Figure 3-18: View under Bridge 2 facing north to the River Shannon

Figure 3-19: : Existing railing between Bridge 2 and Bridge 3

CH1000

The existing path continues to a temporary steel truss bridge that has replaced a concrete deck over an existing stone bridge (named as Bridge 3 in this project). This bridge crosses the Plassey Mill Race where it flows into the River Shannon.

Figure 3-20: Existing temporary bridge across the Plassey mill race where it rejoins the River Shannon

Figure 3-21: Shallow water level in Plassey Mill Race and existing abutments of Bridge 3

CH1000-1040

The existing path continues past a rest area north of Plassey Mills (Figure 3-22).

Figure 3-22: Existing bench in front of Plassey Mill

The existing bridge between Co. Limerick and Co. Clare is to the north of this area (Figure 3-23). This bridge is known locally as the 'Black bridge'.

Figure 3-23: Black bridge

Figure 3-24: Blocked access to the Black bridge that links County Limerick and County Clare

There is an existing kissing gate on the path east of the rest area in front of Plassey Mills.

Figure 3-25: Existing gate on path at Plassey Mills (1 of 2)

Figure 3-26: Existing gate on path at Plassey Mills (2 of 2

CH1040

The existing path continues eastwards towards an existing bridge (named as Bridge 4 in this project) across the decommissioned overspill for the Plassey Mill Race.

Figure 3-27: Existing bridge (Bridge 4) over the decommissioned and dry Plassey Mill race overspill

Figure 3-28: Dry bed of overspill from Plassey Mill Race

CH1040-CH1330

The existing path continues north of the existing Fisherman cottages, but the proposed path will turn south-east and run behind the Fisherman Cottages as requested by the residents. This area is characterised by uneven poorly drained ground with thick undergrowth. The residents in the cottages have reported regular flooding in their properties so this project will construct a new flood defence system for the residents.

Figure 3-29: Thick vegetation with immature trees with Plassey Mills in the background

Figure 3-30: Heavy undergrowth to rear/south of Fisherman Cottages

Figure 3-31: Trees to south/rear of Fisherman Cottages (cottage partially visible)

Figure 3-32: Existing Bee Hives east of the Fisherman Cottages

Figure 3-33: Existing kissing gate at the Garrisson Wall to be retained on the gravel path that runs in front of the Fisherman cottages

There is an existing gravel path to the east of the Fisherman Cottages that connects to existing shared paths in the UL Campus.

Figure 3-34: Existing gravel path east of Fisherman Cottages

CH1330-CH1340

The proposed path will rejoin the existing path and will pass under an existing bridge between Co. Limerick and Co. Clare.

Figure 3-35:: Existing road bridge between the UL campus in Co. Limerick and Co. Clare

Figure 3-36: View of existing gravel path under road bridge that links UL campus between Co. Limerick and Co. Clare

CH1340-CH1410

East of the road bridge the existing path continues eastwards along the southern bank of the River Shannon and towards the existing Dromroe Student village in the UL Campus. The existing path runs through a designated Annex 1 habitat Alluvial woodland forest. UL Facilities has planted Oak trees between Dromroe Student village and the existing path at this location.

Figure 3-37: Existing gravel path along southern bank of the River Shannon

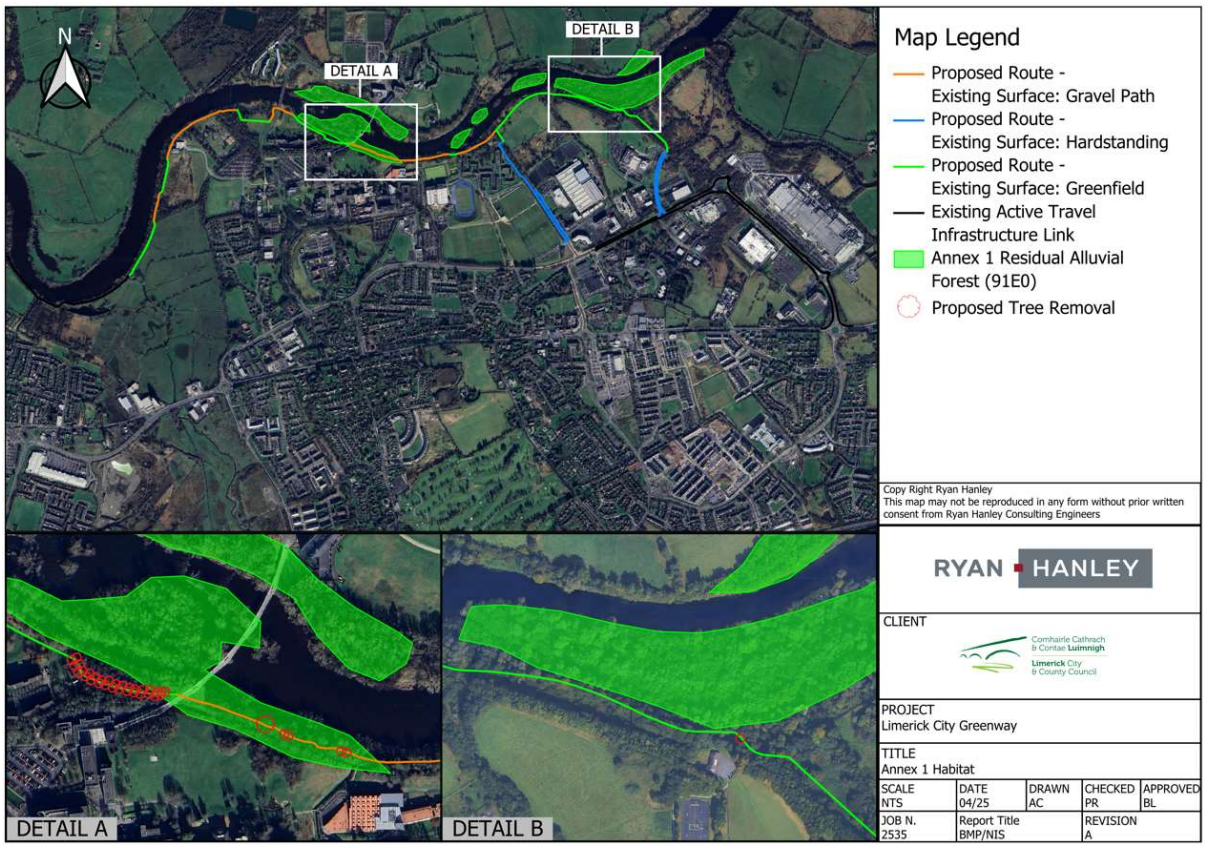

Figure 3-38: Extent of Annex 1 Alluvial Forest interactions with existing path and proposed Greenway route

CH1410-1730

To avoid the existing avenue of beech trees in the Annex 1 Alluvial Woodland forest alongside the riverside path, the proposed greenway route will divert to the south of the beech trees and north of the Oak trees towards a newly planted stand of birch trees. The existing gravel path will remain unaltered.

Figure 3-39: Existing Beach and newly planted Oak trees between the River Shannon and Dromroe Student village

Figure 3-40: Existing gravel path alongside river through an avenue of mature trees in the Annex 1 Alluvial forest

A 6.5m wide strip of immature Birch trees will be removed to provide space for the proposed greenway.

Figure 3-41: Existing immature trees to be removed

The existing path continues under the Living Bridge.

Figure 3-42: Living Bridge in UL campus

Figure 3-43: Existing gravel path under the Living Bridge

CH1730-CH1965

The existing earthen path enters an existing Annex 1 Alluvial woodland and continues eastwards on a raised earth path north of the Plassey Mill Race and approximately 10-20m to the south of the River Shannon.

Figure 3-44: Existing raised earthen path in the Annex 1 habitat Alluvial residual forest

CH1965-CH2150

An existing footbridge from the UL campus joins the earth path at CH1915.

Figure 3-45: Existing footbridge to University of Limerick and flowering Himalayan Balsam (looking west)

The existing earthen path continues eastward on an elevated earth mound with the Plassey Mill Race to the south and the River Shannon to the north.

Figure 3-46: Existing stone steps from earthen path to Plassey Beach

CH2150-CH2250

The existing earthen path continues alongside Plassey Beach.

Figure 3-47: Unpaved path at Plassey Beach

CH2250

There is an existing reinforced concrete bridge that crosses the start of the existing Plassey Mill race.

Figure 3-48: Existing concrete bridge at mouth of Plassey mill race (to be retained)

Figure 3-49: Existing concrete bridge at mouth of Plassey mill race with Plassey Beach in the background

Figure 3-50: Existing concrete bridge at mouth of Plassey mill race looking northeast

CH2250-CH2500

The existing route passes north of Kilmurray Student Village and reaches a junction.

Figure 3-51: Existing gravel path north of Kilmurray Student Village

The route south provides access to University Road and to Plassey Park Road. The route east provides access to Cook Medical in the IDA's National Technology Park and McLaughlan Road.

Figure 3-52: Existing earthbound path south of the River Shannon

Figure 3-53: Existing path east of Kilmurray Student village approaching the land boundary between UL and the IDA

Figure 3-54: Existing gate and culvert at the land boundary between UL and the IDA

CH2500-CH3180

The path changes from an earthen path to a desire line and continues eastwards running generally 20-50m south of the southern bank of the River Shannon. It crosses under overhead electric wires.

Figure 3-55: Desire line through green field

Figure 3-56: Desire line through green field approaching a small stand of trees

Figure 3-57: Desire line through green field weaving between small stands of trees

Figure 3-58: Proximity of desire line to River Shannon

Figure 3-59: Desire line along proposed Greenway route

CH3180-CH3490

The existing desire line continues along the southern bank of the River Shannon at the boundary between UL registered land and IDA registered land (approx. CH3180), but the proposed Greenway route turns south to McLaughlan Road.

Figure 3-60: Warning signs at the IDA boundary (at Cook Medical)

Figure 3-61: Overhead ESB utilities

Figure 3-62: Existing earth berm with Johnson & Johnson factory in background

Figure 3-63: Example of scrubland between the River Shannon and McLaughlan Road

CH3490-CH3805

There are existing concrete footpaths and grass verges alongside McLaughlan Road between the original entrance road into Cook Medical and Plassey Park Road. There is street lighting and other utilities including drainage, telecommunications, and underground electricity cables in this private road.

Figure 3-64: McLaughlan Road in the IDA park

Figure 3-65: McLaughlan Road in the IDA park with street lighting and junctions to other roads/entrances

Figure 3-66: McLaughlan Road where it joins Plassey Park Road (in background)

There is an existing zebra crossing on Plassey Park Road to the north-east of the junction between Plassey Park Road and McLaughlan Road.

Figure 3-67: Existing Zebra crossing on Plassey Park Road

CH000_C-CH300_C

There is a junction in the existing path east of Kilmurray Student Village and the southern route follows a desire line to an existing bridge east of the UL Agricultural Laboratory. The bridge crosses an existing drainage channel at the north of University Road.

Figure 3-68: Existing desire line connecting the riverside path to an existing bridge to the UL Agricultural Laboratory

There is a secure car parking area immediately south of the laboratory.

Figure 3-69: Secure car parking area immediately south of the laboratory

The entrance road to the UL Agricultural Laboratory runs west of the large drainage channel (bounded by an anti-climb fence) and there are rubbish bins and a car parking area between Kilmurray Student Village and the anti-climb fence. There is an entrance road and gate into Kilmurray Student Village that is generally locked. The gate opens onto University Road.

Figure 3-70: Existing gate access from Kilmurray Student Village to University Road

CH300_C-CH677_C

There are no footpaths along University Road but there are large parking bays and public lighting along the western side of the road. There are commercial/industrial buildings along the eastern side.

Figure 3-71: University Road (looking south)

Figure 3-72: Entrance to industrial buildings off University Road

The proposed Greenway will join into newly constructed Active Travel infrastructure at the southern part of University Road where it joins Plassey Park Road.

Figure 3-73: Junction of University Road and Plassey Park Road

3.2 Proposed Greenway and Bridges

CH000 to CH795: Groody Bridge to Proposed Bridge 1

The proposed Greenway will divert to the southeast of the existing tarmac path because the existing path narrows to 2.2m width (between the existing wooden fences) and LCCC has received complaints from members of the public about near passes from cyclists and scooters. It is intended that walkers would continue to use the existing path and cyclists and other users travelling at speeds in excess of walking pace would utilise the proposed Greenway.

Figure 3-74: Proposed Greenway and existing path, and proposed rest area at CH 000

A new rest area with new benches will be provided (refer to Figure 3-95 for an example of the proposed bench). Proposed wooden bollards will redirect cyclists off the existing path and towards the proposed Greenway.

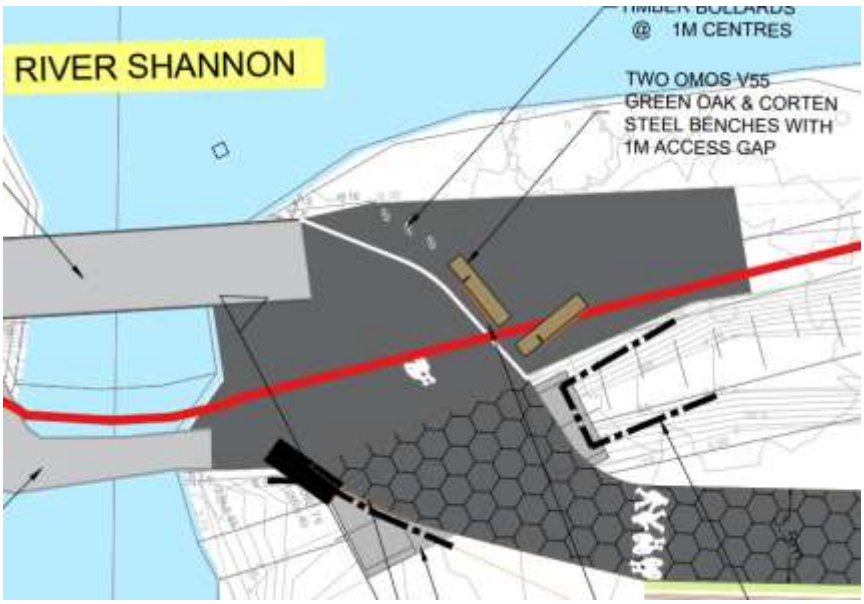

Figure 3-75: Proposed rest area at Groody Bridge

Figure 3-76: Example of wooden bollard that would be installed along the proposed Greenway

In the green field the proposed Greenway will run parallel to a land drain which runs parallel to the River Shannon. A proposed shallow land drain will run along the south side of the Greenway and drainage culverts will enable surface water to drain to the River Shannon. New public lighting will be provided.

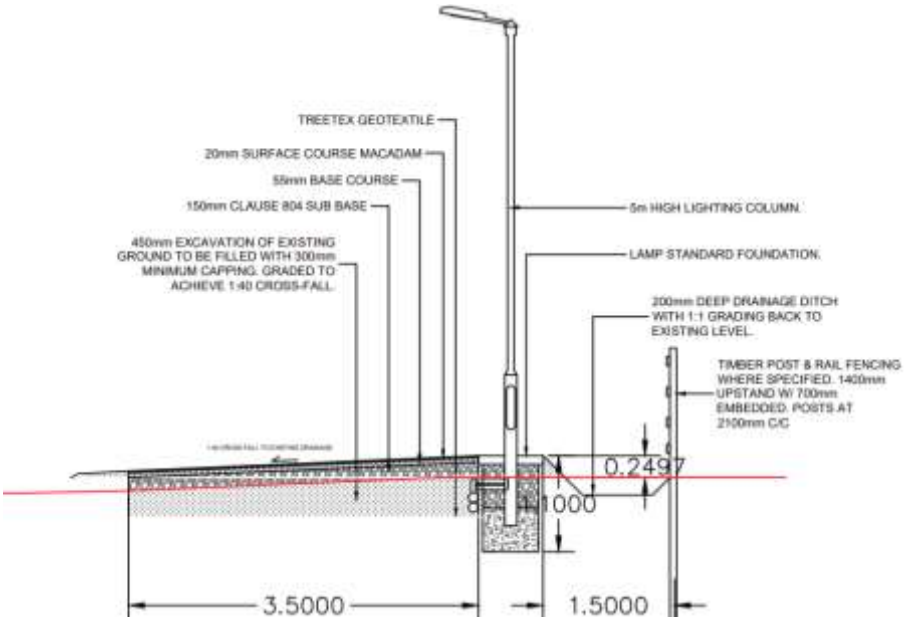

Figure 3-77: Proposed cross section of 3.5m greenway, public lighting column, and land drain

The proposed Greenway will divert north to join the existing 3.5m wide Smarter Travel path and avoid passing through a compensatory habitat area that was planted by the developers of the Living Bridge that connects the UL campus between Co. Limerick and Co. Clare. The proposed Greenway will cross an existing bridge (CH 400). A new steel parapet will be installed above the low stone parapet on this existing bridge to replace the existing parapet which currently narrows the bridge.

Figure 3-78: Existing bridge at CH400

The existing path will be resurfaced.

In accordance with LCCC's tree replacement guide, there will be five trees planted for every tree that will be removed to facilitate construction of the proposed Greenway.

The proposed Greenway will divert south (@ CH430) east of the compensatory habitat area and continue in a green field until it will rejoin the existing 3.5m wide path immediately west of the UL Boat Club. The existing tarmac path will be resurfaced where it passes the existing slipway for the Boat club until CH725 where the existing 2.0m (approx.) wide gravel path will be replaced with a 3.5m wide tarmac path. The surface of the existing path will not be excavated except to install twin ducts for the public lighting and a cellular membrane will be paid onto the gravel path and appropriate building layers will form the base for the tarmacadam surface finish. This will ensure tree roots will not be disturbed.

Figure 3-79: Tree root protection system under new tarmac path in Fairview Park, Dublin 3

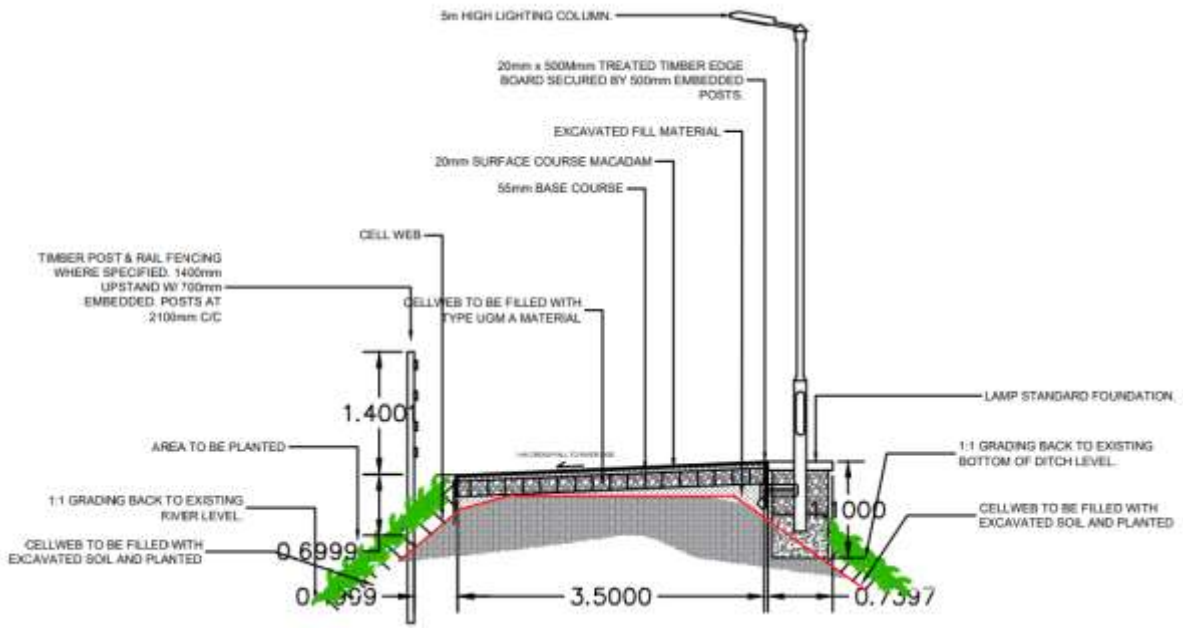

Figure 3-80: Replacement of gravel path with proposed 3.5m wide Greenway

At CH775 there is a proposed tarmac path to join to the existing UL campus shared surface. There are proposed replacement planting trees alongside this proposed path and a proposed bug hotel will be constructed from leftover construction wood and small bore tree branches that may be removed.

Figure 3-81: Example of a bug hotel that will recycle construction materials and reuse tree branches

CH795: Proposed Bridge 1

The proposed Greenway route will extend eastwards to an existing concrete bridge which will be replaced by a proposed 4.8m long and 4.5m wide steel bridge on new concrete abutment walls (Bridge No. 1 @ CH 795). Refer to drawing RHA-XX-DR-C-PD0007.

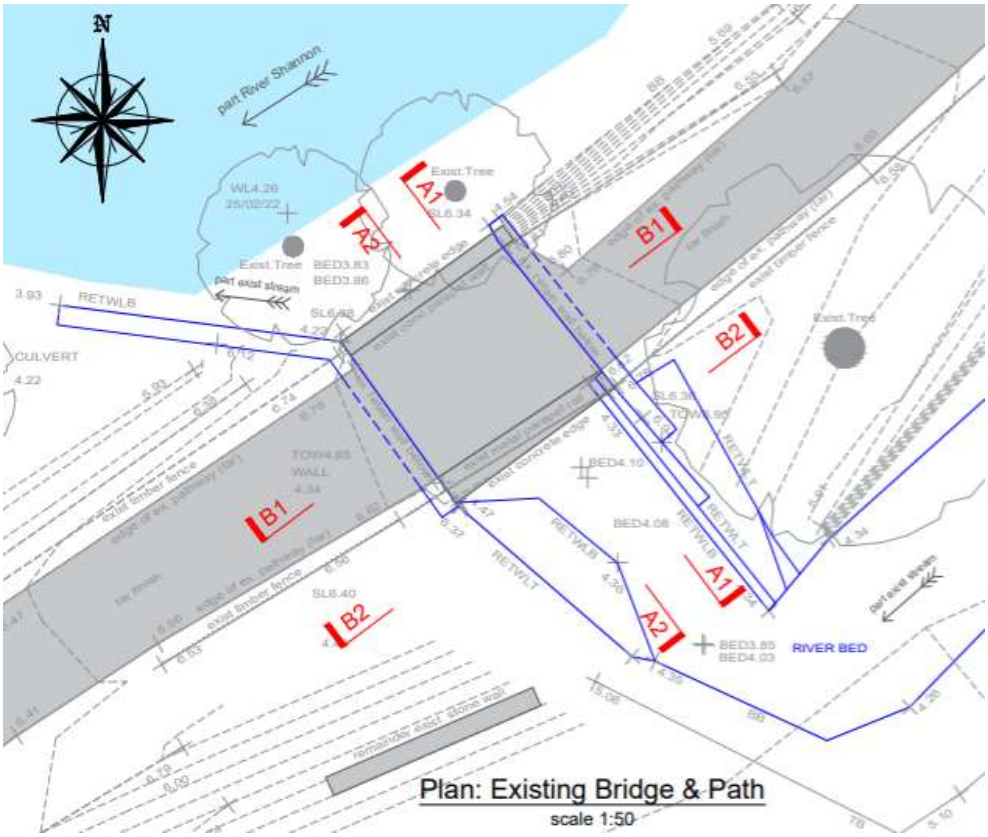

Figure 3-82: Plan of existing Bridge 1 (refer to drawing RHA-XX-DR-S-SP0010)

The existing bridge parapets, one is reinforced concrete, and the other is metal railing (refer to Figure 3-10, Figure 3-11, and Figure 3-12), will be taken down. The existing reinforced concrete bridge deck will be deconstructed by lifting it off the abutments and transporting it to the construction compound where it will be crushed. The crushed material will be recycled by using it to construct haul roads/temporary compounds/ and as a base for the proposed greenway path. Metal arisings, the parapet and the railing will be transported offsite to a licenced waste facility. The existing abutments will be deconstructed by breaking out the walls which will be removed to the construction compound for crushing and recycling, and the foundations will be exposed. Any concrete in the foundations will be broken out and mixed with stone rubble to form the base of the foundations for the proposed bridge abutments.

Dust will be suppressed during the wall and foundation breaking works. To avoid water runoff carrying fines, a shade cloth will be erected immediately adjacent to the concrete that will be broken out to trap dust arisings.

To carry out this deconstruction work and minimise the impact on the environment and local ecology there will be a water filled flood barrier to protect the work site from the River Shannon. To protect the River Shannon from contaminated liquids associated with construction activities including silt, a temporary sheet piled wall will be inserted into the riverbank between the water filled barrier and the worksite, and a silt curtain will be suspended in the River Shannon.

The breaking up and removal of the bridge abutment walls and foundation will be carried out on a dry day within a 6–8-hour period so those works will have a very short duration. The construction period of the bridge is expected to take 2-3 weeks. The existing drain under Bridge 1 is dry so there won't be a risk of drainage water running through the work site. The proposed sheet pile will prevent any material contaminated with dissolved chemicals (from broken concrete) from running into the river. The proposed shade cloth will prevent airborne dust from floating to the river. The proposed water filled flood barrier will prevent water from entering the worksite.

The proposed construction sequence for Bridge 1 is illustrated in Figure 3-83.

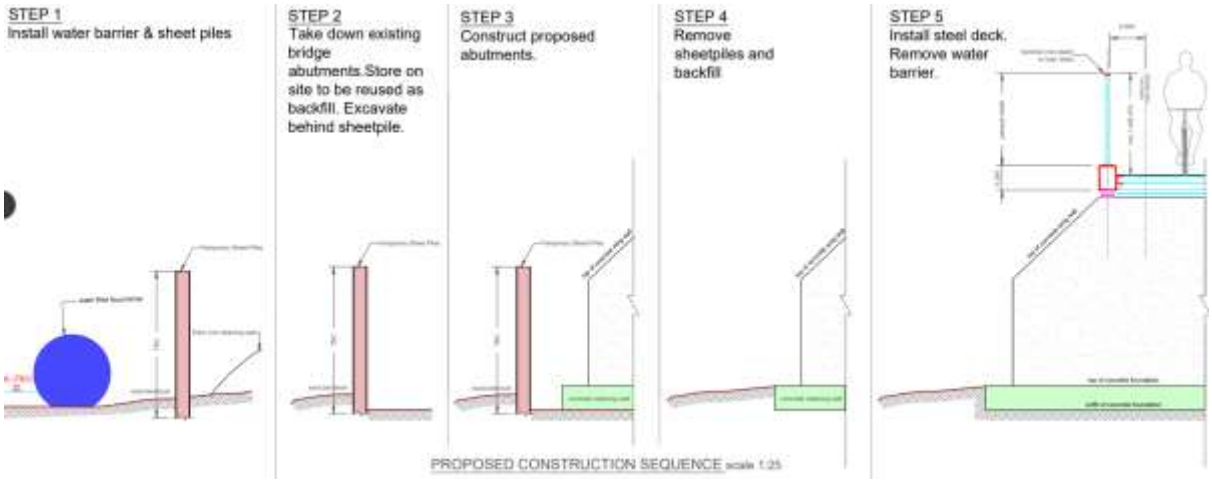

Figure 3-83: Proposed construction sequence for Bridge 1 (refer to drawing RHA-XX-DR-S-SP0012)

New bridge abutments are proposed to be constructed on new concrete foundations and a new steel deck with parapets will be installed by lifting a prefabricated structure into place. Refer to drawing RHA-XX-DR-S-SP0011.

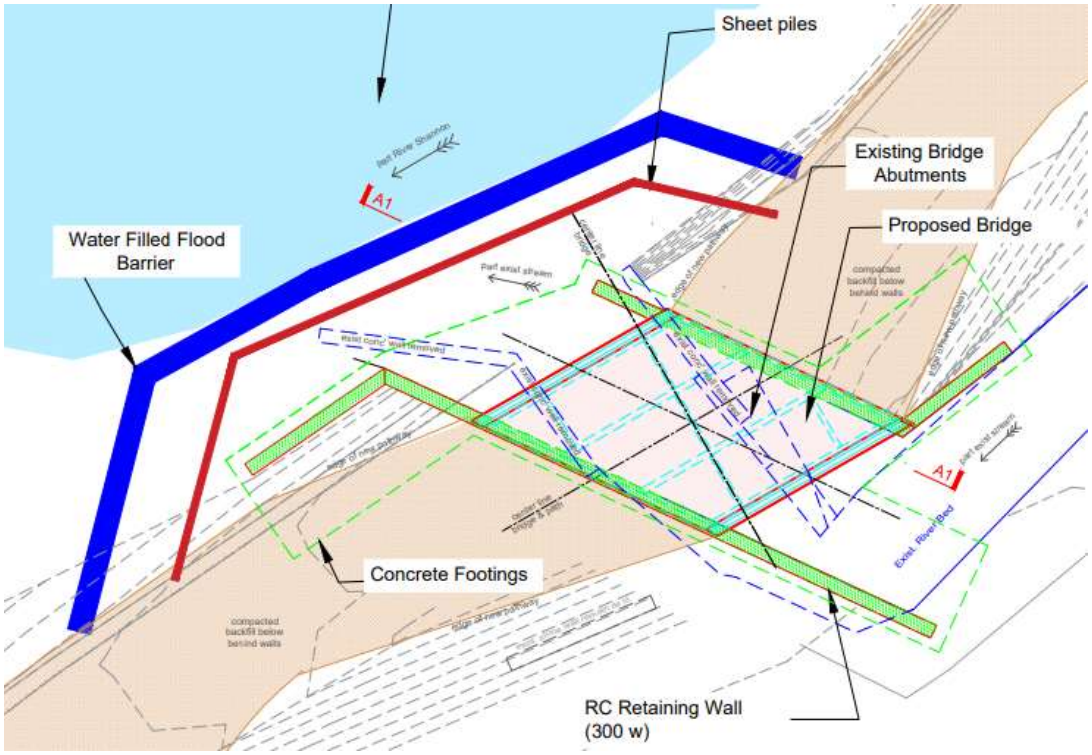

Figure 3-84: Proposed plan of Bridge 1, with ecology protection measures (refer to drawing RHA-XX-DR-S-SP0012)

Due to its proximity to the River Shannon which supports lamprey, the proposed works (including preparatory work) beside the River Shannon which supports salmonids shall be undertaken from May to October (inclusive) and in consultation with Inland Fisheries Ireland (IFI) to avoid accidental damage or siltation of spawning beds, subject to the water level in the river.

Bat surveys have been carried out along the riverbank and in the location of Bridge 1. No trees with a potential for bat roots were identified at Bridge 1 and the closest tree with a potential for a Bar roost is 60m to the east.

The existing bridge and vegetation growing on it were surveyed by an experienced Ecologist to look for species such as dipper, grey wagtail, wren and other bird species that will use bridge structures as nesting sites, and there was no evidence of birds nests or bat roosts at the structure or vegetation. A survey by an experienced Ecologist shall be undertaken at Bridge 1 no more than 24 hours ahead of vegetation clearance or structure removal works to confirm there are no bats roosting or birds nesting in the vegetation or in the structure that will be taken down and removed.

The SAC boundary line runs through the existing and proposed bridge.

The existing area under Bridge 1 is dry so a flume is not proposed.

No refuelling will be permitted outside of construction compounds and all machinery will be periodically serviced and regularly maintained to ensure diesel and oils spills do not occur.

There will be a 40m long silt curtain installed in the River Shannon to catch any discharges from the worksite into the river. Silt curtains will catch materials that float or are suspended in the water. Silt curtains are typically made from PVC and closed-cell foam. They are a flexible, water permeable barrier that extends downwards in the body of water, where it is typically anchored or weighted to prevent the silt from moving. The foam provides buoyancy, while the PVC curtain controls sediment in the

water. Example photos of a silt curtain in the River Corrib in Galway are provided in Figure 3-85 and Figure 3-86.

Figure 3-85: Installation of a silt curtain in the River Corrib, Co. Galway

Figure 3-86: Silt curtain retaining contaminated water during advanced works for sheet piling

Figure 3-87: Example of sheet piling along the bank of the River Corrib

CH795 to CH970: Proposed 3-4m wide greenway

The proposed 3.5m wide greenway will be installed on top of the existing 1.5-2.0m wide gravel path and grass verges (refer to the cross section in Figure 3-77). The proposed Greenway will pass two trees with bat roost potential (although no roosts have been identified) at CH850. The public lighting columns have been designed at maximum distances from these trees to minimise light impact on bats if bats were to create roosts there in the future.

CH970: Proposed Bridge 2

The proposed Bridge No. 2 @ CH 970 will be a new 9.6m long and 4.5m wide steel and reinforced concrete bridge, and it will be constructed alongside the existing stone bridge. No demolition works are required for Bridge 2.

A photomontage which illustrates the proposed Bridge 2, the proposed Bridge 3, and the proposed amenity area can be seen in Figure 3-88.

Figure 3-88: Proposed bridges No 2 & 3 and rest area east of Plassey Mills

Due to its proximity to the River Shannon which supports lamprey, the proposed foreshore works (including preparatory work) beside all watercourses supporting salmonids shall be undertaken from May to October (inclusive) and in consultation with Inland Fisheries Ireland (IFI) to avoid accidental damage or siltation of spawning beds, subject to the water level in the river.

The SAC boundary line runs through the proposed bridge.

The existing Bridge 2 plan and section are provided in Figure 3-89.

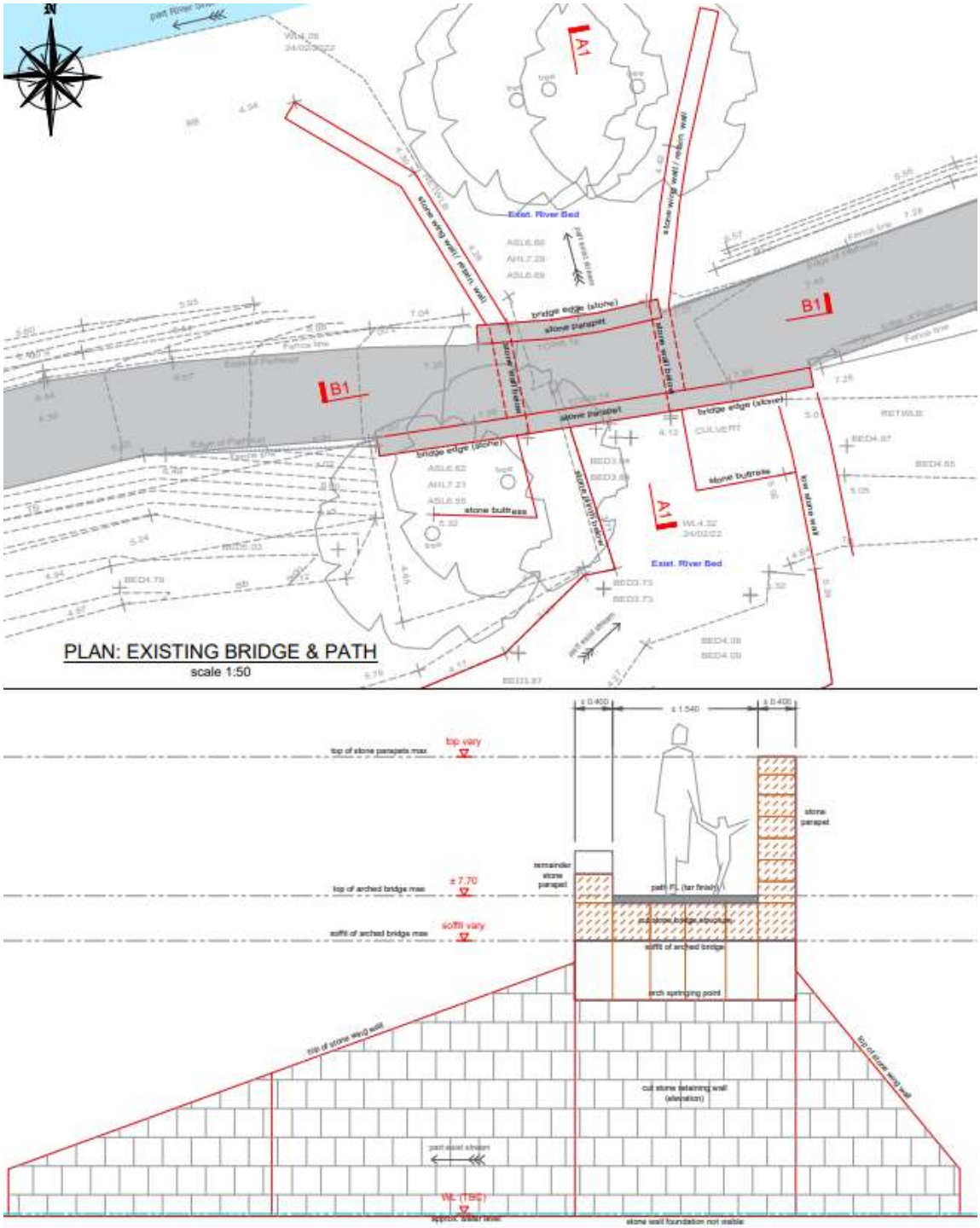

Figure 3-89: Existing plan and section for Bridge 2 (refer to drawing RHA-XX-DR-S-SP0020)

The plan for the proposed new bridge 2 alongside the existing stone bridge is illustrated in Figure 3-90 and the section drawing that illustrates the same is in Figure 3-91. The abutment for the existing stone bridge will remain untouched. The stonework for the existing bridge will be repointed, the low parapet wall will be restored by a stonemason, and a new metal railing will be installed onto it to ensure the existing stone bridge complies with current design standards for bridge parapets, i.e., 1.45m high. The bottom of the new metal parapet railing on the existing low stone parapet will follow the arc of the stone wall to preserve its historical function which was to allow a tow rope to slide over the parapet while a horse was towing a barge down the River Shannon.

Figure 3-90: Plan for the proposed new bridge 2 alongside the existing stone bridge (refer to drawing RHA-XX-DR-S-SP0021)

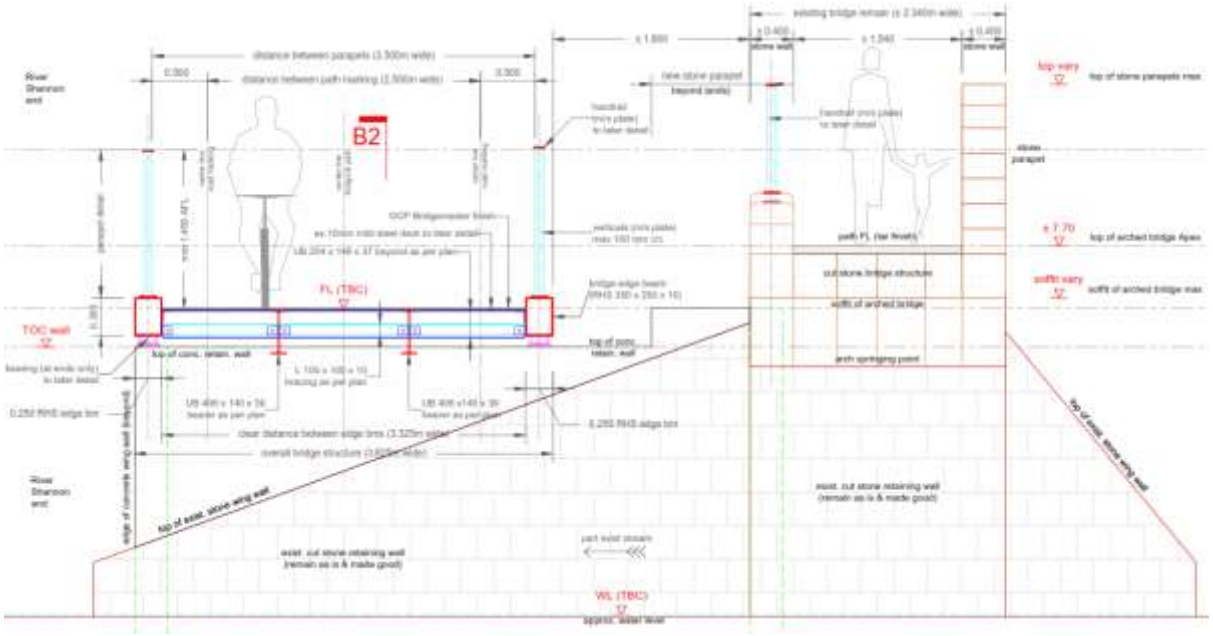

Figure 3-91: Section for the proposed new bridge 2 alongside the existing stone bridge (refer to drawing RHA-XX-DR-S-SP0021)

To carry out this construction work and minimise the impact on the environment and local ecology there will be a water filled flood barrier to protect the work site from the River Shannon. To protect the River Shannon from contaminated liquids associated with construction activities including silt, a temporary sheet

piled wall will be inserted into the riverbank between the water filled barrier and the worksite, and a silt curtain will be suspended in the River Shannon. Refer to drawing RHA-XX-DR-S-SP0022.

The construction period of Bridge 2 is expected to take 2-3 weeks. The existing stream under Bridge 2 will be flumed during the works to keep the work site dry. The proposed sheet pile will prevent any material contaminated from running into the river. A proposed shade cloth will prevent airborne dust from floating to the river. The proposed water filled flood barrier will prevent river water from entering the worksite.

There will be a 60m long silt curtain installed in the River Shannon to catch any discharges from the worksite into the river. Silt curtains will catch materials that float or are suspended in the water. Silt curtains are typically made from PVC and closed-cell foam. They are a flexible, water permeable barrier that extends downwards in the body of water, where it is typically anchored or weighted to prevent the silt from moving. The foam provides buoyancy, while the PVC curtain controls sediment in the water. Example photos of a silt curtain in the River Corrib in Galway are provided in Figure 3-85 and Figure 3-86.

Tree felling of immature trees and saplings will be required in the September to February period before the construction work for Bridge 2. All trees to be cut down shall be inspected by an experienced and qualified Ecologist to check for nests and roosts (despite their very limited habitat potential) and shall be laid on the ground for at least 24 hours before they will be recycled or mulched.

There will be aquatic wall plates bolted to the new abutments where they will be in contact with river/surface water drainage water. The purpose of the aquatic plates is to provide a habitat for fish and other aquatic life.

Figure 3-92: Example of aquatic plates to be installed on bridge abutments

CH1000: Proposed Deck replacement for Bridge 3

The existing temporary bridge across the Plassey Mill race @ CH1000 will be replaced with a new 5.4m long and 4.5m wide steel bridge deck. The new steel deck and parapets will be lifted onto new concrete plinths which will be cast directly onto the stone abutment walls. Refer to drawing RHA-XX-DR-S-SP0031.

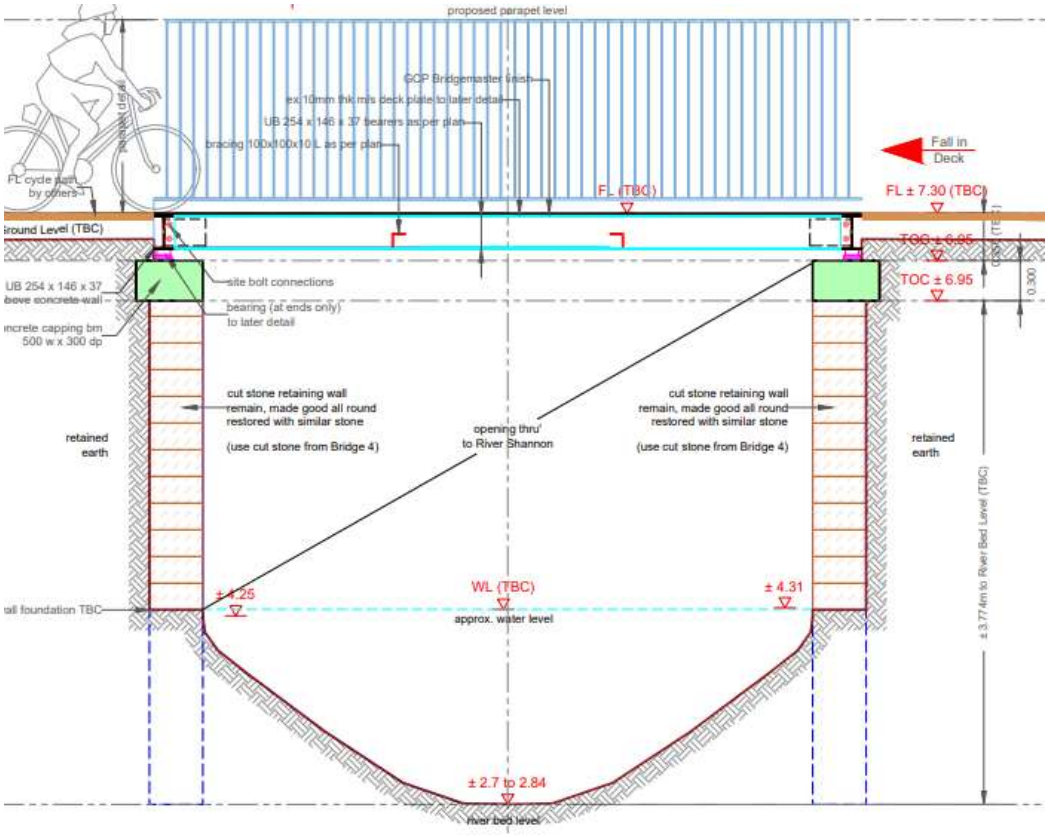

Figure 3-93: Proposed deck replacement for Bridge 3 with new concrete plinths on existing stone abutments

Due to its proximity to the River Shannon which supports lamprey, the proposed foreshore works (including preparatory work) beside all watercourses supporting salmonids shall be undertaken from May to October (inclusive) and in consultation with Inland Fisheries Ireland (IFI) to avoid accidental damage or siltation of spawning beds, subject to the water level in the river.

There will be two 6m long silt curtains installed in the Mill Race stream to catch any discharges from the worksite into the stream. Silt curtains will catch materials that float or are suspended in the stream water. They are a flexible, water permeable barrier that extends downwards in the body of water, where it is typically anchored or weighted to prevent the silt from moving. Silt curtains are typically made from PVC and closed-cell foam. The foam provides buoyancy, while the PVC curtain controls sediment in the water.

The SAC boundary line runs through the existing and proposed bridge. Refer to the red line in Figure 3-94.

CH1010 to CH1030: Proposed rest area at Plassey Mills

The plan for the proposed rest area at Plassey Mills is illustrated in Figure 3-94.

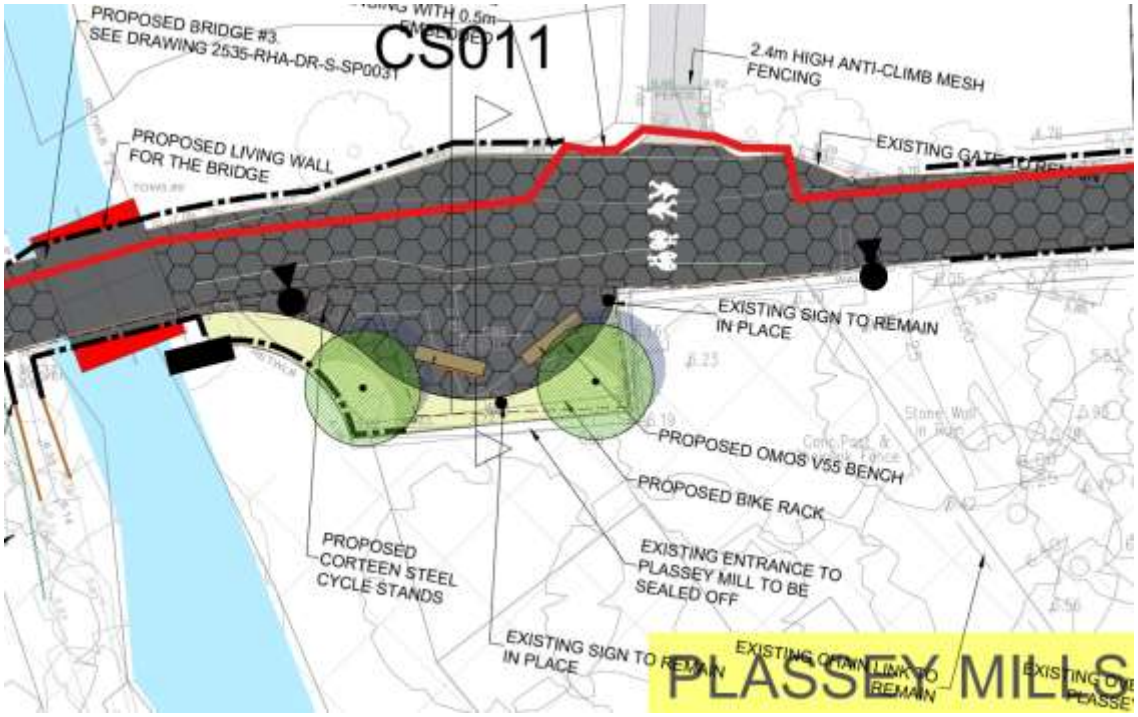

Figure 3-94: Proposed rest area at Plassey Mill

Two new benches similar to an OMOS green oak and Corten steel bench will be provided. A rack of new Corten steel cycle stands will also be provided and two new native Irish trees with understory will soften the interface between the existing stone/block walls and the proposed tarmac path surface.

Figure 3-95: Green Oak and Corten steel seat and cycle stand

A future connection to the Black bridge across the River Shannon to Co. Clare could join the proposed Greenway at this rest area.

CH1045: Proposed deck replacement for Bridge 4

A proposed 5.1m long and 4.5m wide steel bridge deck for Bridge 4 @ CH 1045 will replace the existing 3m wide concrete bridge deck across the overspill for the Plassey Mill race. The existing reinforced concrete bridge deck will be deconstructed by lifting it off the cut stone abutment walls and transporting it to the construction compound where it will be crushed. The crushed material will be recycled by using it to construct haul roads/temporary compounds/ and as a base for the proposed greenway path. Metal arisings and the existing steel parapets will be transported offsite to a licenced

waste facility. The existing cut stone abutment walls and foundations will remain in-situ. The proposed steel deck will sit on top of a concrete plinth that will be set into place on the existing stone abutments. The existing width of the Plassey Mill Race overspill will not be impacted.

New parapets will replace the existing stainless-steel parapets. Refer to drawing RHA-XX-DR-S-SP0042.

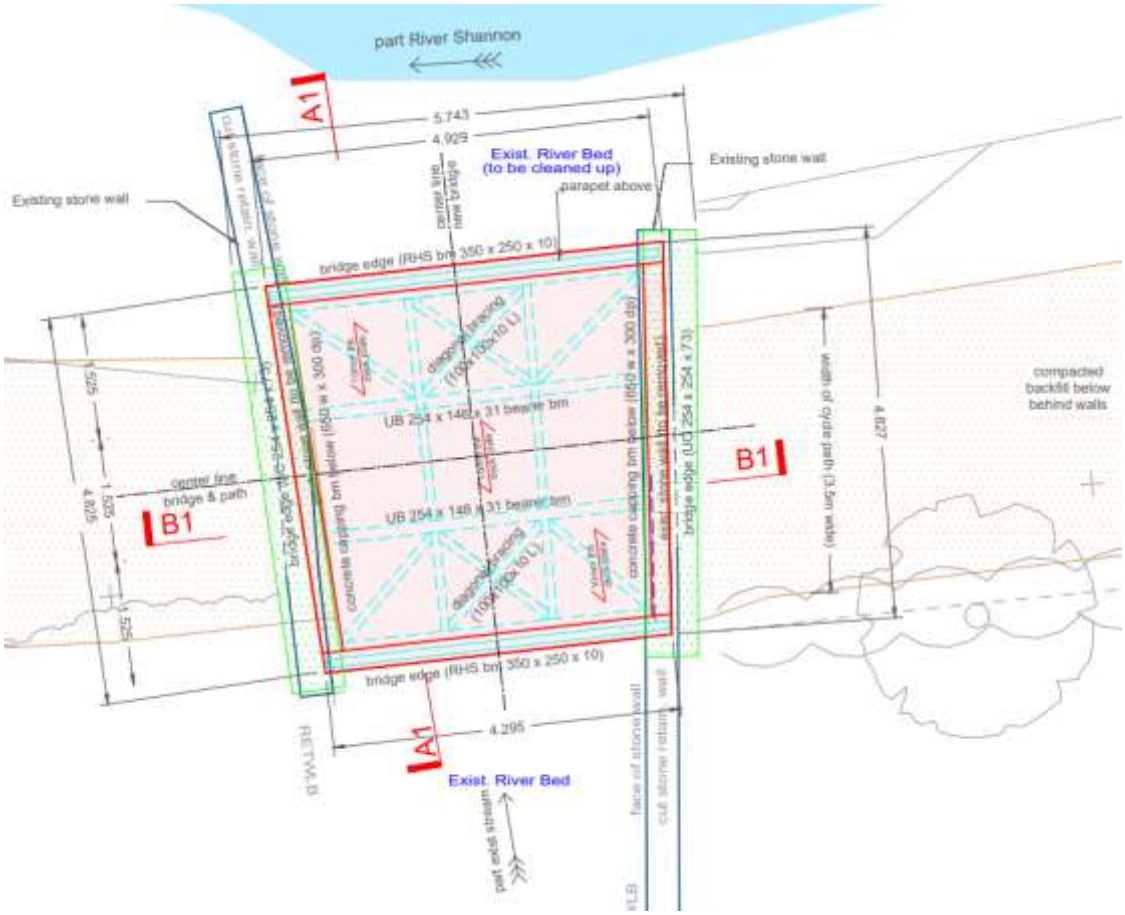

Figure 3-96: Proposed plan of Bridge 4 deck replacement

Due to its proximity to the River Shannon which supports lamprey, the proposed foreshore works (including preparatory work) beside all watercourses supporting salmonids shall be undertaken from May to October (inclusive) and in consultation with Inland Fisheries Ireland (IFI) to avoid accidental damage or siltation of spawning beds, subject to the water level in the river.

The SAC boundary line runs through the existing and proposed bridge.

There are no trees proposed for removal to construct Bridge 4.

CH1050 to CH1320: Proposed route south of Fisherman Cottages

The proposed Greenway will turn southeast and will continue south of a collection of fishing huts and cross a section of mixed broadleaved woodland and amenity grassland (approx. CH 1050 – CH 1250).

The plan for the proposed Greenway route south of the Fisherman cottages is illustrated Figure 3-97.

Figure 3-97: Proposed route south of Fisherman cottages

The trees and hedgerows that will be cut down to clear a path for the proposed Greenway will be replanted to act as a screen between the proposed path and the rear of the Fisherman cottages. All trees and hedgerows shall be cut down between September and February and shall be inspected by an experienced and qualified Ecologist to check for nests and roosts. They shall be laid on the ground for at least 24 hours before they will be recycled or mulched. Refer to the Landscape drawing 2525-RHA-XX-DR-C-LA0003 for proposed planting details for the Trees, Hedgerows, and wildflower meadow in this area.

The residents in the Fisherman cottages requested LCCC to resolve flooding at the rear of their properties. The proposed earth bund along the east (partially), south, and west (partially) of the properties will prevent flood water from the Plassey Mill Race from entering the rear of the properties. There will be proposed drainage channels on the north and south sides of the elevated Greenway path (refer to Figure 3-98) and surface water will drain towards the existing land drain that discharges to the Plassey Mill Race (refer to drawing RHA-XX-DR-C-PD0011). A proposed flap valve will prevent water from back entering the rear of the Fisherman Cottage properties from the Plassey Mill Race.

There is no direct drainage route to the river at the rear of the cottages. The area drains overland south to the Plassey Mill Race and the Plassey Mill Race overspill drain adjacent to the worksite is dry. Sediment mats will be placed between the bund and the Plassey Mill Race on the overland drainage route to trap material. If the area at the rear of the cottages needs to be drained dry ahead of the works, a silt buster tank to remove sediment from water will be utilised, before the water will be returned to the Plassey Mill race.

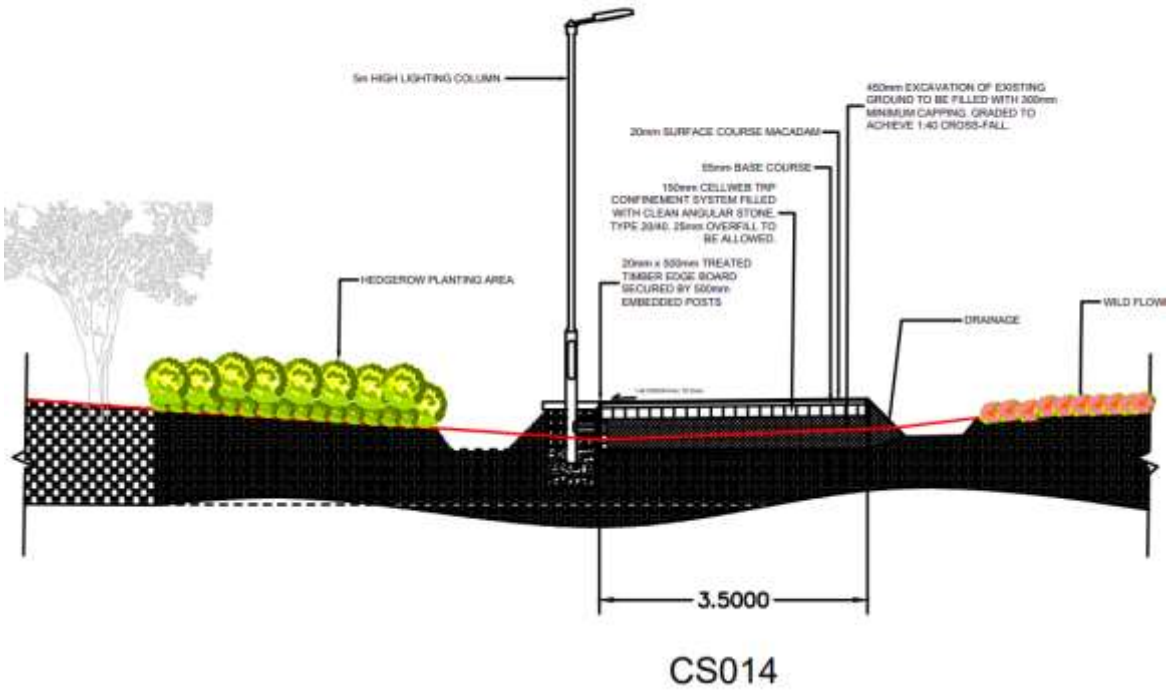

Figure 3-98: Cross Section 014 along proposed Greenway south of the Fisherman Cottages

Figure 3-99: Proposed Greenway south of the Fisherman cottages with proposed hedgerows and trees (looking west)

The proposed route will replace an existing gravel path going north towards Drumroe Village University Bridge, pass under the existing road bridge between Limerick and Clare, and turn east to continue along the River Shannon north of the Drumroe Student Village.

CH1320 to CH2180: Proposed Greenway through Annex 1 Alluvial Woodland forest area

East of the road bridge and east and west of the Living bridge between Co. Limerick and Co. Clare there is an Annex 1 Alluvial Woodland forested area outlined in green in Figure 3-100. The existing path is illustrated by the orange line, and the proposed path in a green field is illustrated by the green

line. The trees that are proposed to be cut down are illustrated in red outline. There is also an avenue of mature Beach trees along the riverbank within this wooded area and the proposed greenway avoids those trees.

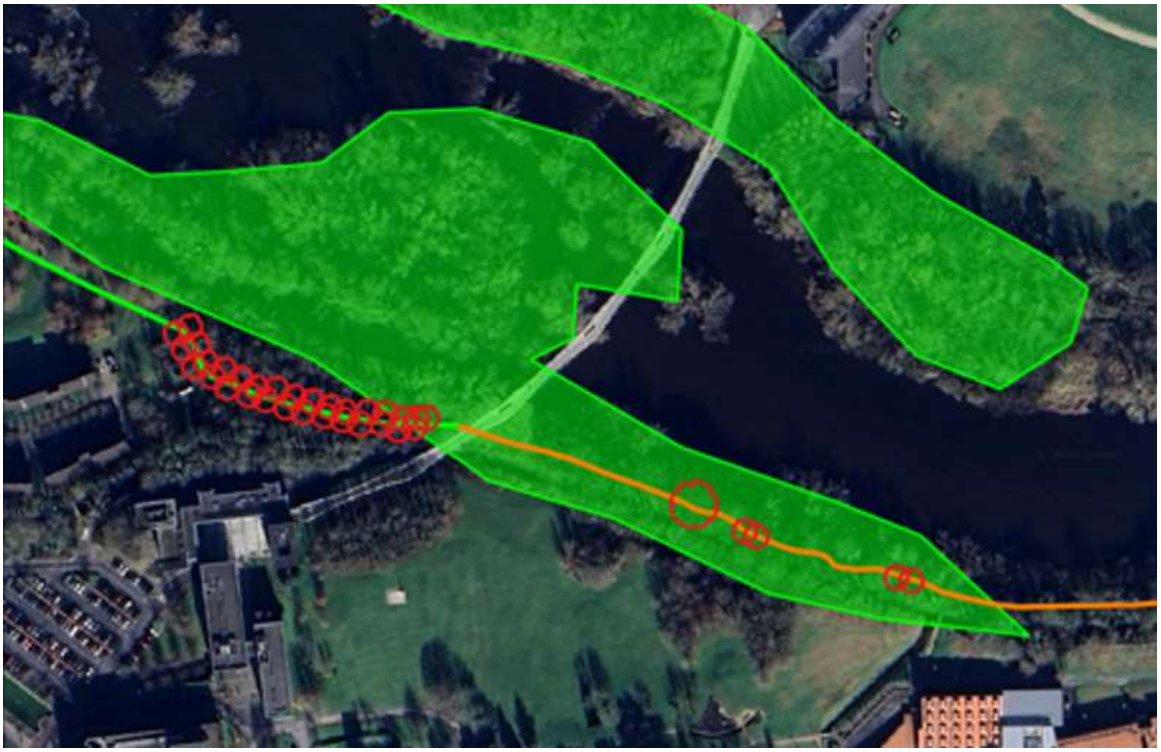

Figure 3-100: Existing Annex 1 Alluvial woodland

Figure 3-101: Proposed Greenway diverts from existing path to avoid the Annex 1 Alluvial Woodland north of Dromroe Student Village

The proposed Greenway avoids the mature Beach trees by diverting south of the existing gravel path (@ CH1420) to immature Birch trees where a 6m wide avenue of tree clearance will be required to construct the proposed Greenway. The trees that will be cut down are saplings and immature Birch with no habitat potential. Refer to Figure 3-132 later in this report. All trees shall be cut down between September and February and shall be inspected by an experienced and qualified Ecologist to check for nests and roosts. They shall be laid on the ground for at least 24 hours before they will be recycled or mulched.

These trees have been characterised as moderate quality by the project Arborist, namely '*Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality*'. Further information is available in the LCG Tree Survey Report_Rev0 in the EIA Part 3 Appendices.

Figure 3-102: Arborist map of moderate-quality trees east of the Living Bridge that will be removed for the proposed Greenway

The proposed Greenway will rejoin the existing gravel path and pass under the Living bridge (@ CH 1650).

Between the Living Bridge and Plassey Beach the proposed path will narrow to 3m at locations to avoid trees and will meander around existing trees. The new tarmac surface will be laid on top of the existing earth bank and no excavations will be carried out. Refer to Figure 3-104 for a photomontage where the proposed path will pass through the Annex 1 Alluvial Woodland forest with the River Shannon to the north and the Plassey Mill Race to the south.

Figure 3-103: Proposed Greenway under the Living Bridge (looking west)

Figure 3-104:Proposed Greenway in the Annex 1 Alluvial Woodland

CH2180 to CH2250: Proposed Bridge 5, Ramp to Plassey Beach, Rest area

The proposed infrastructure at Plassey Beach includes a new bridge, an access ramp to provide access from the path to the beach for all users, new seating for a rest area or for swimmers to change, new cycle stands, and new landscape planting areas as illustrated in Figure 3-105. The existing earthen embankment at the start of the Plassey Mill Race will be preserved.

The new bridge (Bridge 5) will facilitate pedestrians with limited mobility, wheelchair users, and cyclists to cross the Plassey Mill Race in this area whereas the existing bridge is narrow and has steps to access it which currently makes it inaccessible to users with limited mobility, buggies/prams, and wheelchair

users (refer to Figure 3-48, Figure 3-49, and Figure 3-50). This existing narrow concrete bridge at the mouth of the Plassey Mill Race will remain in place.

There will be a new ramp for people to walk down, wheelchair users to roll down, and children's prams/buggies to be pushed down from the proposed Greenway to Plassey Beach providing an amenity that provides access for all.

New public lighting will be provided using both 5m high and 1.6m high columns depending on existing tree cover.

The SAC boundary line runs south of the Plassey Mill Race stream (refer to the red line in Figure 3-105) and the existing and proposed bridge, retaining wall, and ramp are within the SAC.

The trees that have to be removed are illustrated in red in Figure 3-105. They will be cut down between September and February. All trees to be cut down shall be inspected by an experienced and qualified Ecologist to check for nests and roosts and shall be laid on the ground for at least 24 hours before they will be recycled or mulched.

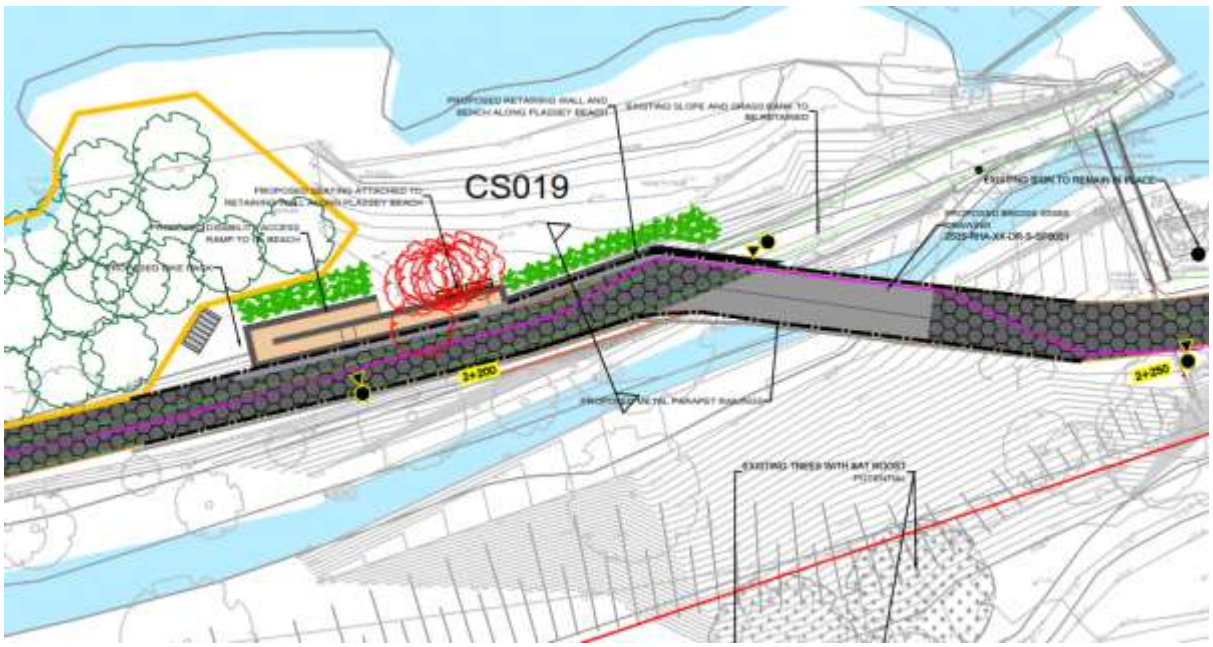

Figure 3-105: Proposed plan of ramp and Bridge 5 at Plassey Beach

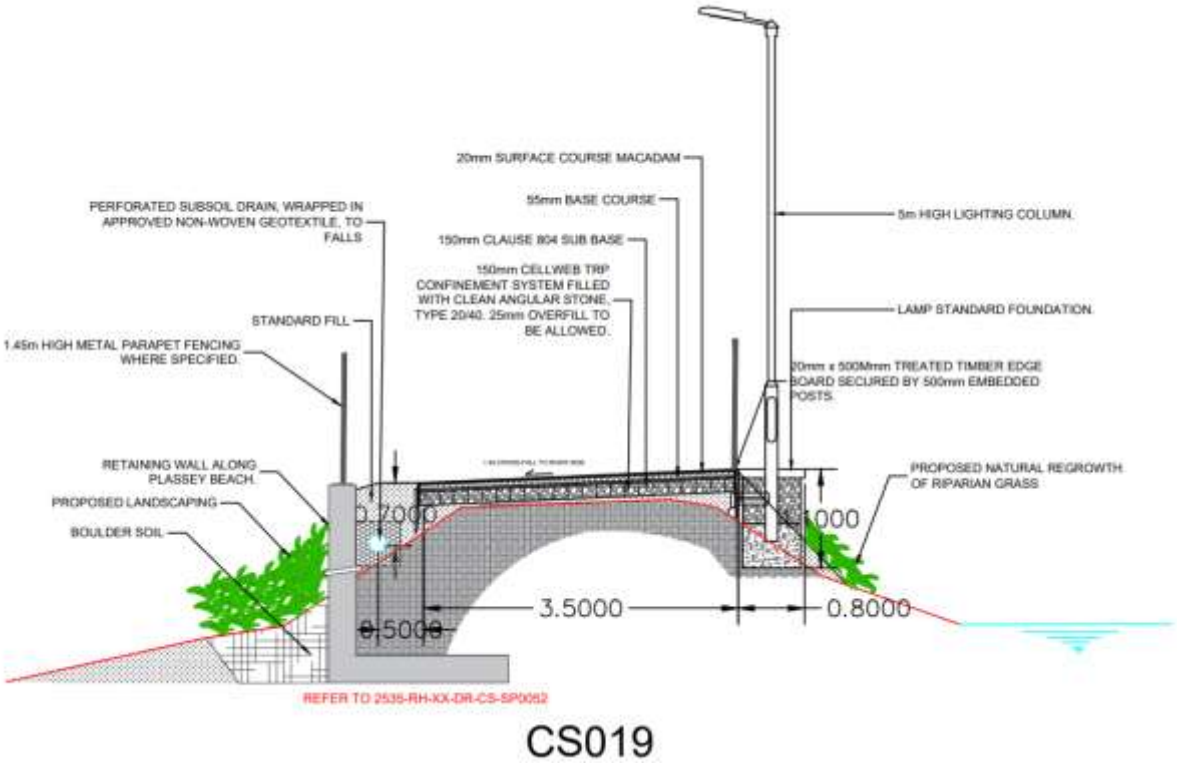

Figure 3-106: Proposed section of retaining wall for ramp at Plassey Beach

Figure 3-107: Proposed Bridge No. 5, existing embankment at Plassey Beach, and existing bridge in background

Figure 3-108: View of proposed Bridge 5 and ramp to Plassey Beach with landscaping, seating, and cycle stands

No instream works will take place at Plassey Beach or in the Plassey Mill Race. As per Bridge 1 and Bridge 2, the worksite will be protected from river water flooding by installing a water filled flood barrier on Plassey Beach, and the River Shannon and Plassey Mill Race will be protected from accidental spillages of contaminated water by proposed sheet piles and a silt curtain.

There will be a 100m long silt curtain installed in the River Shannon to catch any discharges from the worksite into the river. Silt curtains will catch materials that float or are suspended in the water. Silt curtains are typically made from PVC and closed-cell foam. They are a flexible, water permeable barrier that extends downwards in the body of water, where it is typically anchored or weighted to prevent the silt from moving. The foam provides buoyancy, while the PVC curtain controls sediment in the water. Example photos of a silt curtain in the River Corrib in Galway are provided in Figure 3-85 and Figure 3-86.

Dust will be suppressed during the construction works. To avoid water runoff carrying fines, a shade cloth will be erected immediately adjacent to the proposed concrete foundations and walls to trap dust arisings.

Dewatering of the area where the proposed foundations for the Bridge 5 abutment walls will be constructed will utilise a silt buster tank to remove silt from water before the water will be returned to the River Shannon.

The construction period of the bridge, the retaining wall, and the ramp is expected to take 4-5 weeks and the work will be carried out during the summer when it is expected to be dry and the river is at the lowest level during the year. The existing Mill Race stream under the proposed Bridge 5 will continue to run during the works and during the summer months the depth of this stream has been measured during the summer of 2022 as being 100mm deep. The proposed sheet pile will prevent any loose soil or suspended material from running into the Mill Race stream. The proposed shade cloth will prevent airborne dust from floating onto the stream or River Shannon. The proposed water filled flood barrier will prevent river water from entering the worksite.

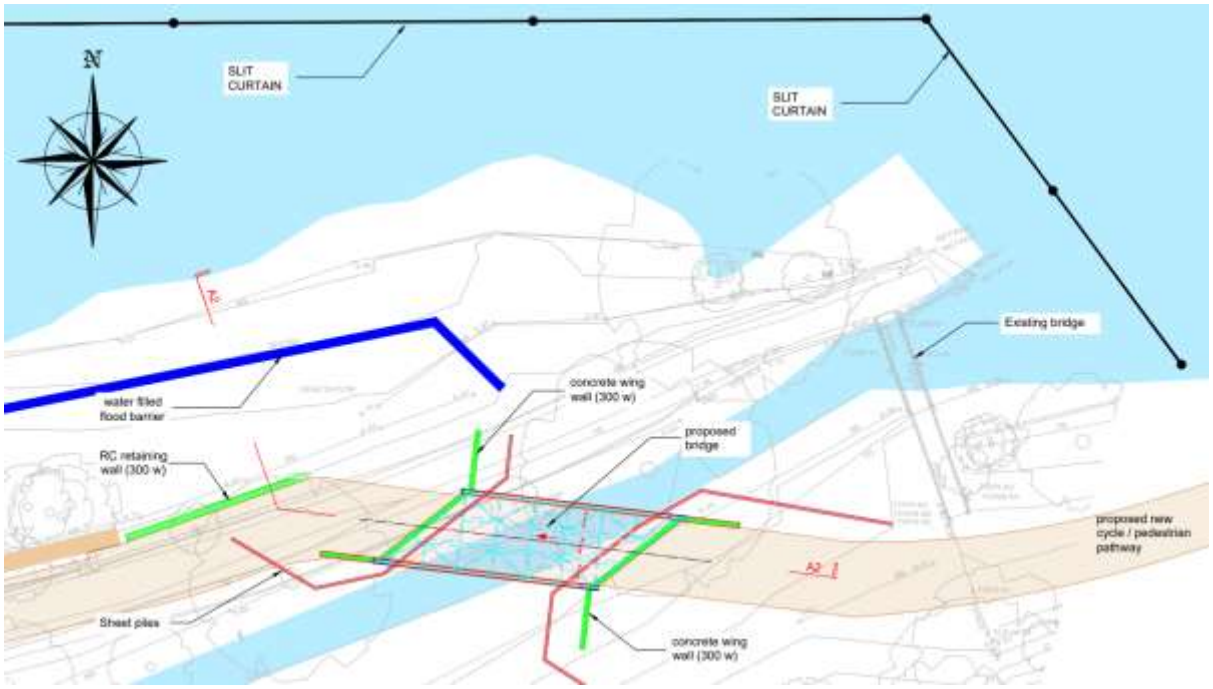

Figure 3-109: Plan of proposed Bridge 5 and proposed Ramp, showing proposed Silt Curtain, Sheet piles and water filled flood barrier (refer to drawing RHA-XX-DR-S-SP0052)

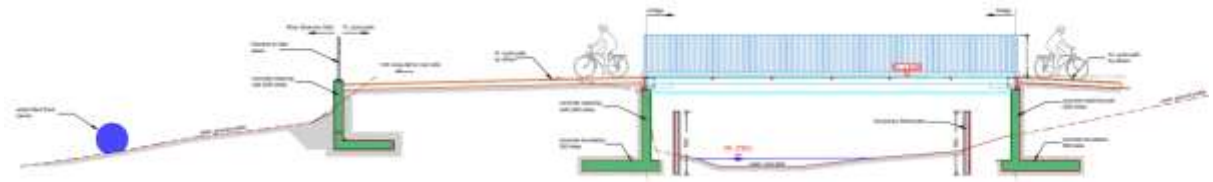

Figure 3-110: Section of retaining wall for proposed Ramp and Abutment walls for proposed Bridge 5 (refer to drawing RHA-XX-DR-S-SP0052)

The construction sequence for the bridge abutments is illustrated in the figure below.

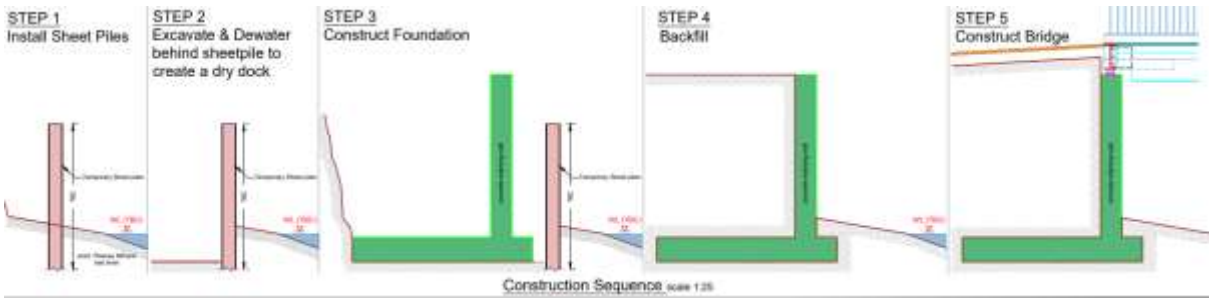

Figure 3-111: Construction sequence for abutment structures to support the steel deck of Bridge 5 (refer to drawing RHA-XX-DR-S-SP0052)

CH2250 to CH2500: Proposed Greenway on raised gravel path

East of Plassey Beach and north of Kilmurray Student village is an existing raised gravel path that will be covered with a tarmac surface. The proposed Greenway will cross an existing watercourse and the existing drainage pipe will be replaced with a proposed 900mm diameter culvert pipe.

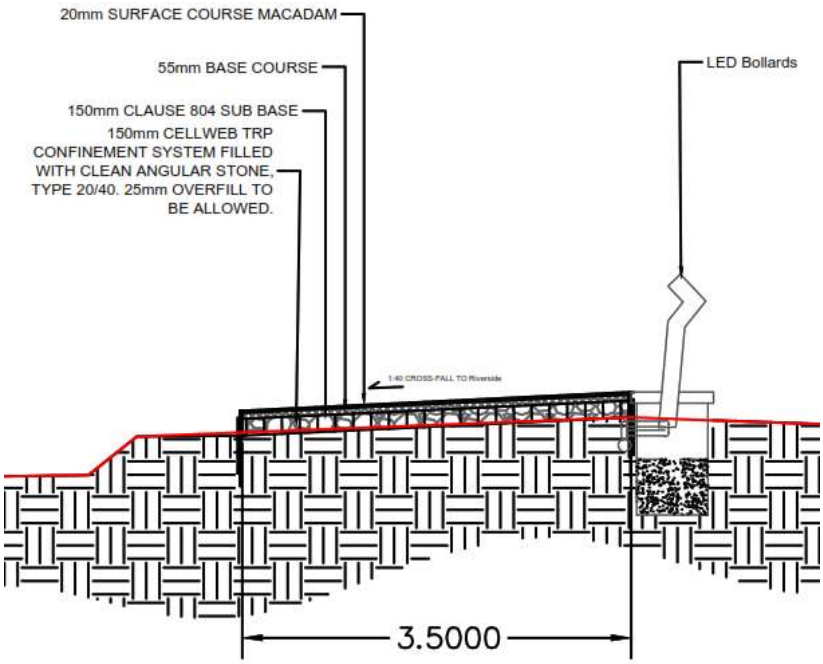

Figure 3-112: Proposed tarmac path and public lighting north of Kilmurray Student Village

At CH2500 the proposed Greenway will split into two paths. One will continue eastwards along an existing desire line to Cook Medical and onwards to McLaughlan Road. There will be a new swing gate installed at this junction so the section of proposed Greenway in the green field can be temporarily closed during and after significant flood events. The other path at the junction will turn south towards University Road and this is described in CH000_C to CH300_C.

Figure 3-113: Proposed junction on Greenway at CH2500 (refer to drawing RHA-XX-DR-C-PD0019)

CH2500 to CH3180: Proposed Greenway along desire line

The proposed Greenway route continues east and traversers amenity grassland and scrub areas where there is an unpaved desire line.

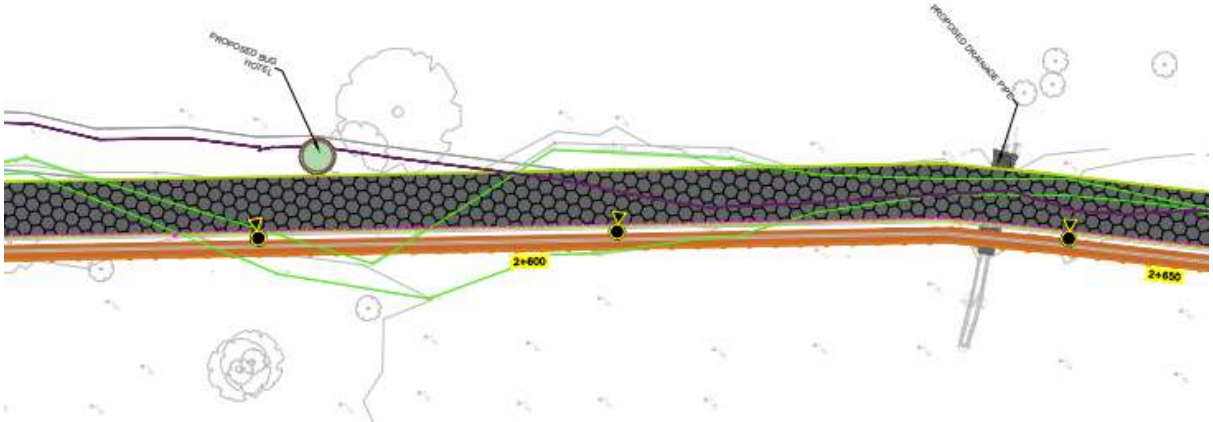

Figure 3-114: Proposed Greenway to replace existing grass desire line

There will be a new shallow land drain on the field side of the proposed Greenway and proposed drainage culverts will be constructed under the proposed path to drain surface water to the River Shannon, and to ensure the tarmac path can be utilised as soon as possible after flooding events (after LCCC maintenance personnel have inspected and cleared the path of flood debris).

The Flood Risk Assessment undertaken for this project, CFRAM flood mapping, confirms this part of the proposed Greenway will be subject to low probability (1 in 1000 year) and medium probability (1 in 100 year) flooding events. Anecdotal evidence collected during site visits and the public consultation event in August 2022 confirmed there will also be a high probability (1 in 10 year) of flooding events.

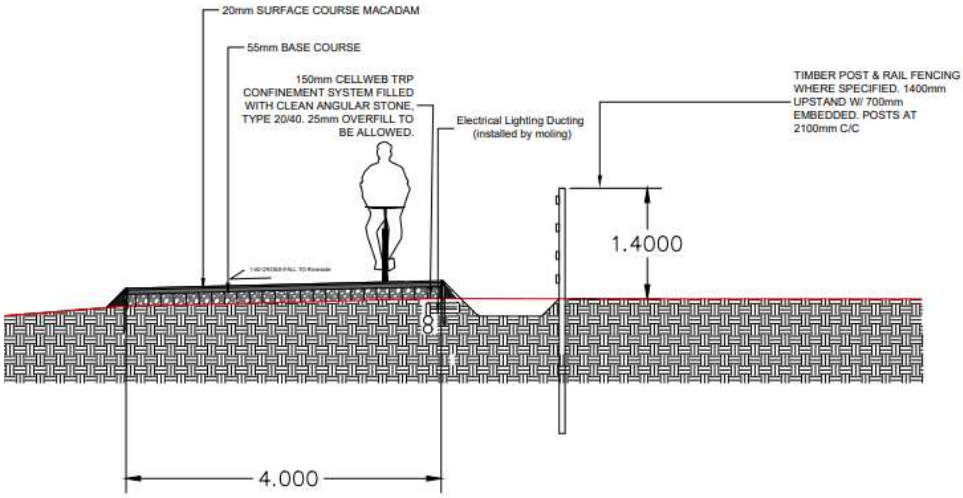

Figure 3-115: Proposed Greenway cross section in green field

CH3180 to CH3490: Proposed Greenway in green field

The proposed Greenway route turns south-east (CH 3180) to traverse the edge of trees, and through grassland and scrub areas. It will avoid the IDA's proposed surface water management system (shown in greyscale). There will be drainage channels along the east and west sides of the proposed Greenway to manage surface water and drain water towards the River Shannon.

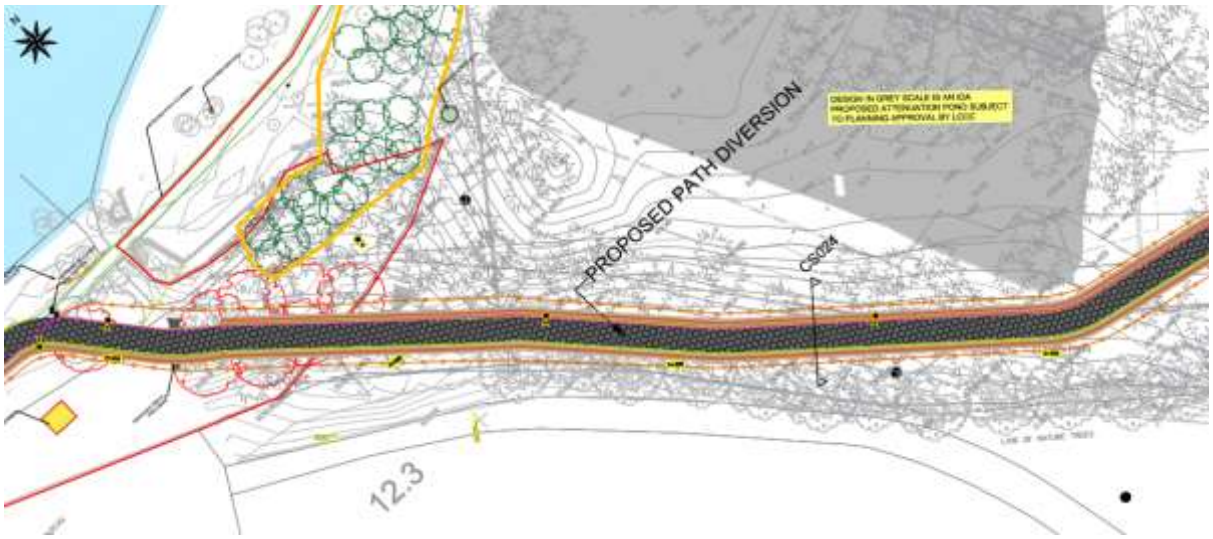

Figure 3-116: Proposed drainage alongside proposed path to manage surface water

The proposed Greenway will turn south-west to join to McLaughlan Road in the National Technology Park (NTP) at CH 3490.

CH3490 to CH3805: Proposed Cycle lane and Footpaths alongside McLaughlan Road

The proposed Greenway changes from a shared 3.5m wide greenway to Active Travel infrastructure with separate 1.8m wide footpaths and 1.8m wide cycle lanes along the eastern and western side of McLaughlan Road.

Figure 3-117: Proposed cycle lanes and footpath on McLaughlan Road where it joins the shared path

The proposed footpaths and cycle lanes will tie into existing footpaths and cycle lanes on Plassey Park Road at its junction with McLaughlan Road.

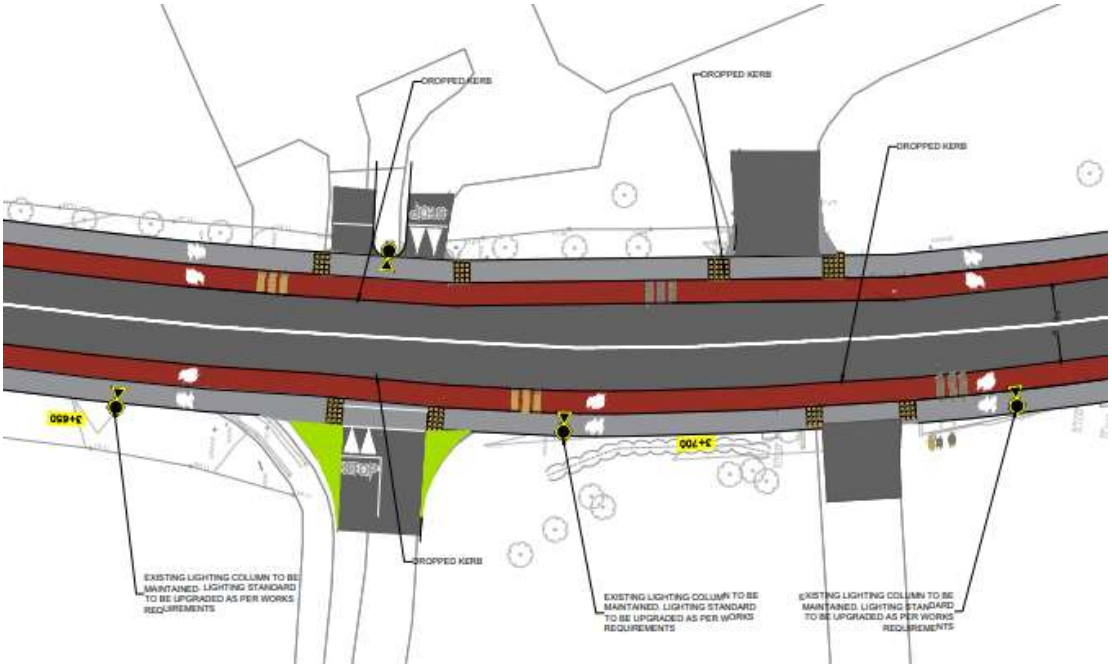

Figure 3-118: Proposed plan for footpaths and cycle lanes alongside McLaughlan Road

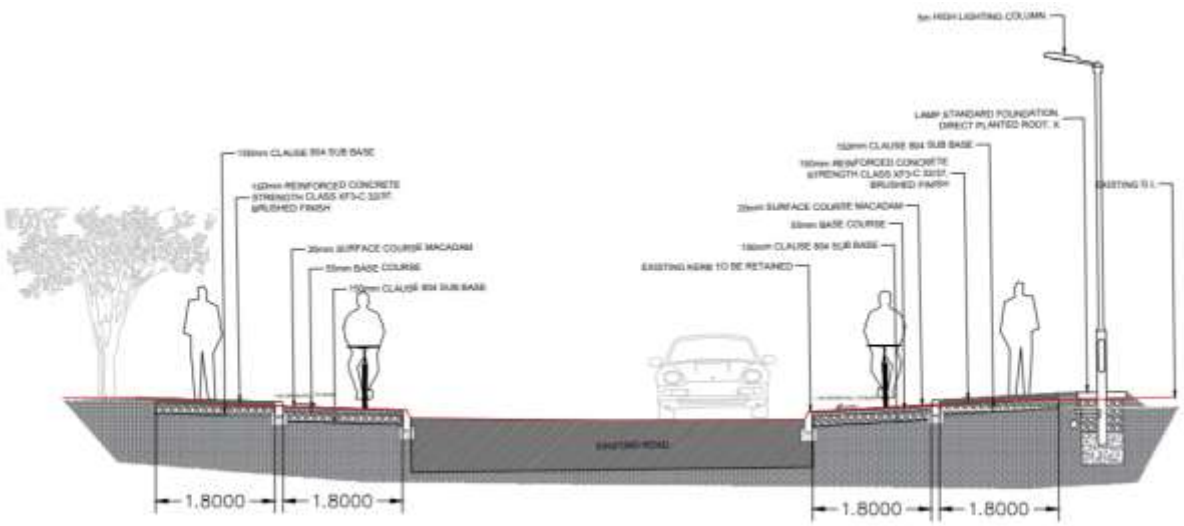

Figure 3-119: Proposed cross section for footpaths and cycle lanes alongside McLaughlan Road

An existing 2m wide raised table Zebra crossing on Plassey Park Road will be converted to a 6m wide Toucan crossing to prioritise crossings for pedestrians and cyclists and in accordance with design guidance for Toucan crossings on bus routes.

Figure 3-120: The existing Zebra crossing on Plassey Park Road proposed to be converted to a Toucan crossing

CH000_C to CH300_C:P Proposed Greenway east of Kilmurray Student Village

The proposed Greenway will run in a southerly direction past the eastern boundary of the UL Agricultural Laboratory building and Kilmurray Student Village. This short section of the Greenway will be a shared space between Greenway users and vehicles associated with the UL Agricultural laboratory, but removable bollards will be installed on the Greenway that will be operated by UL Facilities to manage vehicle movements. Typically the bollards would be locked in place to prevent unauthorized access for vehicles to this section of the Grenway. Refer to drawing RHA-XX-DR-C-PD0029. The existing parking spaces to the east of Kilmurray Student Village will be reconstructed to accommodate the proposed Greenway. The existing rubbish bin area will be realigned for the same reason.

Figure 3-121: Proposed Greenway at UL Agricultural Laboratory building east of Kilmurray Student Village

Figure 3-122: Proposed Greenway approaching the eastern/rear entrance to Kilmurray Student Village

The proposed Greenway will leave the Kilmurray Student Village and join University Road.

Figure 3-123: Proposed Greenway at eastern entrance to Kilmurray Student Village

CH300_C to CH677_C: Proposed footpaths and cycle lanes on University Avenue

The proposed Greenway crosses the entrances to Kilmurry Student Village and the UL Gaelic grounds where it changes from a shared 3.5m wide greenway to Active Travel infrastructure with separate 1.8m wide footpaths and 2.0m wide cycle lanes along the eastern and western side of University Road.

Figure 3-124: Proposed Greenway on University Road

The proposed cycle lanes and footpaths on University Road will tie into Active Travel infrastructure which was constructed along Plassey Park Road as part of the Limerick Shannon Metropolitan Area Transport Strategy (refer to Figure 3-73).

3.3 Proposed Amenity/Rest areas, Landscaping and Tree Planting

In accordance with LCCC's replacement tree planting policy, there will be five native Irish trees (e.g.: Oak, Willow, Alder, Birch) are proposed to be planted for every tree that is cut down to enable construction of the proposed Greenway path.

There will be three new amenity/rest areas provided along the proposed Greenway with new seating and cycle stands.

There will be a new wildflower meadow (in accordance with the All-Ireland pollinator plan), a hedgerow, and tree planting south of the Fisherman cottages, and new understory planting at the Plassey Mills rest area. There will be new landscaping along the retaining wall and ramp at Plassey Beach.

CH000: Proposed Amenity/Rest area at Groody Bridge

There will be a proposed amenity/rest area east of Groody Bridge. The red line in Figure 3-125 is the SAC boundary line which passes through the existing path. Refer to drawings 2525-RHA-XX-DR-C-PD0001 and 2525-RHA-XX-DR-C-LA0002.

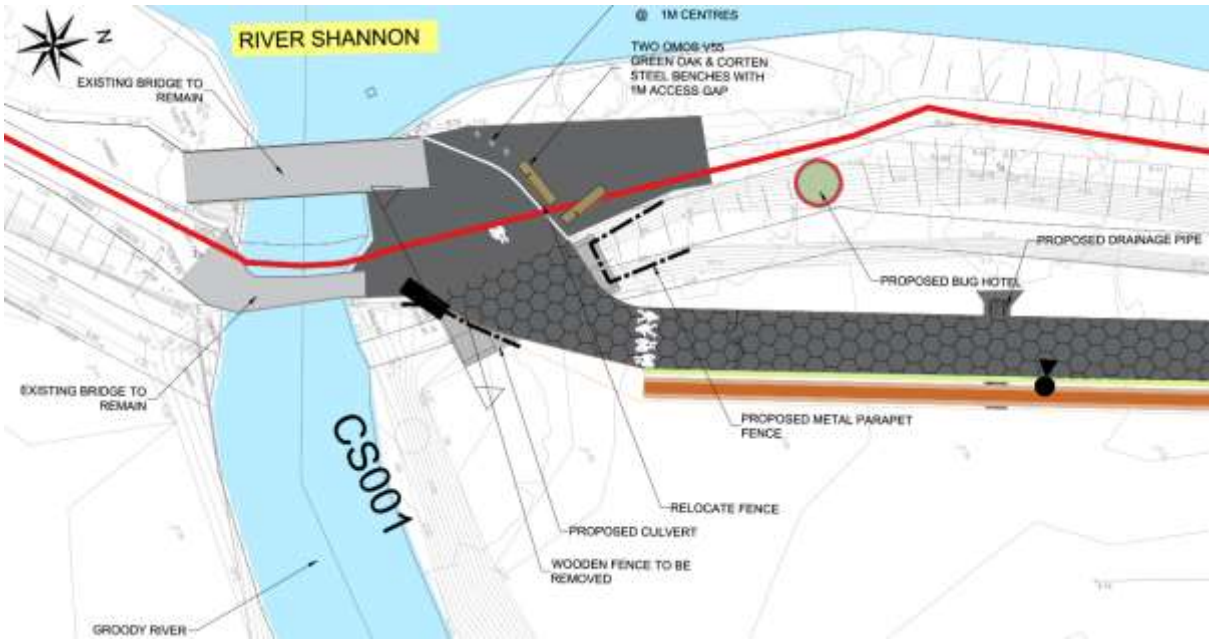

Figure 3-125: proposed amenity/rest area east of Groody Bridge

CH 770: Proposed Tree planting east of UL Boat Club

There will be native Irish trees planted along a proposed path between the proposed Greenway and an existing UL campus shared path. Refer to drawing 2525-RHA-XX-DR-C-PD0007. The replacement tree planting will support the propagation of and avoid gaps in the broad leaf woodland along the riverbank to the benefit of bats, especially the Lesser Horseshoe bat.

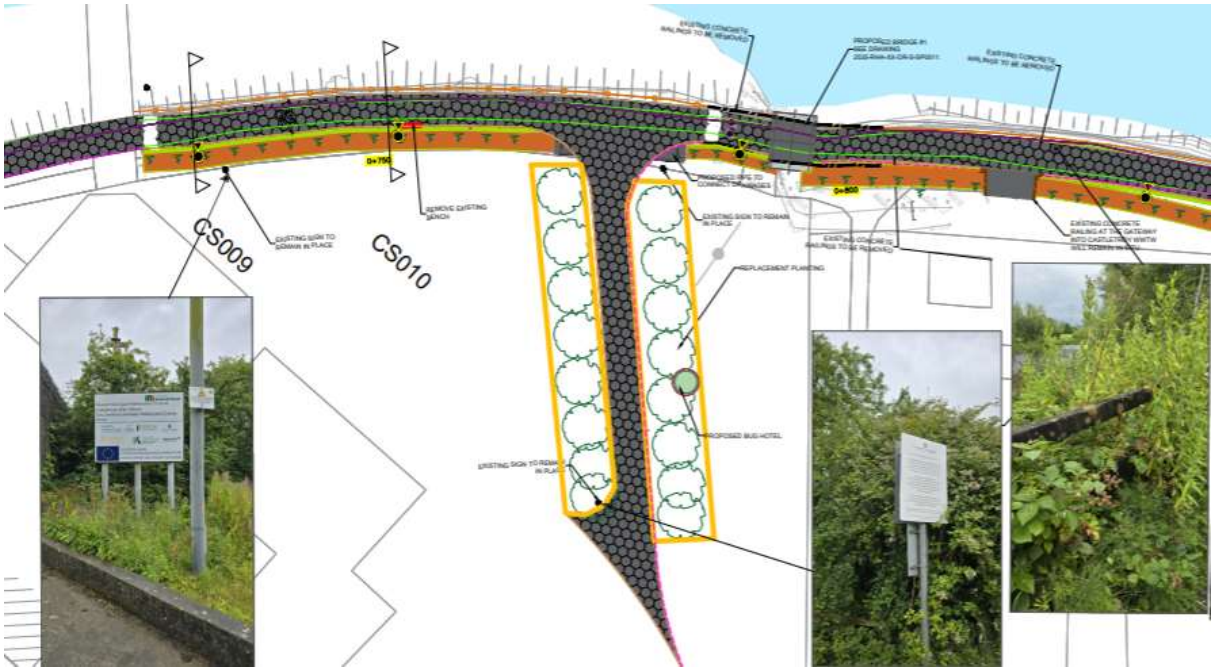

Figure 3-126: Proposed tree planting area west of proposed Bridge 1

CH1020: Proposed Amenity/Rest area at Plassey Mills

The proposed amenity/rest area at Plassey Mills will provide new seating and cycle stands. It could also function as a junction for any future usage of the currently sealed off Black bridge that crosses the River Shannon in this location.

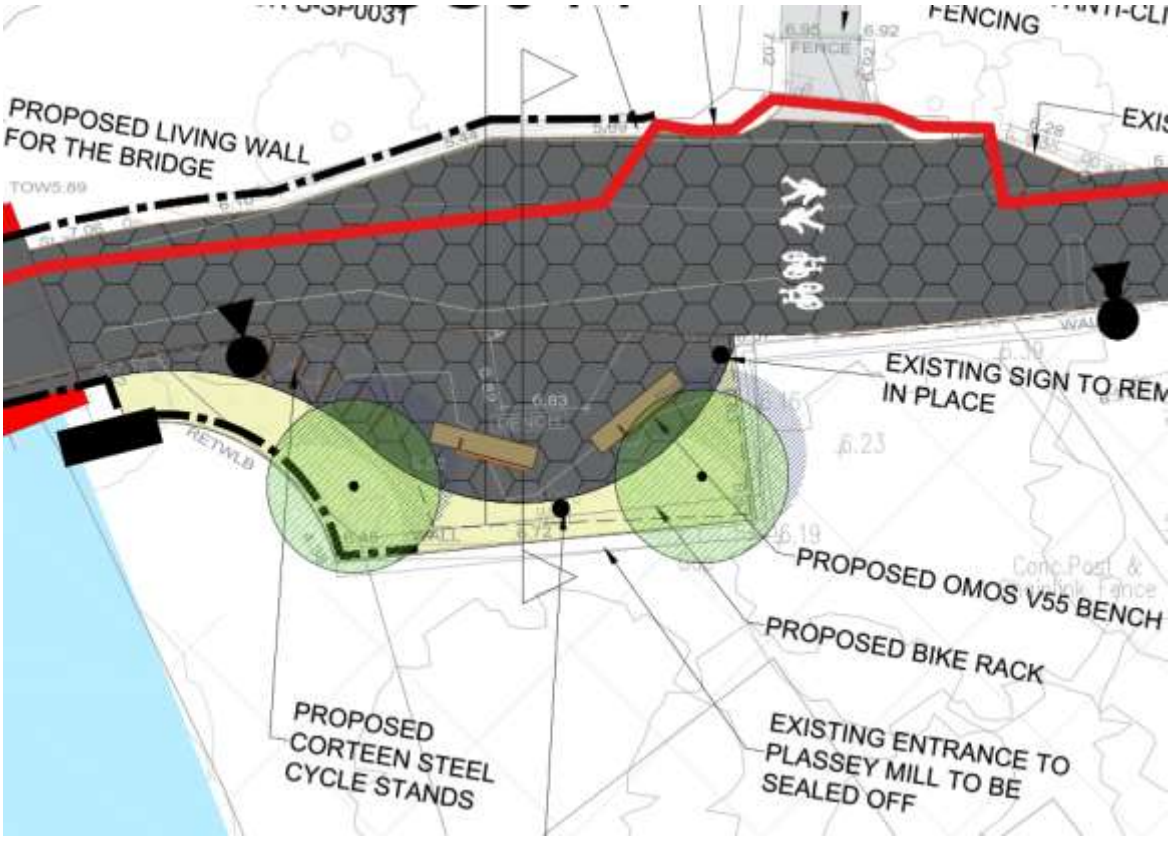

Figure 3-127: Proposed amenity/rest area at Plassey Mills

CH 1200; Proposed Landscaping south of the Fisherman cottages

There will be a new wildflower meadow (in accordance with the All-Ireland pollinator plan), a hedgerow, and tree planting south of the Fisherman cottages. Refer to drawings 2525-RHA-XX-DR-C-PD0001 and 2525-RHA-XX-DR-C-LA0003. The replacement tree planting will support the propagation of and avoid gaps in the broad leaf woodland to the benefit of bats, especially the Lesser Horseshoe bat.

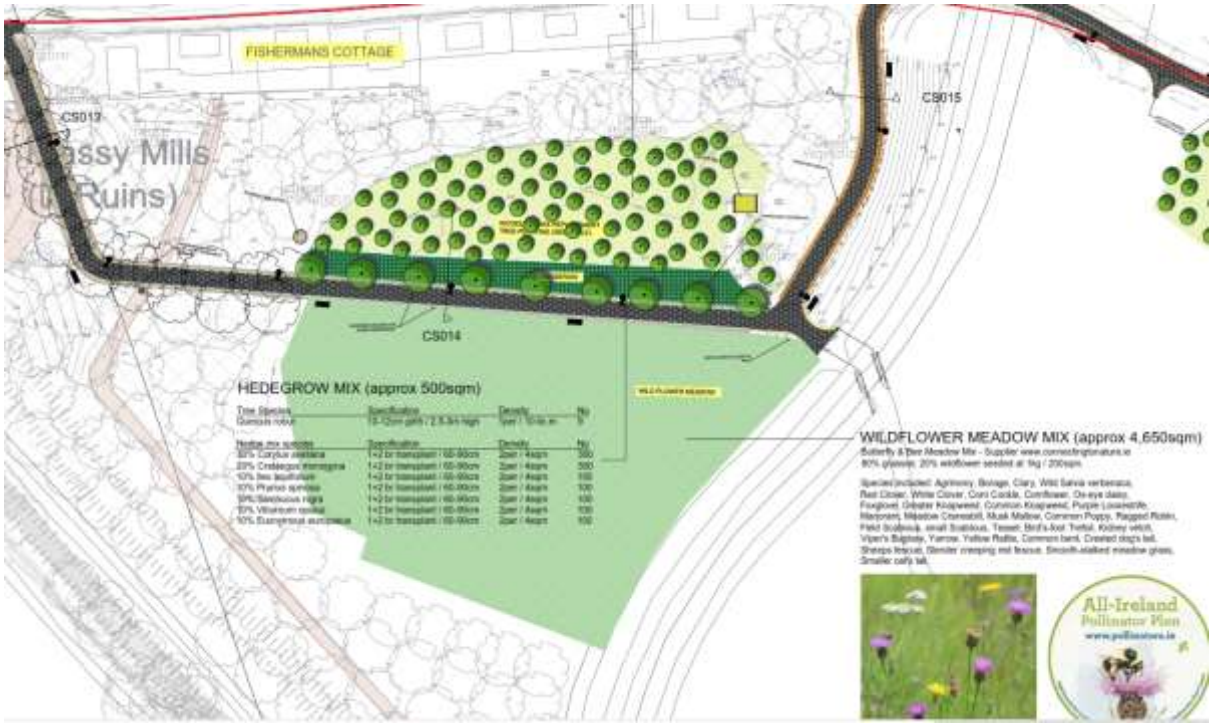

Figure 3-128: Proposed landscaping south of the Fisherman cottages

CH 1400-1520: Proposed Tree planting north of Dromroe Student Village

There will be replacement trees planted in a green field area to the north of Dromroe Student Village. Refer to drawings 2525-RHA-XX-DR-C-PD0011, 2525-RHA-XX-DR-C-PD0012, and 2525-RHA-XX-DR-C-LA0003. The replacement tree planting will support the propagation of and avoid gaps in the broad leaf woodland along the riverbank to the benefit of bats, especially the Lesser Horseshoe bat.

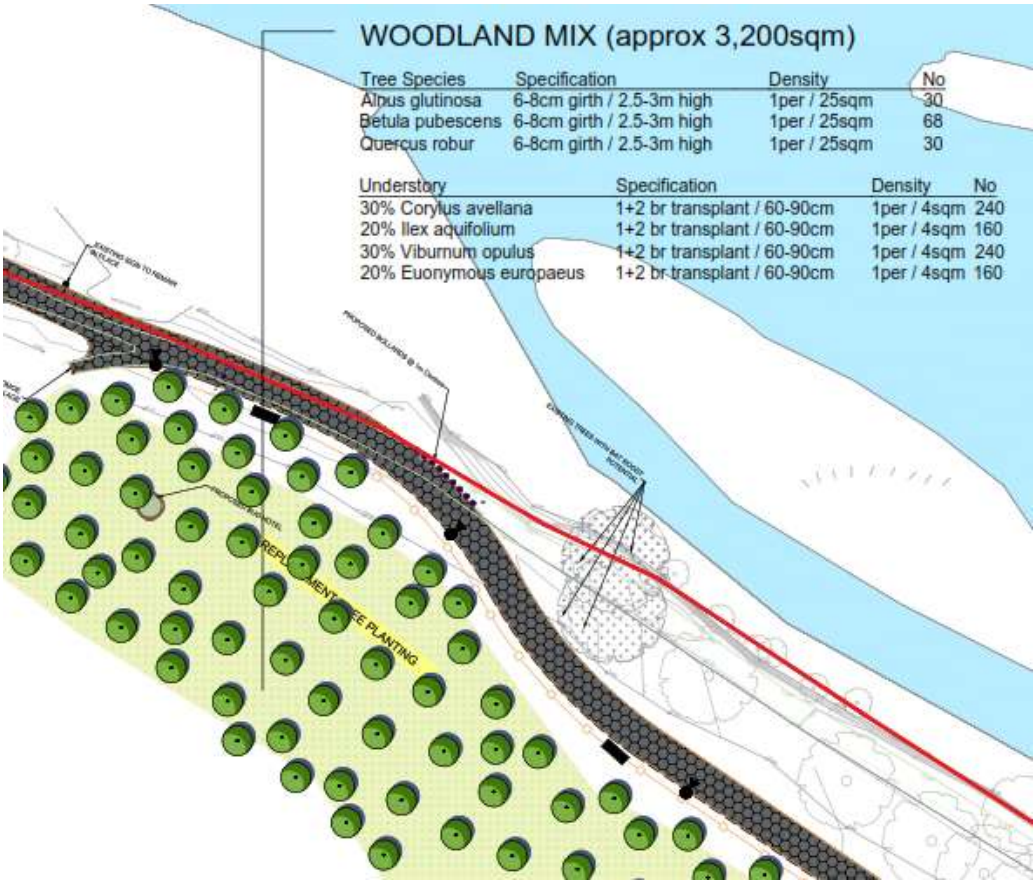

Figure 3-129: Proposed tree planting area north of Dromroe Student Village

CH 2105-2175: Proposed Landscaping and Amenity/Rest area at Plassey Beach

There will be new native Irish trees and new riverside shrubs planted at Plassey Beach. Refer to drawings 2525-RHA-XX-DR-C-PD0017 and 2525-RHA-XX-DR-C-LA0004. The replacement tree planting will support the propagation of and avoid gaps in the broad leaf woodland along the riverbank to the benefit of bats, especially the Lesser Horseshoe bat.

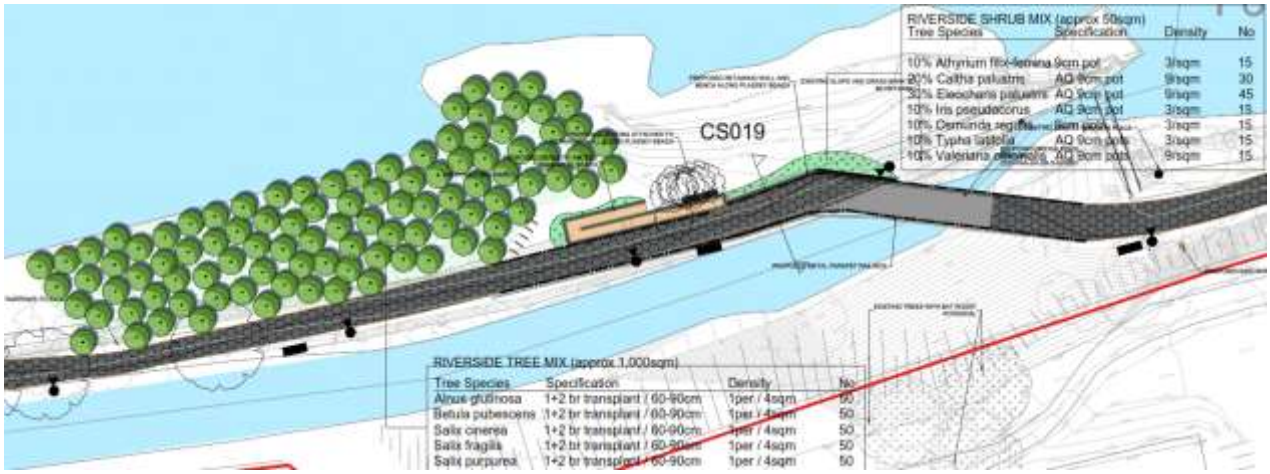

Figure 3-130: Proposed native Irish trees and new riverside shrubs at Plassey Beach

CH 3190-3450: Proposed Tree planting east of Cook Medical campus

There will be native Irish trees and an understory planted adjacent to the proposed path east of the Cook Medical campus and southwest of Troy Castle. Refer to drawing 2525-RHA-XX-DR-C-PD0023 and 2525-RHA-XX-DR-C-LA0005. The replacement tree planting will support the propagation of and avoid gaps in the broad leaf woodland along the riverbank to the benefit of bats, especially the Lesser Horseshoe bat.

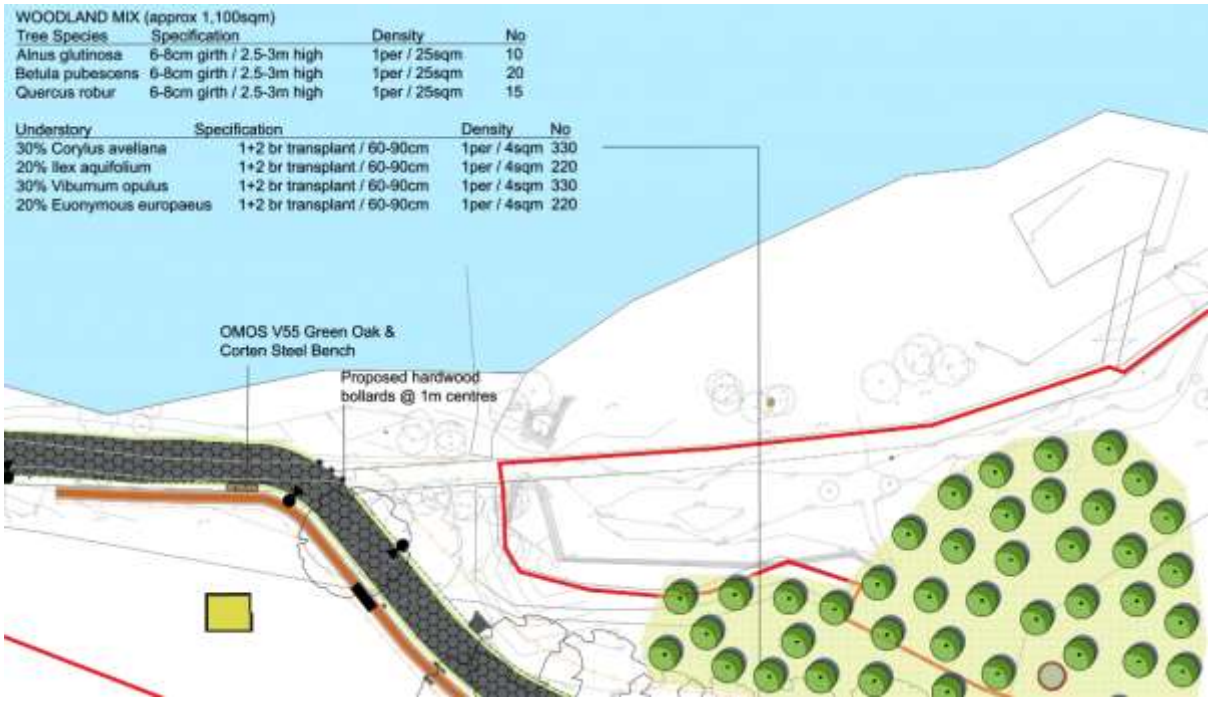

Figure 3-131: Proposed replacement tree planting east of Cook Medical

3.4 Description of Proposed Construction Works

3.4.1 Tree removal

The proposed works have been designed to minimise disturbance to the habitat and limit tree removal within the site, but there are trees that will be cut down to construct the proposed Greenway. In accordance Section 40 of the Wildlife Act 1976 as amended by Section 46 of the Wildlife Amendment Act 2000 the proposed trees can only be removed between and 1st September and the last day of February in the following year. The trees that have to be removed will be cut down during this period.

The proposed path has been designed to avoid existing mature trees except for one dead mature tree and one dead semi-mature tree that will be felled ahead of the construction works. Tree overhang from approximately 30 No. semi-mature and mature trees will be cut down along the proposed path. These trees have been assessed by an experienced and qualified Arborist and an experienced and qualified Ecologist, and they have very limited habitat potential. There is one dead mature tree and four immature trees that will be removed in the Annex 1 habitat Alluvial woodland forest (Refer to Figure 4.2). The remainder of the trees to be cut down are outside the Annex 1 habitat Alluvial woodland and they are saplings and immature trees with no habitat potential. Refer to Figure 3-132.

Figure 3-132: Saplings and immature trees that will be removed along the route of the Greenway

All trees to be cut down between September and February shall be inspected by an experienced and qualified Ecologist to check for nests and roosts and shall be laid on the ground for at least 24 hours before they will be recycled or mulched.

LCCC requires trees that are cut down to be replanted at a rate of 5:1 so over 300 native trees are proposed to be planted along the proposed Greenway. This will help to deliver the LDP Objective EH

O10 to plant 'native trees, hedgerows and vegetation and the creation of new habitats in all new developments and public realm projects'.

Tree branches and immature trunks which are felled will be reused in the production of bug hotels. Any leftover trunks and branches will be chipped and mulched at the closest construction compound for reuse on site.

Figure 3-133: Scrubland that will be cleared ahead of the Greenway construction works

3.4.2 Site Clearance

Surface stripping will be required in greenfield areas where topsoil and subsoil will be stripped along the route of the path to an average depth of 300mm. The topsoil and subsoil will be mounded and seeded on the river side of the path and will be left in place as a permanent installation. To prevent soil washing into the river, a sediment barrier will be erected at the base of the mounds on the river side.

In advance of construction works existing infrastructure items will be removed and disposed off-site, these include:

- One steel kissing gates along the existing gravel track at Plassey Mills and disposal off site;
- Approximately 500m of existing wooden, concrete, and steel fencing and disposal off site;

Advance work in Section 2 will require the removal of a temporary steel bridge at the location of Bridge No. 3.

Advance works will also include cutting out of four existing concrete footbridges and one set of bridge abutments and crushing of concrete within the construction compounds so the aggregate can be reused during the construction works.

Extensive areas of vegetation will need to be cleared in advance of construction works. Trees which are felled will be chipped on site for mulch for use on site. Mulch will be added to slopes to prevent soil erosion, retain water, and manage weeds.

Vegetation clearance includes:

- Felling of trees and mulching for onsite use;
- Clearance of overhanging branches and mulching for onsite use;
- Clearance of native scrub from drainage channels, bagging, and disposal;
- Clearance of native scrub in heavy dense areas, bagging, and burial under soul mounds to prevent spread of invasive species.

A planting scheme is proposed to replace vegetation which has been removed as part of the works. Refer to the landscape drawings 2525-RHA-XX-DR-C-LA0001 to 2525-RHA-XX-DR-C-LA0005 for details of the proposed planting areas and species.

Advanced treatment and removal of invasive species including Giant Hogweed and Himalayan Balsam that have been surveyed in the work site shall be carried out ahead of construction works. Refer to the Invasive Species Management Plan in Appendix E for details.

If invasive species plants that spread by rhizomes (e.g. Japanese Knotweed) are encountered by site clearance crews, the plant will be removed in accordance with guidelines for managing invasive species, wrapped in plastic, and buried under topsoil and subsoil mounds so those invasive species plants cannot propagate. No invasive species will be moved to a different location within the works site or off site.

Site clearance will be required in advance of the Greenway's construction, as follows:

- At a minimum this will include excavation of topsoil and subsoil and establishment of permanent mounds (including reseeding) immediately alongside the stripped soil in green fields along the proposed route between Kilmurray Student village and Cook Medical;
- Existing infrastructure items obstructing the proposed path, such as metal gates, metal parapets, metal arisings from crushed concrete, and metal fences will be removed and disposed offsite to a licenced waste facility;
- Existing concrete footbridges will be or crushed in temporary construction compounds and the material will be reused as aggregate for haul roads during the works (metal arisings will be transported to a licenced waste facility);
- Vegetation clearance involves removing scrub and will be carried out in consideration of ecological restrictions between September and February.
- Trees which are felled will be mulched in a temporary construction compound for reuse on site to minimise soil erosion, keep soil wet, and prevent weed growth.
- Where excavation is required to remove roots from trees that have been cut down, any unconsolidated ground will be sown with grass seed following reinstatement to prevent erosion;

Temporary works will be put in place in advance of construction, including the provision of silt fences at all interfaces of the works area and the existing watercourse to prevent run off from the works area.

3.4.3 Temporary Construction Compounds

The temporary construction compounds will be temporarily surfaced with hard standing on a geomembrane to prevent generation and spreading of mud. Temporary perimeter fencing with silt curtains at the base and shade cloths to act as dust curtains will be erected around compounds. Delivery trucks will not cross through the compounds, and they will drop their loads within the compounds. The construction works vehicles will be permitted to work on the Greenway side of the compounds only and will not pass through the compound to exit onto public roads. This will control mud spreading onto public roads and will help to prevent the spread of invasive species that are evident along the proposed path.

The compounds will be adequately buffered to prevent any surface water runoff. The construction compounds will be constructed in Flood Zone C areas only.

The compounds will comprise the following elements:

- temporary site office, portaloo toilets, facilities for staff, and car-parking areas;
- crushing and storage areas for construction materials;
- bunded containment areas for plant refuelling which will only be permitted within the compounds,
- maintenance area for construction vehicles and plant;
- wheel wash area for construction vehicles and plant with water capture and settlement to prevent the spread of invasive species;
- storage of fuels, oils, lubricants, solvents, and site generators;
- a dedicated waste storage area for any construction waste generated. Skips or bays will be provided for recyclable material;
- wheel wash area for delivery vehicles (or road cleaning to be carried out as an alternative subject to UL, IDA and LCCC requirements).

Temporary compounds and a working area will be required during the construction period to accommodate workforce and vehicle movements, stockpiling of excavated material, and the construction (and removal where required) of haul roads. For each compound the top-soil and sub soil will be removed and mounded on the compound footprint, a geotextile layer will be laid across the entre area, imported fill (40mm crushed rock) will be spread across the area, and the compounds will have a temporary fence set up on their boundary.

Provision has been made for four temporary compounds with areas typically measuring 40m x 40m but these dimensions will be adjusted to suit site conditions and avoid tree felling. There is one temporary working area proposed in Castletroy wastewater treatment plant (WwTP) to set up a crane to lift in prefabricated concrete and steel sections associated with Bridges 2 and 3. Each of the compounds facilitate access to the five different sections of the proposed Greenway. Sectioning of the route in this way will allow part of the existing path to remain open for the public while works are being carried out in other sections. Refer to Figure 3-134.

Each temporary compound and working area will be removed after works in each section are completed and the area will be reinstated back to its original state.

Upon completion of sections of the Greenway, the temporary construction compounds and haul roads will be decommissioned, and the grounds will be reinstated to their original condition. Where possible, hardstanding materials removed will be reused in the construction of other temporary compounds and used in the construction of the base layers of the proposed Greenway project.

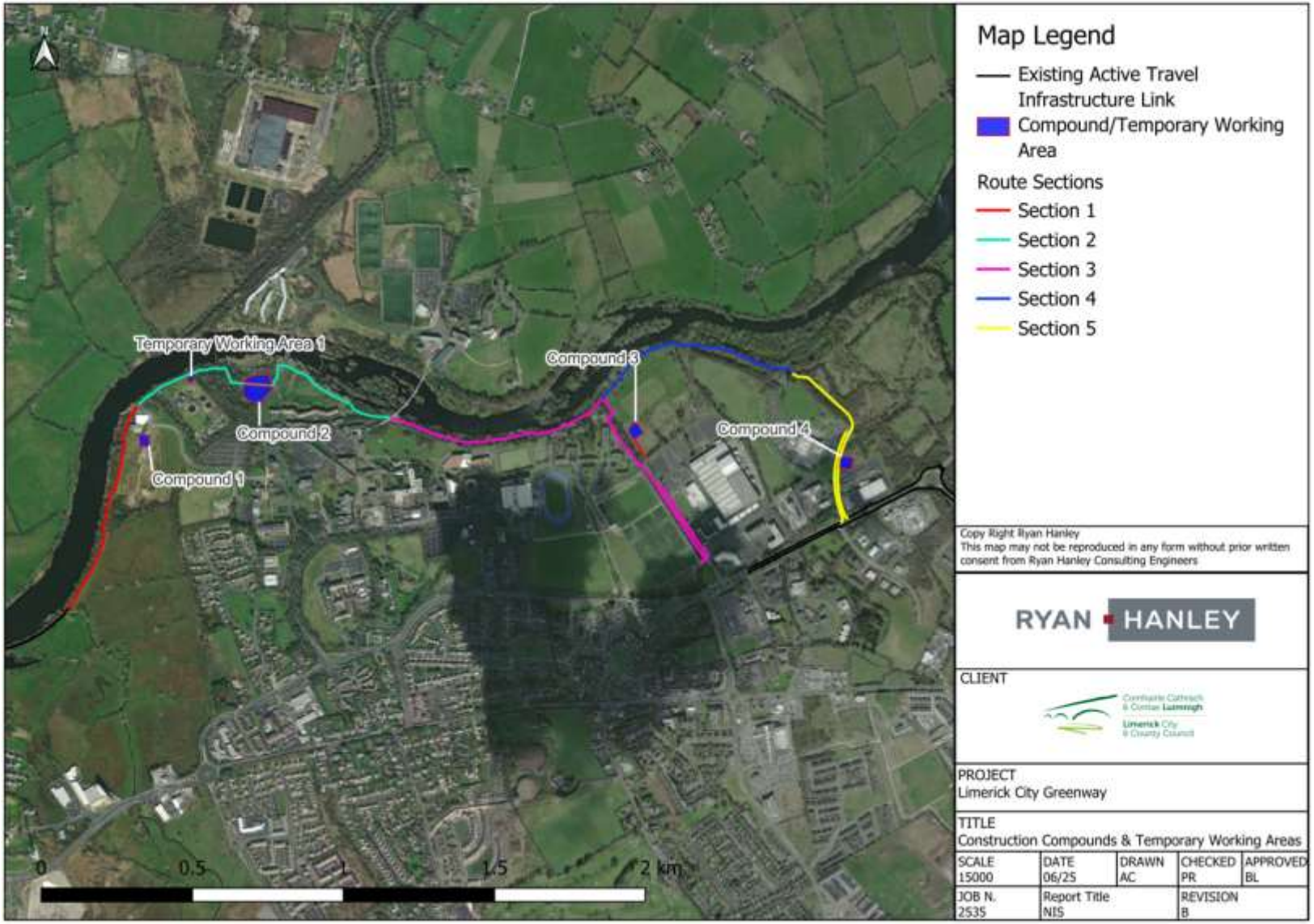

Figure 3-134: Proposed Sections, Compounds and Temporary Working area

3.4.4 Haul roads

Haul roads are required to facilitate the construction of the proposed Greenway. Haul road will be developed in green fields, scrublands, tree felling areas, and along existing gravel paths to enable construction vehicle movements. The haul roads will form the sub-base layer of the proposed path. Approximately 3.6km of haul roads will be developed along the proposed route as per Table 3-1.

Table 3-1: Lengths of Haul Roads per Section

Section Ref.	Haul Roads (m)
Section 1	736
Section 2	1005
Section 3	845
Section 4	725
Section 5	284
Total Length	3,595

The haul roads for construction vehicles will be developed along the route of the proposed path so the tarmac finished layer can be laid onto the haul road. The haul road will be approximately 3.5-4.0m wide and will comprise of the subbase layers of the proposed path: a geotextile layer, and crushed rock (UGM A). The depth of the subbase layer will generally be 300mm – 450mm depending on the ground conditions of the area and the haul roads will be laid in sections as the construction of the Greenway progresses.

Approximately 313m of temporary haul roads which do not lie along the proposed path will be constructed to facilitate access between the compounds and the works areas in each section. These haul roads will be removed after works in each section are completed and the area will be reinstated back to its original state.

Temporary haul roads will be constructed by excavating topsoil and subsoil and laying geotextile and aggregate/blinding (UGM A). The soil will be stored temporarily if it is required for reinstatement or will be permanently mounded and reseeded if it is not required for reinstatement. The haul roads will be laid in sections as construction of the path progresses.

On completion of sections of the proposed Greenway, the temporary haul roads will be removed, and materials will be reused in subsequent sections as the works advance, or the UGM A material, 55mm binder course and 20mm surface macadam course will be laid above the haul roads in greenfield areas. Lath edging (50 x 75mm) will be laid at both side of path attached to stakes located at 900mm c/c.

3.4.5 Earthworks

There will be no excavation required for the proposed Greenway along existing tarmac or gravel paths. To protect trees alongside the path a 'Cellweb®TRP' tree root protection system (or equivalent) will be laid onto the existing path and imported material (i.e., crushed rock and gravel to UGM A, overlaid with

tarmacadam) will build up the level of the path. The sloping banks on the river side and the Plassey Mill Race will also have a new 'Cellweb®TRP' system (or equivalent) to enable regrowth of bankside plants. Refer to Figure 3-135 for an example.

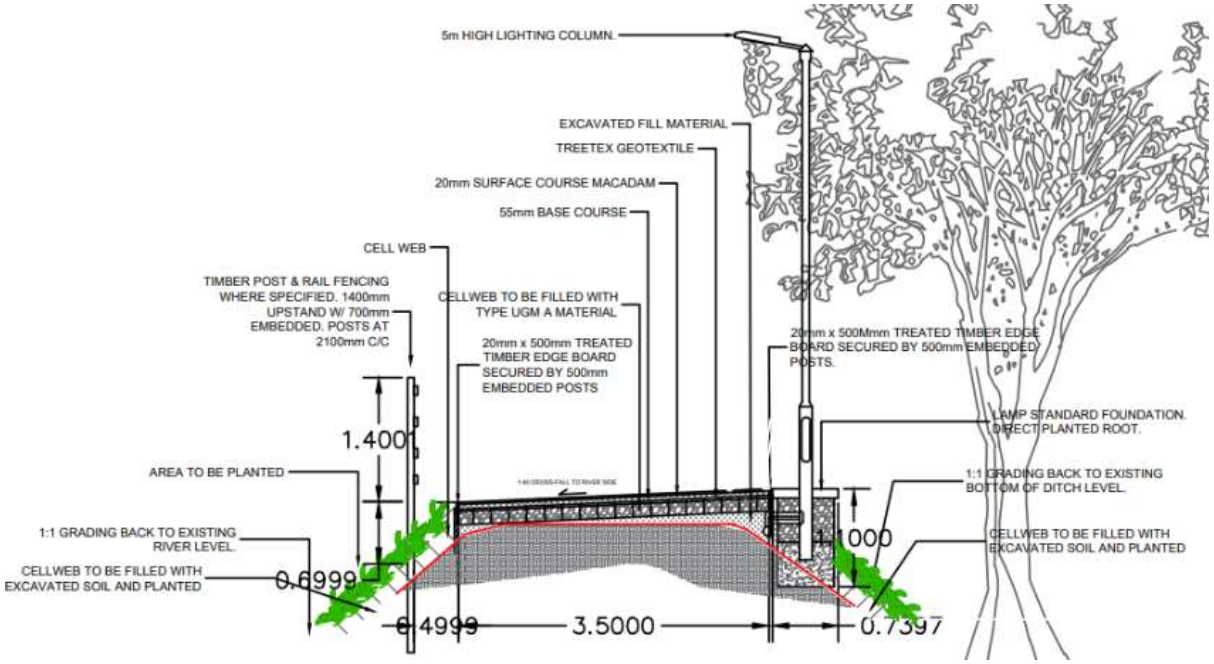

Figure 3-135: Tree root protection along proposed Greenway (Red line is existing ground level)

Excavation of topsoil and subsoil will be required where the proposed path passes through green field areas. Approx. 300mm depth of soil will be excavated and permanently left as a mound to be reseeded approximately 0.75m high and 2m wide on the river side of the path. Soil from areas that were contaminated with invasive species will be wrapped in plastic and buried under excavated soil. This accords with the project objective to ensure at least 95% of all waste is kept on site and not sent to a landfill.

Excavation of the carriageway, green verge, and footpaths will be required along University Road and McLaughlan Road to build up the concrete footpath and tarmac cycle lanes. A raised kerb will separate the existing roads from the proposed cycle lanes.

3.4.6 Testing of Imported Material

Clean Type UGM A fill material is required to be imported into the work site. To prevent cross contamination or pollution, a suite of testing from the source quarry will be required because the proposed Greenway is adjacent to water.

3.4.7 Traffic Management

A *Draft* Traffic Management Plan has been prepared for the proposed works and consultation has been carried out with UL Facilities and Uisce Éireann. The traffic management proposals have been presented to elected representatives. Construction and works delivery traffic will use the following existing roads/routes:

- The entrance road to the Castletroy WwTP;
- The road across the bridge to Co. Clare;
- University Road;
- McLaughlan Road;

- Plassey Park Road.

3.4.8 Construction of Greenway

Construction works should take place during daylight hours only with no temporary lighting on the site during the hours of darkness. Works shall only be carried between 08:00-18:00 during daytime hours or between dawn and dusk to minimize disturbance to nocturnal Qualifying Interests species. Motion detection sensors to turn on lights were considered but have not been proposed because the existing path is well used by the public so the use of always on lights from dusk until 23:00 hours is preferred over lights turning on and off, and risking the creation of a strobe light effect for nocturnal Qualifying Interests species.

During construction, noise limits, noise control measures, hours of operation and selection of plant items will be considered in relation to disturbance of birds. Plant machinery will be turned off when not in use.

The design and construction of the 4.25km long and 3.5-4.0m wide shared path, 1.5-2.0m wide footpath, and 1.8-2.0m wide cycle lanes has been carried out in accordance with the following:

- Transport Infrastructure Ireland (TII) Rural Cycleway Design DN-GEO-03047 (2022);
- Department of the Transport and Department of Housing, Local Government and Heritage, Design Manual for Urban Roads and Streets (DMURS, 2023);
- National Transport Authority's Cycle Design Manual (2023); and,
- Department of Transport, Tourism & Sport document Traffic Signs Manual (TSM) (2019).

Construction of the path will be carried out in sections. The sequencing of works per section is flexible. Each section will be reinstated before works commence in the next section. Existing users of the gravel track along the River Shannon will be directed around each section and there are existing footpaths and cycle lanes in the UL campus and along Plassey Park Road to accommodate diversions.

Isolation of the works area, including erection of fencing around the temporary works area and traffic management will be set up as required. The fenced area will include the full area required to facilitate the works including the temporary site compounds and the temporary haul roads.

Construction of the Greenway along the existing gravel path in wooded areas will involve the installation of lath edging (50 x 75mm) at both sides of the proposed path attached to stakes located at 900mm c/c, laying a 150mm thick root protection material onto the gravel track, filling this with UGM A material, laying a 55mm binder course onto it and finishing with 20mm surface macadam course;

Construction of the path along the existing gravel path in non-wooded areas will involve the installation of lath edging (50 x 75mm) at both sides of the proposed path attached to stakes located at 900mm c/c, laying 150mm of UGM A material directly onto the existing gravel path, laying a 55mm binder course onto that, and finishing with 20mm surface macadam course;

Where the path is being laid in an area with an existing tar pavement (i.e., along University Road and McLaughlan Road, the top 250mm of the existing surface will be removed and subsequently the depth of the subbase layer in these areas will be reduced to approximately 180mm.

Storage of other excavated material will be on a temporary basis, on site within the temporary works area and separate from the topsoil storage. Excavated material will be reused on-site, primarily for backfilling against new bridge abutments and the proposed retaining wall at Plassey Beach. This material will be classified as a construction by-product in the context of Article 27 of the European Communities (Waste Directive) Regulations. If there is any surplus excavated material, it will be

transported off site to an authorised waste or recovery facility. Large volumes of excavated material will not be allowed to accumulate within the temporary working areas.

The construction works for reinforced abutment walls, retaining walls, concrete culverts, open drains will be carried out in parallel with the path construction.

The construction works for lighting column foundations and trenches for ducting will be carried out in parallel with the path construction. To protect the tree roots, ducts will be moled to a minimum crown depth of 600mm wherever the ducts pass mature trees.

Additional works including the installation of; signage, safety barriers, fencing, park benches and tree planting will be completed along the path prior to reinstatement of works area and the works area being reopened.

The works area will be reinstated to its original condition. This will involve levelling, raking, and seeding with grass.

3.4.9 Construction of Bridges, Retaining wall, Ramp

The five bridges on which the proposed path will cross existing drains, a stream, and the Plassey Mill Race (at two locations). These are as follows:

- A 4.9m long single span, steel frame bridge and new concrete abutments will be constructed for both pedestrians and cyclists at CH795;
- A 9.6m long single span steel bridge and 41m of concrete retaining wall and abutments will run adjacent to an existing stone footbridge at CH970;
- A 5.4m long single span, steel frame bridge for both pedestrians and cyclists will be constructed on existing cut stone abutments at CH1000;
- A 5.1m long single span, steel frame bridge for both pedestrians and cyclists will be constructed on existing cut stone abutments at CH1045;
- A 12.9m long single span, steel frame bridge for both pedestrians and cyclists will be constructed on new concrete abutments and obliquely cross the Plassey Mill Race at CH2220-2235. 28m of concrete abutments will support the 12.9m long steel deck;
- A new 12m long concrete retaining wall will be constructed at Plassey Beach;
- A new fully accessible 20m long ramp at a 3% slope will be constructed at Plassey Beach to provide access from the proposed Greenway to the beach for all users.

Construction of the new bridges will take place as follows:

- Temporary works will be put in place including silt barrages, and temporary flumes will be installed to manage overland drainage water.
- To prevent pollution to the adjacent stream and river bio-degradable hydraulic oils are to be used in machinery, and spill kits shall be ready on site for immediate use.
- Works beside streams will be restricted as a result of the spawning season for salmonids so work will not be carried out during Nov-March.
- Biosecurity management for in-stream works will be strictly monitored. With the presence of Giant hogweed (*Heracleum mantegazzianum*) and Himalayan balsam (*Impatiens glandulifera*) along the path route, regular cleaning of machinery to prevent spread of non-native species is very important.
- The foundations and abutment walls will be excavated down to formation level. Excavated material will be stored on site for reuse as backfilling. Formwork will be erected, and aggregate and blinding will be tamped into place. Reinforcement bars will be placed into the formwork

and concrete will be poured in using a concrete pump crane. After the required curing time has passed the formwork will be removed.

- The new bridges will be constructed using prefabricated steel frames that will be placed and fixed *in situ* onto the concrete abutments or onto the existing cut stone abutments. Steel frames will be delivered to the construction compound by truck, and then transported to the proposed crossing location by digger. The steel frames will be swung into place using a crane or digger and placed and fixed by hand.
- The annulus between the new structures and the excavated areas will be backfilled with excavated material (and topped up with imported material if required), the area will be reinstated, and the section will be reopened.

3.4.10 Drainage infrastructure

A Flood Risk Assessment for the proposed greenway has been completed. The following figures illustrate the potential temporary impact that 1 in 100 year and 1 in 1000 year floods will have on the proposed Greenway, and demonstrates why a new drainage network of land drains and culverts will be required to convey surface water to the River Shannon after flood events. Maintenance of this drainage infrastructure by LCCC will be required.

Figure 3-136: Past Flood Events OPW database (www.floodinfo.ie)

Flood Mapping developed by the OPW CFRAM programme confirms that appreciable lengths of the proposed Greenway are in Flood Zone A (2.36km) and Flood Zone B (2.77km) associated with the River Shannon and its tributaries scheme floodplains.

Portions of the existing paths and the proposed greenway are below the 10% AEP flood level.

The proposed scheme, being an "Amenity open space, outdoor sports and recreation" facility, is classed as a Water Compatible development in the OPW Planning System and Flood Risk management Guidelines, and therefore is an appropriate development for both Flood Zone A and B.

A justification test for the development in accordance with the Flood Risk Management Guidelines, further confirmed that the proposed development is appropriate albeit with mitigations. The Greenway track should be constructed to be water compatible, i.e. one which is resistant to damage caused by flooding and prolonged inundation, e.g. sealed surface, appropriate drainage etc.

Figure 3-137: November 2009 River Shannon Flood Event at UL campus in Co. Limerick on left hand side, with UL campus in Co. Clare on right hand side of figure, OPW database (www.floodinfo.ie)

Figure 3-138: Sections of Greenway at Flood Risk (1 in 100 or 1% AEP)

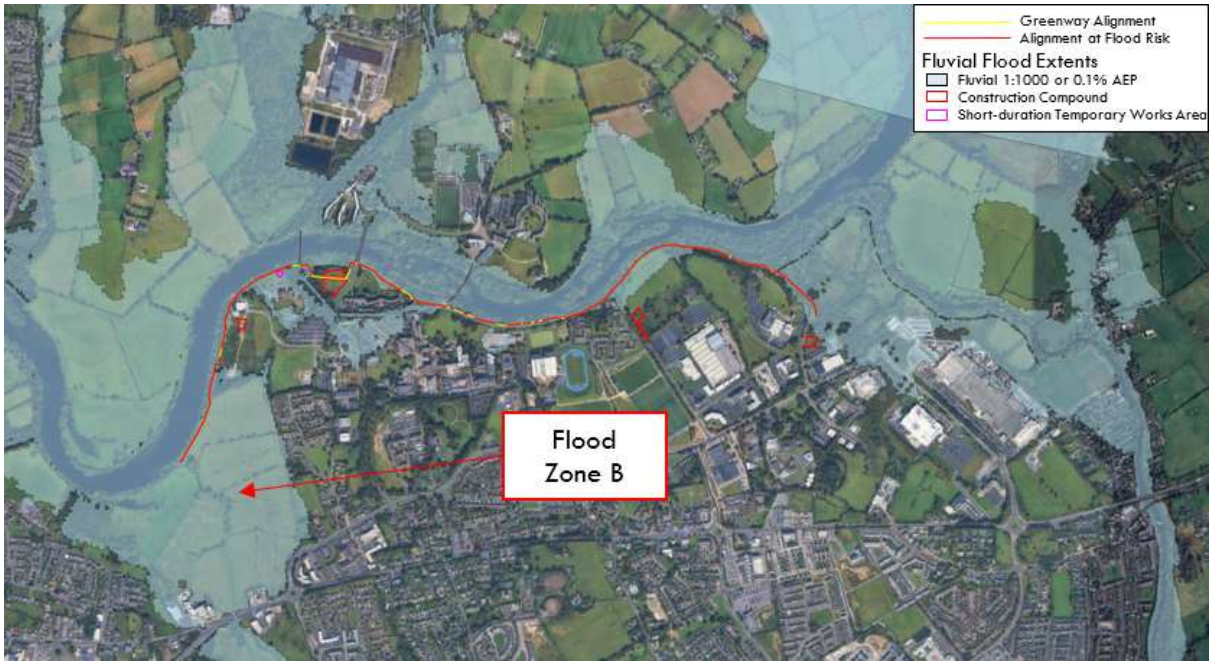

Figure 3-139: Sections of Greenway at Flood Risk (1 in 1000 or 0.1% AEP)

Surface water will be managed through a series of existing open drains alongside the proposed Greenway and existing culverts under existing paths, proposed open drains alongside the proposed Greenway, and new culvert pipes under the proposed path.

There will be 5 No. box culverts constructed in existing drainage channels where the proposed Greenway will cross it. Four are new culverts and one is a replacement culvert. They will have a minimum diameter of 0.9m and range up to 2.0m cross sectional diameter (exact diameters to be confirmed after completion of the Section 50 assessment).

22 No. precast concrete culvert pipes of 0.5m diameter and 6-8m in length and associated headwalls will cross under the proposed Greenway path at 100m intervals where there are no existing culverts. The purpose of these culverts is to enable groundwater which collects in the open drains alongside the path to be discharged to the rivers. The open drains will be shallow, approximately 1.0m wide and 200mm deep. The drains will collect storm water flows from the proposed path and runoff from the hilly green field in the IDA's National Technology Park. Water will flow in the drains to the 22 No. culverts and pass under the proposed path.

Following flood events there is a risk of debris in the minor watercourses culverts and drains pipes. Post flooding maintenance to clear the culverts of debris will be required by LCCC.

3.4.11 Public Lighting

The Public Lighting design for the proposed project will use best practice guidance notes "*Bats and artificial lighting in the UK*" as published by the Bat Conservation Trust, in respect of mitigation strategies, to minimise the impact of outdoor lighting upon bat populations. The LCCC Public Lighting standard has also been followed.

There will be new public lighting along the shared path which follows the south bank of the River Shannon for approximately 3km.

Public lighting will be controlled by light sensors so their turn on time will vary during the calendar year and turn on after dusk, but lights will turn off at 23:00 hours.

Light emitting diodes (LEDs) type lanterns of the cool white type in accordance with the LCCC Public Lighting standard will be installed. They will have a Colour Temperature of 2,700°Kelvin, because it is considered less disruptive to the emergence of bats from roosts at dusk, and subsequent movement from habitats to foraging locations.

LED lanterns do not emit any ultraviolet or infra-red radiation, this again being a desirable feature in relation to impact upon bats, in terms of causing spatial exclusion from artificially lit areas.

Light levels have been kept as low as possible (P4 Class) by reference to levels specified in "Design of road lighting' - BS EN 5489-1: 2020, and these will be in accordance with the LCCC Public Lighting standard.

There will be two lighting columns; 1.6m high and 5m high. The 1.6m high lighting column will have an integrated lantern that will point directly onto the path, and they will be spaced 5m apart (Refer to the Preliminary design drawing 2535-RHA-XX-DR-C-PD-0016 for a photo of an equivalent lighting column). The Lanterns on 5m high columns will be mounted at 0° degree tilt and will be the fully cut off type with no light output above the horizontal plane. The 5m high lighting columns will be spaced approximately 35m apart to avoid siting lighting columns near mature trees with roost potential and the 1.6m high columns shall be used if there are any signs of bats in an area. The 1.6m high columns will be used in the Annex 1 Alluvial forest area.

Cable ducts for the public lighting will be installed by open trench to minimum 300mm cover in areas where no trees or tree roots are present, and by Moling technique in areas with trees. The moling will allow cable ducts to be installed to a minimum depth of 600mm so the cable ducts will pass under tree roots and protect them from damage.

Any temporary lighting required for health or safety reasons during the construction period shall be installed at a minimum of 10 metres from existing treelines and woodland habitats and directed away from such sensitive habitats.

3.4.12 Interface with roads

The proposed Greenway will interface with existing roads at several locations along the route. The features which define interfaces with roads relate to improving the safety of pedestrians, cyclists, and motorists where they interact. In addition to sign posting and path markings/decals, the following features have been included as safety measures at the interfaces with roads.

i) Tactile paving

Tactile paving will be installed on a footpath wherever a footpath crosses a road at road level and at raised tables to provide warning of approaching traffic for the visually impaired.

ii) Toucan Crossing

There will be 1 No. new 6m wide Toucan crossing on Plassey Park Road to replace the existing raised table.

iii) Kerbs

Raised kerbs will run parallel to the proposed cycle lanes to provide a physical separation between the road and the proposed Greenway. At junctions, the proposed raised kerbs will transition to dipped

kerbing to facilitate smooth for vehicles from the carriageway across the proposed cycle lanes and footpaths.

iv) Raised Tables

Alongside University Road, there will be raised tables crossing the road entrance into Kilmurry Village and the northern entrance to the UL Gaelic pitches. There will be raised tables at the southern part of McLaughlan Road. These raised tables will maintain a consistent level of the footpath and the cycle lanes where they cross a road, or a junction, and will signal traffic to slow down and check oncoming walkers and cyclists.

3.4.13 Road Markings

Cycle track markings will be carried out in line with Traffic Signs Manual, Chapter 7 – Road Markings – Department of Transport, Tourism & Sport (2019).

There will be decals on shared surfaces illustrating the side of the path that cyclists and walkers should adopt at transitions from shared surface paths to separated cycle lanes and footpaths.

3.4.14 Signage

There will be directional signs along the 4.25km of the proposed route. Existing signs along the proposed route will be retained. Refer to Figure 3-7 for a photo of an existing directional sign on the existing path.

Directional signage for the Greenway will be erected at the approach to junctions and interfaces with roads, and where the path splits into separate cycle lanes and footpaths. There will be signs to University Road, McLaughlan Road, Plassey Park Road, and at all the interface locations in the UL campus where the proposed path leads to other existing cycle lanes or interfaces with roads.

Speed control signs will be erected to remind cyclists to manage their speed and be mindful of other path users.

All signage will be clear and consistent and will be designed in accordance with the Department of Transport's 'Traffic Signs Manual'.

3.4.15 Information boards

Information boards will be erected at areas of interest including Plassey Beach and Plassey Mills. The information boards will include information about ecology (i.e., flora and fauna and biodiversity) and built heritage (architecture and/or structures of architectural or heritage importance).

3.4.16 Fencing

There will be 1.4m high timber post and rail fencing to Transport Infrastructure Ireland (TII) standard detail CC-SCD-00301 which will be erected at locations along the path including:

- Where the proposed Greenway runs adjacent to or crosses water
- Where the proposed Greenway approaches bridges or retaining walls;
- Where there is a ditch or steep slope adjacent to the path;
- At junctions;
- At sections of the boundary with UL;
- Along the boundary with private landowners; and,
- Along the boundary with the National Technology Park.

There will be 1.45m high corten steel fencing along the parapets of the proposed steel bridges and along the approaches to the existing stone bridges and cut stone abutments.

There will be 2.4m high anti-climb palisade fencing erected along the south-eastern boundary of Kilmurray Student Village and outside the commercial property BD-RCI Limerick on University Road to match the existing fence.

3.4.17 Amenity/Rest area Benches

Green Oak and corten steel benches will be installed in the amenity areas at Groody Bridge, Plassey Mills and Plassey Beach.

3.4.18 Construction Programme and sequencing

The construction duration for 4.25km of the proposed Greenway is approximately 30-60 months with works being carried out in one section at any one time. Sequencing of work in any of the five sections is flexible.

The works will be subject to ecological programme constraints as follows:

- Foreshore works (include preparatory work) beside all watercourses supporting salmonids shall be undertaken from May to October (inclusive) and in consultation with Inland Fisheries Ireland (IFI) to avoid accidental damage or siltation of spawning beds.
- To avoid impacting on bird nesting sites, the vegetation removal within the defined working area will not be carried out during the peak bird nesting season of March to August (inclusive) prior to the onset of works.
- Invasive species along the proposed greenway should be treated and removed prior to construction works.

3.4.19 Reinstatement works

The temporary working areas and compounds will be reinstated to their original condition following completion of the construction phase in each section.

Tree planting is proposed alongside the Greenway to compensate for tree felling along the route. For every tree that is felled, there will be five trees planted to compensate, so more than 300 trees are proposed to be planted along the proposed Greenway.

3.4.20 Post construction Maintenance

Adherence to best practice codes such as the "Code of Best Practice for National and Regional Greenways" ensures that a continuously high standard of the proposed Greenway is provided for all users. LCCC be responsible for the upkeep and maintenance including litter control and invasive species management through ongoing maintenance plans.

4 Description of the Receiving Environment

Ecological receptors were surveyed using methodologies outlined in Guidelines for Ecological Impact Assessment in Ireland (CIEEM, 2018 – updated 2022). Habitat mapping was carried out using Best Practice Guidance for Habitat Survey and Mapping (Smith. et.al., 2011).

The study area was examined in detail via a desktop study using aerial photography and National Biodiversity Data Centre biodiversity maps to collate baseline information.

Field surveys were carried out to search and determine the presence of Invasive Non-Native Species (INNS) listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2011). Regulations 49 and 50 of these Regulations include legislative measures to deal with the dispersal and introduction of invasive alien species. Invasive Alien Species (IAS) are also addressed by EU Regulation 1143/2014, which seeks to address the problem of IAS in a comprehensive manner so as to protect native biodiversity and ecosystem services, as well as to minimise and mitigate human health or economic impacts that these species can have.

The habitats within the works area were identified and classified according to Fossitt (2000) and as per (EC, 2013) Interpretation Manual of European Union Habitats, Version EUR 28, where they are found to have links or to correspond to Annex I habitats.

The walkover surveys were designed to detect the presence, or likely presence, of a range of protected species.

4.1 Description of the Study Area

The Study Area covers approximately 5.8km2 in the counties of Limerick and Clare encompassing the main University of Limerick (UL) campus, the NTP, sections of the Dublin Road (R445) and the northern banks of the Lower River Shannon. The proposed greenway will be located entirely in County Limerick.

The Study Area is situated within the Lower Shannon River Catchment, with two main water bodies present including the Lower River Shannon which traverses through the centre of the Study Area and River Mulkear to the east of the Study Area. A small section of the Blackwater (Clare) is present to the north of the Study Area near the Cappavilla UL campus.

The greenway is predominantly located within the grounds of the University of Limerick and National Technology Park along the banks of the River Shannon. Residential settlements are comprised of those associated with the local area of Castletroy and the University. Residential dwellings within the Study Area are quite scattered with the majority of this region being comprised of the University campus buildings and commercial enterprises associated with the National Technology Park.

The land in the Study Area is classified as follows:

- Agricultural areas: Some agricultural lands (Pasture) lie on the north side of the River Shannon surrounding existing UL sports, leisure, accommodation and educational facilities. Agricultural practices on properties on the north side are moderately intensive in nature and the predominant farm enterprises are beef. Lands along the east of the of the study area where the River Shannon and River Mulkear merge are described as principally occupied by agriculture with significant areas of natural vegetation.
- Artificial surfaces: The main UL campus where the greenway will traverse comprises areas of sport, leisure and educational facilities as well as industrial and commercial units. Some discontinuous urban fabric can also be found south and east within the study area.
- Wetlands: Inland marches exist along the River Shannon to the west of the main UL campus.

The works transverse four 1km grid squares of the National Biodiversity Data Centre (NBDC) database: R6057, R6058, R6158, and R6258 These are referenced in the various sections as part of the baseline environment of the study area.

4.1.1 Habitats and Flora

The study area was examined in detail via a desktop study using aerial photography and National Biodiversity Data Centre biodiversity maps to collate baseline information of the study area. In addition, site walkover surveys were undertaken from 2020 to 2022 where species and habitats of interest were recorded. The following paragraphs describe the terrestrial and aquatic habitats and rarer flora within and adjacent to the proposed works area, according to the classification detailed in 'A Guide to Habitats in Ireland' (Fossitt, 2000) and cross referenced with Annex I habitats where required.

The dominant habitats within and adjacent to the proposed development is Buildings and Artificial Surfaces (BL3), Depositing/Lowland Rivers (FW2), Amenity Grassland (improved) (GA2), Riparian Woodland (WN5) and Mixed broadleaved woodland (WD1). Some other habitats were identified but with less presence in the area. Although with less representation regarding the occupied surface, the following Annex I habitats were identified within the study area:

- Dry meadows and grassy verges (GS2) linked to Annex I Lowland meadows *Alopecurus pratensis* and *Sanguisorba officinalis* (6510). It occupies 2.73 Ha.
- Wet grassland (GS4) may contain examples of the annexed habitat Molinia meadows on calcareous, peaty or clayey-silt-laden soils *Molinion caeruleae* (6410). The surface occupied by this habitat is approximately 21.87 Ha.
- Riparian Woodland (WN5) contains Annex I habitat Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior (Alno-padion, Alnion incanae*, woodland *Salicion albae*) (91E0) at one location for 250m east after the Living Bridge
- There is an existing pathway within the Riparian Woodland where the greenway route is proposed to be upgraded. This habitat can also be found within the Islands within the River Shannon and along the banks, specifically from Drumroe Student Village until Thomond College, reappearing from Troy studios up until the merge with the River Mulkear. This habitat is located on both east and west side of the bank although not in a continuous manner. This habitat occupies approximately (23.06 Ha) within the study area.

Dry meadows and grassy verges (GS2 – 2.73 Ha)

Dry meadows that are rarely fertilised or grazed and are mown only once or twice a year for hay and are now rare in Ireland. Most have been improved for agriculture and this type of grassland is now best represented on grassy roadside verges, on the margins of tilled fields, on railway embankments, in churchyards and cemeteries, and in some neglected fields or gardens.

Wet grassland (GS4 – 21.87 Ha)

This type of grassland can be found on flat or sloping ground in upland and lowland areas. It occurs on wet or waterlogged mineral or organic soils that are poorly drained or, in some cases, subjected to seasonal or periodic flooding. On sloping ground, wet grassland is mainly confined to clay-rich gleys and loams, or organic soils that are wet but not waterlogged. This category includes areas of poorly drained farmland that have not recently been improved, seasonally-flooded alluvial grasslands such as the River Shannon callows and wet grasslands of turlough basins.

Buildings and Artificial Surfaces (BL3 – 70.07 Ha)

This broad category incorporates areas of built land that do not fit elsewhere in the classification. It includes all buildings (domestic, agricultural, industrial and community) other than derelict stone buildings and ruins. It also includes areas of land that are covered with artificial surfaces of tarmac, cement, paving stones, bricks, blocks or astroturf (e.g. roads, car parks, pavements, runways, yards, and some tracks, paths, driveways and sports grounds).

Depositing/Lowland Rivers (FW2 – 33.25 Ha)

Includes watercourses, or sections of these, where fine sediments are deposited on the riverbed. Depositing conditions are typical of lowland areas where gradients are low and water flow is slow and sluggish. These rivers vary in size but are usually larger and deeper than those above. In a natural state these rivers erode their banks and meander across floodplains. Because of this, most have been modified to some extent to control water flow, facilitate navigation or prevent flooding and erosion. Canalised or walled sections of rivers are included here, as are natural watercourses that have been dredged or deepened, and those with artificial earth banks.

Amenity Grassland (improved) (GA2 – 54.03 Ha)

This type of grassland is improved, or species-poor, and is managed for purposes other than grass production. It includes amenity, recreational or landscaped grasslands, but excludes farmland. Most areas of amenity grassland have been reseeded and are regularly mown to maintain very short swards. Fertilisers and herbicides are often applied but there is rarely any grazing by livestock.

Riparian Woodland (WN5 – 23.06 Ha)

This category includes wet woodlands of river margins (gallery woodland) and low islands that are subject to frequent flooding, or where water levels fluctuate as a result of tidal movement (in the lower reaches of rivers). Riparian woodland is dominated by stands of willows that may include native (*Salix cinerea, S. purpurea, S. triandra*) and non-native (*Salix fragilis, S. alba, S. viminalis*) species.

Wet Willow-Adler-Ash Woodland (WN6 – 0.22 Ha)

It typically grows in waterlogged or seasonally flooded areas along riverbanks and wetlands. The dominant species are willows (*Salix* species), alder (*Alnus glutinosa*) and ash (*Fraxinus excelsior*) which thrive in these wet conditions. The woodland supports a rich biodiversity, including mosses, lichens and invertebrates, and serves as important habitat for birds, mammals and other wildlife.

Mixed broadleaved woodland (WD1 – 10.29 Ha)

This general category includes woodland areas with 75-100% cover of broadleaved trees, and 0-25% cover of conifers. It should be used in situations where woodland stands cannot be classified as semi-natural on the basis of the criteria outlined above. Trees may include native and non-native species.

Other habitats recorded include Drainage Ditches (FW4), Treelines (WL2), Scattered trees and parklands (WD5), Spoil and bare ground (ED2), Recolonising bare ground (ED3), Scrub (WS1), Exposed sand, gravel or till (ED1), Earth banks (BL2), Wet-willow-alder-ash woodland (WN6) and Canals (FW3).

Figure 4.1 below, shows the habitats present in the study area and adjacent to the proposed greenway.

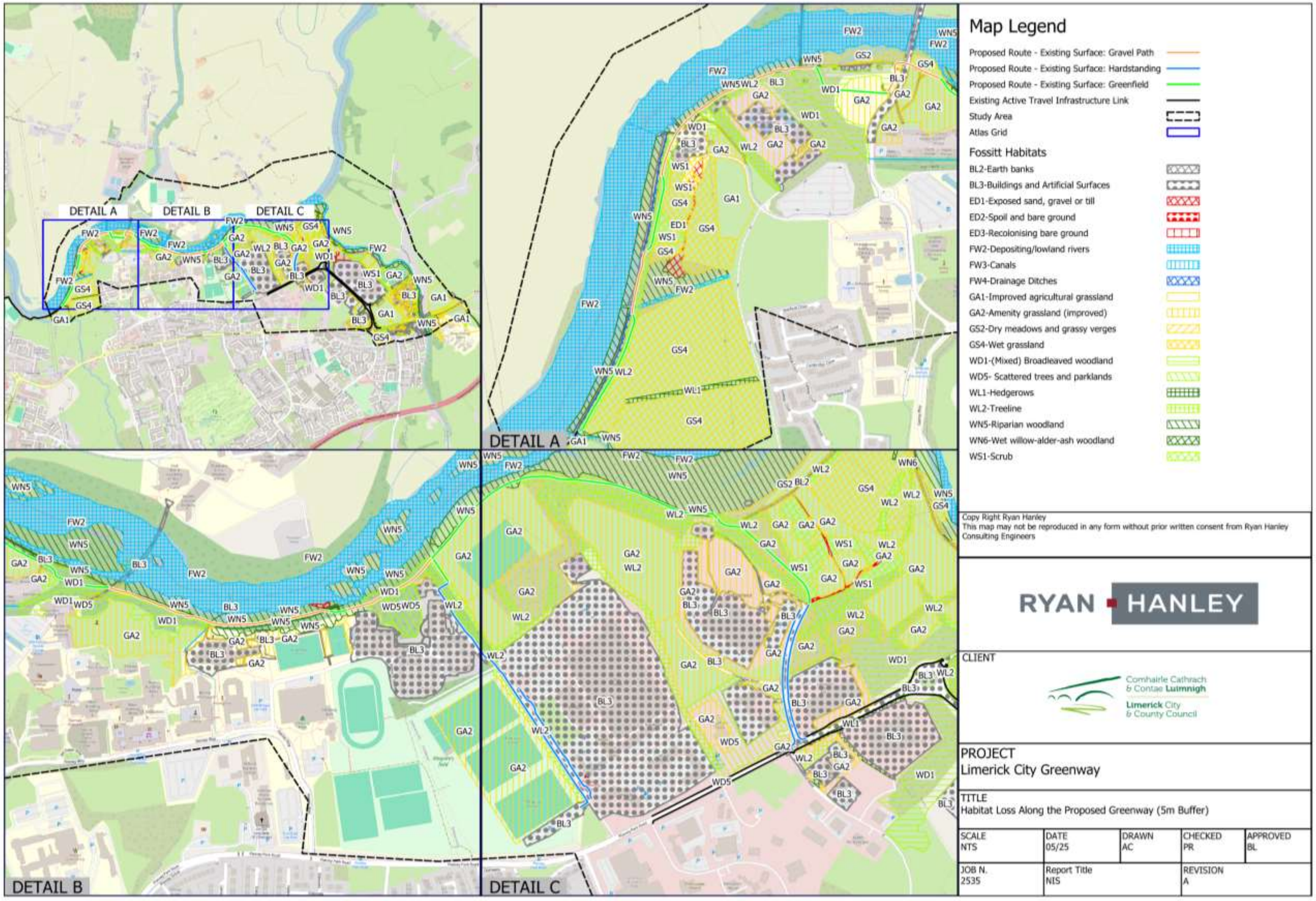

Figure 4.1 Fossitt habitats recorded within the study area of the greenway

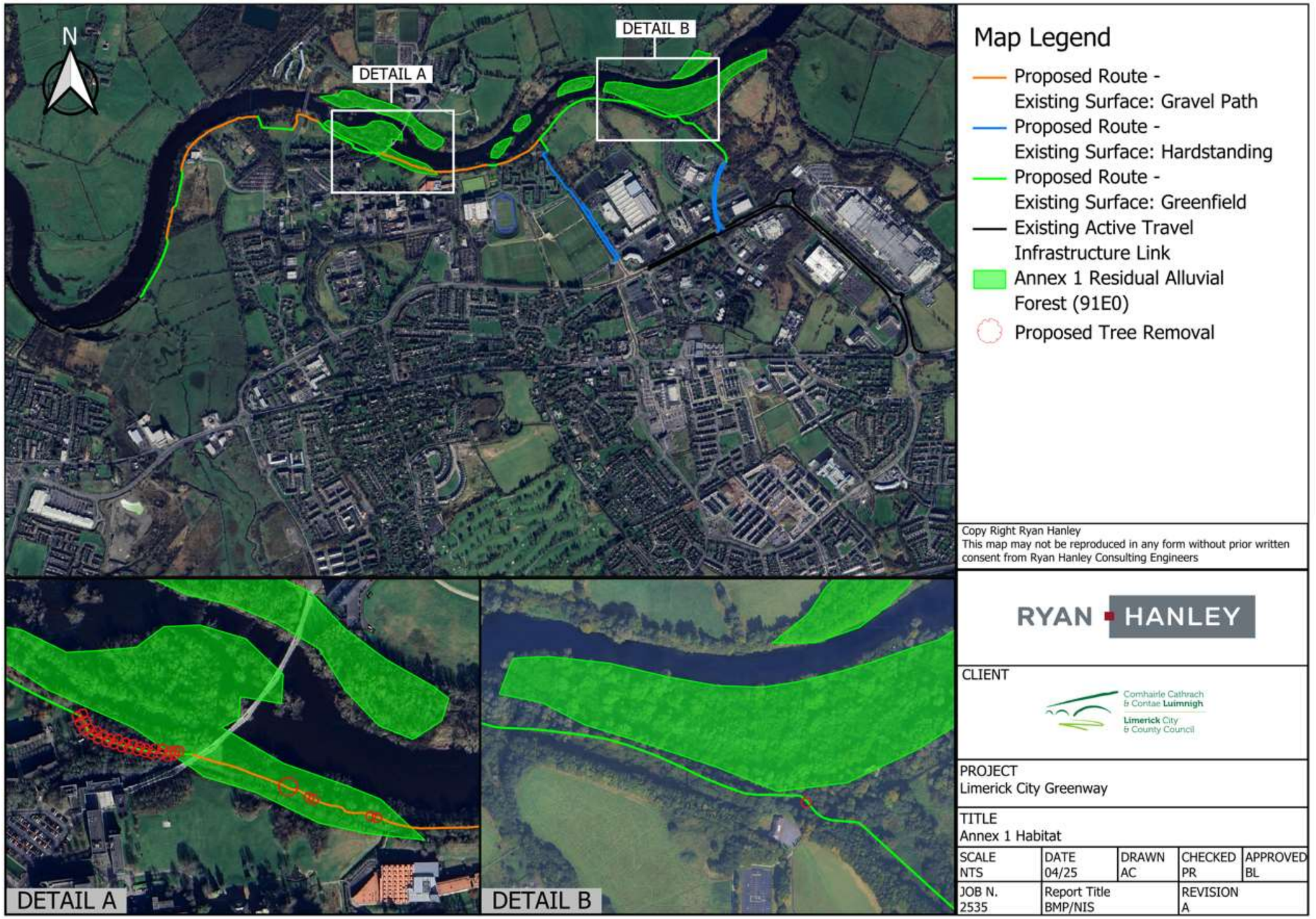

Figure 4.2 Annex I habitat presence in the proximity of the proposed works

4.1.2 Invasive Species

The NBDC grid squares show records of High Impact invasive plant species under Regulation S.I. 477/2011. These include Giant Hogweed (*Heracleum mantegazzianum*), Himalayan Balsam *(Impatiens glandulifera*) and Japanese knotweed (*Fallopia japonica)*.

Field survey for invasive plant species were carried out during 2020, 2021, 2023 and 2024. Stands of Giant Hogweed and Himalayan Balsam were identified along the length of the proposed greenway route interspersed with one another within the Study Area. Additionally, the non-native species Winter Heliotrope (*Petasites fragrans*) and Cherry laurel (*Prunus laurocerasus*) were recorded, however, these species are not listed on the Third Schedule.

The invasive species infestation was found to be extensive throughout the length of the greenway as recorded in the following tables.

Table 4-1: Invasive plant species recorded during walkover survey 2021

Target No.	Species	ID	ITM X	ITM Y	Notes
1	Giant Hogweed	GH6	562730.9	658623.6	Very large area of infestation
2	Giant Hogweed	GH7	562735	658628.8	In castle
3	Giant Hogweed	GH8	562750.9	658648.7	Castle with GH everywhere
4	Giant Hogweed	GH9	562792.6	658669.4	Either side of path
5	Himalayan Balsam	HB17	563049.6	658872.9	Extensive area of Himalayan balsam
6	Himalayan Balsam	HB18	563100.3	658925.1	
7	Himalayan Balsam	HB19	563141	658931.8	Himalayan balsam everywhere, Bindweed and Mares tail
8	Giant Hogweed & Himalayan Balsam	GH & HB5	563174.7	658915.7	
9	Giant Hogweed & Himalayan Balsam	GH & HB6	563144.1	658857.2	40m either side of path
10	Giant Hogweed	GH12	563144.1	658746.5	20+ plants either side of path
11	Himalayan Balsam	HB21	563288.5	658528.9	

Target No.	Species	ID	ITM X	ITM Y	Notes
12	Giant Hogweed	GH13	563478.2	658428.8	
13	Giant Hogweed	GH10	563424.2	658433	
14	Giant Hogweed	GH11	563502.8	658426.6	
15	Giant Hogweed & Himalayan Balsam	GH & HB5	563606.8	658447.2	
16	Himalayan Balsam	HB20	563634.4	658442.5	
17	Giant Hogweed	GH16	563642.2	658443.9	
18	Giant Hogweed	GH17	563739.3	658380.9	
19	Wild Rose		563771.1	658300.5	
20	Himalayan Balsam	HB22	563154.2	658716	Large areas either side of track
21	Himalayan Balsam	HB29	563196.5	658592.3	
22	Snowberry	SB2	563246.5	658461.2	150m x 40m
23	Giant Hogweed	GH14	563794	658285.9	
24	Giant Hogweed	GH15	563825.8	658254.8	
25	Ground elder and Mares tail		560822.8	658631.2	x4m and x 3m
26	Giant Hogweed	GH21	560686.9	658611.3	In WWTP
27	Giant Hogweed	GH22	560632	658583.7	WWTP extensive area along boundary fence
28	Giant Hogweed	GH23	560596.3	658554.8	Extensive area in WWTP
29	Giant Hogweed	GH18	560581.7	658557	
30	Giant Hogweed	GH19	560722.5	658351.6	Sprayed with herbicide
31	Giant Hogweed	GH20	562620	658587.7	
32	Cherry Laurel	CL1	562633.3	658614.2	

Target No.	Species	ID	ITM X	ITM Y	Notes
33	Snowberry	SB3	562633.2	658615.2	
34	Cherry Laurel	CL2	562634.7	658604.2	
35	Himalayan Balsam	HB26	561229.5	658521.1	
36	Himalayan Balsam	HB27	561282.6	658507.7	Loose bank sides with Himalayan balsam on right and mares tail on left river bank side and Himalayan balsam.
37	Himalayan Balsam	HB23	561353.4	658469.9	
38	Himalayan Balsam	HB24	561559.3	658391.8	
39	Giant Hogweed & Himalayan Balsam	GH & HB7	561569.9	658382.8	Several GH plants and extensive Himalayan balsam
40	Himalayan Balsam	HB25	561590.3	658389.3	HB and mares tail either side of path
41	Mares tail		561643.8	658386.5	Either side of path 100+ m
42	Himalayan Balsam	HB3	561671.8	658391.9	Either side of path 100+ m
43	Himalayan Balsam	HB4	561728.9	658400.7	Either side of pat 100m +
44	Himalayan Balsam	HB5	561811	658418	Weak bank side with Himalayan balsam
45	Giant Hogweed	GH24	561839.4	658420.3	
46	Himalayan Balsam	HB28	561873.6	658421	Left side 100m+
47	Himalayan Balsam	HB1	561927.1	658438.2	And Himalayan balsam 100m+
48	Himalayan Balsam	HB2	562214.5	658691.2	Either side of path 25m plus Mares tail
49	Giant Hogweed	GH3	562237.7	658708.8	Evidence of herbicide spraying with large areas missed

Target No.	Species	ID	ITM X	ITM Y	Notes
50	Himalayan Balsam	HB7	562269	658710.6	
51	Giant Hogweed & Himalayan Balsam	GH & HB2	562306.3	658714.7	Large areas of infestation here
52	Giant Hogweed	GH4	562387.3	658702.7	Large infestation in the area and Himalayan balsam
53	Giant Hogweed & Himalayan Balsam	GH & HB1	562590.6	658640.7	
54	Giant Hogweed	GH1	561812.3	658422.3	Weak sandy bank and sandy shoreline with Himalayan balsam and Mares tail
55	Giant Hogweed	GH2	562362	658704.9	Large areas of infestation along the path 100m+ including large areas of Himalayan balsam and Mares tail
56	Himalayan Balsam	HB6	561776	658407.8	Either side of path 100m +
57	Himalayan Balsam	HB12	562010.5	658482.1	Either side of path 100m+
58	Rubus fruitcosa (blackberry)		561912.7	658427.3	
59	Himalayan Balsam	HB13	562087.6	658564.9	Either side of trail 20m
60	Himalayan Balsam	HB14	560514.5	658511.4	
61	Himalayan Balsam	HB8	560564.4	658543.1	
62	Himalayan Balsam	HB9	560589	658557.9	
63	Himalayan Balsam	HB10	560595.6	658563.1	
64	Himalayan Balsam	HB11	560684	658607.1	
65	Giant Hogweed	GH5	560719.2	658613.7	
66	Himalayan Balsam	HB16	560727.3	658620.5	

Target No.	Species	ID	ITM X	ITM Y	Notes
67	Giant Hogweed & Himalayan Balsam	GH & HB4	560788.9	658627	
68	Snowberry	SB1	560803.6	658634	
69	Giant Hogweed & Himalayan Balsam	GH & HB3	560819.7	658643.6	
70	Himalayan Balsam	HB15	561084	658606.1	Starlings, mallards, seagulls, wren, grey heron
71	Mares Tail		561104.6	658594	Either side of path. Himalayan balsam in river bank

Table 4-2: Invasive plant species recorded during walkover survey in 2024

Target number	Invasive species	ITM X	ITM Y	Notes
TN1	Himalayan balsam	560506.54	658496.97	Within river bank, west of the existing pathway
TN2	Himalayan balsam	560505.259	658484.76	Within ditch, east of the existing pathway
TN3	Himalayan balsam	560494.103	658481.29	Large carpet of HB underneath and adjacent to the pontoon
TN4	Himalayan balsam	560495.932	658474.48	Within grassy verge
TN5	Himalayan balsam	560494.423	658474.8	Large carpet of HB within bankside
TN6	Himalayan balsam	560496.16	658465.42	Within ditch
TN7	Himalayan balsam	560488.204	658462.5	HB carpeting river bank
TN8	Himalayan balsam	560488.845	658457.33	Within ditch
TN9	Himalayan balsam	560481.392	658445.81	HB carpeting river bank as well as grassy verges on both sides of the path

Target number	Invasive species	ITM X	ITM Y	Notes
TN10	Himalayan balsam	560476.179	658412.54	HB still dominating both sides of the path
TN11	Himalayan balsam	560476.842	658408.2	Within field
TN12	Giant hogweed	560476.842	658408.2	Within field
TN13	Giant hogweed	560472.27	658395.33	Within field
TN14	Himalayan balsam	560467.263	658386.64	HB in grassy verges beside path and river bank
TN15	Giant hogweed	560467.08	658371.23	GH in ditch
TN16	Himalayan balsam	560458.964	658340.23	HB within grassy verges
TN17	Giant hogweed	560457.272	658334.15	Within river bank
TN18	Himalayan balsam	560454.072	658324.14	HB continues to carpet river bank and grassy verges
TN19	Himalayan balsam	560452.746	658313.39	Within ditch
TN20	Himalayan balsam	560447.442	658272.65	Within ditch
TN21	Himalayan balsam	560445.018	658270.41	Within river bank
TN22	Himalayan balsam	560438.96	658241.38	On both sides of the pathway
TN23	Himalayan balsam	560429.769	658210.17	Within river bank
TN24	Himalayan balsam	560430.04	658199.88	Large carpet of HB around bridge
TN25	Himalayan balsam	560424.97	658181.64	Within grassy verges
TN26	Himalayan balsam	560421.54	658171.76	Carpeting river bank
TN27	Himalayan balsam	560420.72	658156.53	Within ditch
TN28	Himalayan balsam	560417.42	658149.13	Within river bank
TN29	Himalayan balsam	560415.23	658140.35	Dominating grassy verges
TN30	Giant hogweed	560415.23	658127.18	Within ditch

Target number	Invasive species	ITM X	ITM Y	Notes
TN31	Himalayan balsam	560408.78	658105.64	Within river bank and grassy verge
TN32	Giant hogweed	560410.7	658096.87	Within ditch/stream bank
TN33	Himalayan balsam	560408.65	658092.75	Within river bank and both grassy verges
TN34	Himalayan balsam	560396.06	658068.57	Large carpet of HB in river bank and within grassy verges
TN35	Giant hogweed	560285.054	657841.93	Within river bank
TN36	Himalayan balsam	560283.133	657837.68	Within river bank
TN37	Himalayan balsam	560275.52	657823.55	Within river bank
TN38	Giant hogweed	560317.7	657806.68	Large stand of GH in field
TN39	Himalayan balsam	560289.94	657829.04	Coming through wooden fence
TN40	Giant hogweed	560290.558	657829.42	Near pathway, behind wooden fence
TN41	Giant hogweed	560290.489	657830.07	Within ditch
TN42	Sycamore	563776	657556.58	10x sycamore trees within treeline
TN43	Sycamore	563809.74	657562.07	Within treeline
TN44	Sycamore	563826.48	657562.62	Within treeline
TN45	Cherry laurel	563851.44	657560.97	Within planted area
TN46	Sycamore	563859.67	657551.37	Within treeline
TN47	New Zealand Flax	563926.61	657554.66	Within garden
TN48	Butterfly-bush	564004.66	657567.83	Within garden
TN49	Butterfly-bush	564026.61	657569.75	Within garden
TN50	Sycamore	564046.09	657558.37	Within treeline

Target number	Invasive species	ITM X	ITM Y	Notes
TN51	Sycamore	564067.08	657563.58	Within treeline
TN52	Sycamore	564068.31	657572.22	Within garden
TN53	Sycamore	564078.05	657564.4	Within treeline
TN54	Sycamore	564087.24	657565.36	Within treeline
TN55	Sycamore	564111.66	657565.91	Within treeline
TN56	Cherry laurel	564122.49	657574	Hedging for boundary of a house
TN57	Cherry laurel	564130.17	657576.47	Behind wall
TN58	Sycamore	564133.47	657563.85	Within treeline
TN59	Sycamore	564148.56	657582.78	Saplings behind wall
TN60	Cherry laurel	564204.66	657638.2	Within hedgerow
TN61	Cherry laurel	564206.72	657644.79	Within hedgerow
TN62	Butterfly-bush	564207.54	657660.7	Within hedgerow
TN63	Giant hogweed	564234.43	657633.81	Growing out from wall edge of the Mulkear river
TN64	Sycamore	564268.615	657661.45	Within riparian treeline
TN65	Giant hogweed	564278.8	657667.52	On top of wall
TN66	Sycamore	564281.544	657670.85	Within treeline
TN67	Sycamore	564301.81	657692.35	Multiple planted sycamores within treeline
TN68	Sycamore	564322.39	657683.84	Within treeline
TN69	Winter heliotrope	564412.028	657718.28	Within grassy verge
TN70	Sycamore	564468.47	657738.03	Planted tree
TN71	Butterfly-bush	564510.86	657756.82	Sapling within grassy verge
TN72	Winter heliotrope	564516.21	657760.11	Within grassy verge

Target number	Invasive species	ITM X	ITM Y	Notes
TN73	Sycamore	564534.18	657768.89	Planted tree
TN74	Sycamore	564553.726	657782.87	Planted tree
TN75	Winter heliotrope	564626.79	657827.67	Within grassy verge
TN76	Winter heliotrope	564642.7	657837.68	Within grassy verge
TN77	Winter heliotrope	564659.02	657847.01	Surrounding sign post in grassy verge
TN78	Himalayan balsam	562052.4	658519.6	Large carpet before treeline
TN79	Giant hogweed	562059.07	658517.92	Stand in front of treeline
TN80	Giant hogweed	562084.73	658490.21	Small stand in front of treeline
TN81	Giant hogweed	562092	658482.25	In front of treeline
TN82	Giant hogweed	562089.25	658479.51	Multiple stands within and around treeline
TN83	Giant hogweed	562084.73	658477.45	Large stands behind fence
TN84	Giant hogweed	562088.7	658470.45	Multiple stands within and around treeline
TN85	Giant hogweed	562194.46	658316.41	Large GH stands within treeline
TN86	Winter heliotrope	562189.52	658298.17	Carpeting field boundary line
TN87	Himalayan balsam	562640.48	658626.29	Carpeting south side of pathway
TN88	Giant hogweed	562644.73	658625.15	Large stands within the HB
TN89	Himalayan balsam	562673.69	658638.49	Carpeting the north side of the pathway
TN90	Giant hogweed	562671.7	658636.79	Large stands within the HB
TN91	Giant hogweed	562683.62	658623.73	Large stands
TN92	Cherry laurel	562693.56	658620.04	Large tree where pathway is proposed

The Limerick City and County Council 'Report Invasive Plants' app was also consulted. It allows members of the public to quickly and easily submit reported sightings of these plants to a central database and map. Results in the Study Area match the NBDC records and survey results in relation to IAPS identification.

Other invasive species found in the Study Area, according to NBDC records include Water fern (*Azolla filiculoides*), Greylag goose (*Anser anser*), Jenkins' spiral snail (*Potamopyrgus antipodarum*), Butterfly bush (*Buddleja davidii*), Japanse rose (*Rosa rogusa*), Greater white-toothed shrew (*Cocidura russula*), Cherry laurel (Prunus laurocerasus), European rabbit (Oryctolagus cuniculus) and Dace (*Leuciscus leuciscus*).

4.1.3 Otters

During the dedicated otter surveys undertaken during May 2021 and July 2024, the Study Area watercourses were searched for signs of Otter. There were no definitive sights for Otter, such as spraints, tracks, holt or couch sites but potential trails were observed. Some areas of the path were considered suitable for Otter. Otter requires suitable bankside vegetation as cover for their holts.

Populations of Otter in the Shannon (Lower), where the proposed greenway works will take place, are unlikely to be significantly affected as there will be no impacts on foraging and commuting habitats of the species.

It should be noted that while no Otters or field signs of Otters were recorded along the River Shannon it should be considered that habitats are suitable for Otter. The Precautionary Principle will be undertaken during construction in consideration for the potential of Otters to forage and/ or inhabit the area, especially on the opposite banks to the construction works.

Otter as an ecological receptor have been assigned as Local Importance (High value) on the basis of suitable riparian habitats along the study area.

4.1.4 Winter Birds

An initial winter bird survey was conducted during 2021/2022 by Delichon Ecology and consisted of walkover surveys that incorporated field transect surveys, field scanning surveys and presence / absence surveys of overwintering wetland species from selected Vantage Point locations during the winter season. The bird surveys were conducted in accordance with the methodology described by Bibby et al. (2000).

The 2021/2022 results showed that the proposed greenway supports small numbers and low diversity of over-wintering avifauna. The adjoining riverine habitats support Mute Swan, Greylag Goose (feral) Mallard, Cormorant and Black-headed Gull. Kestrel was the only raptor species identified during the wintering bird surveys. Species such as Sparrowhawk, Peregrine and Buzzard may utilise the wider study area for foraging and hunting purposes.

Amber listed species identified during the breeding bird surveys included Kingfisher, Mallard, Mute Swan, Cormorant, Greylag Goose, Coot, Goldcrest, Linnet and Kingfisher. With the exception of Goldcrest and Linnet, most of these species are associated with the River Shannon main channel, utilising the main channel for foraging purposes.

Red listed species identified during the breeding bird surveys include Grey Wagtail, Golden Plover, Lapwing, Kestrel and Redwing.

The 2023/2024 winter bird survey was carried out by Ryan Hanley and consisted in one visit per month from October 2023 to March 2024. All bird species encountered (seen or heard) during the surveys were recorded, together with the abundance of each species. Birds flying over the site were also included

as part of the observations. Casual records of birds encountered during the spot counts and field walkovers, but outside of dedicated survey period were also noted.

Mute swan, Cormorant, Greylag geese, Mallard, Black-headed gulls and Grey herons were the most consistent wintering species recorded throughout the winter bird survey season.

Passerine species were also abundant throughout the winter bird survey season, including the Wren, Blue tit, Great tit, Long-tailed tit, Coal tit, Song thrush, Blackbird, Chaffinch, Goldcrest, Pied wagtail, Wood pigeon and corvid species.

Amber listed species identified during the winter bird surveys included Mute swan, Mallard, Cormorant, Black-headed gull, Herring gull, Kingfisher.

Red listed species identified during the winter bird surveys included the Grey wagtail and Curlew.

4.1.5 Fisheries Habitats

No fish survey data was available for either the Shannon (Lower)_060 waterbody (Waterbody ID IE_SH_25S012600) or the Mulkear (Limerick)_050 waterbody (Waterbody ID IE_SH_25M040590). However, data was obtained from the 2017 survey of transitional waters in the Shannon Estuary, Fergus Estuary and Limerick Docks (Coyne et.al, 2017) in conjunction with records from the NBDC, 2021.

According to the NBDC (2021) sea lamprey (*Petromyzon marinus*) can be found within the ZoI. Numerous other species which undertake migratory movements were found, including brook lamprey (*Lampetra planeri*), Atlantic salmon (*Salmo salar*) and European eel (*Anguilla Anguilla*). The Atlantic salmon and river lamprey are protected under Annex II and V of the EU Habitats Directive, whilst brook lamprey and sea lamprey are protected under Annex II of the same legislation.

4.1.6 Water quality data

The proposed greenway is situated on the banks of the Lower River Shannon_060 and crosses the Mulkear (Limerick)_050 River, with the Blackwater (Clare) situated in the north of the Study Area draining into the Lower River Shannon. The Mulkear (Limerick)_050 and Blackwater (Clare) river bodies form part of the WFD river waterbody Shannon (Lower)_060. The Study Area sits within the Lower Shannon (25D) Catchment which covers an area of 1,041 km² and includes the lower reaches of the River Shannon to Limerick City and the catchment of the River Mulkear.

Table 4-3: Water quality sampling station in the Study Area

Station Code	Station Location	Up or Downstream of proposed works site	Date of last Q Value	Q-Value Rating
RS25M040600	MULKEAR (LIMERICK) - 1km d/s Annacotty Br (LHS)	Downstream	1987	4-5 (High - unpolluted)
RS25M040590	Annacotty Br d/s weir	Downstream	2021	4 (Good)
RS25B060300	BLACKWATER (CLARE) - Gilloge Bridge	Upstream	1988	4 (Good – unpolluted)
RS25S012600	Athlunkard Br (d/s LHS)	Downstream	2002	3-4 (Moderate – Slightly polluted)
RS25G050300	GROODY - Groody Br (G1)	Upstream	1993	3 (Poor – Moderately polluted)

Latest WFD Status 2016-2021 show a 'Moderate' status for the Shannon (Lower)_060 while the Mulkear (Limerick)_050 upstream from the works has a 'Good' status. The risk for the River Shannon is currently under 'Review' while the Mulkear is classified as 'Not at Risk'.

Current pressures and impacts for the Shannon Lower_SC_090 sub-catchment include urban run-off, hydromorphology, domestic wastewater and agriculture.

The groundwater body present within the Study Area is the 'Limerick City East' with a 'Good' status according to the latest WFS 2016-2021 data but is presently 'At Risk' due to chemical quality diminution and nutrients.

4.1.7 Photos of the Study Area

Plate 4-1: Amenity grassland (improved) GA2

Plate 4-2: Living Bridge

Plate 4-3: View of the proposed path with WN5 Riparian Woodland

Plate 4-4: View of the path with riparian woodland habitat along its edges

Plate 4-5: Exiting path between the Groody River and UL Boat House

Plate 4-6: Amenity grassland (GA2) east of Kilmurry Student Village

Plate 4-7: R445 bridge at Annacotty village crossing the River Mulkear

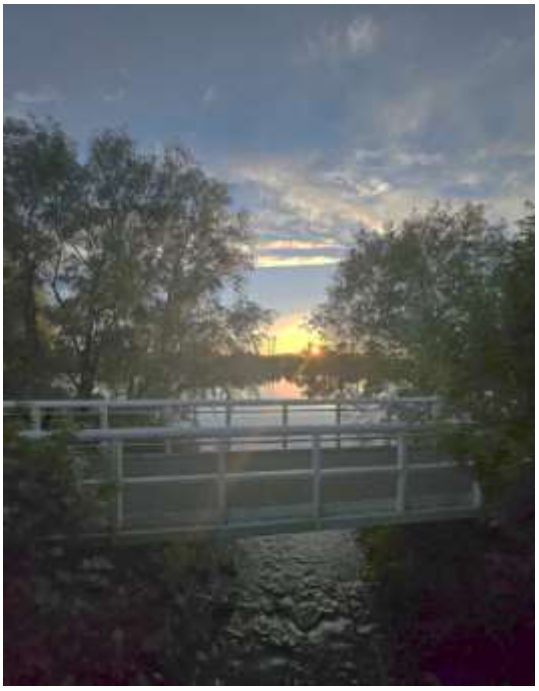

Plate 4-8: Bridge over the Groody River, west end of the proposed greenway

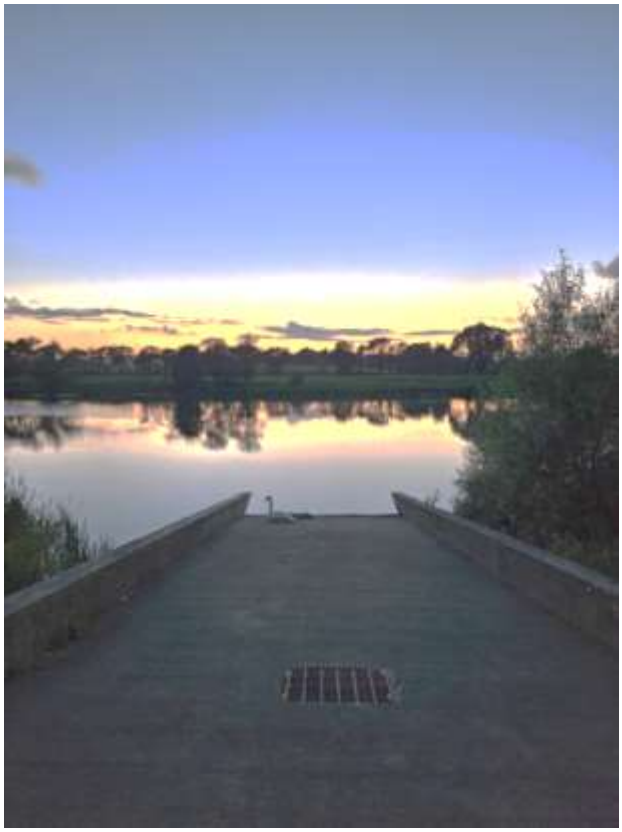

Plate 4-9: UL Pontoon into the River Shannon

5 European Sites Brought Forward for Appropriate Assessment and Assessment of Effects

The Appropriate Assessment Screening Report (amended), prepared by Ryan Hanley (July 2024), 'screened in' the potential for significant effects on one European Sites: Lower River Shannon SAC (002165). A description of this European Site is provided in Appendix II of this report. The conclusion of the AA Screening report stated the following:

"It cannot be excluded beyond reasonable scientific doubt, in view of best scientific knowledge, on the basis of objective information and in light of the conservation objectives of the relevant European sites, that the proposed development, individually or in combination with other plans and projects, would be likely to have a significant effect on the European Sites".

A number of potential Source » Pathway » Receptor chains, which could impact on the conservation objectives within the Zone of Influence (ZoI) of the proposed works were identified. The Zone of Influence was determined using the OPR (2021) guidance: '*The zone of influence of a proposed development is the geographical area over which it could affect the receiving environment in a way that could have significant effects on the Qualifying Interests of a European site*'.

In assessing the proposed project, the following general potential impacts have been considered with regard to the screening for significant effects on the conservation objectives of the European sites:

Changes to water quality which could result from:

- Construction excavations for expanding the pathway;
- Accidental release or spillage of hydrocarbons; and
- Maintenance works during the operational phase of the project.

Disturbance to protected species:

- Generation of noise and vibration through construction activities;

Habitat degradation:

- Improper construction practises with inadequate erosion control measures and poor sediment management, can lead to soil erosion and sedimentation of receiving water environment. This runoff can degrade habitats through by smothering benthic organisms and reduce water quality.
- Through dust generated during construction phase; and
- Spread of Invasive Non-Native Species.

The following QIs were screened-in in the AA Screening Report for likely significant effects due to the proposed works.

Figure 5.1 shows the boundaries of the Lower River Shannon SAC with regards to the proposed works area.

Table 5-1: Assessment of Effects on the Qualifying Interests (QIs) of the Lower River Shannon SAC

Qualifying Interest	Attribute and Target	Likely Significant Effect	Assessment
Sea Lamprey (*Petromyzum marinus*) [1095] Brook Lamprey (*Lampetra planeri*) [1096] River Lamprey (*Lampetra fluviatilis*) [1099]	▪ Distribution: access to all river watercourses down to first order stream ▪ Population structure of juveniles: at least three age/size groups present ▪ Juvenile density in fine sediment: juvenile density of at least 1/m² for sea lamprey, 2/m² of brook lamprey and river lamprey ▪ Extent and distribution of spawning habitat: no decline in extent and distribution of spawning beds ▪ Availability of juvenile habitat: more than 50% of sample sites positive	▪ Reduced water quality due to mixed sources of pollution (hydrocarbon spillage, surface runoff, accidental discharges) ▪ Increased sedimentation due to runoff ▪ Habitat loss ▪ Reduction in species density	The River Shannon and River Mulkear supports suitable habitat for these species and reduced water quality and increased sedimentation are likely to arise from the proposed works, which in turn can lead to adverse effects on the lampreys' populations and distribution in the local area. There is potential for indirect impact to juvenile lamprey species due to surface water run-off associated with the proposed works. Construction works will be temporary in nature and will not have a significant effect on the population density or lead to habitat loss for this species.
Atlantic salmon (*Salmo salar*) [1106]	▪ Distribution, extent of anadromy: 100% of river channels down to second order accessible from estuary	▪ Reduced water quality due to mixed sources of pollution (hydrocarbon spillage, surface runoff, accidental discharges)	The River Shannon and River Mulkear provide valuable nursing habitats for salmon. The slow-flowing aquatic habitat with marginal tree cover, undercut banks provides shelter from the main channel, and the presence of cobble

Qualifying Interest	Attribute and Target	Likely Significant Effect	Assessment
	▪ Adult spawning fish number: Conservation Limit (CL) for each system consistently exceeded ▪ Salmon fry abundance: maintain or exceed 0+ fry mean catchment wide abundance threshold value. Currently set at 17 salmon fry/5 min sampling ▪ Out migrating smolt abundance: no significant decline ▪ Number and distribution of redds: no decline in number and distribution of spawning redds due to anthropogenic causes ▪ Water quality: At least Q4 at all sites sampled by the EPA		and gravel substrate may provide suitable foraging and refugia habitat for salmonids. Reduced water quality can result from spillage, surface runoff or accidental discharges from the proposed works which could lead to significant effects on this species given that they need good water quality to maintain their survival. The proposed works will not result in any physical migrating barriers for salmon.
Otter (Lutra lutra) [1335]	▪ Distribution: no significant decline ▪ Extent of terrestrial habitat: no significant decline	▪ Reduced water quality due to mixed sources of pollution (hydrocarbon spillage, surface runoff, accidental discharges)	The proposed works can lead to a temporary reduction of water quality due to surface runoff, spillage of hydrocarbons, cementitious materials and other sources of

Qualifying Interest	Attribute and Target	Likely Significant Effect	Assessment
	▪ Extent of marine habitat: no significant decline ▪ Extent of freshwater habitat: no significant decline ▪ Couching sites and holts: no significant decline ▪ Fish biomass available: no significant decline ▪ Barriers to connectivity: no significant increase	▪ Disturbance and displacement	pollutants which can result in an adverse effect on prey availability for otters. Construction noise and vibration could result in temporary disturbance and displacement of the species after which they would return to the site, assuming that they are already used to the pedestrian and cycling traffic of the existing path. The proposed works will not result in habitat loss or fragmentation or create connectivity barriers for otter's commuting and distribution.
Water course of plain montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260]	▪ Habitat area: stable or increasing subject to natural processes ▪ Habitat distribution: no decline, subject to natural processes ▪ Hydrological regime river flow: maintain appropriate regimes ▪ Hydrological regime tidal influence: maintain regime	▪ Reduced water quality due to mixed sources of pollution (hydrocarbon spillage, surface runoff, accidental discharges) ▪ Increased sedimentation due to runoff ▪ Habitat loss ▪ Reduction in species density	This habitat is known to be present throughout most major rivers in the catchment and has been noted in the vicinity of the proposed works. Construction activities could result in temporary surface runoff pollution and increase sedimentation, reducing water quality which could have an adverse effect on the vegetation and substratum composition. This may also result in an associated deterioration in the area of habitat suitable for colonisation by floating river vegetation. Degradation of the substrate as a result of sediment and hydrocarbon release, as well as from surface water run-off has the potential to result in a change of the vegetation composition.

Qualifying Interest	Attribute and Target	Likely Significant Effect	Assessment
	▪ Hydrological regime freshwater seepages: maintain appropriately ▪ Substratum composition: particle size appropriate to habitat sub type (sands, gravels and cobbles) ▪ Water quality nutrients: levels sufficiently low to prevent changes in species composition or habitat condition ▪ Vegetation composition typical species: relevant to the habitat sub-type should be present and in good condition ▪ Floodplain connectivity: active floodplain at and upstream of the habitat should be maintained ▪ Riparian habitat: area at and upstream of the bryophyte-rich sub-type should be maintained		The proposed works will not alter the current hydrological regime. The flood plain connectivity will not be affected as part of proposed works as these will be within and/or adjacent to artificial and built surfaces. Where the path diverts into greenfield areas, it is considered that the total surface area occupied by the path is not considered significant as to have an effect on the floodplain connectivity.

Qualifying Interest	Attribute and Target	Likely Significant Effect	Assessment
Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) [91E0]	▪ Habitat area: stable or increasing subject to natural processes ▪ Habitat distribution: no decline. ▪ Woodland size: stable or increasing. Large woods 25ha, small woods 3ha. ▪ Woodland structure: diverse and relatively closed canopy containing mature trees. ▪ Woodland structure: maintain diversity and extent of community types ▪ Woodland structure: seedlings, saplings and pole age classes in adequate proportions to ensure woodland survival ▪ Hydrological regime: appropriate hydrological regime to maintain alluvial vegetation	▪ Five trees to be removed ▪ Habitat loss ▪ Change in vegetation composition ▪ Invasive species	The existing path where the proposed greenway works will occur, crosses a section of Alluvial forest where there will be scrub clearance and tree felling of one dead mature tree and four immature alluvial trees which will not negatively affect the targets related to the habitat area, distribution or woodland structure of this Qualifying Interest. The presence of Third Schedule invasive species (Giant Hogweed and Himalayan Balsam) can result in spreading of these within the habitat, altering the Conservation Objective related to the vegetation composition of this habitat by increasing the negative species indicator in the area. This could also have an effect on the diversity, local distinctiveness and extent of community types within this habitat. The proposed works will not have an significant effect on the rest of the attributes and targets for this habitat, not posing a risk to its conservation objectives.

Qualifying Interest	Attribute and Target	Likely Significant Effect	Assessment
	▪ Woodland structure: dead wood at least 30m3/ha; 30 snags/ha ▪ Woodland structure: no decline in veteran trees ▪ Woodland structure: no decline in indicators of local distinctiveness ▪ Vegetation composition: no decline in native tree cover, not less than 95% ▪ Vegetation composition: typical species present ▪ Vegetation composition: negative indicator species, particularly non-native invasive species, absent or under control		

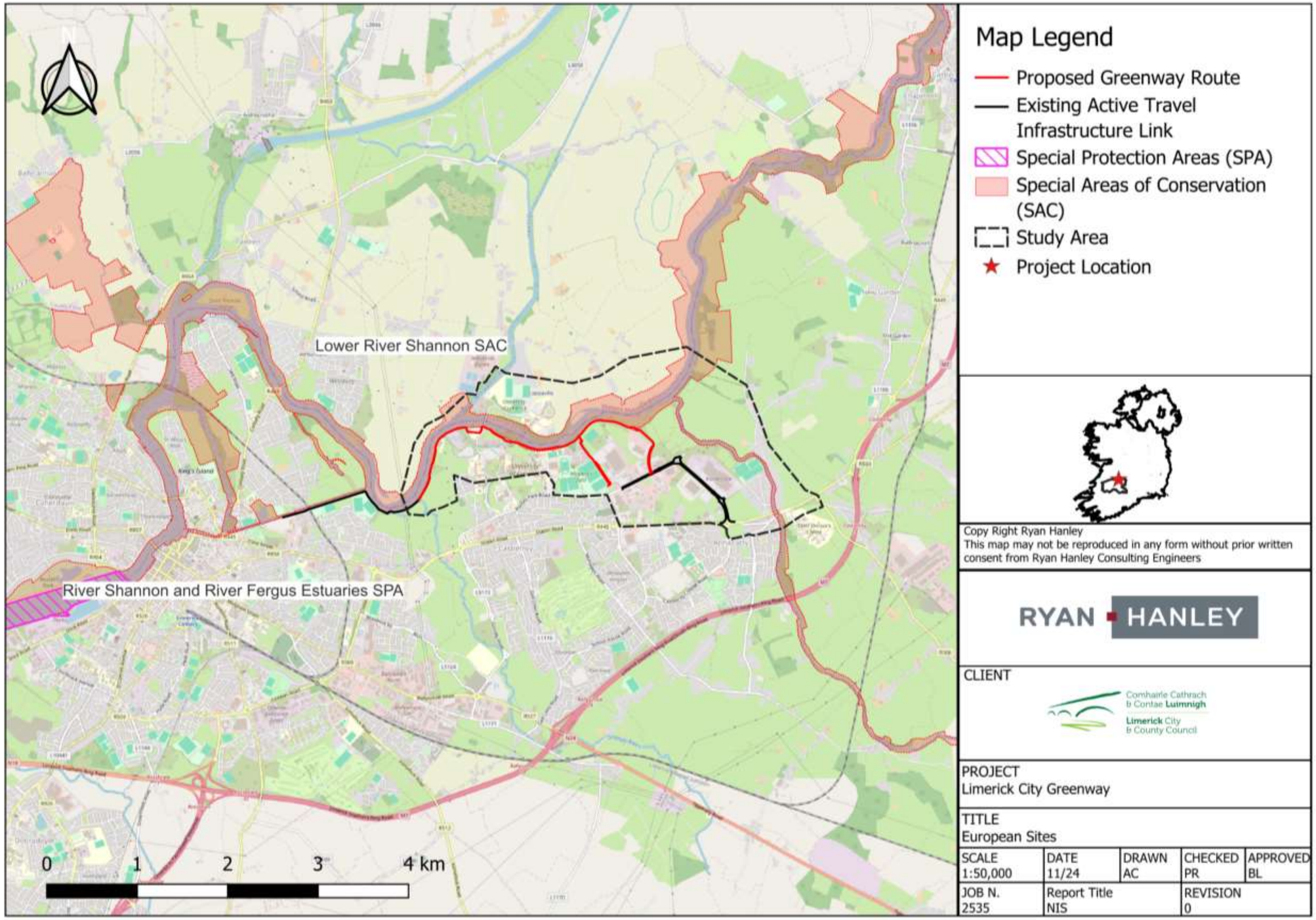

Figure 5.1 European site in the study area of the proposed works

5.1 Characterising Impacts

The methodology for the assessment of impacts is derived from the Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites (EC, 2001) and European Commission (2015) Ecological flows in the implementation of the Water Framework Directive – Guidance Document No. 31. Changes/ activities and impacts on Qualifying Interests are categorised by:

- Direct and indirect effects;
- Short and long-term effects;
- Construction, operational and decommissioning effects; and
- Isolated, interactive and cumulative effects.

Impacts that could potentially occur through the implementation of the proposed project, can be categorised as follows (EC, 2001):

- Loss/Reduction of habitat area;
- Disturbance to key species;
- Habitat or species fragmentation;
- Reduction in species density, and
- Changes in key indicators of conservation value such as decrease in water quality.

Meaning of 'Adversely Affect the Integrity of the Site'

The concept of the 'integrity of the site' is explained in the EU publication Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC, as follows;

'It is clear from the context and from the purpose of the directive that the 'integrity of the site' relates to the site's conservation objectives. For example, it is possible that a plan or project will adversely affect the integrity of a site only in a visual sense or only habitat types or species other than those listed in Annex I or Annex II. In such cases, the effects do not amount to an adverse effect for purposes of Article 6(3), provided that the coherence of the network is not affected. On the other hand, the expression 'integrity of the site' shows that focus is here on the specific site. Thus, it is not allowed to destroy a site or part of it on the basis that the conservation status of the habitat types and species it hosts will anyway remain favourable within the European territory of the Member State.

As regards the connotation or meaning of 'integrity', this can be considered as a quality or condition of being whole or complete. In a dynamic ecological context, it can also be considered as having the sense of resilience and ability to evolve in ways that are favourable to conservation. The 'integrity of the site' has been usefully defined as 'the coherence of the site's ecological structure and function, across its whole area, or the habitats, complex of habitats and/or populations of species for which the site is or will be classified'

A site can be described as having a high degree of integrity where the inherent potential for meeting site conservation objectives is realised, the capacity for self-repair and self-renewal under dynamic conditions is maintained, and a minimum of external management support is required. When looking at the 'integrity of the site', it is therefore important to take into account a range of factors, including the possibility of effects manifesting themselves in the short, medium and long-term.

The integrity of the site involves its ecological functions. The decision as to whether it is adversely affected should focus on and be limited to the site's conservation objectives.

5.1.1 Potential for Direct Impacts

Direct impacts refer to habitat loss or fragmentation arising from land-take requirements for development purposes. The proposed works are partially located within the footprint of a European Site; i.e. the Lower River Shannon SAC. As a consequence, the proposed works have the potential to result in direct effects such as mortality or temporary loss, disturbance or disruption of habitat within the bounds of this European Site.

5.1.2 Potential Indirect Impacts

Indirect impacts refer to those which can arise through proximal or remote connectivity, for example by means of a watercourse, via overland flow of surface water, via groundwater, via air (e.g. dust) or via other emissions from a project site (e.g. noise and light). Indirect and secondary impacts do not have a straight-line route between cause and effect. It is potentially more challenging to ensure that all the possible indirect impacts of the project – in combination with other plans and projects - have been established. These can arise, for example, when a development alters the hydrology of a catchment area, which in turn affects the movement of groundwater to a site and the qualifying interests that rely on the maintenance of water levels. Deterioration in water quality can occur as an indirect consequence of development, which in turn changes the aquatic environment and reduces its capacity to support certain plants and animals. The introduction of invasive species can also be defined as an indirect impact. Disturbance to fauna can arise directly through the loss of habitat (e.g. displacement of roosting bats) or indirectly through noise, vibration and increased activity associated with construction activities or the operational processes of a proposed development.

5.2 Types of Impacts Arising from the Works

Potential significant impacts on habitats and species of conservation importance for European sites screened in during Stage 1 are examined, analysed, and evaluated in this section. The types of impact identified, e.g. direct and indirect impacts, short and long-term impacts, construction and operational phase impacts etc. arising from the project are assessed in light of the Conservation Objectives set out for the Qualifying Interests of those European sites. Overall, the habitats and species considered to have potential to be impacted by the proposed scheme are mostly terrestrial and aerial species, along with their habitats.

5.2.1 Lower River Shannon SAC (002165)

Construction phase

During the construction phase the proposed project will result **in medium-term habitat loss,** fragmentation and disturbance to habitats classified as of Local (lower) and Local (higher) importance. Construction activities and site clearance will lead to direct loss of amenity lands as well tree lines (riparian woodland), scrub and hedgerows. The greenway passes through an area with Annex I habitat Residual alluvial forest with Alnus glutinosa and Fraxinus excelsior (91E0), although only a few individual trees of low value will be removed (5 No.), not affecting the integrity of the habitat or its ecological benefits. Construction works will also require the establishment of 6 No. temporary construction compounds (Refer to Figure 3.1) for drop-off and storage of materials including fuel, site offices and other staff facilities which will be located on and within the study area on lands of little conservation value.

Construction works for the proposed greenway are predominantly in amenity grassland habitats. The majority of this land will be removed within the boundary of the works corridor in the central, western and eastern sections of the path. The **amenity grassland** within the works footprint is of low ecological

value as they are modified from their natural state, subject to high levels of management, have reduced diversity and are widespread within the local area. The Project is assessed as having a Neutral Slight Positive Effect and as such, the loss of these habitats will not represent any significant loss of biodiversity.

An analysis of the predicted impacts on the proposed greenway has been completed and include **potential effects on local habitats and species in the adjacent watercourses** during the construction phase. This will be temporary short term in nature and confined to the construction phase. Upon completion, aquatic habitat, flora and fauna within the affected lengths of channel should recover and re-colonise from adjacent sources resulting in a temporary slight-moderate negative effect.

The proposed construction works for the greenway has the potential to result in **medium term loss of resting sites and disturbance to a range of faunal species** such as small mammals and birds in the absence of mitigation where hedgerows, trees and scrub are to be trimming back and unavoidably removed in some areas. There is potential for the greenway to have some impact on ecological features used by fauna species in the study area permanently, through the removal of suitable habitats to facilitate the greenway's construction, or temporarily during the construction works in such a way that suitable habitats are not available for use by fauna species during the construction period due to disturbance and displacement. Disturbance will be minimised through the setting out of the project works areas at an early stage to avoid un-necessary disturbance to areas that are outside the footprint of the works. These measures will be set out in the construction environmental method statements.

The River Shannon and River Mulkear within the study area are known to support good populations of **salmonid species** as well as providing key migratory corridors. In addition, the 'Shannon (Lower)_060' water body WFD status is 'Unassigned', whilst the 'Mulkear (Limerick)_050' water body WFD status is 'Good' and both water bodies are classified as 'not at risk' for both the second and the third cycle of the WFD implementation (EPA, 2018). Direct impacts on salmon or other aquatic species are not anticipated. As there will be no instream works there will be no loss of suitable spawning habitats within the study area as a result of the construction of the greenway as no suitable spawning habitats were identified within and directly adjacent to the works area during the aquatic surveys (APEM in 2021 and updated in November 2023). Potential indirect effects may include deterioration of habitat resulting from un-mitigated surface water pollution associated with construction activities.

During the walkover surveys no **otter holts**, nor any other physical evidence of otter, was found but potential trails were observed and some areas of the path were considered suitable for otter.

No **amphibians or reptiles** were observed in the proposed scheme study area during site surveys though it is possible that these species groups utilise the area. In the absence of mitigation, there could be a negative impact on these species through direct mortality during construction works by machinery in lands adjacent to the proposed scheme. Removal of vegetation also has the potential to result in direct mortality where these species may be sheltering/hibernating. It is considered these species would move back into the area once construction works cease resulting in a short-term negative impact.

- Two **invasive plant species** listed on the Third schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477/2011, as amended) were identified within the study area of the proposed scheme during the walkover surveys, Himalayan balsam (*Impatiens glandulifera*) and Giant hogweed (*Heracleum mantegazzianum*).

Operational phase

During the operational phase of the proposed greenway there will be considerably less site activity within the study area then during the construction phase. The Limerick City and County Council (LCCC)

will be required to **maintain the greenway** in proper repair and effective condition under a maintenance programme.

On completion of the greenway, areas from which vegetation was removed will be replanted and landscaped with appropriate vegetation and a replanting programme. Refer to the landscaping drawings 2525-RHA-XX-DR-C-LA0001 to 2525-RHA-XX-DR-C-LA0005. Significant effects are not anticipated during the operational phase of the greenway as there will be no overall loss or fragmentation of habitats associated with the operation travel path. Existing levels of human activity and background disturbance are moderate in the areas of the proposed works, considering the existing greenway route and adjacent university grounds, sports complex and technological park. The predicted human activity using the greenway is anticipated to be medium-high and it might be expected that anti-social activities and human presence might have a minor effect on vegetation/habitats or disturbance to protected fauna species in the area.

There will be no habitat loss or fragmentation associated with the operational phase of the proposed development. No direct works will take place within the nearby **waterbodies,** the Lower River Shannon and River Mulkear, with no direct/indirect effects as a result of the operational phase of the greenway anticipated.

6 Avoidance and Mitigation Measures

Section 5.1 identifies potential impacts on protected habitats and species associated with the proposed works that require mitigation. All required mitigation is set out below as a full suite of actions required to ensure that the proposal does not adversely impact on the conservation objectives of the Lower River Shannon SAC or any Qualifying Interests that may occur onsite.

6.1 General Mitigation

The following mitigation measures are proposed:

- A suitable qualified Ecological Clerk of Works (ECoW) shall be appointed for part time attendance for the full duration of the works and will supervise all aspects of the construction of the path.
- The ECoW will hold a minimum University degree in Environmental Science, (NFQ Level 8); preferably be a member of a relevant professional institute, minimum of 5 years' post-graduate experience in ecological assessment, appraisal techniques and mitigation monitoring;
- The ECoW will be responsible for biodiversity monitoring elements in particular for those key environmental receptors identified in this chapter, and providing toolbox talks;
- The ECoW should be present for works related to vegetation removal and any works that might have potential effects on sensitive habitats and/or species;
- The ECoW should oversee the implementation of the CEMP, particularly in relation to ecological and biodiversity related measures; and

The ECoW will be responsible for monitoring water quality throughout the works duration. Discrete monitoring (field and laboratory analysis) will be undertaken during all phases of the proposed works and frequency will be determined by the Water Quality Monitoring Plan to de developed before any works commence. It is essential to monitor indicator parameters that have the greatest potential to be impacted. The main concern in relation to the construction activity and water quality are potential increases in siltation and release of P and N. At least the following surface water parameters are to be tested/analysed in the field and/or in the laboratory: alkalinity (mg/l CaCO3), molybdate reactive phosphorus (mg/l P), ammonia (mg/l NH3), nitrate (mg/l N), nitrite (mg/l N), biochemical oxygen demand (mg/l), total suspended solids (mg/l), pH, temperature, dissolved oxygen, electrical conductivity, ammonium (NH4), turbidity. Sondes will be employed to measure turbidity in the main channel upstream and downstream of the works area during the construction stage. Sondes will be employed within the River Shannon to determine a baseline Nephelometric Turbidity Unit (NTU) value. During the construction period, alarms will trigger where there is a 20% difference between the NTU value recorded in the upstream and downstream Sondes when NTU is above its baseline value. All works will cease immediately until the source is identified and rectified (if caused by the construction works). The ECoW, project manager and contractor site manager should be contacted. If the increase is not attributed to the construction works, works will proceed.

- All personnel involved with the project shall be informed of the requirement for protection of designated habitats including the aquatic environment, i.e. Lower River Shannon SAC, and best practice methodologies to be employed via toolbox talks or formal presentation from the ECoW;
- The ECoW shall be onsite part time until all works have finished, and all machinery has been demobilised and has left the site;
- The access location to the proposed works shall be clearly marked out prior to the commencement of works. No works will be permitted outside of this works area;

- Appropriate fencing shall be installed and maintained for the duration of the works to prevent the public from entering the works site;
- Clearance of vegetation shall be undertaken as early as possible prior to the commencement of works and maintained until work commences to prevent bird nesting. In the event that vegetation clearance is not possible before the commencement of works, upon agreement by the NPWS, a check to confirm the absence of nesting birds should be carried out by a suitably experienced ecologist no more than 24 hours prior to works;
- Works shall only be carried out in dry, low flow conditions. Met Eireann five-day forecasts will be monitored on a daily basis prior to works commencing and no work will be carried out if more than 10mm of rainfall is predicted in a 24 hour period;
- Works shall only be carried between 08:00-18:00 during daytime hours or between dawn and dusk to minimize disturbance to nocturnal QI species;
- Excavated material shall not be stored beyond the working day, however in the event that this is not practical, appropriate precautions in relation to the material will be taken. These precautions will include appropriate storage and covering;
- Full method statements and Risk Assessments shall be provided and approved prior to the commencement of works. Approval will require coordination between the contractor, ECoW, project manager and local authorities;
- The proposed public lighting is designed to prevent light spill on to habitat features, such as the River Shannon and the Plassey Mill Race stream, and concentrate artificial light only where required. It will use best practice guidance notes "Bats and artificial lighting in the UK" as published by the Bat Conservation Trust, in respect of mitigation strategies, to minimise the impact of outdoor lighting upon bat populations. The LCCC Public Lighting standard has also been followed. Public lighting will be controlled by light sensors that will turn the lanterns on after dusk and off at 23:00 hours. Light emitting diodes (LEDs) type lanterns of the cool white type in accordance with the LCCC Public Lighting standard will be installed. They will have a Colour Temperature of 2,700°Kelvin, because it is considered least disruptive to the emergence of bats from roosts at dusk, and subsequent movement from habitats to foraging locations. LED lanterns do not emit any ultraviolet or infra-red radiation, this again being a desirable feature in relation to impact upon bats, in terms of causing spatial exclusion from artificially lit areas. Light levels have been kept as low as possible (P4 Class) by reference to levels specified in "Design of road lighting' - BS EN 5489-1: 2020, and these will be in accordance with the LCCC Public Lighting standard. Two Lanterns are proposed; one Lantern will be on a 5m high column approximately 35m apart mounted at 0o degree tilt and fully cut off type with no light output above the horizontal plane, while the other column will be 1.6m high with an integrated light in the column and they will be spaced approximately 5m apart. 5m high Lighting columns will not be placed within 15m of mature trees that have been identified by bat specialists as having roost potential and the 1.6m high columns shall be used if there are any signs of bats in an area. The 1.6m high columns will be used in the Annex 1 Alluvial forest area.
- Cable ducts for the public lighting will be installed by open trench to minimum 300mm cover in areas where no trees are present, and by Moling technique in areas of dense tree coverage. The moling will allow cable ducts to be installed to a minimum depth of 600mm where the cable ducts will pass under tree roots and protect them from damage.
- Construction works should take place during daylight hours only with no lighting on the site during the hours of darkness.
- Any temporary lighting required for health or safety reasons during construction shall be installed at a minimum of 10 metres from existing treelines and woodland habitats and directed away from such sensitive habitats.

- During construction, noise limits, noise control measures, hours of operation and selection of plant items will be considered in relation to disturbance of birds. Plant machinery will be turned off when not in use.
- A Biodiversity Management Plan and a Construction Environmental Management Plan have been prepared for this project and they are included as appendices to this NIS.

The following mitigation calendar will be applied and followed to ensure protection of habitats and species during construction and operational phases of the greenway. In general, the construction works should be planned during the 'green' periods in the calendar year, as long as appropriate mitigation measures are implemented. The exception to this is Fish (salmonoid spawning) because foreshore works (including preparatory work) beside all watercourses supporting salmonids shall be undertaken from May to October (inclusive) and in consultation with Inland Fisheries Ireland (IFI) to avoid accidental damage or siltation of spawning beds.

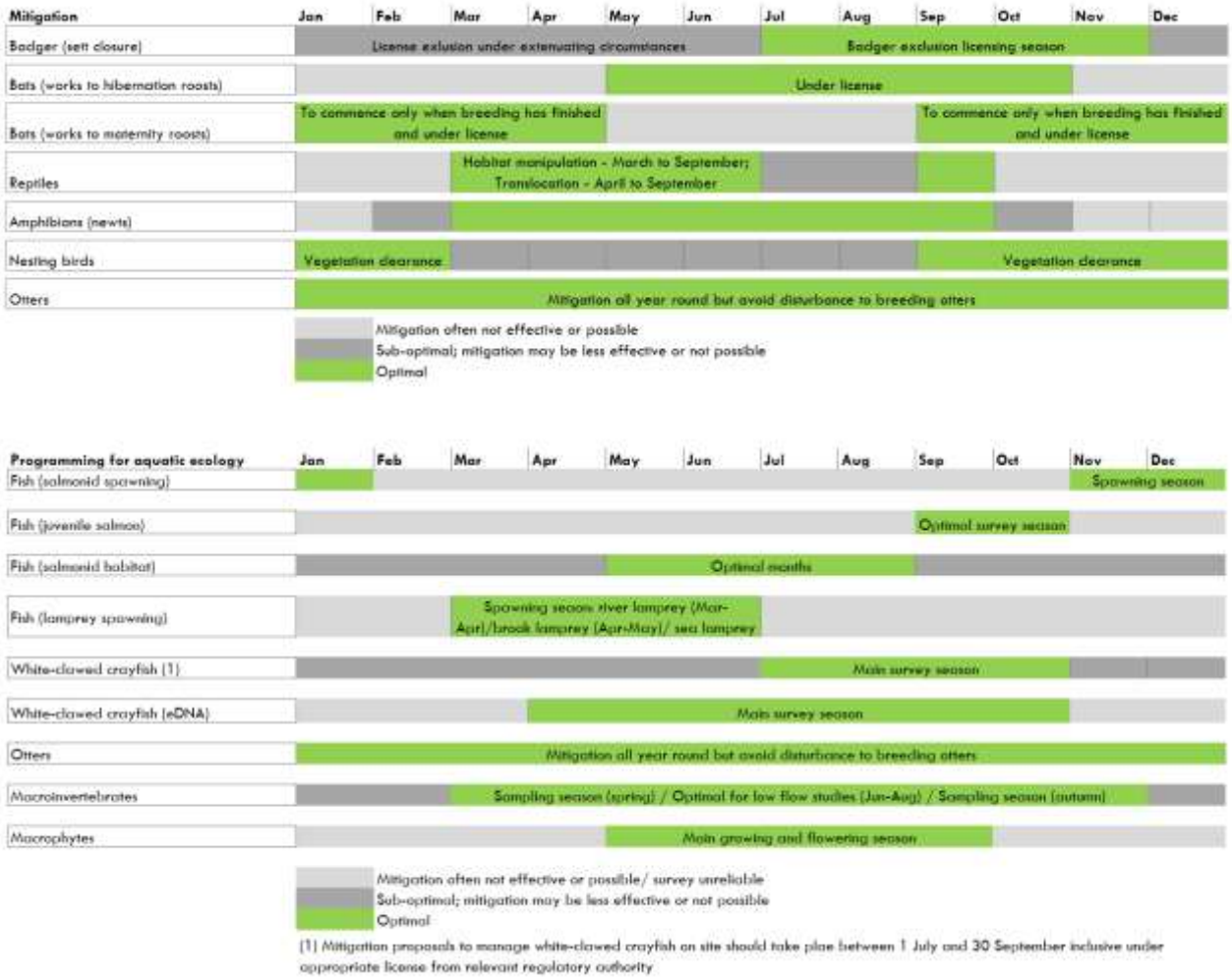

Figure 6.1 Mitigation timing - ecological calendar

6.2 Measures to Protect Water Quality

- No abstraction from any watercourses will be permitted to facilitate the works.
- A silt curtain will be floated in the River Shannon and the Plassey Mill Race ahead of, during and shortly after the construction works for the bridges, retaining wall, and ramp to protect aquatic species from soil and suspended material associated with the construction works.
- A water filled flood barrier will act as a barrier to prevent river water entering the proposed work sites for the bridges, retaining wall, and ramp but if water enters the work site a sump pump will pump water to a silt buster to remove contaminated material from water before it is returned to the River Shannon downstream.
- Sheet piles will be temporarily pushed into the riverbank and stream bank to facilitate construction of foundations and abutment walls for the bridges and retaining wall. They will be removed immediately after the bridge decks have been bolted into place. The sheet piles will act as a physical barrier between the worksite and the banks and prevent soil or other construction material runoff from the work site to the riverbank, stream bank, river or stream.
- Consumables and/or waste material will be removed from all water sampling locations and returned to the site compound for disposal to a licenced waste facility.
- Alarm sondes will be triggered when there is a 20% difference between NTU value recorded in the upstream and downstream sondes.
- Machinery will be stored in purpose built temporary construction compounds which will be constructed in Flood Zone C areas only.
- There will be no storage of machinery in the temporary construction compounds (including drill rigs) fuel, samples, or chemicals (e.g. bentonite, drilling fluid) within 20m of any drain or watercourse.
- Fuel storage tanks will only be placed within temporary construction compounds. They shall have secondary containment provided by means of an above ground bund to capture any oil leakage irrespective of whether it arises from leakage of the tank itself or from associated equipment such as filling and off-take points, sighting gauges, etc., all of which should be located within the bund. Bund specification should conform to the current best practice for oil storage (Enterprise Ireland, BPGCS005).
- Oil booms and oil soakage pads shall be kept in the temporary construction compounds to enable a rapid and effective response to any accidental spillage or discharge. The site foreman shall be trained in the deployment of oil soakage pads in case of an emergency at the works sites.
- Waste oils and hydraulic fluids shall be collected in suitable leak-proof containers and transported from the temporary construction compounds for disposal or recycling;
- Machinery used on site shall be regularly inspected in the temporary construction compounds to ensure there is no leakage from them and to ensure the machinery shall not cause contamination of watercourses.
- Protection measures shall be put in place by the Contractor to ensure that all hydrocarbons used during the works are appropriately handled and stored within the temporary construction compounds and disposed off-site in a licenced facility in accordance with recognised standards as detailed by the Environmental Protection Agency.
- Guidelines for minimising impacts on water quality and fisheries in relation to Construction shall be implemented including, but not limited to, CIRIA C532 "Control of water pollution from construction sites - Guidance for consultants and contractors", Inland Fisheries Ireland guidelines and TII guidelines.

6.3 Measures to Protect Fauna

Otters

Otters are a key species of the Lower River Shannon SAC and the following measures will be put in place to avoid disturbance and habitat degradation:

- While no Otters or signs of Otter trails were identified during field surveys, continuous monitoring of work sites by an experienced and qualified Ecologist for Otters shall be conducted.
- Establish protection zones along riverbanks (10-30m), where possible, which provide suitable foraging and resting sites for otters;
- No otter holts were found during the specialised survey within or near the works area, but if a Holt is discovered by an experienced and qualified Ecologist during the required pre-construction work surveys, a minimum exclusion zone of 150m shall be established and no work shall take place within this zone.
- Pollution prevention control measures will be in place to avoid construction run-off, hydrocarbons or siltation that could degrade water quality (dust control, noise and vibration control, traffic management, water quality and soil, biodiversity, refuelling and hazardous materials, cement-based products).
- The Precautionary Principle will be undertaken during construction in consideration for the potential of Otters to forage and/ or inhabit the area, especially on the opposite banks to the construction works.

Lampreys

Lampreys are protected under Annex II of the Habitats Directive. All three species are found in the Lower River Shannon SAC. The proposed mitigation measures are listed below:

- Silt curtains will be floated in the river and stream.
- The proposed works (including preparatory work) beside the River Shannon which supports salmonids shall be undertaken from May to October (inclusive) and in consultation with Inland Fisheries Ireland (IFI) to avoid accidental damage or siltation of spawning beds, and will be subject to the water level in the river.
- Silt fences will placed on the river side of earth bunds to catch soils and prevent run-off of contaminated surface water to the river and stream.
- Shade cloths will act as dust curtains and they will be installed near watercourses, at locations where excavation works will occur, along construction trenches, and around bridges and culverts to catch any dust arising before it can settle on smaller watercourses and the River Shannon.
- Riparian vegetation buffers of 20m (where possible) will be maintained and restored to naturally filter out sediments, nutrients and other pollutants.
- Spill prevention plans will be in place and spill kits will be available to contain and rapidly respond to accidental spills of hazardous materials.
- Target lamprey surveys should be undertaken within the Mill Race, prior to any site investigation or construction works that could disturb the stream.

Salmon

Salmon requires high water quality for all life stages, particularly clean, well-oxygenated water. The following mitigation measures complement the measures listed under Section 6.2 related to water quality protection:

- There will be no work permitted in streams and works adjacent to streams will be prohibited during the spawning season for salmonids (Nov-March).
- Silt fences, silt mats, and silt curtains will be implemented to mitigate against sediment run-off and activities that could lead to riverbank erosion will be reduced.
- Riparian habitats will be restored which will provide shading to regulate water temperature and improve water quality through natural filtering processes.

6.4 Measures to Protect Habitats and Vegetation

Tree roots will be protected by using non-invasive construction methods:

- No digging into the existing gravel track so as not to encounter tree roots; and
- Installing Cellweb® tree root protection (or equivalent) directly onto the gravel path and build up the path on it. The system allows continued water permeation and gas exchange. It is also extremely effective at spreading point loads and reducing the load that is applied to the soils beneath. This in turn minimises soil compaction, maintaining an open soil structure which allows continued gas exchange, water permeation and migration.

Although impacts arising from disturbance to habitats will last longer than the construction period, it is likely to be reversible over time (7-15 years for hedges and 15-60 years for any trees) once construction ceases allowing habitats to recover or re-establish within the area of the proposed scheme, as addressed by the proposed mitigation.

A planting scheme will be put in place, compensating for tree loss along the greenway route. There will be approximately 300 native Irish trees planted.

6.5 Biosecurity measures

The desktop study and site visits have identified invasive species within the path clearance area, including stands of Himalayan Balsam and Giant Hogweed. Invasive species have the potential to spread to other locations via machinery used on site or via the river itself if plant material is disturbed. The following biosecurity measures will be put in place to ensure no spread of invasive species:

- A pre-construction survey for invasive species will be conducted at the earliest stage possible to update and inform on the status of invasive plant species in or near the works area. Particular attention should be given to identifying those invasive species identified on the Third Schedule of the Birds and Natural Habitats Regulations 2011 (as amended). This survey should be undertaken during the appropriate botanical season (April to September);
- Continuous monitoring of work sites by an experienced and qualified Ecologist for invasive species growth shall be conducted.
- Biosecurity zones must be established on-site prior to site works commencing and will specify the area of the zones, the required actions that must be taken in each zone and who must carry out the actions. All staff will be educated on the health and safety and biosecurity measures that should be followed around each species;
- All plant machinery and construction related vehicles that will travel between the work site and the temporary construction compounds will be checked for the presence of plant material e.g. leaves roots and rhizomes from non-native invasive species. There shall be a bunded area in the temporary construction compound to wash down water from plant machinery and construction related vehicles, particularly for plant machinery and construction related vehicles that are leaving the worksite and travelling elsewhere. The wash down water shall be pumped to a silt

buster to remove contaminated material and soils before the water is returned downstream to the River Shannon;

- Delivery vehicles to the temporary construction compound shall be inspected for any plant material before entering or leaving the 'delivery' side of the compound and will be washed down in the bunded area. The wash down water shall be pumped to a silt buster to remove contaminated material and soils before the water is returned downstream to the River Shannon;
- Where there is potential for cross-contamination on site (machinery or personnel moving from one biosecurity zone to another or from the biosecurity zone to other areas on site), vehicles or machinery will be designating to specific sites to prevent spread of invasive species;
- All staff will be trained by the ECoWs in the identification of invasive species and noxious weeds and the associated biosecurity measures required when working on site;
- Non-native invasive species will be managed or avoided where they occur throughout the works area, in line with the NRA Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Road Schemes (NRA, 2010), and any other best practice guidance which may be available in the interim;
- Any Himalayan balsam identified during the site survey will be hand-pulled prior to the commencement of the works. Hand pulling must only take place before the plant goes to seed around mid-June depending on the growing season. The stalks shall be left to wither where they are pulled and shall not be collected or moved off site;
- Giant hogweed shall be sprayed or injected with Glyphosate when actively growing, usually in April and May when the plants have grown to about 50cm in height with full leaves;
- Removal of Giant Hogweed flower heads in June/July prior to seed production will be carried out;
- If invasive species plants that spread by rhizomes (e.g. Japanese Knotweed) are encountered by site clearance crews, the plant will be removed in accordance with guidelines for managing invasive species, wrapped in plastic, and buried under topsoil and subsoil mounds so those invasive species plants cannot propagate;
- No invasive species will be moved to a different location within the works site or off site; and,
- A three to five year programme of invasive plant species control will be required to extend beyond the works period.

Timing for treatment of invasive species is detailed in the ISMP for the project (refer to Appendix E). Continuous monitoring and treatment of invasive alien plant species along the greenway should be undertaken during the operational phase. The following are the summarised measures for treatment for the invasive species found within the study area:

- Himalayan balsam shall be hand-pulled in mid-June prior to the commencement of the works. Himalayan balsam have very shallow roots, so a gentle tug is usually enough to remove the entire root system and normally best done if pulled from the base of the plant. Hand pulling should ideally commence in May-June when plants can be easily identified and will not have set seed.
- Chemical control of Himalayan balsam can also be achieved with the use of Glyphosate as a foliar spray where infestations occur. Glyphosate should be applied during active growth in late spring (May-June) to ensure that germinating seedlings have grown sufficiently to be covered by the spray.
- Himalayan balsam can also be successfully controlled by cutting back the plants via mowing or strimming before the plants flower in June. Cutting should be undertaken frequently during the

growing season to prevent sprouting and flower formation. This process should be repeated annually until Himalayan balsam stops growing in the infested area.

- Giant hogweed sap poses a major hazard to human health and appropriate PPE must be worn by personnel at all times when undertaking herbicide treatment in areas contaminated with this species. Giant hogweed plants shall be sprayed or injected with Glyphosate when actively growing, usually in April and May when the plants have grown to about 50cm in height with full leaves. Re-application in the same season (late August and early September) should be planned in order to treat new plants that typically grow from the seedbank to replace the dead plants or any plants that may have been missed.
- Herbicide treatment will not kill seeds in the seed bank and monitoring and herbicide application must be repeated annually over 3-5 years to eradicate new plants growing in subsequent years.
- Post works, regular planned monitoring along the greenway by an experienced and qualified Ecologist to identify invasive species regrowth shall be conducted.

6.6 Post-construction works/Reinstatement

Following completion of the construction of the path, construction area and sectors will be reinstated as far as is practicable. The following measures are proposed:

- Where opportunity exists, enhancement measures (see Landscape Architecture drawings in Appendix B) may be employed. This will be carried out in liaison with the competent authority and the ECoW;
- Upon completion of the site works, all plant and machinery will be removed. The adjacent grasslands to the site will be left to regenerate naturally or reinstated to its original condition and site fencing will be removed; and
- Any reinstatement of breaches in hedgerows and tree lines will be carried out in consultation with a suitably qualified ecologist. Local strains of native species shall be planted and hedge management shall reflect local traditional styles.
- A tree planting scheme will be implemented, with proposed planting of more than 300 trees, at a 5:1 ratio for trees that will be cut down. It will include native hedgerow, and tree species which promote biodiversity such as oak, willow, birch, etc.

6.7 Benefiting lands

The planting scheme proposed as part of the mitigation measures as mentioned in Section 6.6 above, will benefit some areas of greenway with potential of preventing long-term net loss and a diversity increase. As well as the ability to maintain contiguous stands that conserve habitat value.

The area in which the route diverges from the original pathway through the broadleaved woodland (WD1) habitat will create a benefit for not only the original pathway as there will be less impact from the current footprint of the walkers/cyclists, but it will also benefit bats by creating a new area of potential foraging habitat.

6.8 Integrity of the Site

From the Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC (EC, 2002), the meaning of integrity is described as follows:

'The integrity of a site involves its ecological functions. The decision as to whether it is adversely affected should focus on and be limited to the site's conservation objectives'.

The concept of the 'integrity of the site' is also explained in the EU publication Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (EC, 2000), as follows:

'It is clear from the context and from the purpose of the directive that the 'integrity of the site' relates to the site's conservation objectives. For example, it is possible that a plan or project will adversely affect the integrity of a site only in a visual sense or only habitat types or species other than those listed in Annex I or Annex II. In such cases, the effects do not amount to an adverse effect for purposes of Article 6(3), provided that the coherence of the network is not affected. On the other hand, the expression 'integrity of the site' shows that focus is here on the specific site. Thus, it is not allowed to destroy a site or part of it on the basis that the conservation status of the habitat types and species it hosts will anyway remain favourable within the European territory of the Member State.

The chosen construction methods, prevents disturbance and potential significant impacts on tree roots, by avoiding digging into the existing gravel track and instead installing a cellular confinement system that creates a stable, load bearing surface whilst eliminating damage to roots through compaction and desiccation of the soil.

Furthermore, the tree planting scheme will prevent long-term net loss by implementing a mitigation measure ratio of 5:1, using replacement species that will provide a similar mature canopy spread, and maintaining contiguous stands to conserve habitat value.

The tree planting scheme and root protection construction methods allow for the maintenance of the integrity of the site.

7 Assessing the Residual Effects of the Proposed Development Following Mitigation

The potential for impacts on the Conservation Objectives and its targets have been assessed in light of habitats and species that are likely to be affected by the proposed development.

Section 7 outlines the assessment of residual impacts following the implementation of the mitigation measures proposed in Section 6 of this report, in relation to the relevant QIs of the Lower River Shannon SAC.

Sea lamprey (*Petromyzon marinus*) [1095], Brook lamprey (*Lampetra planeri*) [1096], River lamprey (*Lampetra fluviatilis*)

The potential adverse effects to all three lamprey species result from a reduction in water quality due to the construction activities through surface runoff, hydrocarbons and other pollutants, as well as an increase in sedimentation in the riverbed which may alter these species' habitats.

Mitigation measures to minimise impacts on water quality and sedimentation were described in section 6.2. With the mitigation measures in place, it is considered that the residual effect is not significant, negative, unlikely, temporary and indirect on this QI.

Atlantic Salmon (*Salmo salar*) [1106]

The main adverse effect on salmon is related to a reduction in water quality which according to the Conservation Objective's Target it should be at least Q4 at all sites sampled by the EPA. Currently the River Shannon is assigned a status of 'Moderate' (EPA, 2016-2021). The construction phase of the proposed works will be temporary and of localised nature and with mitigation measures in place the potential for residual effects on this protected species is not significant, negative, unlikely, temporary and indirect.

Otter (*Lutra lutra*) [1355]

The proposed works will mostly take place within artificial and built surfaces, with small sections on grassland areas. Although suitable otter habitat is present along the banks of the River Shannon, the works will not result in the loss of its commuting or foraging habitat, nor will it create barriers to connectivity for its traveling routes.

Adverse effects on otters are related to disturbance of the species due to the construction works and potential decrease in water quality which might affect the availability of fish biomass in the area. However, the construction phase will be temporary and localised to heavily modified areas with regular traffic of motor vehicles, pedestrians and cyclists to which otters might be used to. The risk of pollution of surface water bodies is related to runoff of sediments and pollutants such as hydrocarbons.

Mitigation measures set in Section 6 aim to ensure water quality and includes time windows to carry out the works and avoid disturbance to species.

Considering the above, the residual impact is considered not significant, negative, unlikely, temporary and indirect to this QI.

Water courses of plain montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260]

The proposed works will occur mostly on an existing path and within some grassland fields away from the riverbank. Given this, it is considered that there is no risk for adverse effects on the habitat area, distribution or hydrological regime of the species that make up this habitat.

Construction activities could lead to runoff and excess sedimentation that could alter the substratum composition and to surface runoff of pollutants or cementitious materials that could reduce the water quality and have an indirect effect on the vegetation composition.

However, there are effective mitigation measures, as detailed in Section 6, that will minimise the potential adverse effect and assure that the works don't interfere with the Conservation Objective's targets set for this QI.

Therefore, the residual impact is considered imperceptible, negative, unlikely, temporary and indirect.

Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) [91E0]

The proposed greenway route crosses a section of alluvial forest habitat where there is potential for direct effects by some habitat loss due to clearance and tree felling during the construction activities of the greenway.

Machinery movement, excavation works, and construction activities close to Third Schedule invasive plant species that run along most of the route can have a direct adverse effect on the vegetation composition of the forest, altering the native species present and increasing the negative species indicator.

However, there is an Invasive Species Management Plan in place to control the spread of invasive species and with the proposed mitigation measures related to biosecurity these potential adverse effects will be minimised.

The residual impact on this Qualifying Interest is considered not significant, negative, unlikely, temporary and direct.

8 Cumulative Assessment of Effects

In order to fully assess the potential impact of the proposed development on European Sites, the project must be assessed alone or in combination with existing activities and proposed plans for the region. Myplan.ie and the LDP were consulted in order to determine if there were any other plans or projects in the area which could result in cumulative impacts.

The LDP has objectives relating to the protection, conservation management and restoration of European Sites. In its Land Use Zoning objectives related to semi natural and open spaces, it states that the plan will protect Natura 2000 designated sites, proposed sites and flood plains. With this objective it recognises the importance and need for protection of these areas for their protected species, habitats and ecosystems. It highlights that within these areas, development will be prohibited in order to maintain the integrity of the site. The plan is accompanied by an Appropriate Assessment Natura Impact Statement (Volume 4 of the LDP, adopted June 2022)

https://www.limerick.ie/sites/default/files/media/documents/2022-07/Appropriate-Assessment-Natura-Impact-Statement.pdf

It concludes that "The risks to the qualifying interests, special conservation interests and conservation objectives of the Natura 2000 site have been addressed by the inclusion of mitigation measures, through policy measures such as non-encroachment of zoning on Natura 2000 sites in the case of zoning objectives and in relation to implementation of Article 6 elsewhere (…) taking into account mitigation measures that have already been integrated into the draft plan and the additional mitigation measures mentioned in this report, it is concluded that the proposed material alterations to the Limerick Draft Plan are not foreseen to have any significant effects on the integrity of any European site, alone or in combination with other plans or projects."

The review of the Limerick City & County Council planning register documented relevant general development planning applications in the vicinity of the proposed greenway, most of which relate to the provision and/or alteration of one-off housing and other structures. No potential for cumulative impacts on European Sites were identified when considered in conjunction with the current proposal.

The Castletroy WwTP Upgrade Project is an element of Irish Water's 2017-2021 Investment Plan, whereby 52 Wastewater 'Above Ground' (i.e., treatment) projects were identified. The planning application (permitted by An Bord Pleanála 12/10/2023, Case reference: PA91.316168) for the upgrade works at Castletroy WwTP will cater for the 10-year growth projections from 45,000 PE to 77,500 PE, which includes a future IDA load of 5,500 PE. There will be provision made in the infrastructural development of the plant (i.e. tank sizing and pipework) for 25-year population growth projection of 81,100PE. Procurement and Construction is scheduled between 2024-2026.

The IDA has proposed upgrade works to existing flood defences under a new planning application that has been submitted to Limerick City & County Council planning section, with Case reference: 25/60477. It was deemed invalid on 24th June 2025. The proposed works consist of the construction of 1.1m – 1.8m sheet pile wall to act as a flood barrier from the River Shannon and Mulkear River; associated drainage works including new drainage trenches, pipes and attenuation pond; construction of 11 no. mammal crossings comprising earth ramps filled to the top of the proposed sheet piles along the River Shannon and Mulkear River; Localised relocation of an existing boundary fence to the adjacent Johnson and Johnson facility to facilitate the proposed development; Removal of existing berm along the Mulkear River; All associated ancillary site development works.

The potential cumulative impacts of those projects with the Limerick City Greenway should be considered if their construction programmes overlap.

There are no known additional plans/projects on-going or proposed (at the time of this study) which in combination with the proposed project may give rise to any form of cumulative impact on the European Sites.

This NIS for the proposed works has identified mitigation measures and determined that there is no requirement to proceed to Stage 3 of the Appropriate Assessment process as there is no significant detrimental effect identified as a result, to the integrity of the Lower River Shannon SAC or other European Sites. This proposed project complies with the conservation objectives of the habitats and species of the Lower River Shannon Sac and is designed so as not to contribute to the cumulative impacts of new developments which will be the subject of assessment.

9 NIS Conclusions

The AA Screening (Ryan Hanley, 2024-amended) found that it could not be excluded, on the basis of objective scientific information that the proposed works, individually or in combination with other plans or projects, would not have a potential contributory effect on a European site without the implementation of best practice measures being implemented during the construction of the greenway works. Therefore, the NIS was undertaken to ascertain whether the proposed works would have an adverse effect on the integrity of European sites within the project ZoI.

Best practice and mitigation measures (as outlined within Section 6) have been identified to ensure that potential pollutant sources are not released from the proposed construction works to the receiving environment such that there will be no risk of adverse effects on the Qualifying Features of European sites within this project's ZoI.

With the implementation of construction best practice and mitigation measures, there will be no significant effects which would adversely affect the Qualifying Interests or Conservation Objectives of the European Sites under consideration with regard to the favourable conservation condition of the considered habitats and species of Qualifying Interest.

The provisions of Article 6 of the 'Habitats' Directive 92/43/EC (2000) defines integrity as the 'coherence of the sites ecological structure and function, across its whole area, or the habitats, complex of habitats and/or population of species for which the site is classified'. It is clear that, given the application of prescribed protective measures for the avoidance of impacts and the implementation of the required mitigation measures, the proposed works will not give rise to adverse effects on the integrity of any of the identified European sites evaluated herein.

It has been concluded that the development of the proposed Limerick City Greenway (UL to NTP) works will not adversely affect the integrity of the European site, either alone or in combination with other plans or projects, and there is no reasonable scientific doubt in relation to this conclusion.

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Appendix A

Preliminary Design Drawings

Appendix B

Landscape Architecture Drawings

Appendix C

Structural Design Drawings

Appendix D

Lower River Shannon Sac (002165)

Site Synopsis

Lower River Shannon SAC (0002165) (Site Synopsis NPWS 2013)

This very large site stretches along the Shannon valley from Killaloe in Co. Clare to Loop Head/ Kerry Head, a distance of some 120 km. The site thus encompasses the Shannon, Feale, Mulkear and Fergus estuaries, the freshwater lower reaches of the River Shannon (between Killaloe and Limerick), the freshwater stretches of much of the Feale and Mulkear catchments and the marine area between Loop Head and Kerry Head.

The Shannon and Fergus Rivers flow through Carboniferous limestone as far as Foynes. The Mulkear flows through Lower Palaeozoic rocks in the upper reaches before passing through Namurian rocks, followed by Lower Carboniferous shales and Carboniferous limestone. The Mulkear River itself, immediately north of Pallas Green, passes through an area of Rhyolites, Tuffs and Agglomerates.

The Shannon and Fergus Estuaries form the largest estuarine complex in Ireland. They form a unit stretching from the upper tidal limits of the Shannon and Fergus Rivers to the mouth of the Shannon Estuary.

Freshwater rivers have been included in the site, most notably the Feale and Mulkear catchments, the Shannon from Killaloe to Limerick (along with some of its tributaries, including a short stretch of the Kilmastulla River), the Fergus up as far as Ennis, and the Cloon River. The Feale and Mulkear catchments exhibit all the aspects of a river from source to mouth. Semi-natural habitats, such as wet grassland, wet woodland and marsh occur by the rivers, but improved grassland is the most common habitat type. One grassland type of particular conservation significance, Molinia meadows, occurs in several parts of the site and the examples at Worldsend on the River Shannon are especially noteworthy. Here are found areas of wet meadow dominated by rushes (*Juncus spp.*) and sedges (*Carex spp.*), and supporting a diverse and species-rich vegetation, including such uncommon species as Blue-eyed Grass (*Sisyrinchium bermudiana*) and Pale Sedge (C. pallescens).

Floating river vegetation characterised by species of water-crowfoot (*Ranunculus spp.*), pondweeds (*Potamogeton spp.*) and the moss *Fontinalius antipyretica* are present throughout the major river systems within the site.

Alluvial woodland occurs on the banks of the Shannon and on islands in the vicinity of the University of Limerick. The woodland is up to 50 m wide on the banks and somewhat wider on the largest island. The most prominent woodland type is gallery woodland where White Willow (*Salix alba*) dominates the tree layer with occasional Alder (*Alnus glutinosa*).

A number of plant species that are listed in the Irish Red Data Book occur within the site, and several of these are protected under the Flora (Protection) Order, 1999. These include Triangular Club-rush (*Scirpus triquetrus*), a species which is only found in Ireland only in the Shannon Estuary, where it borders creeks in the inner estuary. Opposite-leaved Pondweed (*Groenlandia densa*) is found in the Shannon where it passes through Limerick City.

Overall, the Shannon and Fergus Estuaries support the largest numbers of wintering waterfowl in Ireland. The highest count in 1995-96 was 51,423 while in 1994-95 it was 62,701. A number of species listed on Annex I of the E.U. Birds Directive breed within the site. These include Peregine Falcon (2-3 pairs), Sandwich Tern (34 pairs on Rat Island, 1995), Common Tern (15 pairs: 2 on Sturamus Island and 13 on Rat Island, 1995), Chough (14-41 pairs, 1992) and Kingfisher.

The most common use of the terrestrial parts is grazing by cattle, and some areas have been damaged through over-grazing and poaching. Much of the land adjacent to the rivers and estuaries has been improved or reclaimed and is protected by embankments. Domestic and industrial wastes are discharged into the Shannon, but water quality is generally satisfactory, except in the upper estuary where it reflects the sewage load from Limerick City.

Further details on this site can be found at NPWS | Lower River Shannon SAC.

Appendix E

Invasive Species Management Plan

Appendix F

Biodiversity Management Plan

Appendix G

Construction Environmental Management Plan