Comhairle Cathrach & Contae Luimnigh

Limerick City & County Council

Limerick City Greenway (UL to NTP)

Natura Impact Statement

August 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.

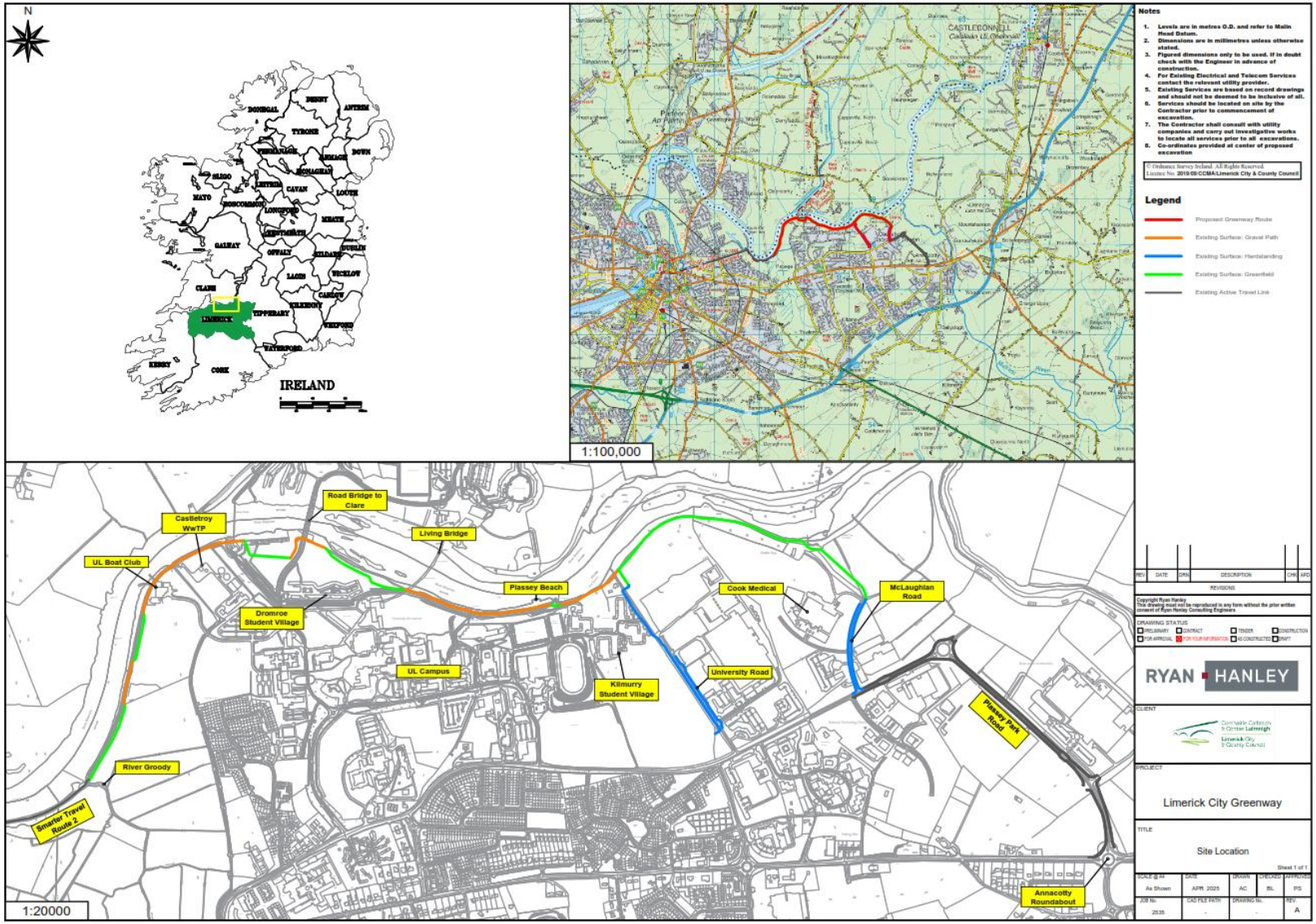

Figure 1-1: Location Map

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
11/08/2025	IDA Castletroy	Letter notifying Stakeholder of Planning Application	No response
11/08/2025	UL Facilities	Letter notifying Stakeholder of Planning Application	No response

Date	Stakeholder	Document	Response
11/08/2025	Failte Ireland	Letter notifying Stakeholder of Planning Application	No response
11/08/2025	Waterways Ireland	Letter notifying Stakeholder of Planning Application	No response
11/08/2025	Inland Fisheries Ireland	Letter notifying Stakeholder of Planning Application	No response
11/08/2025	Environmental Protection Agency	Letter notifying Stakeholder of Planning Application	No response
11/08/2025	Dept. of Environment	Letter notifying Stakeholder of Planning Application	No response
11/08/2025	Dept. of Housing, Local Government and Heritage	Letter notifying Stakeholder of Planning Application	No response
11/08/2025	ESB	Letter notifying Stakeholder of Planning Application	No response
11/08/2025	Eirgrid	Letter notifying Stakeholder of Planning Application	No response
11/08/2025	Gas Networks Ireland	Letter notifying Stakeholder of Planning Application	No response
11/08/2025	Uisce Eireann	Letter notifying Stakeholder of Planning Application	No response
11/08/2025	An Taisce	Letter notifying Stakeholder of Planning Application	No response
11/08/2025	Fire Service	Letter notifying Stakeholder of Planning Application	No response
11/08/2025	HSE Ambulance	Letter notifying Stakeholder of Planning Application	No response
11/08/2025	An Garda Siochana	Letter notifying Stakeholder of Planning Application	No response
11/08/2025	UL Director of the Buildings and Estates department	Letter notifying Stakeholder of Planning Application	No response
11/08/2025	OPW	Letter notifying Stakeholder of Planning Application	No response
11/08/2025	Clare County Council	Letter notifying Stakeholder of Planning Application	No response
11/08/2025	TII	Letter notifying Stakeholder of Planning Application	No response
11/08/2025	NTA	Letter notifying Stakeholder of Planning Application	No response
11/08/2025	Arts Council	Letter notifying Stakeholder of Planning Application	No response
11/08/2025	Heritage Council	Letter notifying Stakeholder of Planning Application	No response

Date	Stakeholder	Document	Response
11/08/2025	Southern Regional Assembly	Letter notifying Stakeholder of Planning Application	No response
11/08/2025	Department of Transport	Letter notifying Stakeholder of Planning Application	No response
07/31/2025	Dept. of Tourism, Culture, Arts, Gaeltacht, Sports and Media	Request of appropriate contact to notify of planning application	Advised to contact department of housing, which are already being notified.
11/08/2025	Commissioner of Public Works in Ireland	Letter notifying Stakeholder of Planning Application	No response

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, 2024 and 2025 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, 15.07.2024 and 05.08.2025)
- Bat survey (19.07.21, 9.09.2021 to 21.09.2021 – 19.06.2024, 10.07.2024 and 05.08.2025)
- 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 and 05.08.2025)
- Otter survey (15.05.2021, 08.07.2024 and 05.08.2025)
- 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

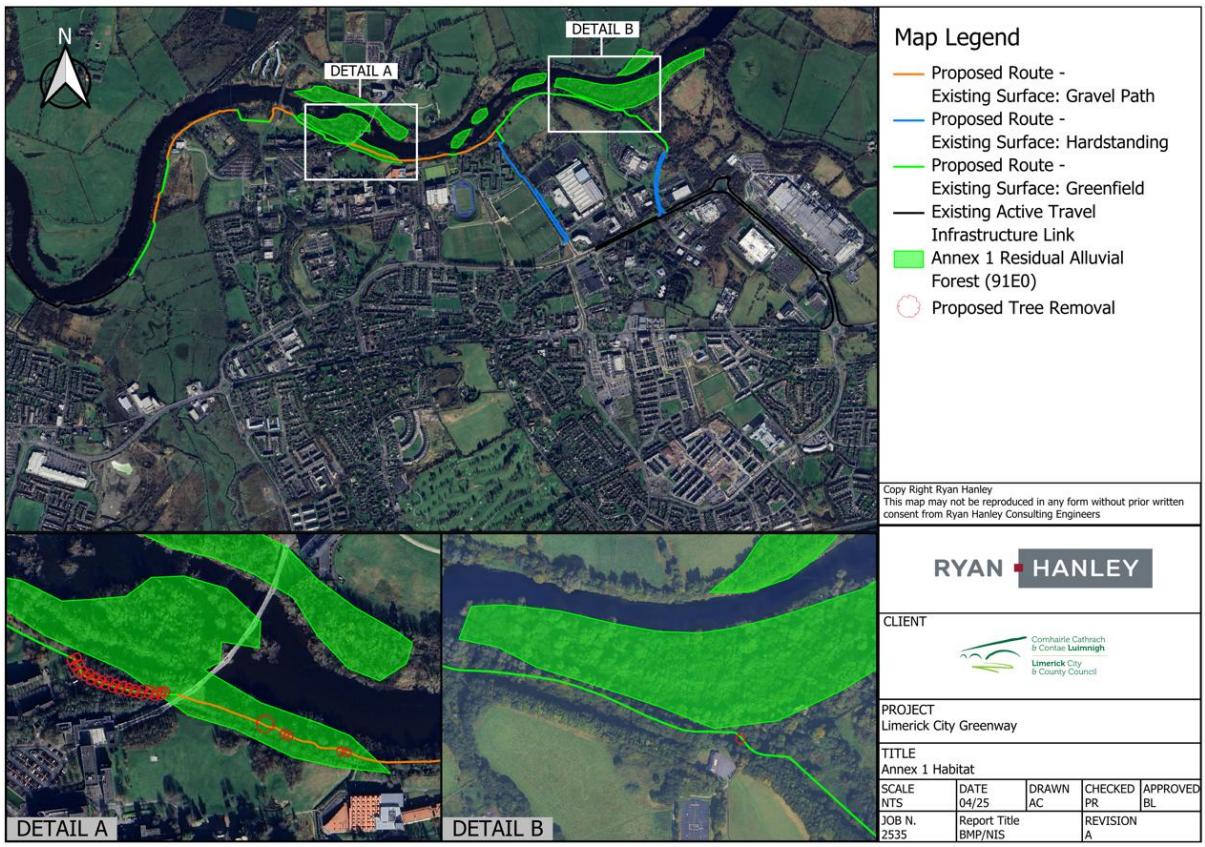

Figure 3-38: Extent of Annex 1 Alluvial Forest interactions with existing path and proposed Greenway route

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

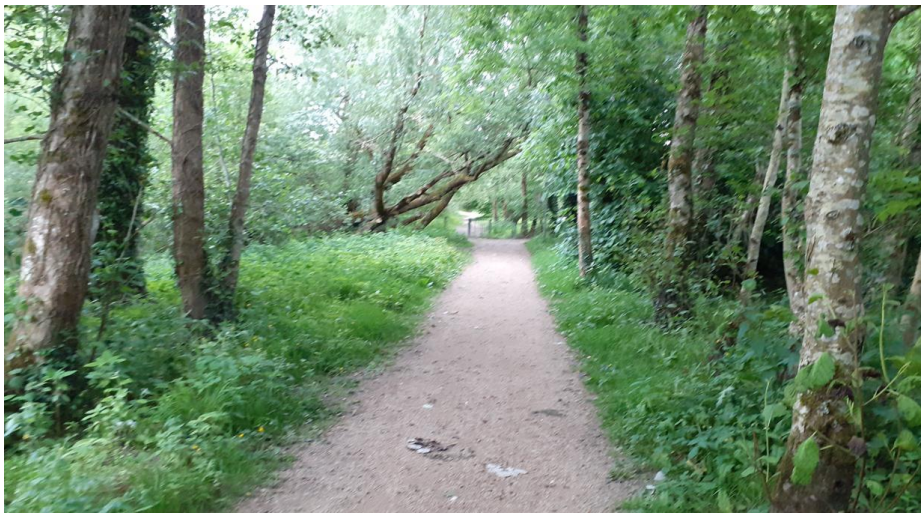

Figure 3-53: Existing path east of Kilmurray Student village approaching the land boundary between UL and the IDA

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.

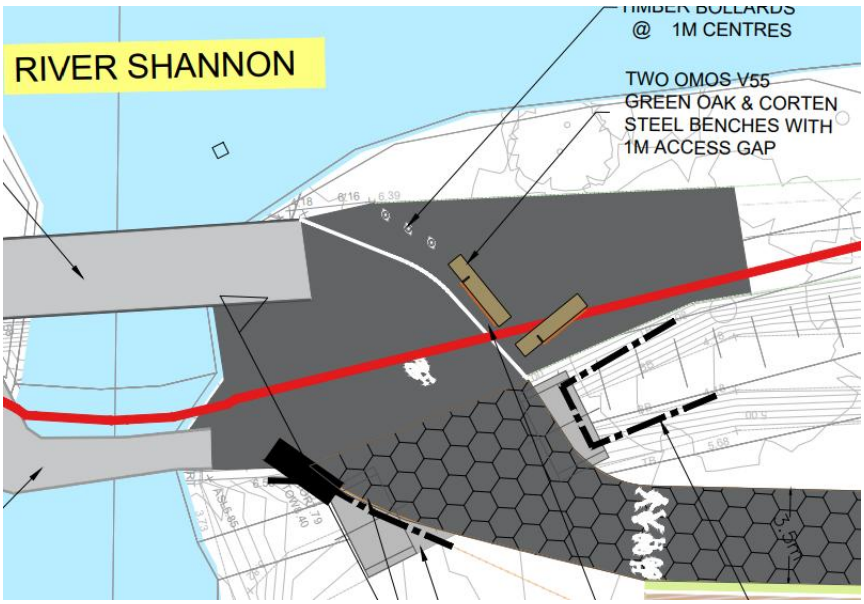

Figure 3-75: Proposed rest area at Groody Bridge

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.

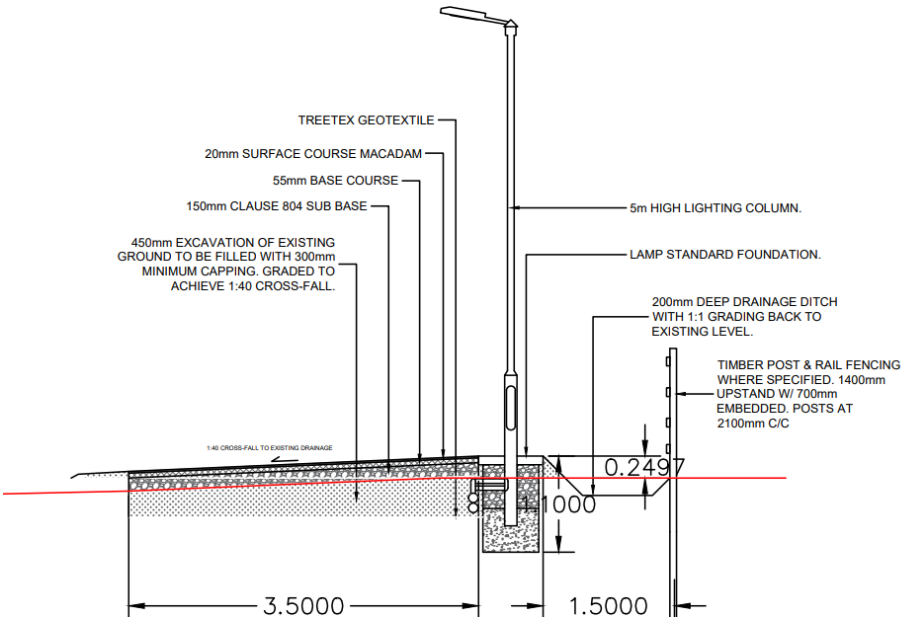

Figure 3-77: Proposed cross section of 3.5m greenway, public lighting column, and land drain

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

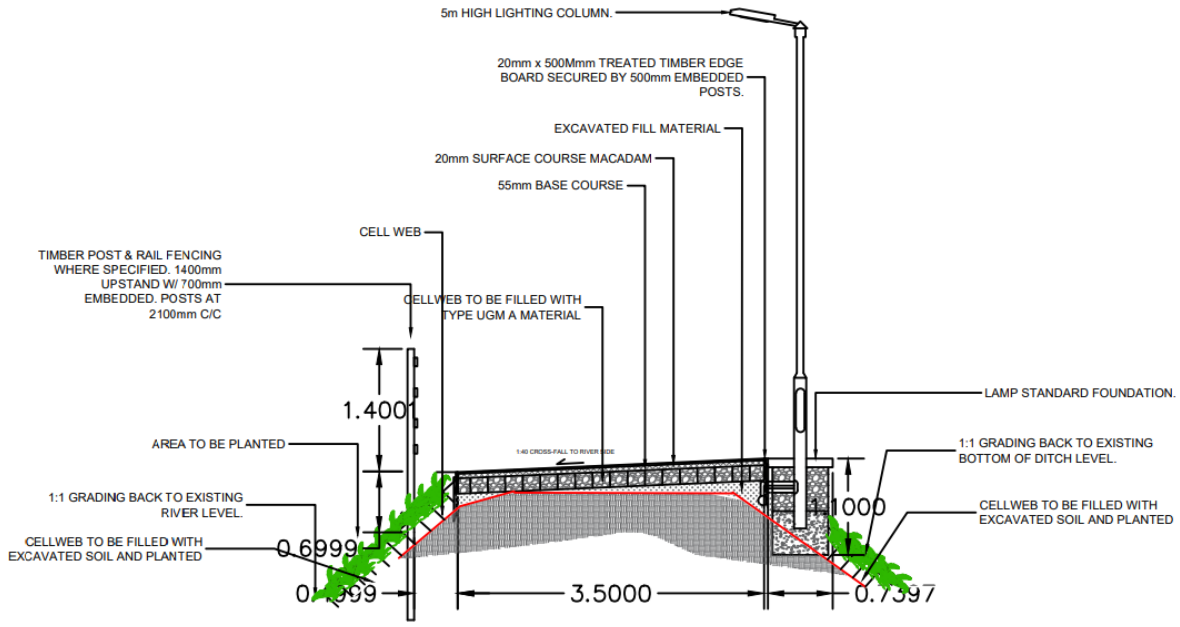

Figure 3-80: Replacement of gravel path with proposed 3.5m wide Greenway

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.

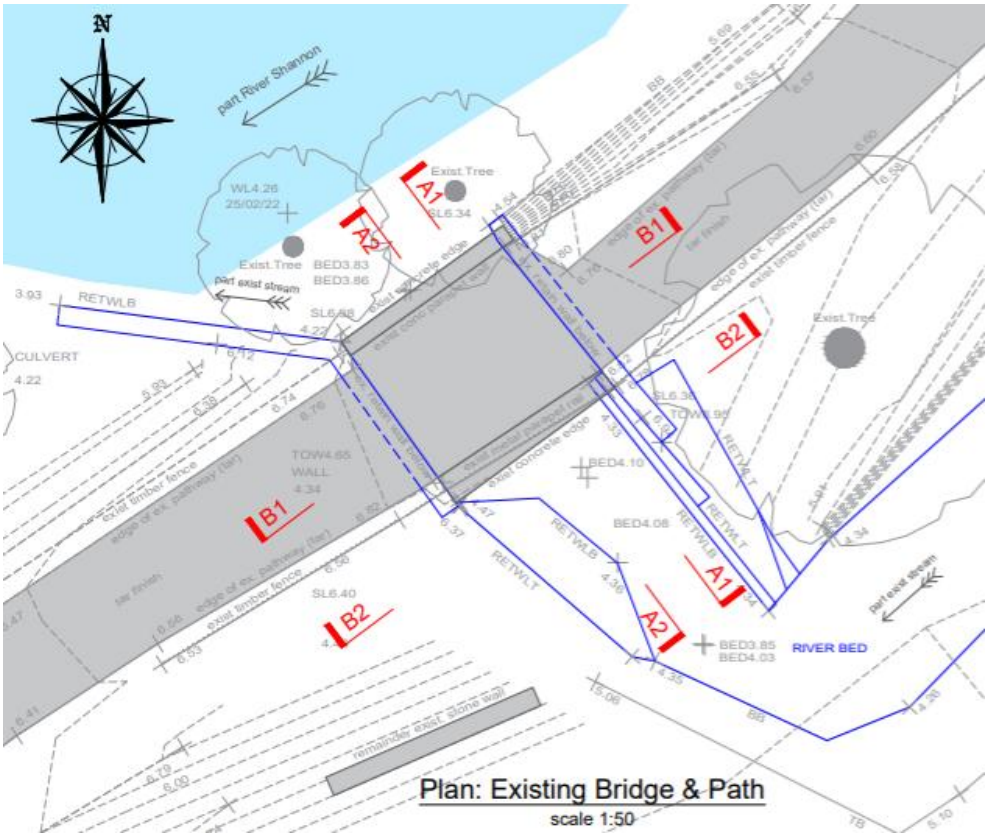

Figure 3-82: Plan of existing Bridge 1 (refer to drawing RHA-XX-DR-S-SP0010)

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.

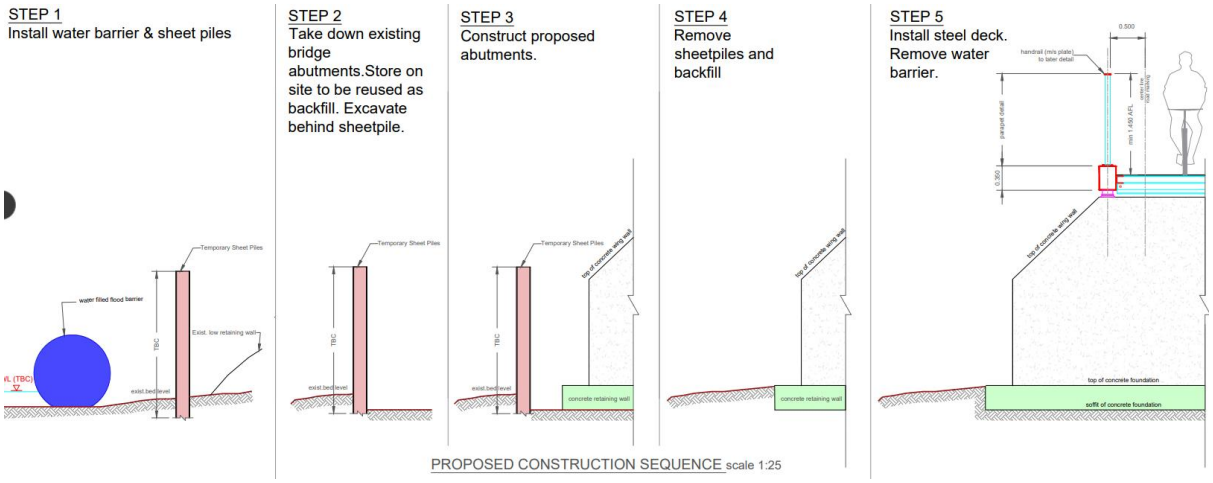

Figure 3-83: Proposed construction sequence for Bridge 1 (refer to drawing RHA-XX-DR-S-SP0012)

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.

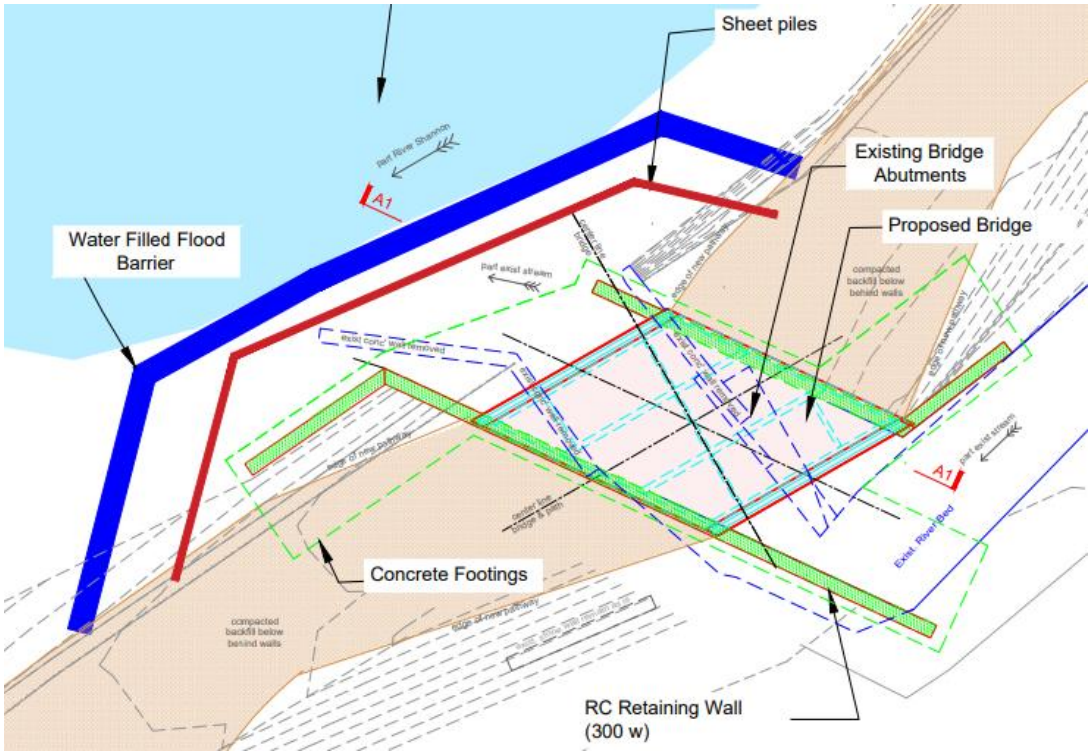

Figure 3-84: Proposed plan of Bridge 1, with ecology protection measures (refer to drawing RHA-XX-DR-S-SP0012)

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.

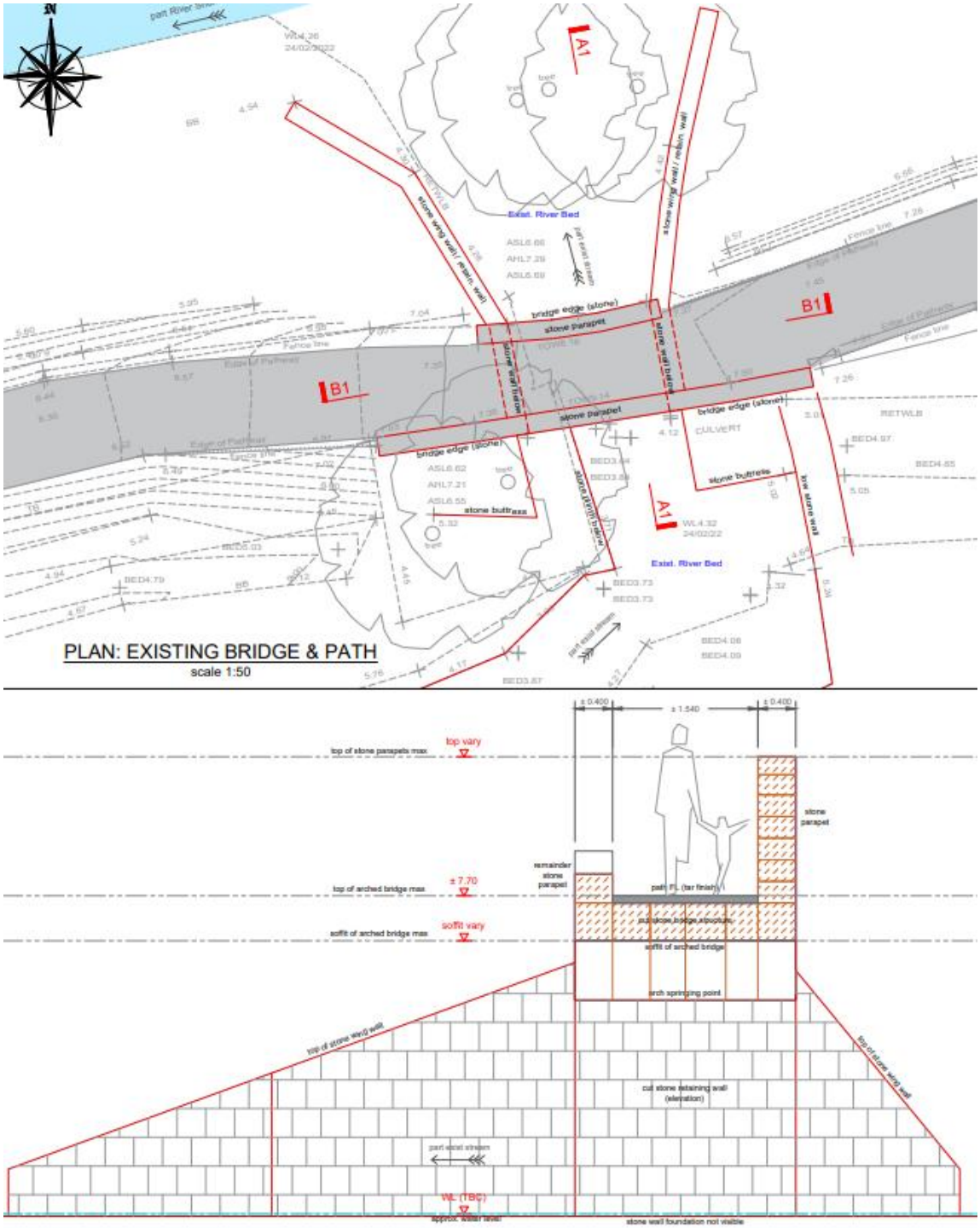

Figure 3-89: Existing plan and section for Bridge 2 (refer to drawing RHA-XX-DR-S-SP0020)

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.

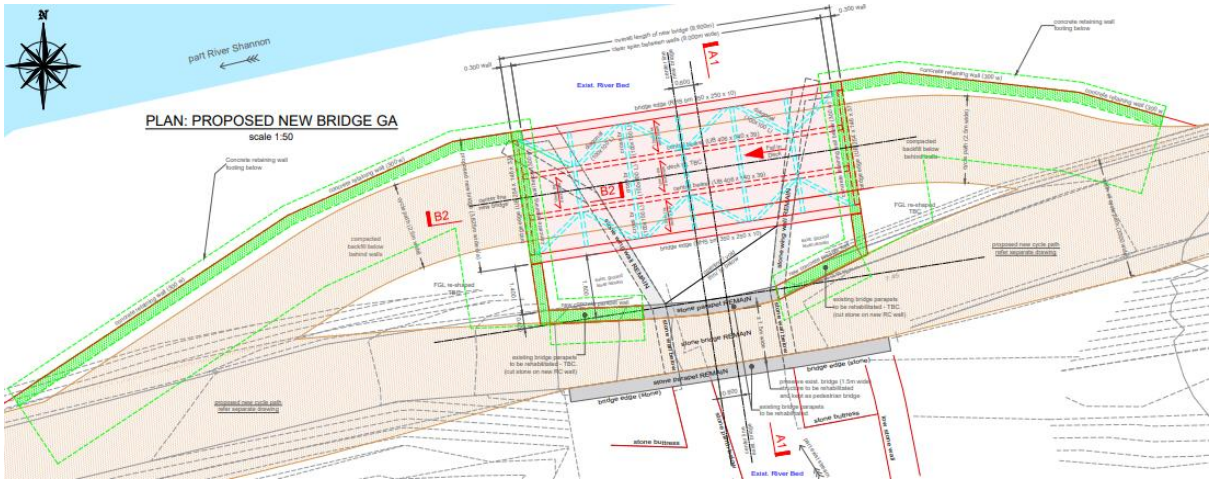

Figure 3-90: Plan for the proposed new bridge 2 alongside the existing stone bridge (refer to drawing RHA-XX-DR-S-SP0021)

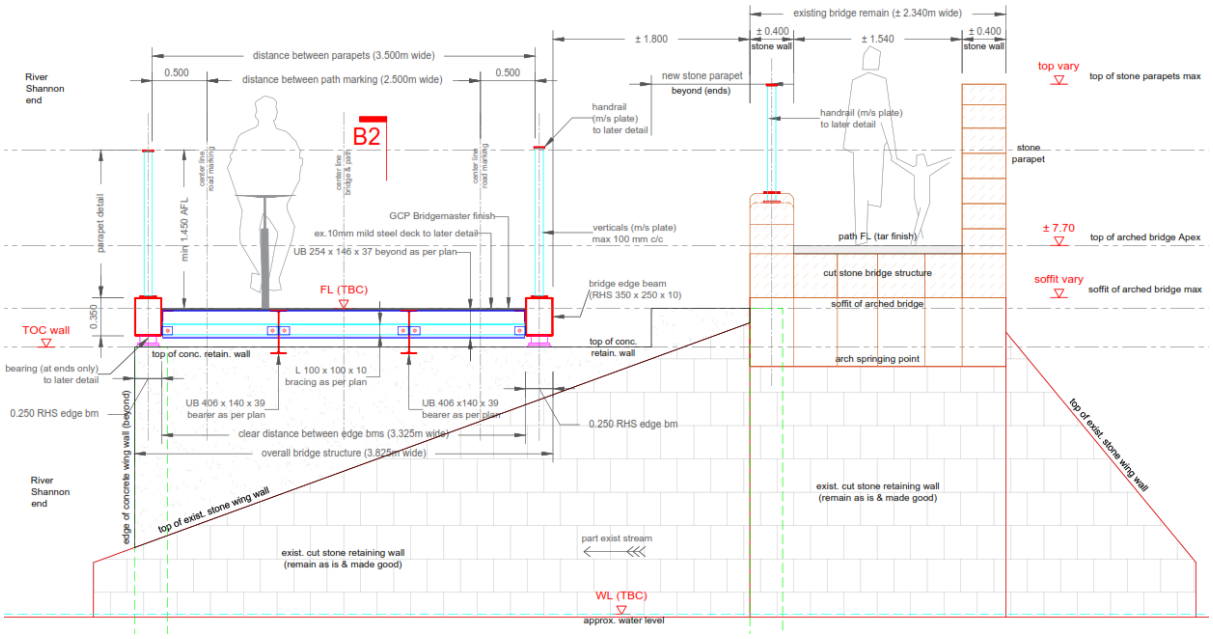

Figure 3-91: Section for the proposed new bridge 2 alongside the existing stone bridge (refer to drawing RHA-XX-DR-S-SP0021)

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.

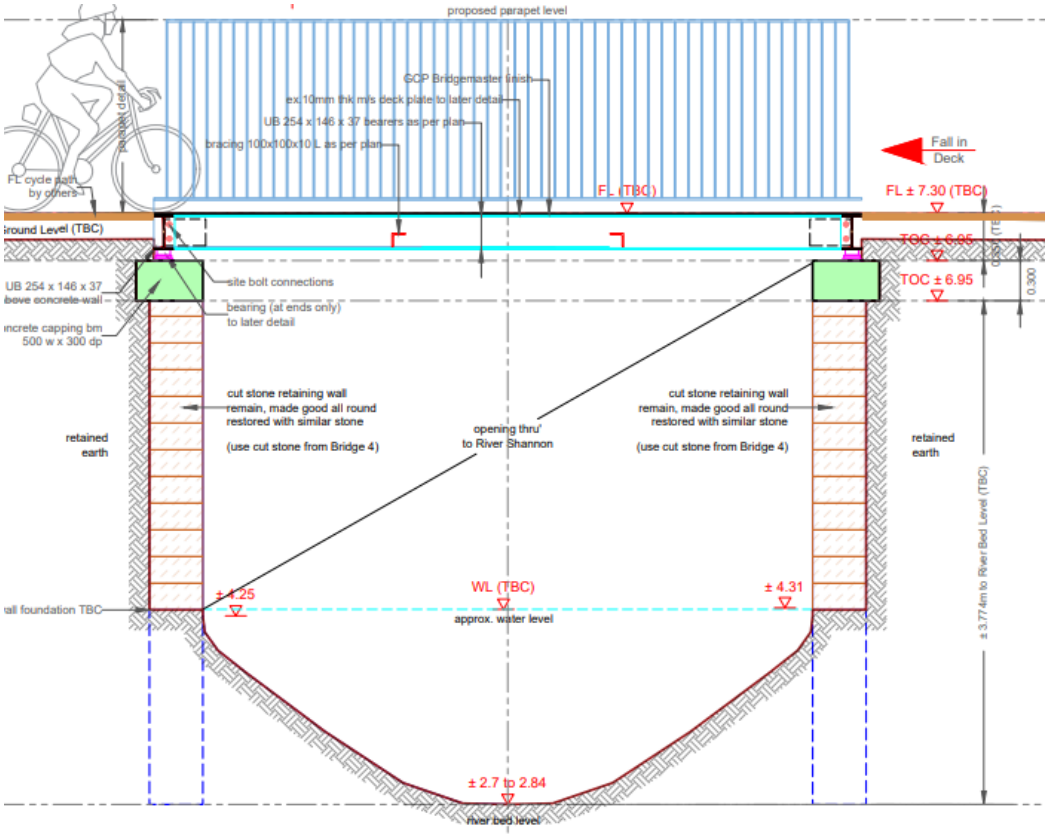

Figure 3-93: Proposed deck replacement for Bridge 3 with new concrete plinths on existing stone abutments

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.

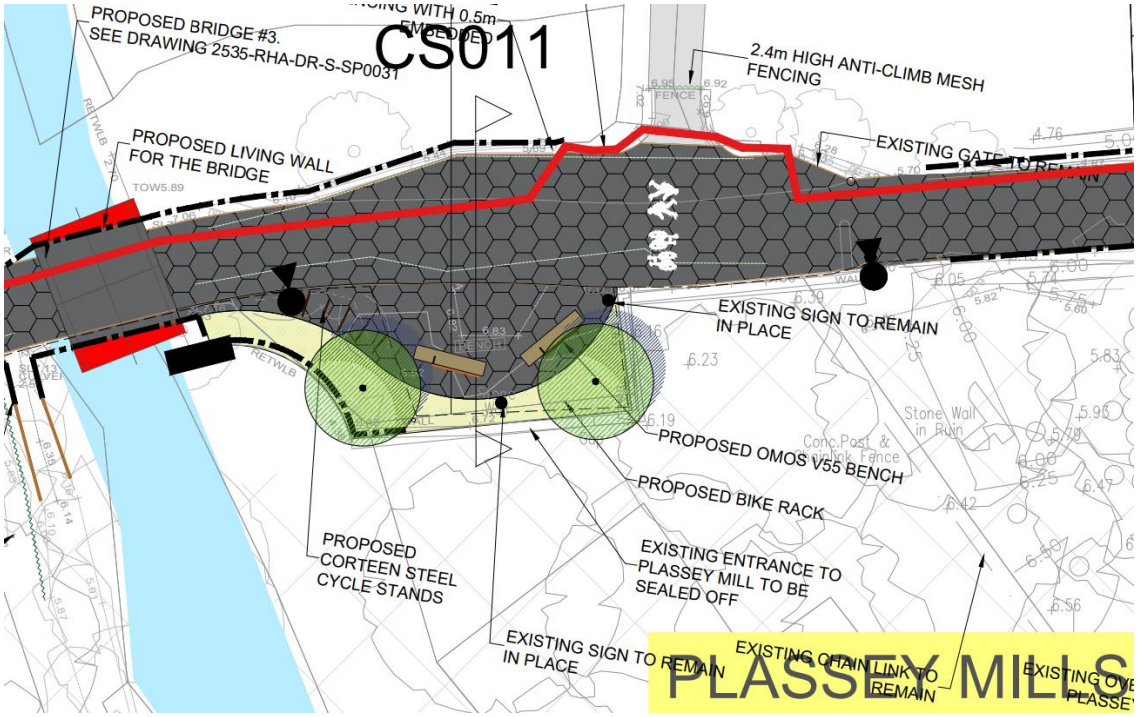

Figure 3-94: Proposed rest area at Plassey Mill

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.

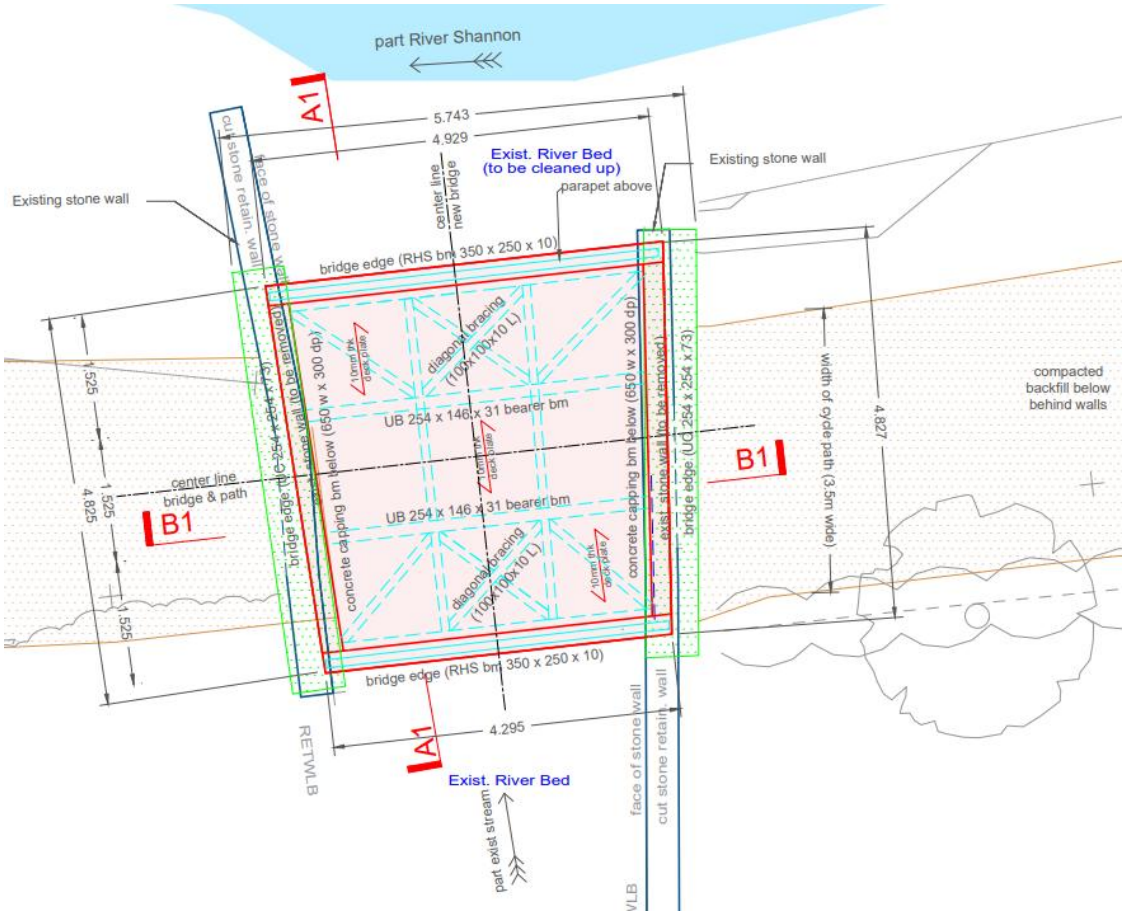

Figure 3-96: Proposed plan of Bridge 4 deck replacement

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.

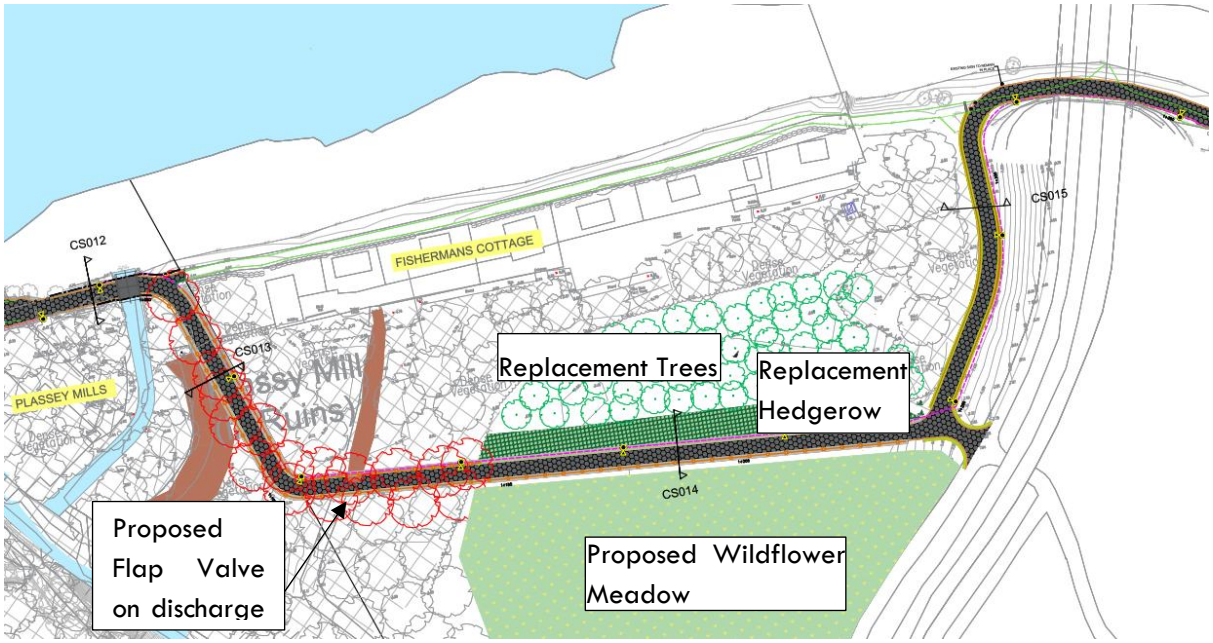

Figure 3-97: Proposed route south of Fisherman cottages

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.

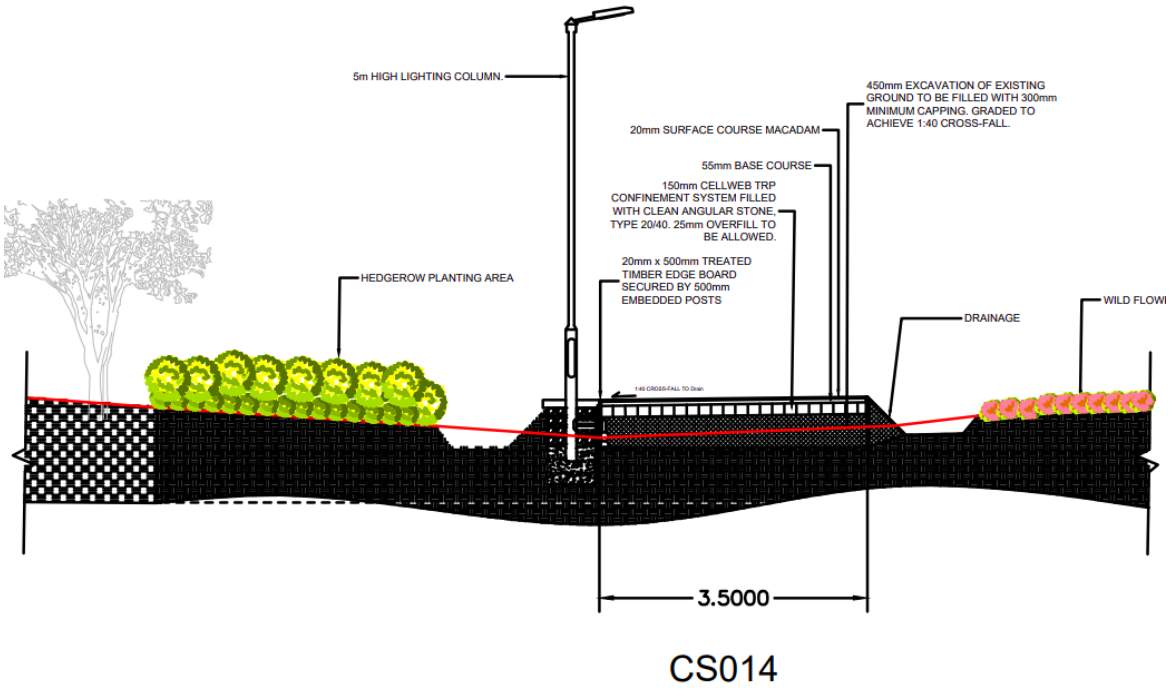

Figure 3-98: Cross Section 014 along proposed Greenway south of the Fisherman Cottages

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.

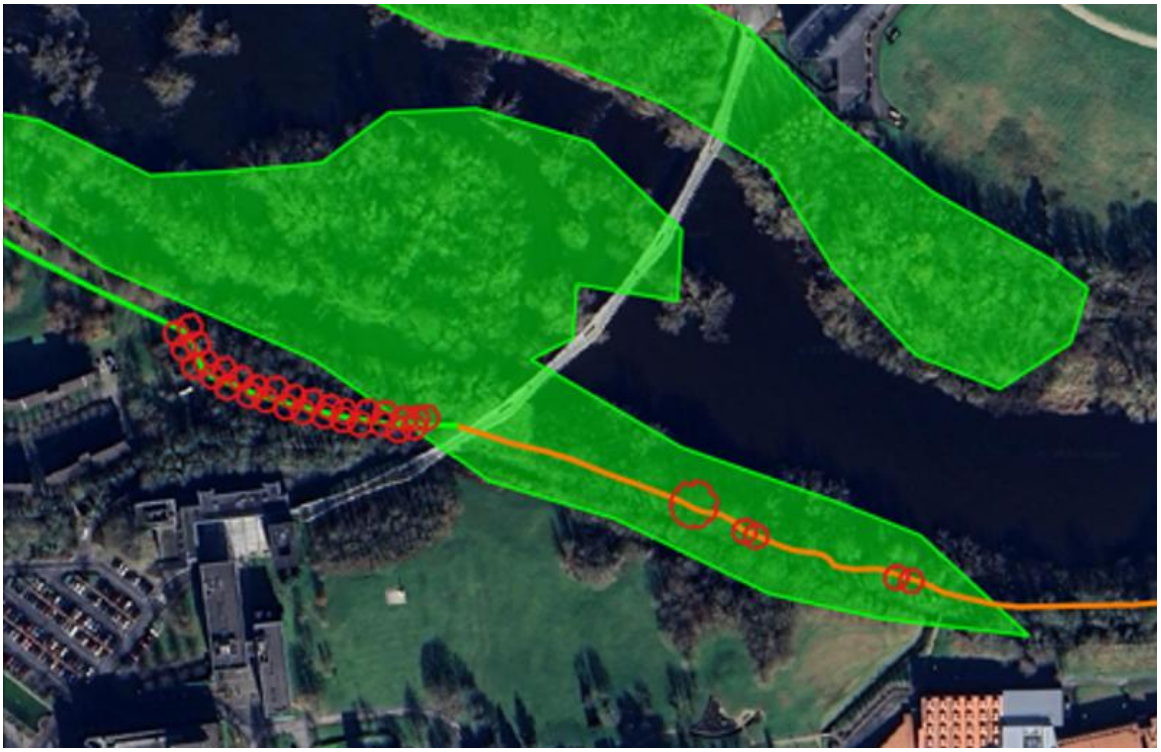

Figure 3-100: Existing Annex 1 Alluvial woodland

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.

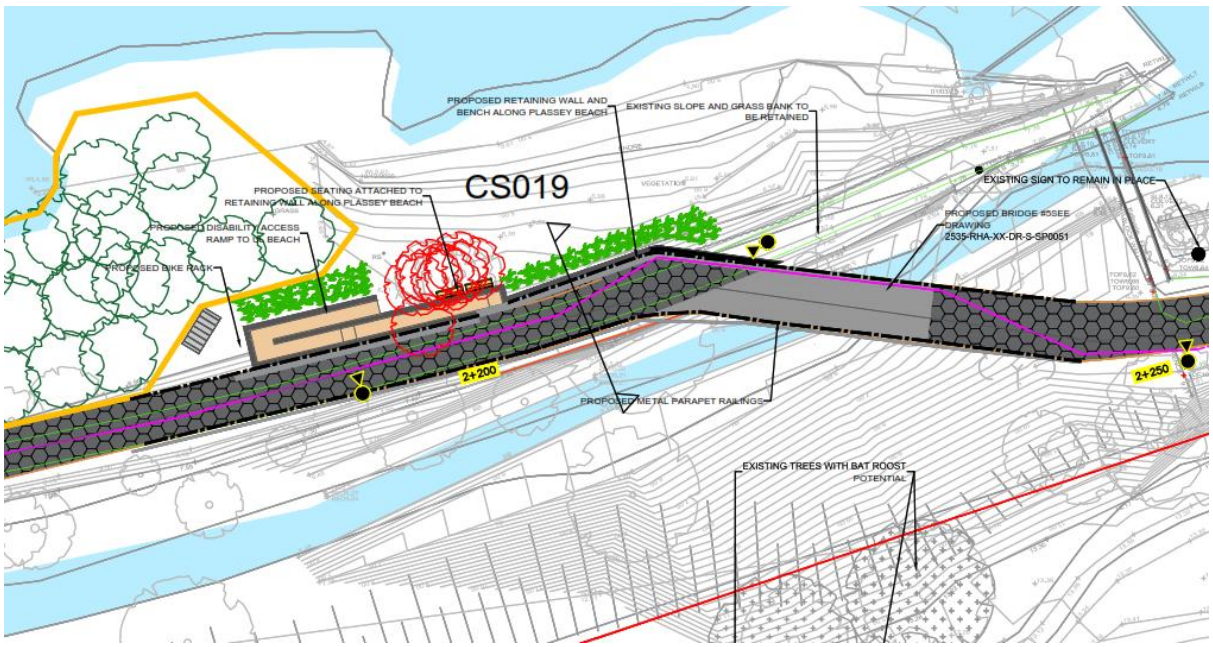

Figure 3-105: Proposed plan of ramp and Bridge 5 at Plassey Beach

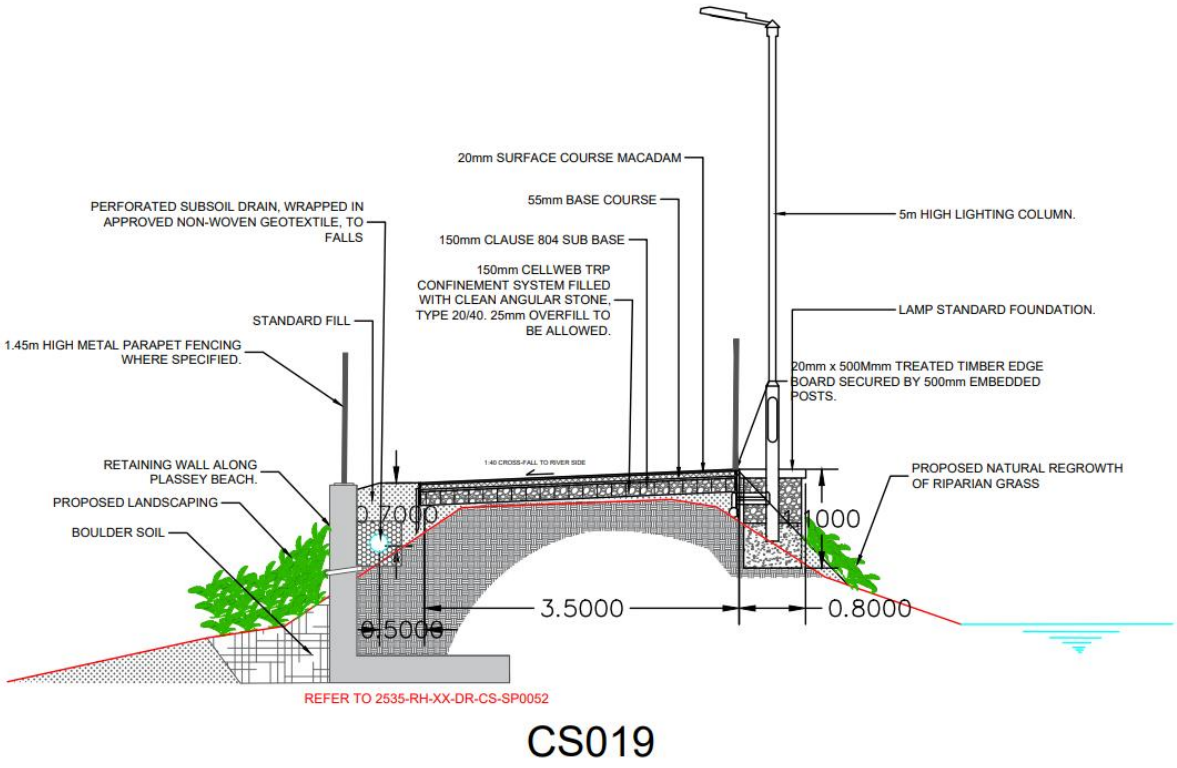

Figure 3-106: Proposed section of retaining wall for ramp at Plassey Beach

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.

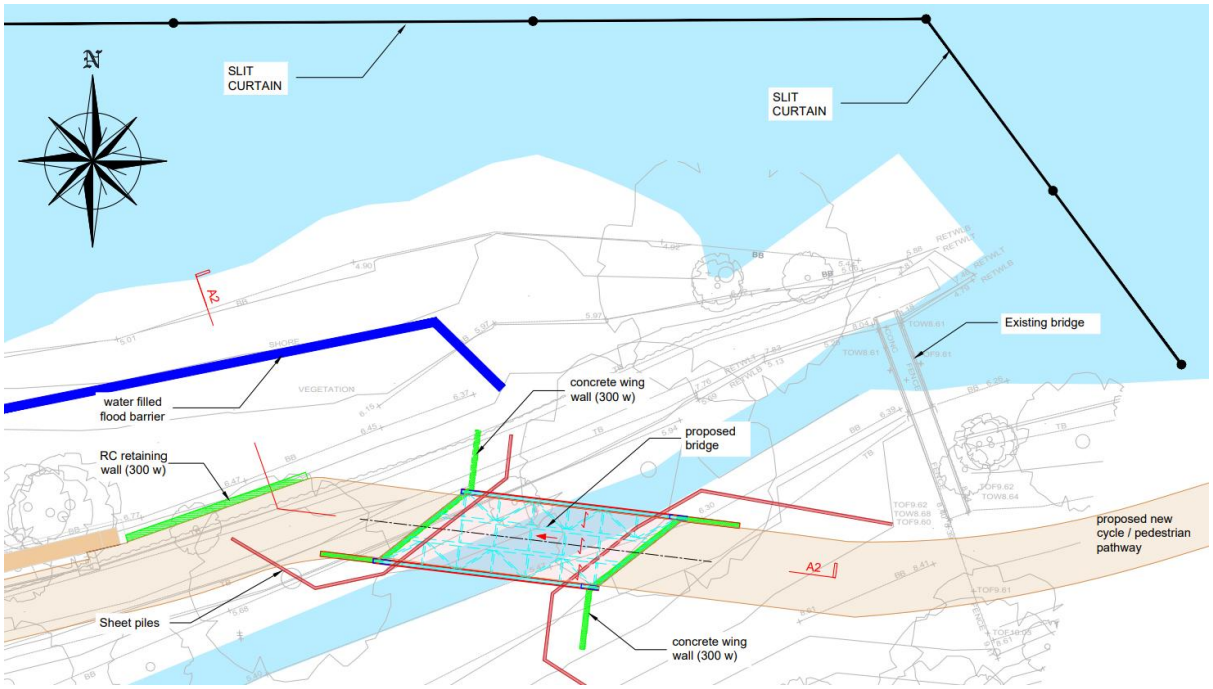

Figure 3-109: Plan of proposed Bridge 5 and proposed Ramp, showing proposed Silt Curtain, Sheet piles and water filled flood barrier (refer to drawing RHA-XX-DR-S-SP0052)

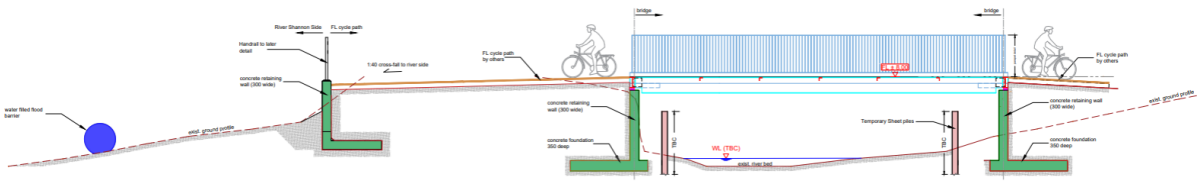

Figure 3-110: Section of retaining wall for proposed Ramp and Abutment walls for proposed Bridge 5 (refer to drawing RHA-XX-DR-S-SP0052)

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

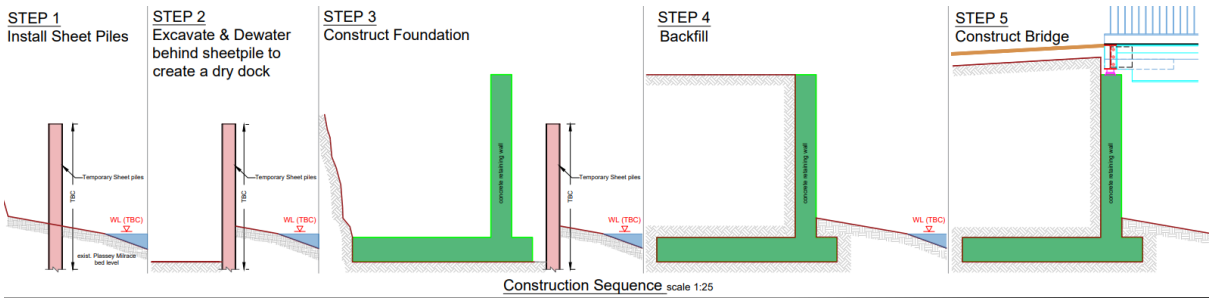

Figure 3-111: Construction sequence for abutment structures to support the steel deck of Bridge 5 (refer to drawing RHA-XX-DR-S-SP0052)

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.

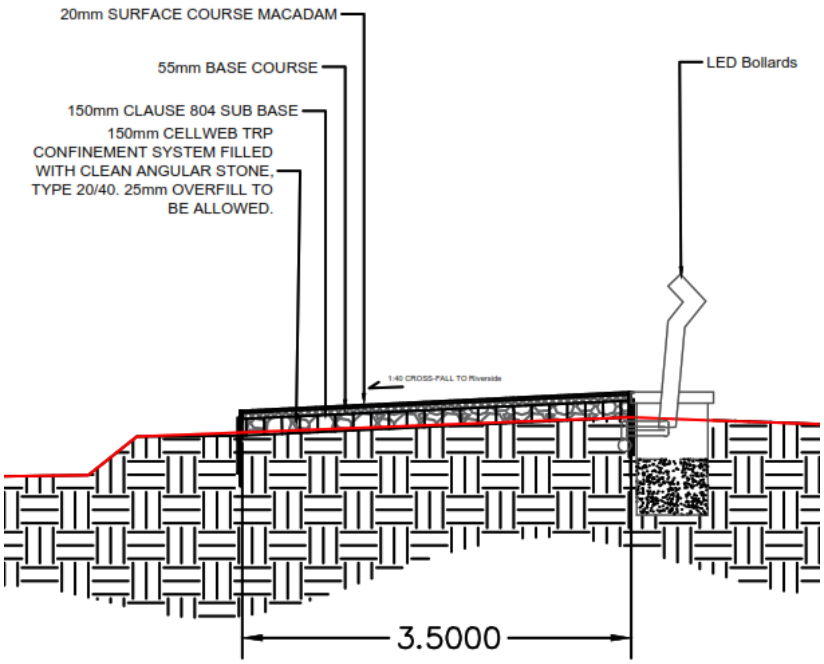

Figure 3-112: Proposed tarmac path and public lighting north of Kilmurray Student Village

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.

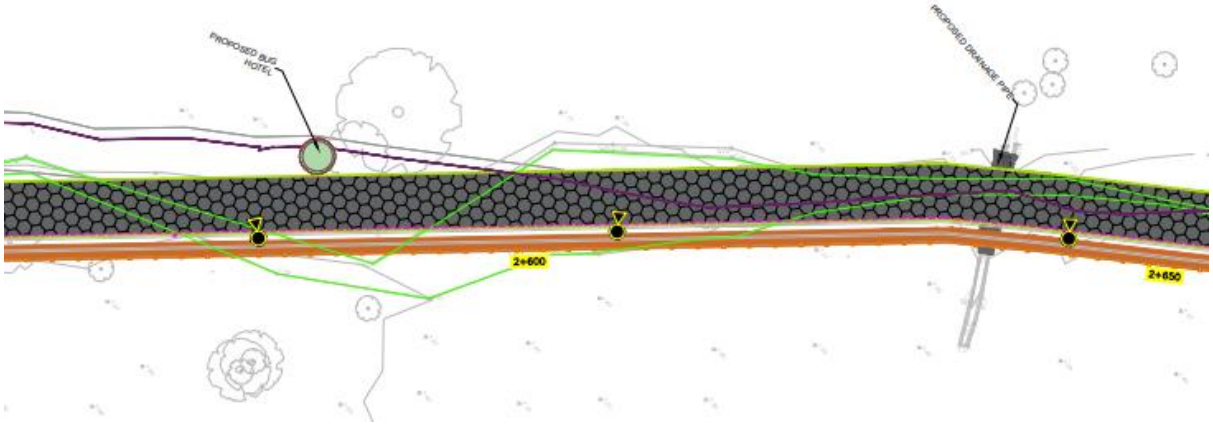

Figure 3-114: Proposed Greenway to replace existing grass desire line

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.

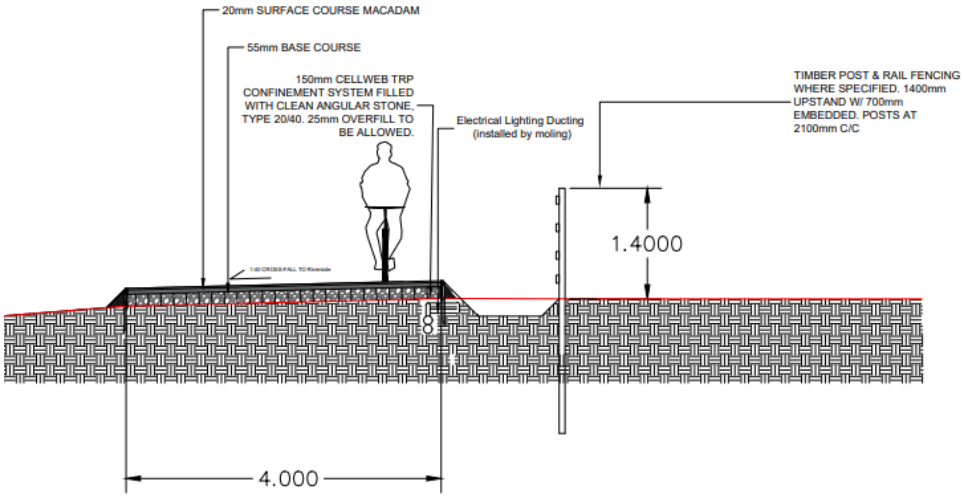

Figure 3-115: Proposed Greenway cross section in green field

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.

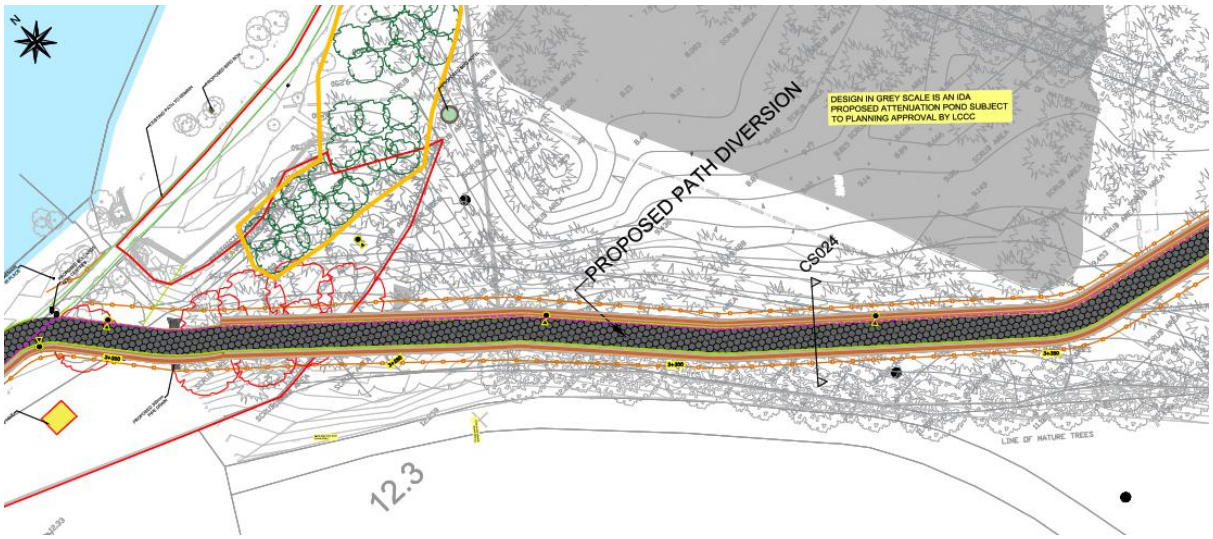

Figure 3-116: Proposed drainage alongside proposed path to manage surface water

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.

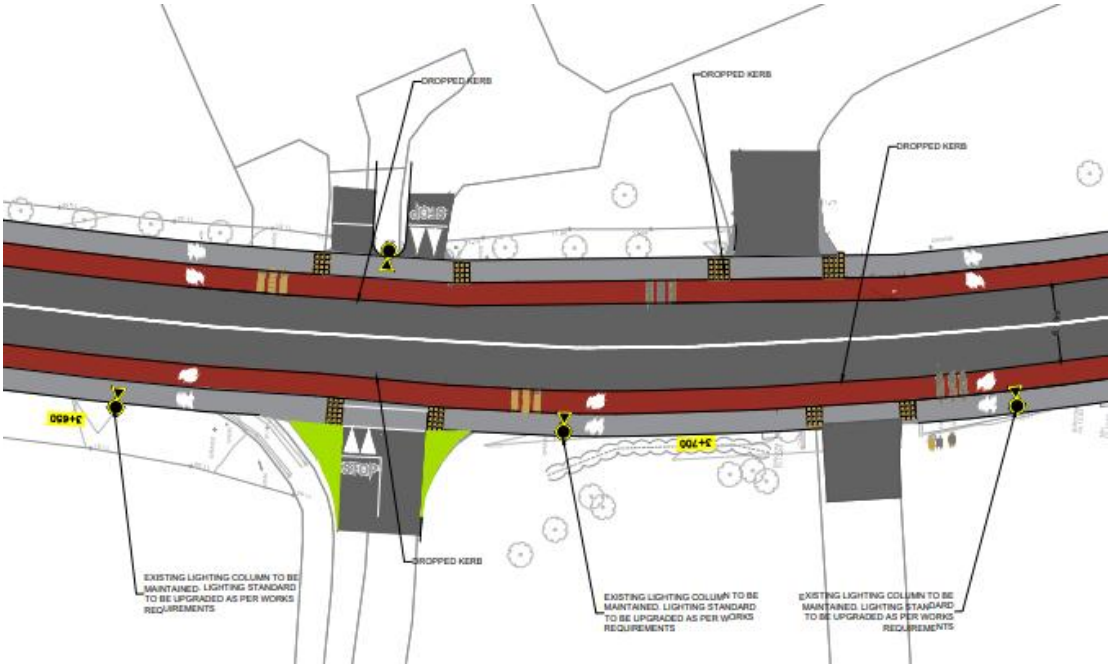

Figure 3-118: Proposed plan for footpaths and cycle lanes alongside McLaughlan Road

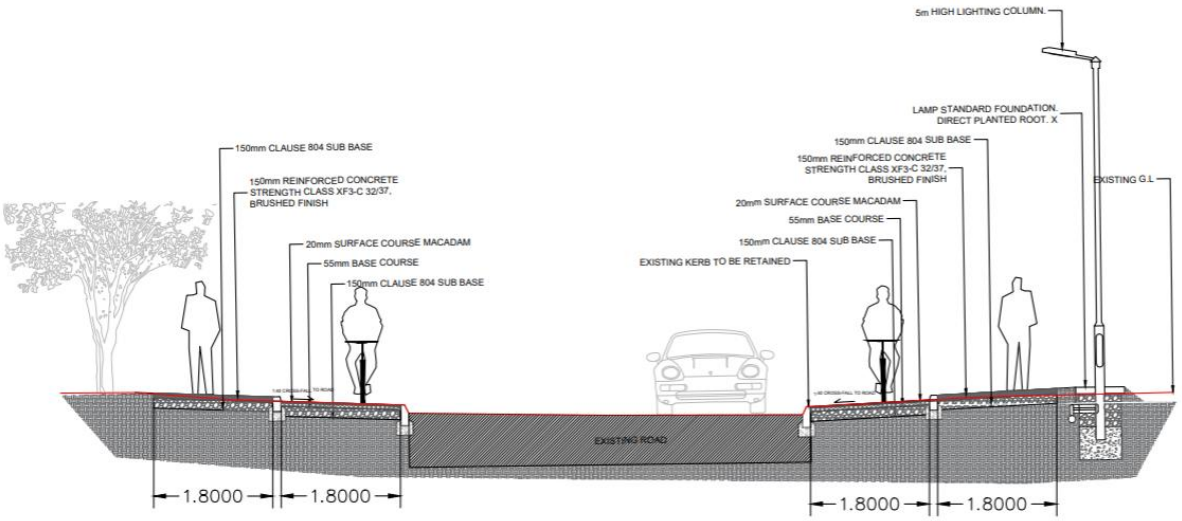

Figure 3-119: Proposed cross section for footpaths and cycle lanes alongside McLaughlan Road

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.

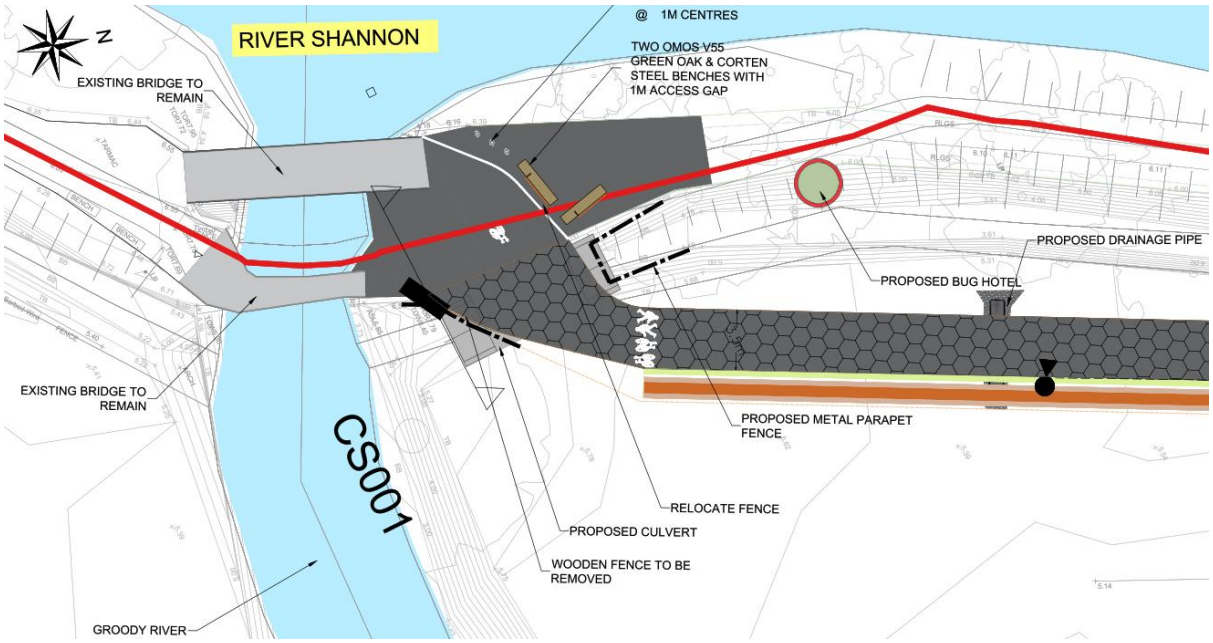

Figure 3-125: proposed amenity/rest area east of Groody Bridge

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.

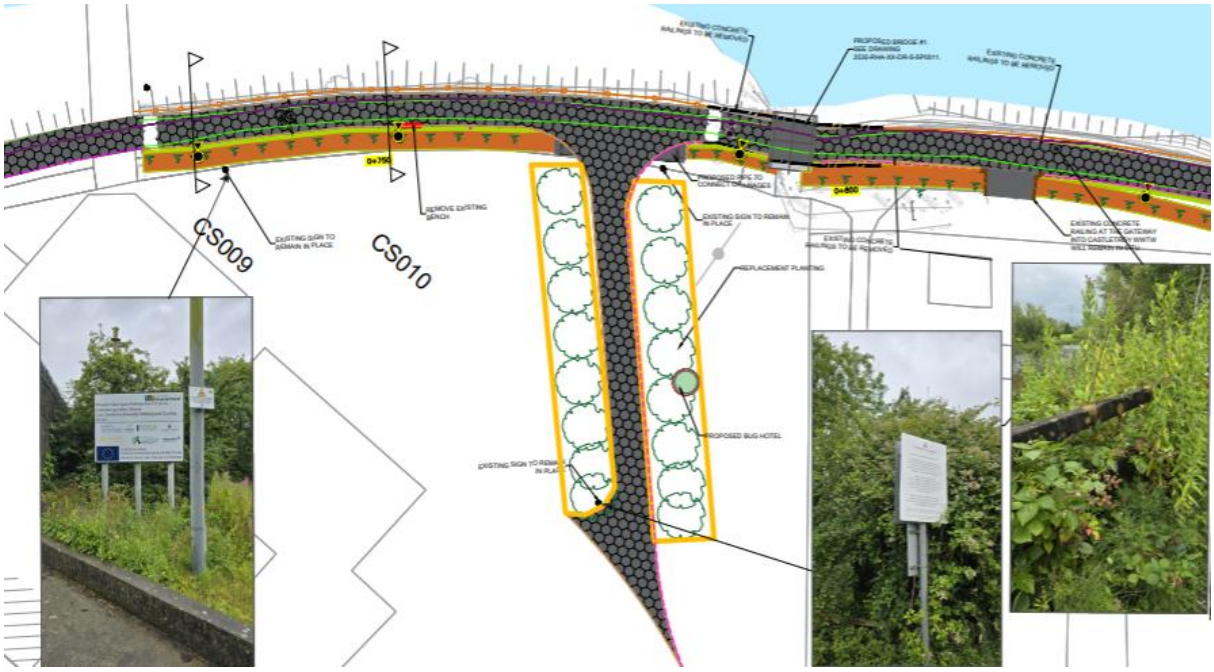

Figure 3-126: Proposed tree planting area west of proposed Bridge 1

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.

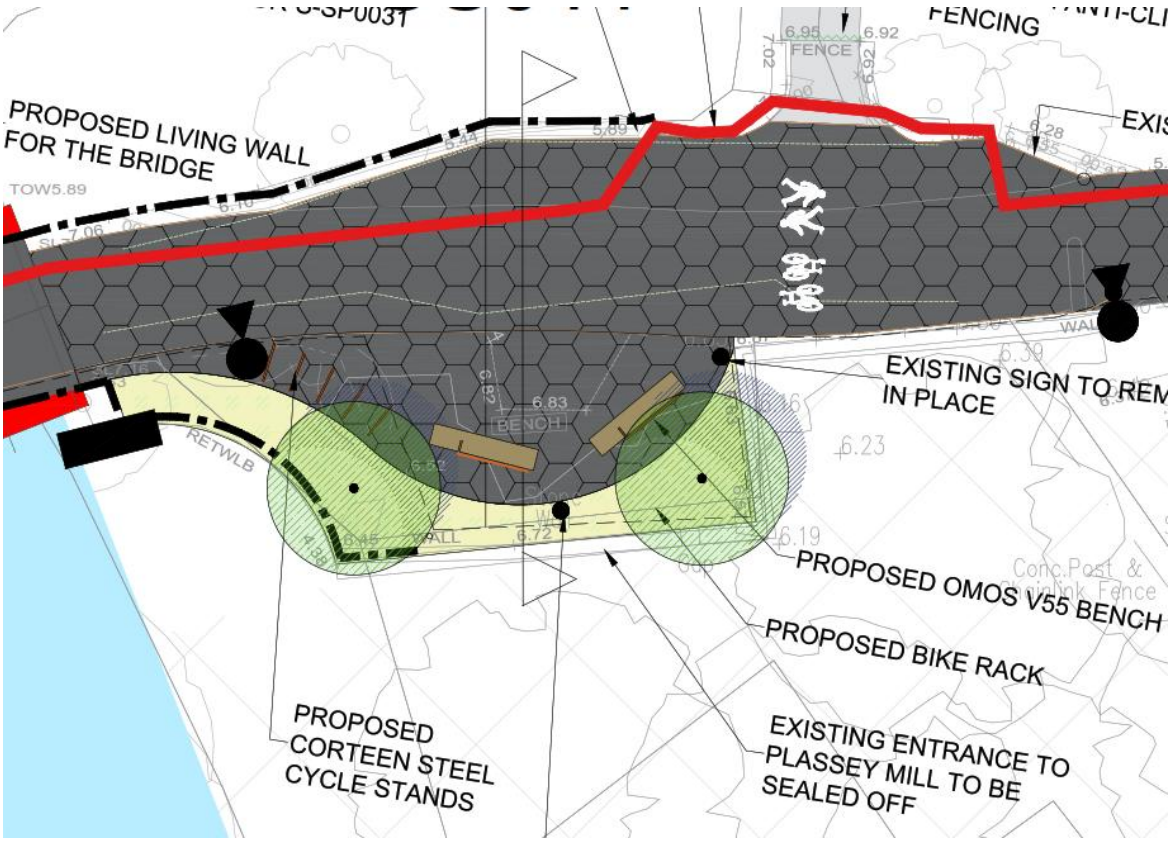

Figure 3-127: Proposed amenity/rest area at Plassey Mills

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.

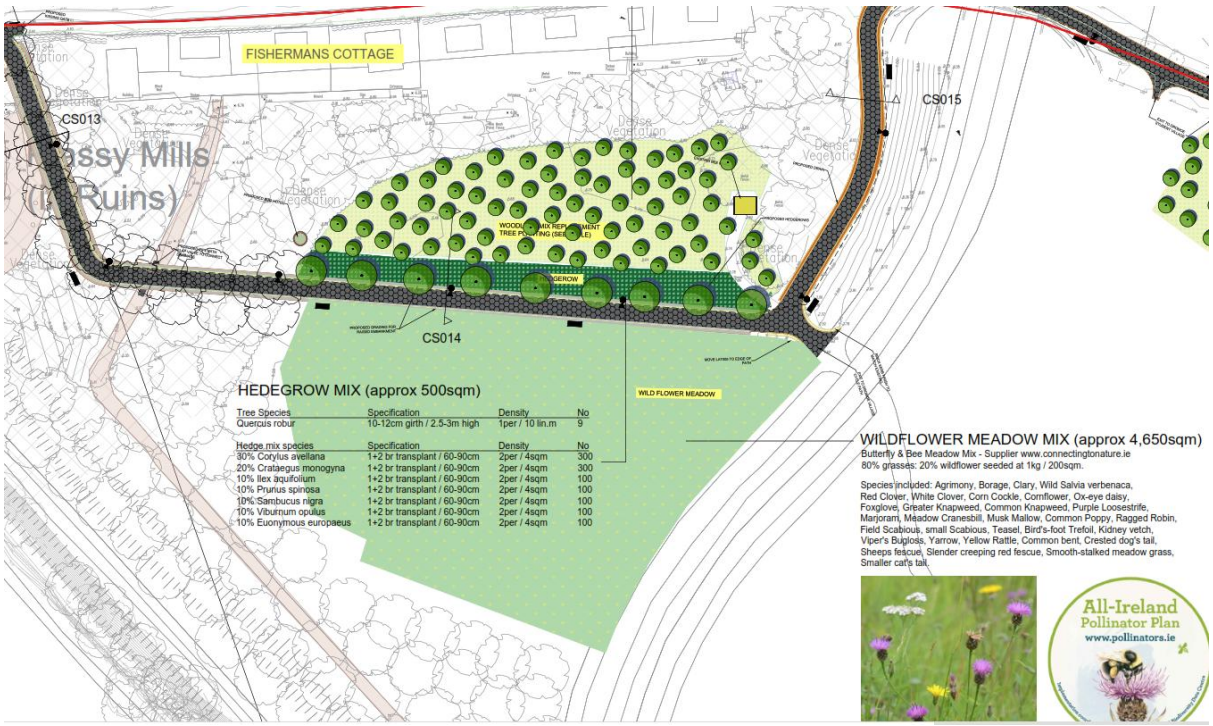

Figure 3-128: Proposed landscaping south of the Fisherman cottages

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.

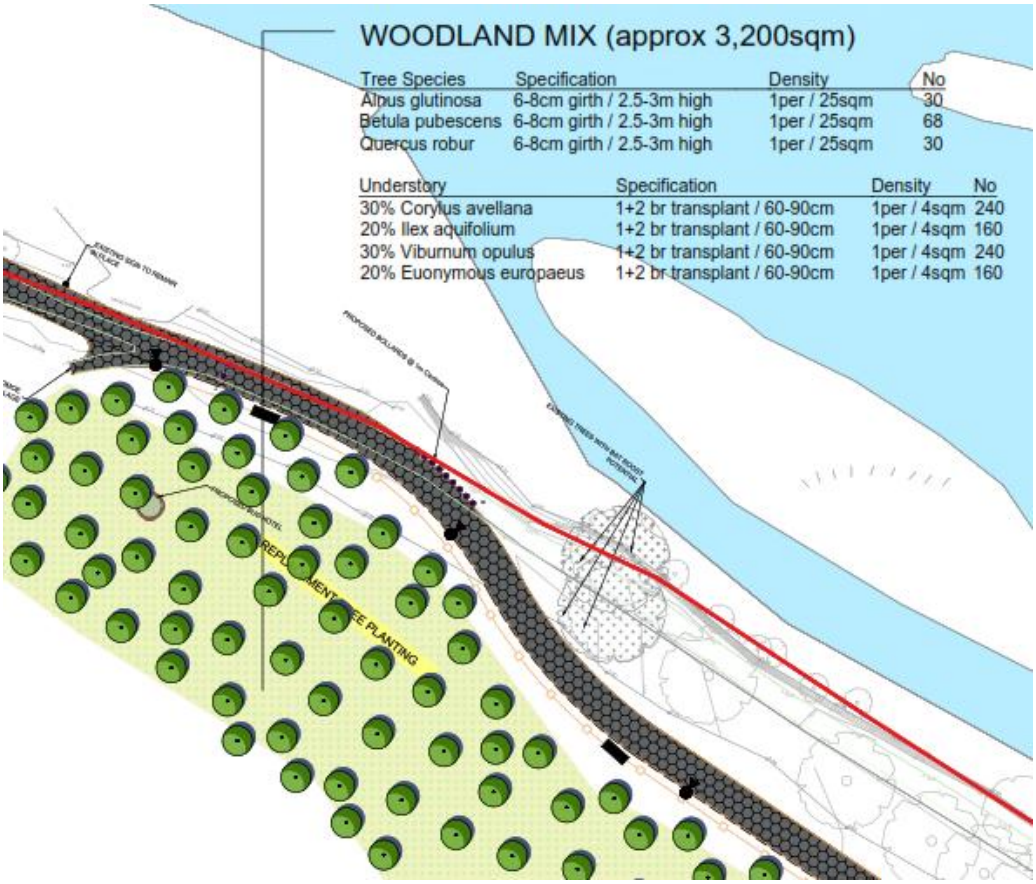

Figure 3-129: Proposed tree planting area north of Dromroe Student Village

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.

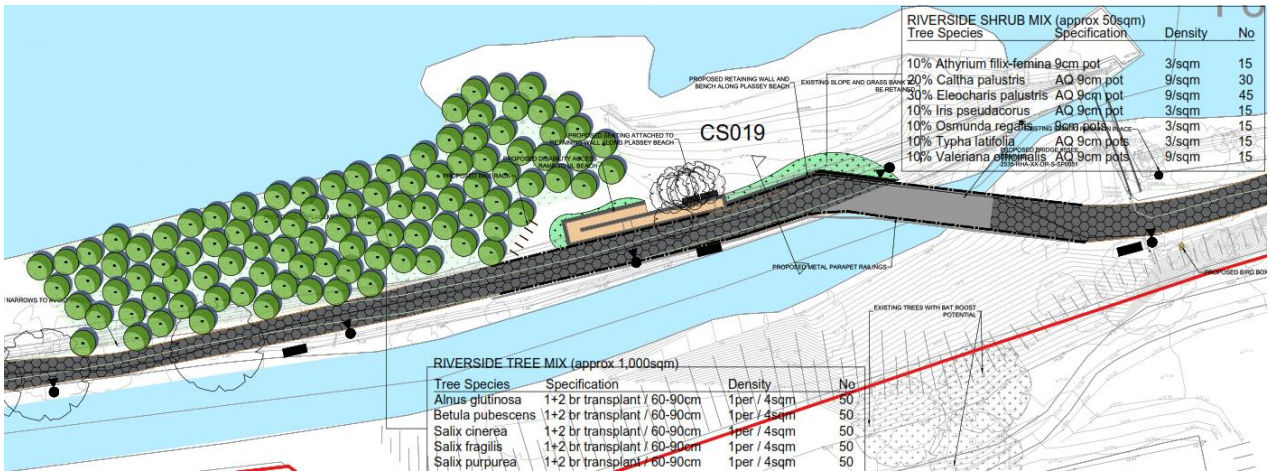

Figure 3-130: Proposed native Irish trees and new riverside shrubs at Plassey Beach

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.

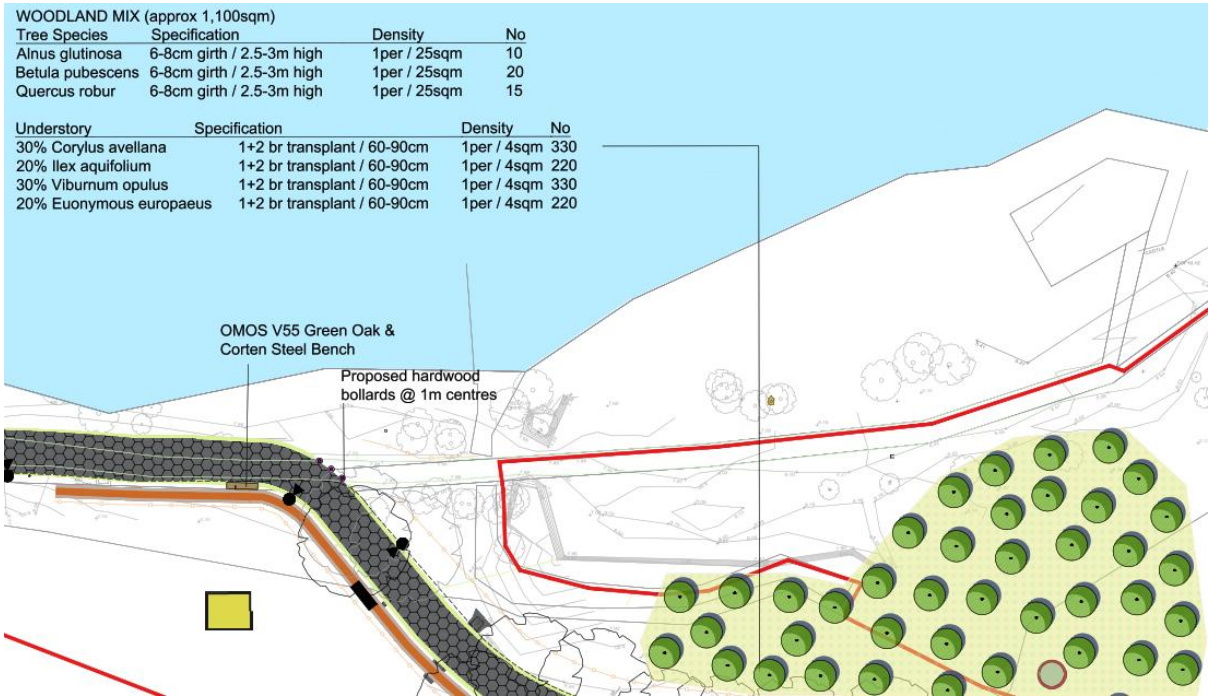

Figure 3-131: Proposed replacement tree planting east of Cook Medical

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.

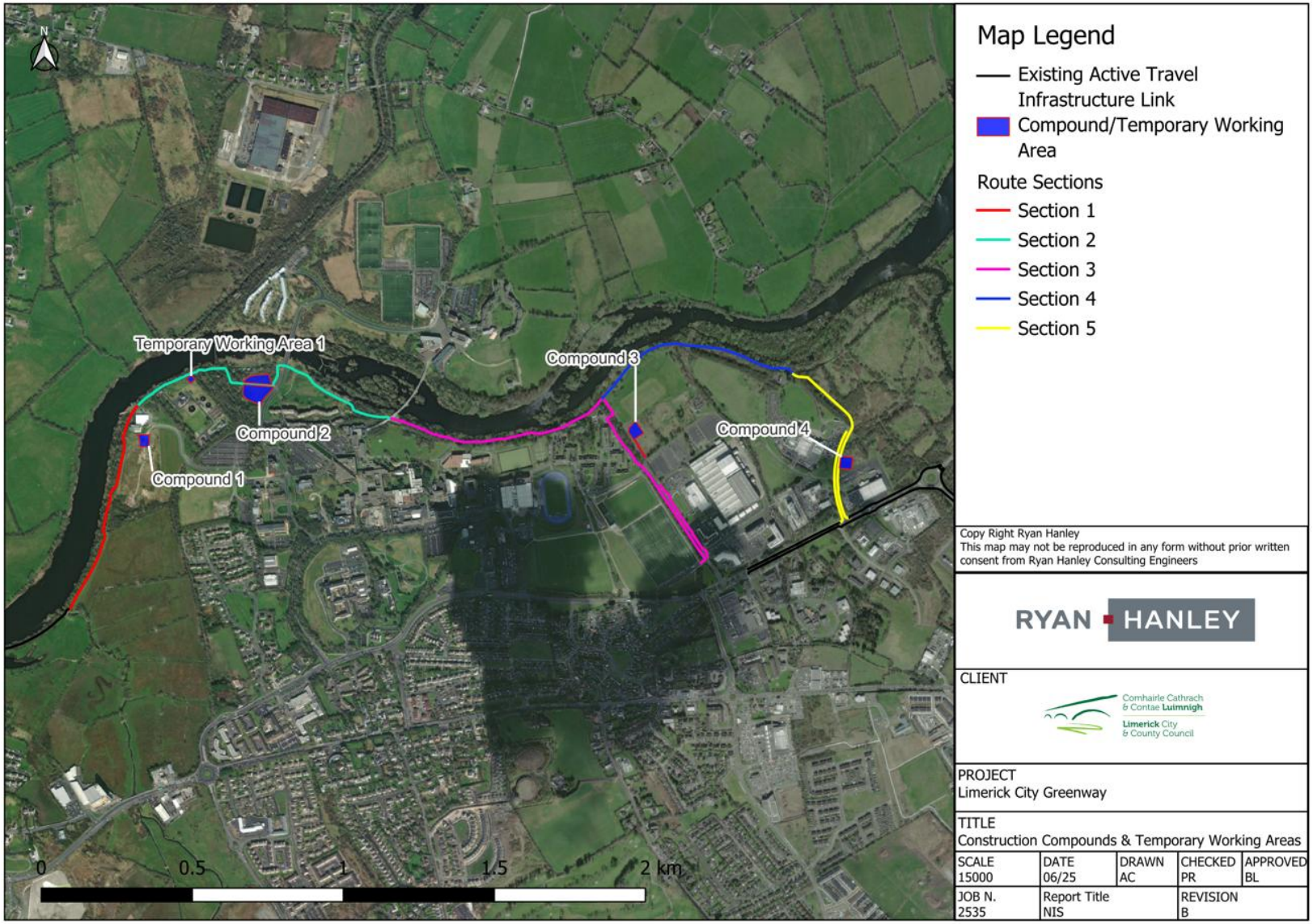

Figure 3-134: Proposed Sections, Compounds and Temporary Working area

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.

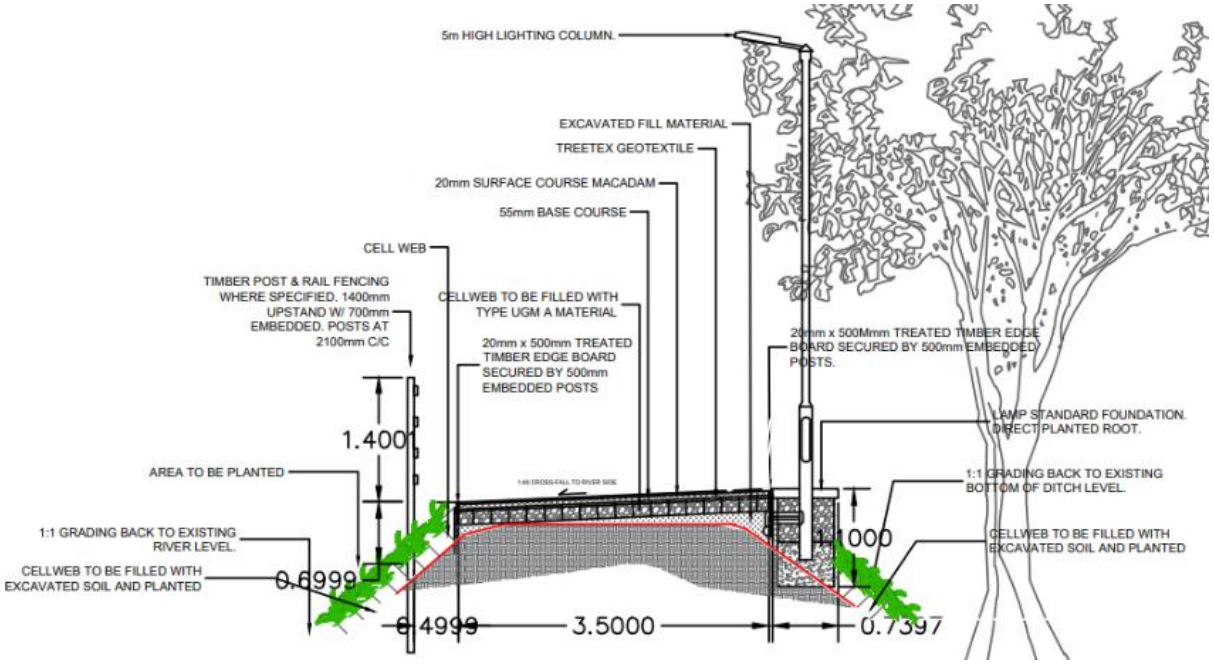

Figure 3-135: Tree root protection along proposed Greenway (Red line is existing ground level)

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)

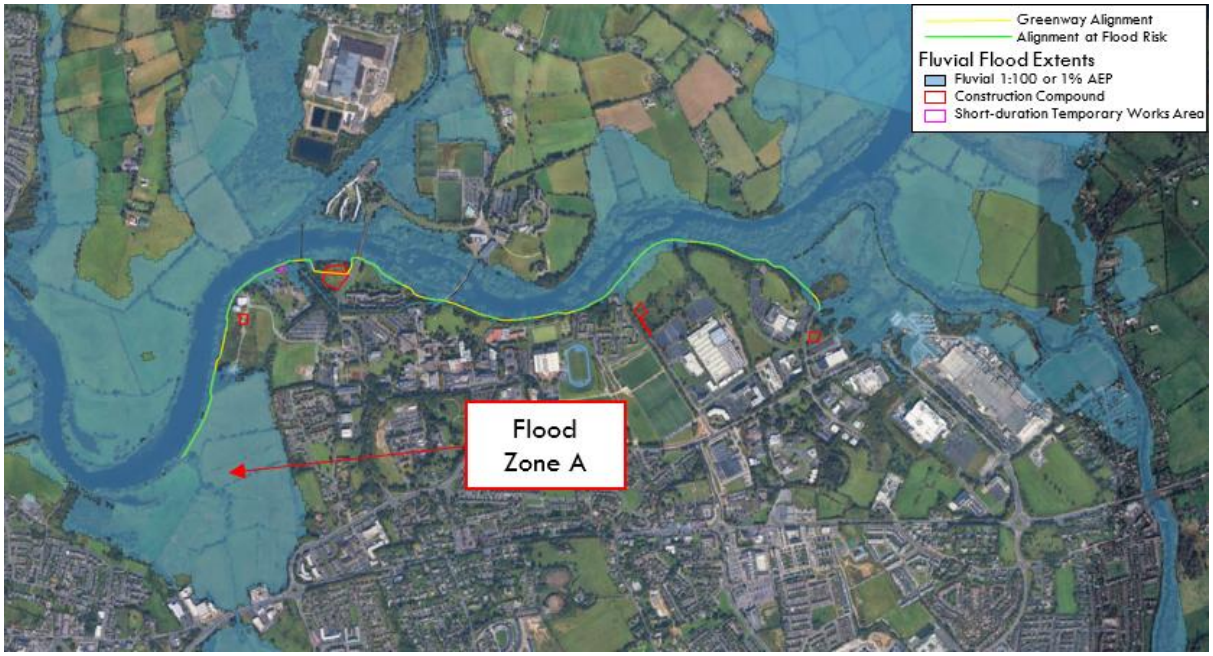

Figure 3-138: Sections of Greenway at Flood Risk (1 in 100 or 1% AEP)

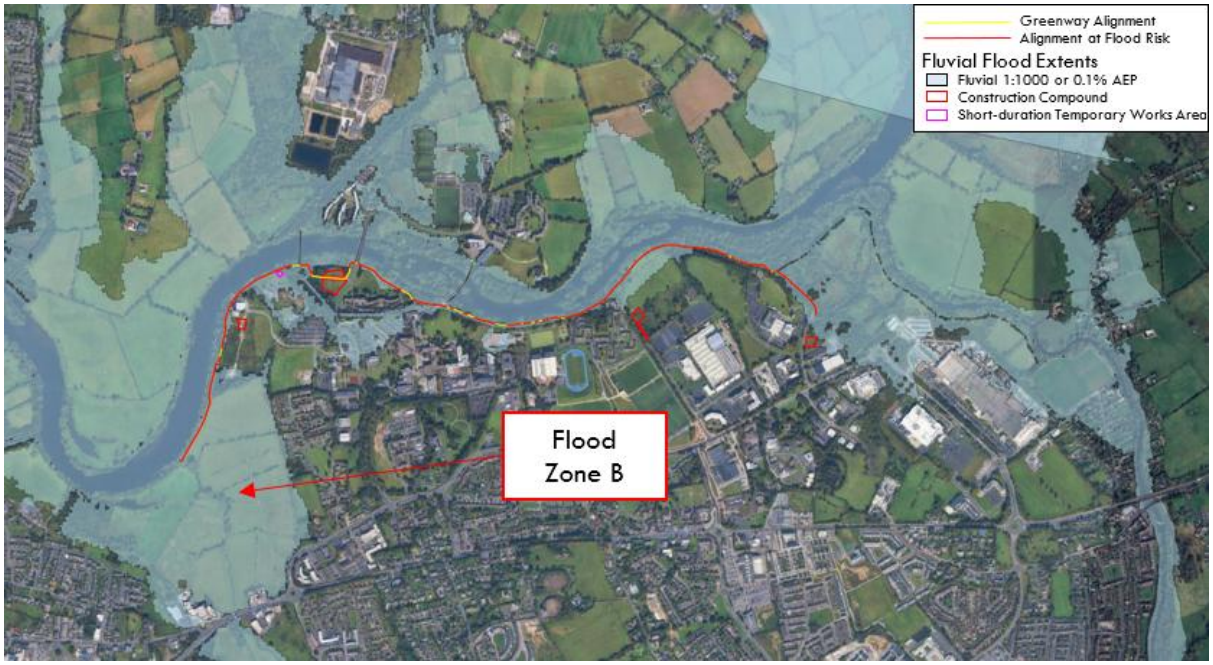

Figure 3-139: Sections of Greenway at Flood Risk (1 in 1000 or 0.1% AEP)

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 2025 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.

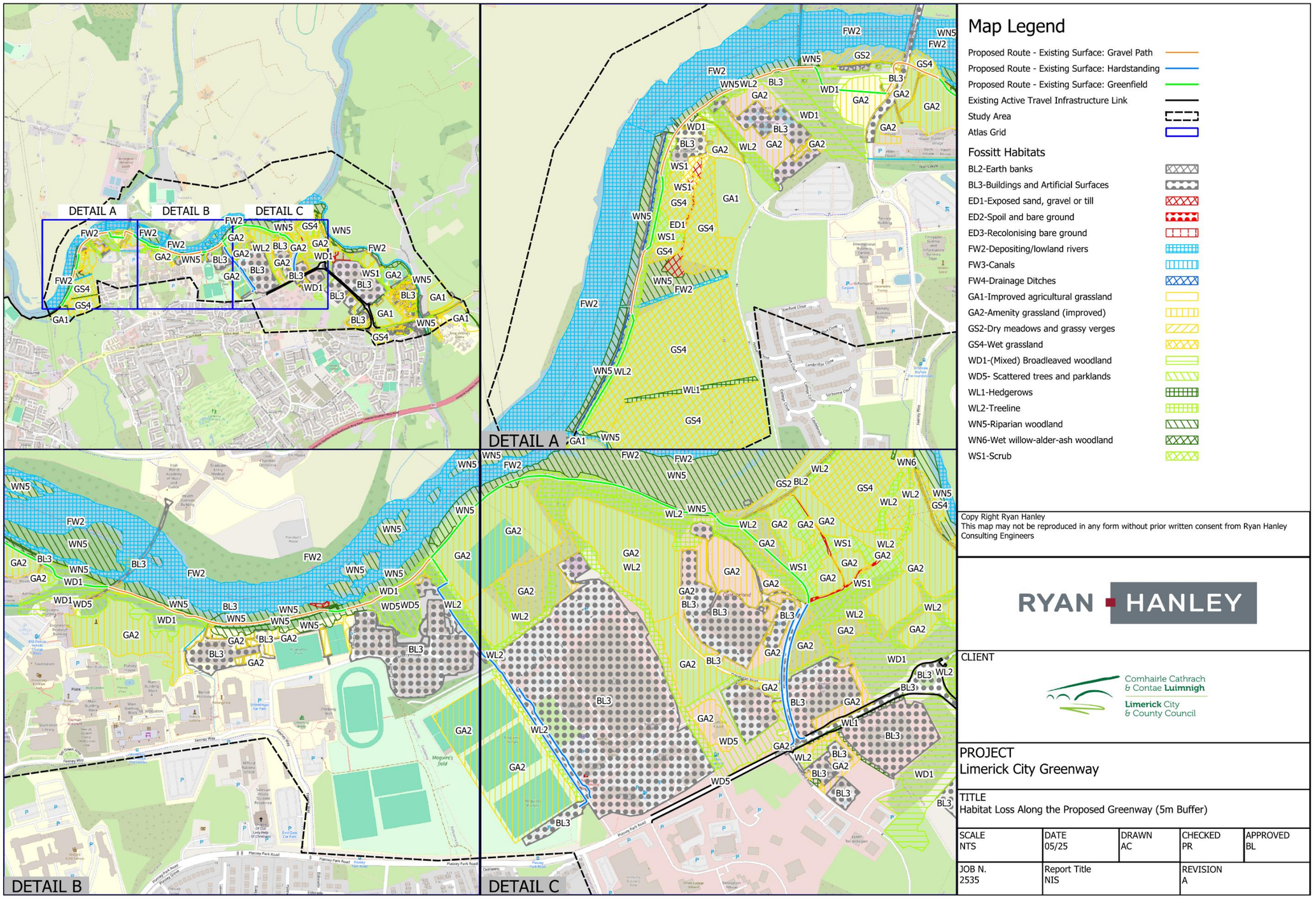

Figure 4.1 Fossitt habitats recorded within the study area of the greenway

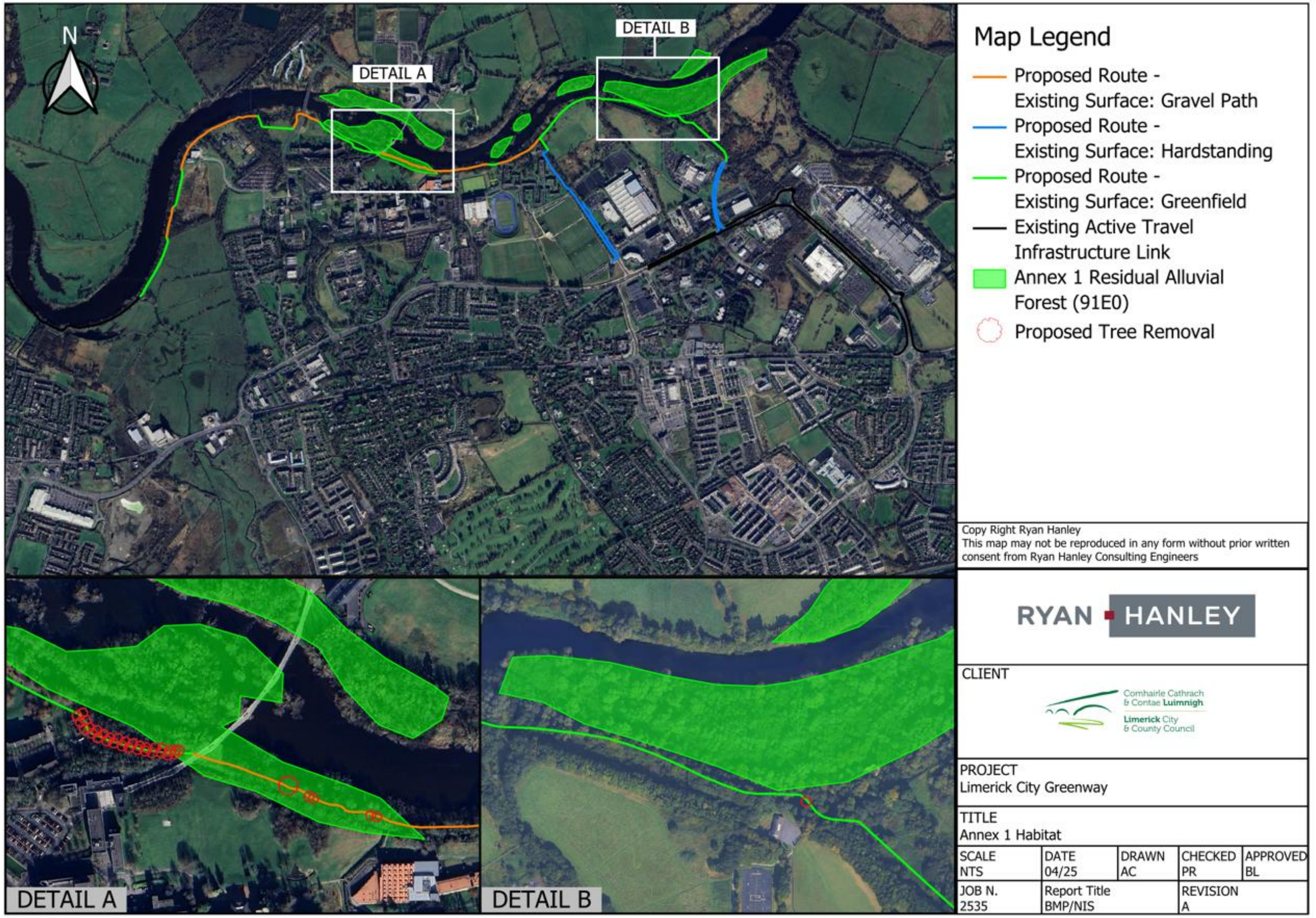

Figure 4.2 Annex I habitat presence in the proximity of the proposed works

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, 2024 and 2025. 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, July 2024, and August 2025, 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

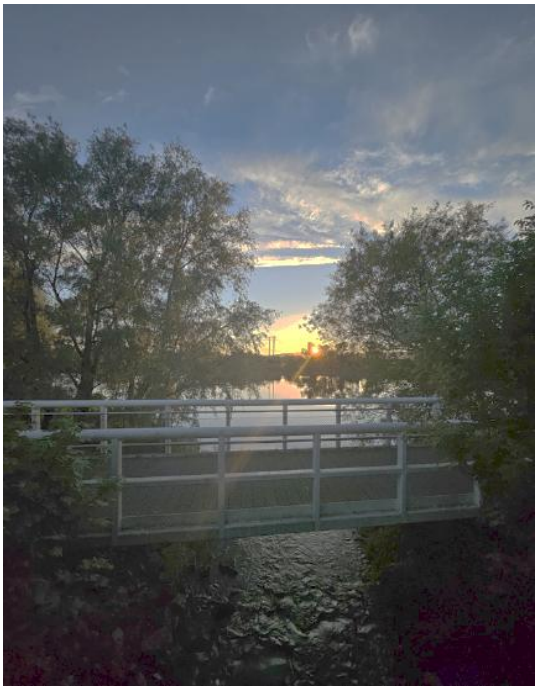

Plate 4-8: Bridge over the Groody River, west end of the proposed greenway

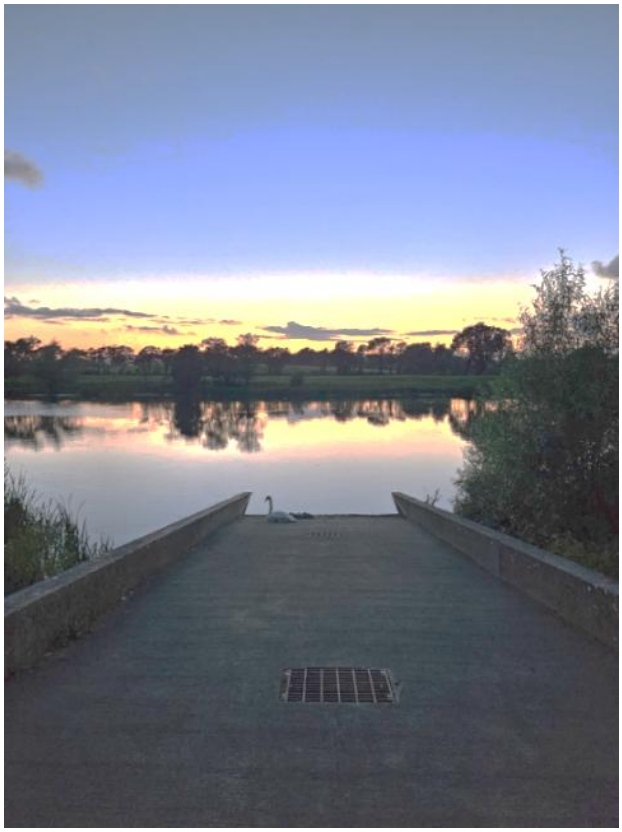

Plate 4-9: UL Pontoon into the River Shannon

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		

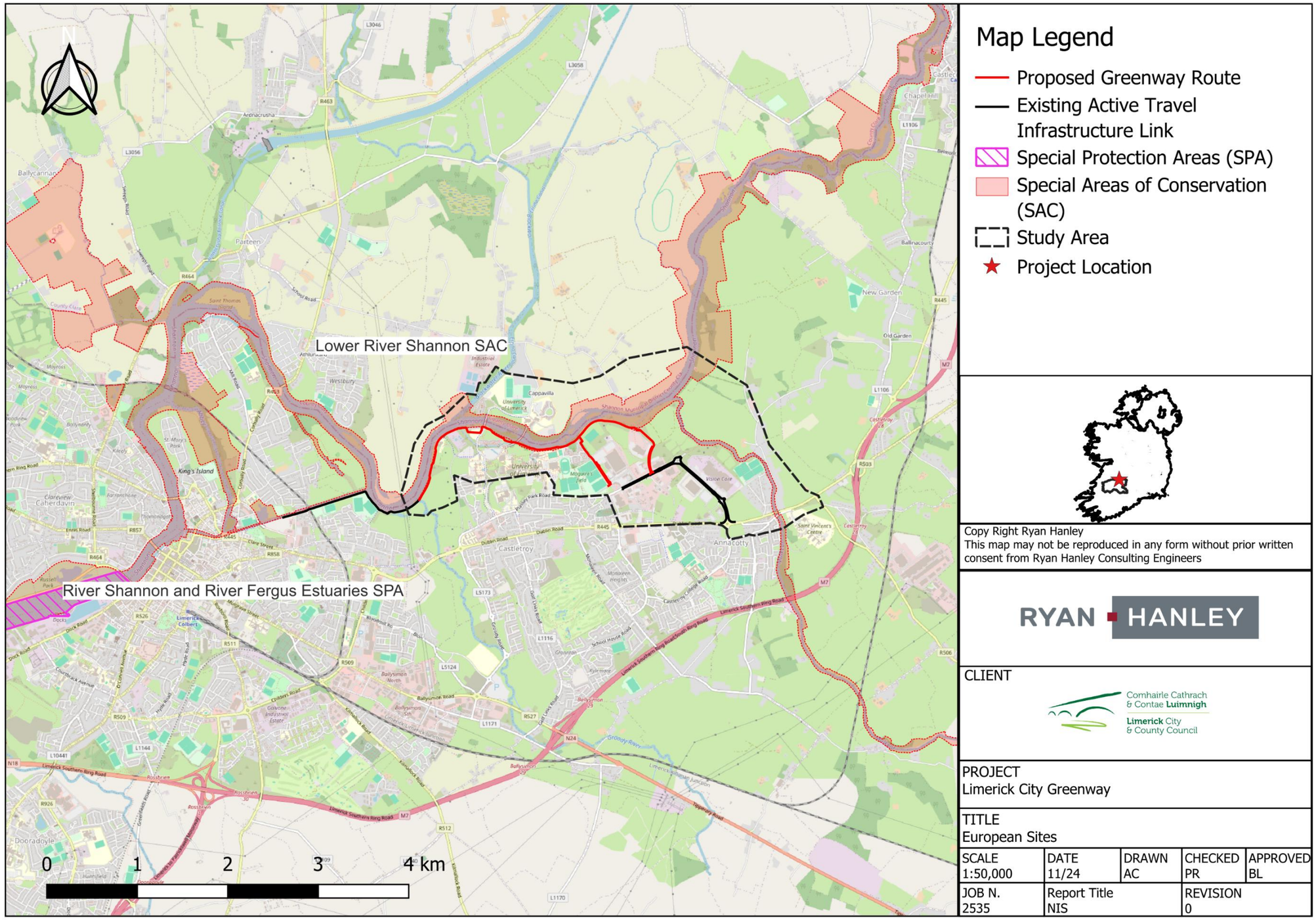

Figure 5.1 European site in the study area of the proposed works

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.

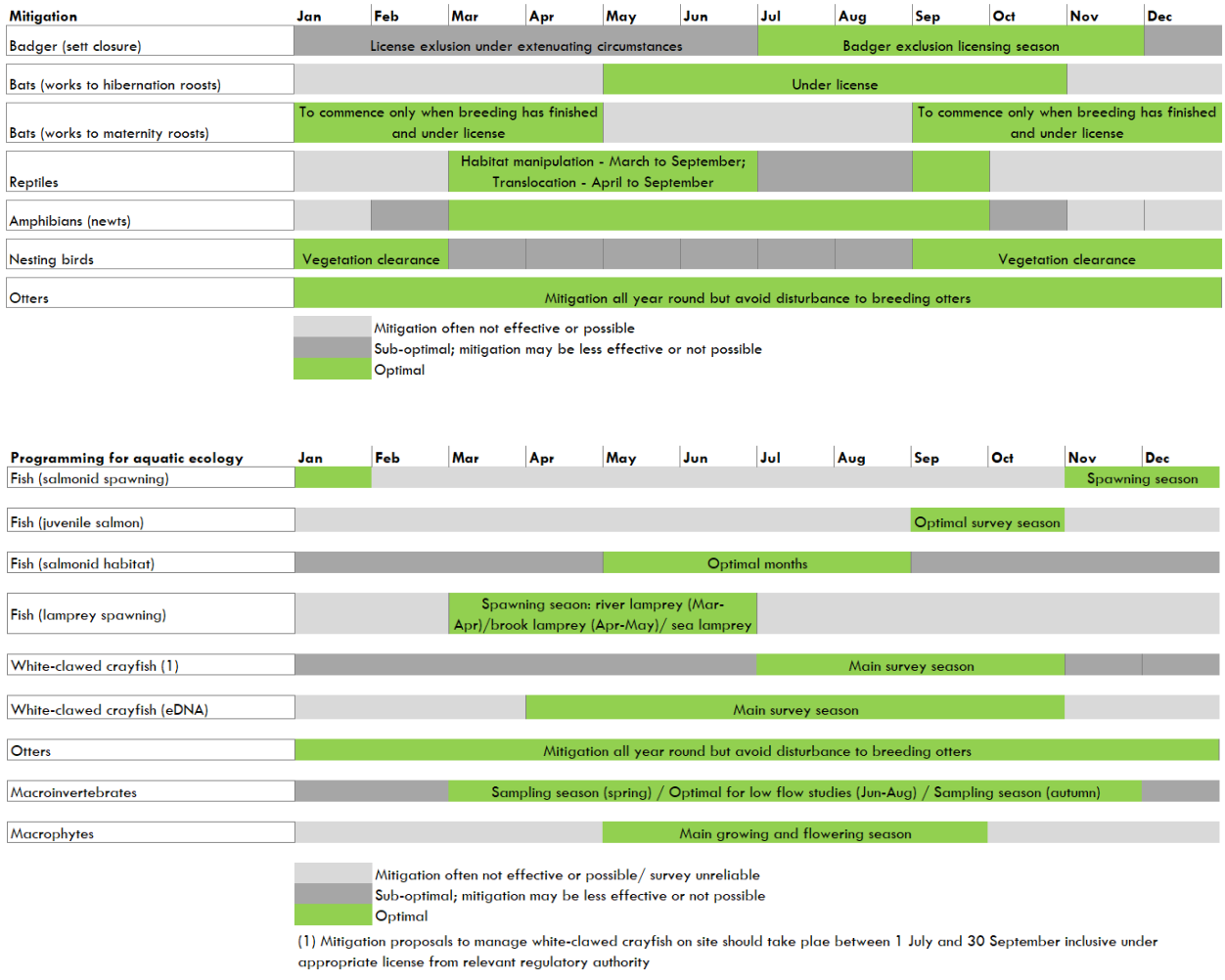

Figure 6.1 Mitigation timing - ecological calendar

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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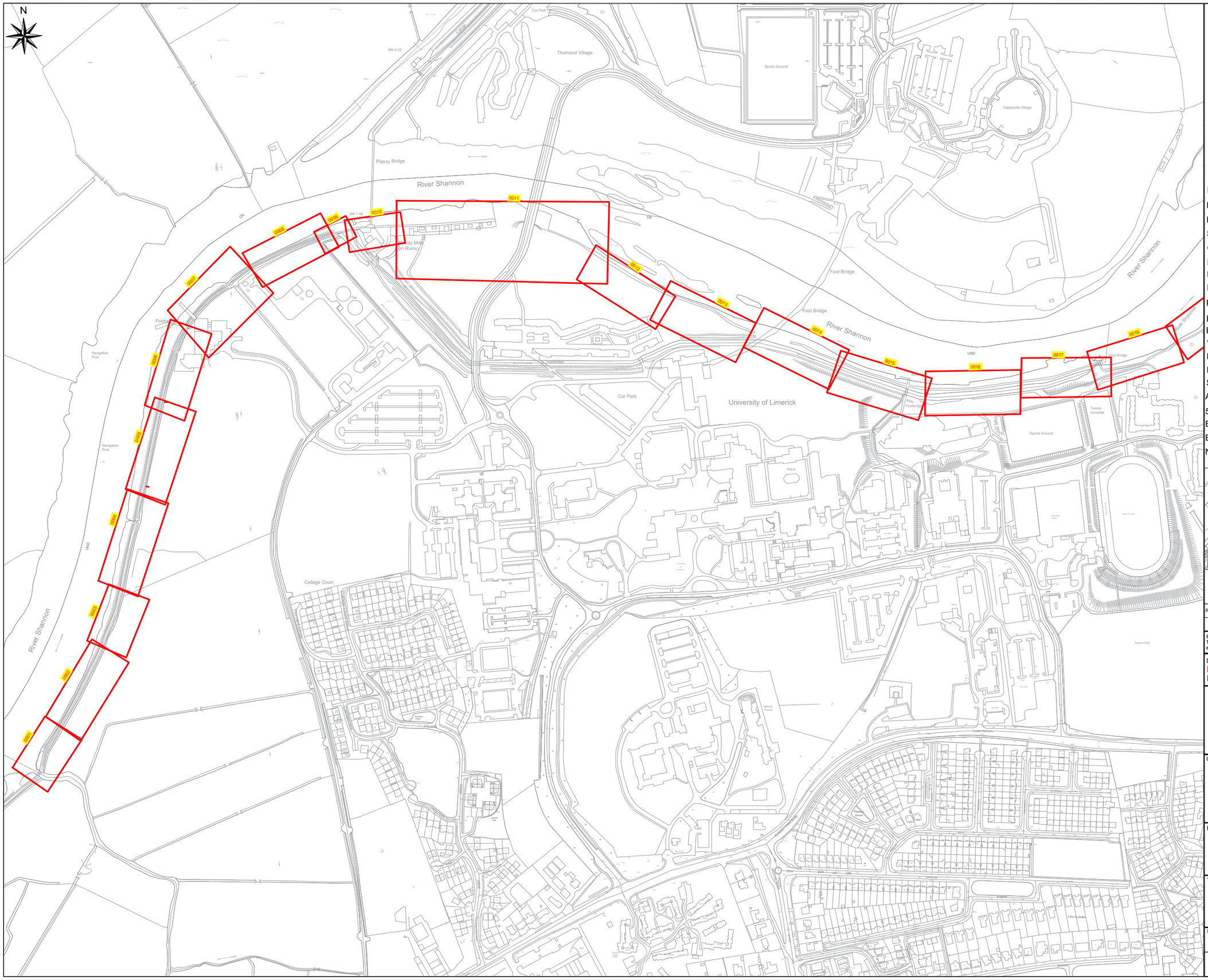
Appendix A

Preliminary Design Drawings



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Legend

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- Footpath
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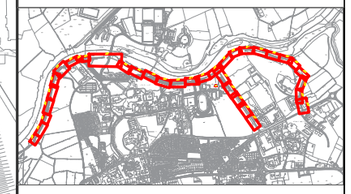
- Structural Bridge/Deck
- Cycle Lane
- Proposed Raised Table
- Proposed Corduroy Tactile Paving
- Proposed Blister Tactile Paving
- Proposed Grading
- Proposed Drain
- Existing Path
- Wooden Post & Rail Fencing
- Metal Parapet
- Electrical Ducting for Lighting
- SAC Boundary Line
- Area for Replacement Tree Planting
- 5m High Lighting Column
- Existing Tree - To Be Retained
- Existing Tree - To Be Removed
- New Tree - To Be Planted



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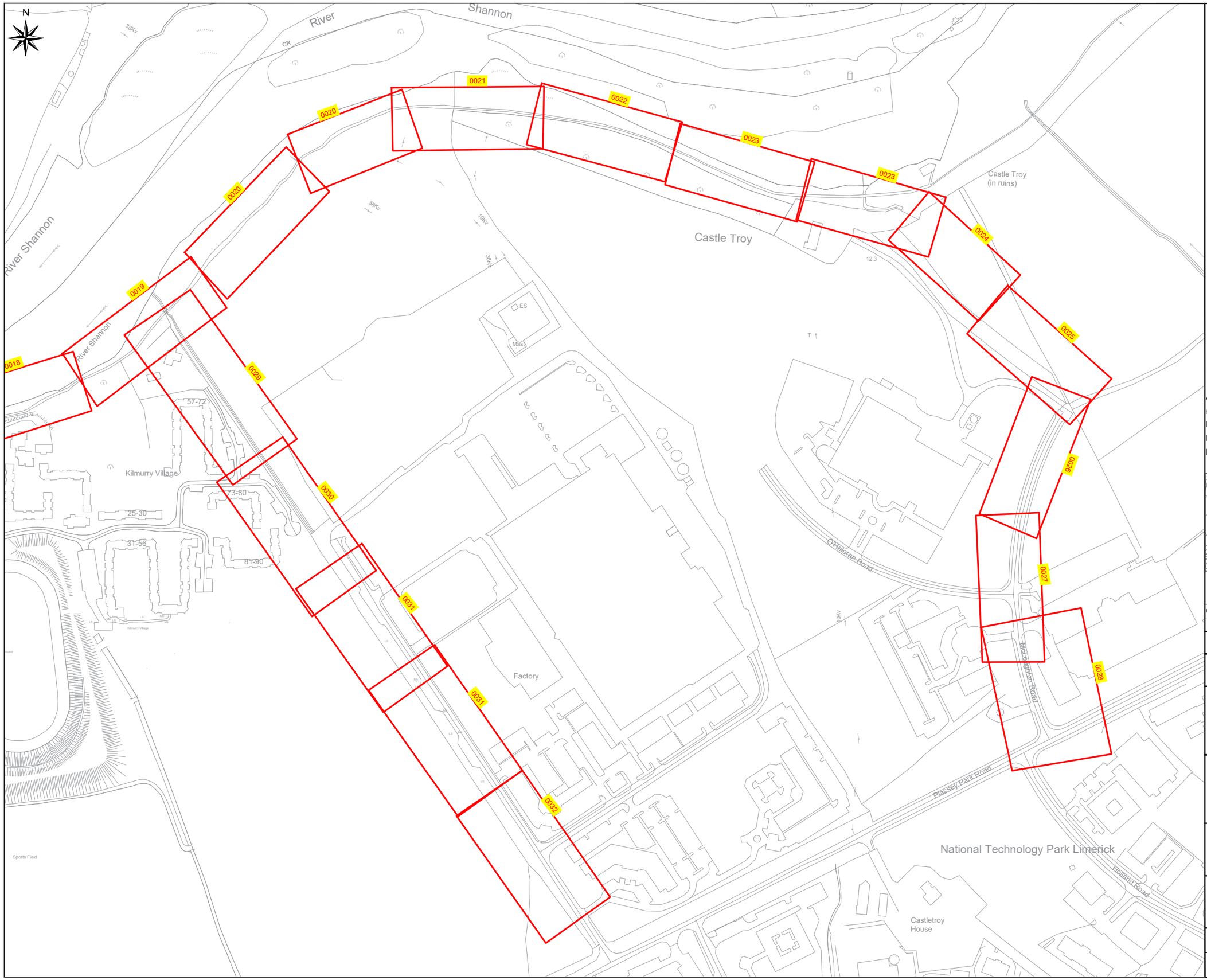

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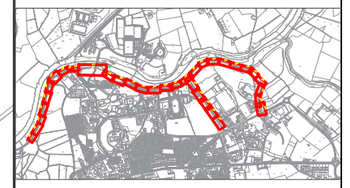

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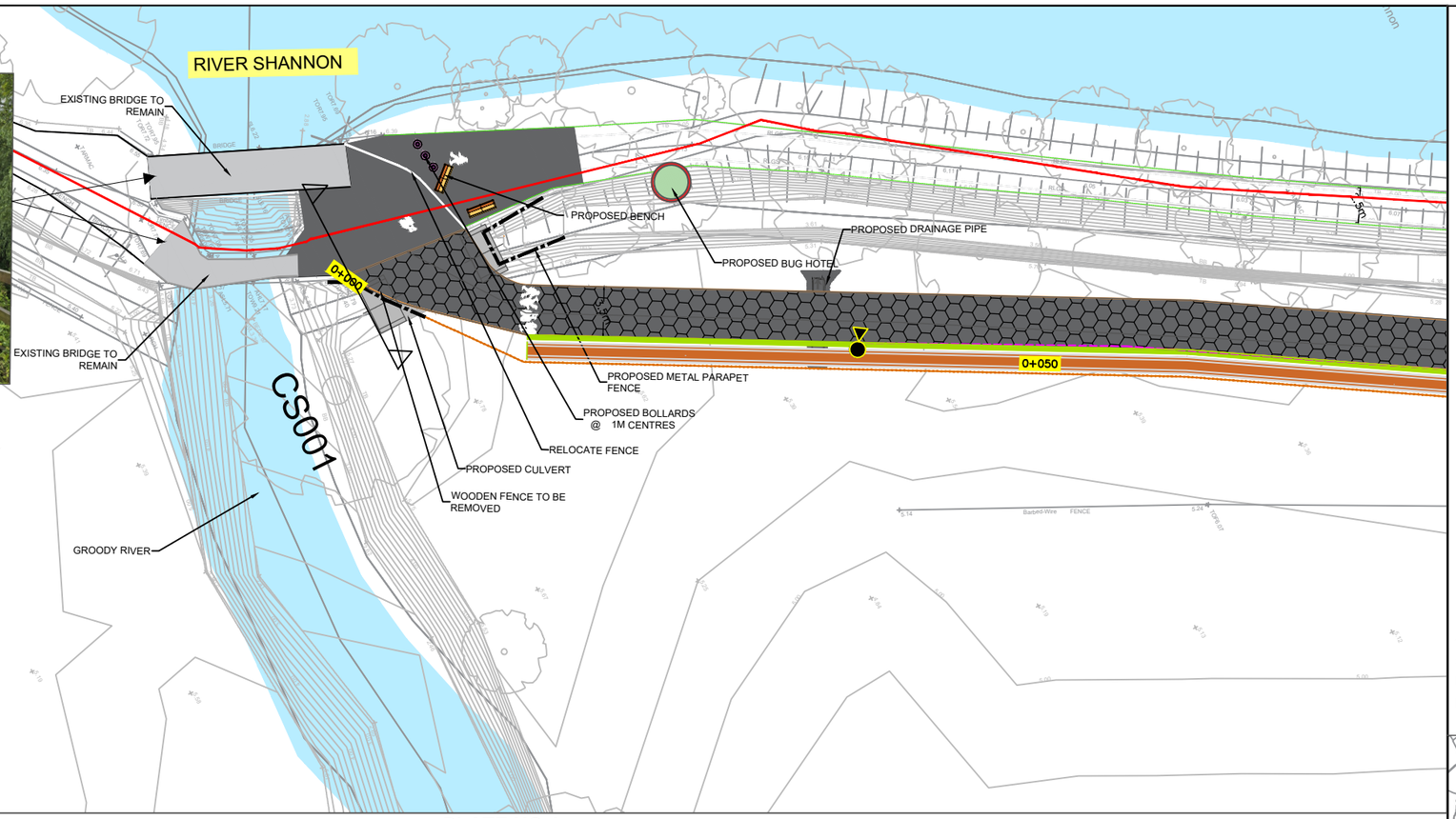

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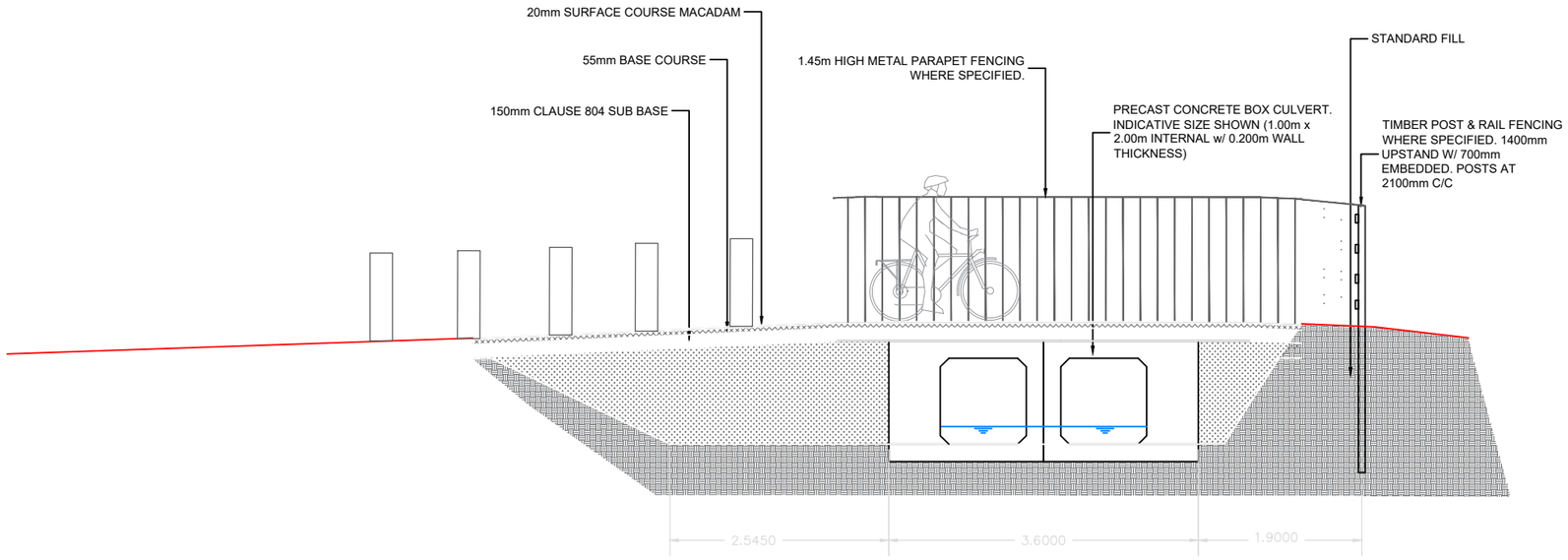

CS001

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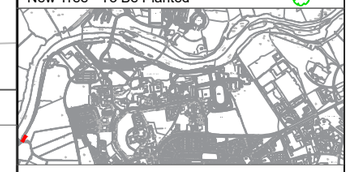

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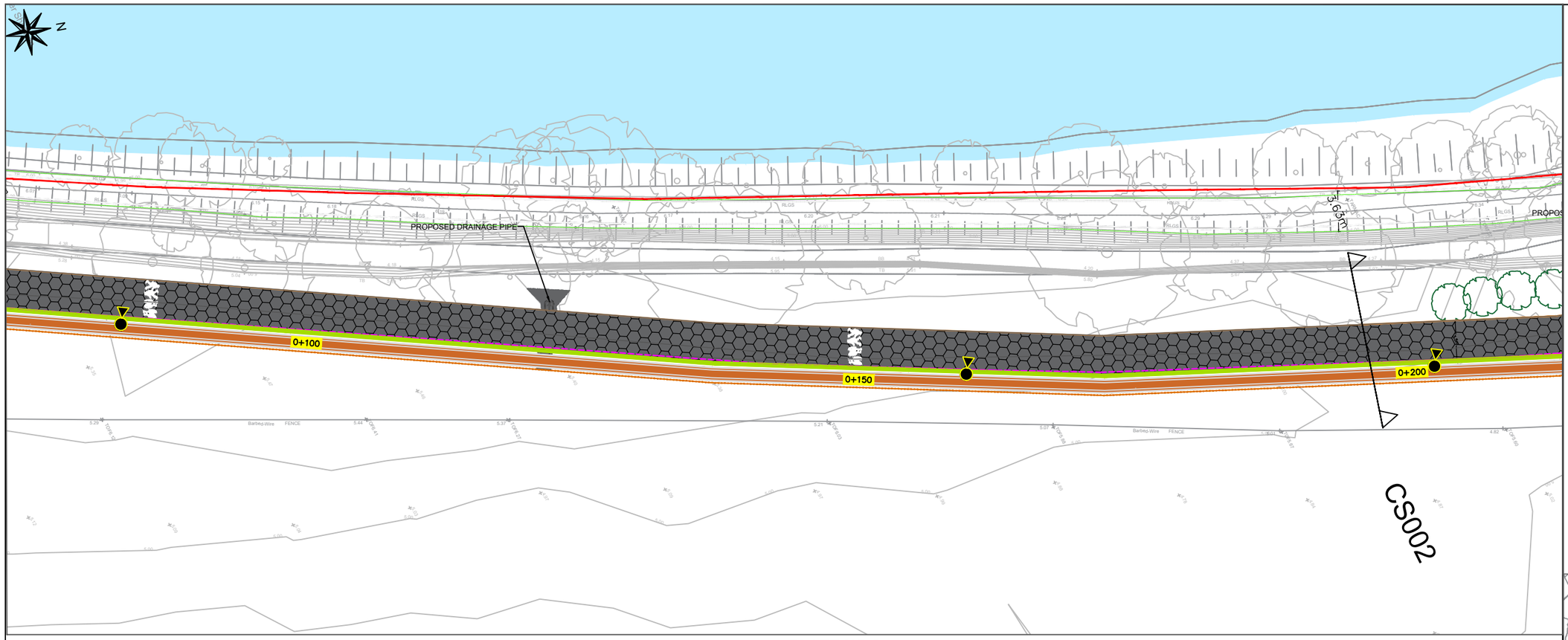

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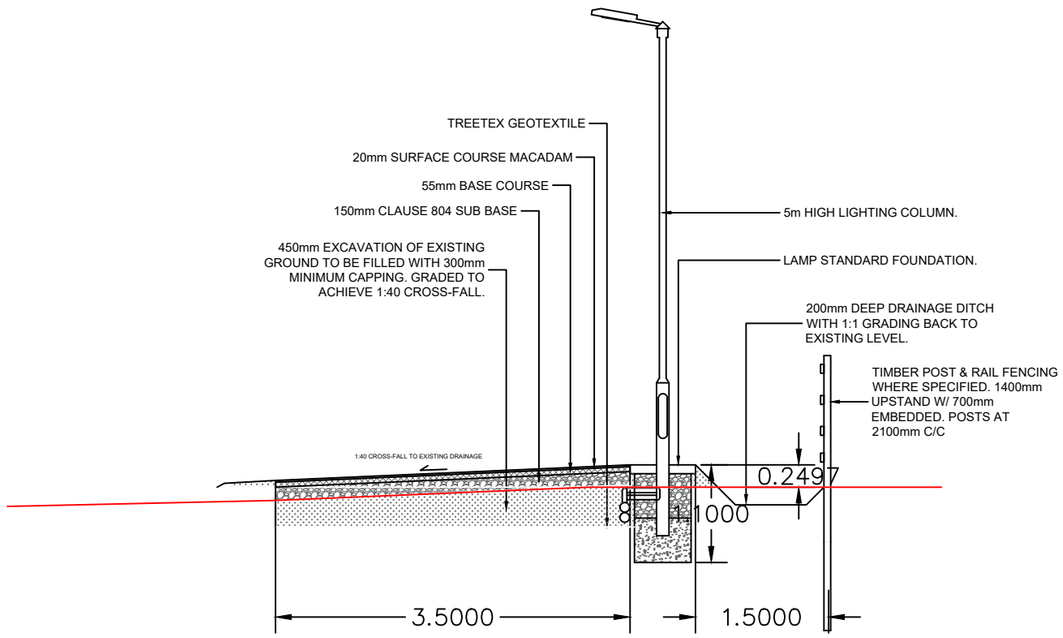

CS002

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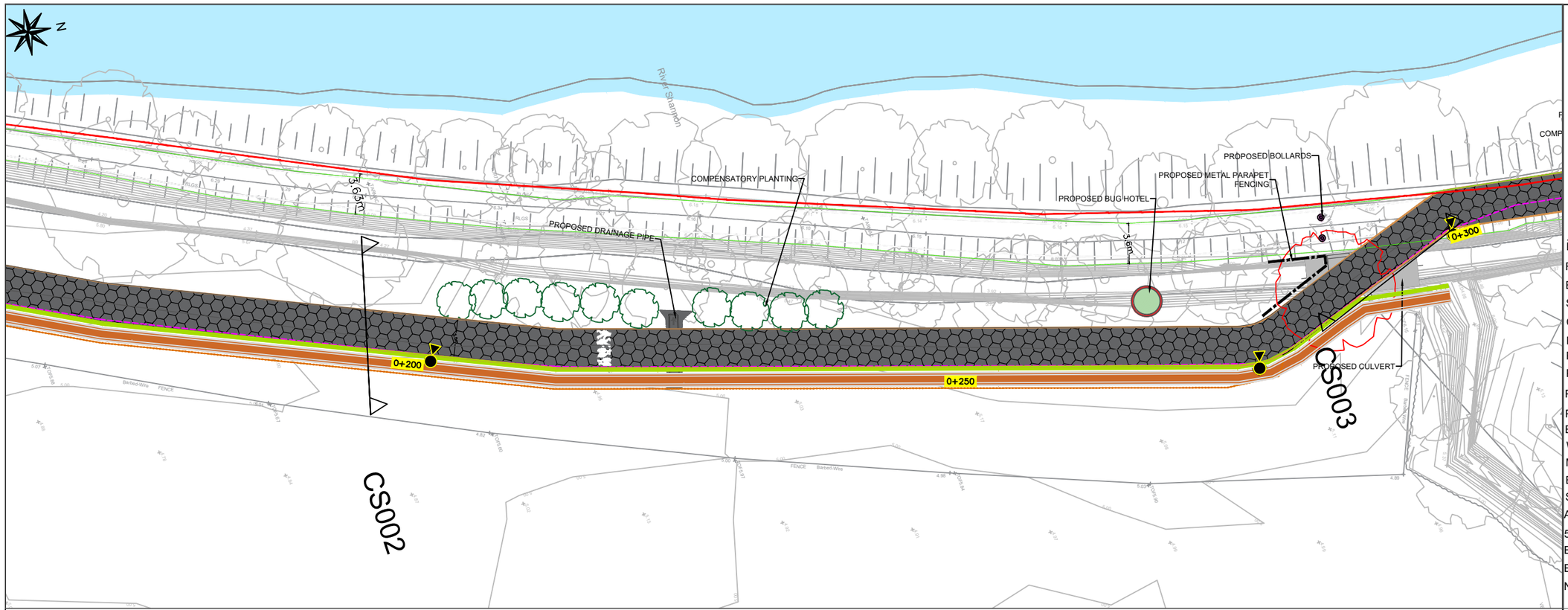

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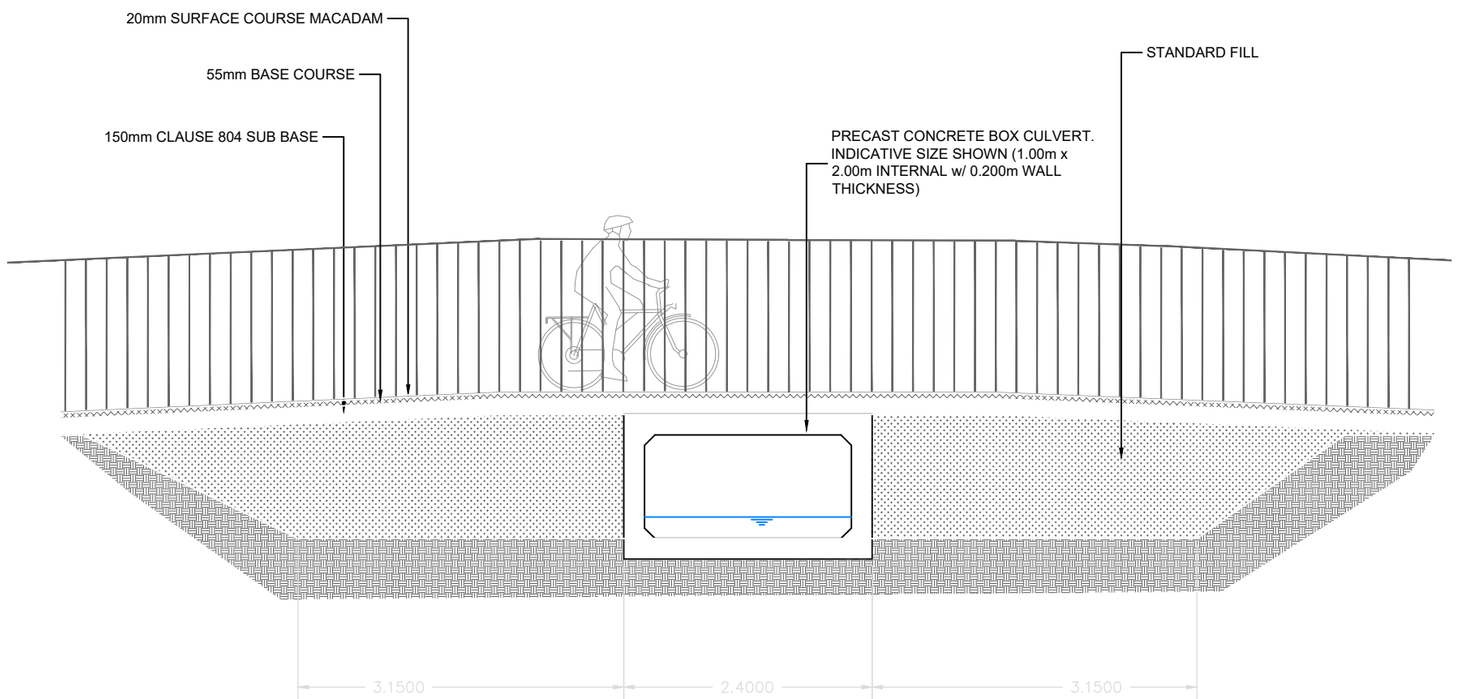

CS003

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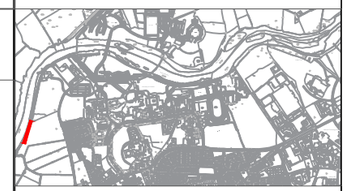

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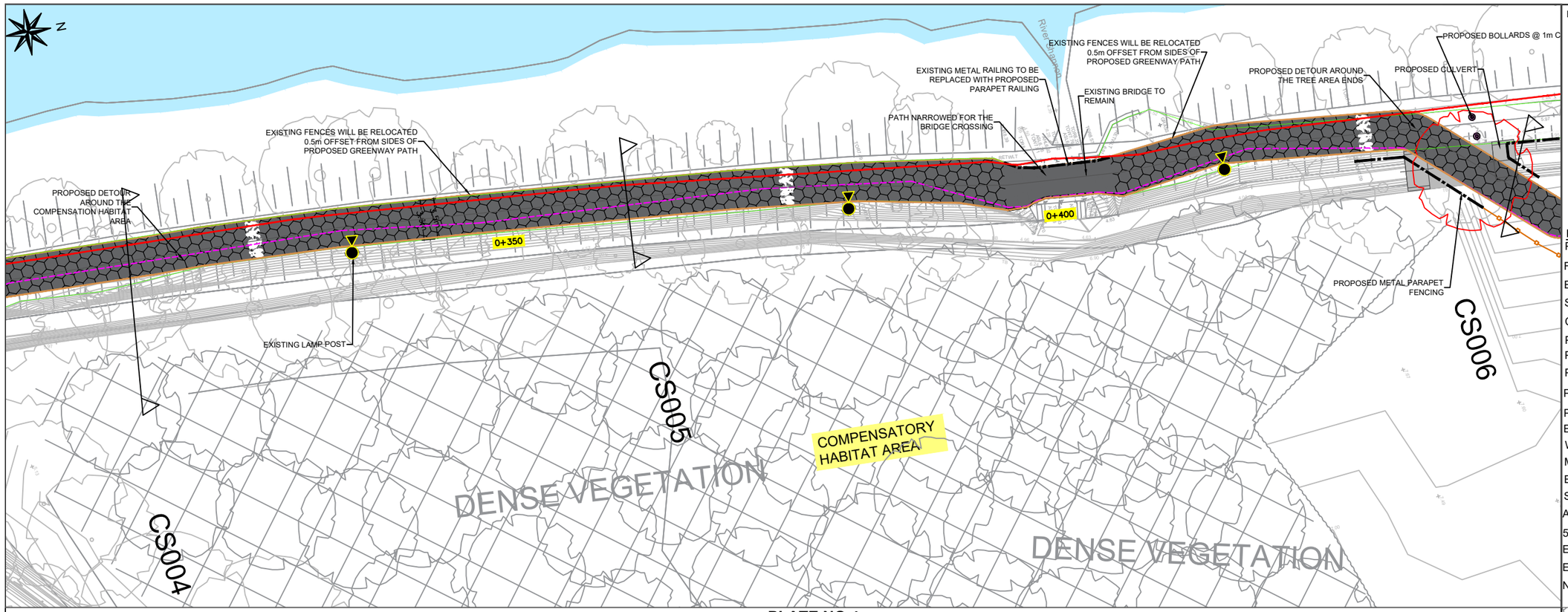

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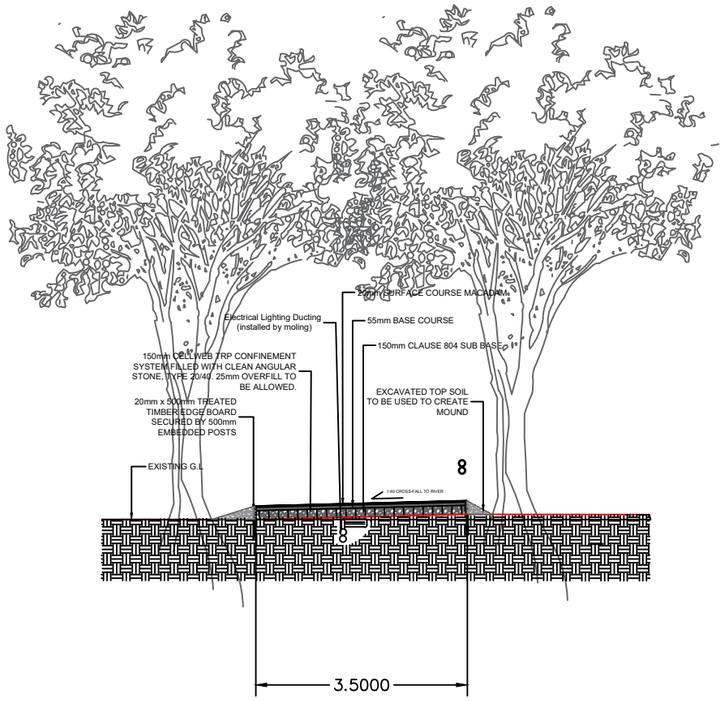

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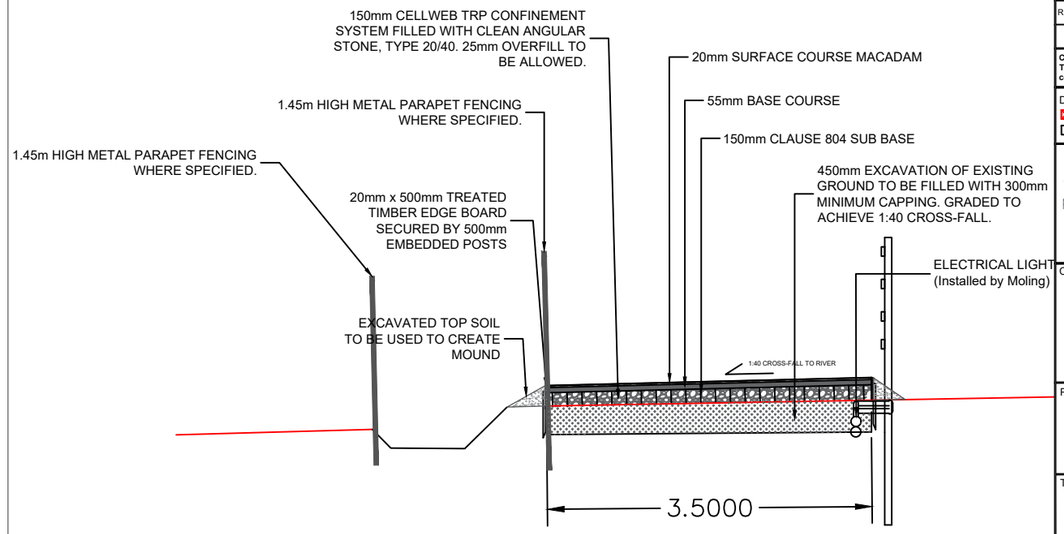

CS006

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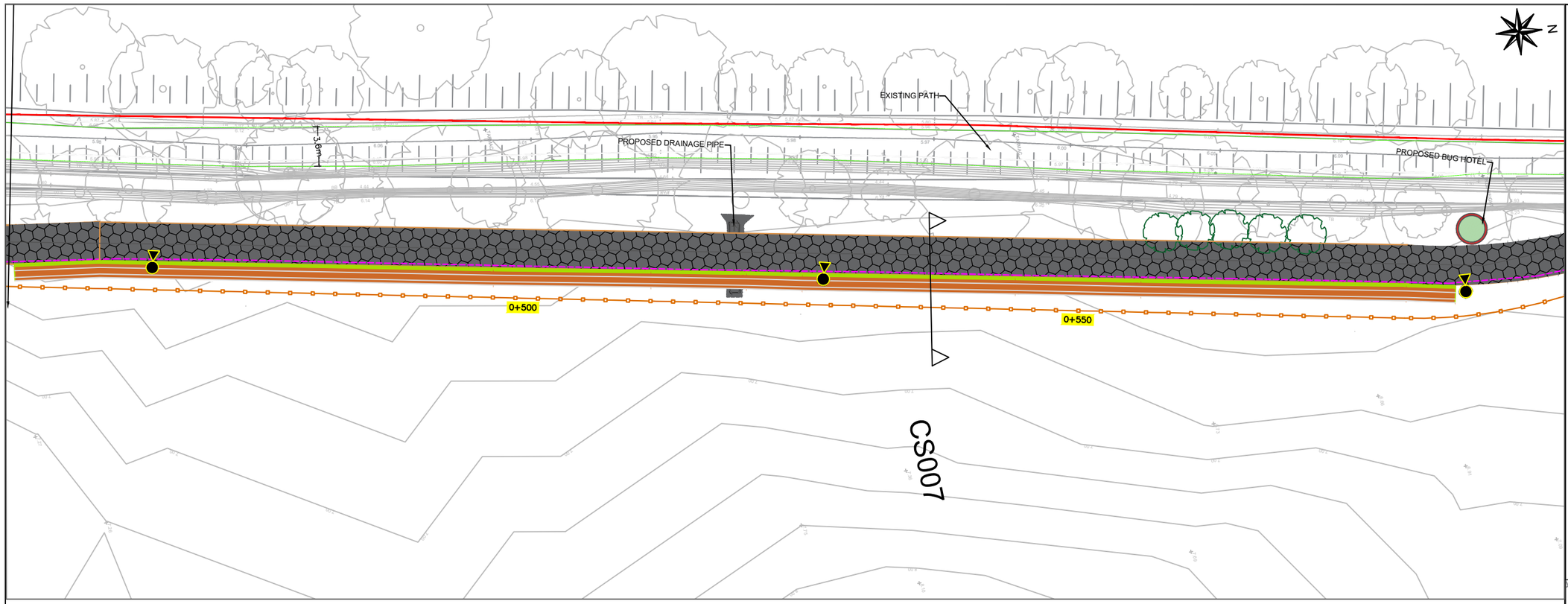

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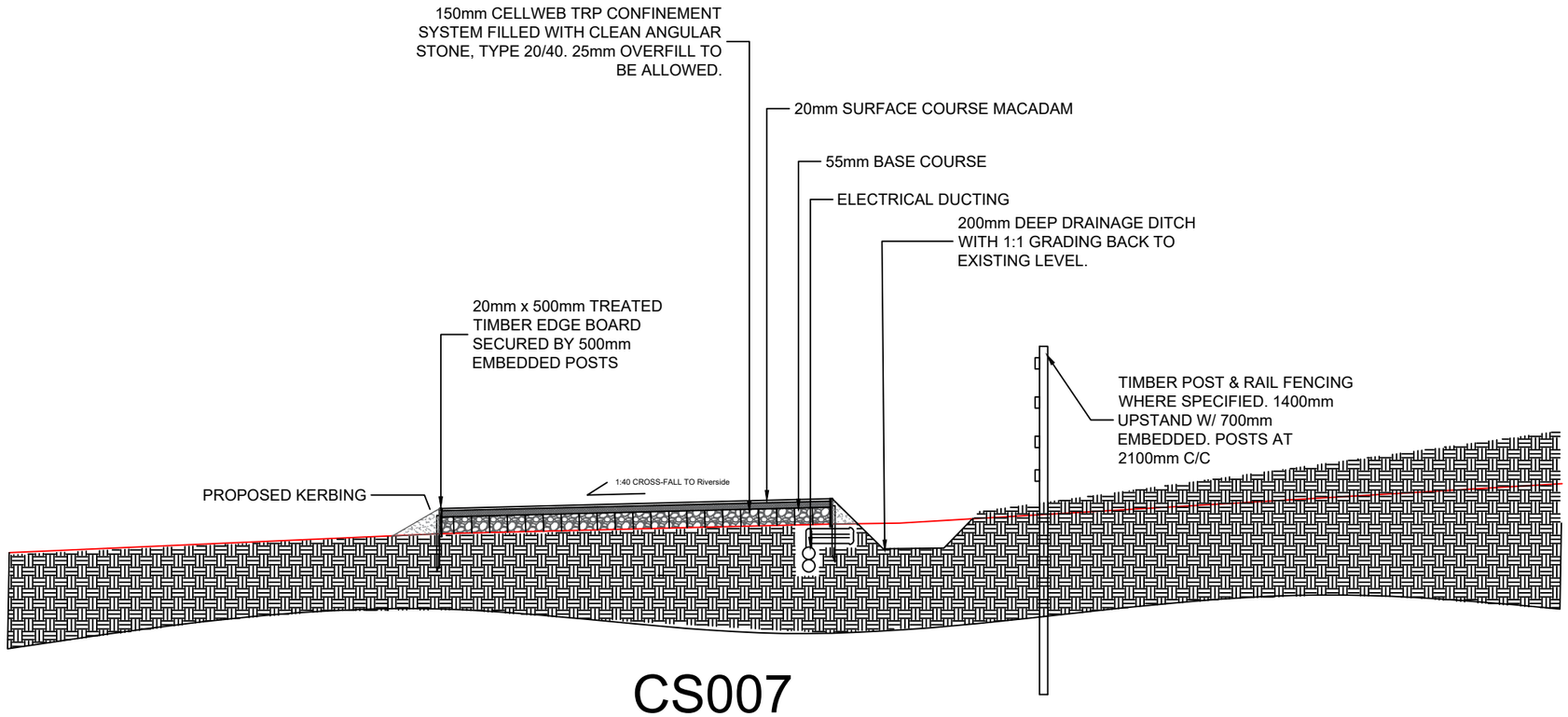

CS007

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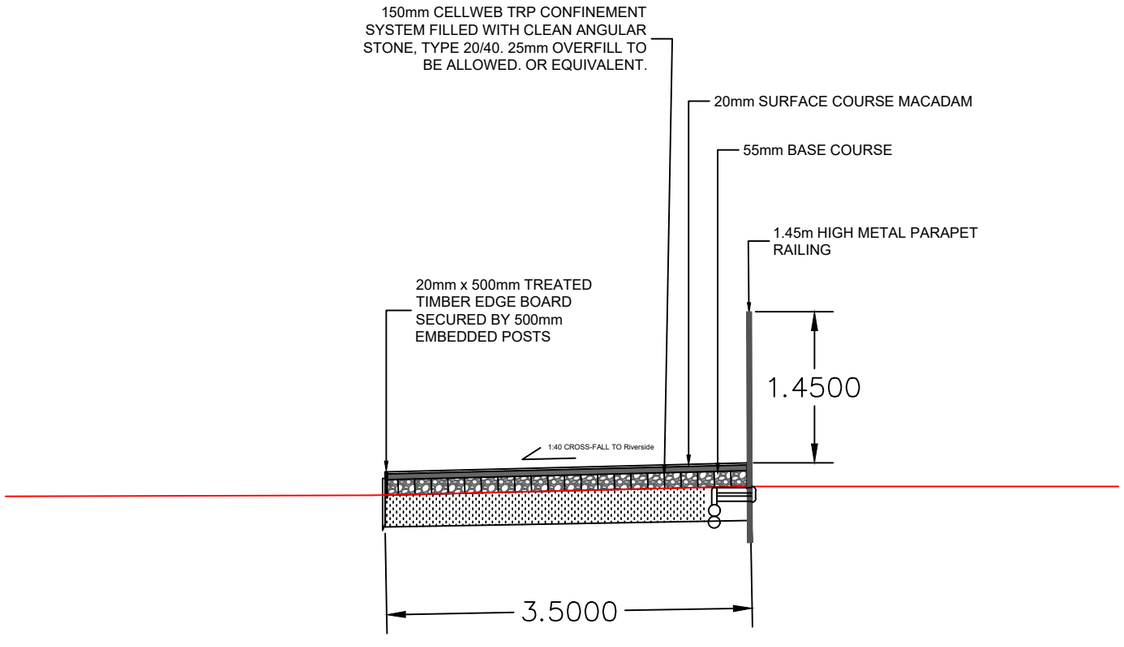

CS008

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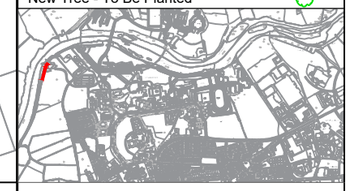

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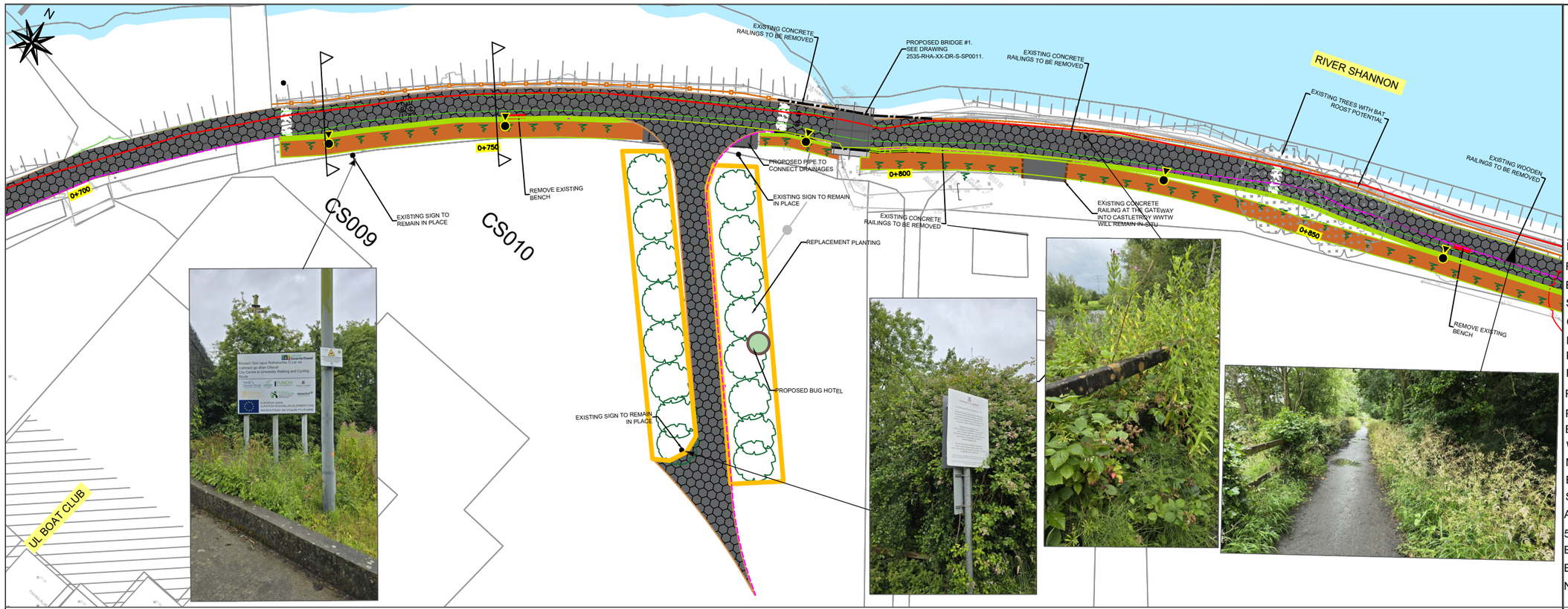

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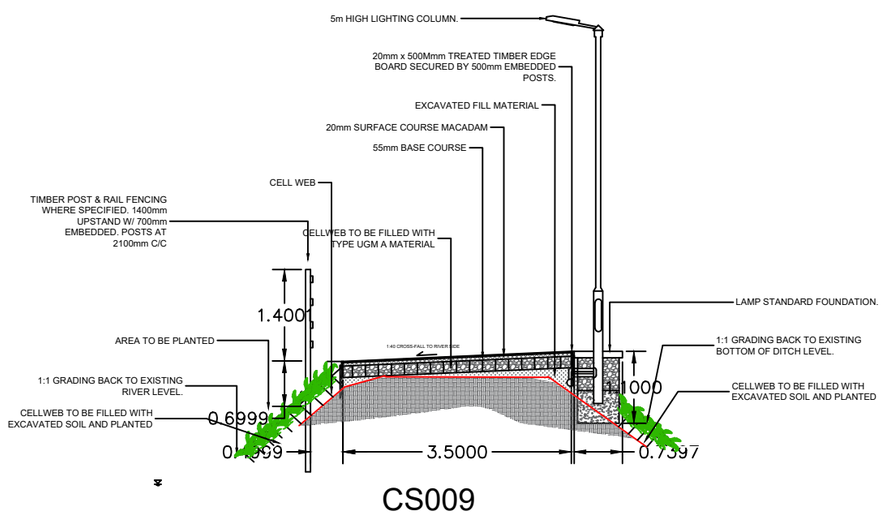
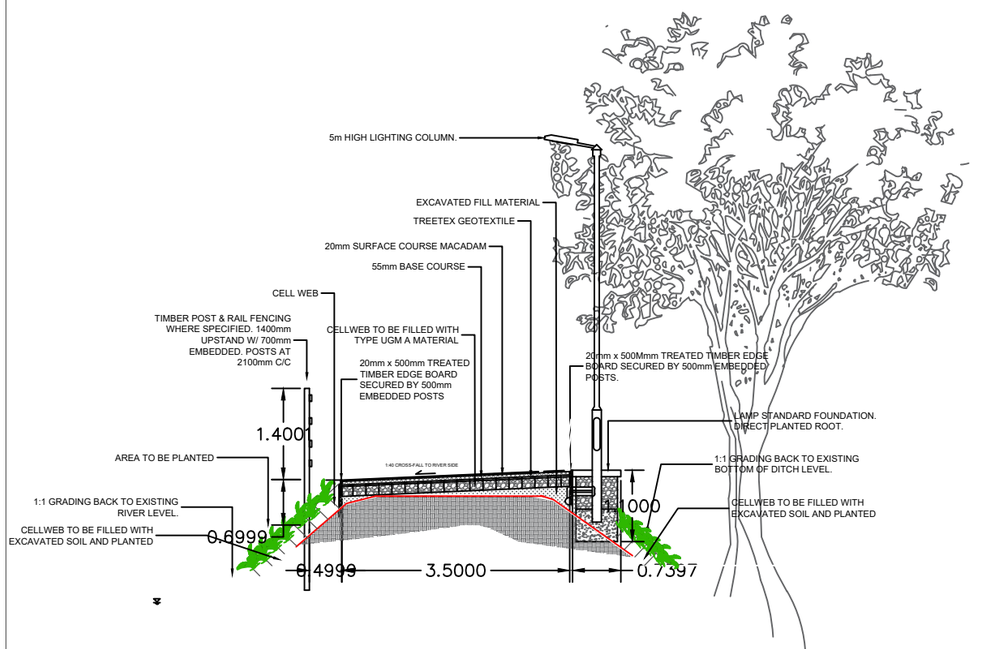
- New Tree - To Be Planted

PLATE NO. 7



CS009



CS0010

REV	DATE	DRN	DESCRIPTION	CHK	APD
			REVISIONS		

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RYAN HANLEY now Stantec

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Comhairle Cathrach & Contae Luimnigh
Limerick City & County Council

PROJECT

Limerick City Greenway (UL to NTP)

TITLE

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JOB No.	CAD FILE PATH	DRAWING No.	REV.
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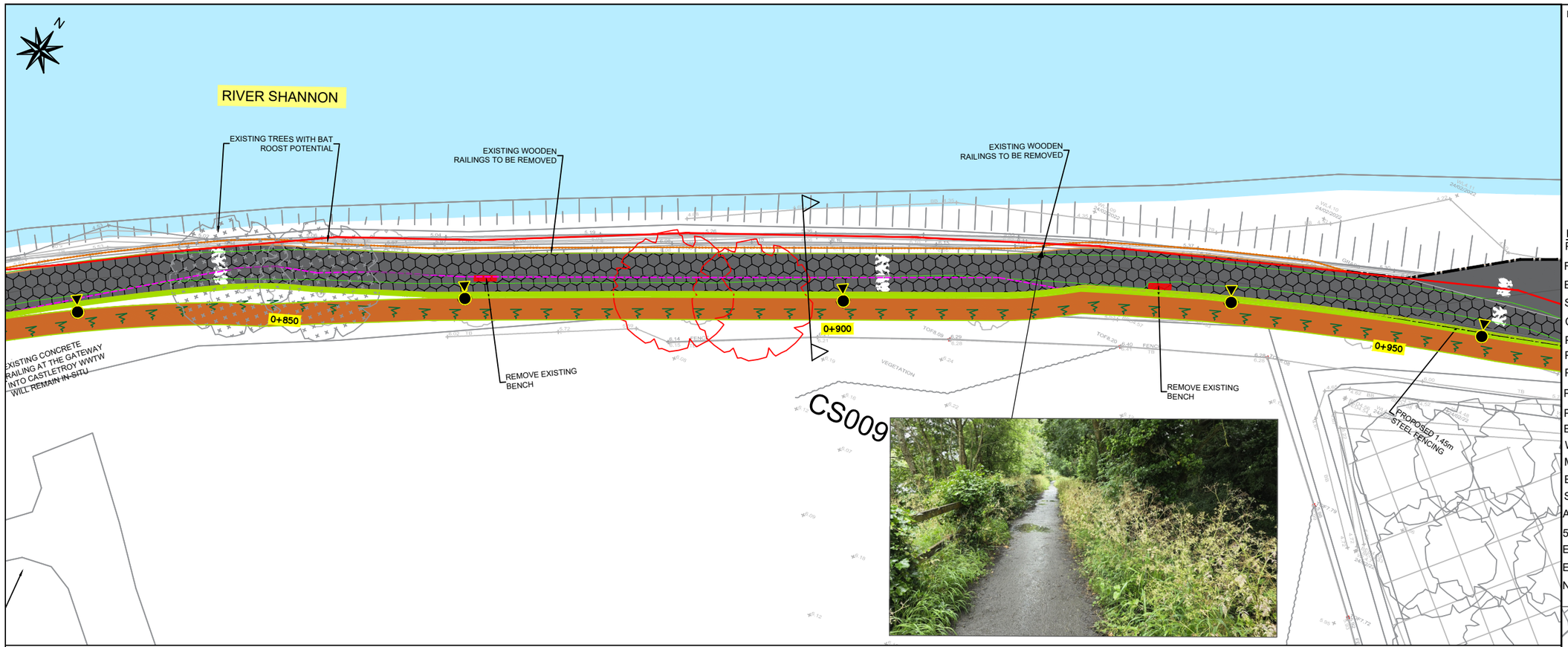
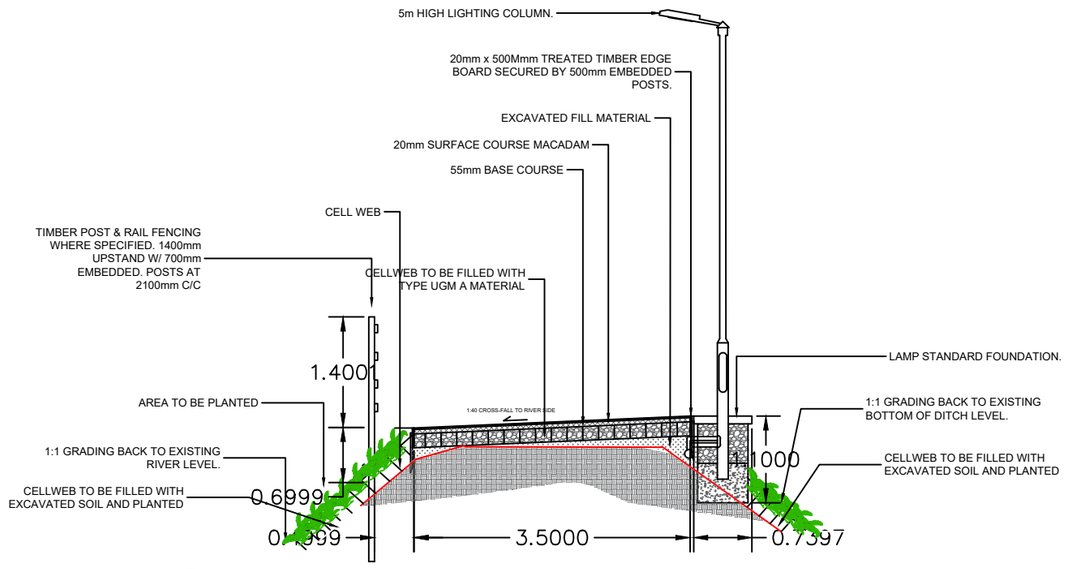


PLATE NO. 8



CS009

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- Footpath
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- Existing Tree - To Be Retained
- Existing Tree - To Be Removed
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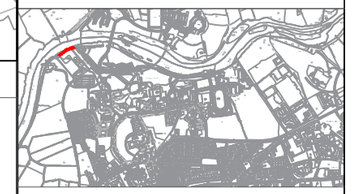

REV	DATE	DRN	DESCRIPTION	CHK	APD

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Limerick City & County Council

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Limerick City Greenway (UL to NTP)

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Sheet 8 of 32

SCALE @ A1	DATE	DRAWN	CHECKED	APPROVED
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2535	2535 / 04 / DD / 01	PD0008	

PROPOSED 1.45m STEEL FENCING

PROPOSED BRIDGE #2.
SEE DRAWING RHA-XX-DR-S-SP0021

PROPOSED LIVING WALL FOR THE BRIDGE

METAL PARAPET TO TIE INTO EXISTING WOODEN RAILINGS

EXISTING SIGN TO REMAIN IN PLACE

EXISTING STONE PARAPET

PROPOSED 1.45m STEEL FENCING

PROPOSED 1.45m STEEL FENCING

0+950

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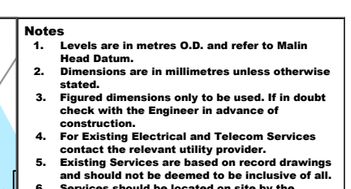

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JOB No.	CAD FILE PATH	DRAWING No.	REV.
2535	2535 / 04 / DD / 01	PD0009	

PLATE NO.9

CS012

PROPOSED BRIDGE #4.
SEE DRAWING 2535-RHA-DR-S-SP0041

PROPOSED 1.45m
STEEL FENCING

PROPOSED GREENWAY DIVERGES FROM
EXISTING PATH TO AVOID MATURE
TREES ALONG THE RIVER BANK

PROPOSED
KISSING GATE

EXISTING PEDESTRIAN
BRIDGE / PROPOSED
FUTURE GREENWAY LINK
TO KILLALOE

RAISE EXISTING PARAPET
TO 1m ABOVE GL

PROPOSED 1.45m STEEL
FENCING WITH 0.5m
EMBEDDED

2.4m HIGH ANTI-CLIMB MESH
FENCING

CS011

PROPOSED BRIDGE #3.
SEE DRAWING 2535-RHA-DR-S-SP0031

EXISTING GATE TO REMAIN

1+050

PROPOSED LIVING WALL
FOR THE BRIDGE

EXISTING SIGN TO REMAIN
IN PLACE

PROPOSED PLASSEY MILL
LAY-BY AREA

1+000

PROPOSED BENCH

PROPOSED BIKE RACK

PROPOSED BENCH

EXISTING ENTRANCE TO
PLASSEY MILL TO BE
SEALED OFF

EXISTING OVERSPILL FOR
PLASSEY MILL RACE

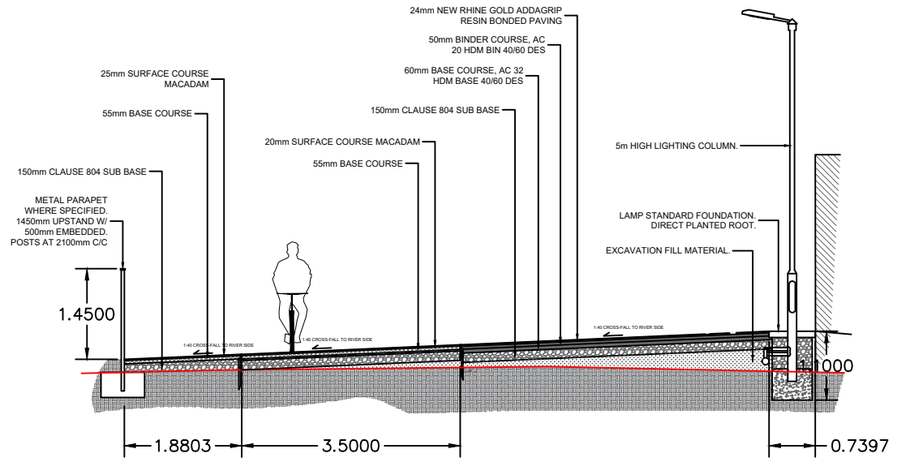
EXISTING CHAIN LINK TO
REMAIN

EXISTING SIGN TO REMAIN
IN PLACE

PET TO TIE
G WOODEN
RAILINGS

REMAIN

PLASSEY MILLS



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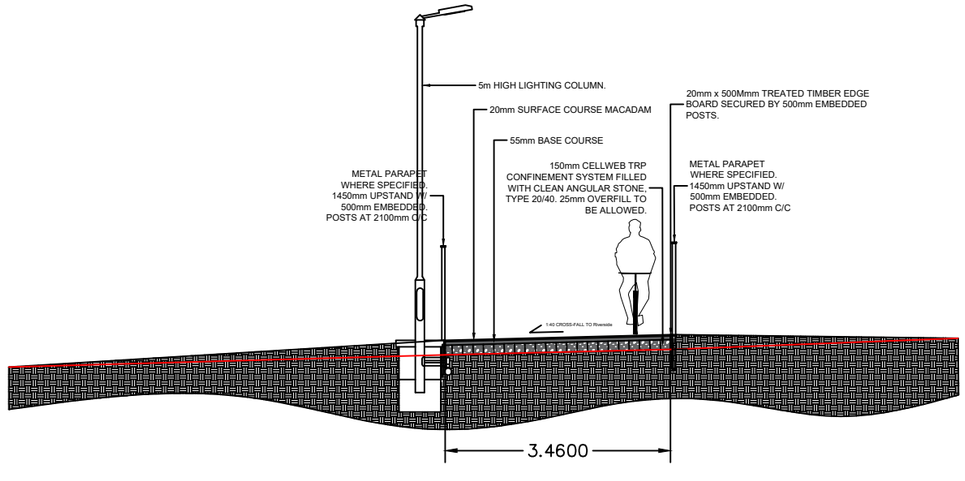

CS012

PLATE NO.10

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RYAN HANLEY now Stantec

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Limerick City Greenway
(UL to NTP)

TITLE

Planning Drawings

Sheet 10 of 32

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1:200 / NTS	OCT 2023	KB	BL	PS

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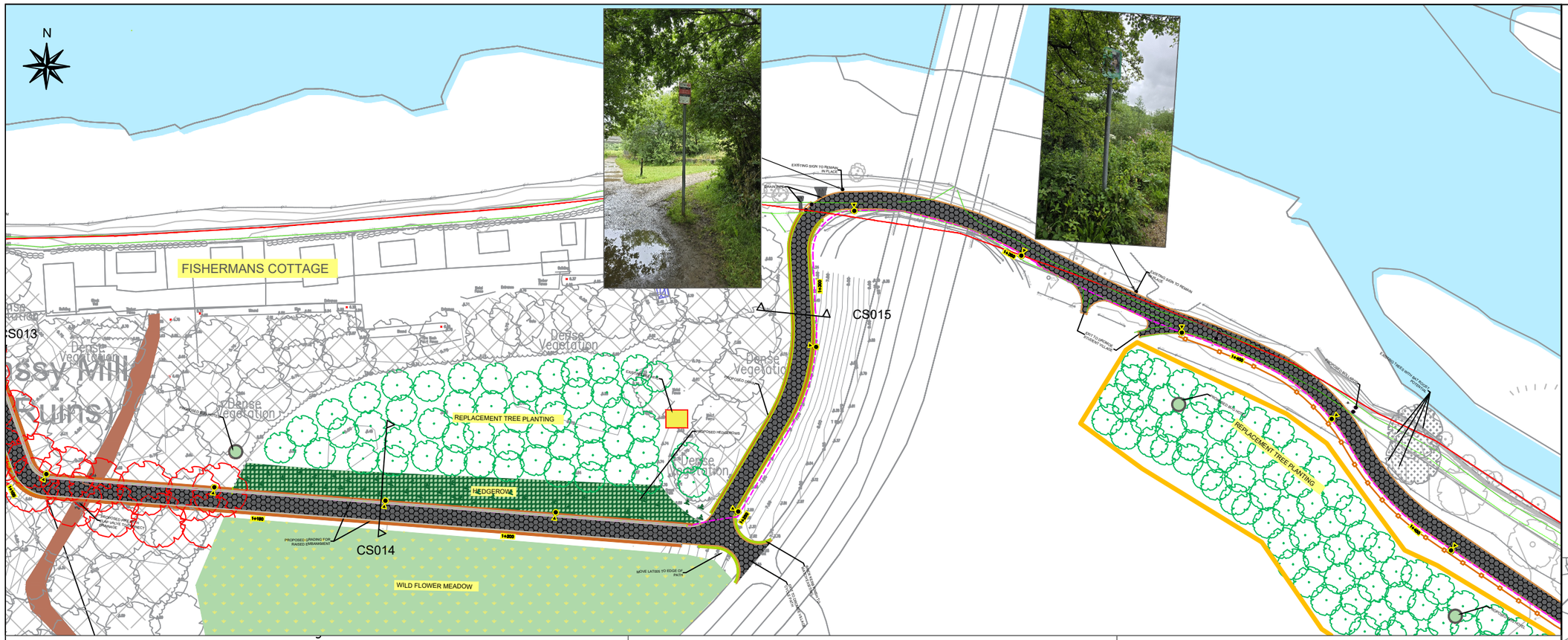

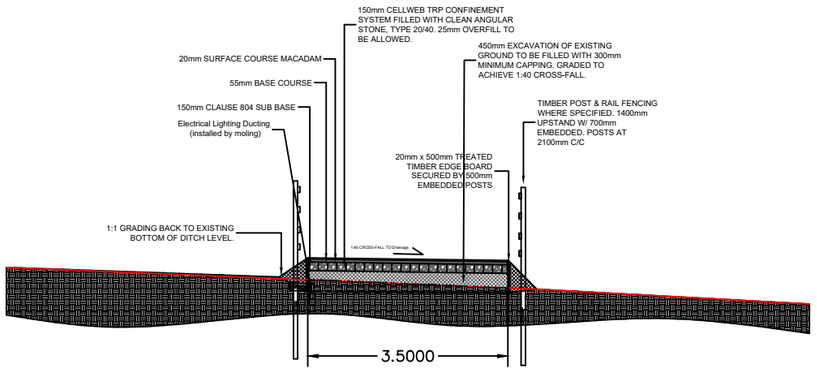

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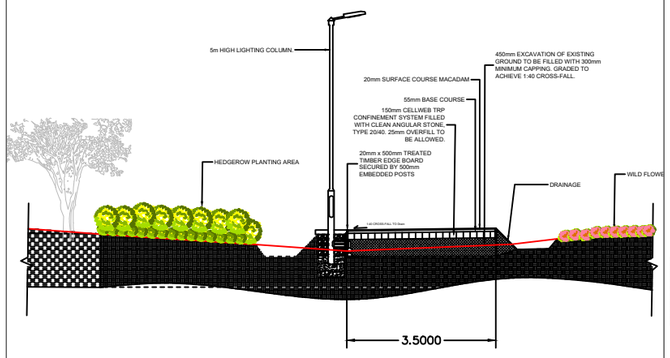

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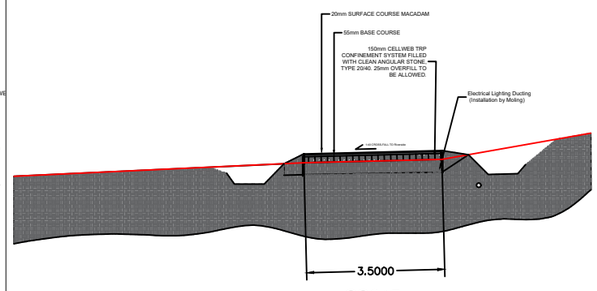

CS015

PLATE NO.11

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SCALE @ A1	DATE	DRAWN	CHECKED	APPROVED
1:1000	OCT 2023	KB	BL	PS

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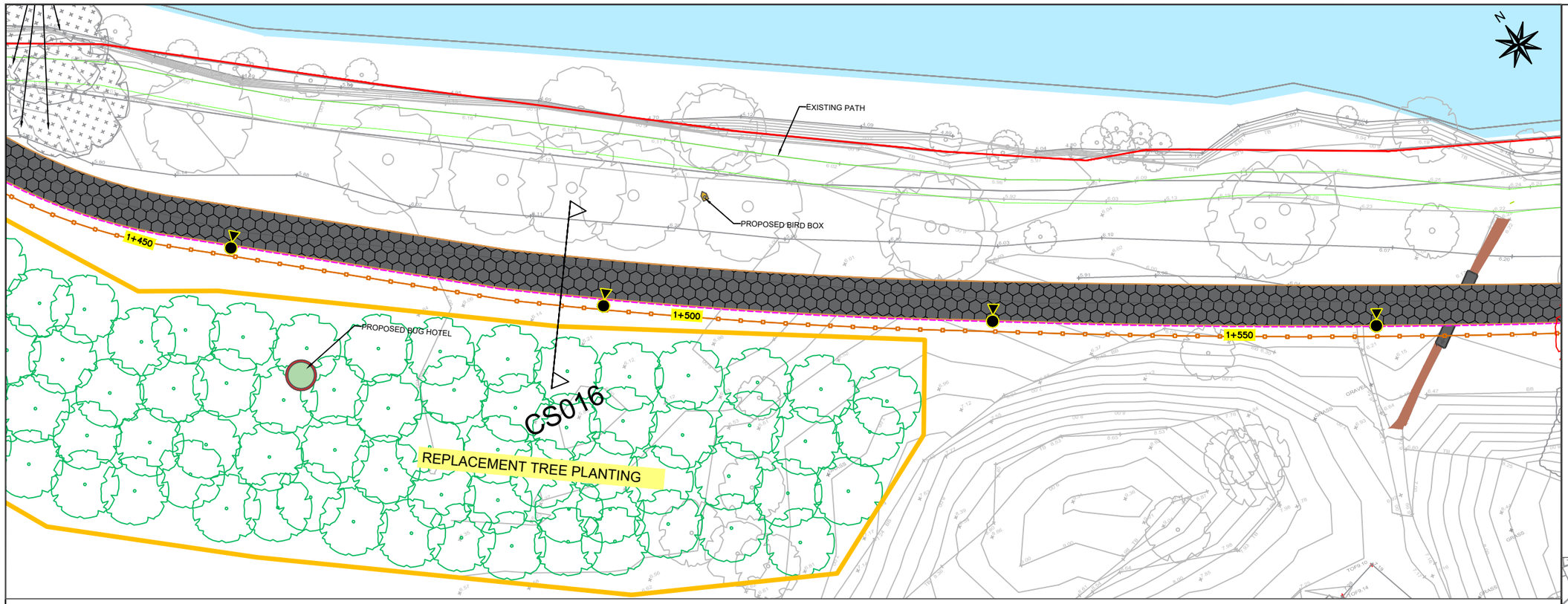
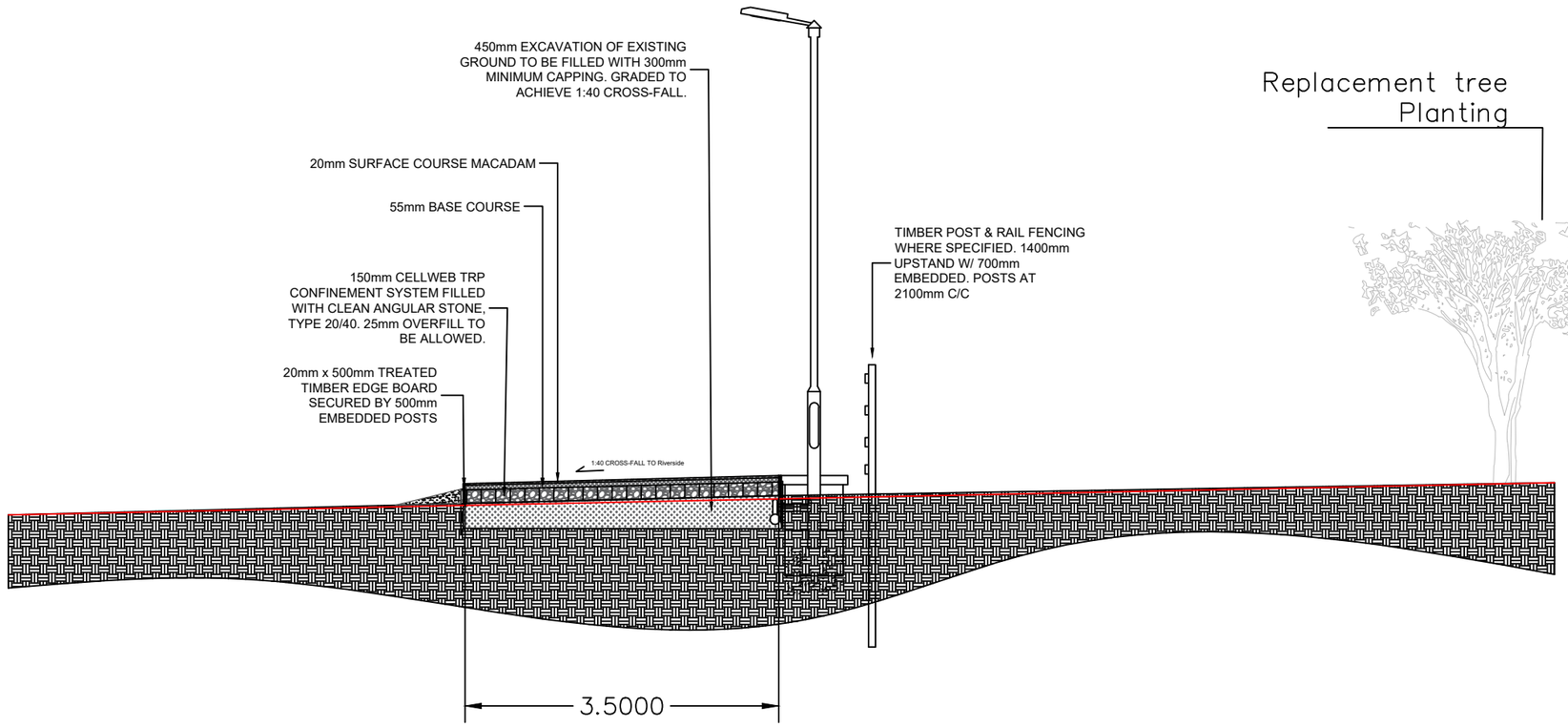


PLATE NO.12



CS016

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JOB No.	CAD FILE PATH	DRAWING No.	REV.
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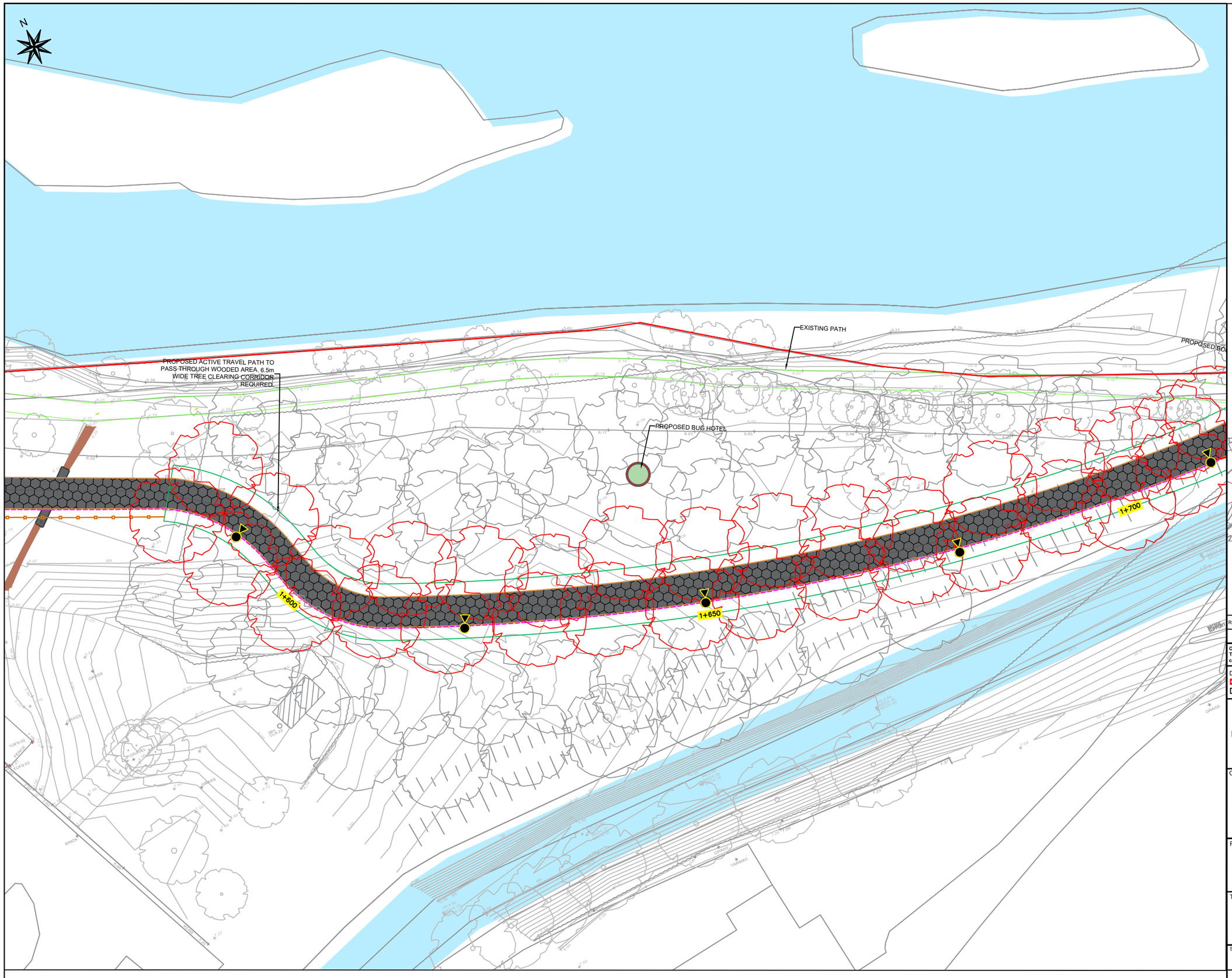

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JOB No.	CAD FILE PATH	DRAWING No.	REV.
2535	2535 / 04 / DD / 01	PD0013	

PLATE NO.13

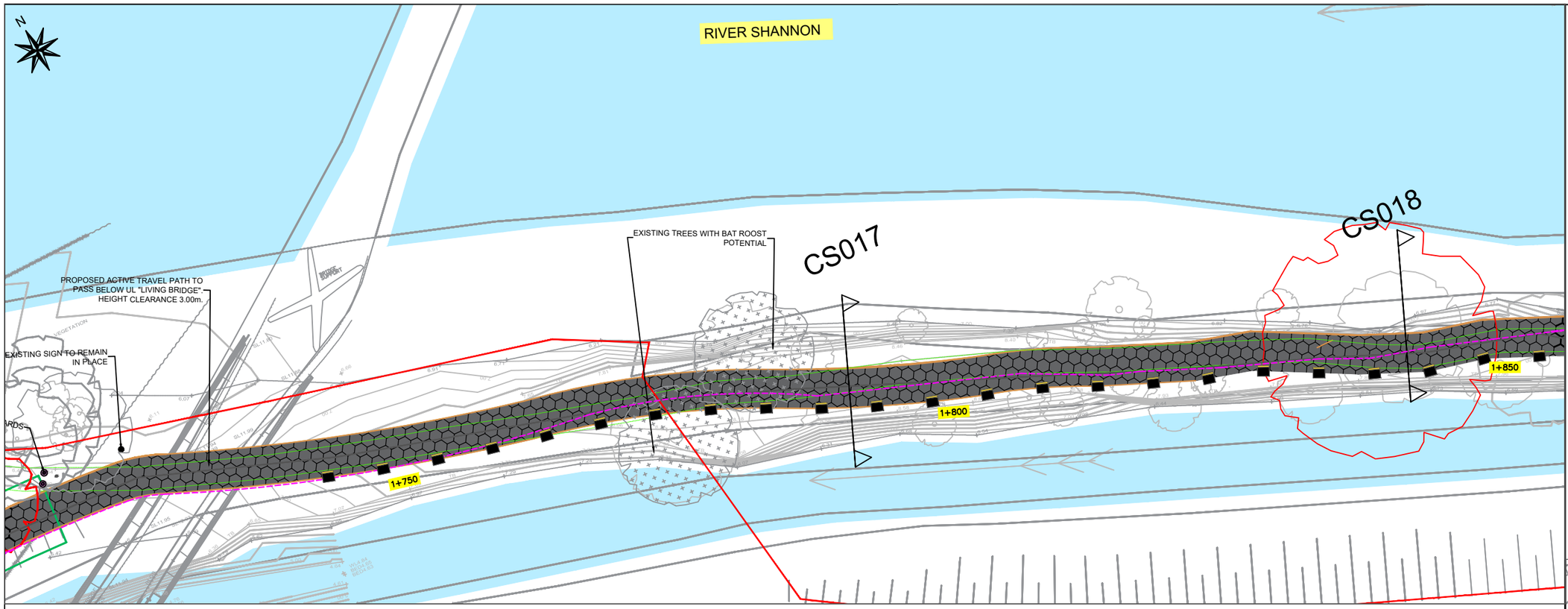
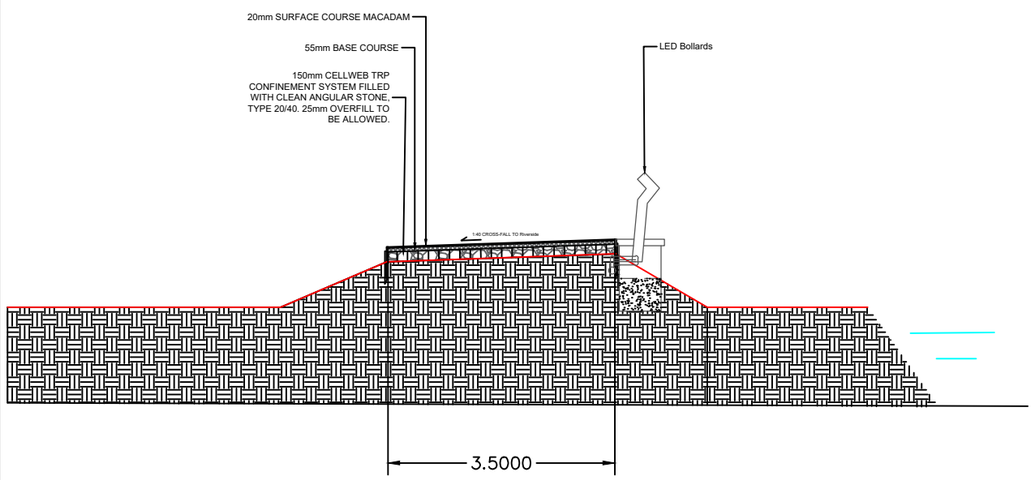


PLATE NO. 14



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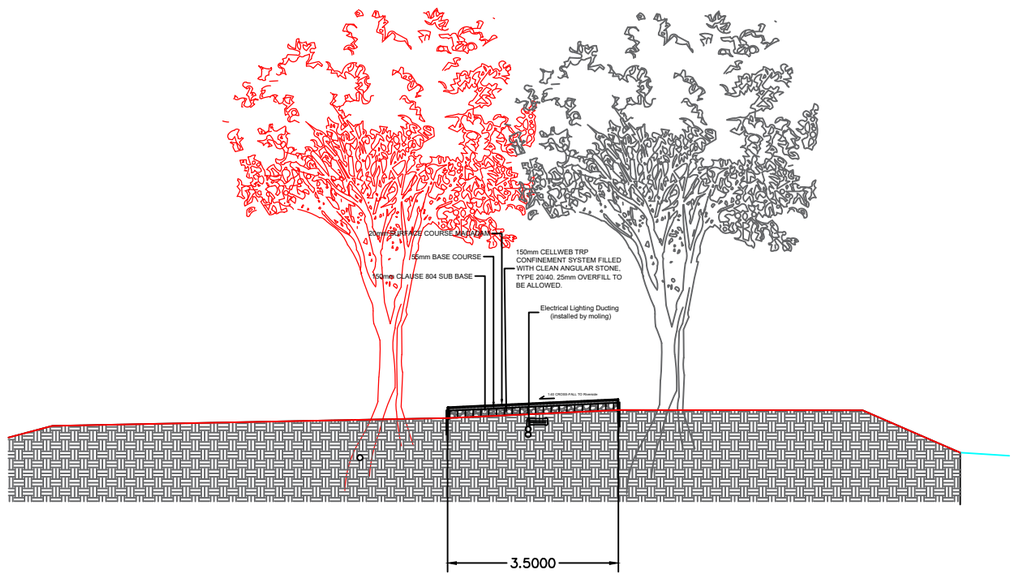

CS018

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2535	2535 / 04 / DD / 01	PD0014	

RIVER SHANNON

EXISTING SIGN TO REMAIN IN PLACE

EXISTING SIGN TO BE RELOCATED AS SHOWN

PATH NARROWS TO AVOID EXISTING TREE

PATH NARROWS TO AVOID EXISTING TREE

1+950

1+900

EXISTING BRIDGE TO REMAIN

Footbridge

PLATE NO. 15

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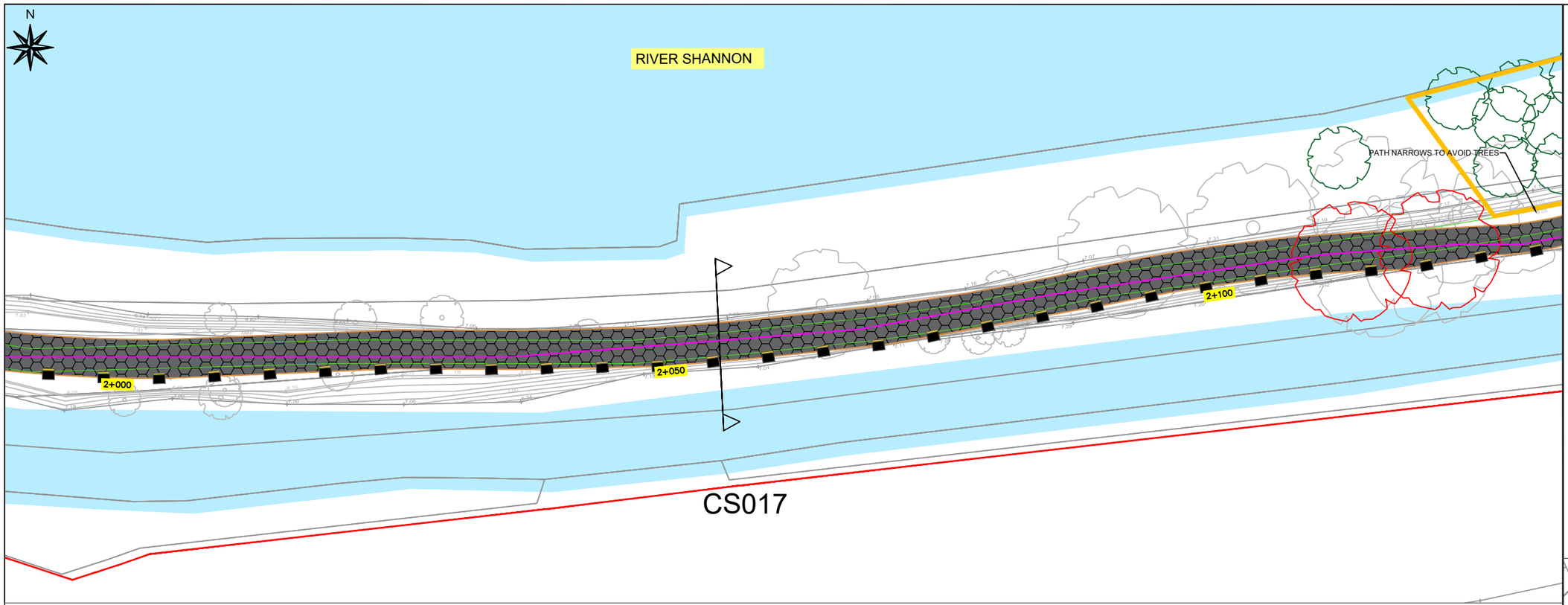

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- Proposed Raised Table
- Proposed Corduroy Tactile Paving
- Proposed Blister Tactile Paving
- Proposed Grading
- Proposed Drain
- Existing Path
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- Metal Parapet
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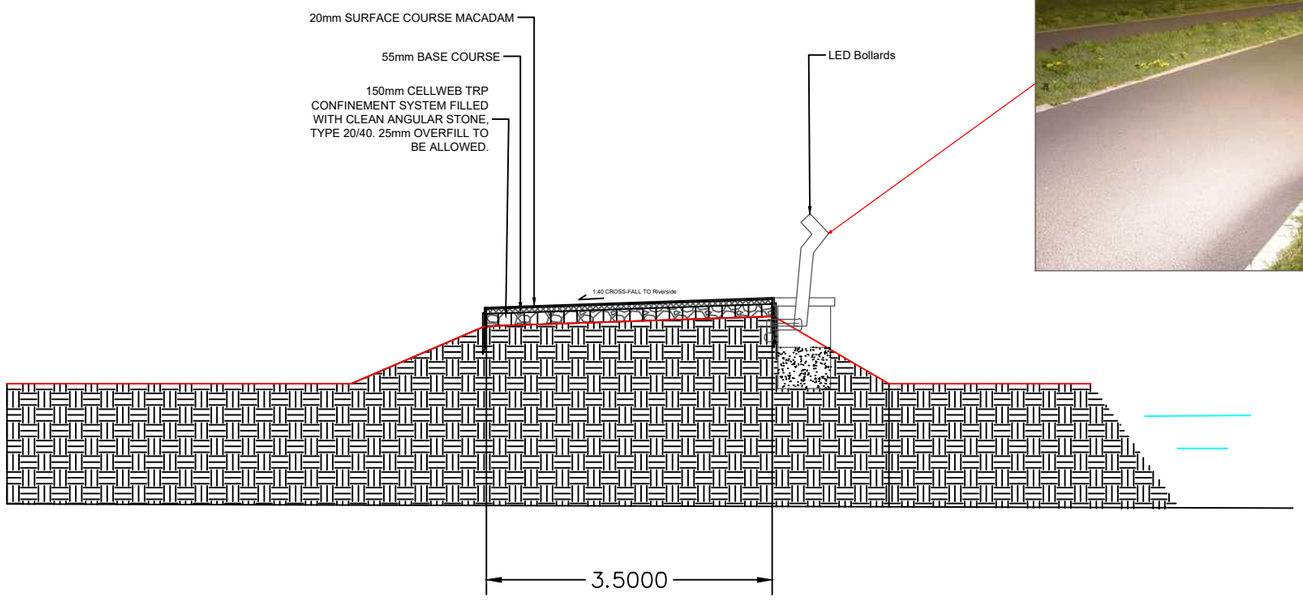
- SAC Boundary Line
- Area for Replacement Tree Planting
- LED Bollard
- 5m High Lighting Column
- Existing Tree - To Be Retained
- Existing Tree - To Be Removed
- New Tree - To Be Planted



CS017

REV	DATE	DRN	DESCRIPTION	CHK	APD

REVISIONS

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RYAN HANLEY now Stantec

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Limerick City & County Council

PROJECT

Limerick City Greenway (UL to NTP)

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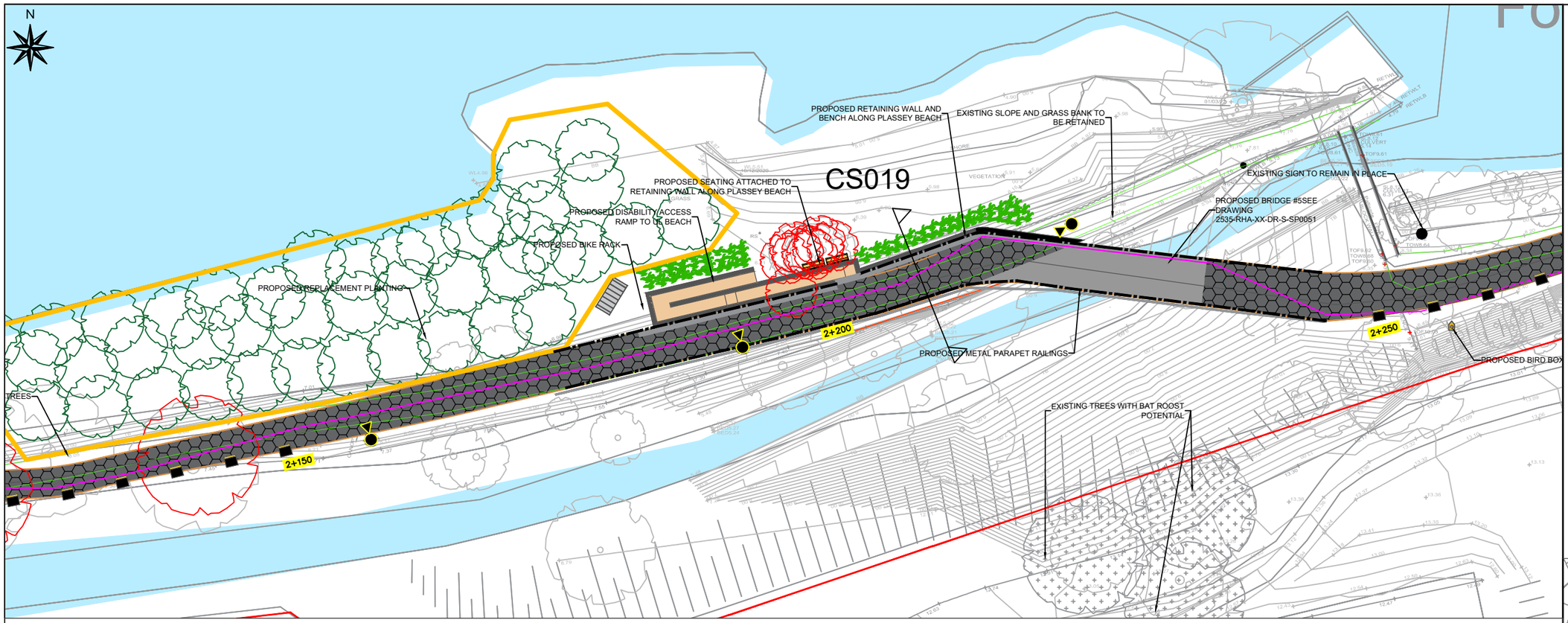
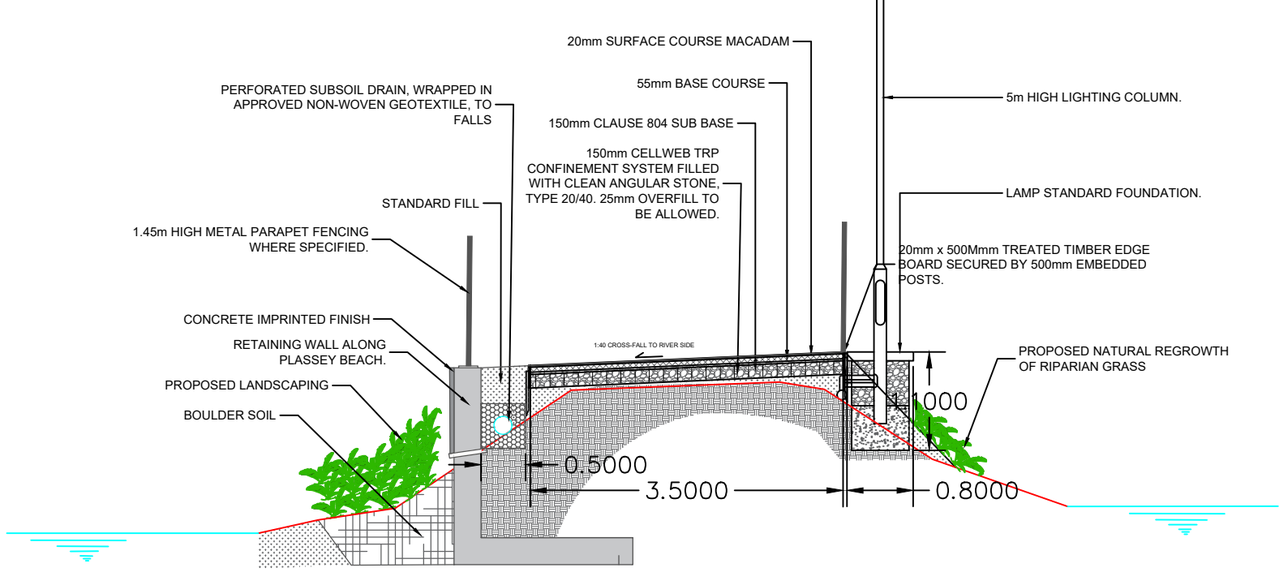
JOB No.	CAD FILE PATH	DRAWING No.	REV.
2535	2535 / 04 / DD / 01	PD0016	

PLATE NO.16





REFER TO 2535-RH-XX-DR-CS-SP0052

CS019

PLATE NO.17

Notes

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Legend

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- New Tree - To Be Planted

REV	DATE	DRN	DESCRIPTION	CHK	APD

REVISIONS

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RIVER SHANNON

PROPOSED BRIDGE #5SEE DRAWING 2535-RHA-XX-DR-S-SP0051

PROPOSED BIRD BOX

EXISTING SIGN TO REMAIN IN PLACE

EXISTING STONE WAY

KILMURRAY STUDENT VILLAGE

2+250

2+300

2+350

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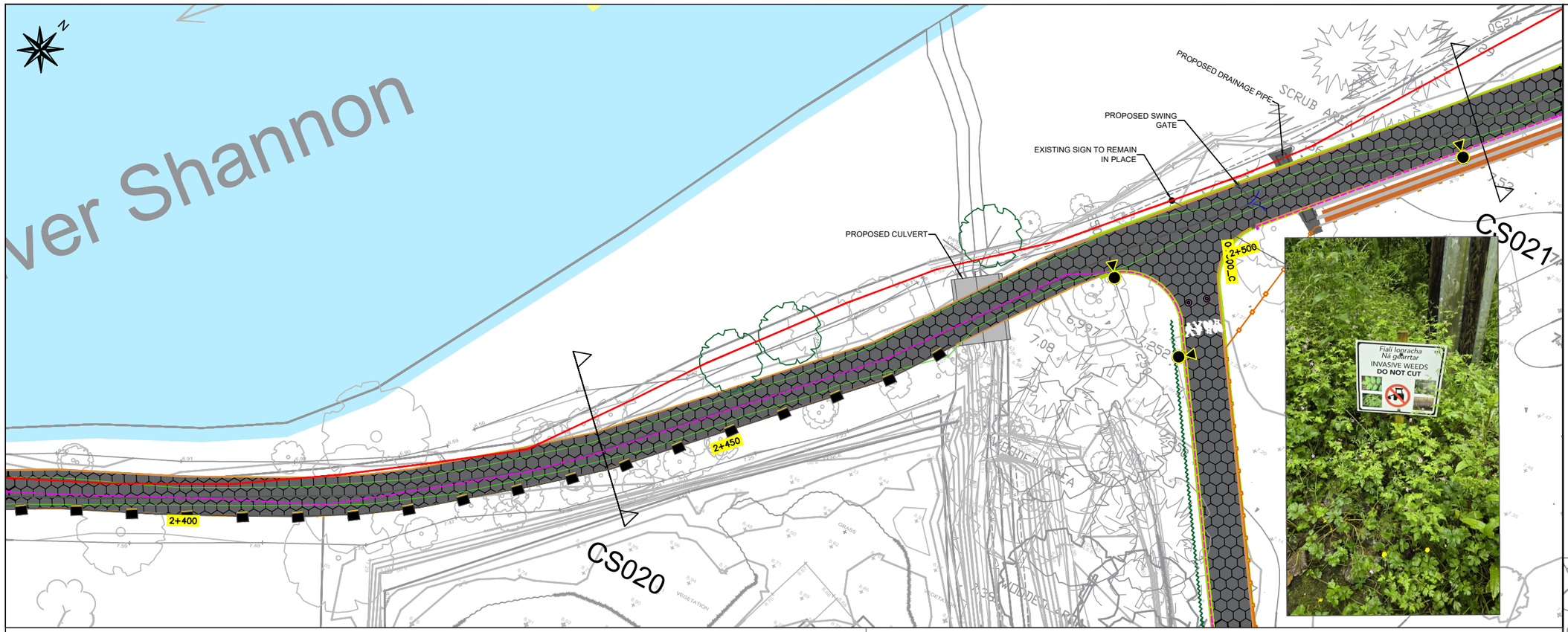
JOB No.	CAD FILE PATH	DRAWING No.	REV.
2535	2535 / 04 / DD / 01	PD0018	

PLATE NO. 18



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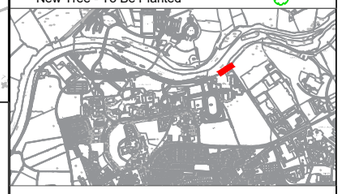
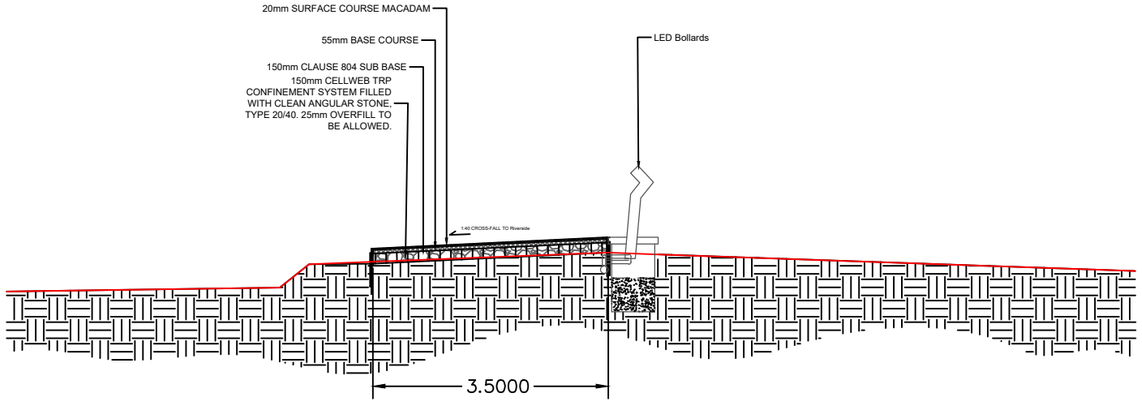
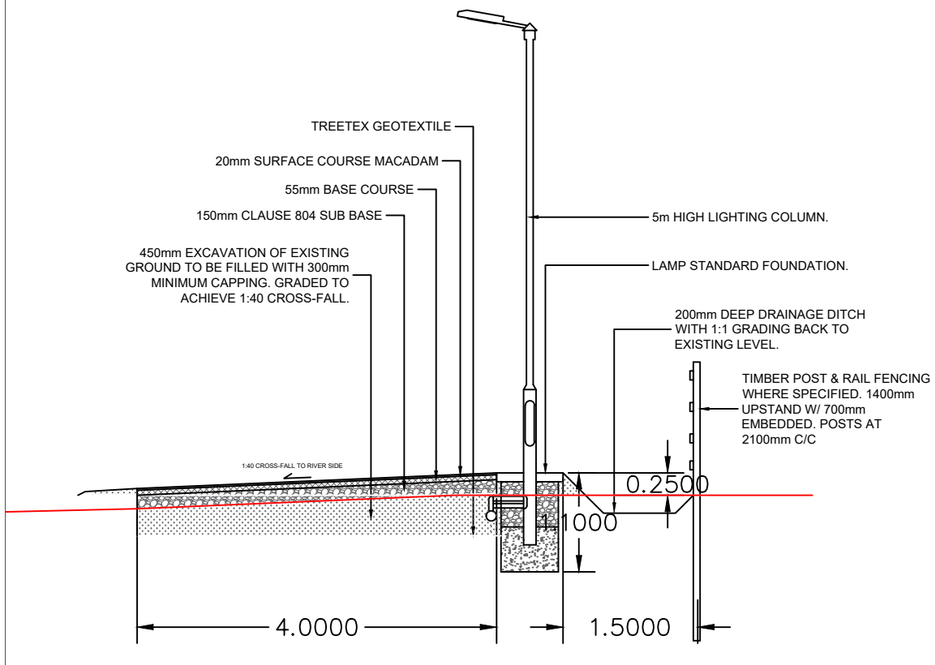




CS020



CS021

REV	DATE	DRN	DESCRIPTION	CHK	APD

REVISIONS

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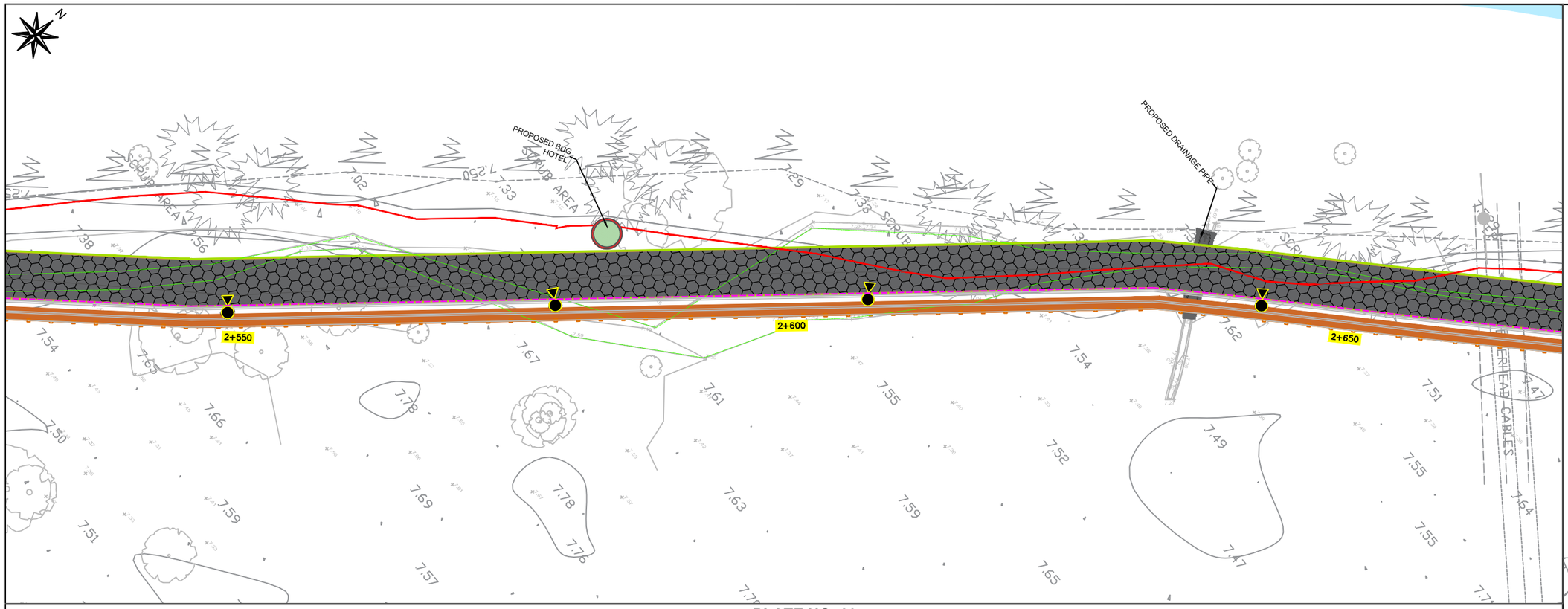
JOB No.	CAD FILE PATH	DRAWING No.	REV.
2535	2535 / 04 / DD / 01	PD0019	

PLATE NO. 19



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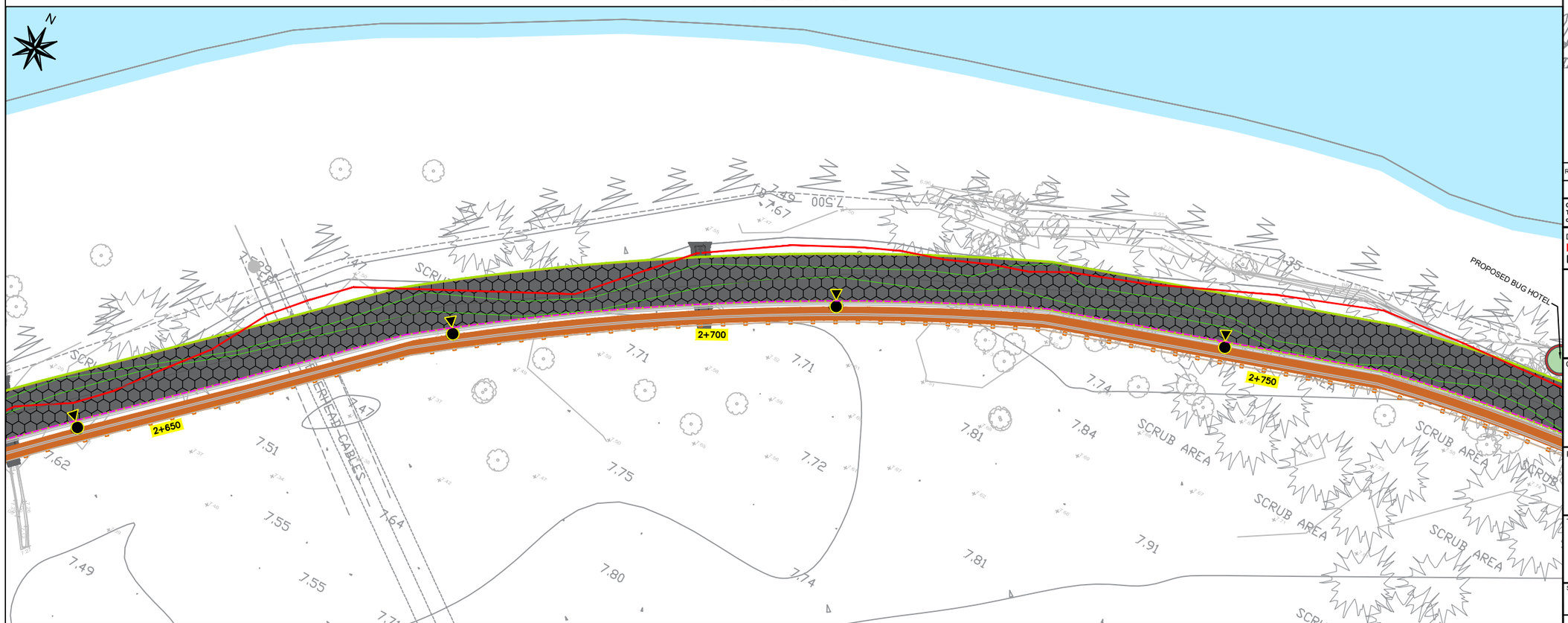

PLATE NO. 21

Notes

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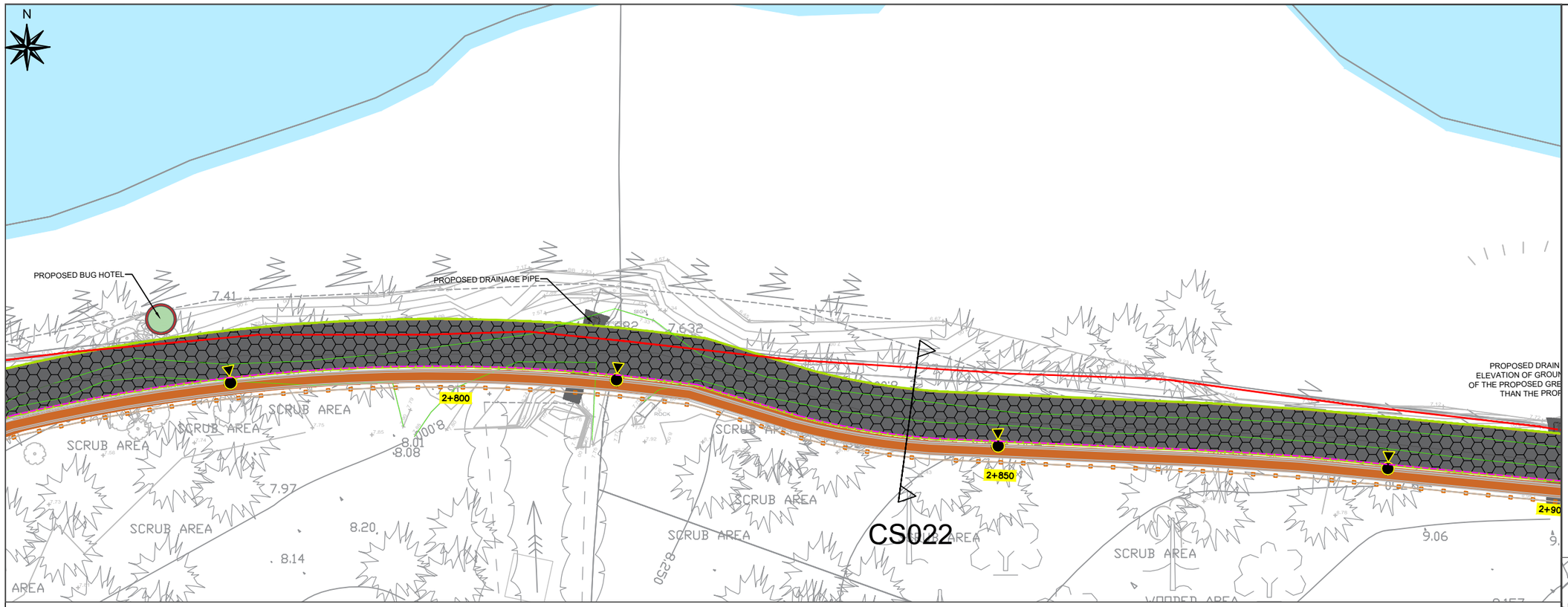

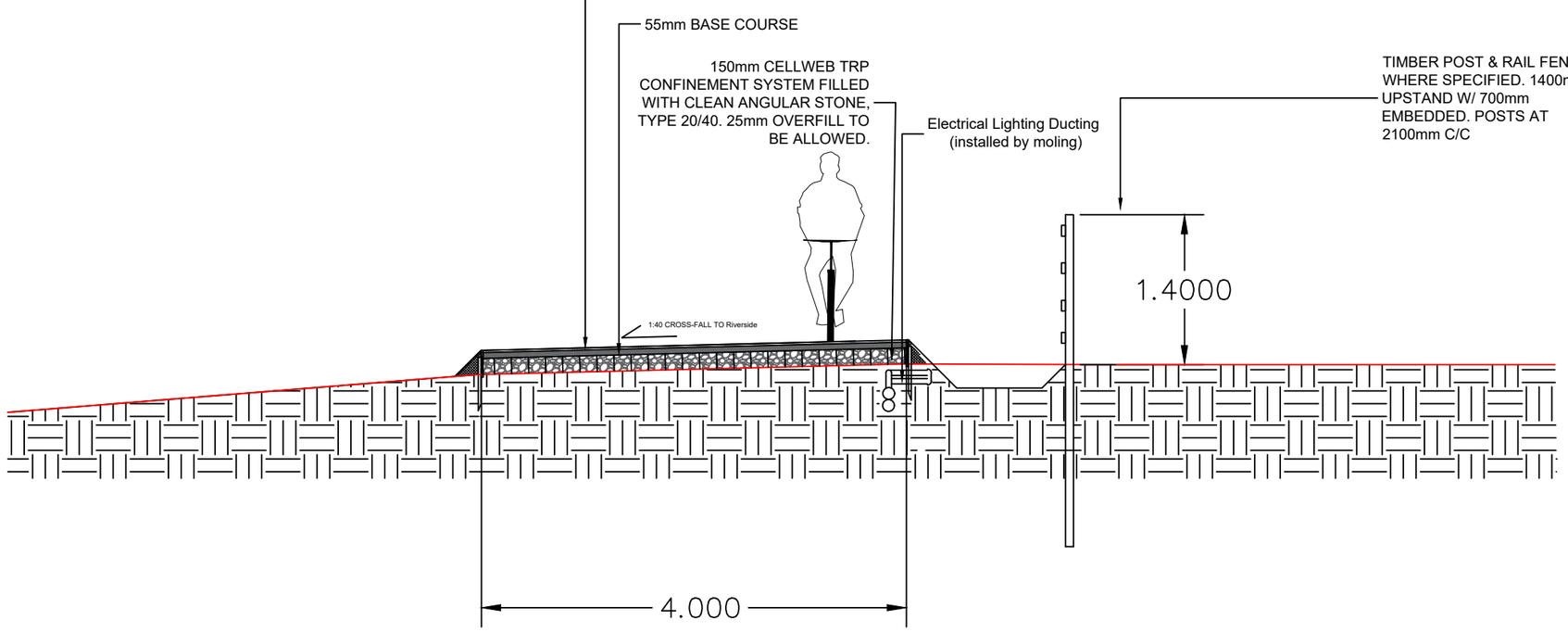

CS022

PLATE NO. 22

Notes

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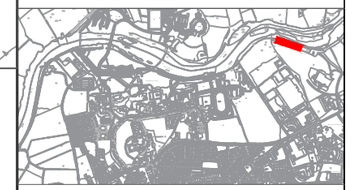

REV	DATE	DRN	DESCRIPTION	CHK	APD

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(UL to NTP)

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2535	2535 / 04 / DD / 01	PD0021	

N

PROPOSED DRAIN ENDS WHERE THE ELEVATION OF GROUND ON SOUTH SIDE OF THE PROPOSED GREENWAY IS HIGHER THAN THE PROPOSED GREENWAY

RIVER SHANNON

2+900

2+950

3+000

WOODED AREA

SCRUB AREA

LINE OF MATURE TREES

ROCK

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JOB No.	CAD FILE PATH	DRAWING No.	REV.
2535	2535 / 04 / DD / 01	PD0022	

PLATE NO. 23

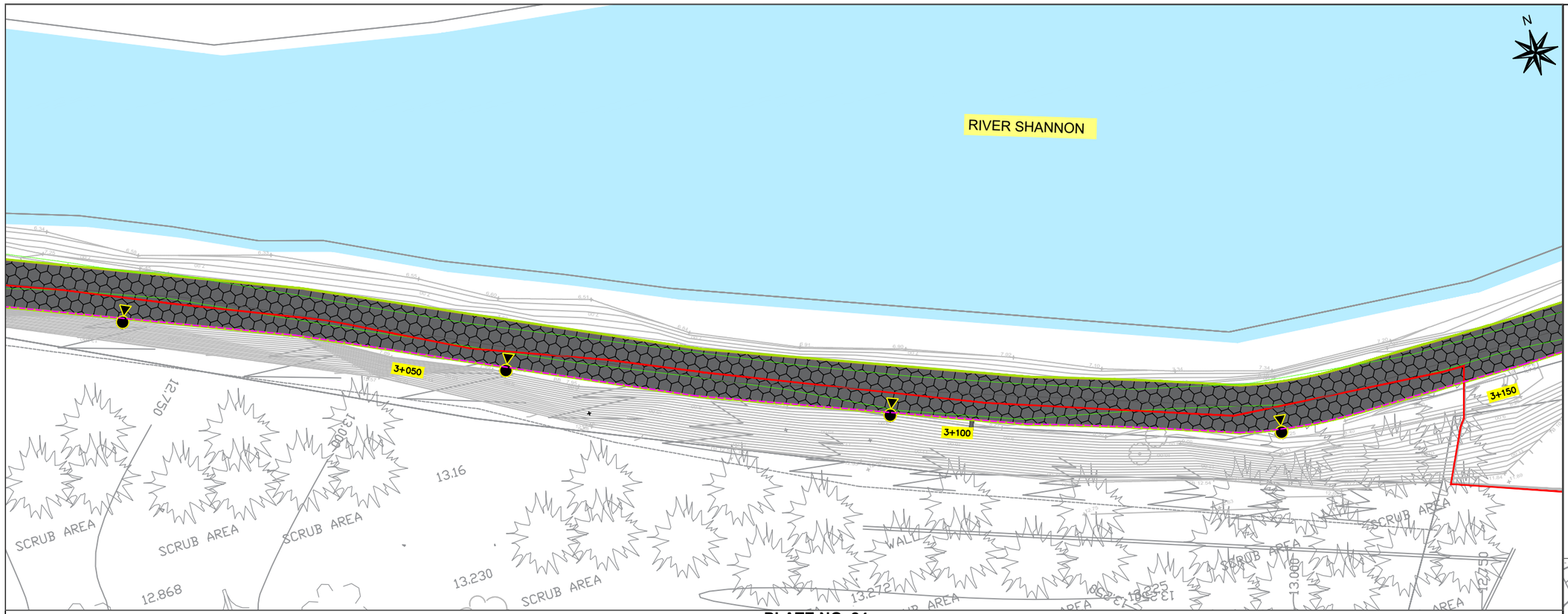

PLATE NO. 24

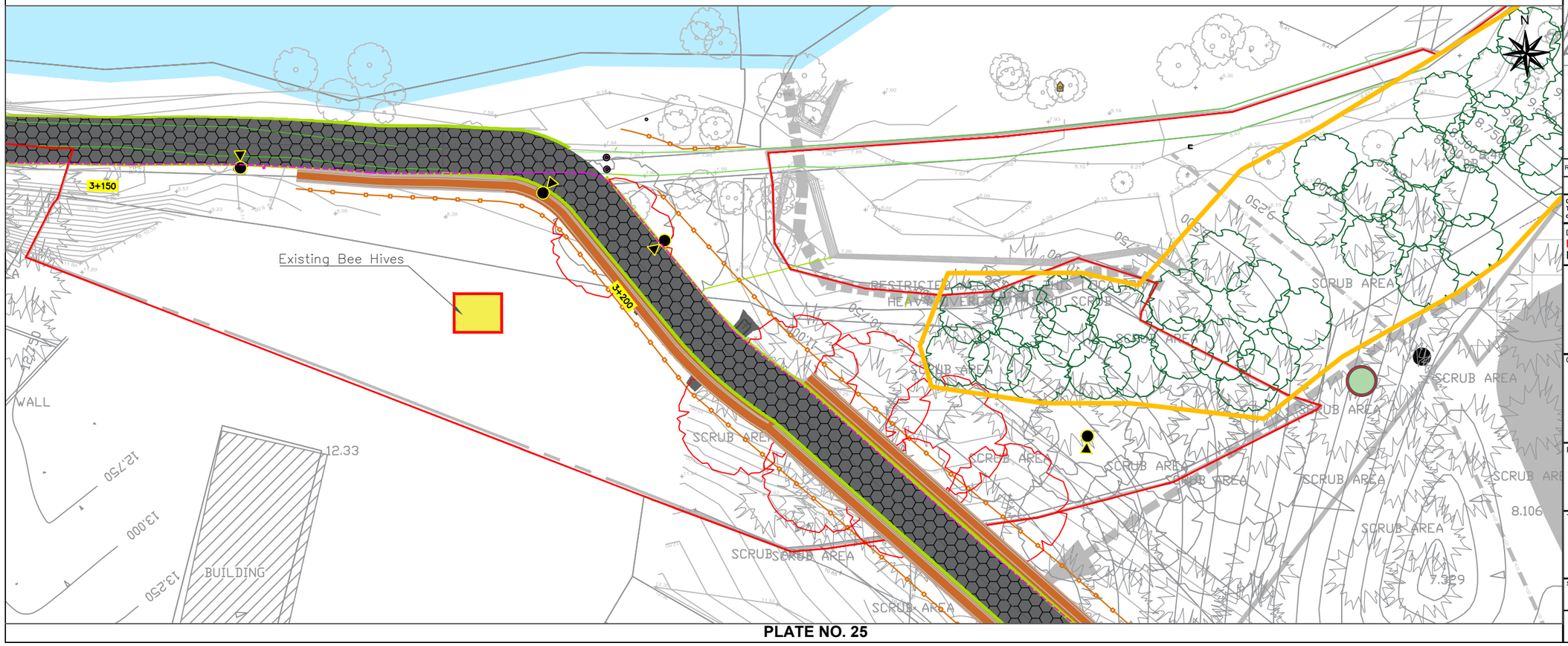

PLATE NO. 25

Notes

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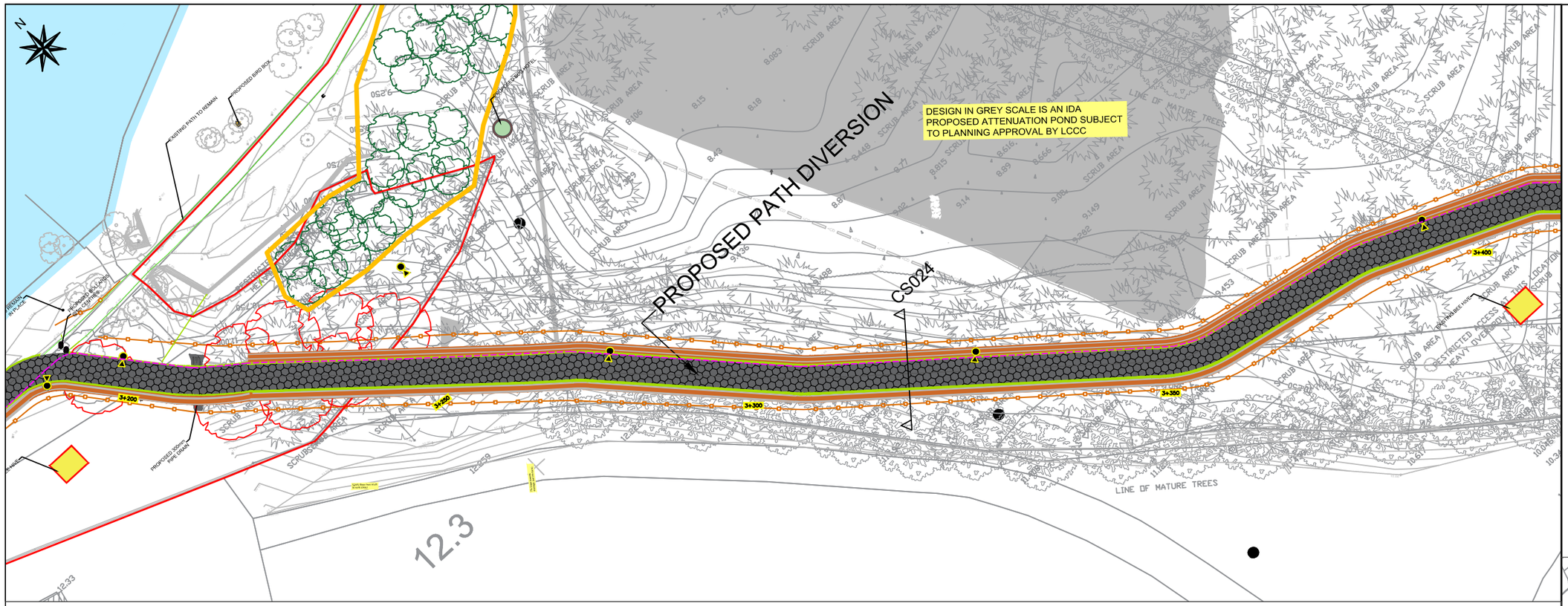

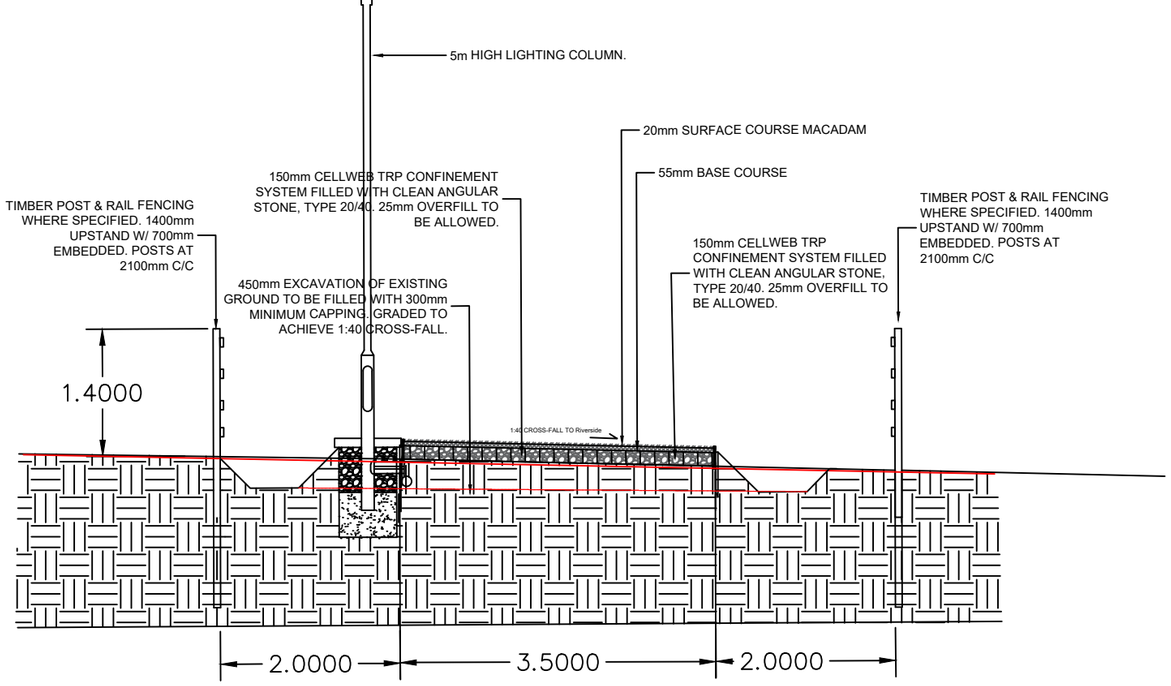

CS024

PLATE NO. 26

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1:200	OCT 2023	KB	BL	PS

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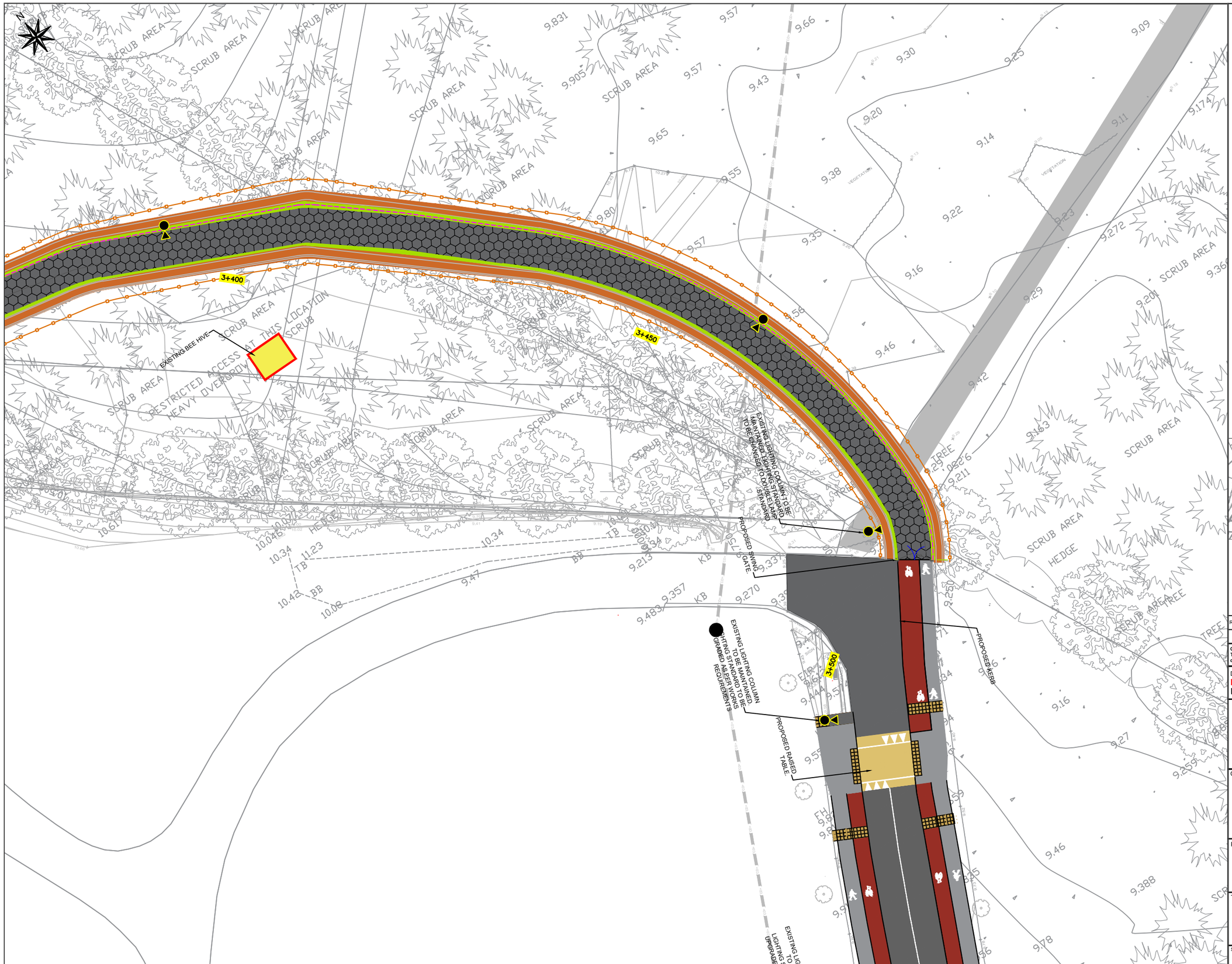

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JOB No.	CAD FILE PATH	DRAWING No.	REV.
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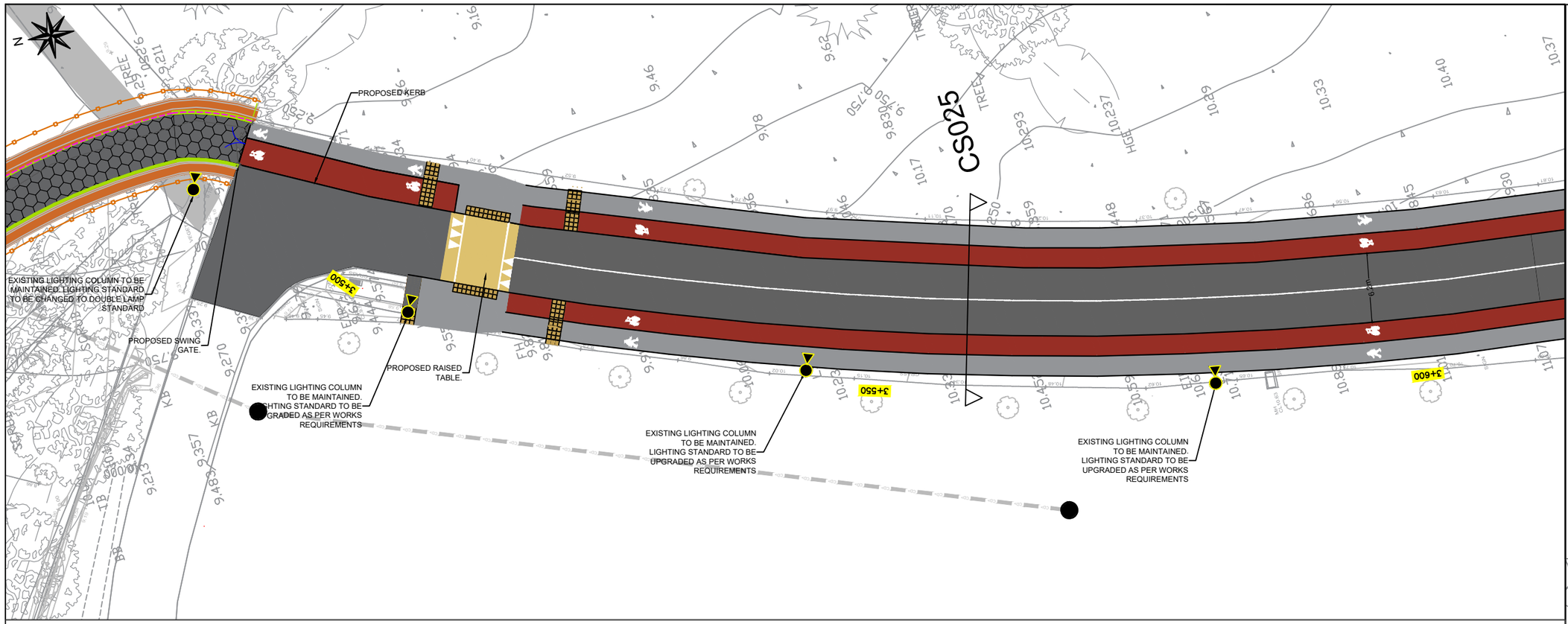
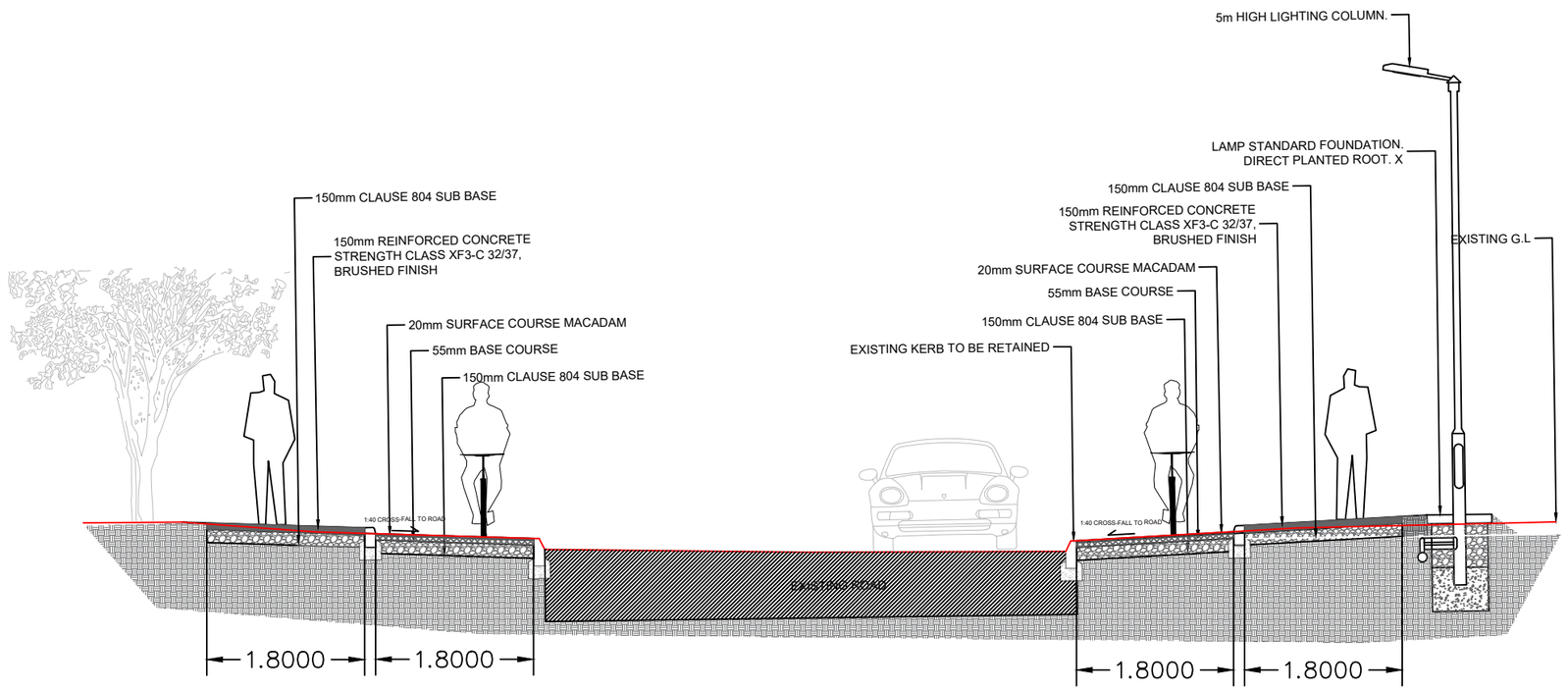
PLATE NO. 27





CS025

PLATE NO. 28

Notes

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Legend

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- Structural Bridge/Deck
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- Proposed Raised Table
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- Proposed Blister Tactile Paving
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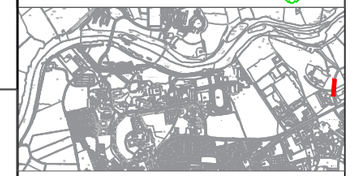
- Proposed Drain
- Existing Path
- Wooden Post & Rail Fencing
- Metal Parapet
- Electrical Ducting for Lighting
- SAC Boundary Line
- Area for Replacement Tree Planting
- 5m High Lighting Column
- Existing Tree - To Be Retained
- Existing Tree - To Be Removed
- New Tree - To Be Planted



REV	DATE	DRN	DESCRIPTION	CHK	APD

REVISIONS

DRAWING STATUS

☒ PRELIMINARY ☐ CONTRACT ☐ TENDER ☐ CONSTRUCTION
☐ FOR APPROVAL ☐ FOR YOUR INFORMATION ☐ AS CONSTRUCTED ☐ DRAFT

RYAN HANLEY now Stantec

CLIENT

Comhairle Cathrach & Contae Luimnigh
Limerick City & County Council

PROJECT

Limerick City Greenway (UL to NTP)

TITLE

Planning Drawings

Sheet 26 of 32

SCALE @ A1	DATE	DRAWN	CHECKED	APPROVED
1:200	OCT 2023	KB	BL	PS

JOB No.	CAD FILE PATH	DRAWING No.	REV.
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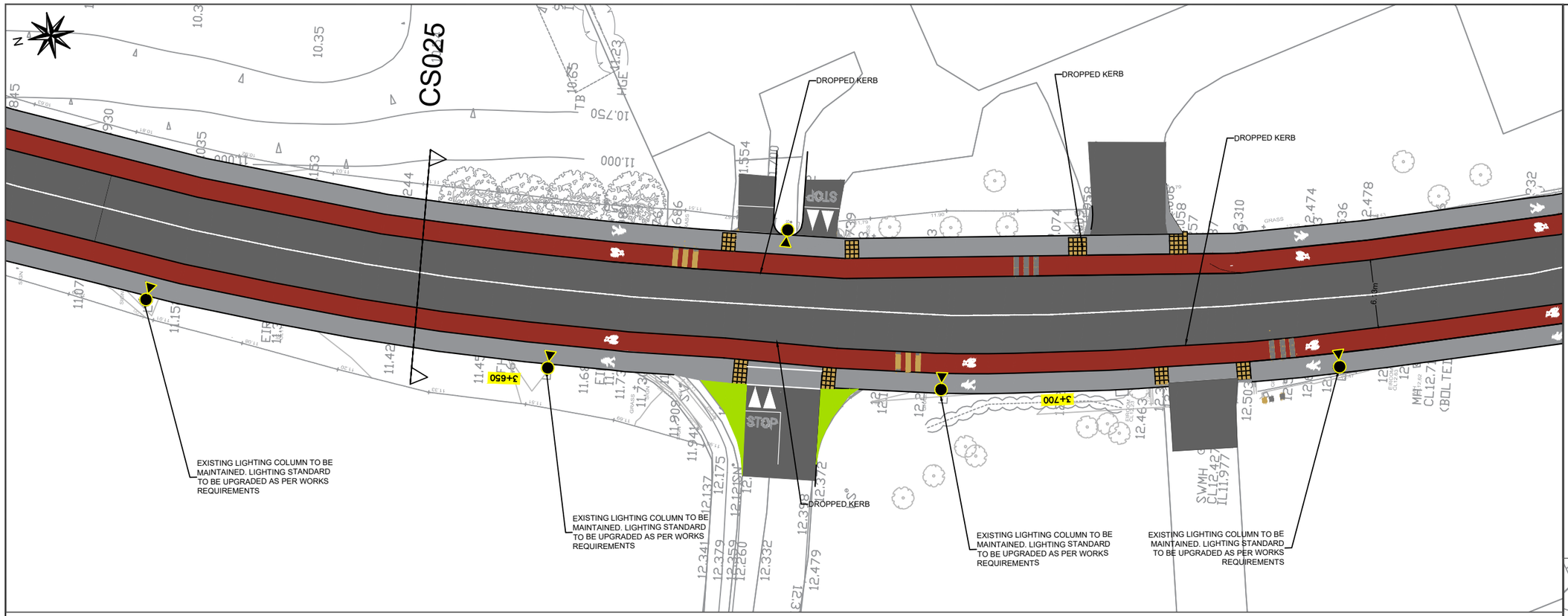

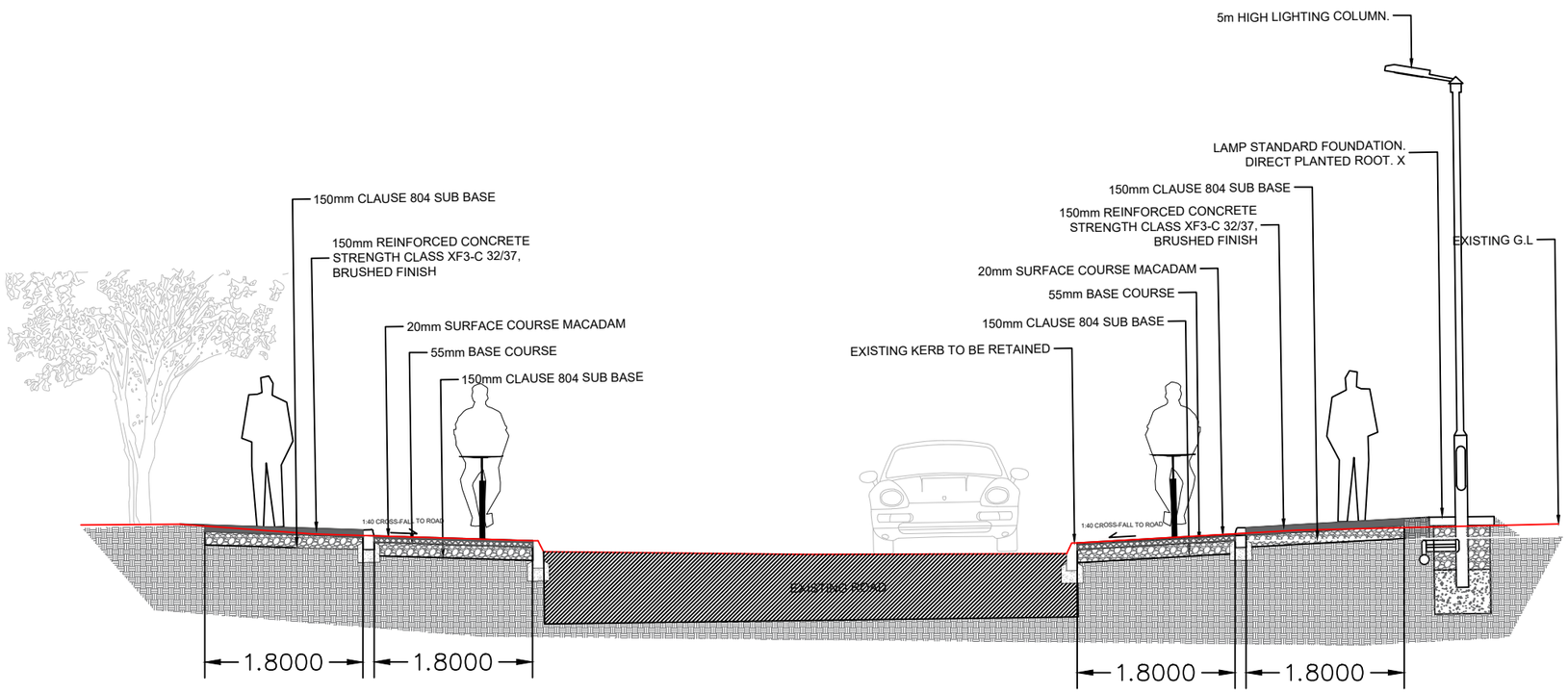

CS025

PLATE NO. 29

Notes

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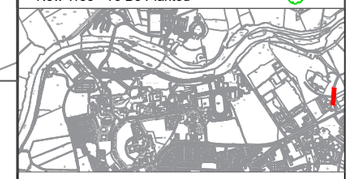

REV	DATE	DRN	DESCRIPTION	CHK	APD

REVISIONS

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RYAN HANLEY now Stantec

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Limerick City & County Council

PROJECT

Limerick City Greenway
(UL to NTP)

TITLE

Planning Drawings

Sheet 27 of 32

SCALE @ A1	DATE	DRAWN	CHECKED	APPROVED
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JOB No.	CAD FILE PATH	DRAWING No.	REV.
2535	2535 / 04 / DD / 01	PD0027	

PROPOSED TACTILE PAVING

PROPOSED RAISED TABLE WITH TOUCAN CROSSING

CONNECTION TO EXISTING FACILITIES

CONNECTION TO EXISTING FACILITIES

EXISTING SIGN TO REMAIN IN PLACE

DROPPED KERB

DROPPED KERB

3+750

3+800

3+805

EXISTING LIGHTING COLUMN TO BE MAINTAINED. LIGHTING STANDARD TO BE UPGRADED AS PER WORKS REQUIREMENTS

EXISTING LIGHTING COLUMN TO BE MAINTAINED. LIGHTING STANDARD TO BE UPGRADED AS PER WORKS REQUIREMENTS

EXISTING LIGHTING COLUMN TO BE MAINTAINED. LIGHTING STANDARD TO BE UPGRADED AS PER WORKS REQUIREMENTS

PLATE NO. 30

N

Notes

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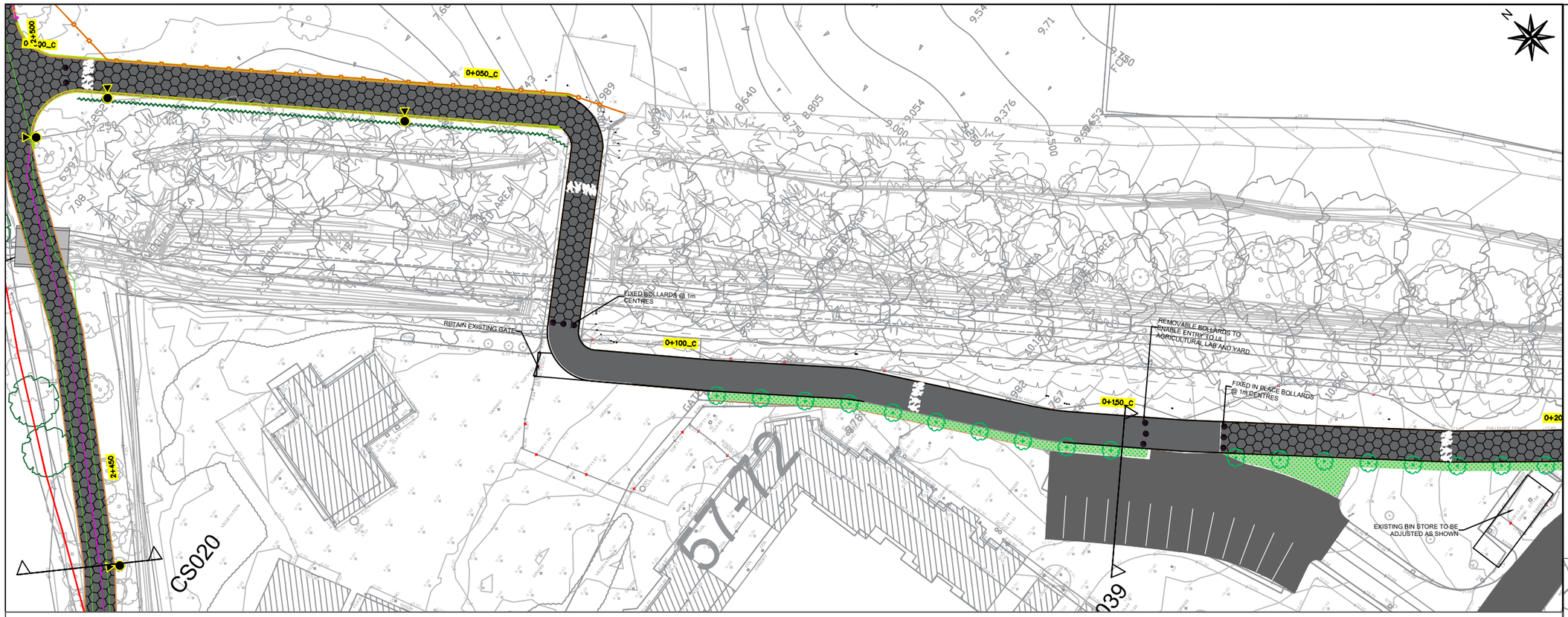
TITLE

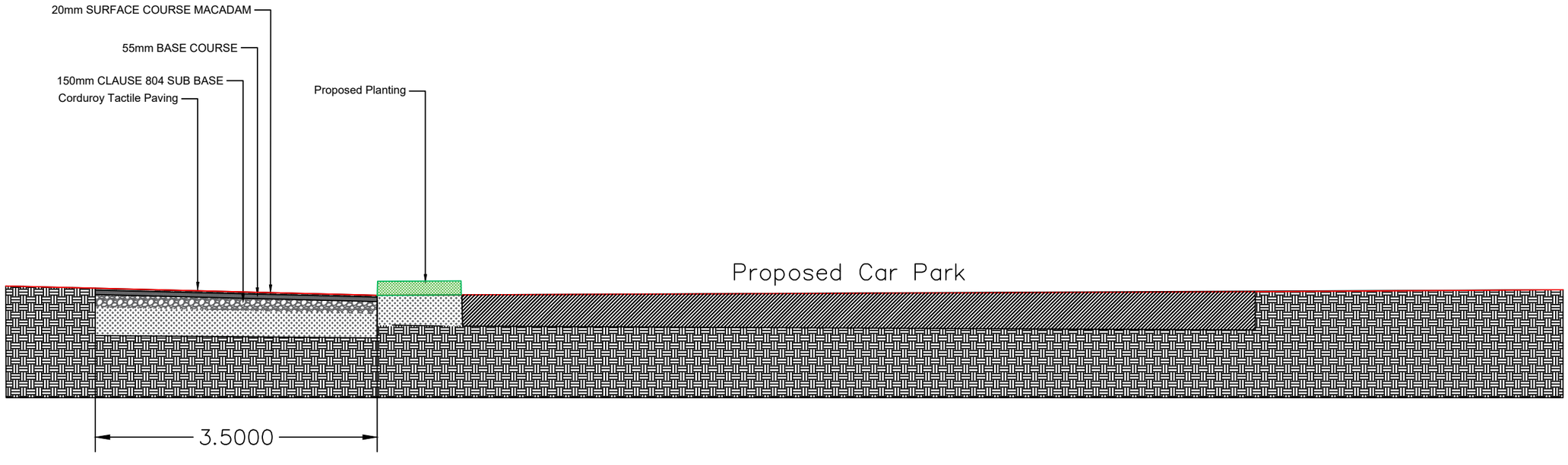
Planning Drawings

Sheet 28 of 32

SCALE @ A1	DATE	DRAWN	CHECKED	APPROVED
1:200	OCT 2023	KB	BL	PS

JOB No.	CAD FILE PATH	DRAWING No.	REV.
2535	2535 / 04 / DD / 01	PD0028	





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Limerick City Greenway
(UL to NTP)

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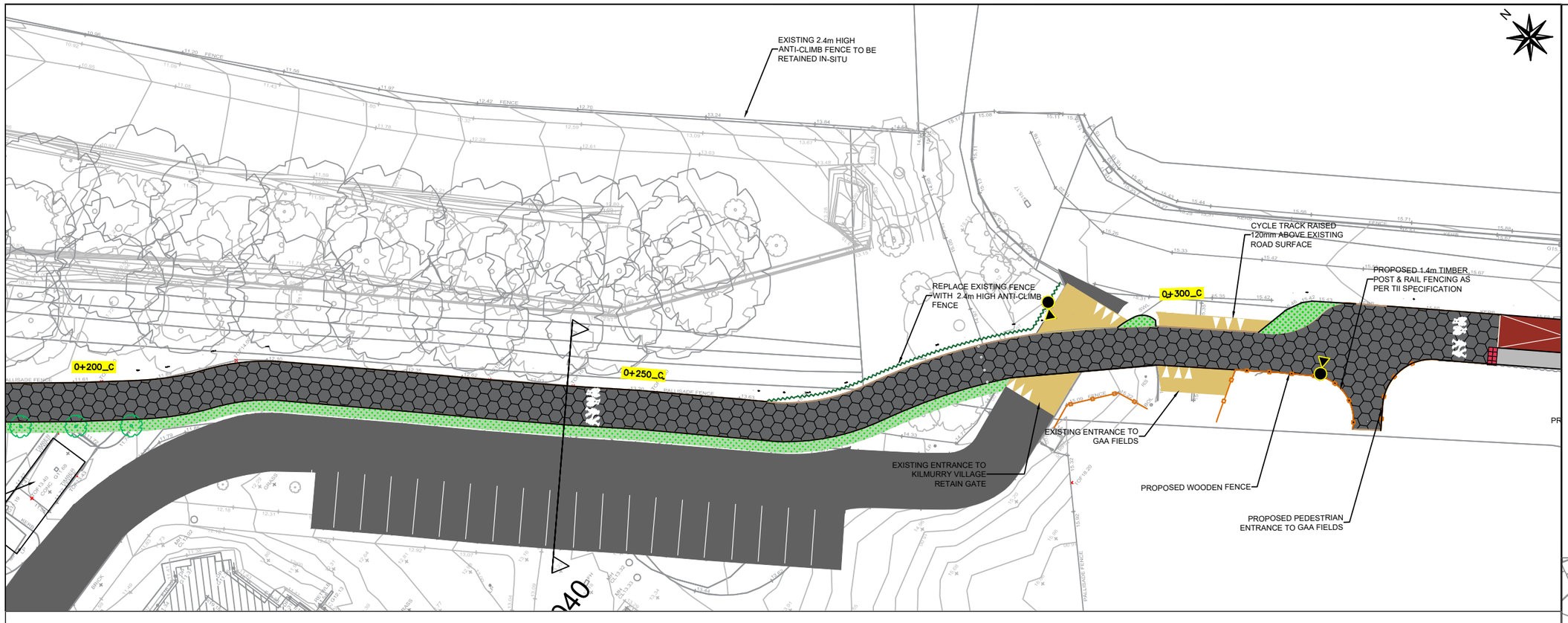
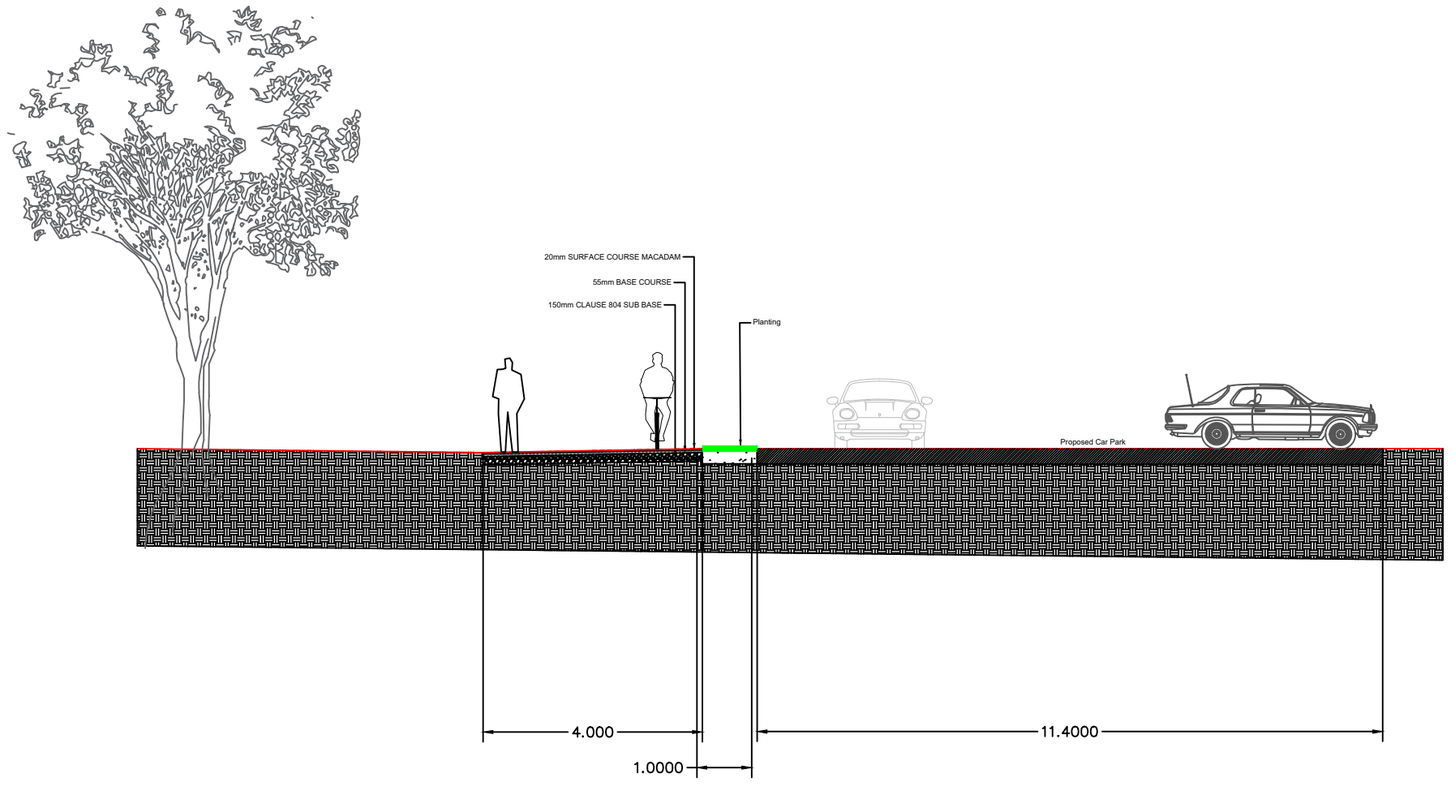
SCALE @ A1	DATE	DRAWN	CHECKED	APPROVED
1:200	OCT 2023	KB	BL	PS

JOB No.	CAD FILE PATH	DRAWING No.	REV.
2535	2535 / 04 / DD / 01	PD0029	

PLATE NO. 31





CS040

PLATE NO. 32

Notes

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Limerick City Greenway (UL to NTP)

TITLE

Planning Drawings

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SCALE @ A1	DATE	DRAWN	CHECKED	APPROVED
1:200	OCT 2023	KB	BL	PS

JOB No.	CAD FILE PATH	DRAWING No.	REV.
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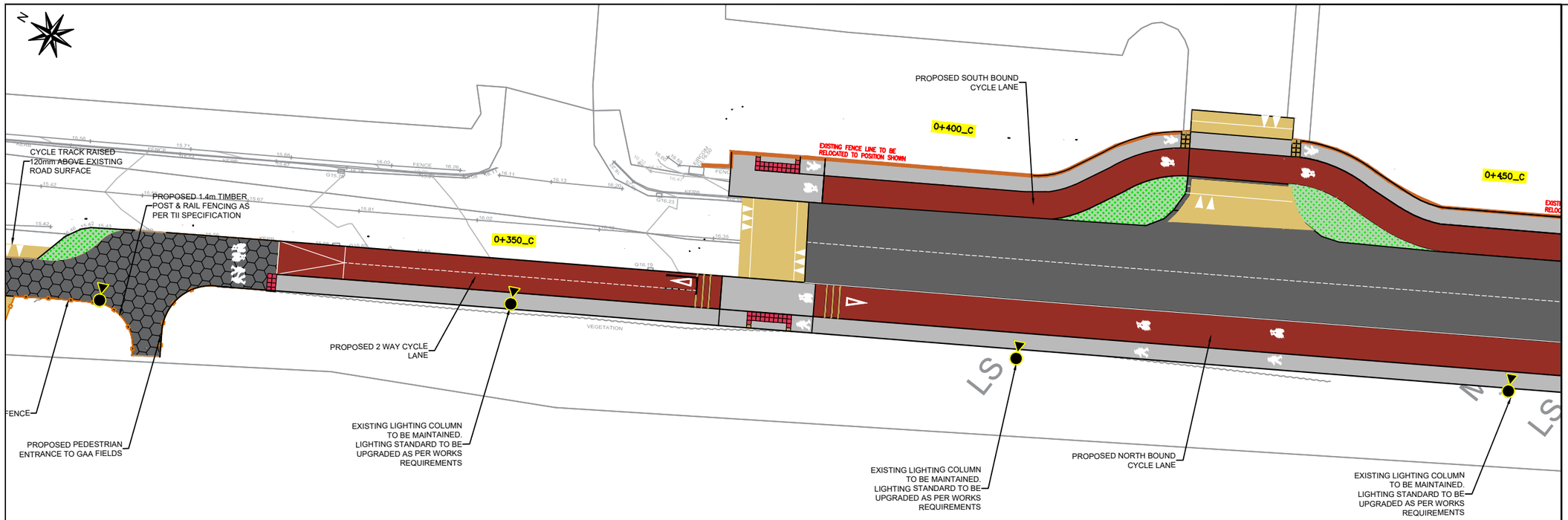

PLATE NO. 33

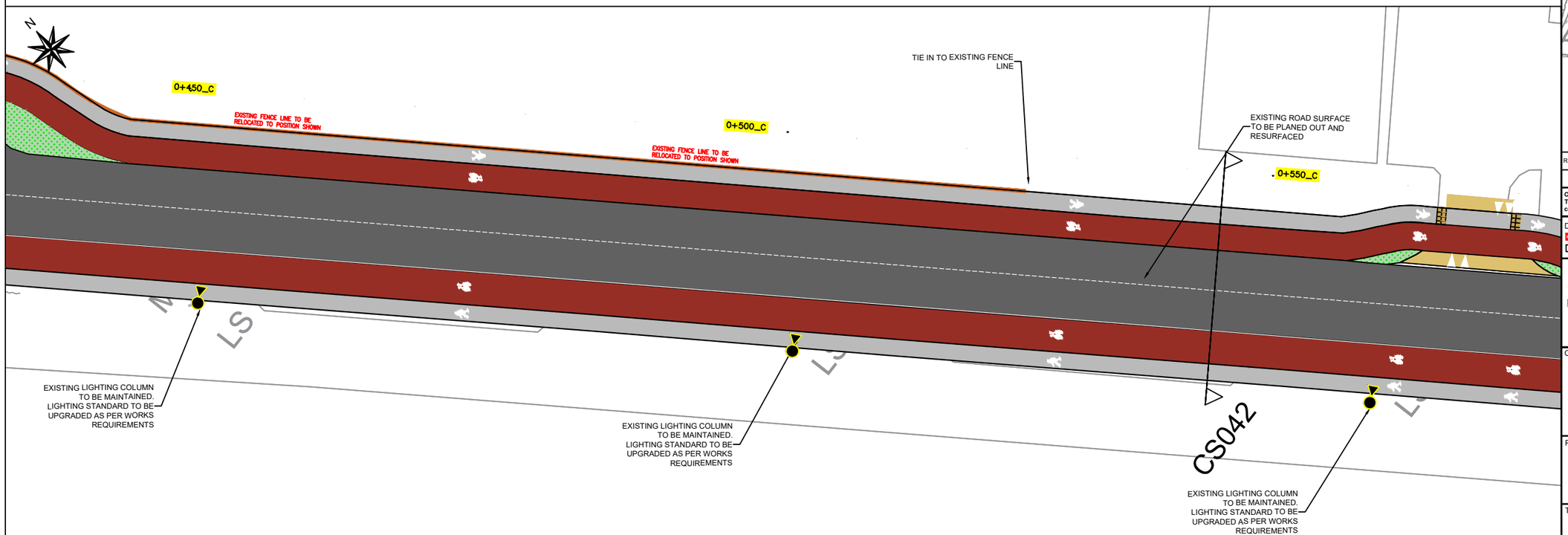

PLATE NO. 34

Notes

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REV	DATE	DRN	DESCRIPTION	CHK	APD
			REVISIONS		

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Limerick City & County Council

PROJECT

Limerick City Greenway (UL to NTP)

TITLE

Planning Drawings

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SCALE @ A1	DATE	DRAWN	CHECKED	APPROVED
1:200	OCT 2023	KB	BL	PS

JOB No.	CAD FILE PATH	DRAWING No.	REV.
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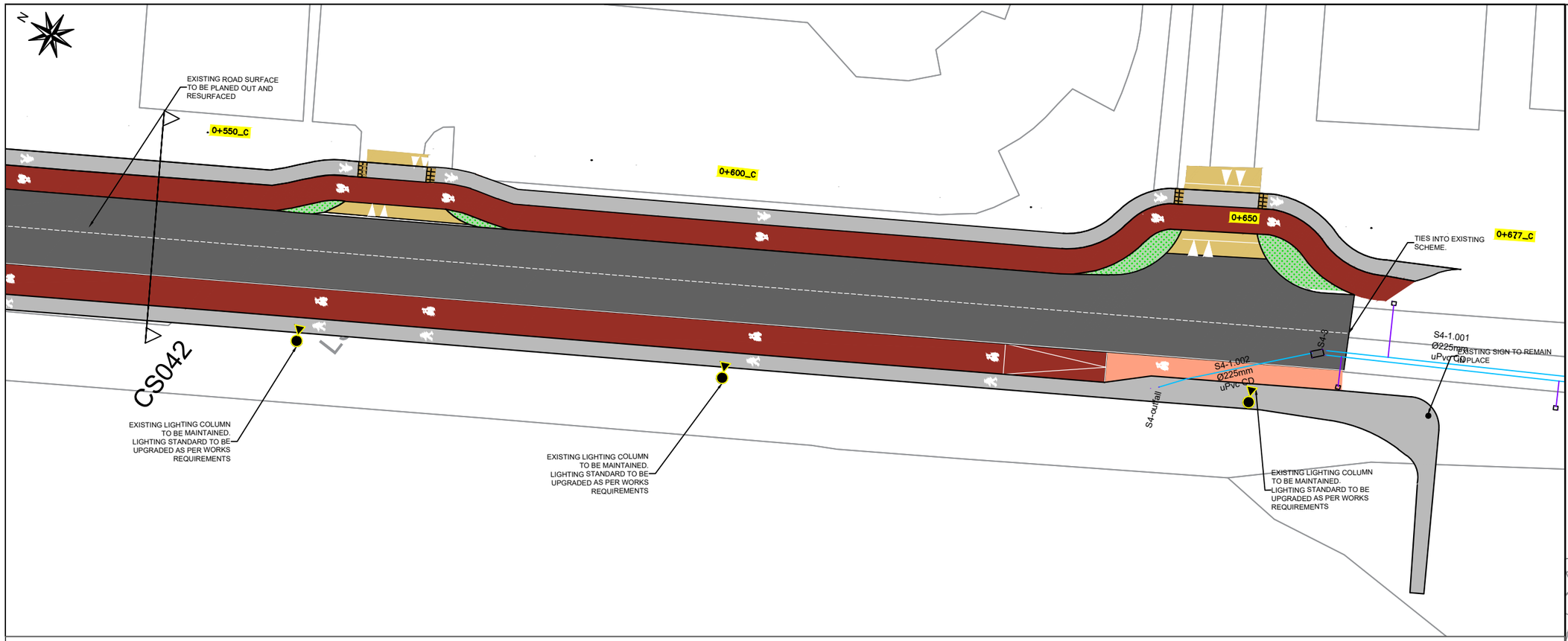

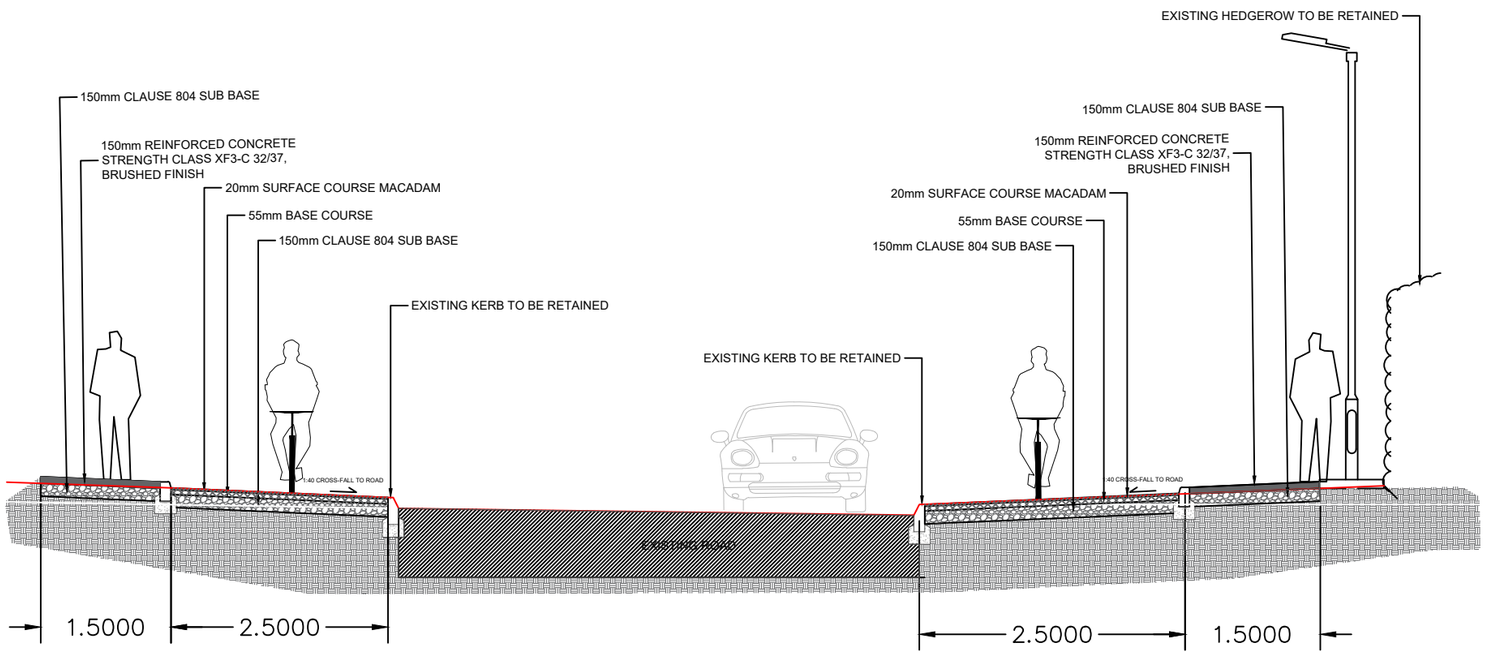

CS042

PLATE NO. 35

Notes

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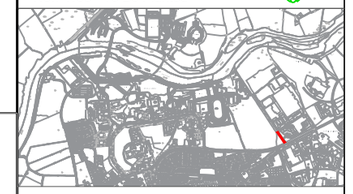

REV	DATE	DRN	DESCRIPTION	CHK	APD

REVISIONS

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RYAN HANLEY now Stantec

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Comhairle Cathrach & Contae Luimnigh
Limerick City & County Council

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Limerick City Greenway (UL to NTP)

TITLE

Planning Drawings

Sheet 32 of 32

SCALE @ A1	DATE	DRAWN	CHECKED	APPROVED
1:200	OCT 2023	KB	BL	PS

JOB No.	CAD FILE PATH	DRAWING No.	REV.
2535	2535 / 04 / DD / 01	PD0032	

Appendix B

Landscape Architecture Drawings

AREA 1

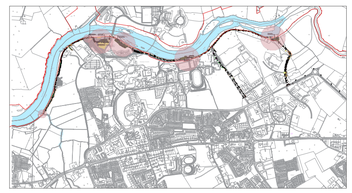
AREA 2

AREA 3

AREA 4

AREA 5

AREA 6



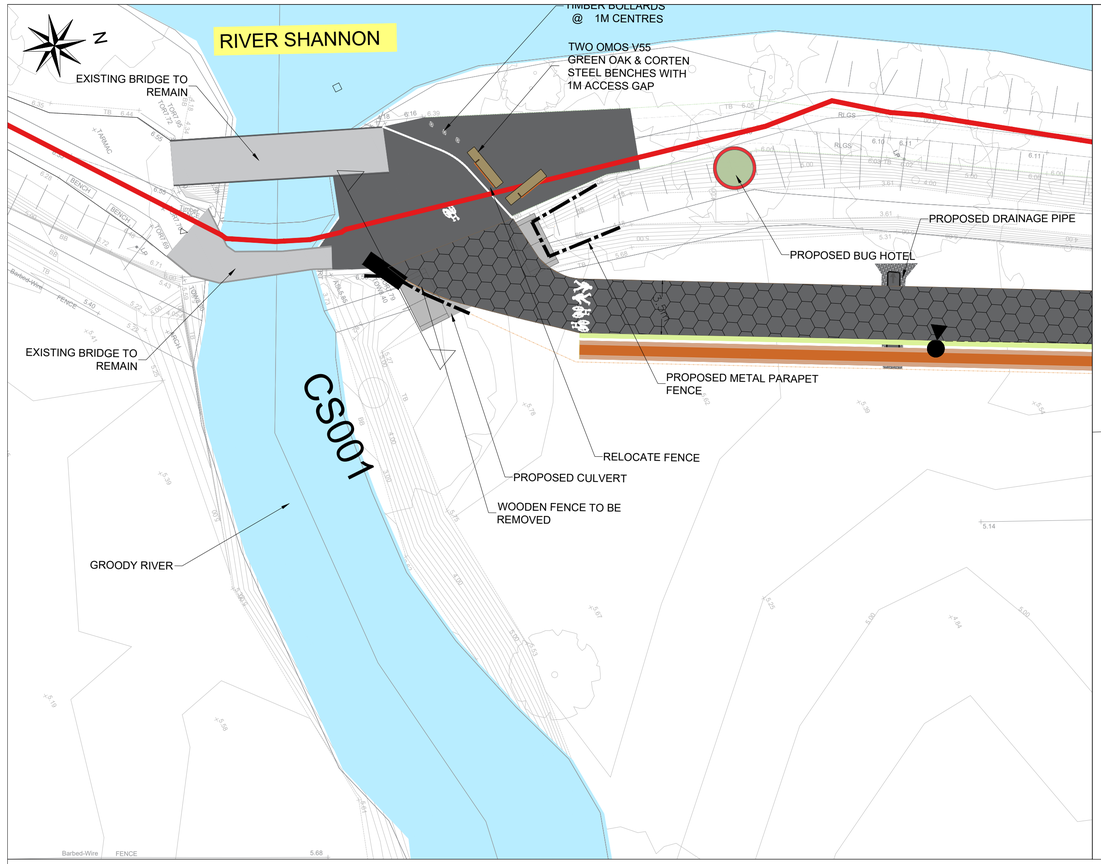
REV	DATE	AMENDMENT

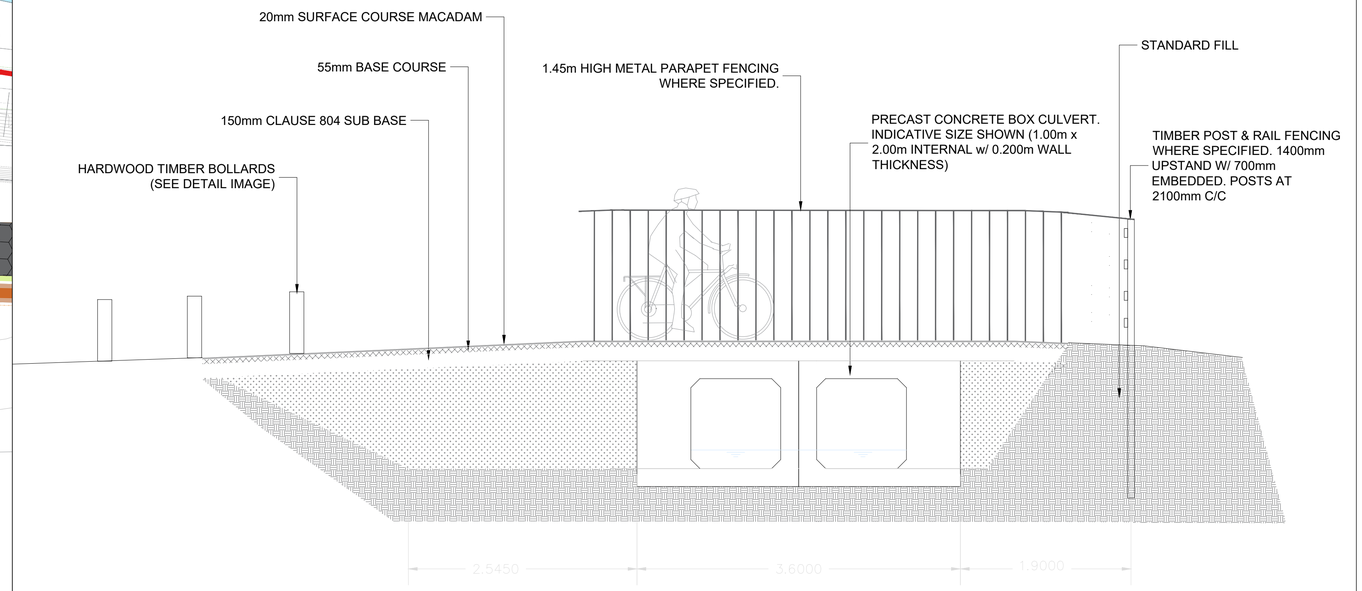
CUNNANE STRATTON REYNOLDS

LAND PLANNING & DESIGN

GALWAY OFFICE
ARDACONG, BALLYTRASNA, TUAM, CO GALWAY.
TEL 093 60854
EMAIL galwayinfo@csrlandplan.ie
www.csrlandplan.ie

PROJECT: **LIMERICK CITY GREENWAY (UL to ANNACOTTY)**	DATE: JANUARY 2025
	SCALE: 1:500 @ A1
	DRAWN: KM CHECKED: KM
DRAWING: **LANDSCAPE MASTERPLAN**	DRAWING NO: **2535-RHA-XX-DR-C-LA0001**





CS001

v55 Seat

OMOS V55 Green Oak & Corten Steel Bench
Supplier : OMOS
www.omos.ie
info@omos.ie

Green Oak hardwood timber bollards with engraved and painted detail as required.

KEY:

- PROPOSED TREES
- PROPOSED UNDERSTORY
- PROPOSED WILDFLOWER MEADOW
- PROPOSED NATIVE HEDGEROW
- SAC BOUNDARY

REV	DATE	AMENDMENT

CUNNANE STRATTON REYNOLDS
LAND PLANNING & DESIGN

GALWAY OFFICE
ARDACONG, BALLYTRASNA, TUAM, CO GALWAY.
TEL 093 60854
EMAIL galwayinfo@csrlandplan.ie
www.csrlandplan.ie

PROJECT: **LIMERICK CITY GREENWAY (UL to ANNACOTTY)**	DATE: JANUARY 2025
	SCALE: 1:200 @ A1
	DRAWN: KM CHECKED: KM
DRAWING: **LANDSCAPE MASTERPLAN AREA 1**	DRAWING NO: **2535-RHA-XX-DR-C-LA0002**

N

7..48

WOODLAND MIX (approx 32sqm)

Tree Species	Specification	Density	No
Quercus robur	10-12cm girth / 2.5-3m high	1per / 10lin.m	2

Understory	Specification	Density	No
25% Corylus avellana	1+2 br transplant / 60-90cm	1per / 4sqm	2
25% Ilex aquifolium	1+2 br transplant / 60-90cm	1per / 4sqm	2
25% Viburnum opulus	1+2 br transplant / 60-90cm	1per / 4sqm	2
25% Euonymous europaeus	1+2 br transplant / 60-90cm	1per / 4sqm	2

WOODLAND MIX (approx 1900sqm)

Tree Species	Specification	Density	No
Alnus glutinosa	6-8cm girth / 2.5-3m high	1per / 25sqm	20
Betula pubescens	6-8cm girth / 2.5-3m high	1per / 25sqm	35
Quercus robur	6-8cm girth / 2.5-3m high	1per / 25sqm	20

Understory	Specification	Density	No
30% Corylus avellana	1+2 br transplant / 60-90cm	1per / 4sqm	150
20% Ilex aquifolium	1+2 br transplant / 60-90cm	1per / 4sqm	100
30% Viburnum opulus	1+2 br transplant / 60-90cm	1per / 4sqm	150
20% Euonymous europaeus	1+2 br transplant / 60-90cm	1per / 4sqm	100

WOODLAND MIX (approx 3,200sqm)

Tree Species	Specification	Density	No
Alnus glutinosa	6-8cm girth / 2.5-3m high	1per / 25sqm	30
Betula pubescens	6-8cm girth / 2.5-3m high	1per / 25sqm	68
Quercus robur	6-8cm girth / 2.5-3m high	1per / 25sqm	30

Understory	Specification	Density	No
30% Corylus avellana	1+2 br transplant / 60-90cm	1per / 4sqm	240
20% Ilex aquifolium	1+2 br transplant / 60-90cm	1per / 4sqm	160
30% Viburnum opulus	1+2 br transplant / 60-90cm	1per / 4sqm	240
20% Euonymous europaeus	1+2 br transplant / 60-90cm	1per / 4sqm	160

HEDEGROW MIX (approx 500sqm)

Tree Species	Specification	Density	No
Quercus robur	10-12cm girth / 2.5-3m high	1per / 10 lin.m	9

Hedge mix species	Specification	Density	No
30% Corylus avellana	1+2 br transplant / 60-90cm	2per / 4sqm	300
20% Crataegus monogyna	1+2 br transplant / 60-90cm	2per / 4sqm	300
10% Ilex aquifolium	1+2 br transplant / 60-90cm	2per / 4sqm	100
10% Prunus spinosa	1+2 br transplant / 60-90cm	2per / 4sqm	100
10% Sambucus nigra	1+2 br transplant / 60-90cm	2per / 4sqm	100
10% Viburnum opulus	1+2 br transplant / 60-90cm	2per / 4sqm	100
10% Euonymous europaeus	1+2 br transplant / 60-90cm	2per / 4sqm	100

WILDFLOWER MEADOW MIX (approx 4,650sqm)

Butterfly & Bee Meadow Mix - Supplier www.connectingtonature.ie
80% grasses: 20% wildflower seeded at 1kg / 200sqm.

Species included: Agrimony, Borage, Clary, Wild Salvia verbenaca, Red Clover, White Clover, Corn Cockle, Cornflower, Ox-eye daisy, Foxglove, Greater Knapweed, Common Knapweed, Purple Loosestrife, Marjoram, Meadow Cranesbill, Musk Mallow, Common Poppy, Ragged Robin, Field Scabious, small Scabious, Teasel, Bird's-foot Trefoil, Kidney vetch, Viper's Bugloss, Yarrow, Yellow Rattle, Common bent, Crested dog's tail, Sheeps fescue, Slender creeping red fescue, Smooth-stalked meadow grass, Smaller cat's tail.

All-Ireland Pollinator Plan
www.pollinators.ie

CS011 CS012 CS013 CS014 CS015 CS016

FISHERMANS COTTAGE

PLASSEY MILLS

Plassy Mills (in Ruins)

WOODLAND MIX REPLACEMENT TREE PLANTING (SEE TABLE)

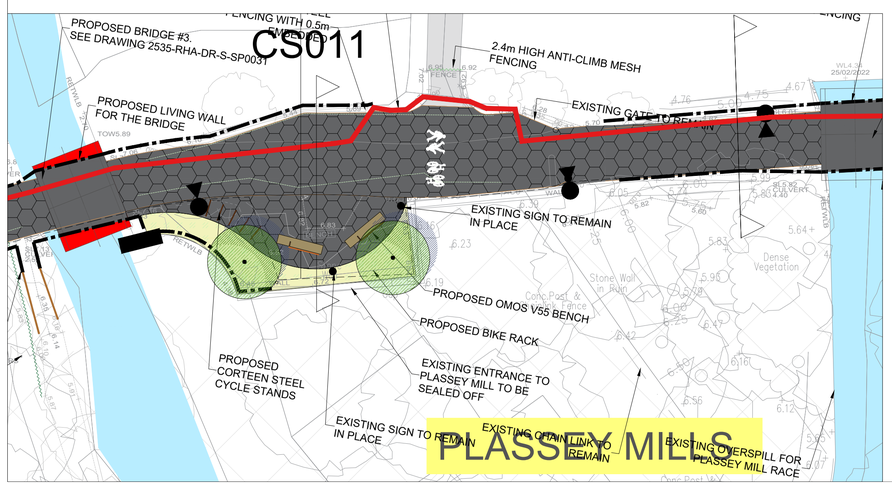
HEDGEROW

WILD FLOWER MEADOW

REPLACEMENT TREE PLANTING

KEY:

- PROPOSED TREES
- PROPOSED UNDERSTORY
- PROPOSED WILDFLOWER MEADOW
- PROPOSED NATIVE HEDGEROW
- SAC BOUNDARY



v55 Seat

OMOS V55 Green Oak & Corten Steel Bench
Supplier : OMOS
www.omos.ie
info@omos.ie

Corten Steel Cycle Stand
Supplier : Corteen Steel Ireland
www.cortensteelireland.ie
info@cortensteelireland.ie

REV	DATE	AMENDMENT

CUNNANE STRATTON REYNOLDS

LAND PLANNING & DESIGN

GALWAY OFFICE
ARDACONG, BALLYTRASNA, TUAM, CO GALWAY.
TEL 093 60854
EMAIL galwayinfo@csrlandplan.ie
www.csrlandplan.ie

PROJECT: **LIMERICK CITY GREENWAY (UL to ANNACOTTY)**	DATE: JANUARY 2025
	SCALE: 1:500 / 1:200 @ A1
DRAWING: **LANDSCAPE MASTERPLAN AREAS 2, 3 & 4**	DRAWN: KM CHECKED: KM
	DRAWING NO: **2535-RHA-XX-DR-C-LA0003**

N

CS019

PROPOSED RETAINING WALL AND BENCH ALONG PLASSEY BEACH

EXISTING SLOPE AND GRASS BANK TO BE RETAINED

PROPOSED SEATING ATTACHED TO RETAINING WALL ALONG PLASSEY BEACH

PROPOSED DISABILITY ACCESS RAMP TO UL BEACH

PROPOSED BIKE RACK

PROPOSED REPLACEMENT PLANTING

PATH NARROWS TO AVOID TREES

PROPOSED METAL PARAPET RAILINGS

EXISTING TREES WITH BAT ROOST POTENTIAL

PROPOSED BRIDGE #5SEE 2535-RHA-XX-DR-S-SP0051

EXISTING SEATING REMAIN IN PLACE

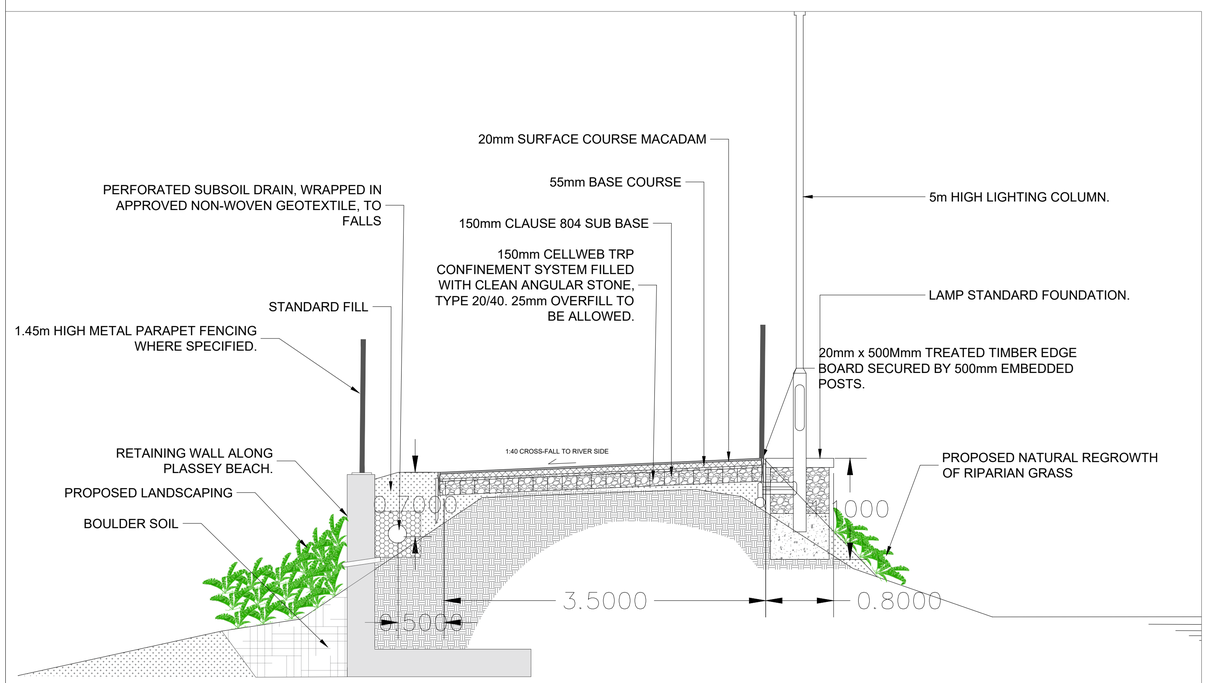
PROPOSED BIRD BOX

RIVERSIDE SHRUB MIX (approx 50sqm)

Tree Species	Specification	Density	No
10% Athyrium filix-femina	9cm pot	3/sqm	15
20% Caltha palustris	AQ 9cm pot	9/sqm	30
30% Eleocharis palustris	AQ 9cm pot	9/sqm	45
10% Iris pseudacorus	AQ 9cm pot	3/sqm	15
10% Osmunda regalis	9cm pots	3/sqm	15
10% Typha latifolia	AQ 9cm pots	3/sqm	15
10% Valeriana officinalis	AQ 9cm pots	9/sqm	15

RIVERSIDE TREE MIX (approx 1,000sqm)

Tree Species	Specification	Density	No
Alnus glutinosa	1+2 br transplant / 60-90cm	1per / 4sqm	50
Betula pubescens	1+2 br transplant / 60-90cm	1per / 4sqm	50
Salix cinerea	1+2 br transplant / 60-90cm	1per / 4sqm	50
Salix fragilis	1+2 br transplant / 60-90cm	1per / 4sqm	50
Salix purpurea	1+2 br transplant / 60-90cm	1per / 4sqm	50



REFER TO 2535-RH-XX-DR-CS-SP0052

CS019

Corten Steel Cycle Stand
Supplier : Corteen Steel Ireland
www.cortensteelireland.ie
info@cortensteelireland.ie

KEY:

- PROPOSED TREES
- EXISTING VEGETATION UNDERSTORY
- PROPOSED RIPARIAN PLANTING
- SAC BOUNDARY

REV	DATE	AMENDMENT

CUNNANE STRATTON REYNOLDS
LAND PLANNING & DESIGN

GALWAY OFFICE
ARDACONG, BALLYTRASNA, TUAM, CO GALWAY.
TEL 093 60854
EMAIL galwayinfo@csrlandplan.ie
www.csrlandplan.ie

PROJECT: **LIMERICK CITY GREENWAY (UL to ANNACOTTY)**	DATE: JANUARY 2025
	SCALE: 1:500 @ A1
DRAWING: **LANDSCAPE MASTERPLAN AREA 5**	DRAWN: KM CHECKED: KM
	DRAWING NO: **2535-RHA-XX-DR-C-LA0004**

WOODLAND MIX (approx 1,100sqm)

Tree Species	Specification	Density	No
Alnus glutinosa	6-8cm girth / 2.5-3m high	1per / 25sqm	10
Betula pubescens	6-8cm girth / 2.5-3m high	1per / 25sqm	20
Quercus robur	6-8cm girth / 2.5-3m high	1per / 25sqm	15

Understory	Specification	Density	No
30% Corylus avellana	1+2 br transplant / 60-90cm	1per / 4sqm	330
20% Ilex aquifolium	1+2 br transplant / 60-90cm	1per / 4sqm	220
30% Viburnum opulus	1+2 br transplant / 60-90cm	1per / 4sqm	330
20% Euonymous europaeus	1+2 br transplant / 60-90cm	1per / 4sqm	220

OMOS V55 Green Oak &
Corten Steel Bench

Proposed hardwood
bollards @ 1m centres

KEY:

- PROPOSED TREES
- EXISTING VEGETATION UNDERSTORY
- SAC BOUNDARY

v55 Seat

OMOS V55 Green Oak & Corten Steel Bench
Supplier : OMOS
www.omos.ie
info@omos.ie

Green Oak hardwood timber bollards with engraved and painted detail as required.

REV	DATE	AMENDMENT

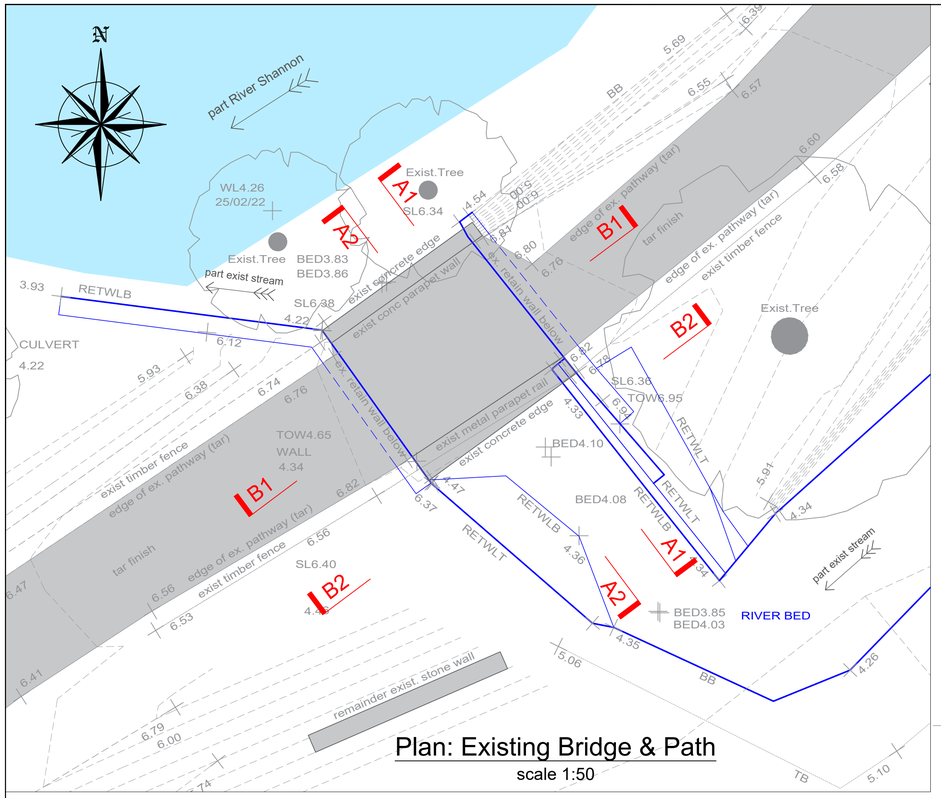
CUNNANE STRATTON REYNOLDS
LAND PLANNING & DESIGN

GALWAY OFFICE
ARDACONG, BALLYTRASNA, TUAM, CO GALWAY.
TEL 093 60854
EMAIL galwayinfo@csrlandplan.ie
www.csrlandplan.ie

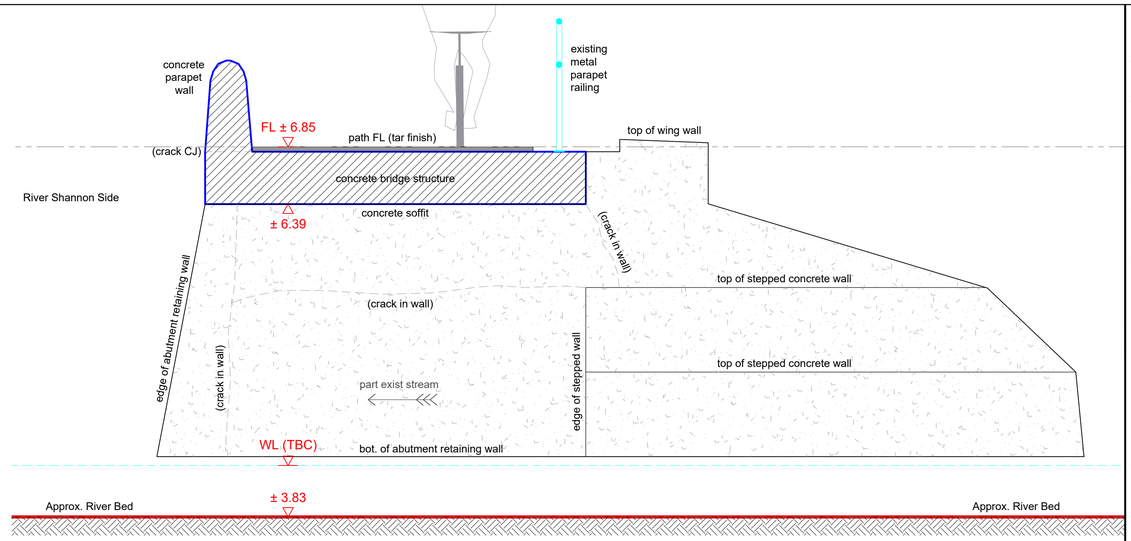
PROJECT: **LIMERICK CITY GREENWAY (UL to ANNACOTTY)**	DATE: JANUARY 2025
	SCALE: 1:500 @ A1
DRAWING: **LANDSCAPE MASTERPLAN AREA 6**	DRAWN: KM CHECKED: KM
	DRAWING NO: **2535-RHA-XX-DR-C-LA0005**

Appendix C

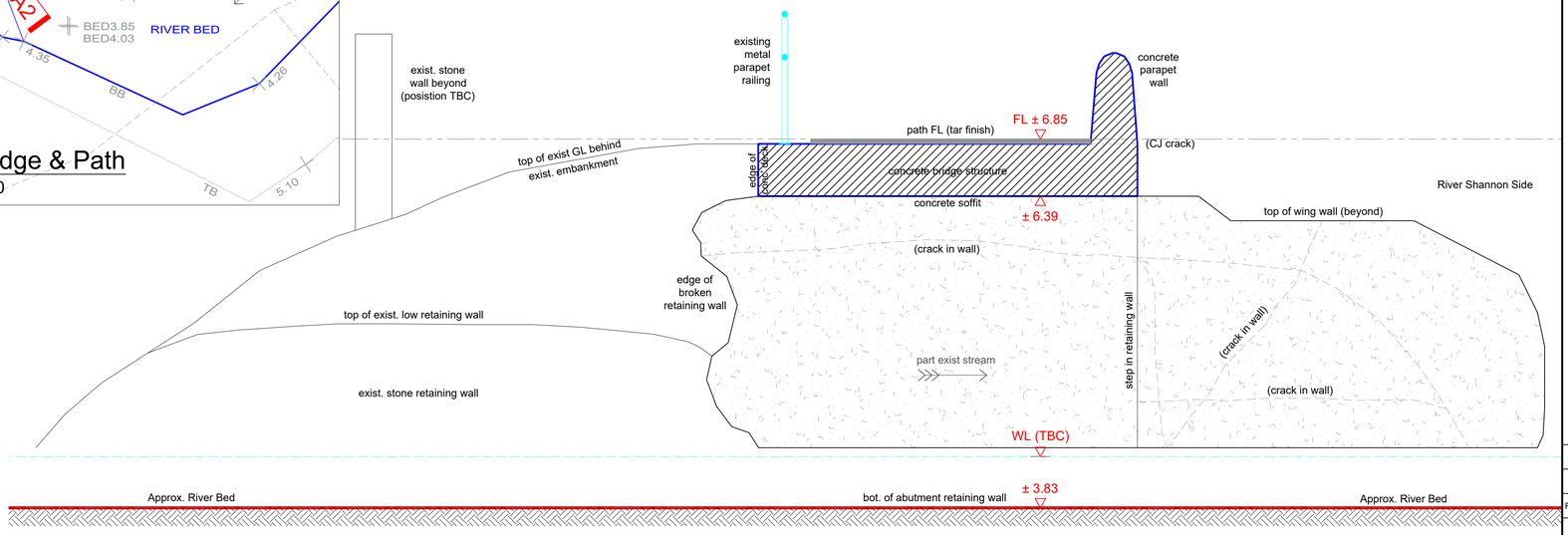
Structural Design Drawings



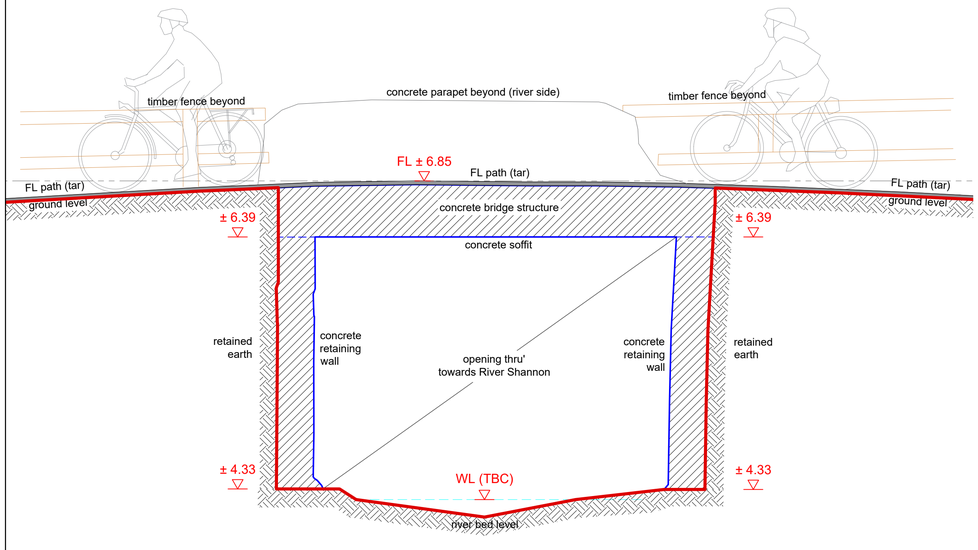
Plan: Existing Bridge & Path
scale 1:50



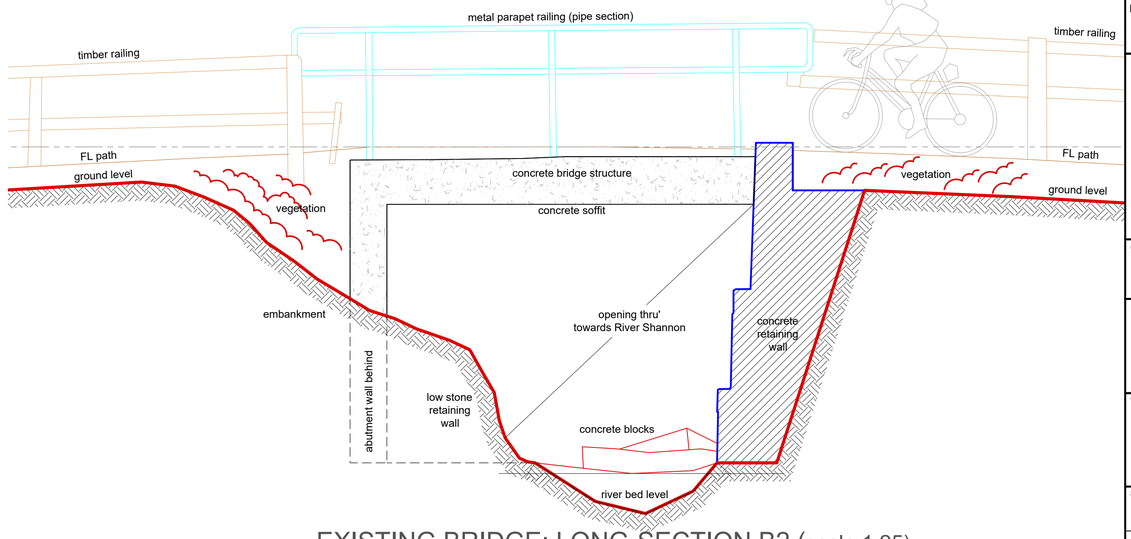
EXISTING BRIDGE: SECTIONAL-ELEVATION A1 scale 1:25



EXISTING BRIDGE: SECTIONAL-ELEVATION A2 (scale 1:25)



EXISTING BRIDGE: LONG-SECTION B1 (scale 1:25)



EXISTING BRIDGE: LONG-SECTION B2 (scale 1:25)

GENERAL NOTES

G1. This drawing is to be read in conjunction with all the relevant Architect's and Engineers' drawings and specifications.

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G3. Any discrepancies are to be reported to the Engineer.

G4. All dimensions are in millimetres unless noted otherwise. All levels are in metres relative to Ordnance Datum (OD) at Malin Head.

G5. All proprietary materials and products shall be installed and used in accordance with the manufacturer's details and specification.

G6. The design of temporary works and the provision of stability of all elements of the work during Construction is the responsibility of the Contractor.

REFERENCE DRAWINGS

2535-RHA-XX-DR-C-GA-000_R1	GA Detail Design.
2535-RHA-XX-DR-S-SKP001	Key Plan New Bridges.

REV	DATE	DESCRIPTION	DRG	CHK	APD
-	17.05.2022	Draft for Approval & Planning Purposes	ASM	PGS	BL

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DUBLIN - GALWAY - CASTLEBAR - CORK

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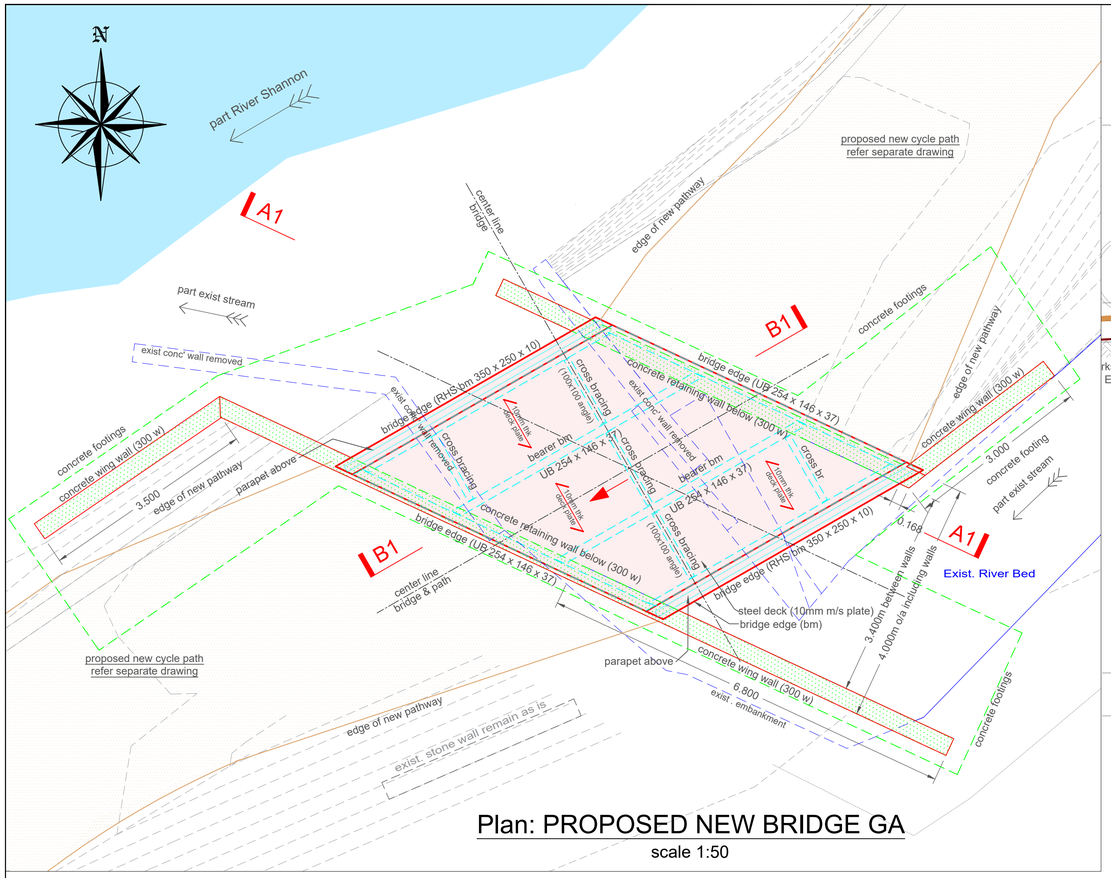
University of Limerick to National Technology Park Cycle Path

TITLE
BRIDGE 1: EXISTING PLAN ELEVATIONS & SECTIONS

Sheet 1 of 1

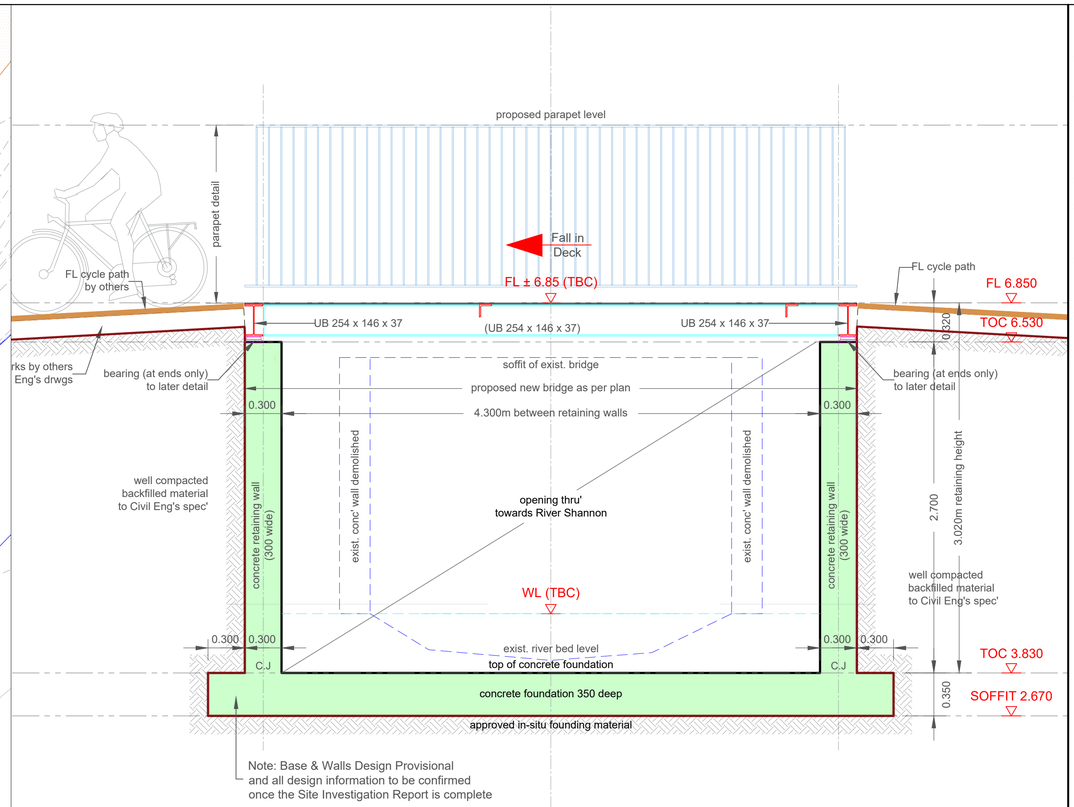
SCALE @ A1	DATE	DRAWN	CHECKED	APPROVED
As Shown	April 2022	ASM	PGS	RW

JOB No.	DRAWING No.	REV.
2535	RHA-XX-DR-S-SP0010	-

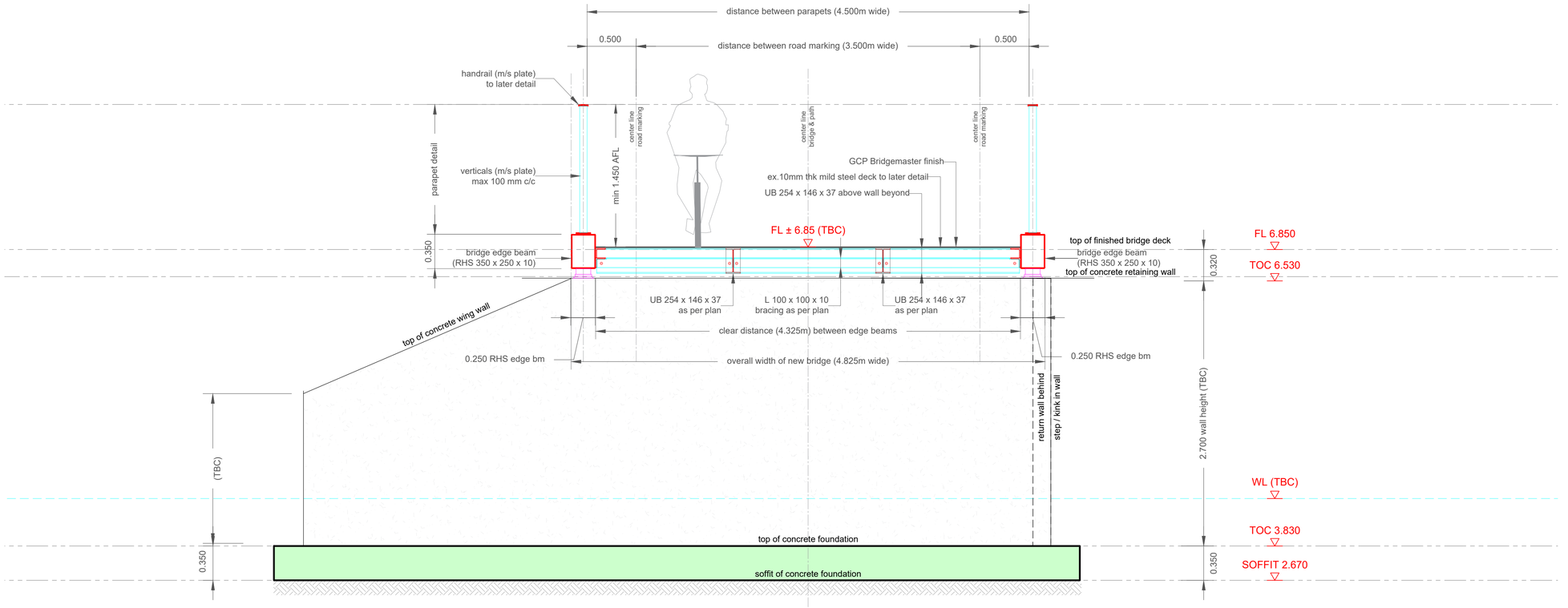


Plan: PROPOSED NEW BRIDGE GA

scale 1:50



PROPOSED BRIDGE: LONG-SECTION B1 scale 1:25



PROPOSED BRIDGE: SECTIONAL-ELEVATION A1 scale 1:25

GENERAL NOTES

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G6. The design of temporary works and the provision of stability of all elements of the work during Construction is the responsibility of the Contractor.

REFERENCE DRAWINGS

2535-RHA-XX-DR-C-GA-000_R1	GA Detail Design.
2535-RHA-XX-DR-S-SKP001	Key Plan New Bridges.
2535-RHA-XX-DR-S-SP0010	Existing Plan & Elevations.

NOTE: AWAITING FINAL SITE INSVESTIGATION REPORT

Foundations and Walls Design are Provisional, and all the information shown to be confirmed once the Final Site Investigation Report is complete and confirmed.

REV	DATE	DESCRIPTION	DRG	CHK	APD
-	17.05.2022	Draft for Approval & Planning Purposes	ASM	PGS	BL

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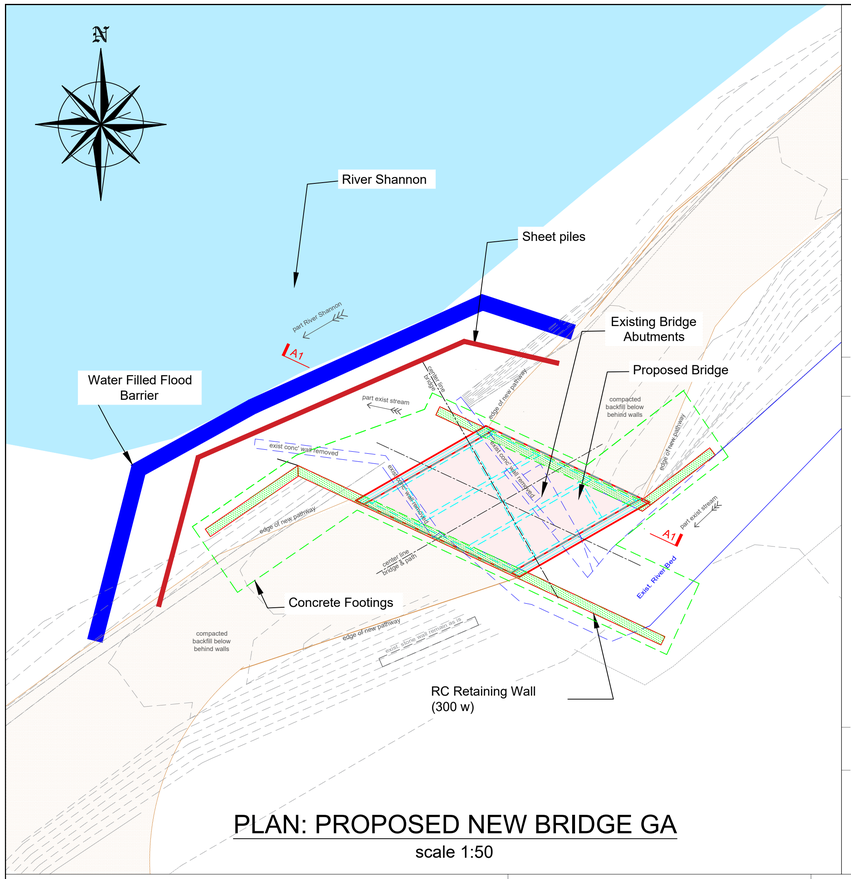
University of Limerick to National Technology Park Cycle Path

TITLE
BRIDGE 1: PROPOSED PLAN ELEVATIONS & SECTIONS

Sheet 1 of 1

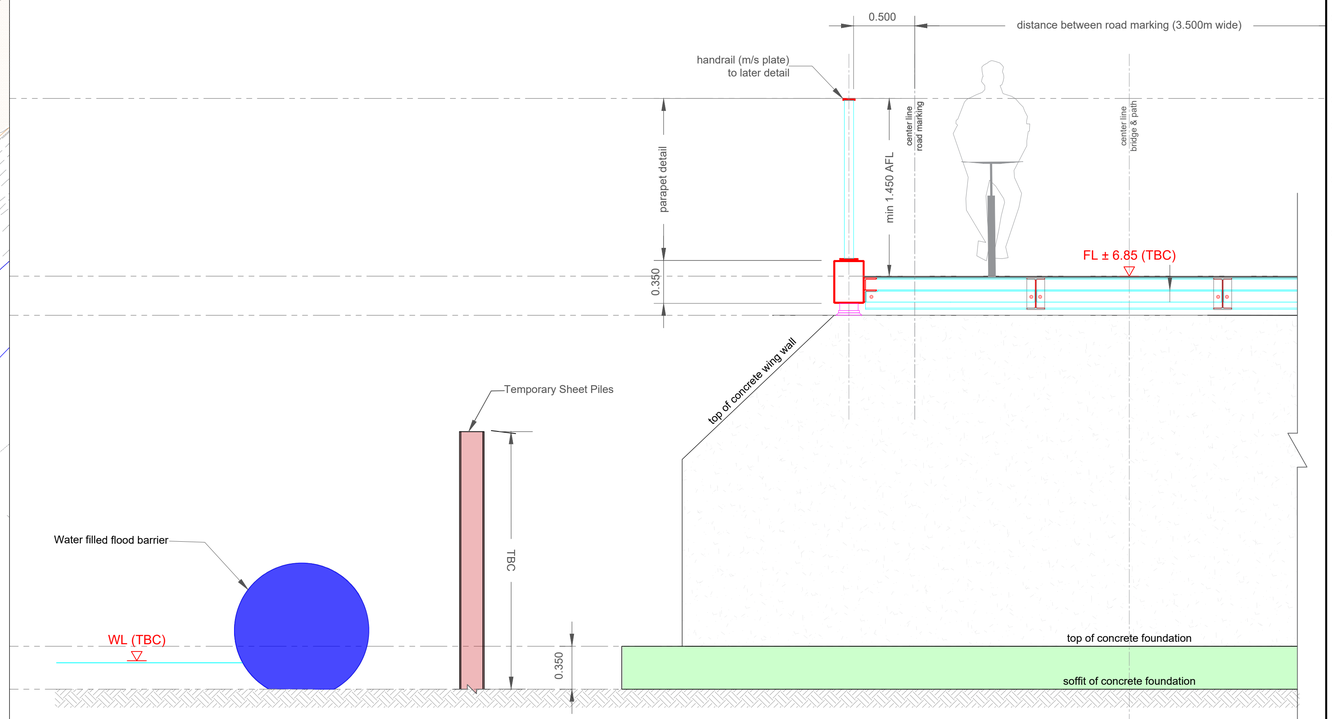
SCALE @ A1	DATE	DRAWN	CHECKED	APPROVED
As Shown	April 2022	ASM	PGS	RW

JOB No.	DRAWING No.	REV.
2535	RHA-XX-DR-S-SP0011	-



PLAN: PROPOSED NEW BRIDGE GA

scale 1:50



PROPOSED BRIDGE: SECTIONAL-ELEVATION A1 scale 1:25

GENERAL NOTES

G1. This drawing is to be read in conjunction with all the relevant Architect's and Engineers' drawings and specifications.

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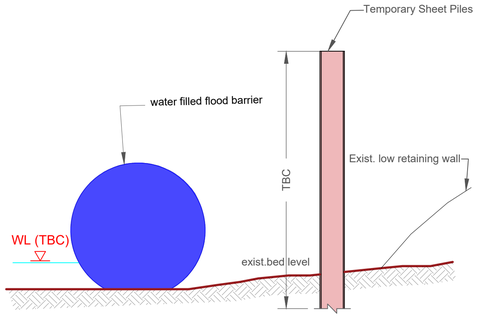
REFERENCE DRAWINGS

2535-RHA-XX-DR-C-GA-000_R1	GA Detail Design.
2535-RHA-XX-DR-S-SKP001	Key Plan New Bridges.
2535-RHA-XX-DR-S-SP0010	Existing Plan & Elevations.
2535-RHA-XX-DR-S-SP0011	Proposed Plan & Elevations.

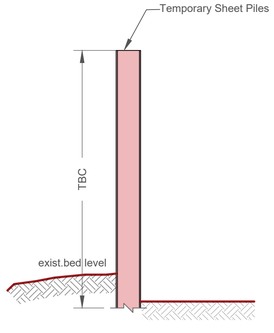
NOTE: AWAITING FINAL SITE INSVESTIGATION REPORT

Foundations and Walls Design are Provisional, and all the information shown to be confirmed once the Final Site Investigation Report is complete and confirmed.

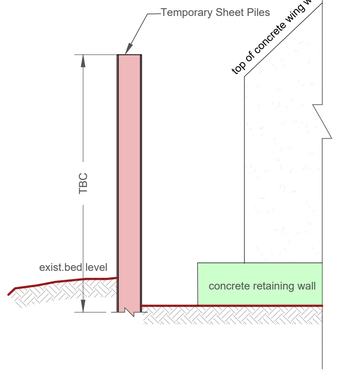
STEP 1
Install water barrier & sheet piles



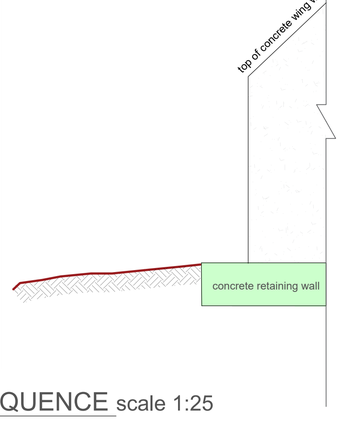
STEP 2
Take down existing bridge abutments.Store on site to be reused as backfill. Excavate behind sheetpile.



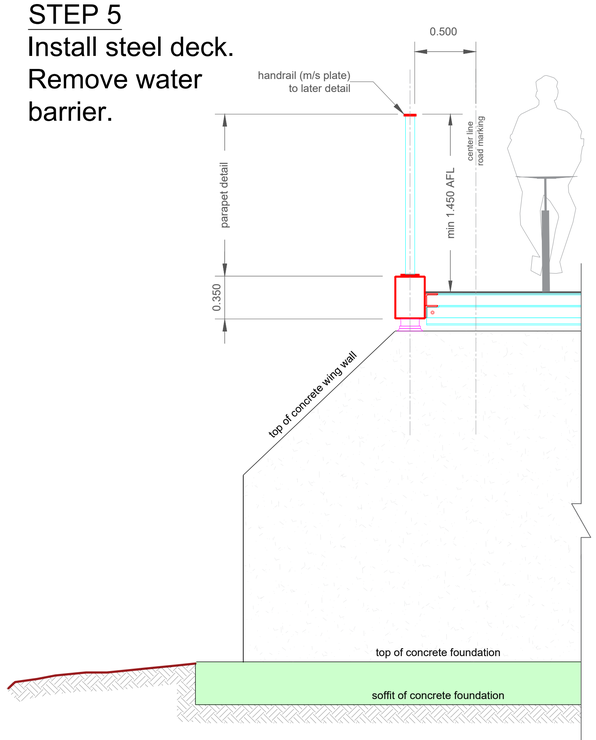
STEP 3
Construct proposed abutments.



STEP 4
Remove sheetpiles and backfill



STEP 5
Install steel deck. Remove water barrier.



PROPOSED CONSTRUCTION SEQUENCE scale 1:25

REV	DATE	DESCRIPTION	DRG	CHK	APD

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DUBLIN - GALWAY - CASTLEBAR - CORK

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PROJECT

University of Limerick to National Technology Park Cycle Path

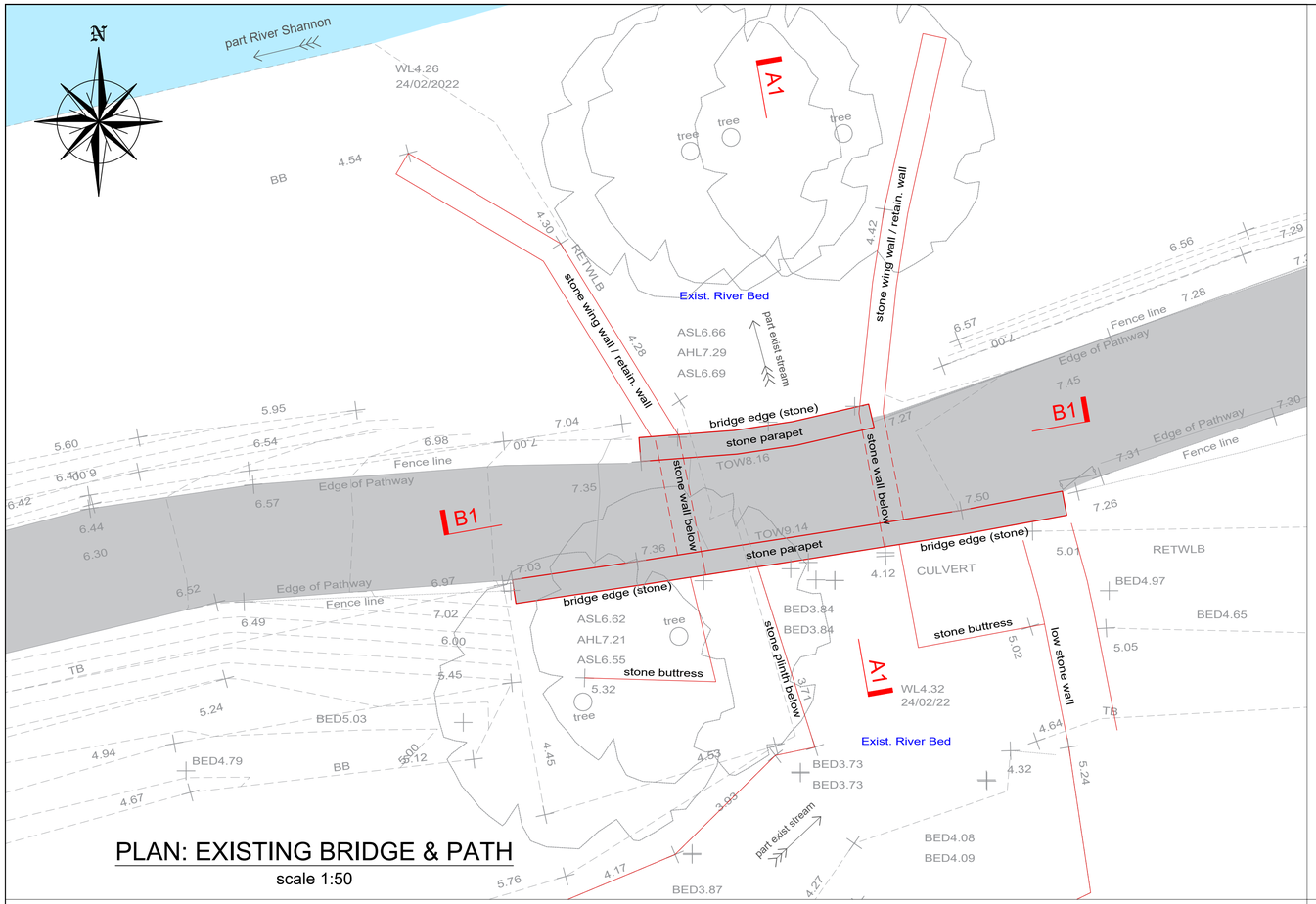
TITLE

BRIDGE 1: POSSIBLE CONSTRUCTION SEQUENCE PLAN & SECTIONS

Sheet 1 of 1

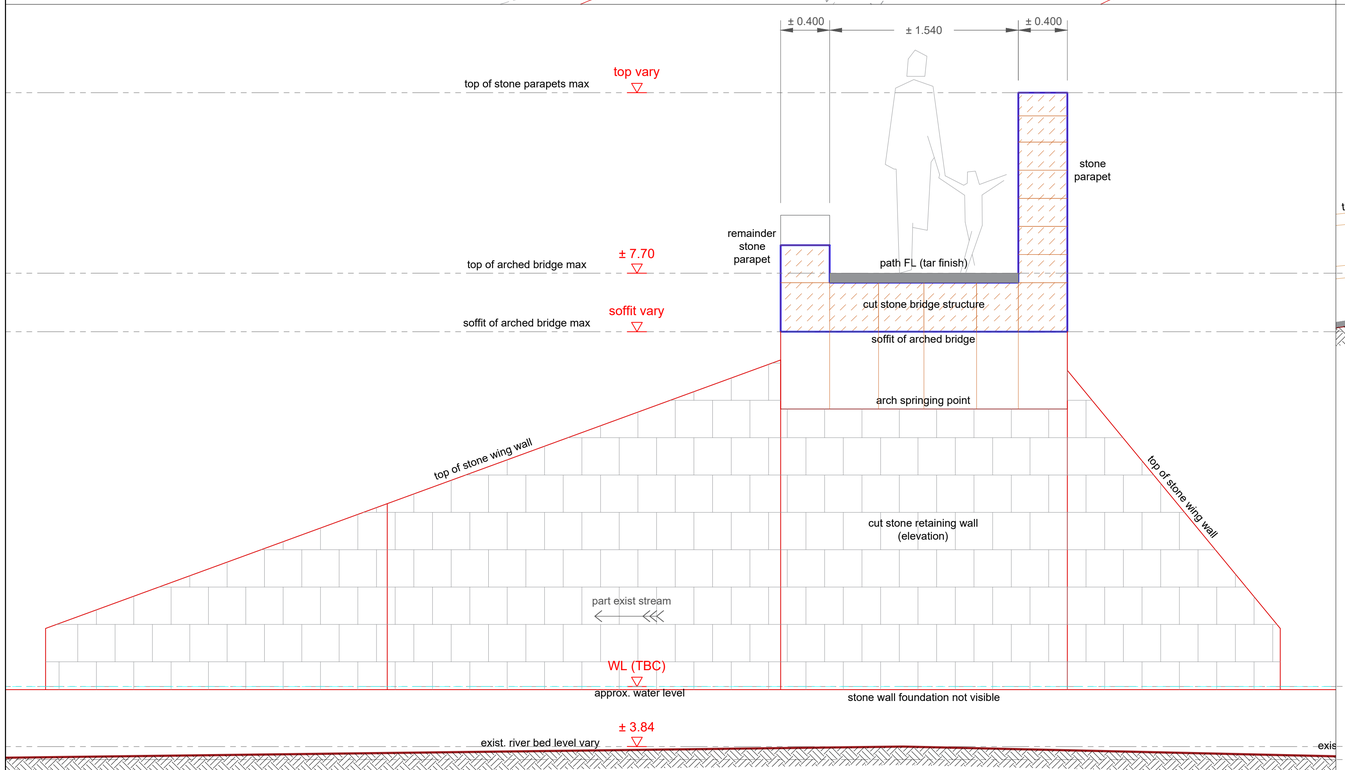
SCALE @ A1	DATE	DRAWN	CHECKED	APPROVED
As Shown	May 2025	AMR	BL	BL

JOB No.	DRAWING No.	REV.
2535	RHA-XX-DR-S-SP0012	-

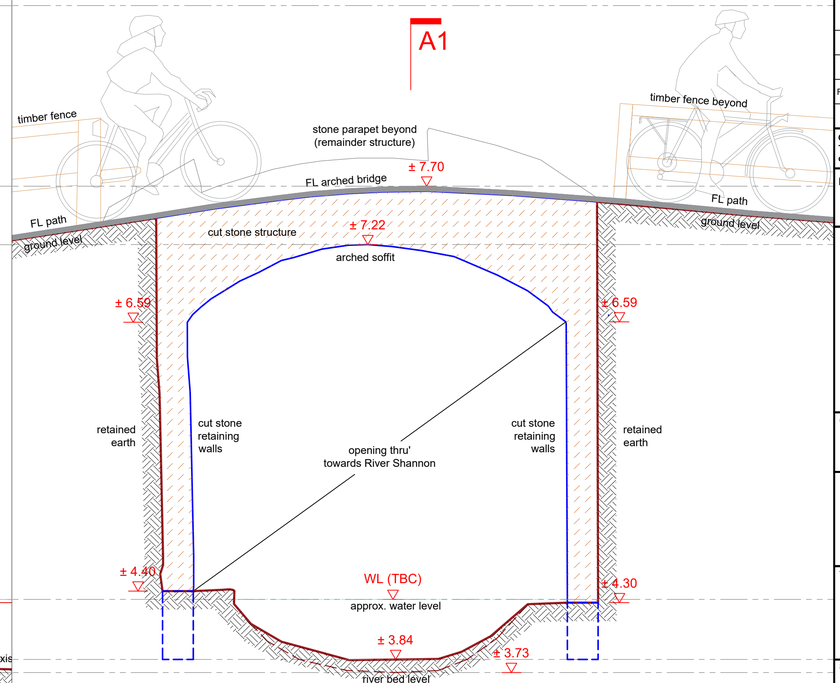


PLAN: EXISTING BRIDGE & PATH

scale 1:50



EXISTING BRIDGE: SECTIONAL-ELEVATION A1 (scale 1:25)



EXISTING BRIDGE: SECTION B1 scale 1:25

GENERAL NOTES

G1. This drawing is to be read in conjunction with all the relevant Architect's and Engineers' drawings and specifications.

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REFERENCE DRAWINGS

2535-RHA-XX-DR-C-GA-000_R1	GA Detail Design.
2535-RHA-XX-DR-S-SKP001	Key Plan New Bridges.

REV	DATE	DESCRIPTION	DRG	CHK	APD
-	17.05.2022	Draft for Approval & Planning Purposes	ASM	PGS	BL

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University of Limerick to National Technology Park Cycle Path

TITLE
BRIDGE 2: EXISTING PLAN ELEVATIONS & SECTIONS

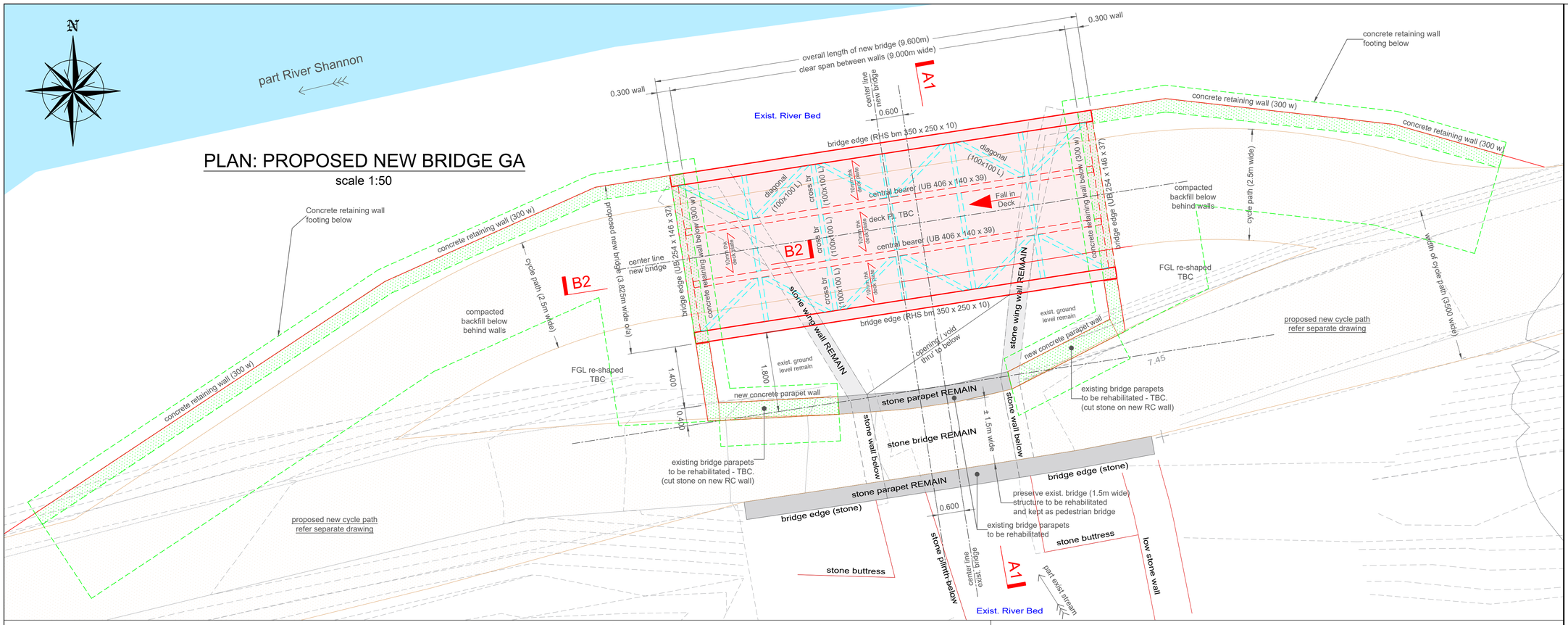
Sheet 1 of 1

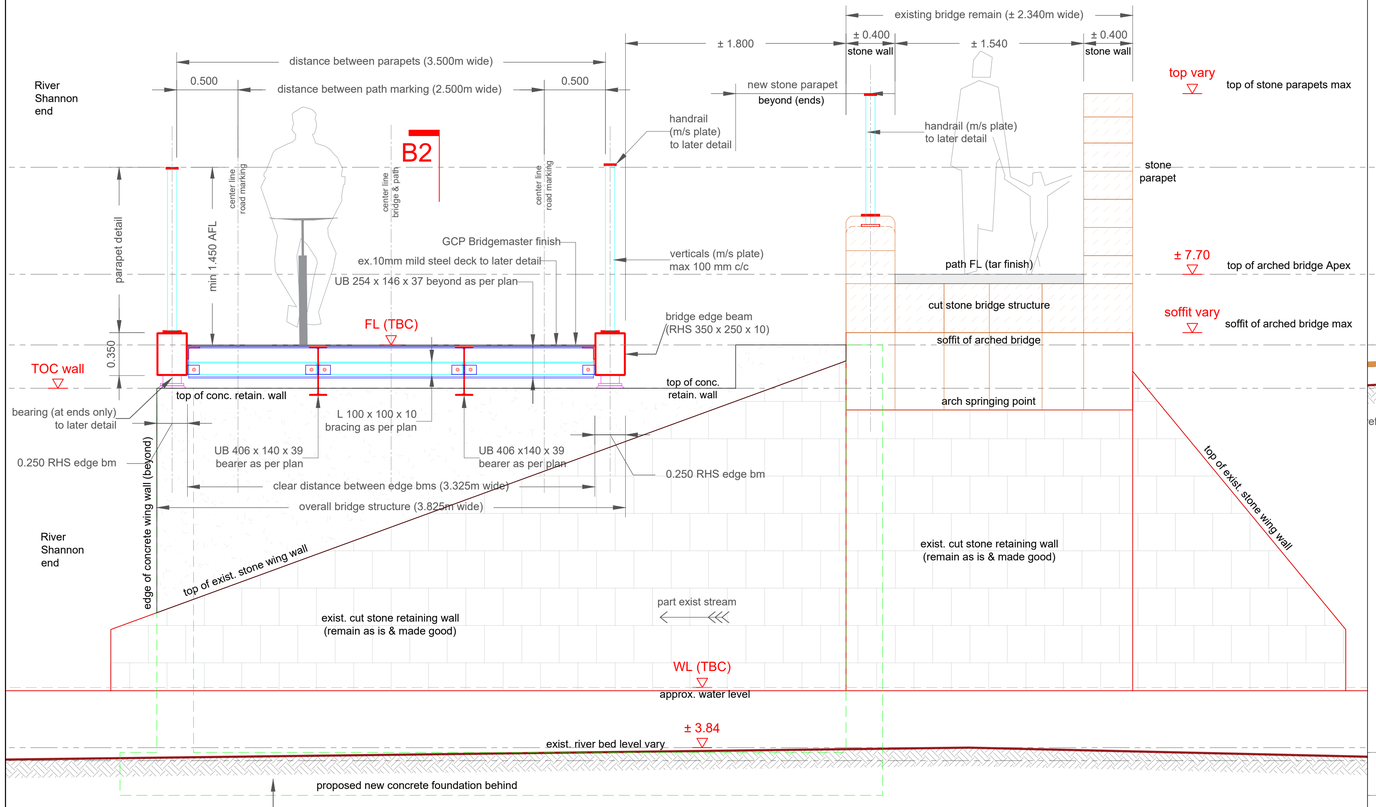
SCALE @ A1	DATE	DRAWN	CHECKED	APPROVED
As Shown	April 2022	ASM	PGS	RW

JOB No.	DRAWING No.	REV.
2535	RHA-XX-DR-S-SP0020	-

PLAN: PROPOSED NEW BRIDGE GA

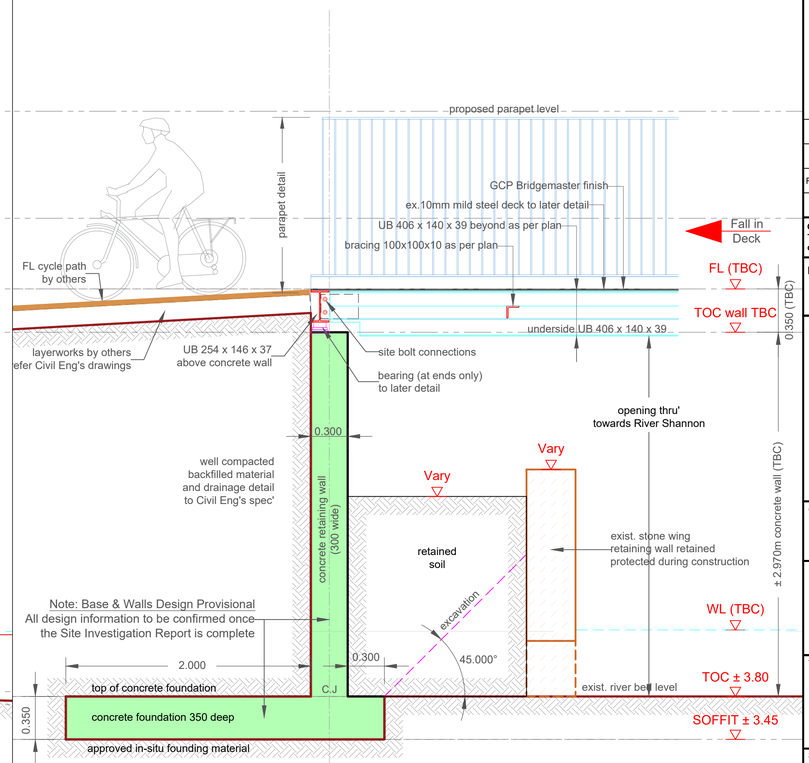
scale 1:50





Note: Base & Walls Design Provisional
All design information to be confirmed once the Site Investigation Report is complete

PROPOSED BRIDGE: SECTIONAL-ELEVATION A1 (scale 1:25)



PROPOSED BRIDGE: ABUTMENT SECTION B2 (scale 1:25)

GENERAL NOTES

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G6. The design of temporary works and the provision of stability of all elements of the work during Construction is the responsibility of the Contractor.

REFERENCE DRAWINGS

2535-RHA-XX-DR-C-GA-000_R1	GA Detail Design.
2535-RHA-XX-DR-S-SKP001	Key Plan New Bridges.
2535-RHA-XX-DR-S-SP0020	Existing Plan, Section & Elevation

NOTE: AWAITING FINAL SITE INSVESTIGATION REPORT

Foundations and Walls Design are Provisional, and all the information shown to be confirmed once the Final Site Investigation Report is complete and confirmed.

REV	DATE	DESCRIPTION	DRG	CHK	APD
-	17.05.2022	Draft for Approval & Planning Purposes	ASM	PGS	BL

REVISIONS

DRAWING STATUS

☒ PRELIMINARY ☐ CONTRACT ☐ TENDER ☐ CONSTRUCTION
☐ FOR APPROVAL ☐ FOR YOUR INFORMATION ☐ AS CONSTRUCTED ☐ DRAFT

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CLIENT

Comhairle Cathrach & Contae Luimnigh
Limerick City & County Council

PROJECT

University of Limerick to National Technology Park Cycle Path

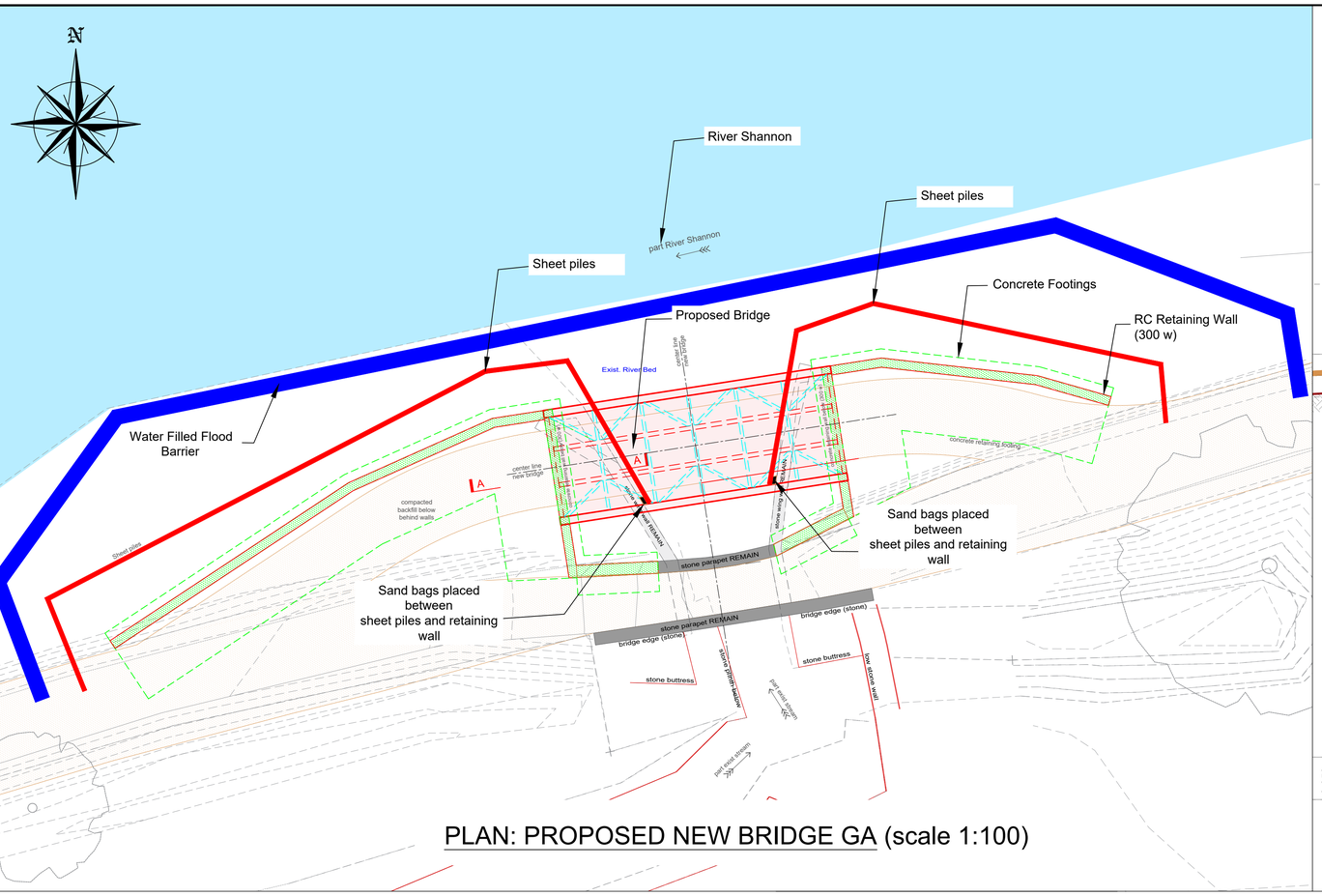
TITLE

BRIDGE 2: PROPOSED PLAN ELEVATIONS & SECTIONS

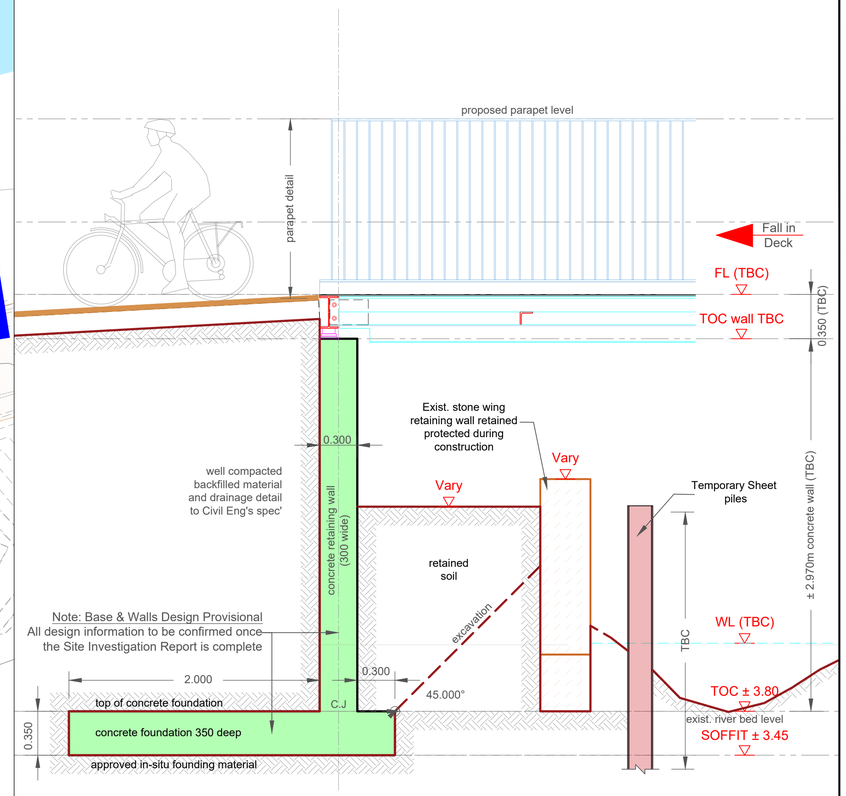
Sheet 1 of 1

SCALE @ A1	DATE	DRAWN	CHECKED	APPROVED
As Shown	April 2022	ASM	PGS	RW

JOB No.	DRAWING No.	REV.
2535	RHA-XX-DR-S-SP0021	-



PLAN: PROPOSED NEW BRIDGE GA (scale 1:100)



PROPOSED BRIDGE: ABUTMENT SECTION A (scale 1:25)

GENERAL NOTES

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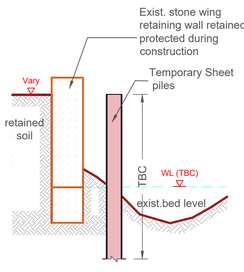
REFERENCE DRAWINGS

2535-RHA-XX-DR-C-GA-000_R1	GA Detail Design.
2535-RHA-XX-DR-S-SKP001	Key Plan New Bridges.
2535-RHA-XX-DR-S-SKP0020	Existing Plan & Elevation
2535-RHA-XX-DR-S-SKP0021	Proposed Plan & Elevation

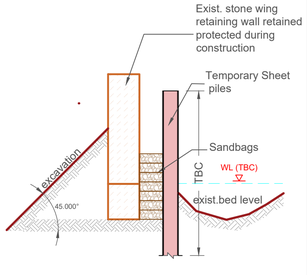
NOTE: AWAITING FINAL SITE INSVESTIGATION REPORT

Foundations and Walls Design are Provisional, and all the information shown to be confirmed once the Final Site Investigation Report is complete and confirmed.

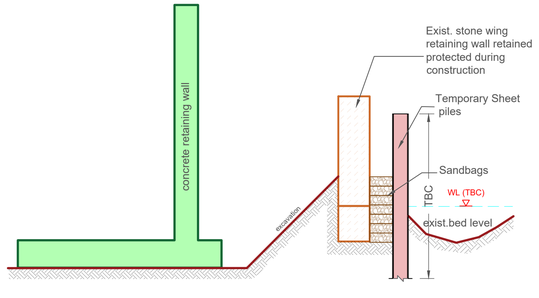
STEP 1
Install water barrier & sheet piles



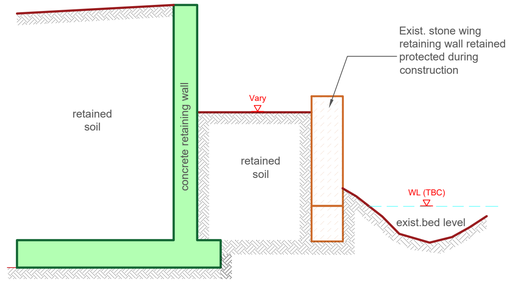
STEP 2
Place sandbags, Dewater & Excavate



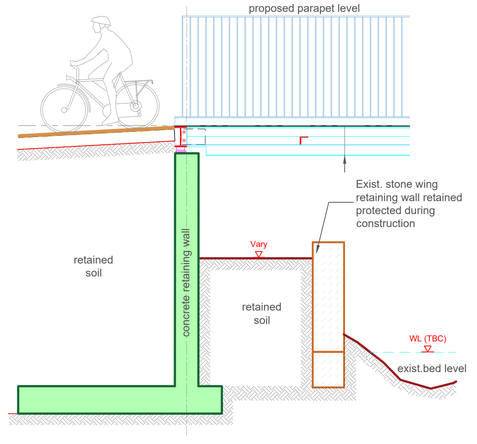
STEP 3
Construction proposed abutments and retaining walls



STEP 4
Remove sheet piles and backfill



STEP 5
Install steel deck & remove water barrier



PROPOSED BRIDGE: CONSTRUCTION SEQUENCE (scale 1:40)

REV	DATE	DESCRIPTION	DRG	CHK	APD

REVISIONS

DRAWING STATUS

☒ PRELIMINARY ☐ CONTRACT ☐ TENDER ☐ CONSTRUCTION
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Limerick City & County Council

PROJECT
University of Limerick to National Technology Park Cycle Path

TITLE
BRIDGE 2: PROPOSED CONSTRUCTION SEQUENCE PLAN & SECTIONS

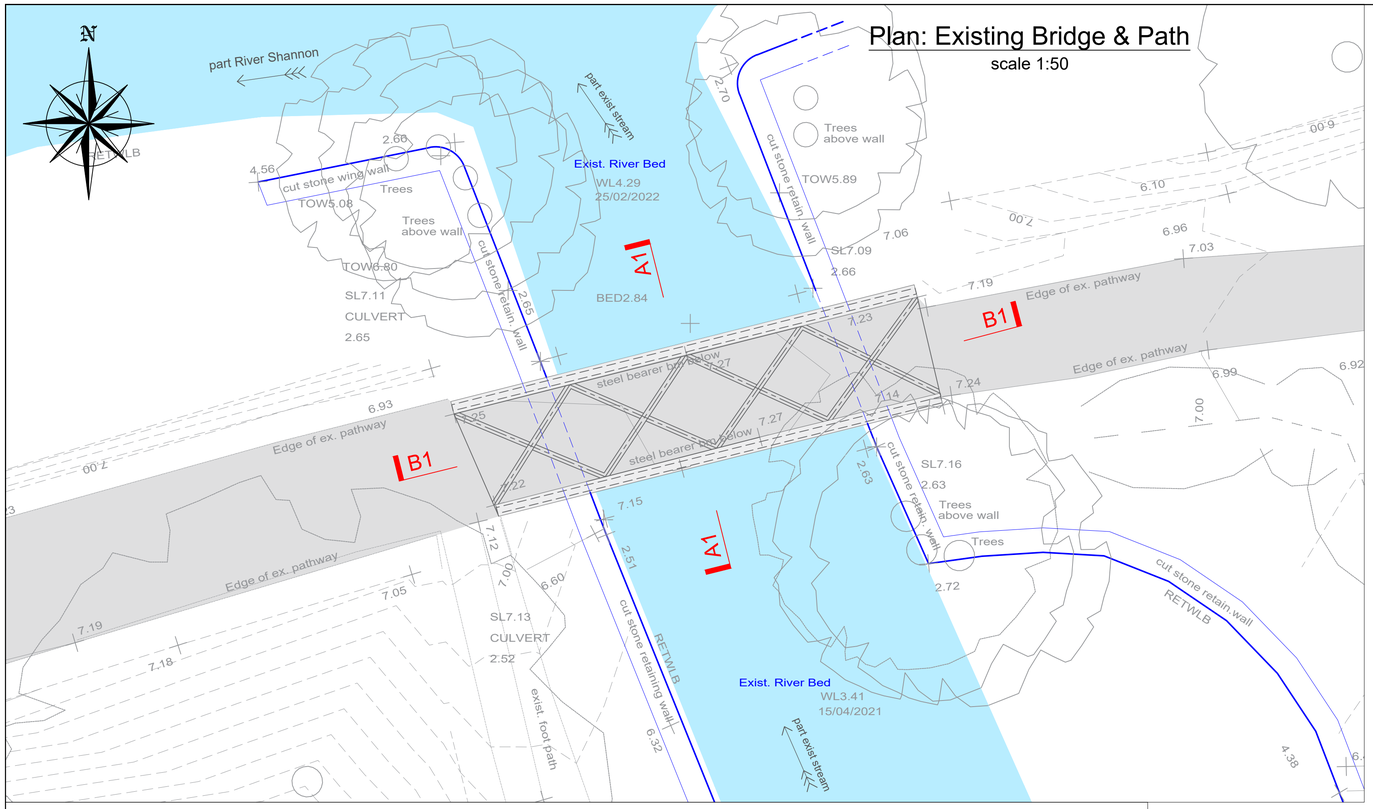
Sheet 1 of 1

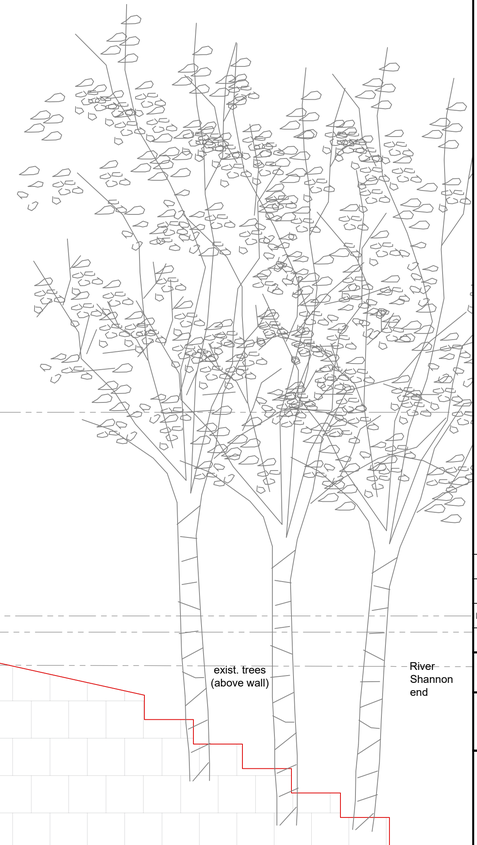
SCALE @ A1	DATE	DRAWN	CHECKED	APPROVED
As Shown	March 2025	ASM/AMR	BL	BL

JOB No.	DRAWING No.	REV.
2535	RHA-XX-DR-S-SP0022	-

Plan: Existing Bridge & Path

scale 1:50





GENERAL NOTES

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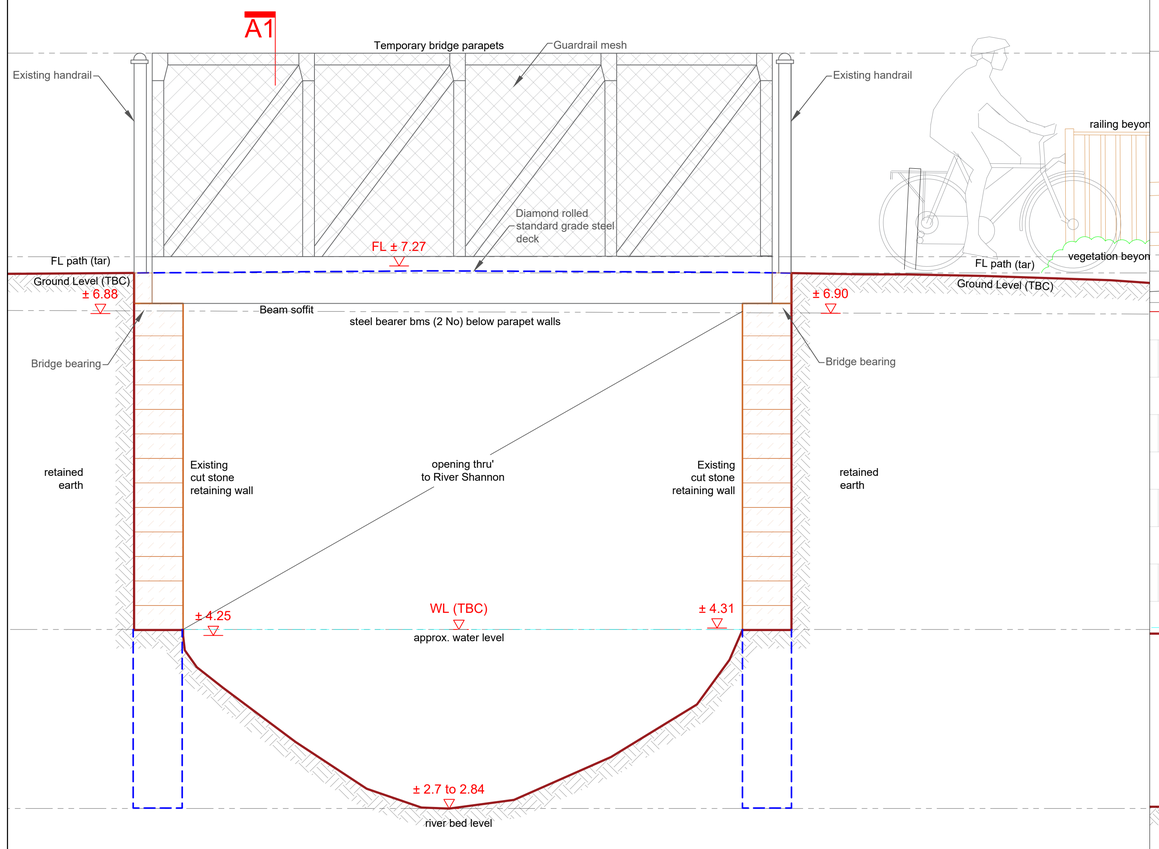
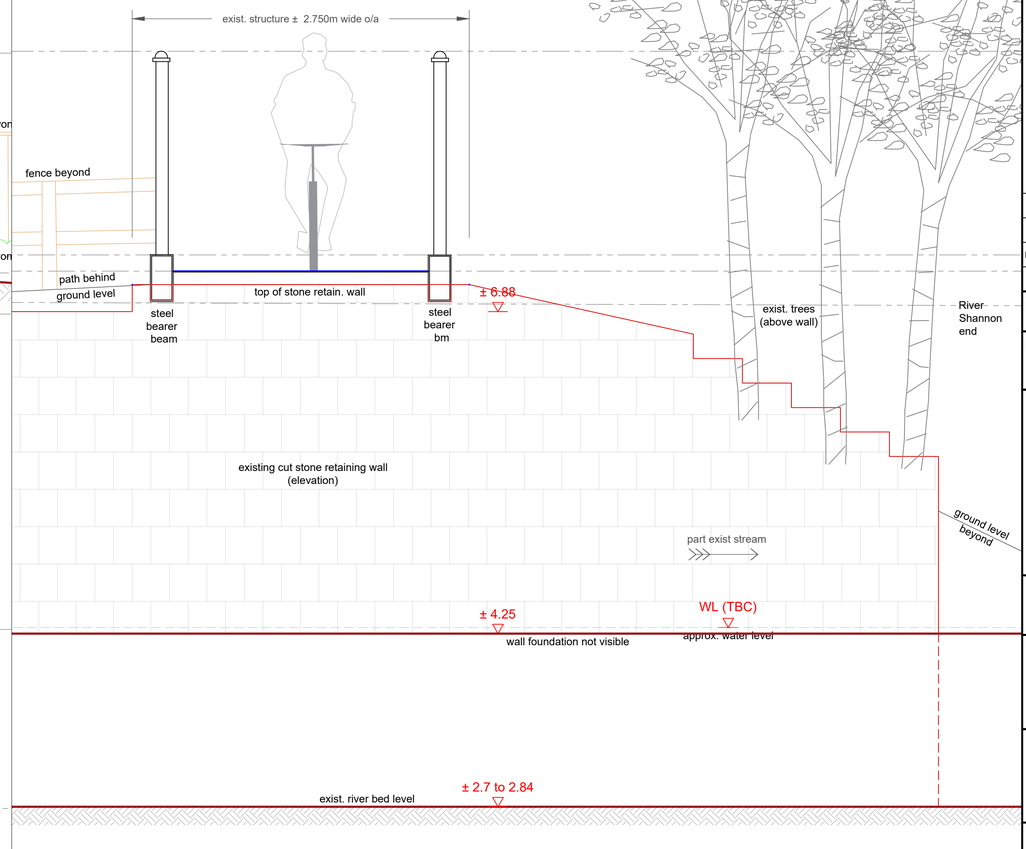
REFERENCE DRAWINGS

2535-RHA-XX-DR-C-GA-000_R1	GA Detail Design.
2535-RHA-XX-DR-S-SKP001	Key Plan New Bridges.



EXISTING BRIDGE: LONG-SECTION B1 scale 1:25



EXISTING BRIDGE: SECTIONAL-ELEVATION A1 scale 1:25

REV	DATE	DESCRIPTION	DRG	CHK	APD
-	17.05.2022	Draft for Approval & Planning Purposes	ASM	PGS	BL

REVISIONS

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PROJECT

University of Limerick to National Technology Park Cycle Path

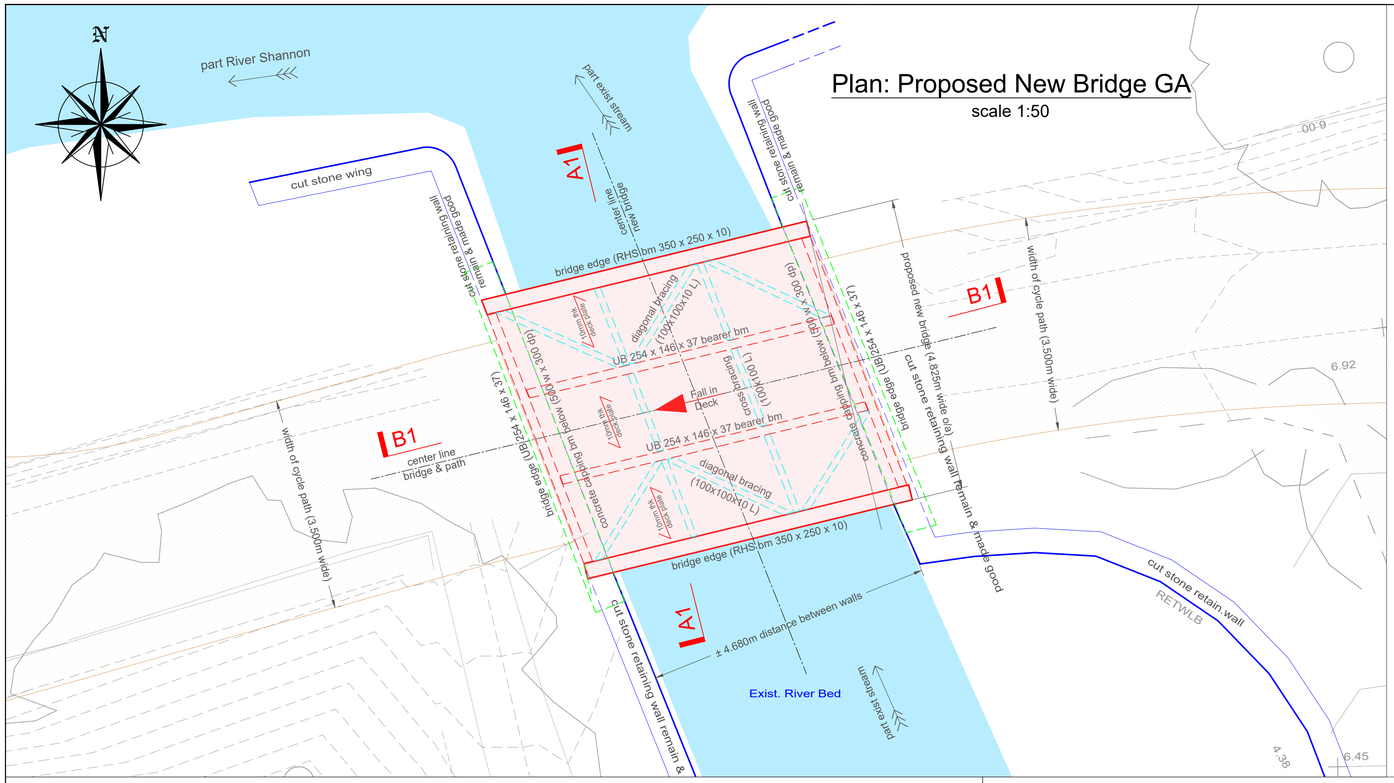
TITLE

BRIDGE 3: EXISTING PLAN ELEVATIONS & SECTIONS

Sheet 1 of 1

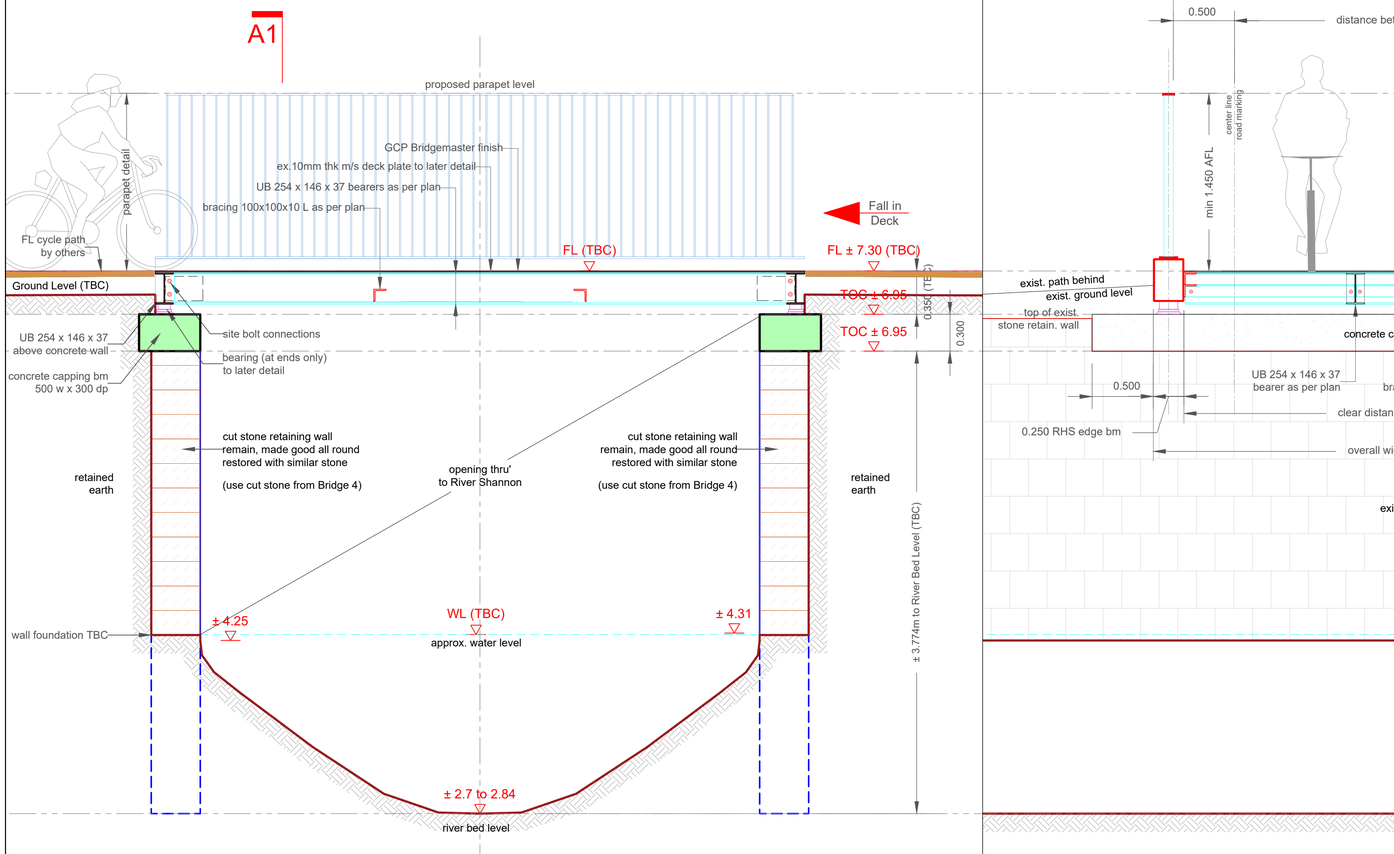
SCALE @ A1	DATE	DRAWN	CHECKED	APPROVED
As Shown	April 2022	ASM	PGS	RW

JOB No.	DRAWING No.	REV.
2535	RHA-XX-DR-S-SP0030	-

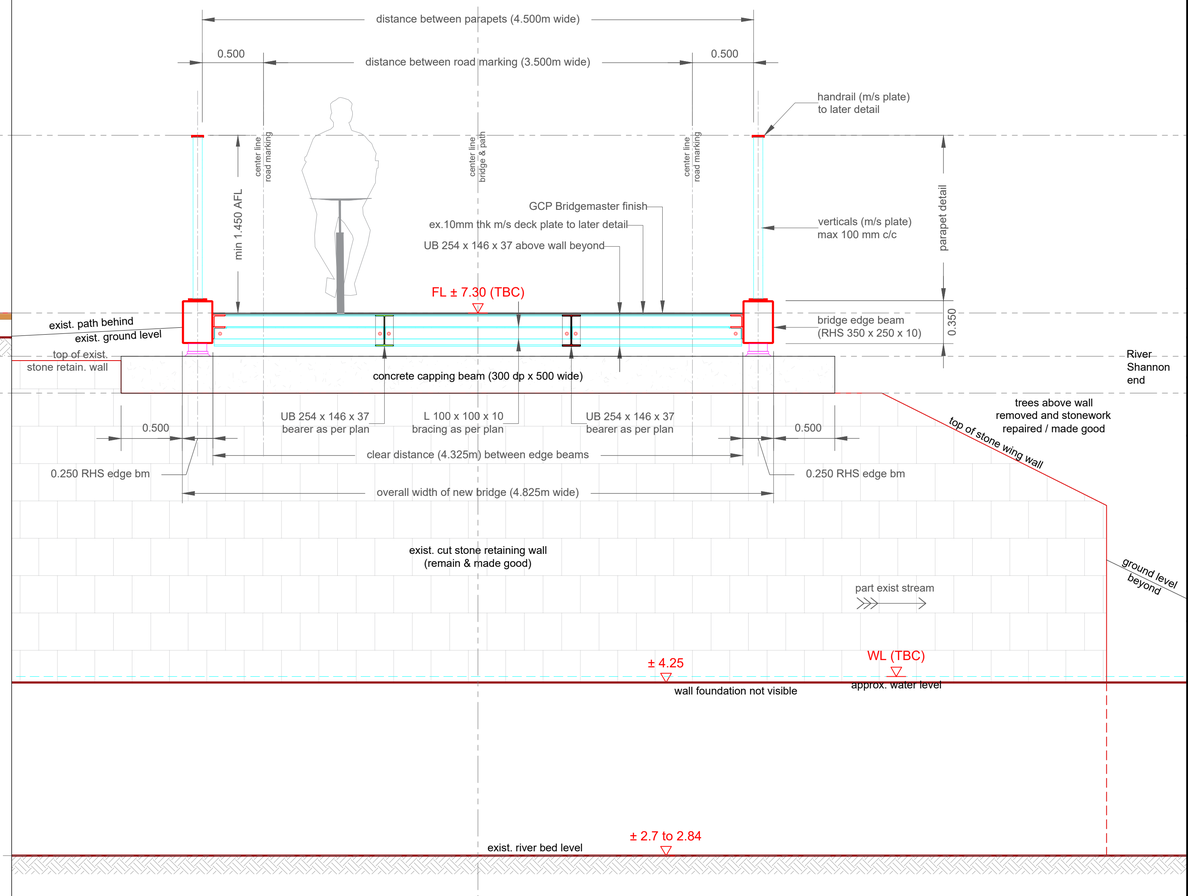


Plan: Proposed New Bridge GA

scale 1:50



PROPOSED BRIDGE: LONG-SECTION B1 scale 1:25



PROPOSED BRIDGE: SECTIONAL-ELEVATION A1 scale 1:25

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REFERENCE DRAWINGS

2535-RHA-XX-DR-C-GA-000_R1	GA Detail Design.
2535-RHA-XX-DR-S-SKP001	Key Plan New Bridges.

NOTE: AWAITING FINAL SITE INSVESTIGATION REPORT

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REV	DATE	DESCRIPTION	DRG	CHK	APD
-	17.05.2022	Draft for Approval & Planning Purposes.	ASM	PGS	BL

REVISIONS

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University of Limerick to National Technology Park Cycle Path

TITLE

BRIDGE 3: PROPOSED PLAN ELEVATIONS & SECTIONS

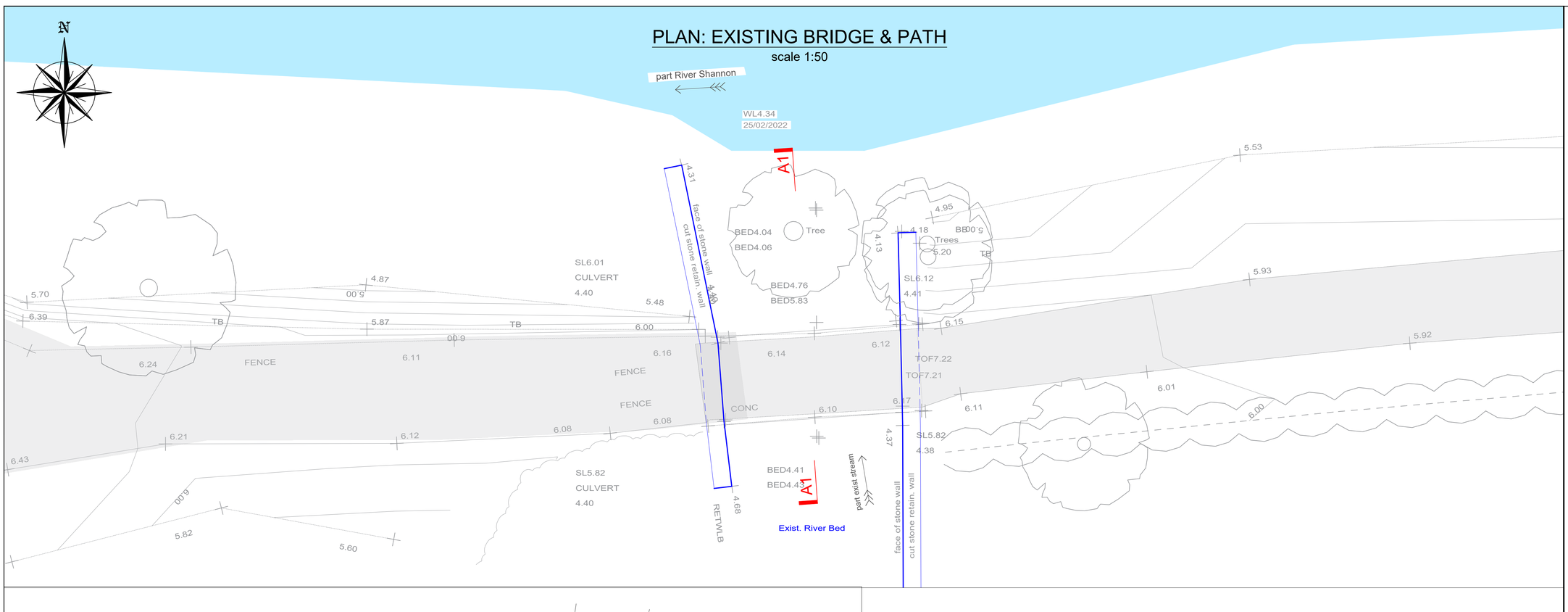
Sheet 1 of 1

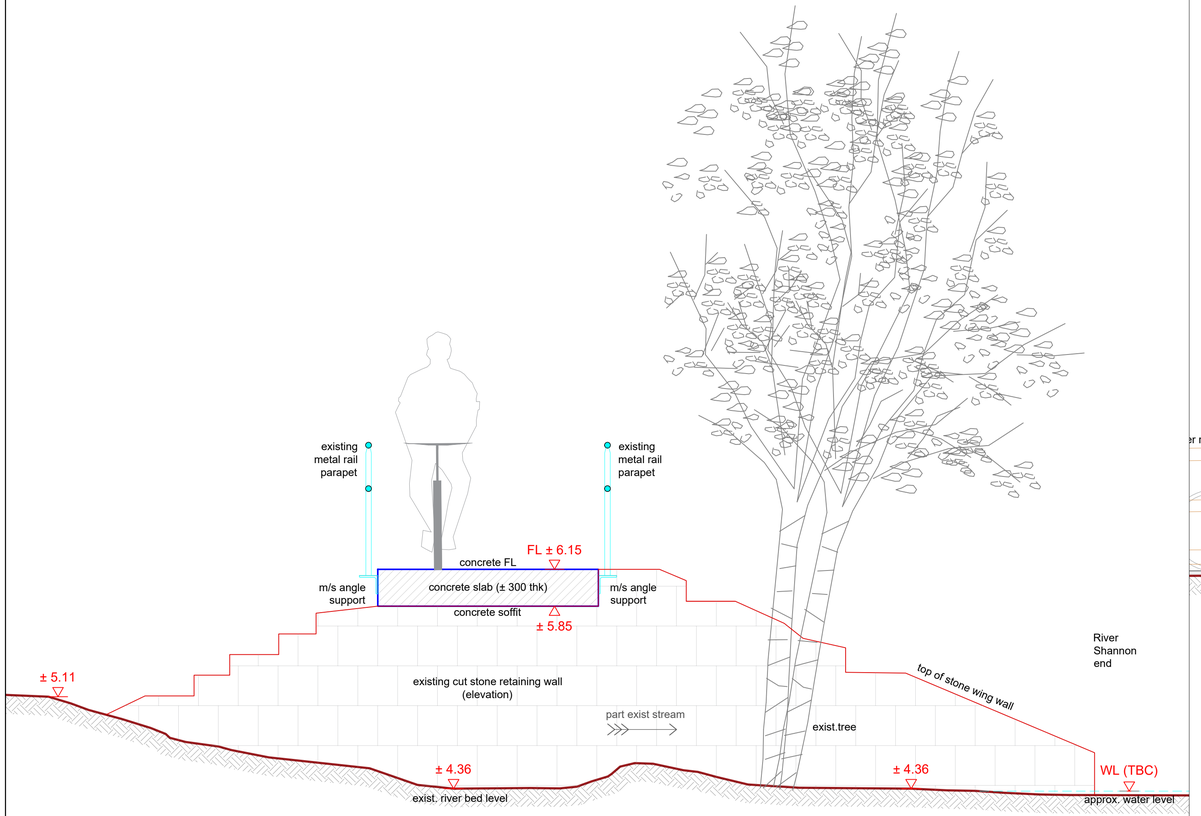
SCALE @ A1	DATE	DRAWN	CHECKED	APPROVED
As Shown	April 2022	ASM	PGS	RW

JOB No.	DRAWING No.	REV.
2535	RHA-XX-DR-S-SP0031	-

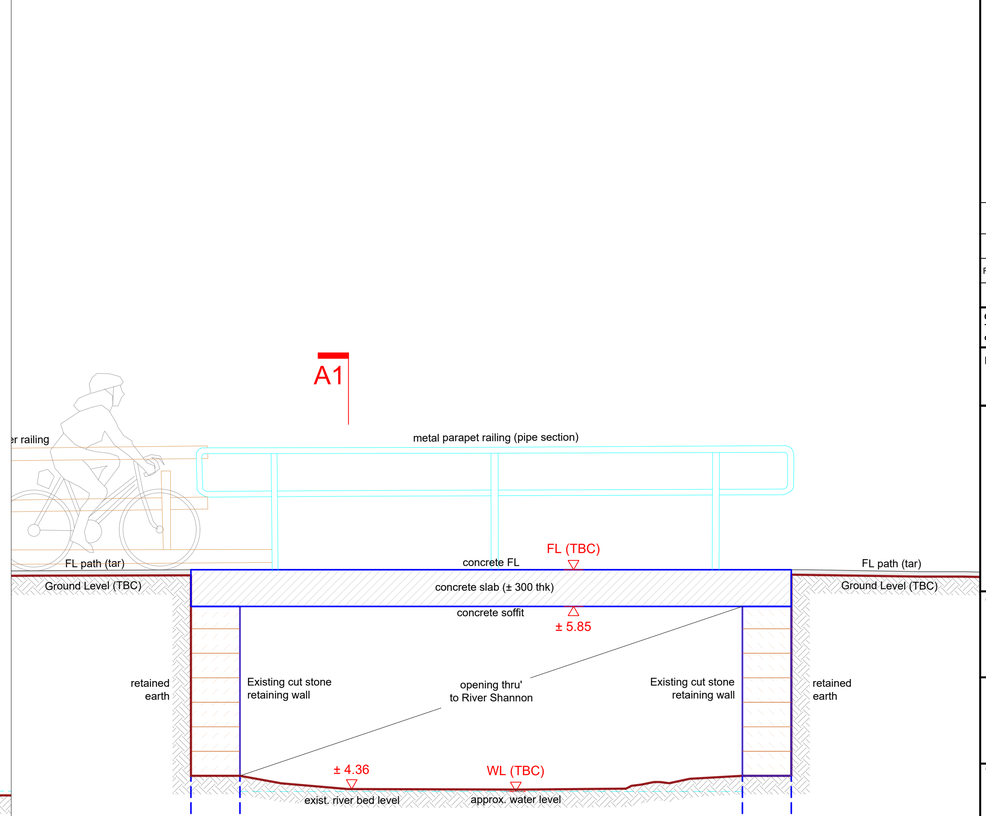
PLAN: EXISTING BRIDGE & PATH

scale 1:50





EXISTING BRIDGE: SECTIONAL-ELEVATION A1 scale 1:25



EXISTING BRIDGE: LONG-SECTION B1 scale 1:25

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REFERENCE DRAWINGS

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2535-RHA-XX-DR-S-SKP001	Key Plan New Bridges.

REV	DATE	DESCRIPTION	DRG	CHK	APD
-	17.05.2022	Draft for Approval & Planning Purposes	ASM	PGS	BL

REVISIONS

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PROJECT

University of Limerick to National Technology Park Cycle Path

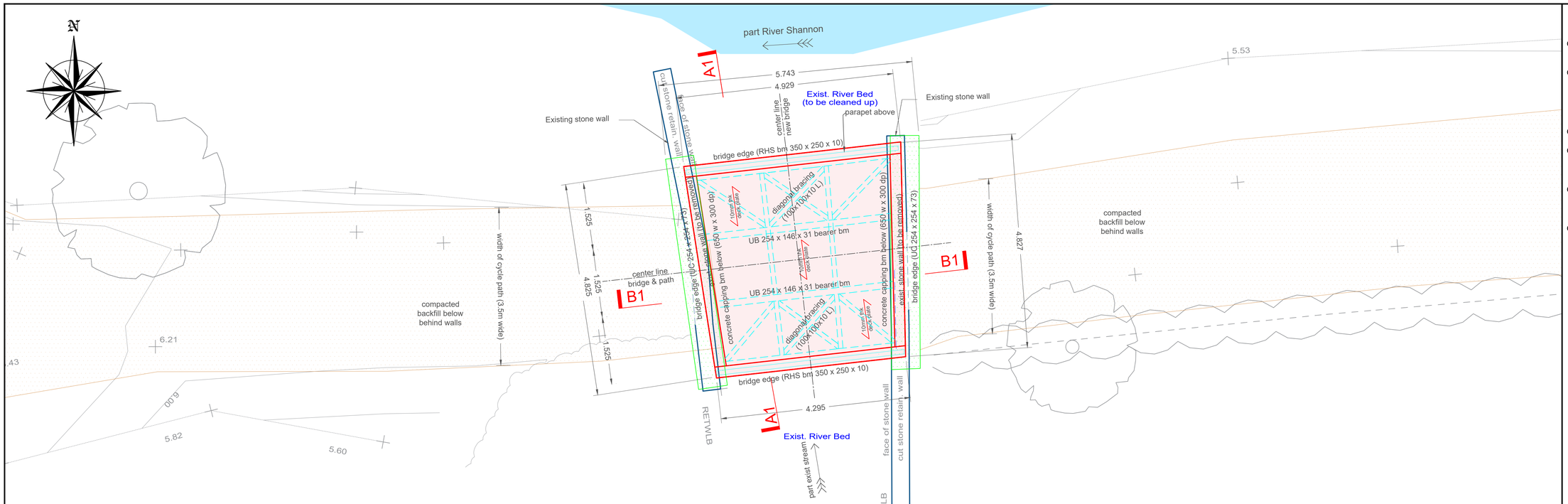
TITLE

BRIDGE : EXISTING PLAN ELEVATIONS & SECTIONS

Sheet 1 of 1

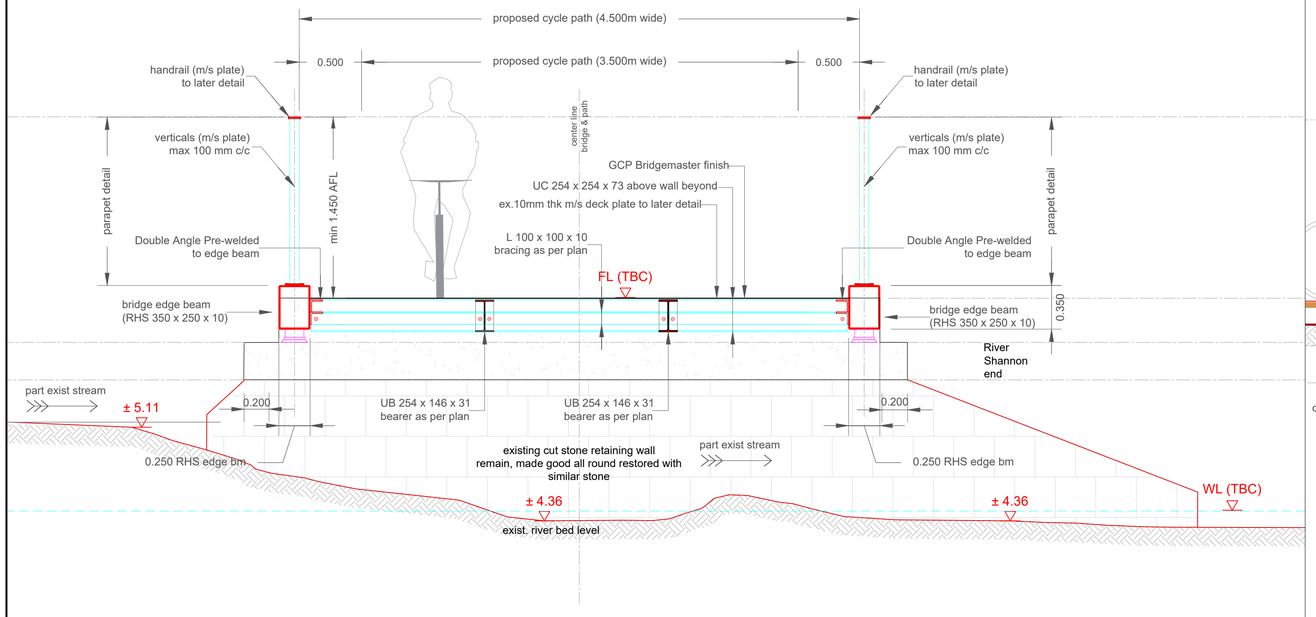
SCALE @ A1	DATE	DRAWN	CHECKED	APPROVED
As Shown	April 2022	ASM	PGS	RW

JOB No.	DRAWING No.	REV.
2535	RHA-XX-DR-S-SP0040	-

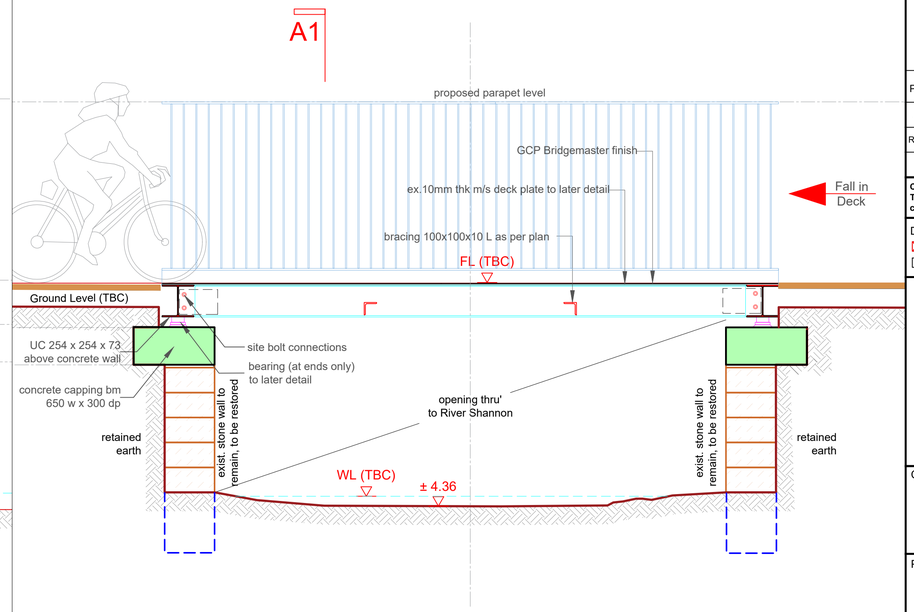


PLAN: PROPOSED NEW BRIDGE GA

scale 1:50



PROPOSED BRIDGE: SECTIONAL-ELEVATION A1 scale 1:25



PROPOSED BRIDGE: LONG-SECTION B1 scale 1:25

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REFERENCE DRAWINGS

2535-RHA-XX-DR-C-GA-000_R1	GA Detail Design.
2535-RHA-XX-DR-S-SKP001	Key Plan New Bridges.

NOTE: AWAITING FINAL SITE INSVESTIGATION REPORT

Foundations and Walls Design are Provisional, and all the information shown to be confirmed once the Final Site Investigation Report is complete and confirmed.

REV	DATE	DESCRIPTION	DRG	CHK	APD
P01	04.07.2024	Draft for Approval & Planning Purposes. Culvert omitted and new bridge design	AR	RW	BL
-	17.05.2022	Draft for Approval & Planning Purposes.	ASM	PGS	BL

REVISIONS

DRAWING STATUS

☒ PRELIMINARY ☐ CONTRACT ☐ TENDER ☐ CONSTRUCTION
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PROJECT

University of Limerick to National Technology Park Cycle Path

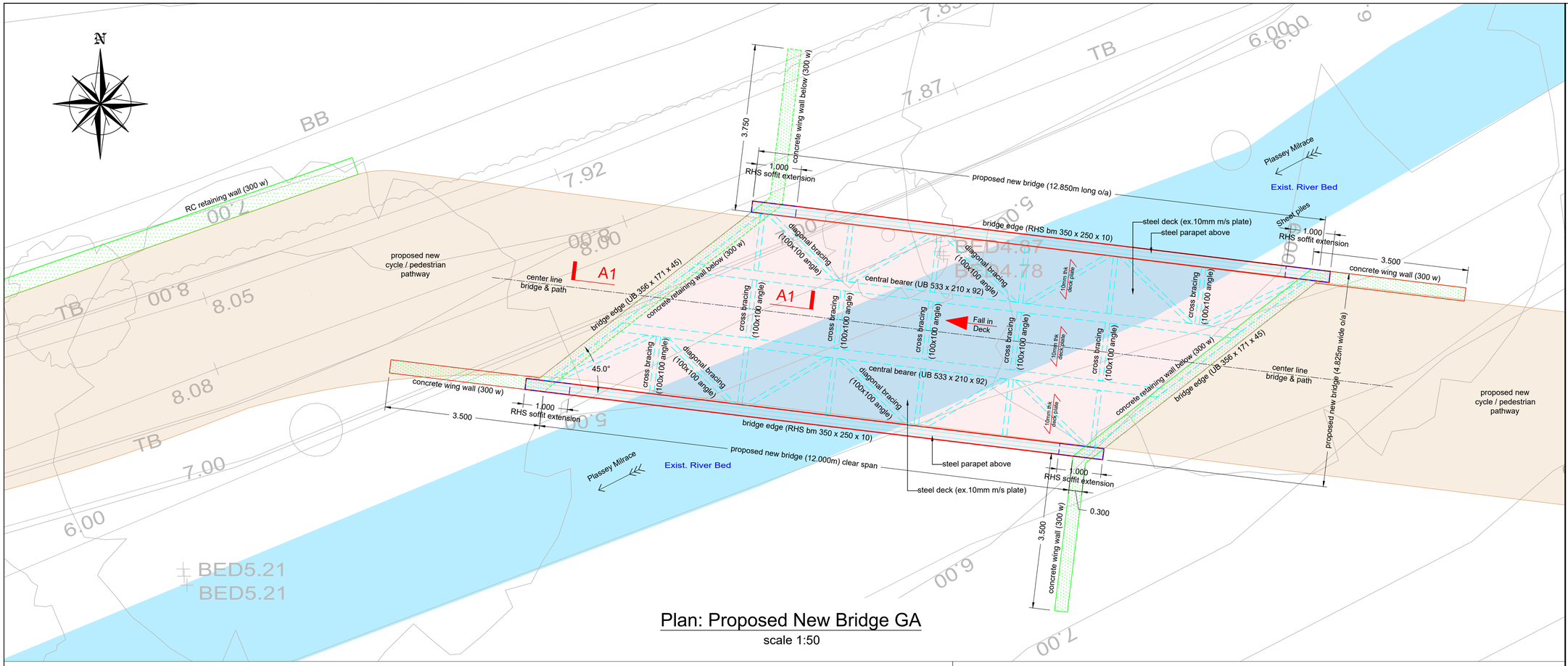
TITLE

BRIDGE 4: PROPOSED PLAN ELEVATIONS & SECTIONS

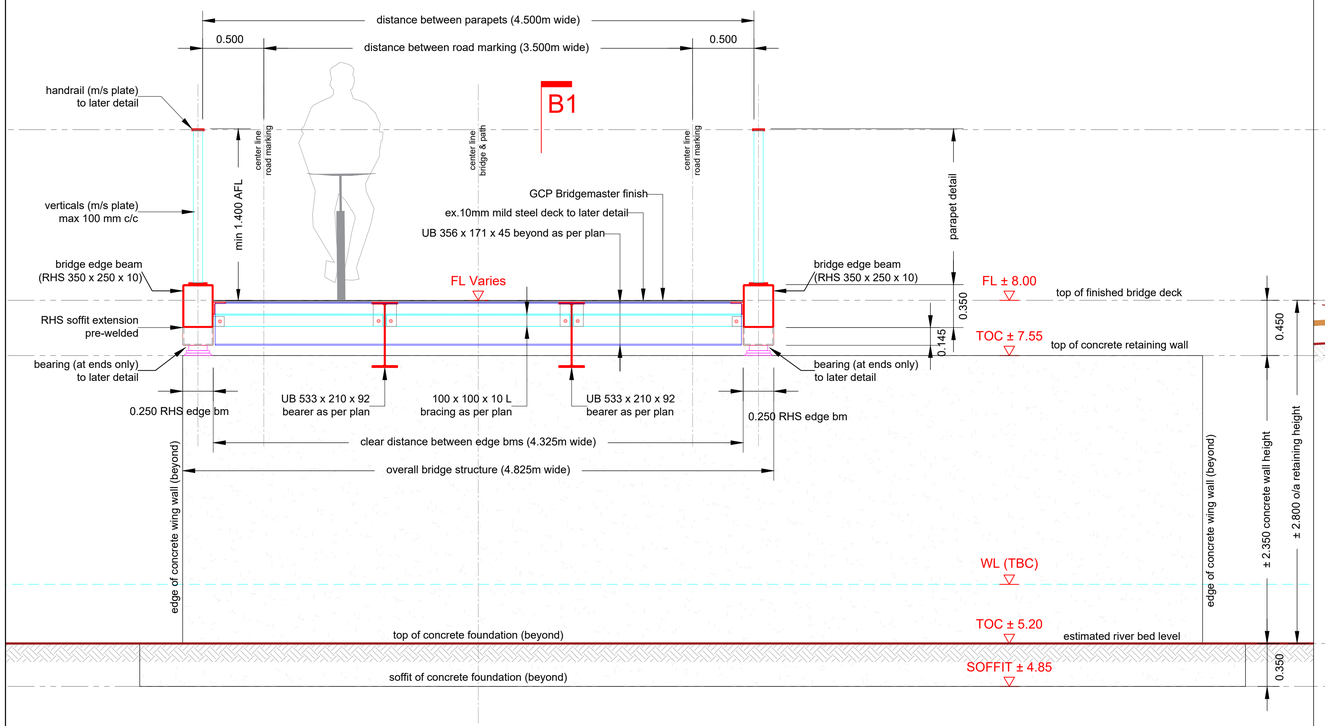
Sheet 1 of 1

SCALE @ A1	DATE	DRAWN	CHECKED	APPROVED
As Shown	April 2022	ASM	PGS	RW

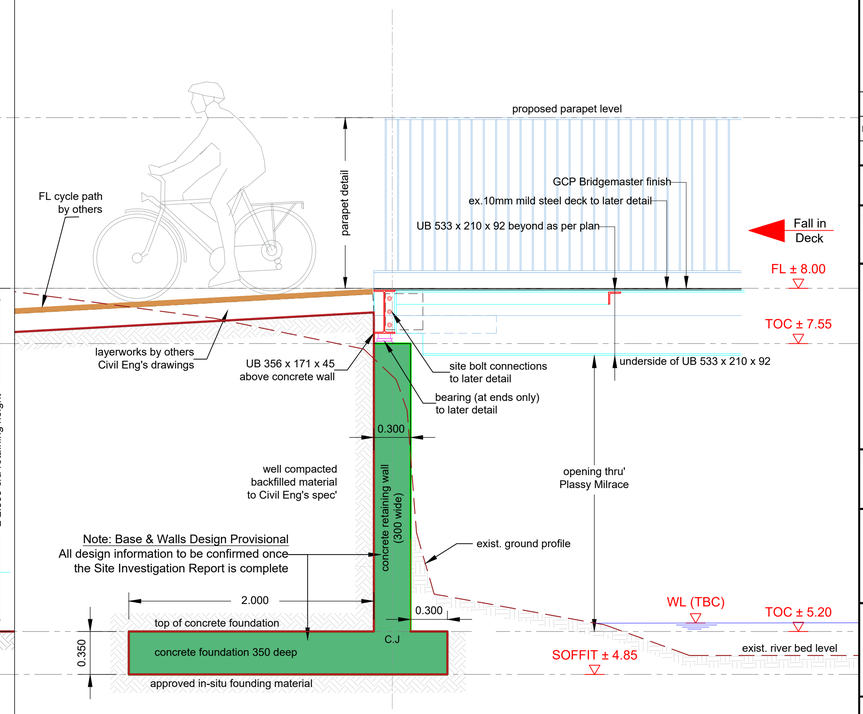
JOB No.	DRAWING No.	REV.
2535	RHA-XX-DR-S-SP0041	P01



Plan: Proposed New Bridge GA
scale 1:50



Proposed Bridge: Sectional-Elevation A1 scale 1:25



Proposed Bridge: Abutment Section A1 scale 1:25

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REFERENCE DRAWINGS

2535-RHA-XX-DR-C-GA-000_R1	GA Detail Design.
2535-RHA-XX-DR-S-SKP001	Key Plan New Bridges.

REV	DATE	DESCRIPTION	DRG	CHK	APD
-	10.05.2022	Draft for Approval & Planning Purposes	ASM	PGS	BL

REVISIONS

DRAWING STATUS
☒ PRELIMINARY ☐ CONTRACT ☐ TENDER ☐ CONSTRUCTION
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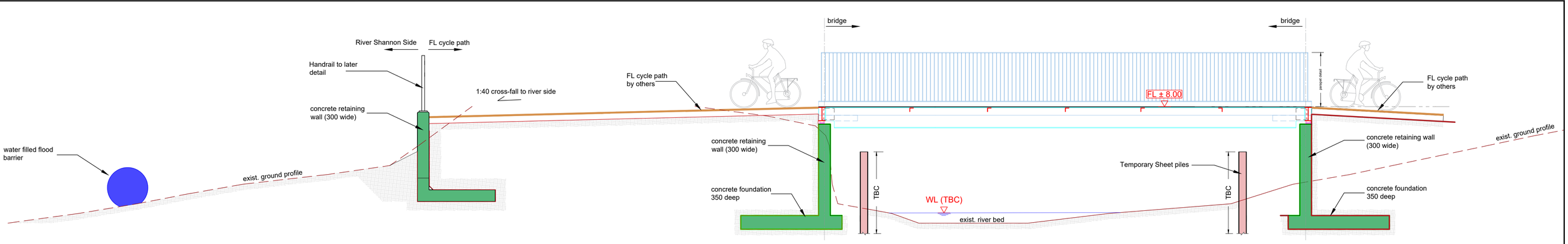
University of Limerick to National Technology Park Cycle Path

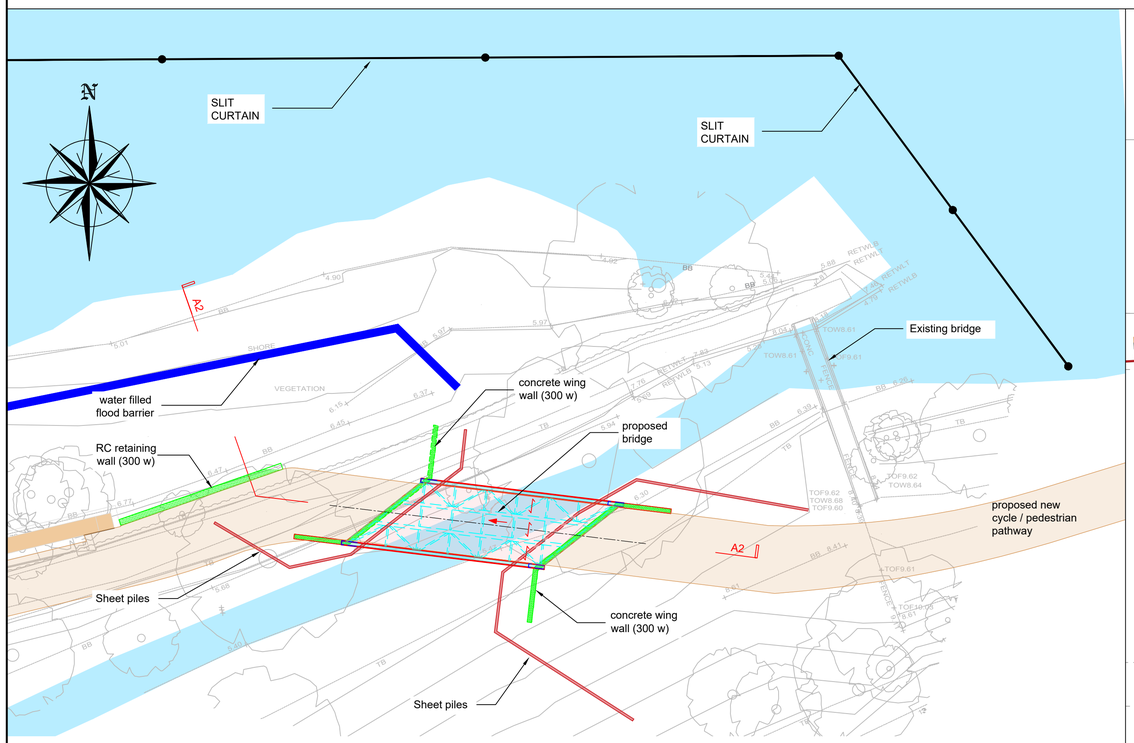
TITLE
BRIDGE 5: PROPOSED PLAN ELEVATION & SECTIONS
Sheet 1 of 1

SCALE @ A1	DATE	DRAWN	CHECKED	APPROVED
As Shown	April 2022	ASM	PGS	RW

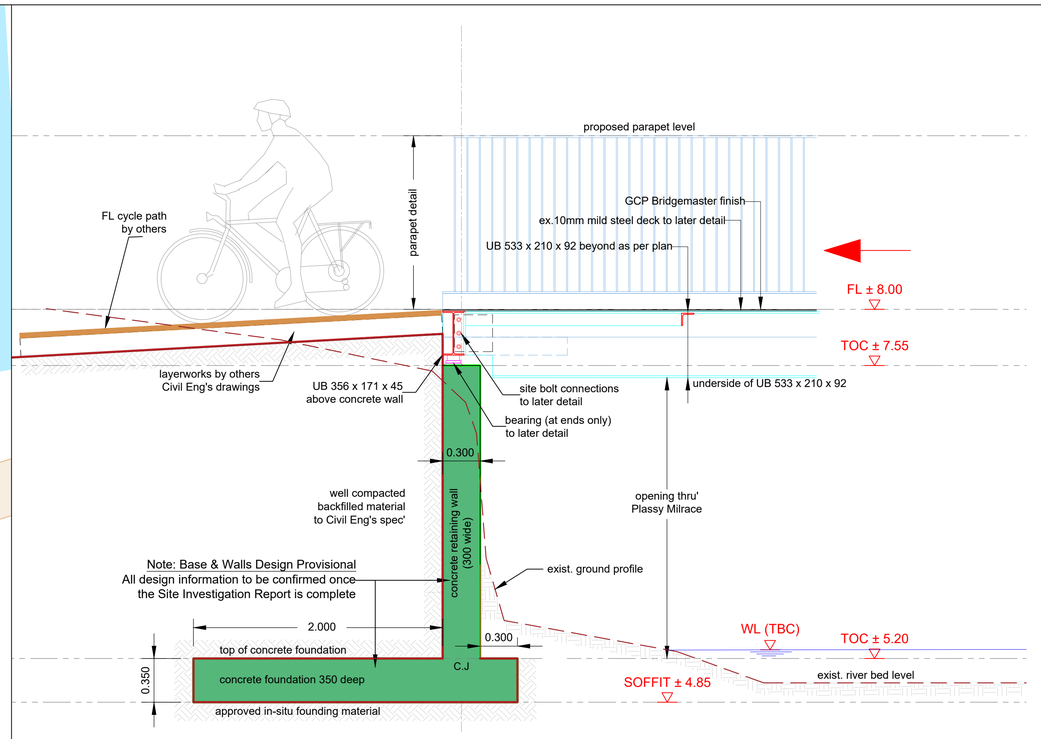
JOB No.	DRAWING No.	REV.
2535	RHA-XX-DR-S-SP0051	-



Section A2 scale 1:50



Plan: Proposed New Bridge GA scale 1:200



Proposed Bridge: Abutment Section A1 scale 1:25

GENERAL NOTES

G1. This drawing is to be read in conjunction with all the relevant Architect's and Engineers' drawings and specifications.

G2. Do not scale off this drawing. All details and dimensions are to be checked by the Contractor and Manufacture on site prior to commencement of construction/fabrication. Any existing dimensions noted on this drawing are to be checked by the contractor prior to commencement of the works.

G3. Any discrepancies are to be reported to the Engineer.

G4. All dimensions are in millimetres unless noted otherwise. All levels are in metres relative to Ordnance Datum (OD) at Malin Head.

G5. All proprietary materials and products shall be installed and used in accordance with the manufacturer's details and specification.

G6. The design of temporary works and the provision of stability of all elements of the work during Construction is the responsibility of the Contractor.

REFERENCE DRAWINGS

2535-RHA-XX-DR-C-GA-000_R1	GA Detail Design.
2535-RHA-XX-DR-S-SKP001	Key Plan New Bridges.
2535-RHA-XX-DR-S-SP0050	Existing Plan & Elevation
2535-RHA-XX-DR-S-SP0051	Proposed Plan & Elevation

REV	DATE	DESCRIPTION	DRG	CHK	APD
		REVISIONS			

DRAWING STATUS

☒ PRELIMINARY ☐ CONTRACT ☐ TENDER ☐ CONSTRUCTION
☐ FOR APPROVAL ☐ FOR YOUR INFORMATION ☐ AS CONSTRUCTED ☐ DRAFT

RYAN HANLEY
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DUBLIN - GALWAY - CASTLEBAR - CORK

CLIENT
Comhairle Cathrach & Contae Luimnigh
Limerick City & County Council

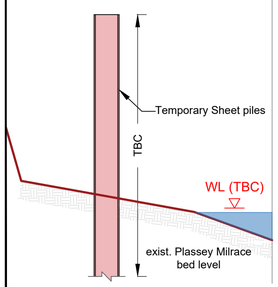
PROJECT
University of Limerick to National Technology Park Cycle Path

TITLE
BRIDGE 5: POSSIBLE CONSTRUCTION SEQUENCE PLAN & SECTION
Sheet 1 of 1

SCALE @ A1	DATE	DRAWN	CHECKED	APPROVED
As Shwon	JAN 2025	ASM/AMR	RW	BL

JOB No.	DRAWING No.	REV.
2535	RHA-XX-DR-S-SP0052	-

STEP 1
Install Sheet Piles



STEP 2
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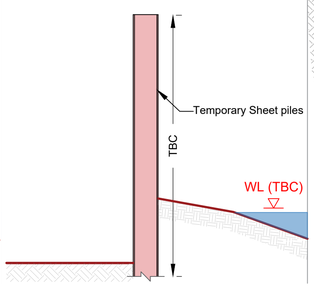
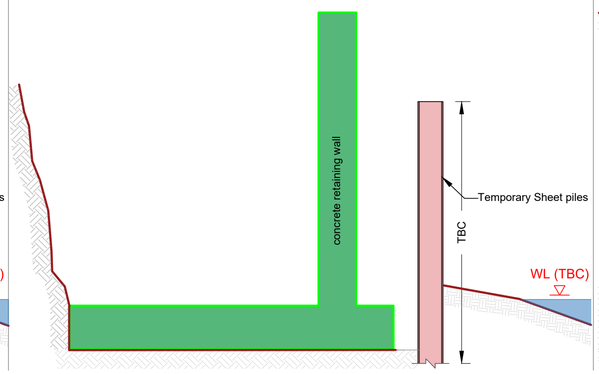
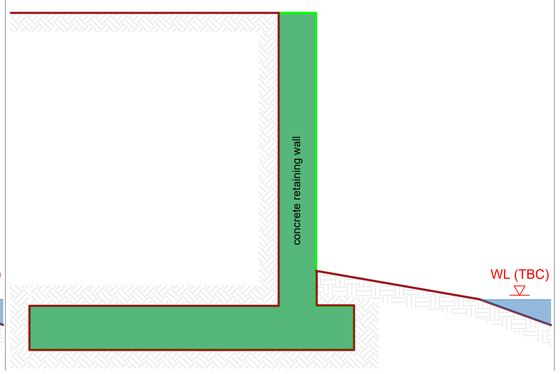


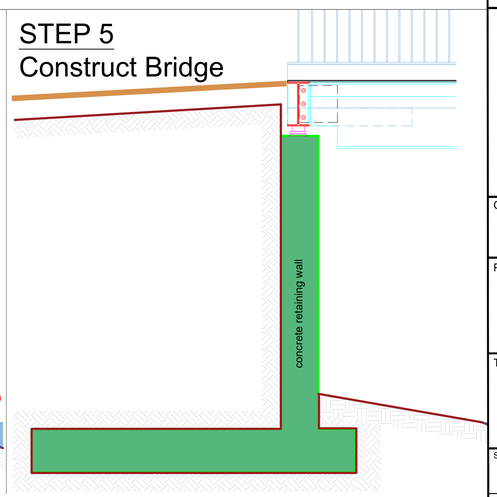
STEP 3
Construct Foundation



STEP 4
Backfill



STEP 5
Construct Bridge



Construction Sequence scale 1:25

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

Comhairle Cathrach & Contae Luimnigh

Limerick City & County Council

Limerick City Greenway (UL to NTP) Project

Invasive Species Management Plan

August 2025

RYAN HANLEY

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Unit 1203, Building 1000, Gateway Business Park, New Mallow Road, Cork.

CLIENT	Limerick City and County Council
PROJECT NO.	2535
PROJECT TITLE	Limerick City Greenway (UL to NTP)
REPORT TITLE	Invasive Species Management Plan

REV.	STATUS	AUTHOR	REVIEWED BY	APPROVED BY	ISSUE DATE
0	DRAFT	G. Kilbane	J. O'Connor	B. Larkin	31/08/2021
1	Updated following LCCC review	G. Kilbane	J. O'Connor	B. Larkin	8/11/2021
2	Updated for new route	B. Quinn/P. Rodolfi	T. Stafford	B. Larkin	31/01/2024
3	Updated for new route	B. Quinn	T. Stafford	B. Larkin	17/07/2024
4	Updated for revised route	B. Quinn	T. Stafford	B. Larkin	16/12/2024
5	Issued	B. Quinn	T. Stafford	B. Larkin	08/08/2025

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1. INTRODUCTION

1.1 Introduction and Objectives

Ryan Hanley was commissioned by the Limerick City and County Council (LCCC) to carry out an invasive species survey and prepare an Invasive Species Management Plan (ISMP) for the prevention of spread, and the management of invasive species within the footprint of the proposed Limerick City Greenway (University Limerick (UL) to National Technology Park (NTP)), County Limerick herein referred to as the Greenway project.

The purpose of this ISMP is to set out options for control and initiate a plan to manage and prevent the spread of invasive species recorded within the Study Area of the Greenway project.

Walkover surveys were conducted on 5th November 2020, 14th May 2021, 28th April 2022, 3rd May 2023, 26th of June 2024 and the 5th August 2025. A number of invasive alien species (IAS) including Himalayan balsam (*Impatiens glandulifera*) and Giant hogweed (*Heracleum mategzzianum*) were recorded during these walkovers and documented growing within the Study Area of the proposed Greenway project. The main objectives of the ISMP are as follows:

1. To identify the extent of these invasive species infestations within the Study Area of the Limerick City Greenway project;
2. To identify appropriate eradication and/or control measures to prevent the spread of invasive species within the Study Area; and
3. To identify and recommend the most favoured method for avoiding the spread of invasive species as per the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011).

This ISMP outlines the biosecurity strategies that will be adopted before and during the construction of the Limerick City Greenway to prevent the spread of invasive species. **The ISMP is intended to be a working document and will be updated annually during the pre-construction, construction and operational phases of the Project.** The ISMP will inform and be instructive to the Construction Environmental Management Plan (CEMP). Following construction, the plan will be updated for the operational phase of the project, taking into account any operational maintenance requirements.

Construction and any scheduled maintenance work undertaken during the project could potentially disturb stands of invasive plants and/or soils contaminated with invasive plant material. In addition to lands within the proposed works areas, there is a potential risk of invasive plant species being spread to neighbouring lands, public roads, and other locations.

1.2 Legislative Framework

Action 28 of the first National Biodiversity Plan (2002) required Ireland to prepare strategies, in consultation with Northern Ireland, to control introduced species and to prevent, or minimise future (accidental or deliberate) introduction of alien species, which might threaten biodiversity both within and outside protected areas. The National Biodiversity Action Plan 2017-2021, Irelands 3rd National Biodiversity Plan builds on this and Target 4.4 of Objective 4- Conserve and restore biodiversity and ecosystem services in the wider countryside aims to ensure '*Harmful invasive alien species are controlled and there is reduced risk of spread of new species*'.

1.2.1 European Communities (Birds and Natural Habitats) Regulations 477/2011

The European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011) contains specific provisions that govern control of invasive species listed on its Third Schedule. Article 49 of the Regulation prohibits the introduction, breeding, release or dispersal of certain species and Article 50 prohibits dealing in and keeping certain species.

Article 49 (2) states; '*Save in accordance with a licence granted under paragraph (7), any person who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow in any place specified in relation to such plant in the third column of Part 1 of the Third Schedule, any plant which is included in Part 1 of the Third Schedule, shall be guilty of an offence*'.

Article 50 (2) states; '*Save in accordance with a licence granted under paragraph (70, a person shall be guilty of an offence if he or she imports or transports:*

(a) An animal or plant listed in Part 1 or Part 2 of the Third Schedule;
(b) Anything from which an animal or plant referred to in Part 2 of the Third Schedule can be reproduced or propagated; or
(c) A vector material listed in Part 3 of the Third Schedule.

Into or in or to any place in the State specified in relation to such an animal or plant or vector material in relation to that animal or plant or vector material in the third column of the Third Schedule.'

The implications of Article 50 result in the requirement of a license for the disposal of non-native alien species at an offsite licenced facility where onsite management is not feasible. Part 50 of the 2011 Regulation has not yet come into effect.

Species listed on the Third Schedule were derived from the Invasive Species in Ireland prioritisation risk assessment undertaken in 2013. From this, 48 non-native species were ranked as at risk of having a High Impact and 78 species at risk of having a Medium Impact.

1.2.2 EU Regulation 1143/2014

EU Regulation 1143/2014 on invasive alien species was entered into force on the 1st January 2015. It provides for a set of measures to prevent, minimise and mitigate adverse impacts in relation to invasive alien species to be taken across the EU that are included on the list of Invasive Alien Species of Union concern. Three distinct types of measures are envisaged, which follow an internationally agreed hierarchical approach to combatting IAS:

- Prevention: a number of robust measures aimed at preventing IAS of Union concern from entering the EU, either intentionally or unintentionally;
- Early detection and rapid eradication: Member States must put in place a surveillance system to detect the presence of IAS of Union concern as early as possible and take rapid eradication measures to prevent them from establishing; and
- Management: some IAS of Union concern are already well-established in certain Member States and concerted management action is needed so that they do not spread any further and to minimize the harm they cause.

Chapter II Preventions - Article 7 Restrictions

1. Invasive alien species of Union concern shall not be intentional:

a) brought into the territory of the Union, including transit under customs supervision;

b) kept, including in contained holding;
c) bred, including in contained holding;
d) transported to, from or within the Union, except for the transportation of species to facilities in the context of eradication;
e) placed on the market;
f) used or exchanged;
g) permitted to reproduce, grow or cultivate, including in contained holding; or
h) released into the environment.

2. Member States shall take all necessary steps to prevent the unintentional introduction or spread, including where applicable, by gross negligence, of invasive alien species of Union concern.

1.3 Guidance Documents

The eradication/control measures identified in this ISMP for the proposed Scheme apply the most relevant and current guidance in relation to the treatment and management of invasive alien plant species in construction projects. These measures were derived from best practice guidance manuals from both the UK and Ireland, in particular:

- The Management of Invasive Alain Plant Species on National Roads- Technical Guidance (TII, 2020);
- NRA Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Road Schemes (NRA, 2010);
- Managing Invasive Non-native Plants in or near Freshwater, Environment Agency (2010);
- Best Practice Management Guidelines Himalayan balsam *Impatiens glandulifera*, Invasive Species Ireland (2008); and
- Best Practice Management Guidelines Giant hogweed *Heracleum mantegazzianum*, Invasive Species Ireland (2008).

1.4 What are Invasive Species?

In an Irish context, invasive species relates to any animal or plant which have been introduced into Ireland by humans and their activities, either purposefully or accidentally. Invasive species are also referred to as 'invasive non-native species', or 'invasive alien species', are those non-native species that have the ability to spread rapidly and become dominant in an area or ecosystem.

Invasive non-native species are so-called as they typically display one or more of the following characteristics or features:

a) prolific reproduction through seed dispersal and/or re-growth from plant fragments;
b) rapid growth patterns; and
c) resistance to standard weed control methods.

Where a non-native species displays invasive qualities, and is not managed, it can potentially:

a) outcompete native vegetation, affecting plant community structure and habitat for wildlife;

b) cause damage to infrastructure including road carriageways, footpaths, walls and foundations; and

c) have an adverse effect on landscape quality through a loss of naturalness, aesthetics and regional identity.

Himalayan balsam (*I. glandulifera*) and Giant hogweed (*H. mategzzianum*) were among the invasive species identified during the Study Area walkover surveys.

The Invasive Species Ireland project identified Himalayan balsam and Giant hogweed as some of the highest risk (most un-wanted) non-native invasive species in Ireland, while Himalayan balsam and Giant hogweed have been listed as Invasive Species of European Concern. There is strict legislation surrounding these species in both Ireland and the EU as described in Section 1.2 above. These species are described in detail below.

1.4.1 Giant hogweed (*H. mantegazzianum*)

Source: https://www.biodiversityireland.ie/wordpress/wp-content/uploads/Giant-Hogweed.pdf

Giant hogweed is a perennial plant that is native to Asia that reaches heights of up to 5 meters. Initially introduced into Ireland as an ornamental plant of parks and gardens, this species has a high competitive advantage over native plants and can outcompete native flora for space and resources through shading that occurs due to dense stand formation. It is found across many habitat types including bog and fen habitats, grasslands, woodlands, urban areas and riparian zones. It is predominantly found along watercourses as it thrives in rich, moist soils. Giant hogweed leaves can grow up to 3m in length and 1.5m wide, with a stem diameter between 5-10cm. It produces large umbels of white flowers up to 80cm across. The stem is green with purple blotches and is covered in fine hairs that are particularly dense at the leaf joints.

It reproduces through seed dispersal and can produce up to 50,000 seeds after 3 to 4 years of growth. Seeds can remain viable in the poor soil for up to 5 years and in favourable soil for up to 15 years if conditions are unsuitable for germination. This is particularly problematic along riparian zones of rivers and streams as large numbers of seeds are dispersed into the flowing water which are carried downstream invading new areas. In addition, severe erosion of riverbanks can occur in winter when the species dies back as native vegetation cannot establish during the growing season.

Giant hogweed is considered a significant health hazard. Giant hogweed is a phototoxic plant its sap contains a chemical (furanocoumarins) that can cause severe reactions when it comes into contact with skin and is then exposed to sunlight. The furanocoumarins alter the genetic structure of skin they come into prolonged contact with, eliminating the skins ability to protect itself from sunlight. The first symptom to occur is itching, followed by blistering of the skin which may recur for several years after the initial exposure that can result in permanent scaring of skin tissue. Extreme caution must be taken around this plant as just brushing into it can cause sap to be released. The intensity of the reaction varies with individual sensitivity.

1.4.2 Himalayan balsam (*I. glandulifera*)

Source: https://www.biodiversityireland.ie/wordpress/wp-content/uploads/Himalayan-Balsam_PRINT.pdf

Himalayan balsam is native to the western Himalayas that was first introduced into Ireland as an ornamental garden plant. It is a tall (up to 2m), shallow-rooted, annual plant that is particularly prevalent in damp areas, mainly colonising riverbanks, waste ground and wet woodlands. The plant has lance-shaped leaves with heavily serrated edges, arranged opposite each other. The stem is jointed, hollow and easily broken. It flowers from June onward, producing pink to white, bonnet shaped flowers. These flowers are very distinctive, making identification easy once they are evident.

It reproduces through seed dispersal from seed pods that explode when mature, scattering the small seeds up to 7 meters from the parent plant. Each plant can produce up to 4,000 seeds that float in water and remain viable in soil for up to 18 months.

Himalayan balsam outcompetes native plants for space, light and nutrients through rapid growth and shading, thereby replacing existing flora resulting in reduced local biodiversity. It is also known as a 'pollinator robber' since Himalayan balsam produces copious quantities of nectar, attracting bees and other pollinators away from native species that require their services to reproduce. It is particularly prevalent along riverbanks and disturbed soils; it has shallow roots making riverbanks bare and vulnerable to erosion when the plant dies back, which in turn leads to soil loss and increased siltation in the water.

1.5 Limitations to Construction and Need for a Management Plan

The negative economic, social and environmental impacts of invasive species have been increasing in recent years. There are significant risks associated with the presence of invasive species during the construction of proposed developments. If left untreated Japanese knotweed has been documented to cause structural damage to infrastructure, concrete, tarmac and the stability of riverbanks. Similarly Himalayan balsam can impede flow in rivers and drainage ditches causing a rise in flow levels, leading to flooding. The invasive species present within the study area represent areas of immediate concern owing to the potential delays and associated costs with their management.

A study on the economic impacts of invasive species in Ireland and Northern Ireland was published in 2013 (Kelly *et al.,* 2013) and estimated the total damage and treatment costs of invasive species on construction, development, and infrastructure projects to be upwards of €26,672,863.

The unintentional spread of invasive species during construction works is a significant issue and if not managed correctly, species could be spread to uninfested areas which would increase the future cost and effort required to control the species and could pose further biosecurity and public health and safety risks. The most common ways in which invasive species can spread during construction of a project are:

- Site and vegetation clearance, mowing, hedge-cutting or other landscaping activities;
- Spread of seed or plant fragments during the movement or transport of soils;
- Spread of seeds or plant fragments through the local surface water and drainage network;
- Contamination of vehicles or equipment with seeds or plant fragments which are then transported to other areas, especially on machinery with tracks; and

- Importation of soil from off-site sources contaminated with invasive species plant material.

Early intervention in the spread of invasive species can prevent invasions and subsequent impacts on infrastructure and habitats, thus reducing long-term management requirements with associated financial costs.

Giant hogweed and Himalayan balsam are listed under the Third Schedule for the purpose of the restriction imposed by Section 49 and 50 of the Regulations. It is therefore an offence to cause the spread of these species.

2. METHODS

2.1 Study Area

The Study Area for the ISMP is centred on the route of the proposed greenway along the banks of the River Shannon, from the west side of the bridge on the River Groody, past Plassey Beach, diverting south along McLoughlan Road and along University Road to Plassey Park Road, as shown in **Figure 2.1**. The Study Area is the area within which physical works are proposed to be constructed, accessed, and maintained.

For the project, the ISMP will only be put in place within the footprint of the proposed Greenway.

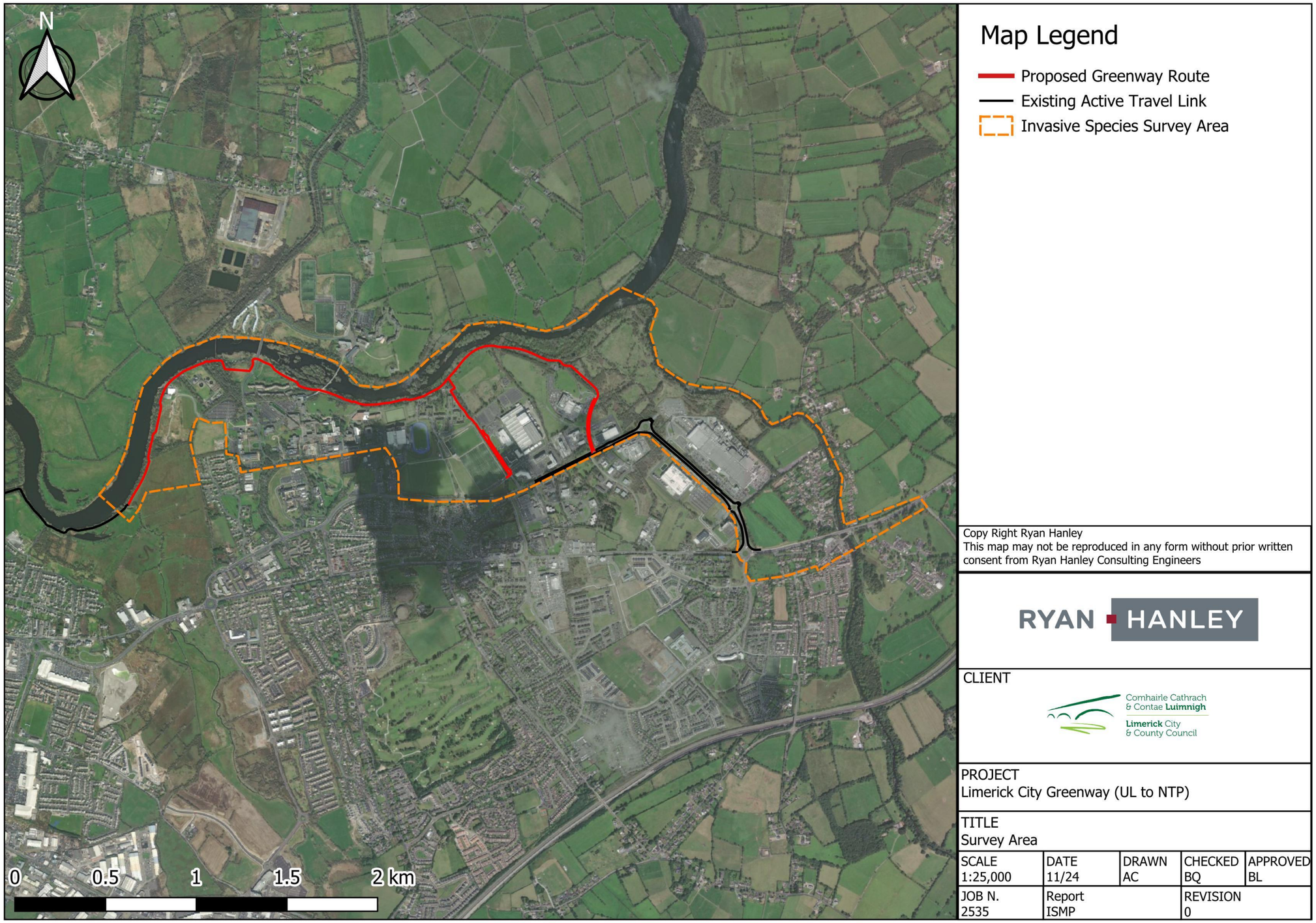


Figure 2.1- Invasive Species Study Area Limerick City Greenway

2.2 Desktop Study

Prior to the commencement of the walkover surveys, a desktop review of the relevant literature and databases (e.g. Biodiversity Ireland Database, NPWS Database, LCCC Invasive Species App) was undertaken for the Study Area in order to identify the presence of any invasive species which are listed on the Third Schedule of the Birds and Natural Habitats Regulations within the 10km grid squares/hectads R65 within which the proposed greenway is located. See **Section 3.1** below for results of this study.

2.3 Field Surveys

Walkover surveys of the proposed greenway Study Area were undertaken on 5th November 2020, 14th May 2021, 28th April 2022, 3rd May 2023, 26th June 2024 and the 5th August 2025 in order to identify the location and map the extent of any stands or individuals of invasive species recorded within the footprint of the preferred greenway route from the Groody River bridge to NTP. Where invasive species were identified, their location and extent were recorded. The area was also searched for new and or emerging shoots of any invasive species. See **Section 3.2** for results of these surveys.

2.4 Identification of Constraints

Constraints relative to the implementation of eradication/control measures were identified on the basis of the walkover surveys, best practice guidance and knowledge of the Study Area. This included a review of designated areas and health and safety constraints and flooding.

3. RESULTS

The presence of invasive species at locations within the Study Area has the potential to increase the financial burden on this project both in terms of treatment costs and delays in commencing construction works. Their presence within the Study Area requires the development of an ISMP prior to construction of the greenway in order to provide biosecurity protocols to eradicate/ avoid disturbing and spreading existing invasive species within the site, at new adjacent locations or off site.

3.1 Desktop Study

Invasive species listed on the Third Schedule identified during the desktop review of the Biodiversity Ireland Database, NPWS Database and LCCC Invasive Species APP are presented in **Table 3.1** below. Appendix A provides an illustration for the location of the invasive species on the LCCC APP.

Table 3.1- Invasive Species Identified within the Study Area during the Desktop Study

Common Name	Latin Name	Records
Brown Rat	*Rattus norvegicus*	Biodiversity Ireland Database
Canadian Waterweed	*Elodea canadensis*	Biodiversity Ireland Database
Dace	*Leuciscus leuciscus*	Biodiversity Ireland Database
Eastern Grey Squirrel	*Sciurus carolinensis*	Biodiversity Ireland Database
Fallow Deer	*Dama dama*	Biodiversity Ireland Database
Giant Hogweed	*Heracleum mantegazzianum*	Biodiversity Ireland Database, LCCC App
Giant Knotweed	*Fallopia sachalinensis*	Biodiversity Ireland Database
Greylag Goose	*Anser anser*	Biodiversity Ireland Database
Himalayan Balsam	*Impatiens glandulifera*	Biodiversity Ireland Database, LCCC App
Japanese Knotweed	*Fallopia japonica*	Biodiversity Ireland Database, LCCC App
Nuttall's Waterweed	*Elodea nuttallii*	Biodiversity Ireland Database
Three-cornered Garlic	*Allium triquetrum*	Biodiversity Ireland Database
Water Fern	*Azolla filiculoides*	Biodiversity Ireland Database

3.2 Field Surveys

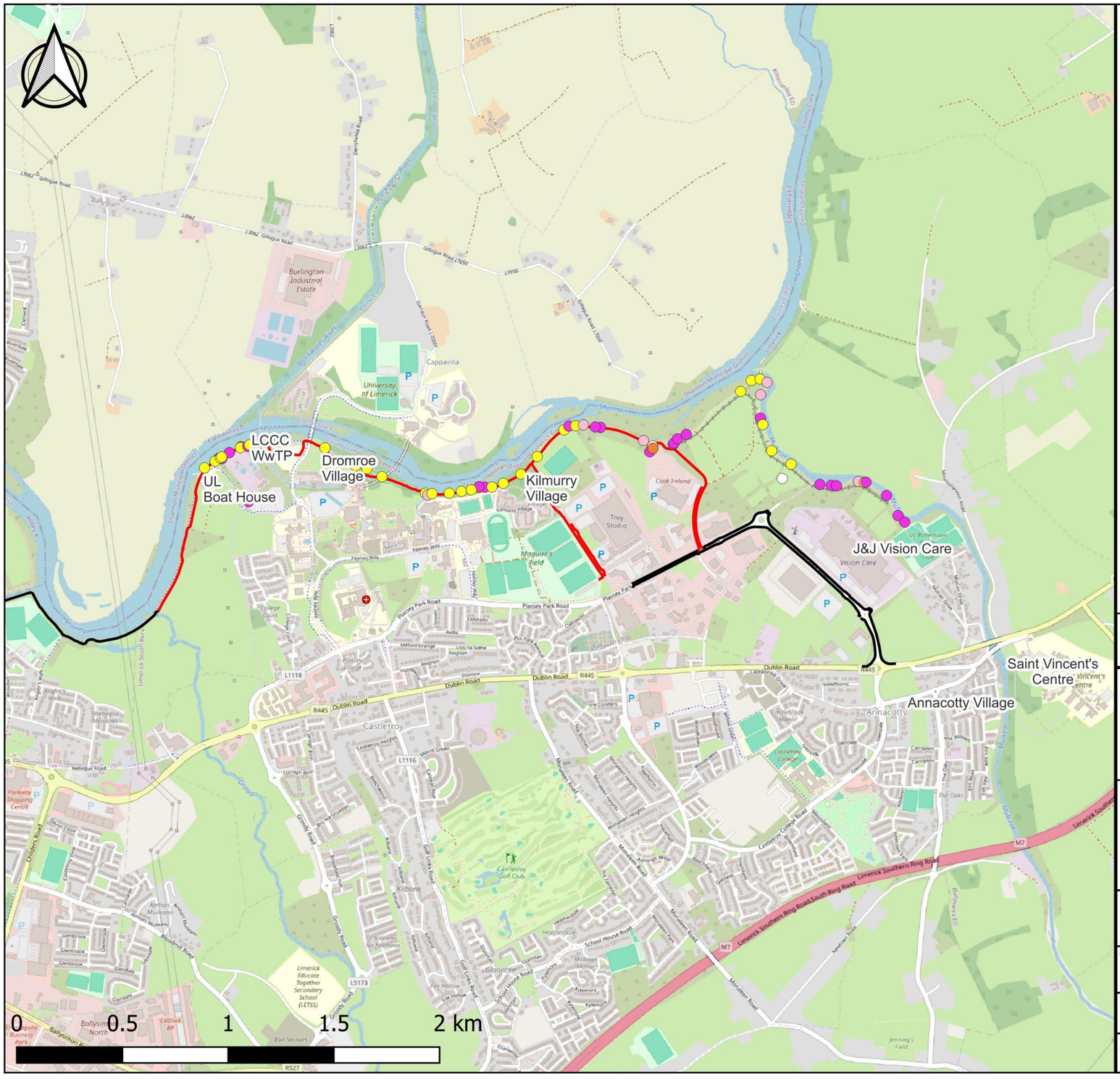
Stands of Giant Hogweed and Himalayan Balsam were identified along the length of the proposed greenway route interspersed with one another within the Study Area (**Plates 3.1- 3.6**). No other species listed in Table 3.1 on the Third Schedule were identified within the Study Area during any of the field surveys. 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 and as such do not require specific measures for their control or disposal, therefore no further assessment for these species are required. However, best practice measures will ensure that avoidance of disturbance and spread of these non-native species as part of the works. The invasive species infestation was found to be extensive throughout the length of the greenway as shown in **Figure 3.1 to Figure 3.4** and **Table 3.2 to Table 3.3.**

Table 3.2- Invasive Species Identified during Walkover Surveys 2020-2021

ID Ref	Species	Grid ref (Easting, Northing)	Details
GH19	Giant hogweed (*H. mantegazzianum*)	160760, 158304	GH stands identified have been sprayed with herbicide in this area
HB14	Himalayan balsam (*I. glanduifera*)	160556, 158464	HB stands approximately 5m X30m in size identified on the riverbank.
HB8	Himalayan balsam (*I. glanduifera*)	160606, 158499	HB stands identified under dry culvert
GH18	Giant hogweed (*H. mantegazzianum*)	160622, 158512	10 stands of GH were identified
HB9	Himalayan balsam (*I. glanduifera*)	160630, 158514	HB stands were identified covering the base of a ditch
GH23	Giant hogweed (*H. mantegazzianum*)	160638, 158511	Extensive area of GH was identified within the boundary of the WWTP
HB10	Himalayan balsam (*I. glanduifera*)	160636, 158519	HB stands identified on both the right and left side of the path for 30m. Evidence of herbicide spraying
GH22	Giant hogweed (*H. mantegazzianum*)	160673, 158529	Stands of GH identified along the boundary fence of the WWTP
HB11	Himalayan balsam (*I. glanduifera*)	160725, 158562	HB stands identified on the left side of the existing track and covering the river bank in this area and additionally within a ditch on the right side of the track
GH21	Giant hogweed (*H. mantegazzianum*)	160728, 158566	An extensive area of GH was identified within the boundary of the WWTP
GH5	Giant hogweed (*H. mantegazzianum*)	160761, 158570	Several stands of GH were identified on the right side of the bridge and plants were approx. 1.5m high
HB16	Himalayan balsam (*I. glanduifera*)	160767, 158576	An extensive area of HB was identified
GH&HB4	Giant hogweed (*H. mantegazzianum*) and Himalayan balsam (*I. glanduifera*)	160830, 158583	Treatment signage present in this area and several GH and HB plants were identified at an early stage of growth
GH&HB3	Giant hogweed (*H. mantegazzianum*) and Himalayan balsam (*I. glanduifera*)	160861, 158600	Several GH and HB plants were identified at an early stage of growth
HB15	Himalayan balsam (*I. glanduifera*)	161126, 158561	HB plants were identified at an early stage of growth
HB26	Himalayan balsam (*I. glanduifera*)	161271, 158475	HB stands identified on the right side of the existing track
HB27	Himalayan balsam (*I. glanduifera*)	161323, 158463	Stands of HB identified on both the right and left sides of the riverbank
HB23	Himalayan balsam (*I. glanduifera*)	161396, 158426	HB interspersed with Mares tail
HB24	Himalayan balsam (*I. glanduifera*)	161602, 158348	HB stands identified on the left side of the existing track and covering the river bank for approx. 100m.
GH&HB7	Giant hogweed (*H. mantegazzianum*) and Himalayan balsam (*I. glanduifera*)	161610, 158336	An extensive area of HB identified with several stands of GH interspersed
HB25	Himalayan balsam (*I. glanduifera*)	161633, 158344	HB stands identified either side of the path in this area
HB3	Himalayan balsam (*I. glanduifera*)	161712, 158347	HB stands identified either side of the path for approximately 100m
HB4	Himalayan balsam (*I. glanduifera*)	161772, 158358	HB stands identified either side of the path for approximately 100m
HB6	Himalayan balsam (*I. glanduifera*)	161820, 158361	HB stands identified either side of the path for approximately 100m

ID Ref	Species	Grid ref (Easting, Northing)	Details
HB5	Himalayan balsam (*I. glanduifera*)	161853, 158373	HB stands identified within the river bank
GH1	Giant hogweed (*H. mantegazzianum*)	161855, 158377	GH immature plants x 4
GH24	Giant hogweed (*H. mantegazzianum*)	161882, 158375	GH immature plants large area adjacent to river bank
HB28	Himalayan balsam (*I. glanduifera*)	161917, 158377	HB stands identified on the left side of the path for approximately 100m
HB1	Himalayan balsam (*I. glanduifera*)	161968, 158394	HB stands identified either side of the path for approximately 100m
HB12	Himalayan balsam (*I. glanduifera*)	162052, 158439	HB stands identified either side of the path for approximately 100m
HB13	Himalayan balsam (*I. glanduifera*)	162130, 158519	HB stands identified either side of the path for approximately 20m
HB2	Himalayan balsam (*I. glanduifera*)	162253, 158643	HB stands identified either side of the path for approximately 25m
GH3	Giant hogweed (*H. mantegazzianum*)	162280, 158663	Stands of GH identified in the area with evidence of spraying being undertaken. Evidence of spray drift on adjacent vegetation.
HB7	Himalayan balsam (*I. glanduifera*)	162311, 158665	HB large area of infestation either side of trail path
GH&HB2	Giant hogweed (*H. mantegazzianum*) and Himalayan balsam (*I. glanduifera*)	162351, 158669	Large area of HB and GH infestation identified in this area
GH2	Giant hogweed (*H. mantegazzianum*)	162406, 158659	Large area of GH identified along the path for approximately 100m
GH4	Giant hogweed (*H. mantegazzianum*)	162429, 158657	Large area of GH identified along the path
GH&HB1	Giant hogweed (*H. mantegazzianum*) and Himalayan balsam (*I. glanduifera*)	162634, 158599	Large area of GH identified along the right side of the path
GH20	Giant hogweed (*H. mantegazzianum*)	162664, 158540	Large area of GH identified by the left corner of the path
GH6	Giant hogweed (*H. mantegazzianum*)	162772, 158577	Large area of GH infestation identified
GH7	Giant hogweed (*H. mantegazzianum*)	162781, 158586	GH stands identified in castle ruins
GH8	Giant hogweed (*H. mantegazzianum*)	162792, 158604	Stands of GH identified in and around the castle ruins
GH9	Giant hogweed (*H. mantegazzianum*)	162836, 158625	GH stands identified either side of path in this area
HB17	Himalayan balsam (*I. glanduifera*)	163094, 158827	HB - Extensive infestation of HB identified in this area
HB18	Himalayan balsam (*I. glanduifera*)	163141, 158880	HB large area of infestation on left side of trail path
HB19	Himalayan balsam (*I. glanduifera*)	163184, 158887	Extensive infestation of HB identified in this area
GH&HB5	Giant hogweed (*H. mantegazzianum*) and Himalayan balsam (*I. glanduifera*)	163219, 158872	HB and GH infestation identified to the left side of the trail path
GH&HB6	Giant hogweed (*H. mantegazzianum*) and Himalayan balsam (*I. glanduifera*)	163187, 158813	Large area of HB and GH infestation identified either side of path for approximately 40m
GH12	Giant hogweed (*H. mantegazzianum*)	163185,158703	Approximately 20 stands of GH identified either side of the path
HB22	Himalayan balsam (*I. glanduifera*)	163196, 158670	Large areas of HB identified either side of the track
HB29	Himalayan balsam (*I. glanduifera*)	163237, 158547	HB small stands identified on right side of trail path

ID Ref	Species	Grid ref (Easting, Northing)	Details
HB21	Himalayan balsam (*I. glanduifera*)	163333, 158484	HB immature stands identified on left side of trail path
GH10	Giant hogweed (*H. mantegazzianum*)	163462, 158389	GH stands identified on right side of path
GH13	Giant hogweed (*H. mantegazzianum*)	163520, 158384	GH stands identified on left side of the trail path
GH11	Giant hogweed (*H. mantegazzianum*)	163543, 158381	GH stands identified on left side of the trail path
GH&HB5	Giant hogweed (*H. mantegazzianum*) and Himalayan balsam (*I. glanduifera*)	163647, 158400	Several GH and HB plants were identified at an early stage of growth by the stone foot bridge
HB20	Himalayan balsam (*I. glanduifera*)	163677, 158400	HB immature stands identified on left side of trail path by the overwater pipe
GH16	Giant hogweed (*H. mantegazzianum*)	163685, 158399	GH large stands identified on left side of the trail path
GH17	Giant hogweed (*H. mantegazzianum*)	163783, 158338	GH stands identified on left side of the trail path
GH14	Giant hogweed (*H. mantegazzianum*)	163836, 158244	GH large stands identified on right side of the trail path
GH15	Giant hogweed (*H. mantegazzianum*)	163868, 158208	GH large stands identified on right side of the trail path by entrance to Bohs rugby club



Map Legend

- Proposed Greenway Route
- Existing Active Travel Link

IAPS Records 2020-2021

- Himalayan Balsam
- Giant Hogweed
- Cherry Laurel
- Giant Hogweed & Himalayan Balsam
- Snowberry

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Limerick City & County Council

PROJECT
Limerick City Greenway (UL to NTP)

TITLE
Invasive Species Locations

SCALE	DATE	DRAWN	CHECKED	APPROVED
1:25,000	07/24	AC	BQ	BL

JOB N.	Report	REVISION
2535	ISMP	0

Figure 3.1- Invasive Species Locations Identified during the Walkover Survey 2020-2021

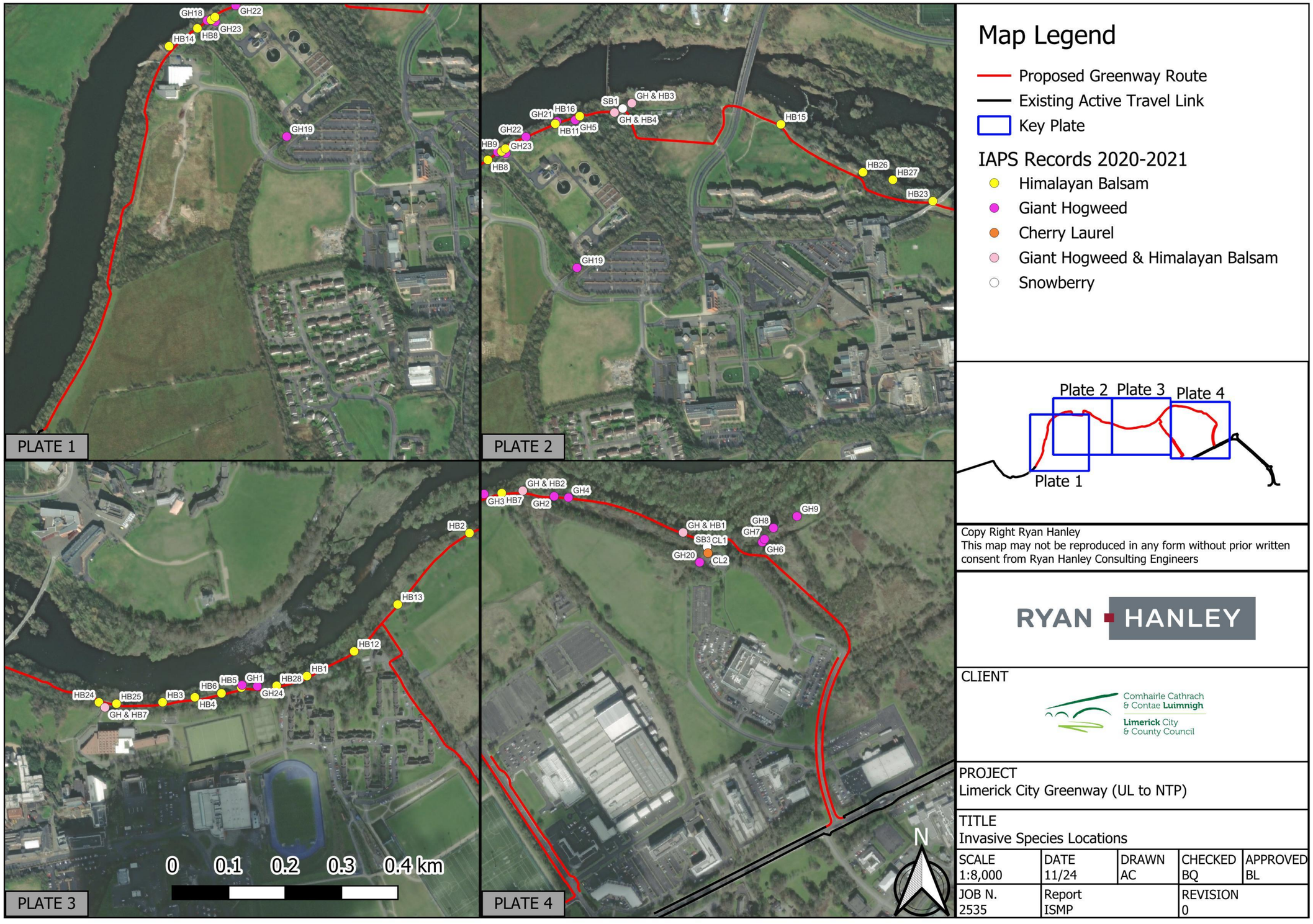


Figure 3.2- Invasive Species Locations Recorded during the Walkover Survey 2020-2021

Plate 3.1 Young Giant Hogweed adjacent to existing track at 163677, 158420 (May, 2021)

Plate 3.2 Young Giant Hogweed adjacent to existing track at 162774, 158592 (May, 2021)

Plate 3.3 Young Giant Hogweed adjacent to existing track at 162466, 158670 (May, 2021)

Plate 3. 4 Young Himalayan Balsam adjacent to existing track at 161221, 158516 (May, 2021)

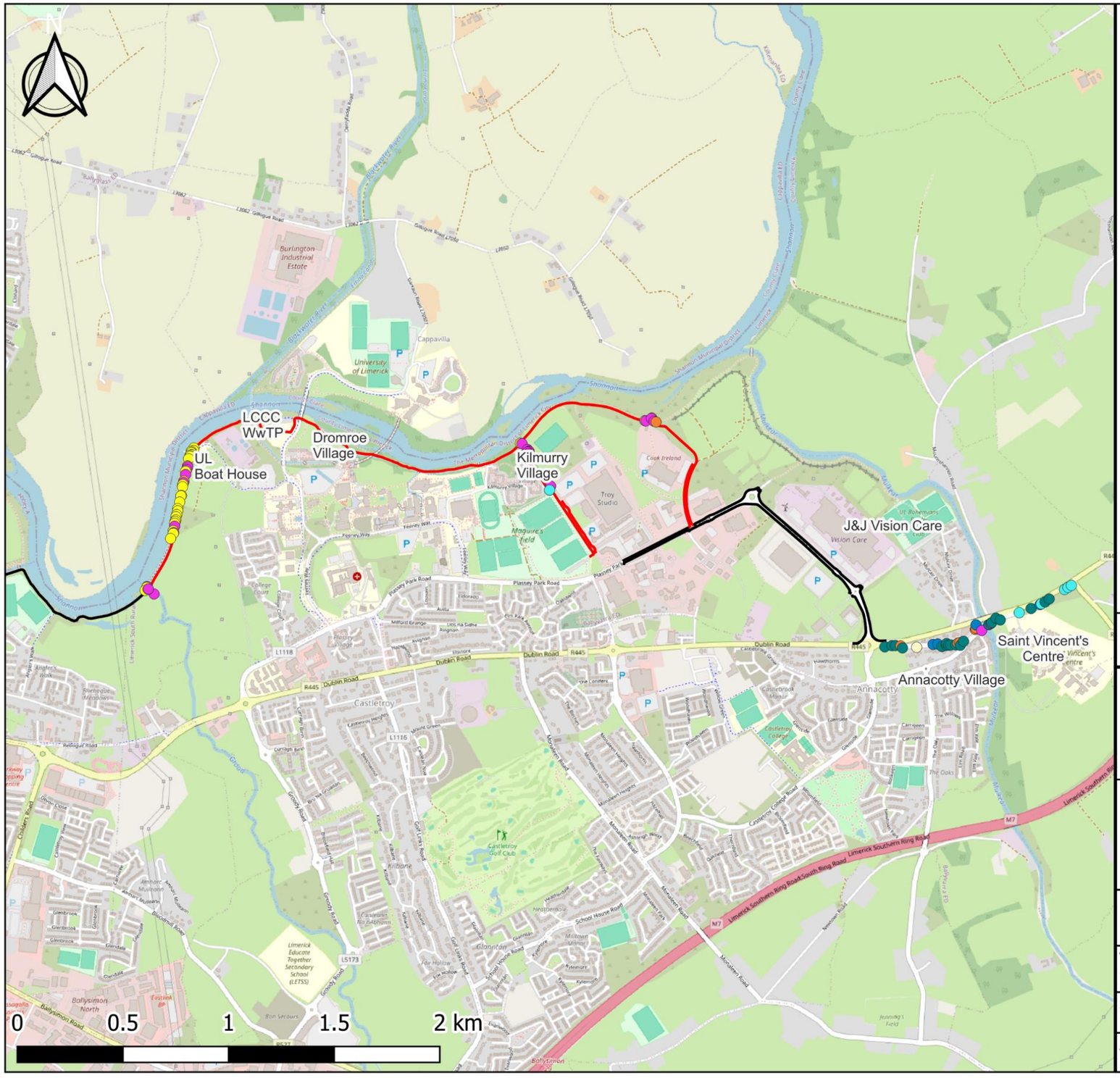
Plate 3.5 Mature Himalayan Balsam on both sides of existing track at 161671, 158354 (Nov, 2020)

Plate 3.6 Young Himalayan Balsam in drainage ditch near existing track at 160756,158580 (May,2021)

Table 3.3- Invasive Species Identified during Walkover Surveys 2024

TN	Invasive species	ITM X	ITM Y	Notes
TN1	Himalayan balsam	560506.54	658496.972	Within riverbank, west of the existing pathway
TN2	Himalayan balsam	560505.259	658484.763	Within ditch, east of the existing pathway
TN3	Himalayan balsam	560494.103	658481.288	Large carpet of HB underneath and adjacent to the pontoon
TN4	Himalayan balsam	560495.932	658474.476	Within grassy verge
TN5	Himalayan balsam	560494.423	658474.796	Large carpet of HB within bankside
TN6	Himalayan balsam	560496.16	658465.422	Within ditch
TN7	Himalayan balsam	560488.204	658462.496	HB carpeting riverbank
TN8	Himalayan balsam	560488.845	658457.329	Within ditch
TN9	Himalayan balsam	560481.392	658445.807	HB carpeting riverbank as well as grassy verges on both sides of the path
TN10	Himalayan balsam	560476.179	658412.543	HB still dominating both sides of the path
TN11	Himalayan balsam	560476.842	658408.199	Within field
TN12	Giant hogweed	560476.842	658408.199	Within field
TN13	Giant hogweed	560472.27	658395.328	Within field
TN14	Himalayan balsam	560467.263	658386.64	HB in grassy verges beside path and riverbank
TN15	Giant hogweed	560467.08	658371.231	GH in ditch
TN16	Himalayan balsam	560458.964	658340.23	HB within grassy verges
TN17	Giant hogweed	560457.272	658334.149	Within riverbank
TN18	Himalayan balsam	560454.072	658324.136	HB continues to carpet riverbank and grassy verges
TN19	Himalayan balsam	560452.746	658313.39	Within ditch
TN20	Himalayan balsam	560447.442	658272.651	Within ditch
TN21	Himalayan balsam	560445.018	658270.41	Within riverbank
TN22	Himalayan balsam	560438.96	658241.375	On both sides of the pathway
TN23	Himalayan balsam	560429.769	658210.169	Within riverbank
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 riverbank
TN27	Himalayan balsam	560420.72	658156.53	Within ditch
TN28	Himalayan balsam	560417.42	658149.13	Within riverbank
TN29	Himalayan balsam	560415.23	658140.35	Dominating grassy verges
TN30	Giant hogweed	560415.23	658127.18	Within ditch
TN31	Himalayan balsam	560408.78	658105.64	Within riverbank and grassy verge
TN32	Giant hogweed	560410.7	658096.87	Within ditch/stream bank
TN33	Himalayan balsam	560408.65	658092.75	Within riverbank and both grassy verges
TN34	Himalayan balsam	560396.06	658068.574	Large carpet of HB in riverbank and within grassy verges
TN35	Giant hogweed	560285.054	657841.932	Within riverbank
TN36	Himalayan balsam	560283.133	657837.68	Within riverbank
TN37	Himalayan balsam	560275.52	657823.551	Within riverbank
TN38	Giant hogweed	560317.7	657806.679	Large stand of GH in field
TN39	Himalayan balsam	560289.94	657829.038	Coming through wooden fence
TN40	Giant hogweed	560290.558	657829.415	Near pathway, behind wooden fence
TN41	Giant hogweed	560290.489	657830.067	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
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	657661.451	Within riparian treeline
TN65	Giant hogweed	564278.8	657667.521	On top of wall
TN66	Sycamore	564281.544	657670.848	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	657718.275	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
TN73	Sycamore	564534.18	657768.89	Planted tree
TN74	Sycamore	564553.726	657782.865	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 signpost 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



Map Legend

- Proposed Greenway Route
- Existing Active Travel Link

IAPS Records 2024

- Himalayan Balsam
- Giant Hogweed
- Sycamore
- Cherry Laurel
- New Zealand Flax
- Butterfly-bush
- Winter heliotrope

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PROJECT
Limerick City Greenway (UL to NTP)

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Invasive Species Locations

SCALE	DATE	DRAWN	CHECKED	APPROVED
1:25,000	11/24	AC	BQ	BL

JOB N.	Report	REVISION
2535	ISMP	0

Figure 3.3- Invasive Species Locations Recorded during the Walkover Survey 2024

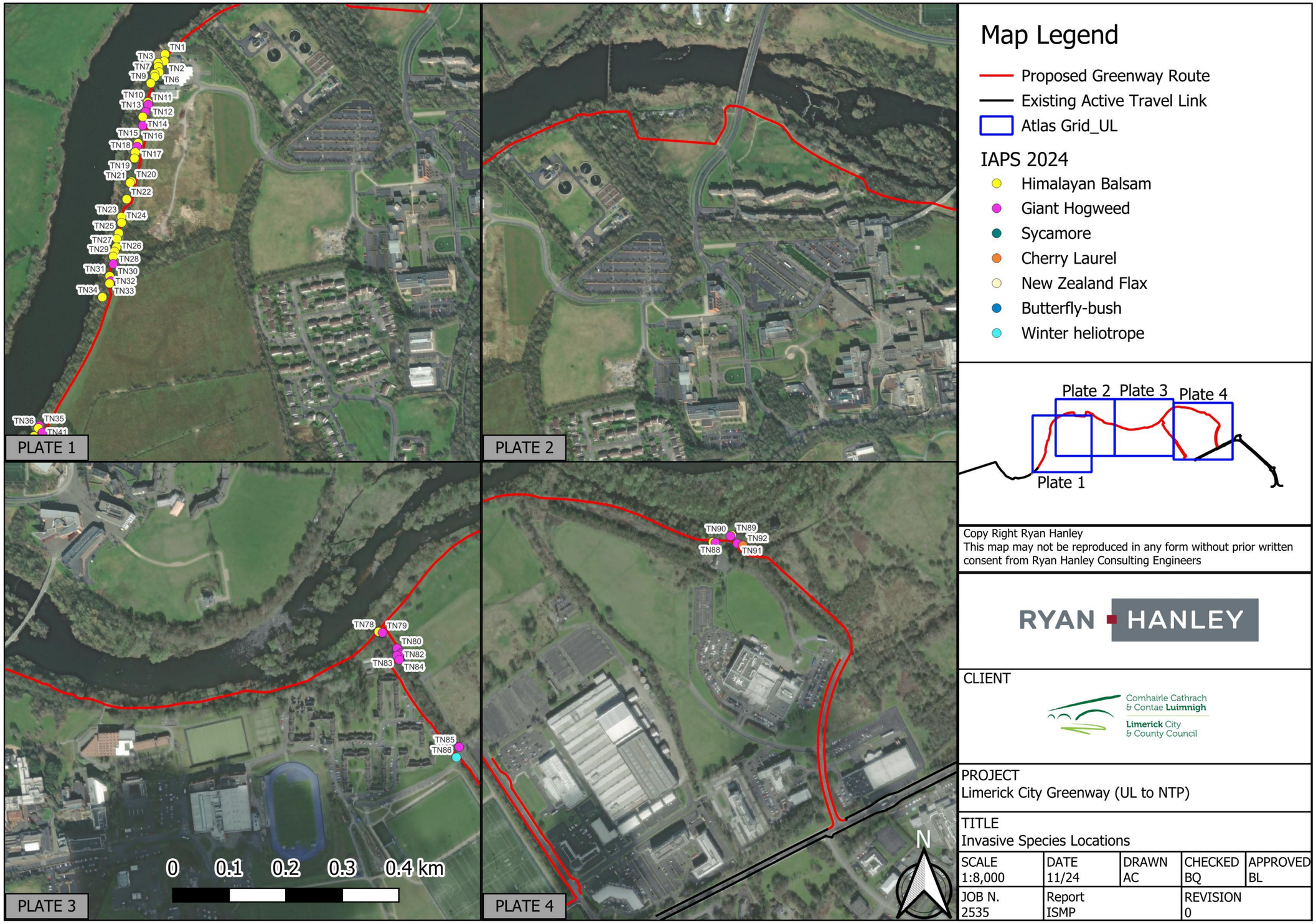

Figure 3.4- Invasive Species Locations Recorded during the Walkover Survey 2024

Table 3.4- Invasive Species Identified during Walkover Survey 2025

TN	Invasive species	ITM X	ITM Y	Notes
T1	Giant hogweed	560333.53	657801.35	Large stand of GH within field
T2	Himalayan balsam	560273.001	657817.514	Bank side, lining pathway
T3	Himalayan balsam	560281.006	657832.609	Within the banks of Groody river
T4	Himalayan balsam	560292.746	657829.788	Within ditch
T5	HB & GH	560291.755	657828.797	Lining the pathway
T6	HB & GH	560287.638	657845.645	Bank side, both species within bank
T7	Himalayan balsam	560378.01	658018.81	HB within bank side
T8	Himalayan balsam	560399.51	658064.25	On both sides
T9	Himalayan balsam	560405.46	658085.74	HB within bank side
T10	Himalayan balsam	560409.58	658107.55	HB within bank side
T11	Himalayan balsam	560412.32	658128.74	HB within bank side
T12	Himalayan balsam	560423.717	658173.414	HB in ditch
T13	Himalayan balsam	560424.327	658174.52	HB in ditch
T14	Himalayan balsam	560426.995	658196.818	HB under bridge and throughout bank
T15	Himalayan balsam	560440.64	658256.51	Large stands on both sides of the pathway and within bank
T16	Himalayan balsam	560446.13	658282.73	Large stands on both sides of the pathway and within bank
T17	Giant hogweed	560458.63	658289.6	Behind ditch
T18	Himalayan balsam	560456.65	658329.24	Large stands on both sides of the pathway and within bank
T19	Himalayan balsam	560462.14	658359.73	Large stands on both sides of the pathway and within bank
T20	Himalayan balsam	560466.71	658384.13	Large stands on both sides of the pathway and within bank
T21	Himalayan balsam	560470.07	658401.81	Large stands on both sides of the pathway and within bank
T22	Himalayan balsam	560473.73	658417.67	HB within bank side
T23	Himalayan balsam	560477.767	658422.625	HB in ditch
T24	Himalayan balsam	560481.884	658434.212	HB within bank side
T25	Himalayan balsam	560486.458	658446.791	HB on both sides of pathway
T26	White dogwood	560489.355	658453.347	Within ditch
T27	Himalayan balsam	560492.785	658464.02	HB within bank side
T28	Himalayan balsam	560496.978	658480.41	HB within bank side
T29	Himalayan balsam	560503.305	658482.316	HB in ditch
T30	Himalayan balsam	560495.148	658489.635	Large HB stands both sides of the pier
T31	Himalayan balsam	560507.422	658496.953	Large HB stands both sides of the pier
T32	Giant hogweed	560515.351	658497.487	Within amenity grassland
T33	Himalayan balsam	560514.055	658505.568	Large HB stands both sides of the pier
T34	Himalayan balsam	560518.095	658498.63	HB in ditch
T35	Himalayan balsam	560528.31	658514.335	HB within bank side
T36	Himalayan balsam	560539.059	658525.312	HB within bank side
T37	Himalayan balsam	560550.799	658534.918	HB within bank side
T38	Himalayan balsam	560552.4	658536.747	HB within bank side
T39	Giant hogweed	560555.069	658535.833	GH in ditch
T40	Himalayan balsam	560590.746	658565.412	HB within bank side
T41	Himalayan balsam	560609.347	658575.627	HB within bank side
T42	Himalayan balsam	560630.541	658584.394	HB within bank side
T43	Himalayan balsam	560678.721	658607.569	HB within bank side
T44	Himalayan balsam	560709.901	658615.879	HB within bank side
T45	HB & GH	560711.273	658613.973	Both species within and behind ditch
T46	Himalayan balsam	560723.47	658619.462	Large stand at bridge
T47	Himalayan balsam	560739.632	658622.435	HB within bank side
T48	HB & GH	560746.417	658625.027	Behind wooden fence, bank side

T49	Himalayan balsam	560748.246	658625.865	Large stand on both sides
T50	Himalayan balsam	560750.915	658625.637	Lining river
T51	Himalayan balsam	560768.296	658629.677	HB within bank side
T52	Himalayan balsam	560788.8	658629.68	HB in ditch
T53	Himalayan balsam	560794.6	658631.81	HB within bank side
T54	Himalayan balsam	560798.26	658628.3	HB in ditch
T55	Himalayan balsam	560809.54	658632.57	HB within bank side
T56	HB & GH	560871.9	658651.79	Large stand of HB and some GH within large open grassland
T57	Himalayan balsam	560954.38	658640.81	HB in ditch
T58	Himalayan balsam	560959.87	658641.11	HB within bank side
T59	Himalayan balsam	560987.62	658639.28	HB within bank side
T60	Himalayan balsam	561008.36	658637.76	HB under bridge and throughout bank
T61	Himalayan balsam	560864.12	658573.72	HB lining woodland
T62	HB & GH	560808.01	658607.26	Within woodland (Couldn't be accessed fully)
T63	Himalayan balsam	561037.02	658651.79	At the edge of the bank
T64	Himalayan balsam	561044.34	658623.43	HB within bank side
T65	Himalayan balsam	561074.83	658618.85	HB within bank side
T66	Himalayan balsam	561229.44	658513.65	HB lining woodland
T67	Himalayan balsam	561238.89	658516.09	HB lining woodland
T68	Himalayan balsam	561263.286	658510.342	HB lining woodland
T69	Himalayan balsam	561264.277	658509.618	HB lining woodland
T70	Himalayan balsam	561281.72	658500.66	HB lining woodland
T71	Himalayan balsam	561289.64	658497.76	HB on both sides of pathway
T72	Himalayan balsam	561314.8	658481.91	HB lining woodland
T73	Himalayan balsam	561338.43	658470.78	HB on both sides of pathway
T74	Himalayan balsam	561347.73	658467.88	HB under bridge and throughout bank
T75	Himalayan balsam	561357.04	658464.37	HB under bridge and throughout bank
T76	Himalayan balsam	561374.57	658463.76	HB under bridge and throughout bank
T77	Himalayan balsam	561378.53	658458.27	HB in ditch
T78	Himalayan balsam	561475.35	658427.02	HB in ditch
T79	Himalayan balsam	561490.75	658420.31	HB within bank side
T80	Himalayan balsam	561515.76	658418.48	HB within bank side
T81	Himalayan balsam	561535.12	658402.78	HB within bank side
T82	Himalayan balsam	561561.65	658390.88	HB on both sides of pathway
T83	Himalayan balsam	561586.577	658388.405	HB on both sides of pathway
T84	Himalayan balsam	561588.406	658389.015	HB within bank side
T85	Himalayan balsam	561609.066	658389.701	HB within bank side
T86	Himalayan balsam	561637.425	658386.118	HB within bank side
T87	Himalayan balsam	561676.838	658388.176	HB within bank side
T88	Himalayan balsam	561684.538	658390.921	HB within bank side
T89	Himalayan balsam	561701.462	658394.199	HB within bank side
T90	Himalayan balsam	561730.66	658399.535	HB within bank side
T91	Himalayan balsam	561738.893	658403.271	HB on both sides of pathway
T92	Himalayan balsam	561763.822	658403.042	HB within bank side
T93	Himalayan balsam	561766.261	658402.127	HB on both sides of pathway
T94	Himalayan balsam	561788.369	658410.513	HB within bank side
T95	Himalayan balsam	561807.961	658413.41	HB lining pathway beside beach
T96	Himalayan balsam	561824.199	658418.67	HB in ditch
T97	Himalayan balsam	561845.011	658426.446	HB under bridge and throughout bank
T98	Himalayan balsam	561846.536	658426.37	HB within bank side
T99	Himalayan balsam	561876.877	658423.93	HB lining pathway and bank side
T100	Himalayan balsam	561893.573	658426.522	HB on both sides of pathway
T101	Himalayan balsam	561907.6	658428.123	HB on both sides of pathway
T102	Himalayan balsam	561927.726	658428.58	HB lining pathway and bank side
T103	Himalayan balsam	561961.574	658452.975	HB behind trees
T104	Himalayan balsam	561962.87	658454.348	HB lining pathway and within bank
T105	Himalayan balsam	561970.722	658458.541	HB on both sides of pathway
T106	Himalayan balsam	561995.727	658473.101	HB on both sides of pathway
T107	Himalayan balsam	562006.552	658481.258	HB on both sides of pathway
T108	Himalayan balsam	562021.799	658491.55	HB on both sides of pathway

T109	Himalayan balsam	562029.803	658498.487	HB on both sides of pathway
T110	Himalayan balsam	562039.561	658504.129	HB on both sides of pathway
T111	Himalayan balsam	562040.476	658505.653	HB on both sides of pathway
T112	Himalayan balsam	562053.588	658514.649	HB lining woodland
T113	Himalayan balsam	562072.418	658512.362	HB lining woodland
T114	Himalayan balsam	562075.773	658507.026	HB lining woodland
T115	Himalayan balsam	562078.365	658502.528	HB lining woodland
T116	HB & GH	562088.351	658489.644	HB & GH lining woodland near gate
T117	Himalayan balsam	562071.427	658541.407	HB lining treeline
T118	Himalayan balsam	562074.934	658549.183	HB lining treeline and desire line
T119	Himalayan balsam	562081.643	658563.82	HB lining treeline
T120	Himalayan balsam	562101.235	658560.771	HB lining treeline
T121	Himalayan balsam	562117.2727	658587.1384	HB lining treeline
T122	Himalayan balsam	562117.3966	658587.7101	HB lining treeline
T123	Himalayan balsam	562124.734	658617.089	HB lining treeline
T124	Himalayan balsam	562158.125	658652.69	HB lining treeline
T125	HB & GH	562159.497	658651.394	Both species lining treeline
T126	Himalayan balsam	562163.614	658656.426	HB lining treeline
T127	Himalayan balsam	562173.905	658671.825	HB within treeline
T128	Himalayan balsam	562188.542	658670.072	HB lining treeline
T129	Himalayan balsam	562189.381	658668.776	HB within grassland
T130	Himalayan balsam	562202.417	658684.938	HB lining treeline
T131	Himalayan balsam	562221.094	658694.619	HB on both sides of pathway
T132	Himalayan balsam	562241.83	658701.938	HB on both sides of pathway
T133	Himalayan balsam	562268.588	658707.35	HB within bank side
T134	HB & GH	562280.633	658711.467	Both species within bank side
T135	Giant hogweed	562282.158	658710.476	GH within bank side
T136	Himalayan balsam	562301.064	658713.068	HB within bank side
T137	Himalayan balsam	562322.791	658709.561	HB on both sides of pathway
T138	Himalayan balsam	562337.047	658706.664	HB on both sides of pathway
T139	HB & GH	562364.034	658703.234	Both species on both sides of the pathway
T140	HB & GH	562373.182	658704.149	Both species on both sides of the pathway
T141	Himalayan balsam	562382.139	658704.301	HB behind trees
T142	Himalayan balsam	562383.435	658705.483	HB on both sides of pathway
T143	Himalayan balsam	562402.99	658699.651	HB within bank side
T144	Himalayan balsam	562406.496	658700.413	HB on both sides of pathway
T145	HB & GH	562407.907	658700.108	Both species on both sides of the pathway
T146	Giant hogweed	562428.338	658700.108	GH within bank side
T147	Himalayan balsam	562449.493	658692.79	HB within bank side
T148	Himalayan balsam	562486.43	658686.73	HB lining woodland
T149	Himalayan balsam	562512.65	658675.14	HB within bank side
T150	Himalayan balsam	562533.85	658666.6	HB within woodland
T151	Himalayan balsam	562552.75	658658.37	HB within bank side
T152	Himalayan balsam	562557.33	658657.76	HB on both sides of pathway
T153	HB & GH	562560.22	658655.78	Both species on both sides of the pathway
T154	Himalayan balsam	562592.09	658639.16	HB on both sides of pathway
T155	Himalayan balsam	562609.47	658637.33	HB on both sides of pathway
T156	Himalayan balsam	562623.5	658633.67	HB on both sides of pathway
T157	Himalayan balsam	562641.18	658633.06	HB on both sides of pathway
T158	Himalayan balsam	562659.48	658631.84	HB on both sides of pathway

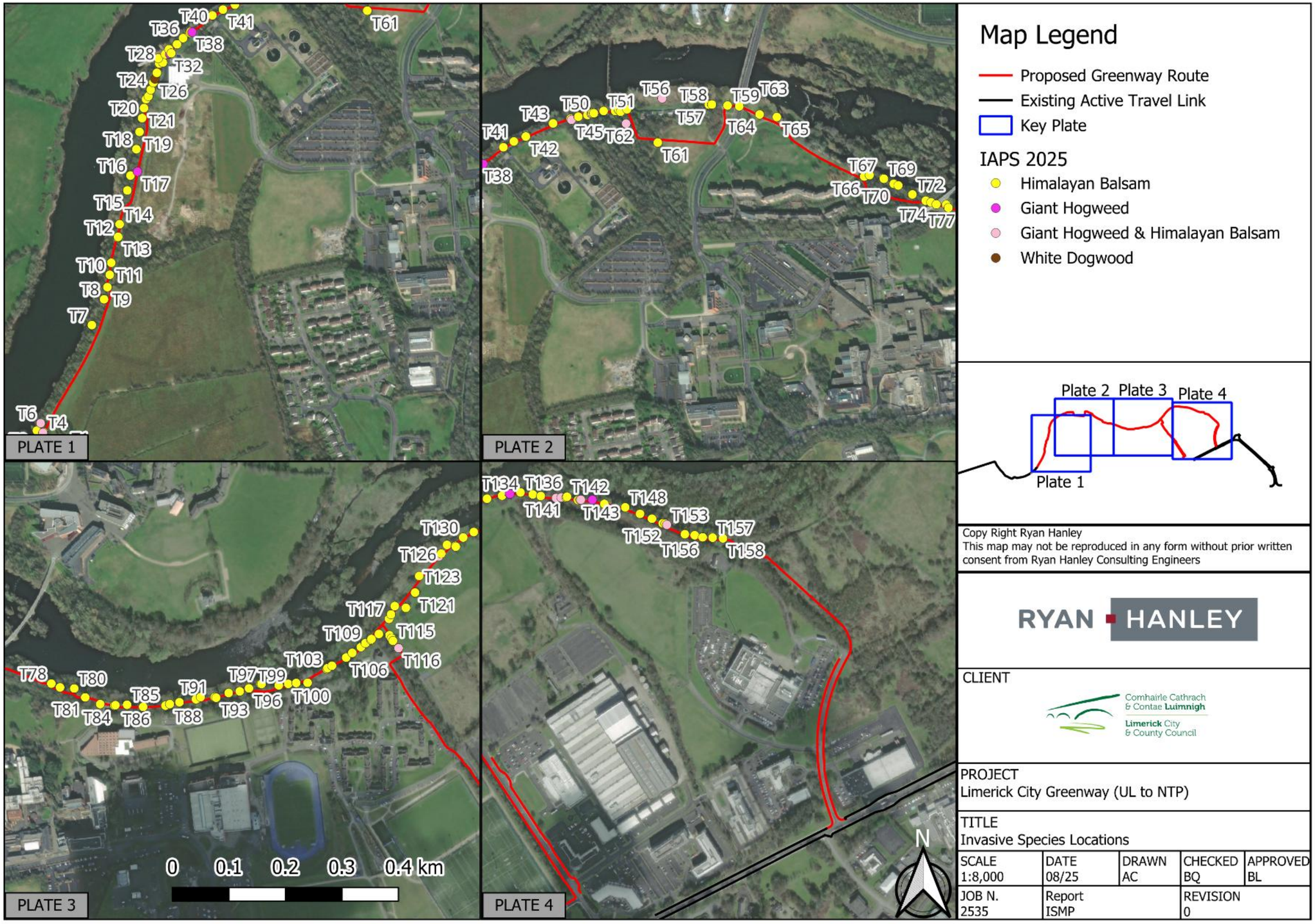

Figure 3-1 Invasive Species Locations Recorded during the Walkover Survey 2025

4. BEST PRACTICE CONTROL MEASURES FOR INVASIVE SPECIES

Invasive species have been identified at a number of locations adjacent to the proposed Greenway route within the Study Area. Himalayan balsam and Giant hogweed are invasive species listed on the Third Schedule whereby interference is legally controlled. They are highly invasive and can easily spread to new areas and are effective colonisers of disturbed ground (e.g. construction sites).

4.1 Advanced Treatment

Depending on the timescale of the construction of a project it may be possible to eradicate some species prior to the onset of construction on site via advanced treatment and in most cases, this is considered preferable. It is the aim of this ISMP to accomplish effective control or eradication of invasive plants within the managed area. By treating in advance of construction there will be control over the spread of infestations. However, if advanced control is not entirely achieved before construction, then biosecurity measures which includes site hygiene protocols, will be needed to avoid spread of invasive species.

Given the high level of invasive species infestation along the Greenway route, it is expected that the advanced treatment for invasives will likely be chemical treatment rather than excavation. Giant hogweed and Himalayan balsam all respond well to chemical treatment.

The specific treatment method will be decided on a site-by-site basis and in consideration of the time of year.

Use of an aquatic approved herbicide for any infestation close to water will be required. Biosecurity measures, as per Section 4.3, will be required even if the control of spread of invasive species is achieved prior to construction.

4.2 Monitoring

This ISMP must be revised by the specialist contractor on the basis of annual monitoring in early summer to assess the effectiveness of controls, treatment of plants/areas in the previous year or any newly discovered infestation including young plants. This will be undertaken by a suitably qualified person, with competence in identifying invasive species, within the proposed boundary of the greenway and any additional areas where construction works are required (e.g. temporary construction compounds, haul routes etc). Further treatment targets and operations will be undertaken thereafter. In advance of works commencing on Greenway:

- Pre-construction surveys will be completed 3-4 weeks before construction begins;
- Data collected as part of this survey will include a detailed description of any infestations identified including the approximate area of the respective stands where feasible;
- Ongoing monitoring throughout the growing season in all areas adjacent to the biosecurity zones; and
- Mapping of the most up to date invasive species distribution and extent of infestations will be produced.

4.3 Biosecurity Measures

All personnel that will be working on the proposed greenway route shall be educated through tailored tool-box talks to recognise each of the invasive species present within the footprint of the works.

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. Personnel must be familiar with the location of all biosecurity zones, and emergency procedures should they come into contact with Giant Hogweed material. Only those who have been inducted into biosecurity measures on-site should enter the biosecurity zones within the works area. Should any risk of contaminated material escaping be observed by the site supervisor, additional tool box talks and any additional necessary training that is needed shall be given.

Maintaining biosecurity measures at all times in an area where invasive species are present is essential to prevent further spread. Biosecurity measures are also necessary on sites where invasive species are not present, but where there is risk of contaminated material being brought to site, i.e., site machinery being used on multiple sites, construction staff travelling between infested and not infested sites. Careful preparation of the site and planning of the works is crucial to successful treatment of invasive species.

At all site locations during the construction stage, the contractor will adhere to the following best practice biosecurity measures in order to avoid the spread and introduction of invasive species where applicable:

- Fence off (biosecurity zones) 8m from the furthermost stand of invasive species in infested areas prior to and during construction where possible in order to avoid spreading seeds or plant fragments around or off the construction site. If this is not possible the biosecurity zones will be determined by a suitably qualified person in agreement with the site manager;
- Clearly identify and mark out infested areas. Erect signs at the construction site entrances and by the biosecurity zones to inform site users of the risk;
- Dedicated biosecurity zone entry and exit points should be created for operators on foot and for mobile plant equipment;
- Personnel working on or between biosecurity zones should ensure their clothing and footwear are cleaned to prevent spread;
- Don't use machinery with caterpillar tracks in infested areas. Machinery tyres must be cleaned prior to exiting the biosecurity zones;
- Clearly identify and mark out areas where contaminated soil is to be stockpiled on site, which cannot be within 50m of any watercourse or within the flood zone. Biosecurity zones need to be fenced and surround all stockpiles of contaminated soils containing invasive species;
- Infested areas which will not be excavated will be protected by a root barrier membrane if they are likely to be disturbed by machinery;
- Appropriate silt barriers will be installed in drains that may occur within infested areas;
- Biosecurity facilities must be installed on-site prior to site works commencing. Installation of a dedicated footwear and vehicular wheel wash down facility, into a contained area by the entrance and exit points of the construction site and in the biosecurity zones, away from drains and watercourses. All run-off will be isolated and treated as contaminated material;
- Vehicles entering and leaving the construction site and biosecurity zones will be cleaned using stiff-haired brush and pressure washers, paying special attention to any areas that might retain seed and plant material;

- 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), consideration should be given to designating vehicles or machinery to specific sites to prevent spread;
- Vehicles leaving the site to be inspected for any plant material and will be washed down into a dedicated wastewater contained storage area then tinkered off site to a licenced waste facility;
- If soil is imported to the site for landscaping, infilling or embankments, the contractor shall gain documentation from suppliers that it is free from invasive species;
- Ensure all site users are aware of measures to be taken and alert them to the presence of the ISMP; and
- An Environmental/Ecological Clerk of Works shall be on site to monitor and oversee the implementation of this ISMP and installation of the biosecurity zones.

4.4 Treatment Methods

There are a number of management options that may be implemented to control and prevent the spread of invasive species. These are presented in the sections below. It must also be noted that it may not be possible to completely eradicate invasive species before or during the construction phase.

4.4.1 Chemical Treatment

The use of suitable herbicides/pesticides should only be recommended and applied by a suitably qualified person. Appropriate training must include achieving competency certification in the safe use of herbicides/pesticides through a National Proficiency Test Council registered assessment centre or achieving an appropriate FETAC award in this area.

Chemical treatment involves the application of a herbicide to invasive species which will be absorbed into the plant's root/rhizome system and kill the plant without any excavation or removal of the plant material. In order for herbicide treatment programmes to be successful, it is important that the initial infestation remains as healthy as possible until the herbicide is applied. The preferred types of herbicides to be used in treatment are Glyphosate or similar. Generally, if herbicide is applied as the treatment option, it will need to be reapplied for up to four years (depending on the targeted invasive species) after the first application to ensure the plant control measures have been effective, or monitored for a minimum of two years during which no regrowth is recorded.

The selection of the most appropriate chemical treatment eradication/control measure for invasive species is dependent on a number of factors including lead in time available before construction activities, the extent of funding available to the management of invasive species within a site and land ownership. Where land is privately owned, chemical treatment and eradication of invasive species on the site may not be an option.

Table 4.1- Type of Herbicide used in Invasive Species Treatment

Herbicide	Licenced Product	PCS No.	Selectivity	Persistence	Timing of 1st Application	Aquatic Approved Product
Glyphosate	Roundup Biactive	04660	Non-selective	Non-persistent	Mar-Oct	Yes

Glyphosate is non-persistent and can be used near water but is not selective (will impact all plant species). The most effective time to apply Glyphosate is dependent on the species being treated but, in general, application should be undertaken before October (or before cold weather causes leaves to discolour and fall). The application of Glyphosate should not be undertaken on foggy days, in windy weather or if rain is forecast within twelve hours of application where there is a risk of spray drift occurring. Consultation should be undertaken with the National Parks and Wildlife Service (NPWS) when herbicide treatment is undertaken adjacent to or within a European Site. Foliar treatment (spraying) is usually applied with a sprayer such as a knapsack sprayer or a larger spray system. Treatment dyes and sticking agents can be used to clearly identify all areas treated and reduce foliar run-off and increase absorption of the herbicide respectively. It is an effective way to treat large monocultures of invasive species, or to spot-treat individual plants. Reapplication rates will depend on site specific considerations including the extent of the infestation, its location and the time of year treatment commences.

4.4.1.1 Himalayan balsam

Chemical control of Himalayan balsam is readily achieved with the use of Glyphosate as a foliar spray where infestations occur. It 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. Herbicide can be applied as a spot treatment to individual plants or as an overall spray. Where accessibility is problematic e.g. riverbanks, a long lance sprayer may be used. Herbicide application will not kill Himalayan balsam seeds in the seed bank. Monitoring with follow-up treatments to control seedling germination will be required over a period of two or more years to ensure complete removal from the seed bank. It is essential to establish native riparian vegetation quickly after herbicide treatment to prevent erosion of the riverbank. Monitoring of the site will be required in mid-summer (July-August) to assess the occurrence of seedlings and determine appropriate control.

Spraying is considered the most suitable treatment method for large dense infestations of Himalayan balsam and is considered suitable for projects that have a limited timescale, as disposal of treated plants is not required.

4.4.1.2 Giant hogweed

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. This includes at a minimum: coveralls with hood made of synthetic, water-resistant fibres, rubber gloves with long sleeves, goggles or face visor with face mask and rubber boots/wellingtons.

Appropriate PPE should be agreed with the contractor's Health & Safety manager prior to any application of herbicide.

Following any incident with Giant Hogweed sap, the site supervisor and qualified first aider should be notified immediately, and appropriate medical advice should be sought. A record must be kept of all incidents involving Giant hogweed.

Giant hogweed plants can 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, potentially killing the plant with one application.

In order to be effective, spraying must be carried out before the plant flowers and sets seed, otherwise there will be additional seeds within the seedbank that will require future treatment in subsequent years.

Long-lance spraying may assist in accurate application of herbicide to plants growing in inaccessible sites and taller plants being treated later in the season. Use of long-lance sprayers have the added benefit of ensuring a safe distance is maintained between the operator and the plants. 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. Numbers of plants will decrease significantly from one year to the next and treatment should be sustained until there is at least one clear year with no new Giant hogweed plants.

Spraying is the most suitable method for treating large dense infestations of Giant hogweed and is considered an efficient method of control.

Stem injections are an option for Giant hogweed with Glyphosate, but since Giant Hogweed is easily and safely treated using conventional spraying methods and stem injections run a higher risk of sap coming into contact with personnel involved in the treatment programme, this should only be conducted where a specific risk assessment has been carried out.

4.4.2 Excavation and Disposal of Material

Even if stands of invasive species are treated using herbicide, care should still be taken regarding the disposal of invasive species plant material and the future use of excavated soil in the Study Area that may be contaminated with invasive species. It is not possible at this stage to accurately estimate the volume of material that will have to be excavated as part of the construction of Limerick City Greenway. Invasive species (particularly roots, flower heads or seeds) must be disposed of at licenced waste facilities or composting sites, appropriately buried on site, or incinerated (under licence) having regard to relevant legislation. It should be noted that some invasive species plant material (such as Giant hogweed) or soil containing residual herbicides may be classified as either 'hazardous waste' or 'non-hazardous waste' under the terms of the Waste Management Acts, and both categories may require special disposal procedures or permissions.

4.4.2.1 Himalayan balsam

Cutting (Mowing or Strimming)

Himalayan balsam can be successfully controlled by cutting back the plants via mowing or strimming before the plants flower in June. If cutting is done earlier in the season this may promote the plants to resprout with greater seed production. In order to prevent vigorous regrowth, plant stems must be cut at ground level, below the first node. 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.

Hand Pulling

As Himalayan balsam have very shallow roots, hand pulling is also an effective treatment option. 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. Hand pulling will require a follow up pull in August due to new seeds sprouting from the seed bank. Plants that are hand pulled should not be placed on soil or in damp areas as they will readily re-root. Waste material should be left to dry out or incinerated. These methods

are particularly useful for smaller infestations to avoid damage to non-target species. Herbicide application can be used as a follow up to hand pulling later in the year to deal with missed plants or regrowth from the seed bank.

While hand pulling is labour intensive and can be time consuming depending on the size of infestation it is considered to be an effective method of treating Himalayan balsam where infestations are relatively low.

Excavated Material

Himalayan balsam can eject its seeds up to 7m from the parent plant and any excavation works from within this area should be considered to be contaminated with Himalayan balsam seeds. The vast majority of these seeds remain in the top 5cm of soil, however, the recommended excavation depth to ensure complete removal of Himalayan balsam from the seed bank is 0.5m (Property Care Association, 2015).

This excavated material should be retained onsite, if possible, either stockpiled/bunded and treated or buried under other substrate. If contaminated soil is stockpiled on site, the stockpile biosecurity area should be cordoned off and fenced from the rest of the site with appropriate signage put in place. Stockpiled material will be monitored and regrowth will be treated with herbicide. If contaminated soil is to be buried a minimum depth of 2m is required. Burial at this depth is sufficient to prevent regrowth. Himalayan balsam seeds do not contain sufficient energy reserves to allow them to germinate and grow up through hard substrate.

It is recommended that work is avoided within areas contaminated with Himalayan balsam during the time when the plant is seeding (late July – Oct). If work is planned during this period, then these areas must be cleared of Himalayan balsam by herbicide application, strimming or hand-pulling plants in May/June in advance of works taking place.

4.4.2.2 Giant Hogweed

Hand cutting of Giant hogweed should never be undertaken unless the operator is wearing full PPE as described above and approval has been agreed with the Site Project Manager and the contractor's Health & Safety representative. A Risk Assessment and Method Statement should be signed off before works commence. Machine operators should take similar precautions as the sap can be spread onto machinery and subsequently come into contact with skin. Cutting must be undertaken before flowering using long-handled loppers in order to maintain a safe distance from the leaves and other parts of the plant. Power equipment, such as trimmers, strimmers or weed whackers, should not be used on Giant hogweed as they can result in the airborne spray of sap and plant material.

If the use of such equipment is unavoidable, a full Risk Assessment and Method statement will be required and approval agreed with the Health & Safety representative and the employer's representative.

Cutting is a treatment method used when a site is unsuitable for herbicide application due to water quality or sensitive area constraints. This technique is considered moderately effective as it is time consuming therefore making it suitable for sites with small infestations or low density and widely dispersed plants.

Cut material must be collected and disposed of as material left in situ is considered a health risk. Seed heads should be bagged before cutting to reduce dispersal. Care should be taken when deciding the most appropriate means of disposing of Giant hogweed plant material in order to avoid the spread of seeds and minimise health hazards to the public.

Small infestations can be controlled by digging out the whole plant. This should be done in April or May, cutting the plant at a 45 degree angle below ground to ensure damage to the rootstock and to prevent regrowth from the base. It is possible that large infestations may be controlled by deep cultivation (ploughing) although this is generally impractical on river banks. This method is very effective but time consuming and labour intensive therefore increasing the costs associated with treatment and therefore is only considered suitable for individual plants or small stands and not areas of significant infestation. This treatment method requires staff to work in close proximity to Giant hogweed and may thereby increase health and safety risks which can be mitigated with PPE and good work practices.

Ensure that soils from within 8m of the plant is not transferred to other areas as it is likely to contain vast numbers of seeds from previous years flowering. The majority of seeds are contained within the top 5cm of the soil and are viable for up to 15 years. Excavated soil and cut vegetative material should not be stock piled within 10m of any watercourse due to the risk of material being transferred by water. Giant hogweed material and infected soil should be stored on top of an invasive species membrane/ fabric in a designated biosecurity area for appropriate disposal.

4.4.2.3 Off-site Disposal

The waste mitigation hierarchy dictates that the licencing, transportation and off-site disposal of invasive species material is only considered as a last resort when none of the other treatment methods described above can be carried out (site is too small to contain excavated material, too shallow for burial, where there is a lack of space or where the infestation simply cannot be avoided by the construction works). For disposal off site to a licenced facility, consultation must be undertaken with the National Parks and Wildlife Service (NPWS), the Environmental Protection Agency (EPA) and the Local Authority prior to the disposal of invasive species. The movement of invasive species plant material including contaminated soil off-site **requires a licence** from the Licensing Unit of the NPWS **and must be transported by a licenced haulier to a licenced facility**. All off site disposals must be carried out in accordance with the relevant Duty of Care and Waste Management legislation (as per guidance from NRA, 2008). The licenced waste facility must:

- Be informed in advance of the nature of the waste material;
- Be licenced to accept this material; and
- Be prepared to accept the material.

Great care is required to ensure that no material is lost when the excavated material is being transported off site.

4.4.4 Post-construction Monitoring

Following the construction of the Greenway, it is important that the site is systematically re-surveyed to determine the success of control measures and to identify areas where invasive plants are reinvading. It is important to note that untreated Giant Hogweed and Himalayan balsam in the wider environment of Limerick, adjacent to or on the riverbanks of the Shannon and Mulkear upstream of the proposed greenway route are a risk to recolonise the study area after treatment. Work in partnership with neighbouring landowners to treat Giant hogweed and Himalayan balsam is encouraged. Establishing a good sward of grasses/ native riparian vegetation soon after treatment of these invasive species will help to reduce the rate of re-colonisation of the area by these species and help to prevent the slippage of banks. If invasive species are found, then they shall be treated as per the measures outlined in this plan and the species- specific guidelines above.

5. PROJECT SPECIFIC TREATMENT PLAN

The proposed Limerick City Greenway (UL to NTP) is a linear project, and construction is proposed to be carried out in five separate sections. The proposed construction works will typically take 6-12 months to construct so the specific treatment method for each section will be decided on a site-by-site basis and in consideration of the time of year.

Before the specialist treatment and invasive species management period begins in each section of the proposed greenway works area, an invasive species specialist should carry out a pre-construction re-survey to confirm the extent of invasive species and adopt/amend this plan accordingly.

Chemical treatment is the preferred treatment for Himalayan balsam and Giant hogweed for this project.

The site must be monitored through the treatment period and in the subsequent years. Any re-growth of Himalayan balsam and Giant hogweed must be subsequently treated as detailed in section 4.

The biosecurity control measures listed in section 4.3 should be implemented. Control measures and treatment shall be implemented by a suitably qualified licenced specialist.

An outline ISMP programme of works is provided in the table below. There is no preference or sequence provided for the completion of particular sections. The periods provided assume the specialist treatment and monitoring works will be carried out by an LCCC appointed specialist over a 24-month period.

Additional monitoring in each section will be required by the Works Contractor's specialist (ideally the appointed Environmental/Ecological Clerk of Works) who is likely to require additional treatment ahead of the site clearance and construction of the proposed greenway given the extensive spread of invasive species currently proliferating in the area.

Table 5-1: Outline ISMP programme for Limerick City Greenway (UL to NTP)

Task	Period	Timing of Treatment	Responsibility
Appoint Specialist	0		LCCC
Specialist re-survey of proposed works area	Month 0-1		Specialist
Specialist works in 1st Section	Month 1-2	Mar/Apr/May/Jun	Specialist
Monitoring in 1st Section	Month 4-24		Specialist
Specialist works in 2nd Section	Month 1-3	Mar/Apr/May/Jun	Specialist
Monitoring in 2nd Section	Month 4-24		Specialist
Specialist works in 3rd Section	Month 1-3	Mar/Apr/May/Jun	Specialist
Monitoring in 3rd Section	Month 4-24		Specialist
Specialist works in 4th Section	Month 2-3	Mar/Apr/May/Jun	Specialist

Monitoring in 4th Section	Month 4-24		Specialist
Specialist works in 5th Section	Month 2-3	Mar/Apr/May/Jun	Specialist
Monitoring in 5th Section	Month 4-24		Specialist

6. CONCLUSION

This Invasive Species Management Plan inclusive of biosecurity measures has been prepared for the proposed Limerick City Greenway (UL to NTP) project.

Advanced chemical treatment has been identified as the preferred treatment option for this project. However, given the extent of the invasive species infestation within the Study Area eradication of these species within the construction site is considered unlikely and further biosecurity control measures during the construction of the greenway will be required. A pre-construction re-survey shall be undertaken by the Works Contractor's specialist to confirm the extent of invasive species within the proposed greenway works area at the time. This plan provides measures to prevent the spread of invasive species listed on the Third Schedule of the Birds and Habitats Regulations (S.I. 477 of 2011) within the proposed greenway works area and adjacent lands.

Invasive species control measures have been described in section 4, and section 5 states the project specific proposals for this project. Control measures and treatment shall be implemented by a suitably qualified licenced specialist. The site will be monitored through the treatment period of this plan and in the subsequent years. Any re-growth of Himalayan balsam and Giant hogweed will be subsequently treated as detailed in section 4.

LCCC engaged a spraying contractor to carry out herbicide treatment during the summer and autumn of 2021. This spraying did not go ahead because the contractor withdrew from the contract.

It is recommended that LCCC engages a specialist to carry out IAPS treatment over two calendar years which should be completed before the works contractor starts on site, following the recommended treatment methods detailed in section 4 and section 5 of this invasive species management plan.

7. REFERENCES

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Delbart, E., Mahy, G., Weickmans, B., Henriet, F., Cremer, S., Pieret, N., Vanderhoeven, S. and Monty, A. (2012). Can land management control Japanese knotweed? Lessons from control tests in Belgium. Environmental Management, 50(6), pp. 1089-1097.

Kelly, J., Maguire, C.M. and Cosgrove, P.J., Muir, R.A. (2015). Best Practice Management Guidelines Japanese knotweed Fallopia japonica. Prepared for NIEA and NPWS as part of Invasive Species Ireland.

National Roads Authority (2010). Guidelines on The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads. Prodiced by EirEco Consultants.

European Commission (2017) Invasive Alien Species of Union Concern.

A Guide to Habitats in Ireland The Heritage Council by Julie A. Fossitt (October 2000).

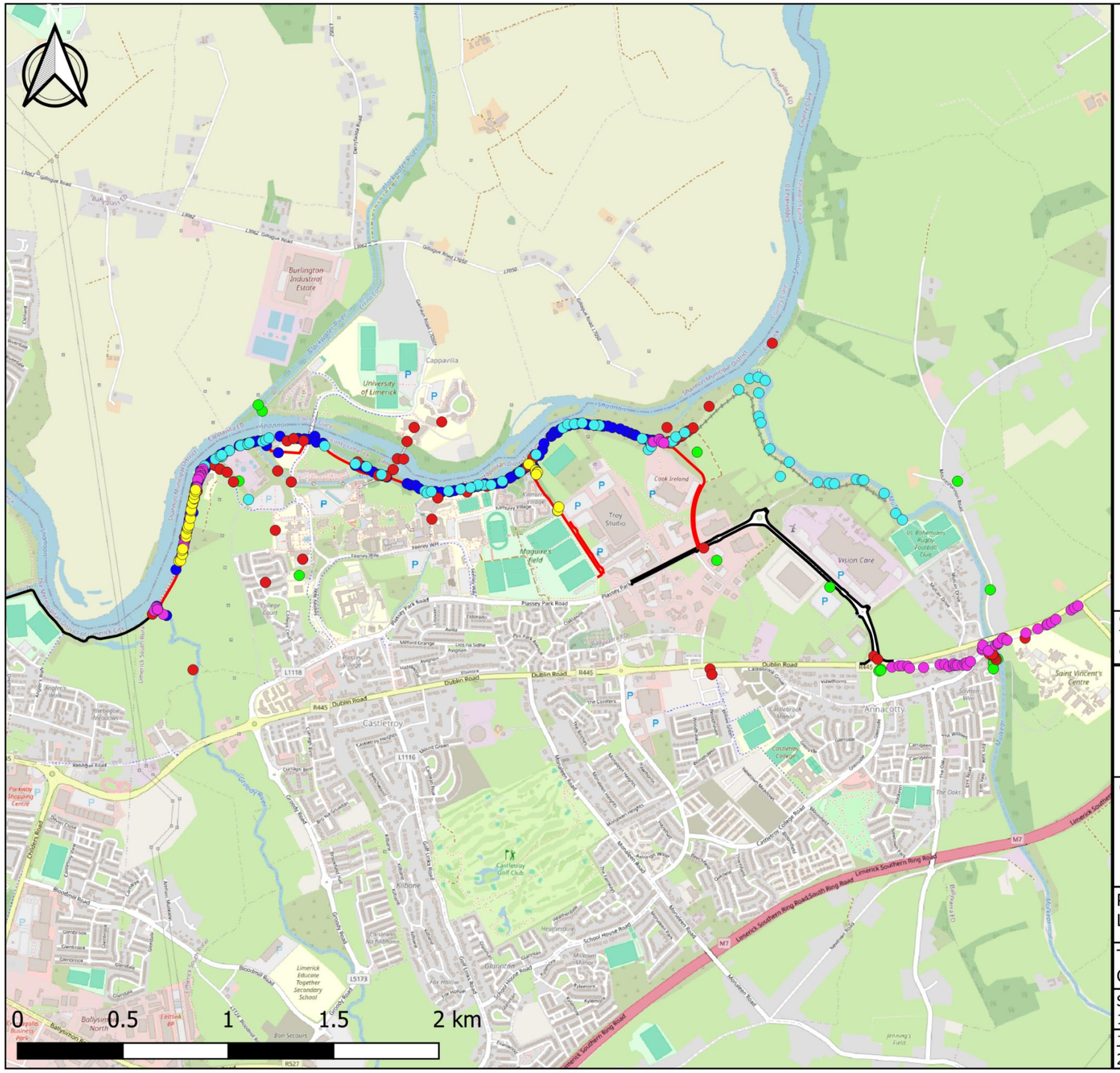
Appendix A

Desktop Study and Field Survey Results

A1: All Invasive Species Records for the Limerick City Greenway Study Area

A2: Limerick City & County Council App Invasive Species Records

A3: National Biodiversity Data Centre Invasive Species Records



Map Legend

- Proposed Greenway Route
- Existing Active Travel Link
- IS from LCCC App
- IS from NBDC
- IAPS Records 2020 - 2021
- IAPS Records 2022 - 2023
- IAPS Records 2024
- IAPS Records 2025

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CLIENT

Comhairle Cathrach & Contae Luimnigh
Limerick City & County Council

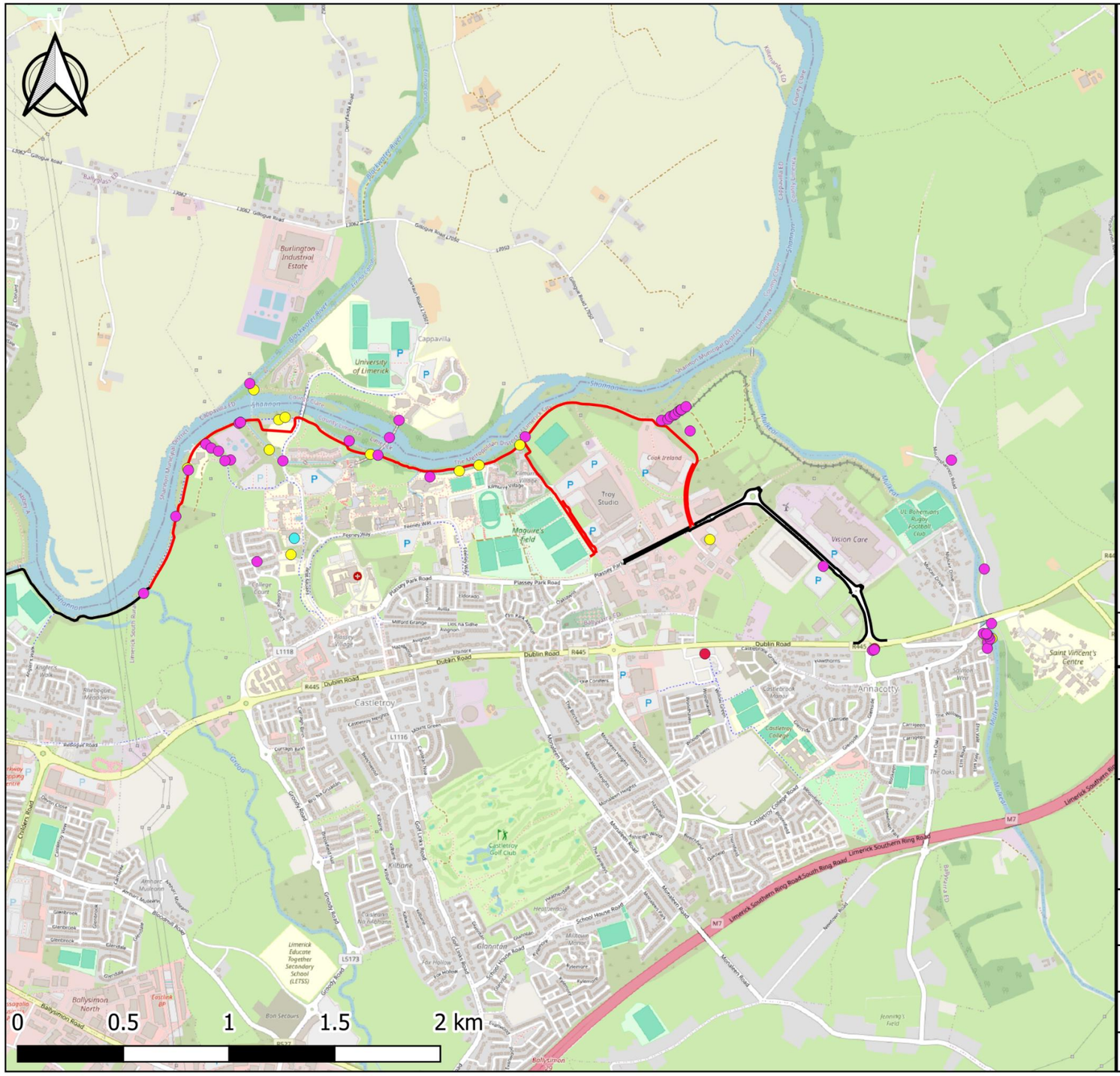
PROJECT
Limerick City Greenway (UL to NTP)

TITLE
Combined Invasive Species Records

SCALE	DATE	DRAWN	CHECKED	APPROVED
1:25,000	08/25	AC	BQ	BL

JOB N.	Report	REVISION
2535	ISMP	0

Appendix A1- All Invasive Species Records for the Limerick City Greenway



Map Legend

- Proposed Greenway Route
- Existing Active Travel Link

IS from LCCC App

- Himalayan Balsam
- Giant Hogweed
- Winter heliotrope
- Japanese Knotweed

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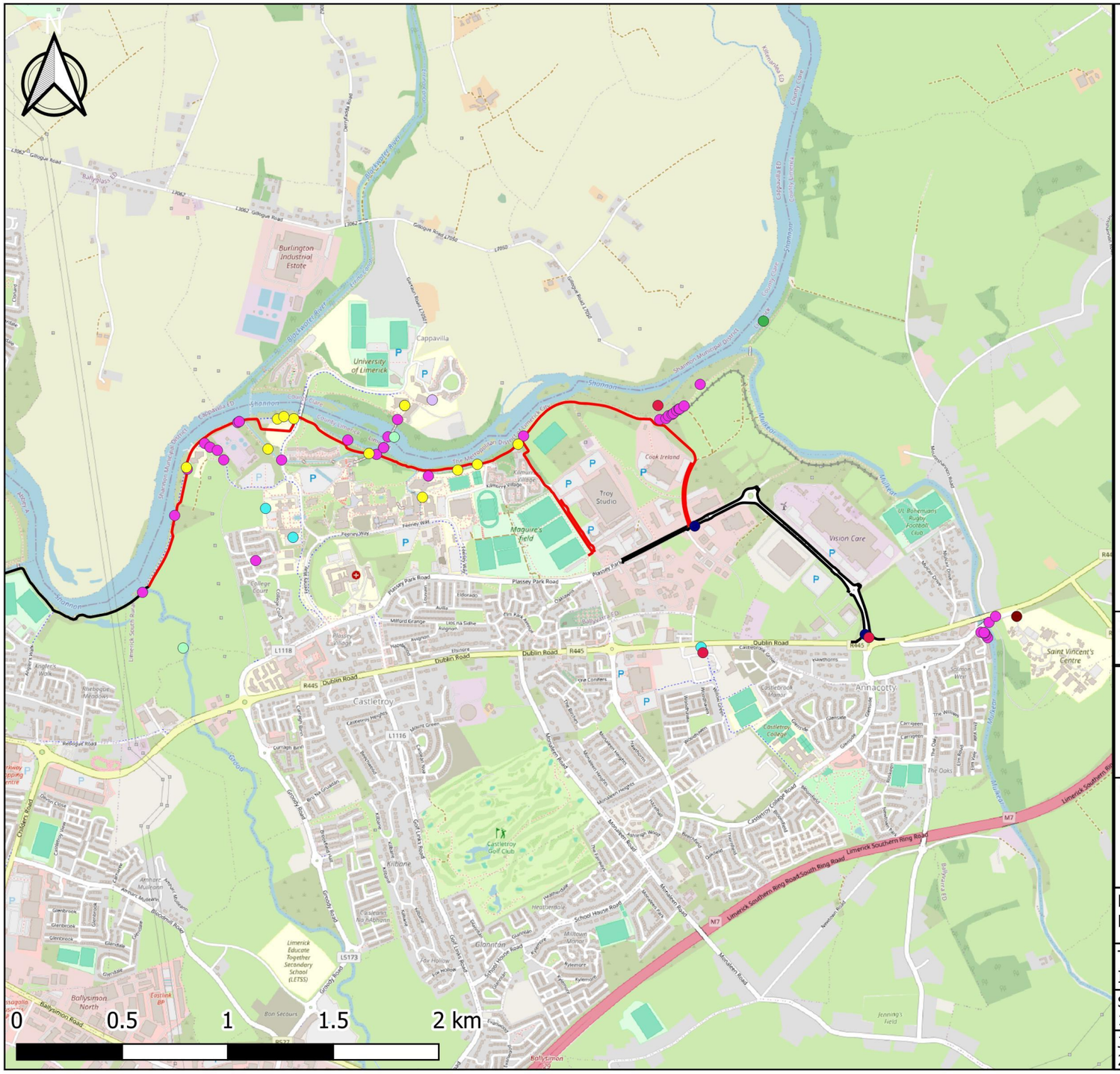
PROJECT
Limerick City Greenway (UL to NTP)

TITLE
LCCC App - Invasive Species Locations

SCALE	DATE	DRAWN	CHECKED	APPROVED
1:25,000	11/24	AC	BQ	BL
JOB N. 2535	Report ISMP		REVISION 0	

Appendix A2- Limerick City and County Council App Invasive Species Records



Map Legend

- Proposed Greenway Route
- Existing Active Travel Link

NBDC Records

- Himalayan Balsam
- Giant Hogweed
- Butterfly-bush
- Water Fern
- Nutall's Waterweed
- Common Dace
- European Rabbit
- Winter heliotrope
- Japanese Knotweed

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PROJECT
Limerick City Greenway (UL to NTP)

TITLE
IAPS Records from National Biodiversity Centre

SCALE	DATE	DRAWN	CHECKED	APPROVED
1:25,000	11/24	AC	BQ	BL

JOB N.	Report	REVISION
2535	ISMP	0

Appendix A3- National Biodiversity Data Centre Invasive Species Records

Appendix F

Biodiversity Management Plan

Comhairle Cathrach & Contae Luimnigh

Limerick City & County Council

Limerick City Greenway (UL to NTP)

Biodiversity Management Plan

August 2025

RYAN HANLEY now Stantec

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Client	Limerick City & County Council
Project No.	2535
Project Title	Limerick City Greenway (UL to NTP)
Report Title	Biodiversity Management Plan

Rev.	Status	Authors	Reviewed By	Approved By	Issue Date
0.1	Draft Issued to Client	C. Murphy	P. Rodolfi T. Stafford	B. Larkin	November 2024
1	Issued following Client Review	C. Murphy	P. Rodolfi T. Stafford	B. Larkin	June 2025
2	Issued	C. Murphy	P. Rodolfi T. Stafford	B. Larkin	July 2025
3	Issued	C. Murphy	P. Rodolfi T. Stafford	B. Larkin	August 2025

Executive Summary

This document is a Biodiversity Management Plan for a proposed Limerick City Greenway (UL to NTP).

Biodiversity Management Plan Summary

The development consists of the upgrading of an existing pathway and desire line, along the southern bank of the River Shannon which will connect UL and the National Technology Park (NTP) directly to Limerick city. This proposed development is in accordance with the Limerick Development Plan 2022-2028 (LDP) and the Limerick Shannon Metropolitan Area Transport Strategy (LSMATS). Both documents aim to promote the use of sustainable and/or zero-emission modes of transport in Limerick. Developing this project in Limerick will allow for safe and efficient modes of carbon neutral transport such as cycling as well as promoting cycling as a realistic choice of travel in the Limerick Metropolitan Area. The project also accords with European Strategies such as the Sustainable and Smart Mobility Strategy and the EU Cycling Strategy.

The proposed site is located within and adjacent to the Lower River Shannon Special Area of Conservations (SAC), and it is located close to the River Shannon and River Fergus Estuaries Special Protected Area (SPA). A number of Natural Heritage Areas (NHA's) and Proposed Natural Heritage Areas (pNHA's) are also relatively close to the proposed site development. Appropriate planning and mitigation strategies must be implemented and followed.

Field surveys undertaken in the study area of the proposed development recorded a number of non-volant mammals and birds using this area. Three faunal species of International Importance are known to populate the area of the proposed site, these species being Otter *(Lutra lutra),* Atlantic salmon (*Salmo salar),* and Sea Lamprey (*Petromyzon marinus*), these species are Qualifying Interests (QIs) of the Lower River Shannon SAC. No instream works are proposed as part of the works so it is not considered that these species will be significantly affected by the proposed site. However, the mobilisation of contaminants during the construction phase of development can impact local aquatic habitats and can cause reductions in water quality, thus affecting aquatic life. Depending on the time of year of the construction phases, the life cycle of migratory fish species may be impacted by a reduction in water quality. Therefore, substances and surface water runoff during the construction phase must be properly managed. The timing of construction phases should also consider breeding and migratory seasons of protected species within the area.

Badgers, bats and birds use the treelines and scrub areas for commuting, foraging and protection purposes. There is the potential of medium-term effects on these species during the construction phases due to loss of hedgerows, trees and scrub. The removal of shrub and trees can reduce feeding opportunities for mammals and increase species competition. However, due to the relatively small amount of habitat losses involved compared to the overall landscape area, faunal species will not be significantly affected.

The dominant habitats present in the study area consist mainly of modified habitats such as amenity grasslands, buildings, and artificial surfaces. No protected floral species were identified during multiple field surveys undertaken between 2020-2025. However, Himalayan balsam (Impatiens glandulifera) and Giant hogweed (Heracleum mantegazzianum) which are classified as invasive alien species were identified in abundance along the length of the proposed greenway route. Alluvial forests, which is recognised as a habitat of international importance (Annex I woodland habitat), occurs on the banks of the Shannon and on islands in the vicinity of the University of Limerick.

As part of the project design and in accordance with best practice guidance notes it is proposed to install energy efficient public lighting that will provide a suitable level of light for use by cyclists and pedestrians whilst creating minimal light spillage onto adjacent environmentally sensitive locations. Ancillary and amenity elements are included as part of the proposed development which include fencing, signage, cycle track markings, information boards, and park benches.

Mitigation measures have been provided in order to reduce long term negative impacts on habitats, flora and fauna in the site area, as well as enhance biodiversity after the construction phase of the development. Invasive alien species must be dealt with according to Ireland's 4th National Biodiversity Action Plan 2023–2030.

Project 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.

Table of Contents

1 Introduction

This Biodiversity Management Plan aims to enhance biodiversity and reduce direct and indirect impacts of the proposed development of the Limerick City Greenway (UL to NTP) on the development site and nearby habitats. The Limerick City Biodiversity Management Plan highlights the importance of local habitat enhancement, wildlife corridors, the management of invasive species and community appreciation in regard to promoting local natural heritage. The Limerick City Greenway (UL to NTP) Project will form an extension to the already constructed Limerick Smarter Travel, Route 2, which connects directly into the city centre. That project involved the upgrading of an existing pathway, 1.5km in length between the Guinness Bridge and the Groody Bridge, along the southern bank of the River Shannon.

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.

Site visits were carried out between 2020-2024, and these visits allowed for screening of the dominant and the non-dominant habitats present which may be affected by the various phases of the project and enabled the assessment of potential impacts on key ecological receptors. Habitats, flora and fauna within and surrounding the proposed site boundary were also included in the screening visits.

2 Methodology

2.1 Desk Study

A desk study of the proposed development site was undertaken in order to gather information regarding the existing ecological and hydrological environment. This assessment included the identification of any potential impacts on designated sites (European Sites, Natural Heritage Areas and Proposed Natural Heritage Areas), water quality and protected, habitats, rare and other notable species by the proposed Greenway during all phases of development and succeeding development. Tables 6.2-6.12 in Chapter 6 – Biodiversity of the EIAR provides detailed information found during the desk study regarding flora, fauna, designated sites and water quality of hectad R65. The following sources of information were reviewed as part of this report:

- Ordnance Survey maps of the study area (www.osi.ie);
- Aerial photography of the Study Area;
- The National Parks and Wildlife Service (NPWS) site synopses and online database (www.npws.ie) of information on designated sites;
- A Guide to Habitats in Ireland (Fossitt, 2000);
- New Atlas of the British & Irish Flora (Preston *et al.*, 2002);
- Flora (Protection) Order 2022 Map Viewer: https://heritagedata.maps.arcgis.com/apps/webappviewer/index.html?id=a41ef4e10227499d8de17a8abe42bd1e
- Bat records from the Bat Conservation Ireland (BCI) databases (All-Ireland Daubenton's Bat Survey, Bat Monitoring Scheme BATLAS);
- The Bird Atlas 2007-2011, the British Ornithology Trust website www.bto.org/volunteer-surveys/birdatlas;
- The National Biodiversity Data Centre (NBDC) database www.biodiveristyireland.ie for records of rare, protected, threatened and invasive species;
- NPWS Rare and Protected Species Records;
- Environmental information/data from the Environmental Protection Agency (EPA) website http://www.epa.ie/rivermap/data;
- The Water Framework Directive website www.wfdireland.ie; and
- GeoHive online mapping http://map.geohive.ie/mapviewer.html.

A section of the proposed greenway lies in close proximity to the Lower River Shannon SAC, site code 002165, so an Natura Impact Statement (NIS) was produced because an Appropriate Assessment Screening report concluded that there are likely significant effects to some of the qualifying interests of the SAC.

There are four Natural Heritage Areas (NHA's) and sixteen Proposed Natural Heritage Areas (pNHA's) within the zone of influence of the scheme.

Records of rare or protected flora and fauna within a 10km grid square of the proposed project were obtained from the National Parks and Wildlife Service (NPWS), National Biodiversity Data Centre (NBDC), Botanical Society for Britain and Ireland (BSBI) and Bat Conservation Ireland (BCI). There are nineteen records of plant species (vascular and bryophytes) of conservation concern, that are listed under either the Flora Protection Order, Annex II or the Irish Red List, within the 10 km grid square. Information

gathered from the National Biodiversity Data Centre for grid R65, indicate there are a total of 62 no. records for protected species.

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

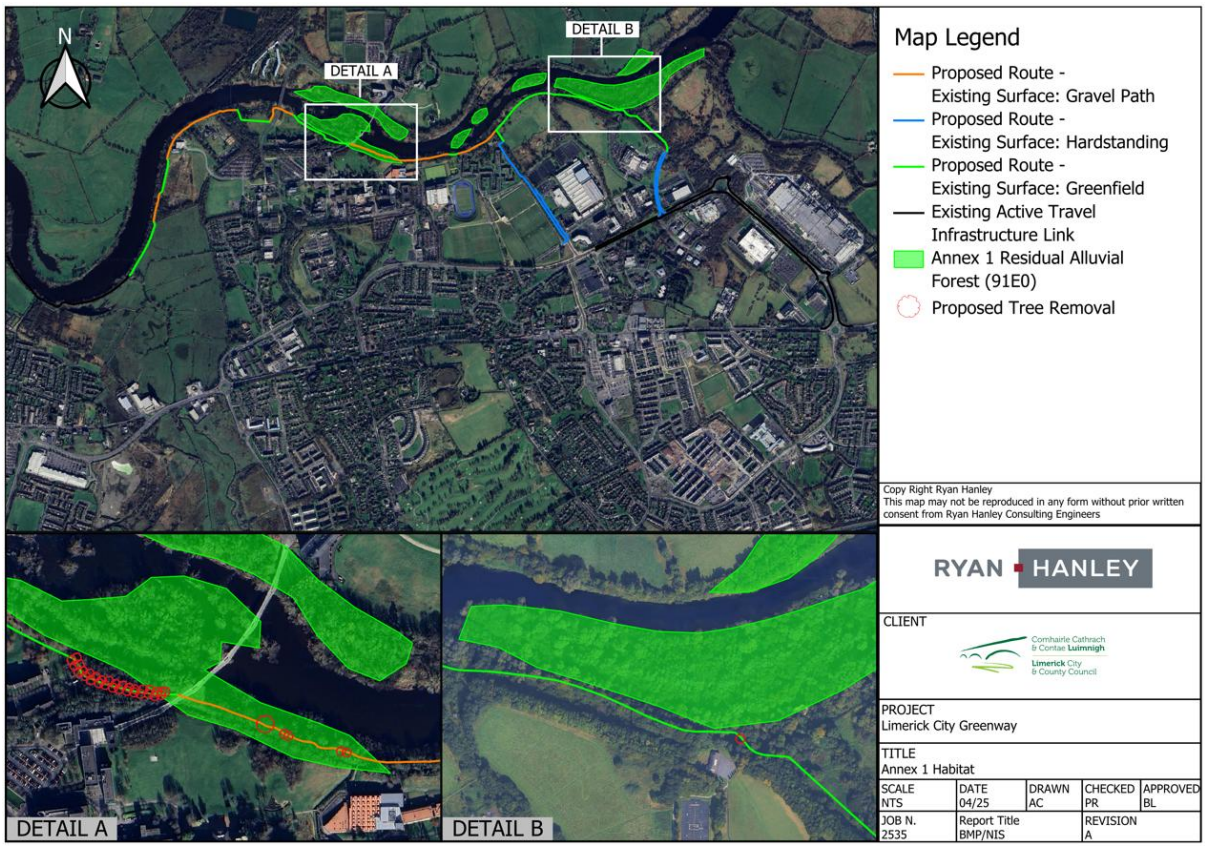

Figure 3-38: Extent of Annex 1 Alluvial Forest interactions with existing path and proposed Greenway route

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

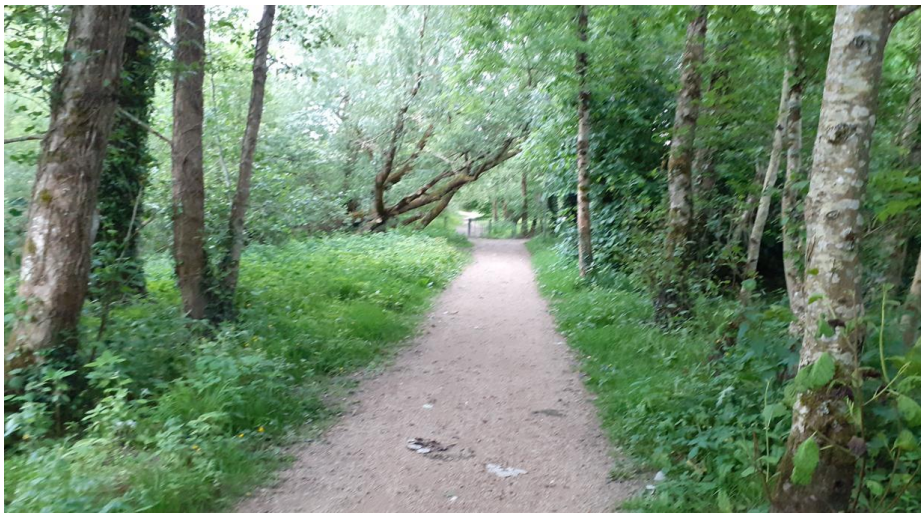

Figure 3-53: Existing path east of Kilmurray Student village approaching the land boundary between UL and the IDA

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.

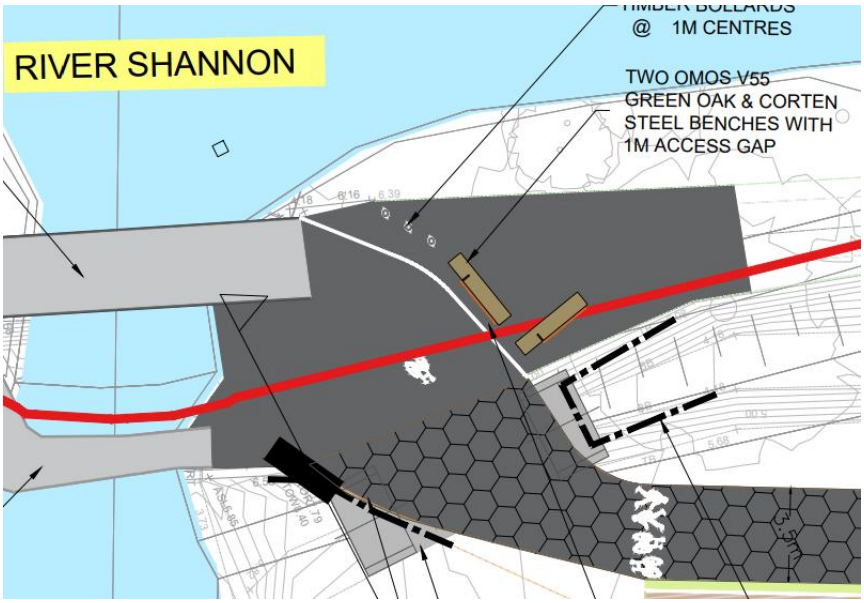

Figure 3-75: Proposed rest area at Groody Bridge

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.

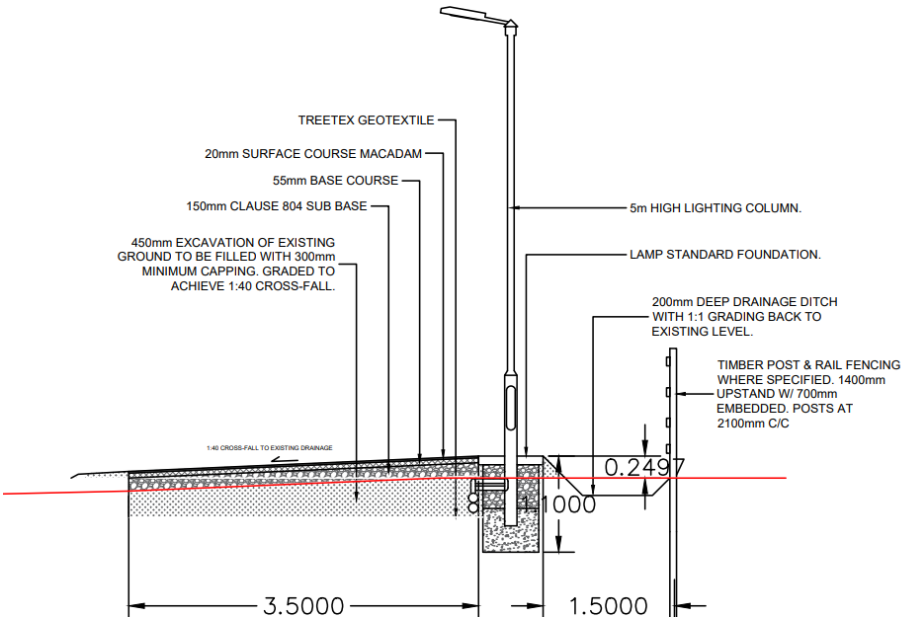

Figure 3-77: Proposed cross section of 3.5m greenway, public lighting column, and land drain

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

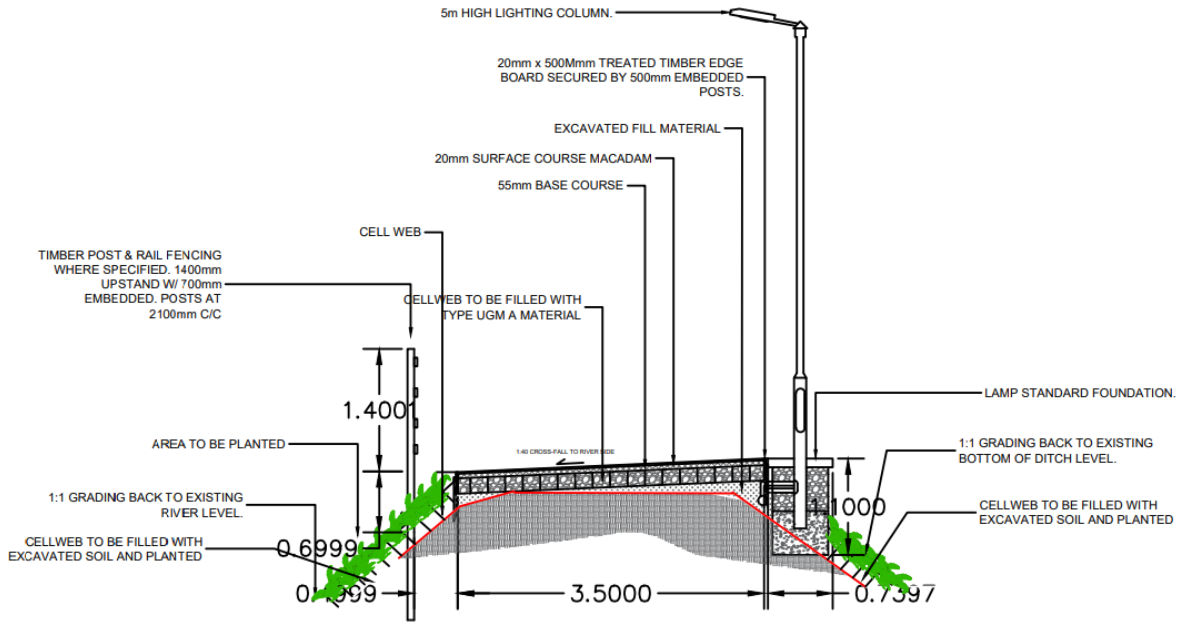

Figure 3-80: Replacement of gravel path with proposed 3.5m wide Greenway

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.

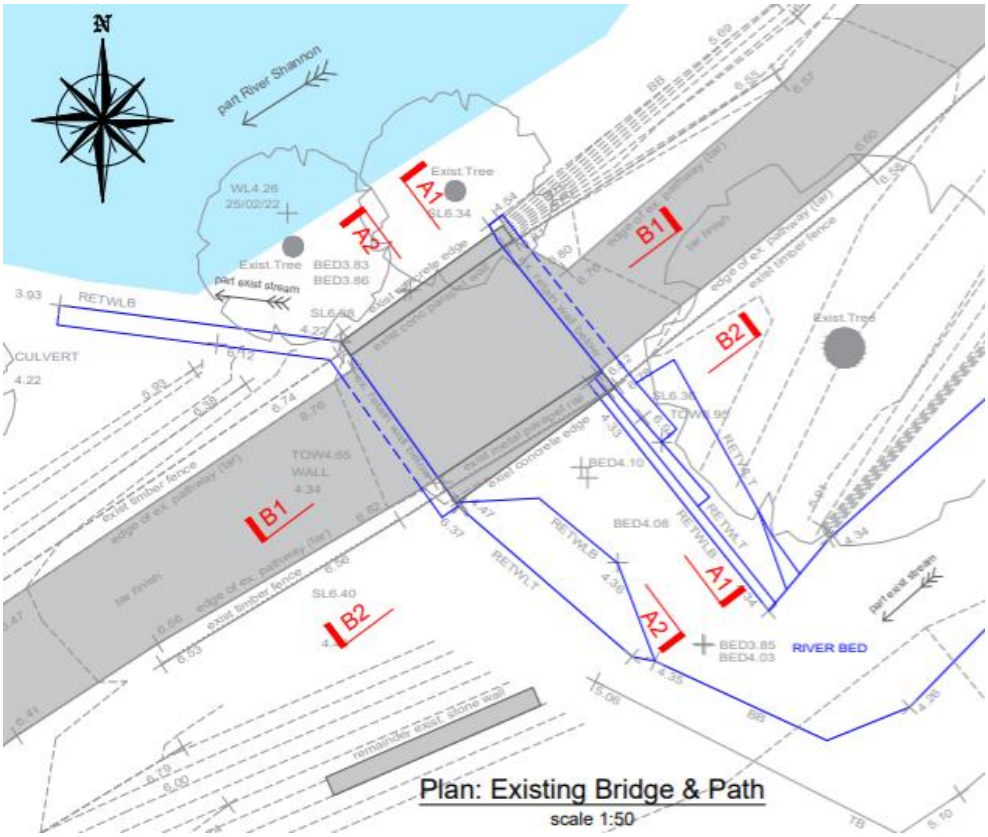

Figure 3-82: Plan of existing Bridge 1 (refer to drawing RHA-XX-DR-S-SP0010)

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.

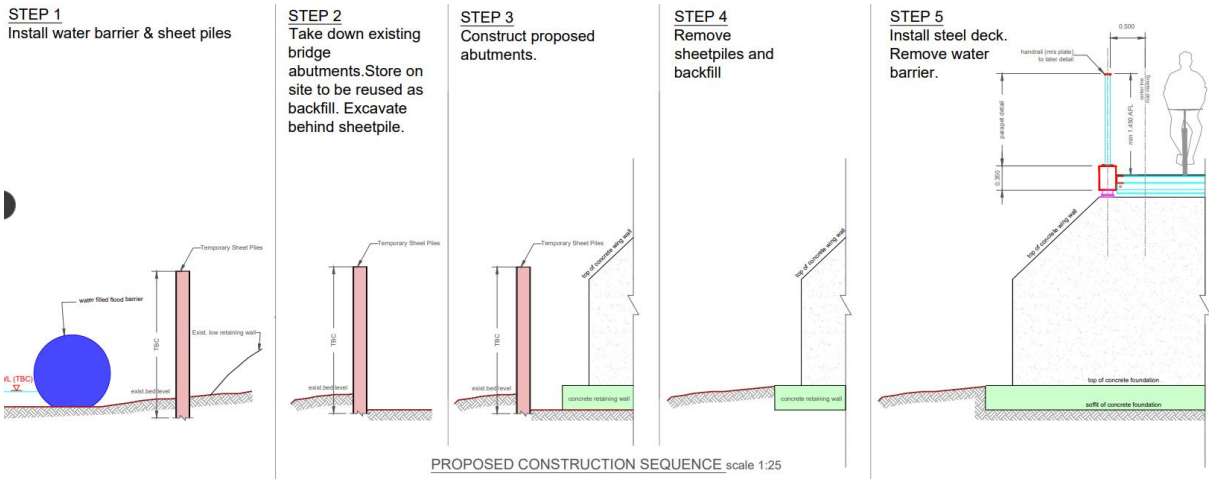

Figure 3-83: Proposed construction sequence for Bridge 1 (refer to drawing RHA-XX-DR-S-SP0012)

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.

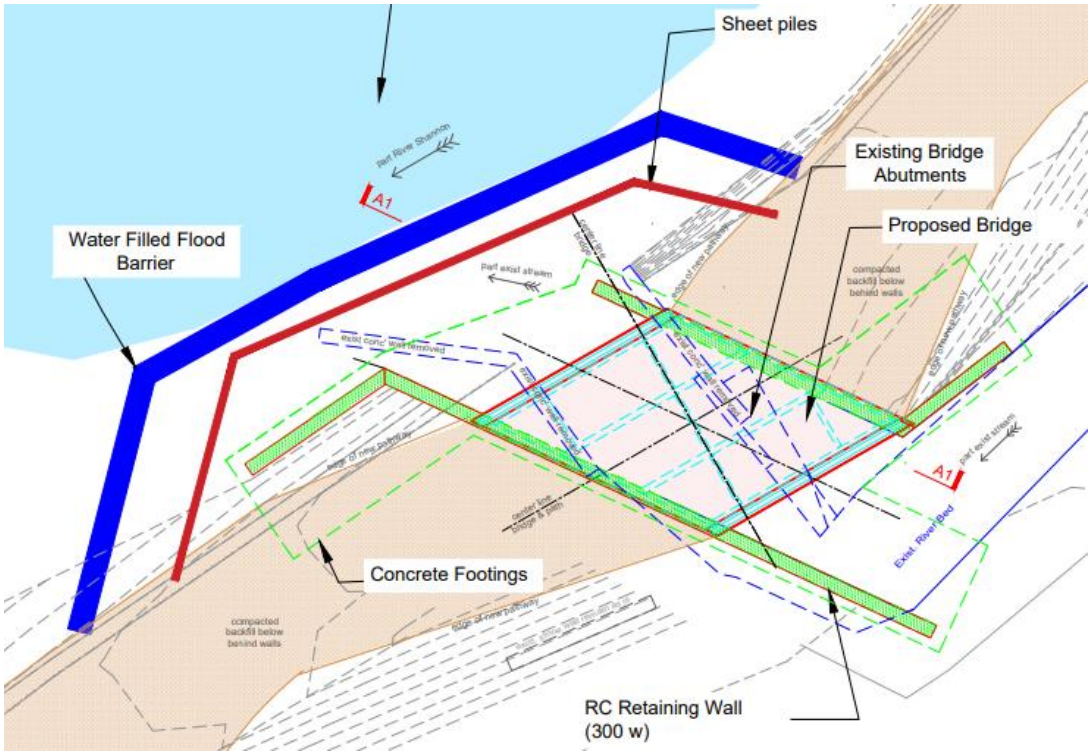

Figure 3-84: Proposed plan of Bridge 1, with ecology protection measures (refer to drawing RHA-XX-DR-S-SP0012)

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.

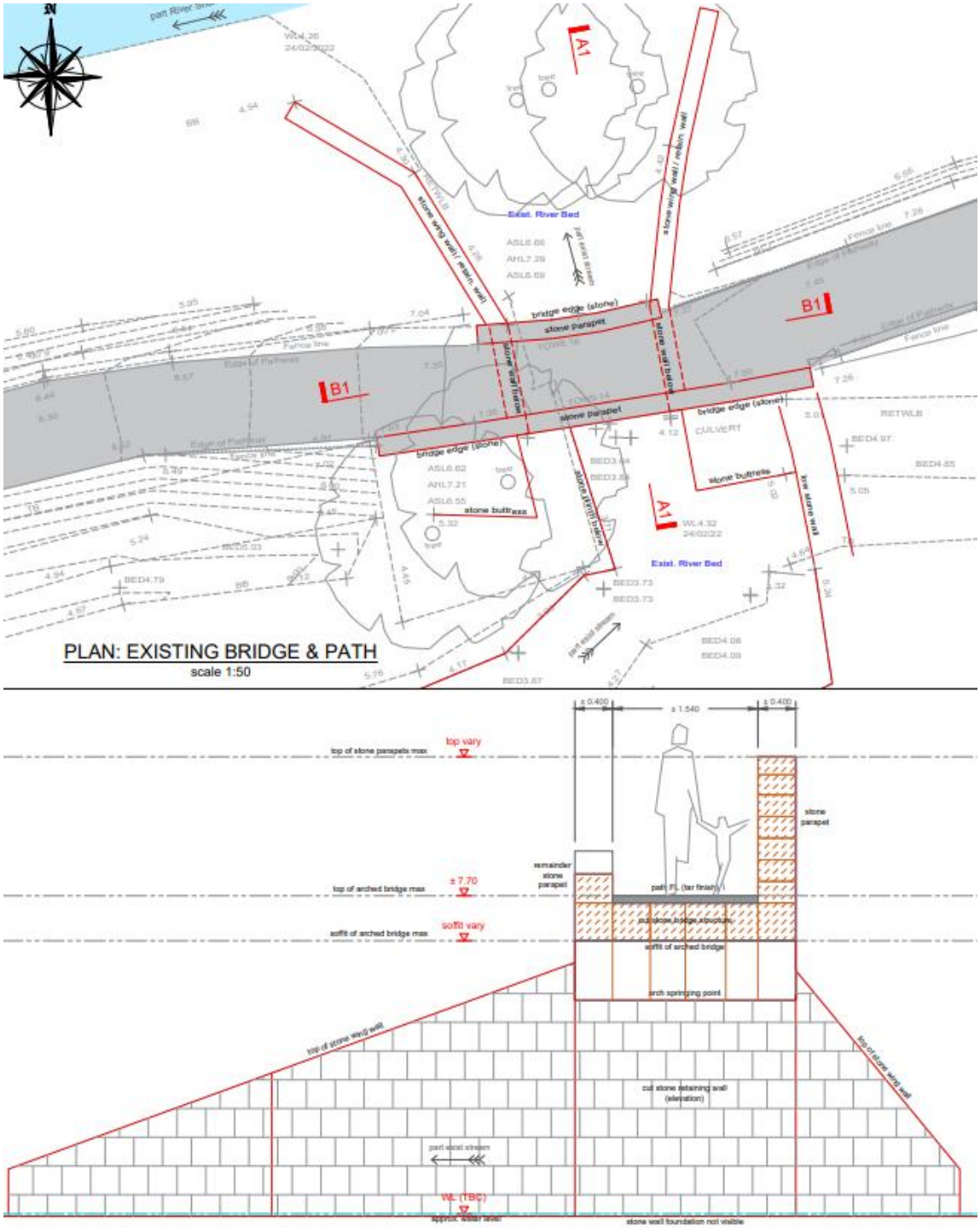

Figure 3-89: Existing plan and section for Bridge 2 (refer to drawing RHA-XX-DR-S-SP0020)

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.

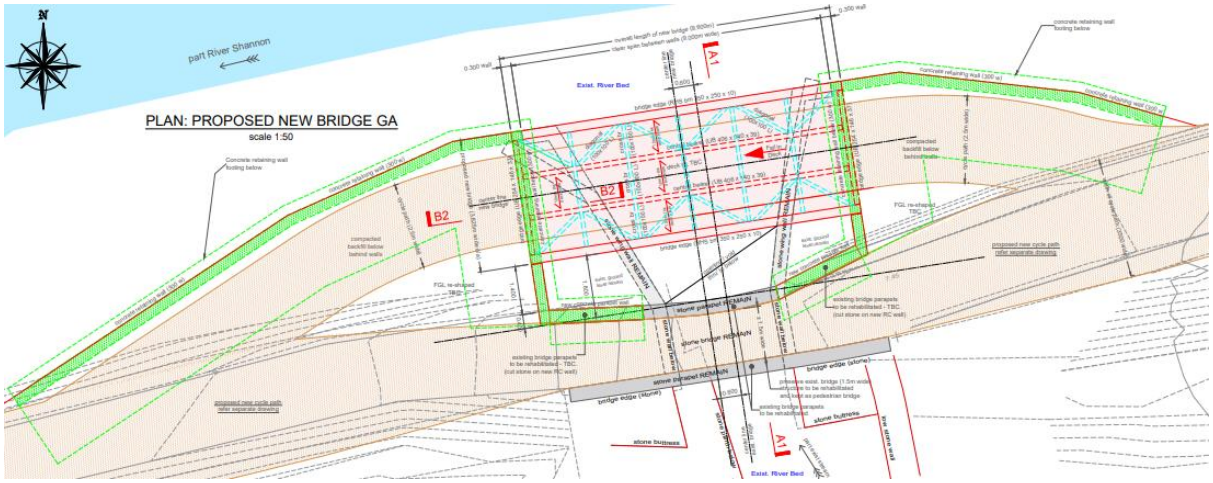

Figure 3-90: Plan for the proposed new bridge 2 alongside the existing stone bridge (refer to drawing RHA-XX-DR-S-SP0021)

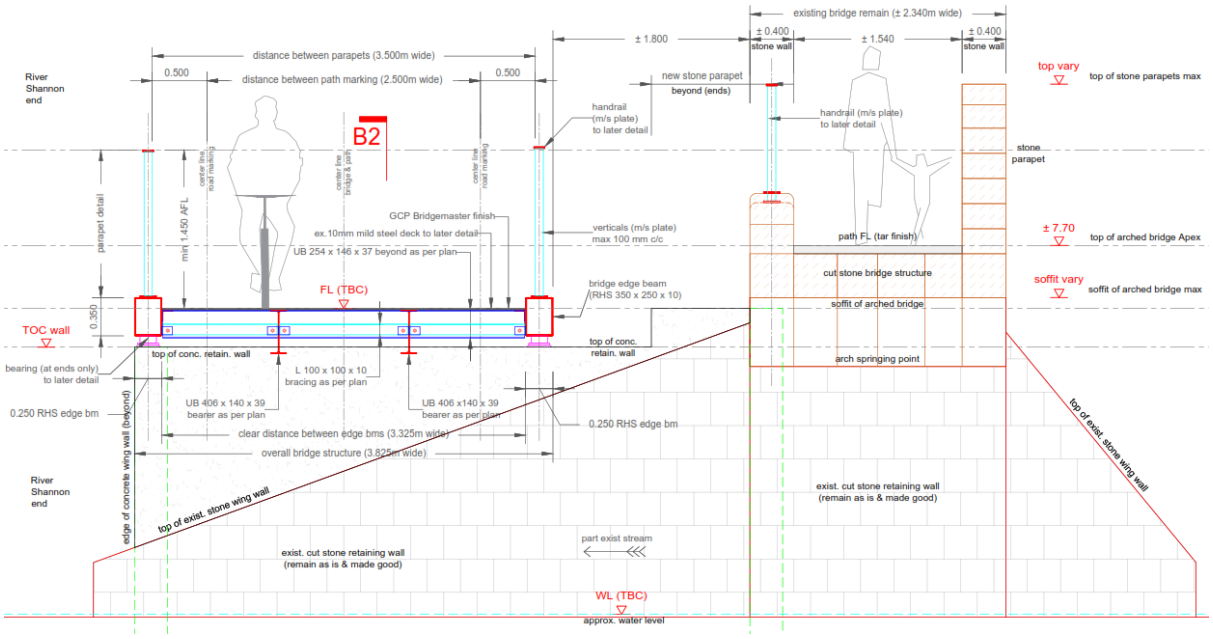

Figure 3-91: Section for the proposed new bridge 2 alongside the existing stone bridge (refer to drawing RHA-XX-DR-S-SP0021)

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.

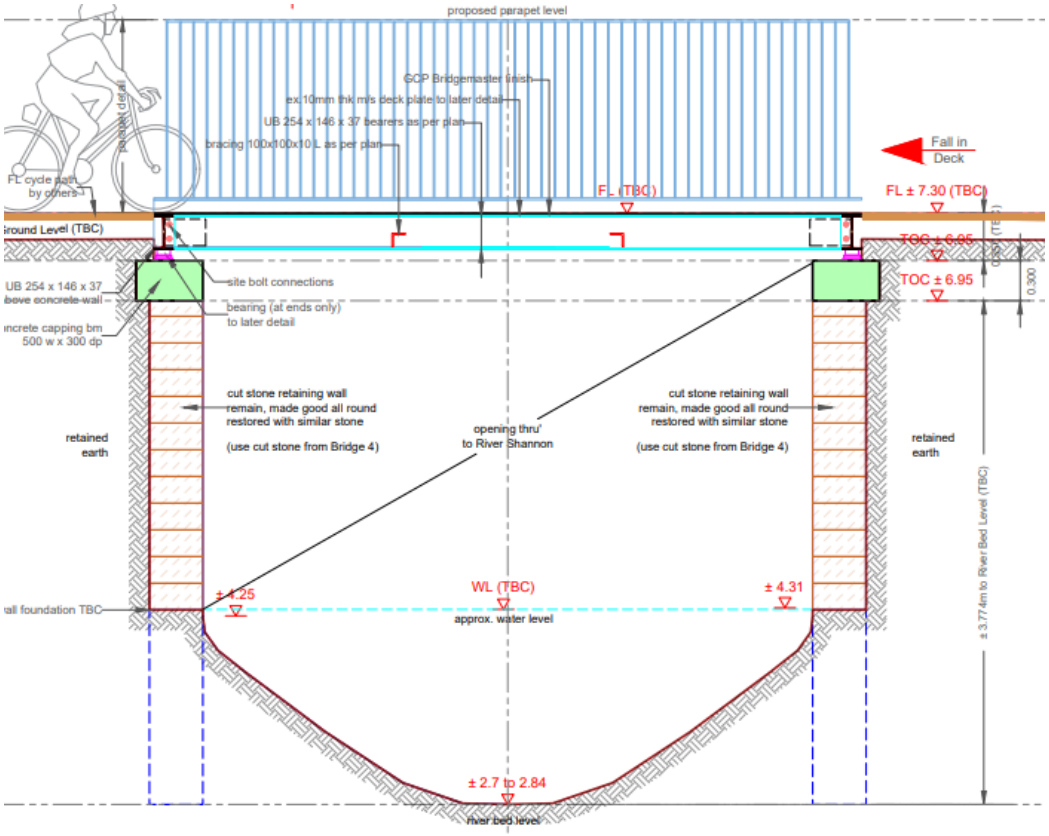

Figure 3-93: Proposed deck replacement for Bridge 3 with new concrete plinths on existing stone abutments

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.

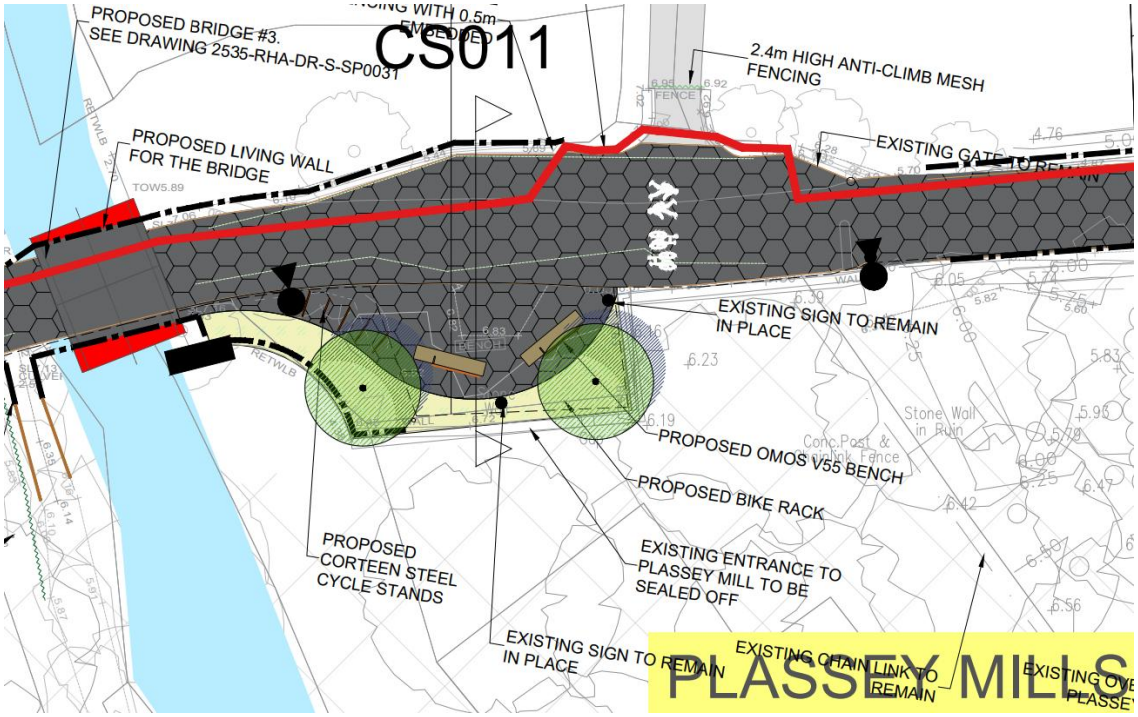

Figure 3-94: Proposed rest area at Plassey Mill

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.

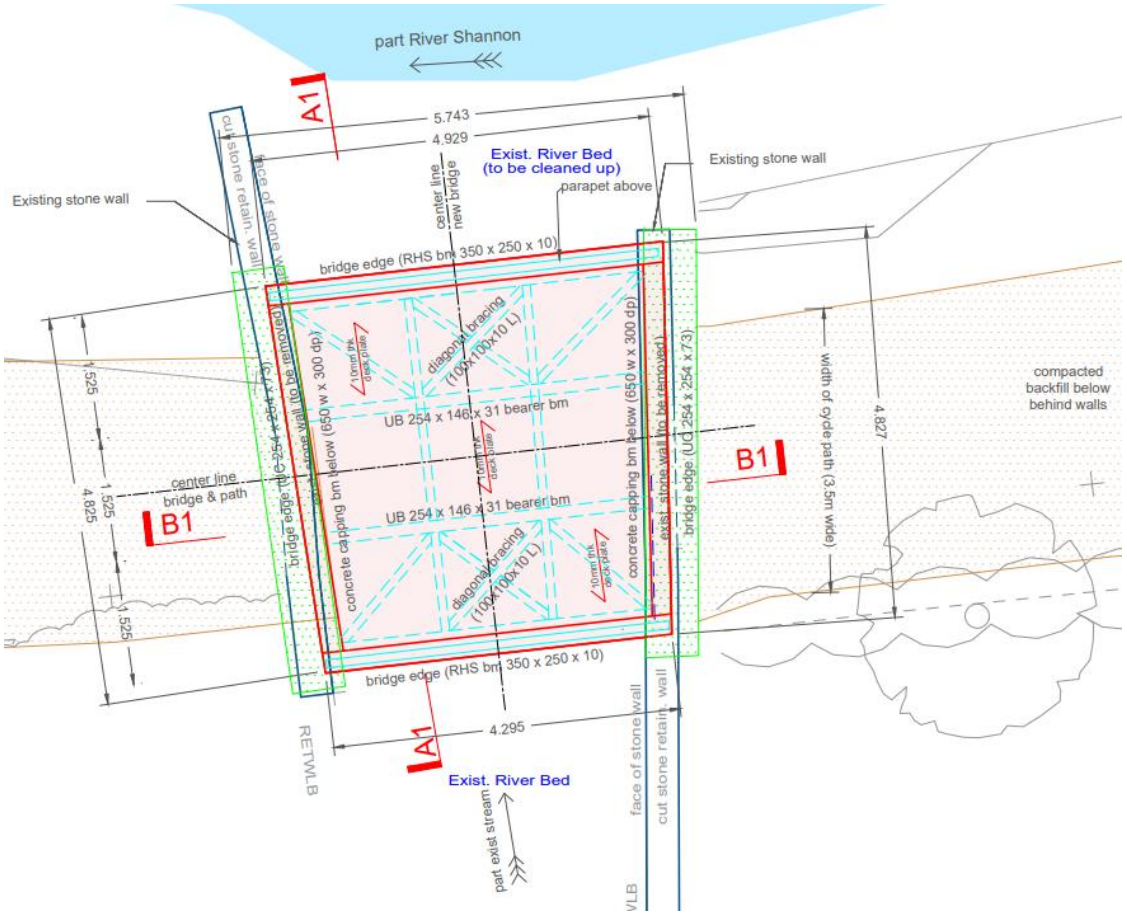

Figure 3-96: Proposed plan of Bridge 4 deck replacement

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.

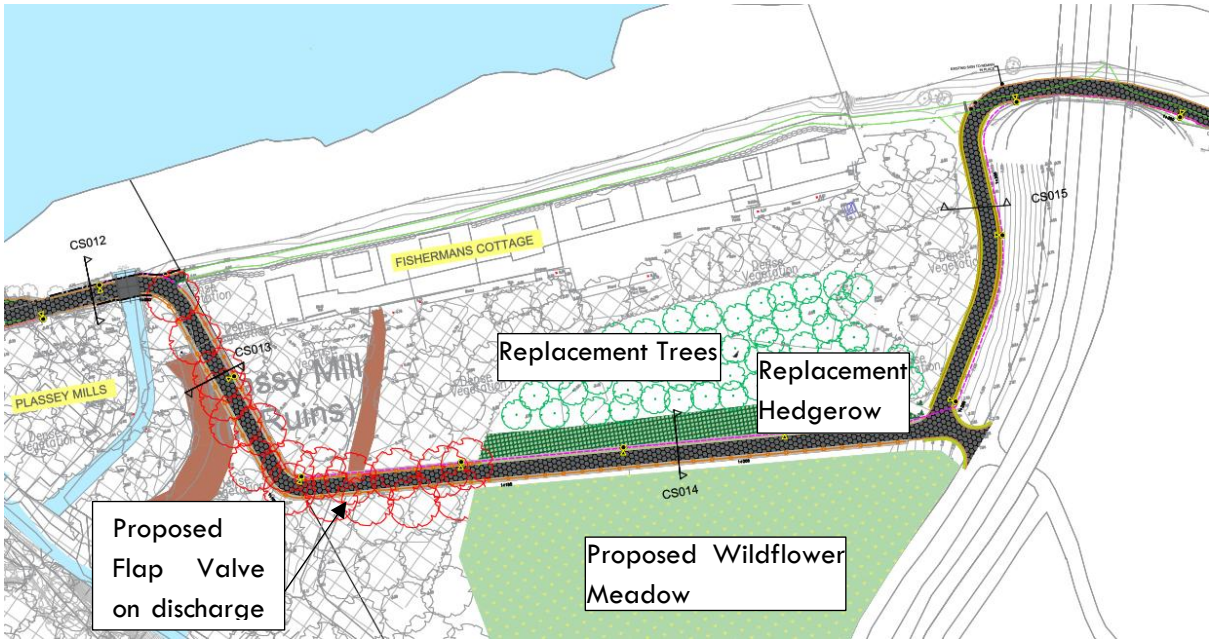

Figure 3-97: Proposed route south of Fisherman cottages

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.

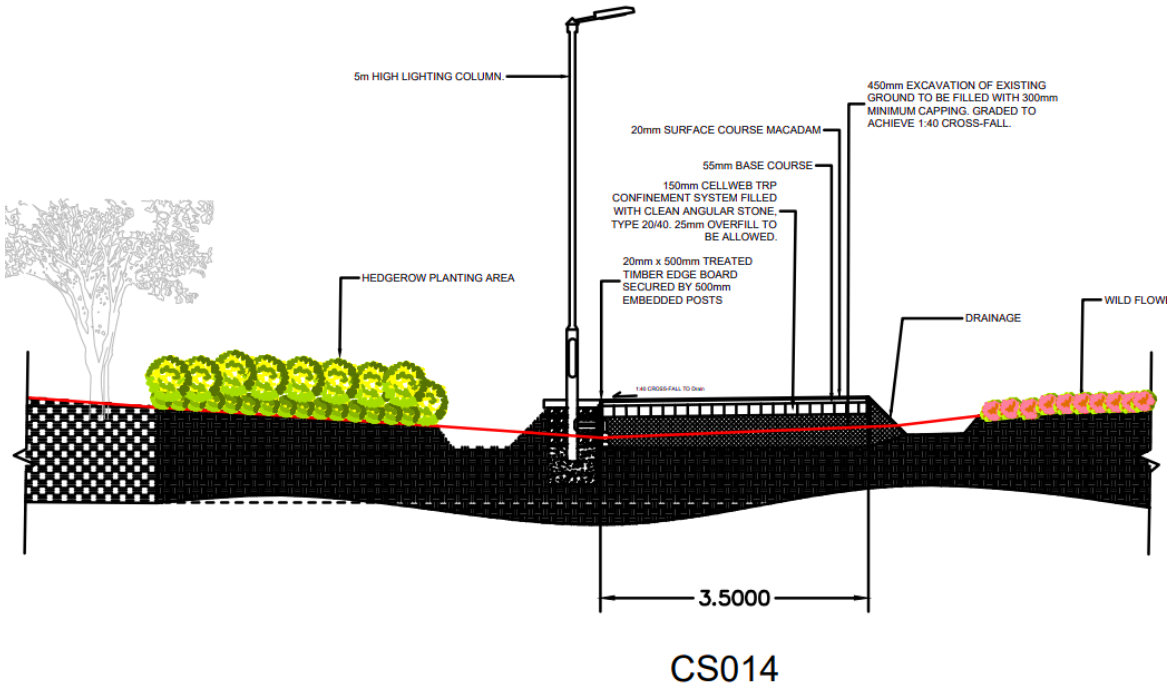

Figure 3-98: Cross Section 014 along proposed Greenway south of the Fisherman Cottages

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.

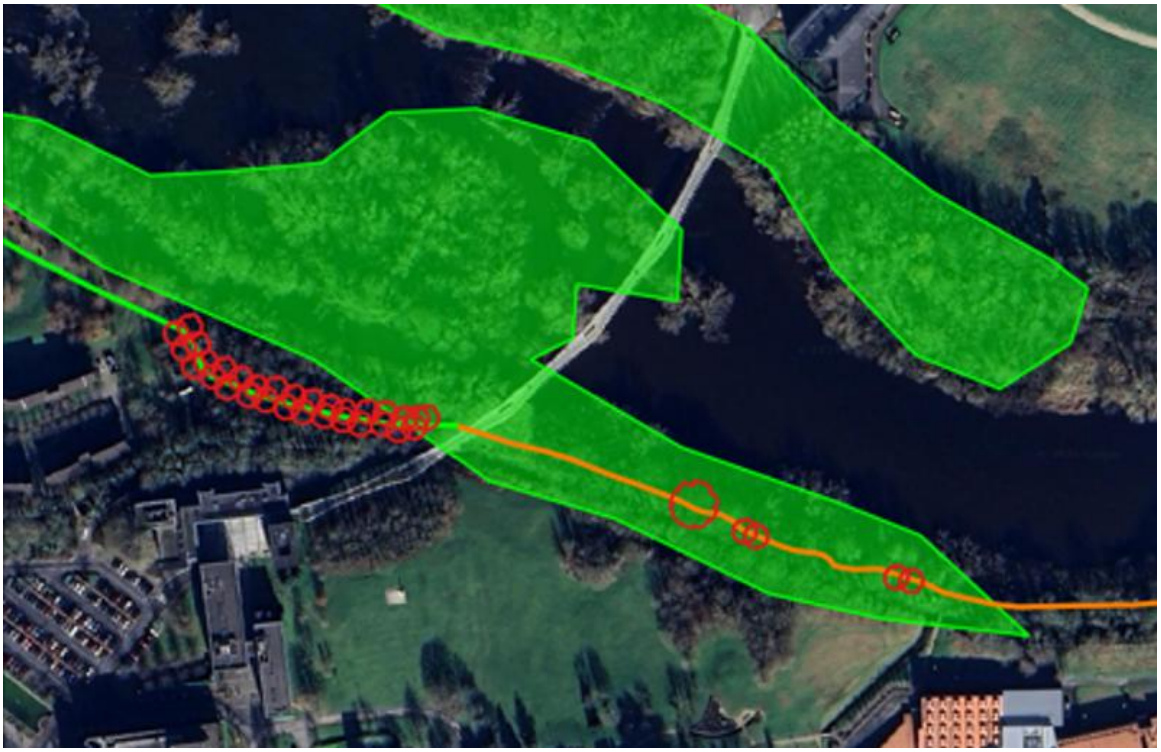

Figure 3-100: Existing Annex 1 Alluvial woodland

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.

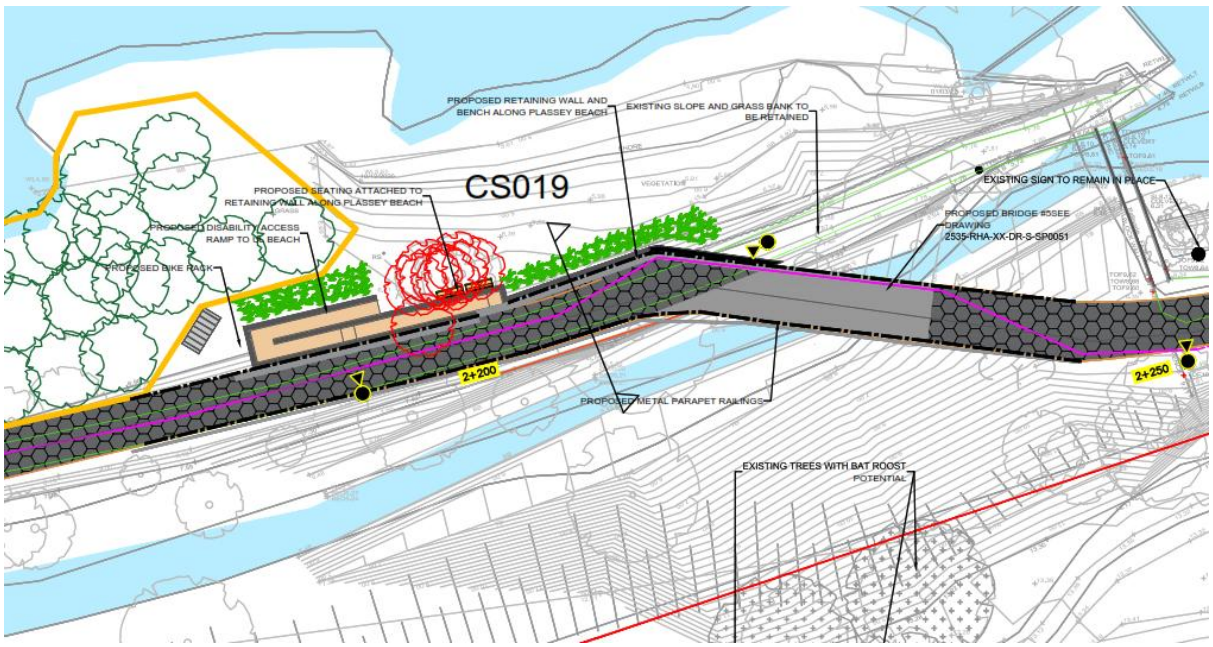

Figure 3-105: Proposed plan of ramp and Bridge 5 at Plassey Beach

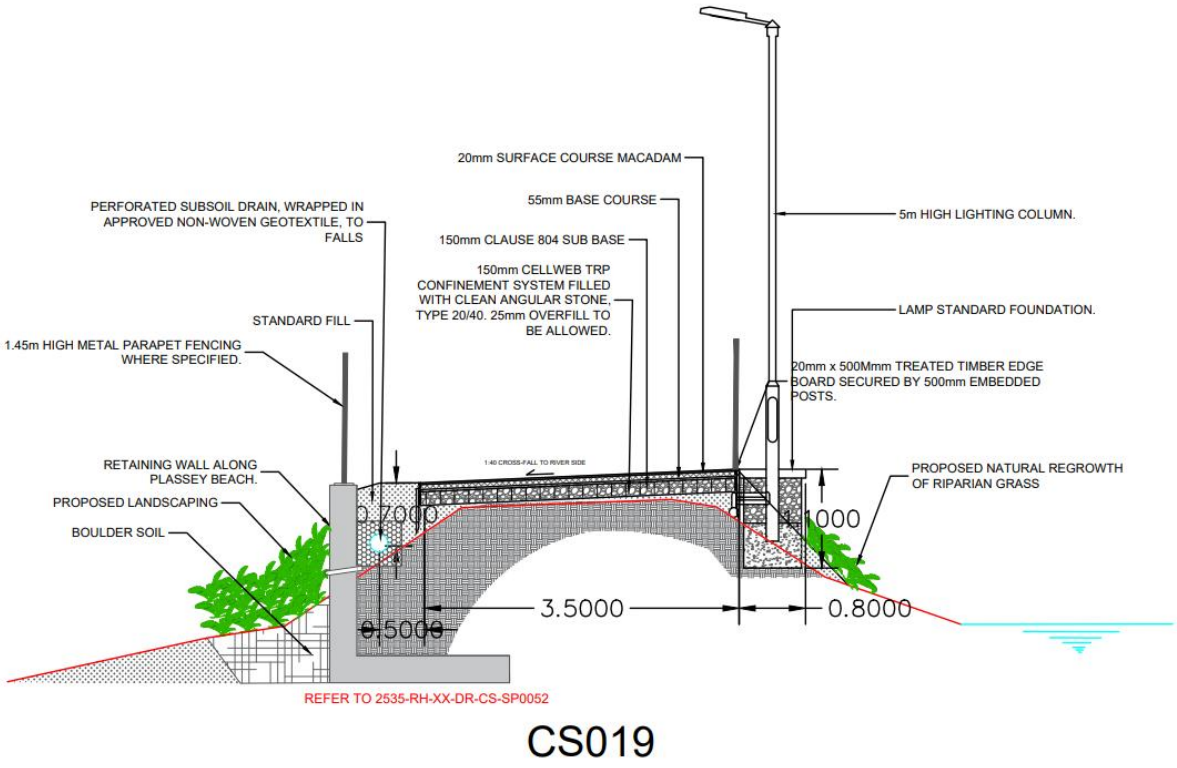

Figure 3-106: Proposed section of retaining wall for ramp at Plassey Beach

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.

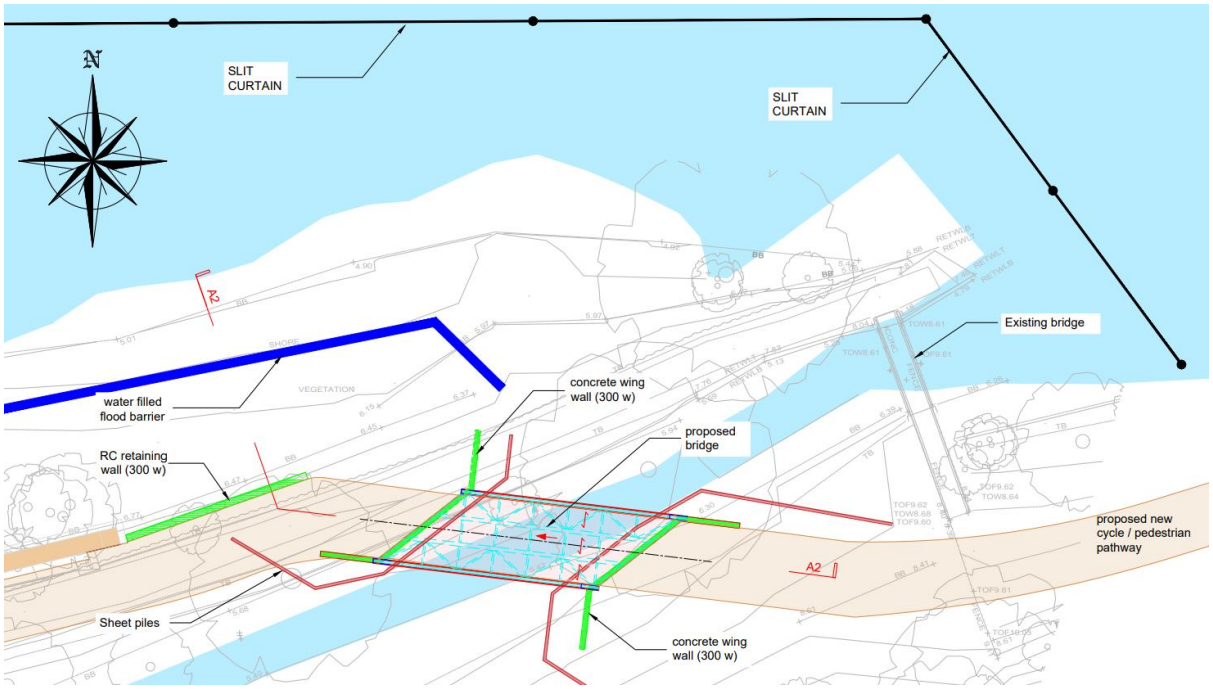

Figure 3-109: Plan of proposed Bridge 5 and proposed Ramp, showing proposed Silt Curtain, Sheet piles and water filled flood barrier (refer to drawing RHA-XX-DR-S-SP0052)

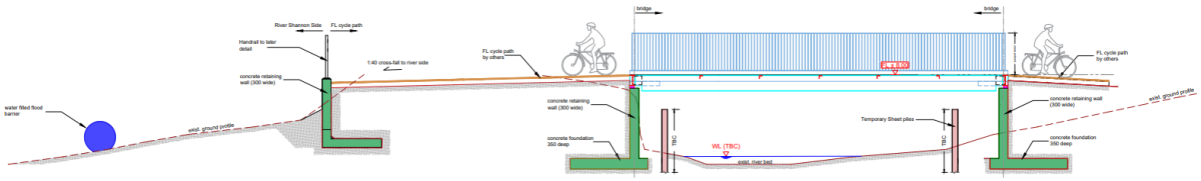

Figure 3-110: Section of retaining wall for proposed Ramp and Abutment walls for proposed Bridge 5 (refer to drawing RHA-XX-DR-S-SP0052)

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

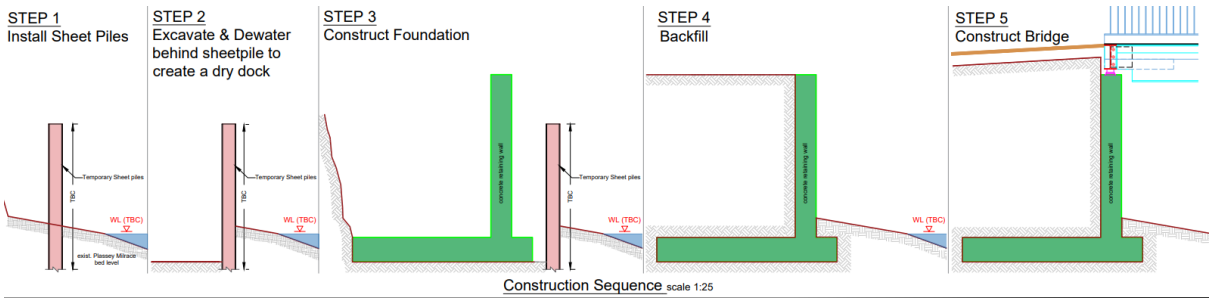

Figure 3-111: Construction sequence for abutment structures to support the steel deck of Bridge 5 (refer to drawing RHA-XX-DR-S-SP0052)

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.

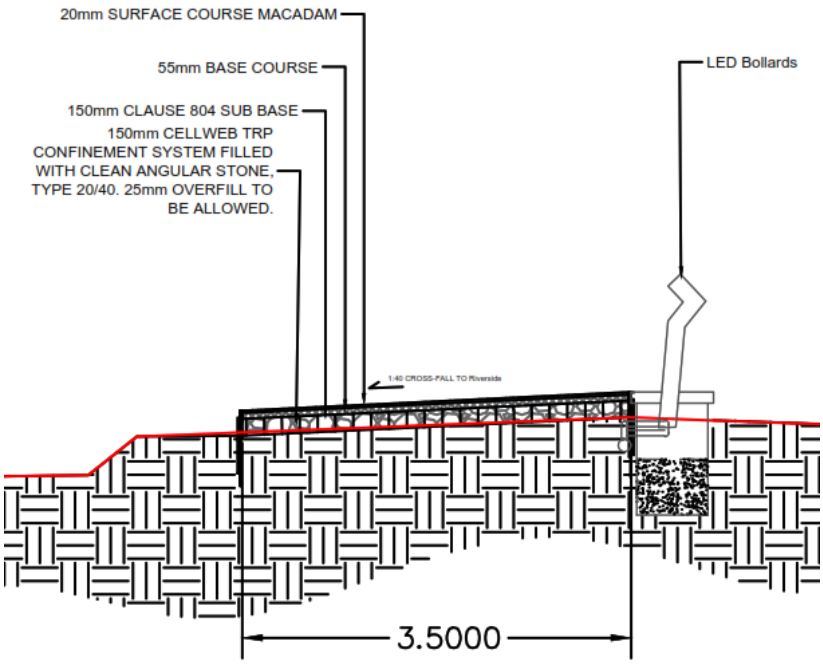

Figure 3-112: Proposed tarmac path and public lighting north of Kilmurray Student Village

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.

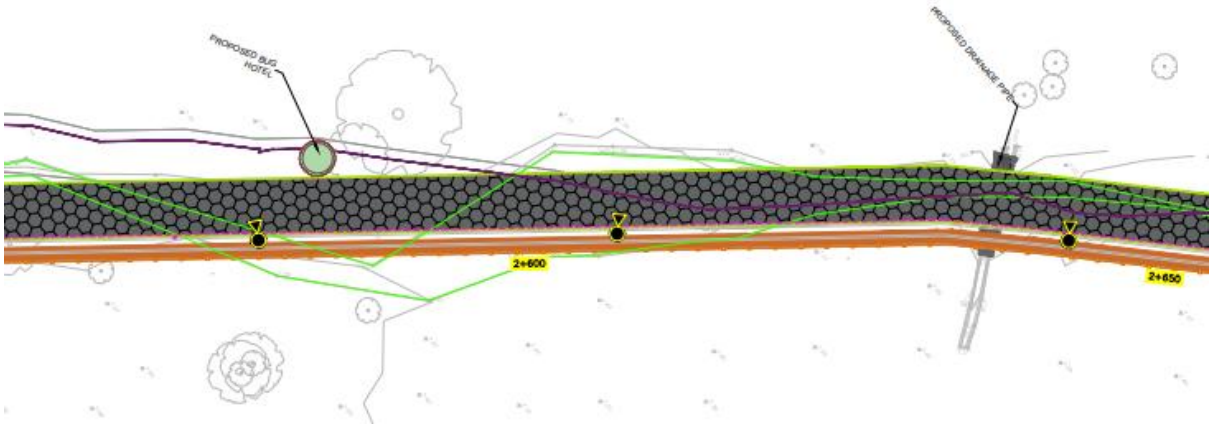

Figure 3-114: Proposed Greenway to replace existing grass desire line

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.

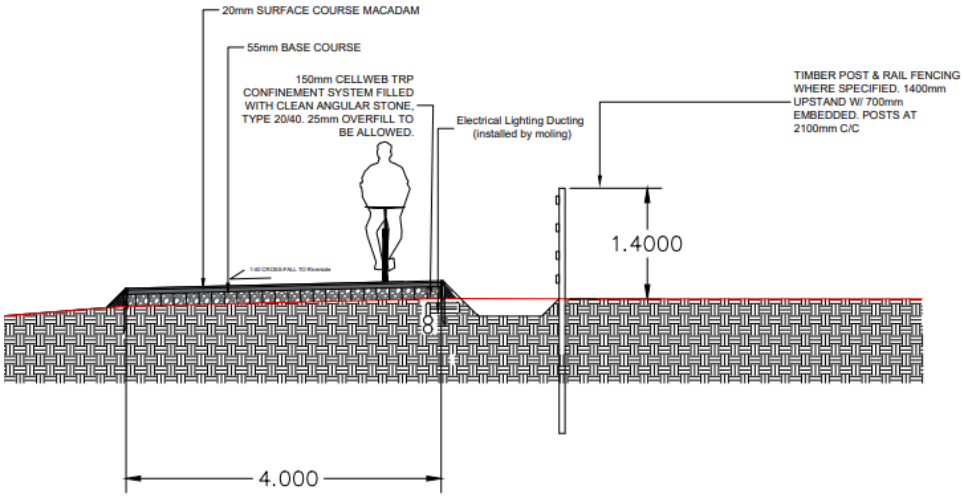

Figure 3-115: Proposed Greenway cross section in green field

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.

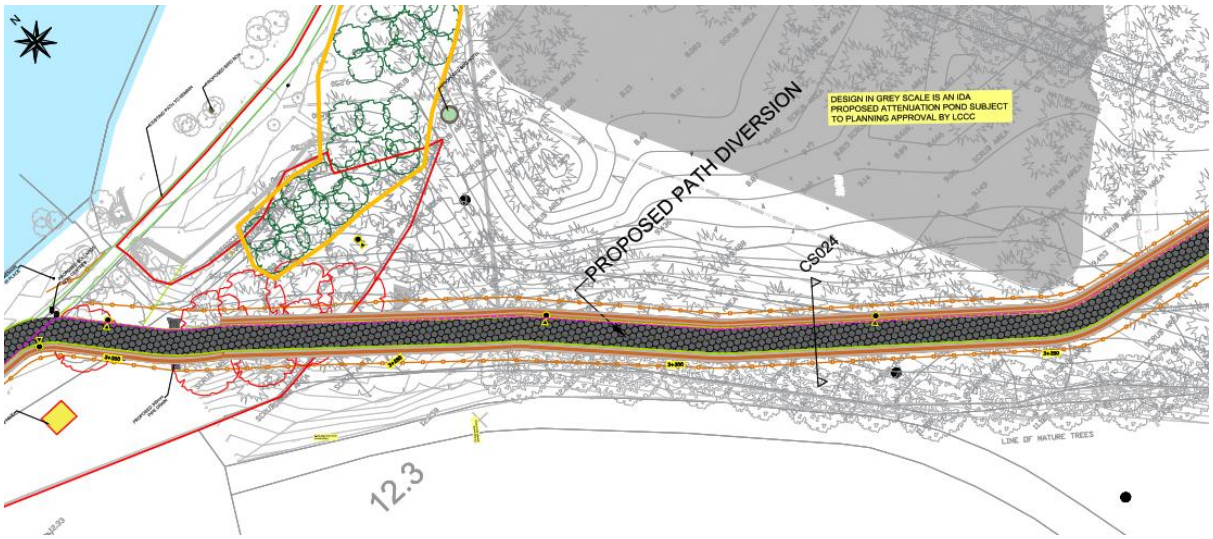

Figure 3-116: Proposed drainage alongside proposed path to manage surface water

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.

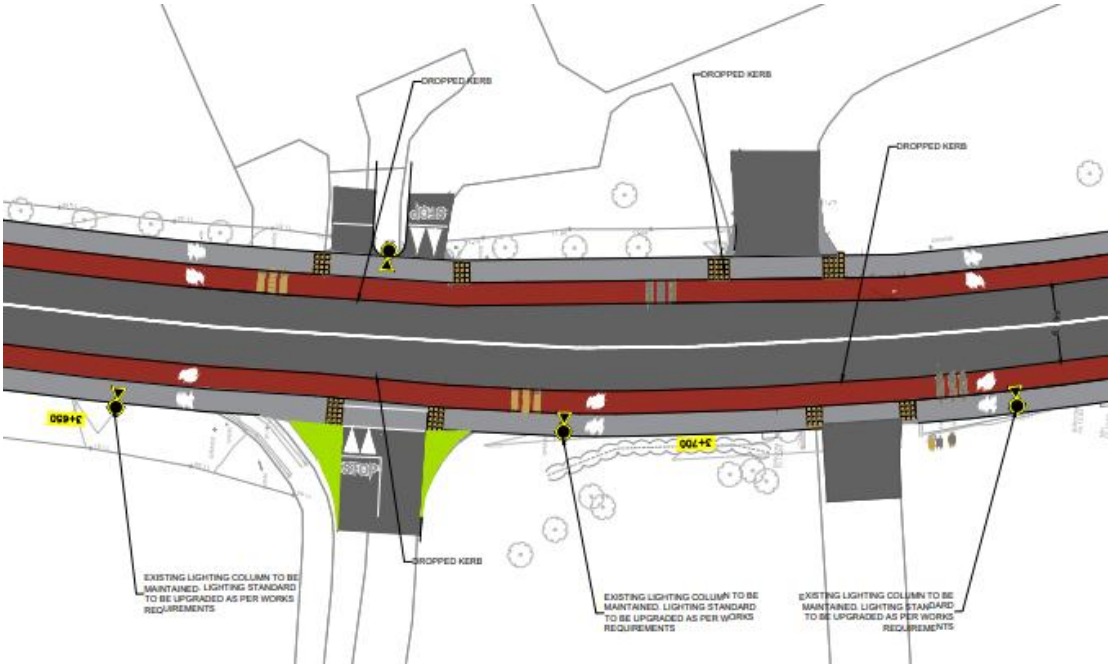

Figure 3-118: Proposed plan for footpaths and cycle lanes alongside McLaughlan Road

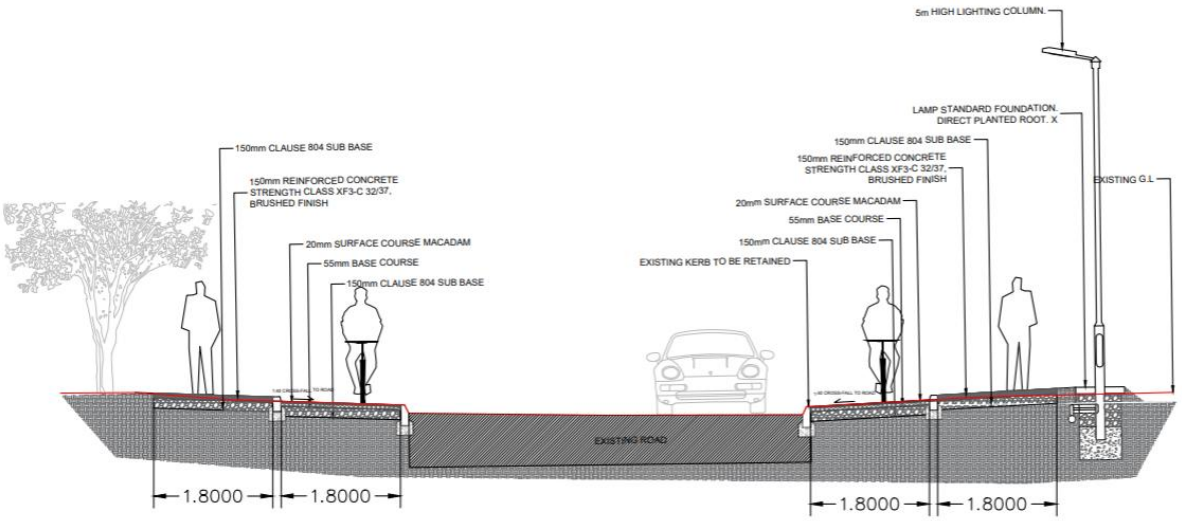

Figure 3-119: Proposed cross section for footpaths and cycle lanes alongside McLaughlan Road

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.

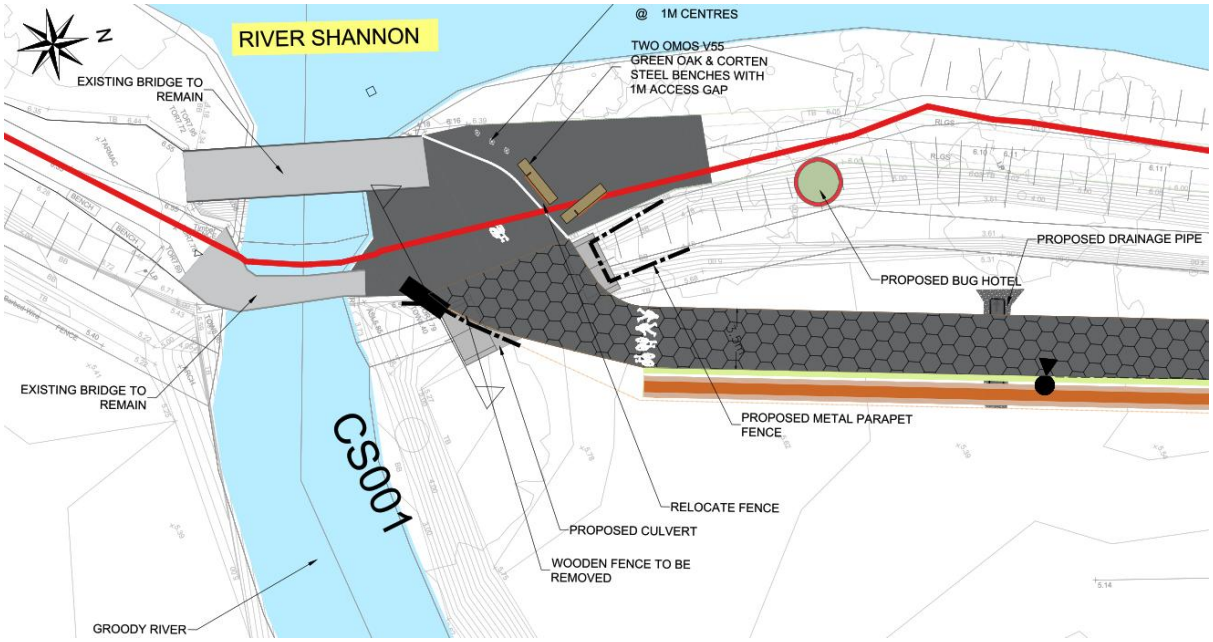

Figure 3-125: proposed amenity/rest area east of Groody Bridge

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.

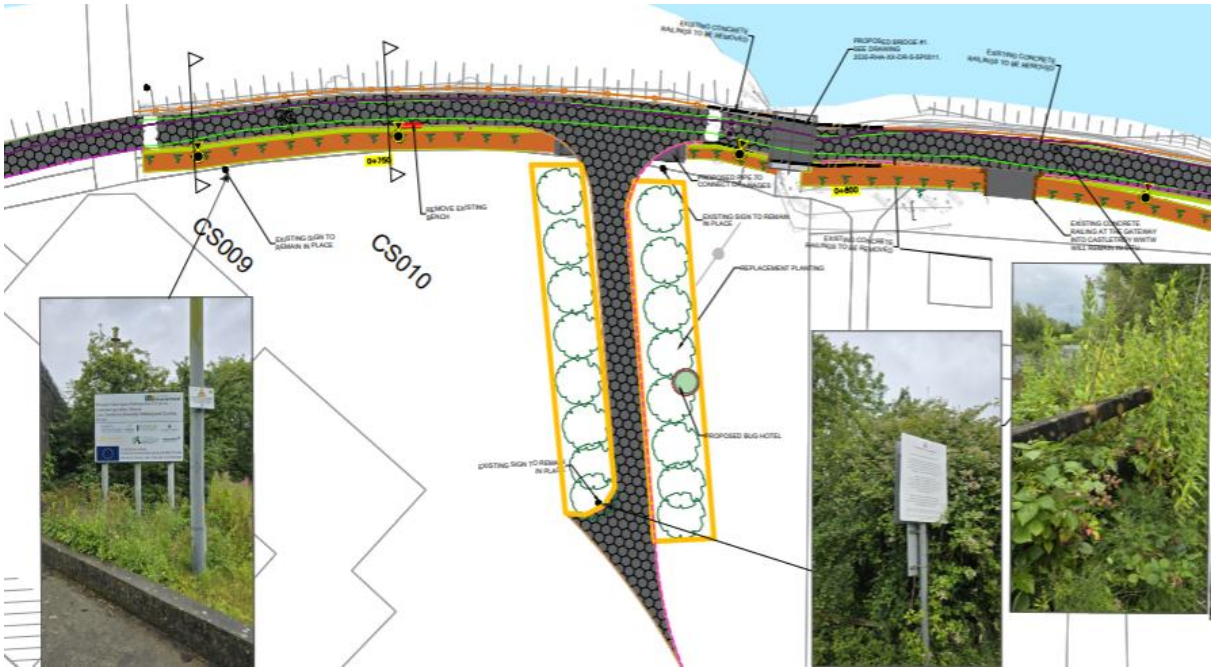

Figure 3-126: Proposed tree planting area west of proposed Bridge 1

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.

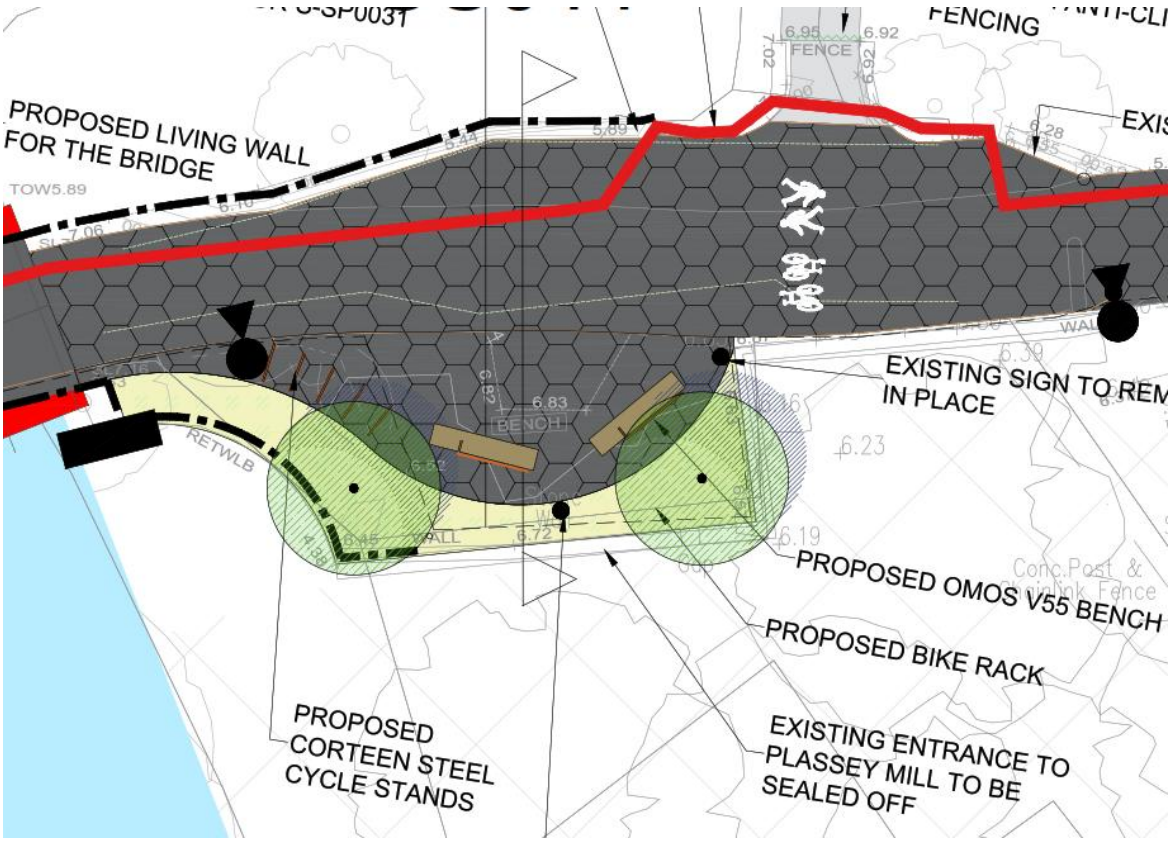

Figure 3-127: Proposed amenity/rest area at Plassey Mills

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 along the riverbank to the benefit of bats, especially the Lesser Horseshoe bat.

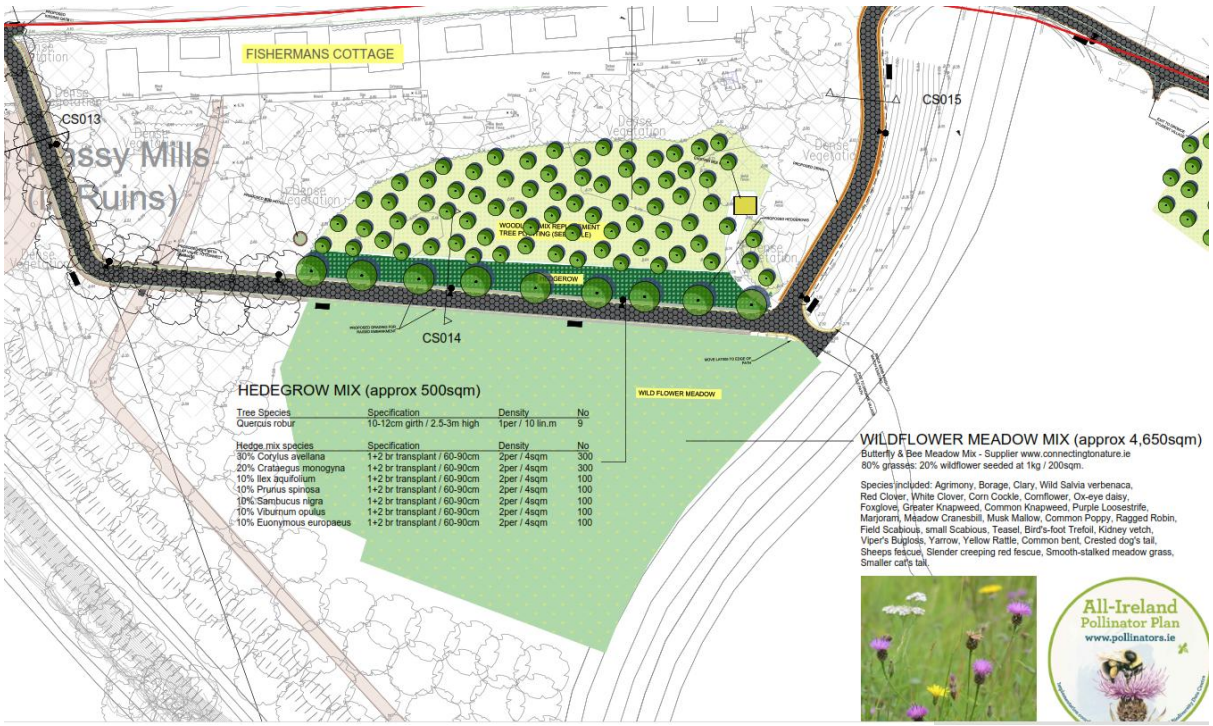

Figure 3-128: Proposed landscaping south of the Fisherman cottages

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.

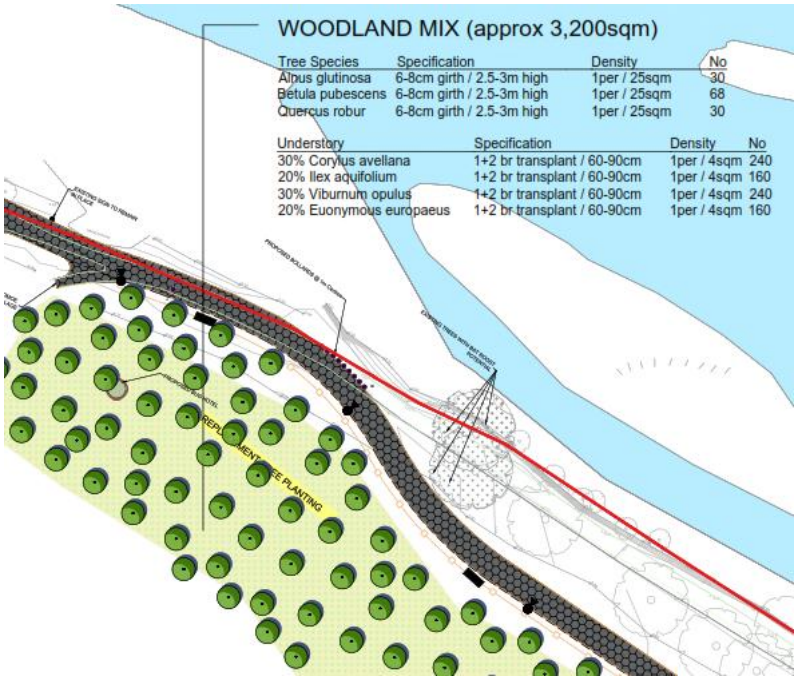

Figure 3-129: Proposed tree planting area north of Dromroe Student Village

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.

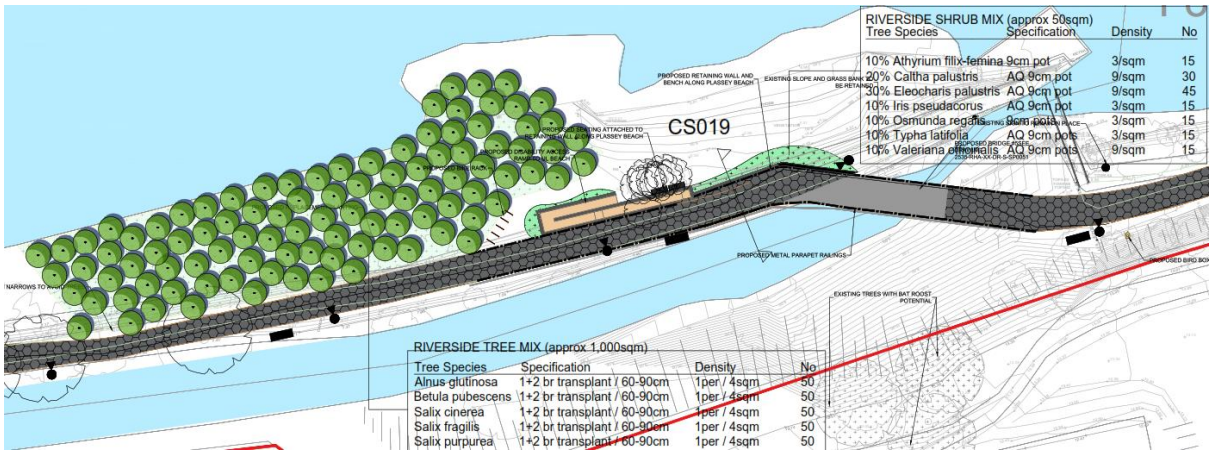

Figure 3-130: Proposed native Irish trees and new riverside shrubs at Plassey Beach

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.

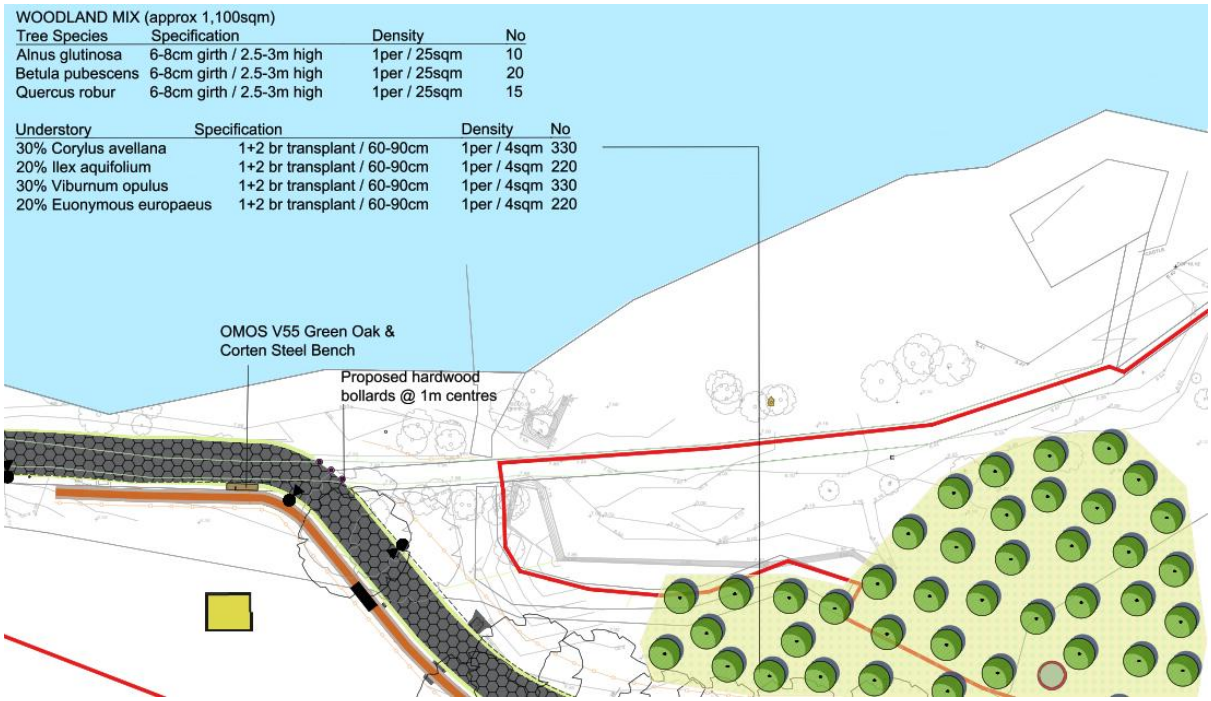

Figure 3-131: Proposed replacement tree planting east of Cook Medical

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.

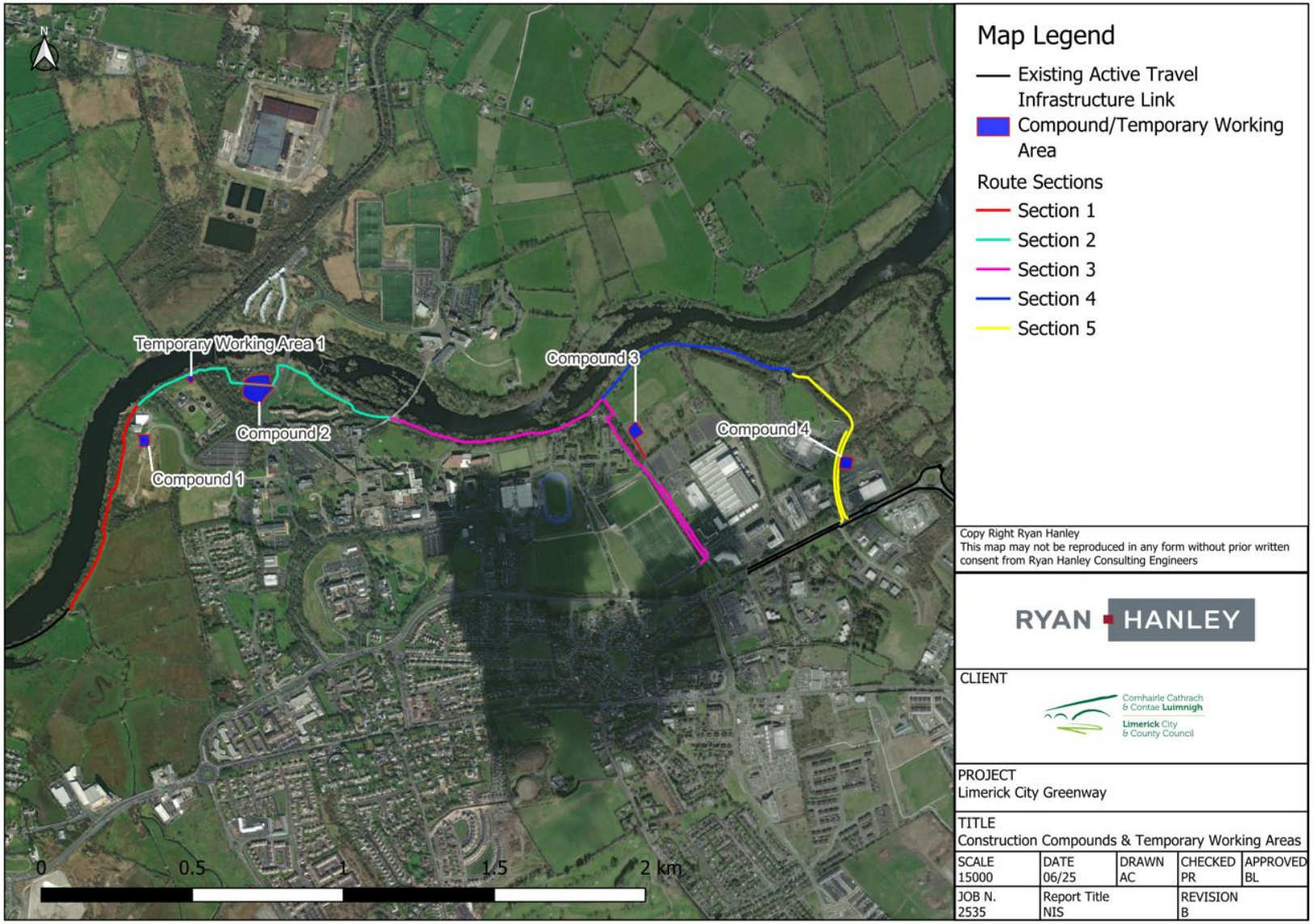

Figure 3-134: Proposed Sections, Compounds and Temporary Working area

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 'Cellweb®TRP' system (or equivalent) to enable widening of the existing gravel track. Refer to Figure 3-135 for an example.

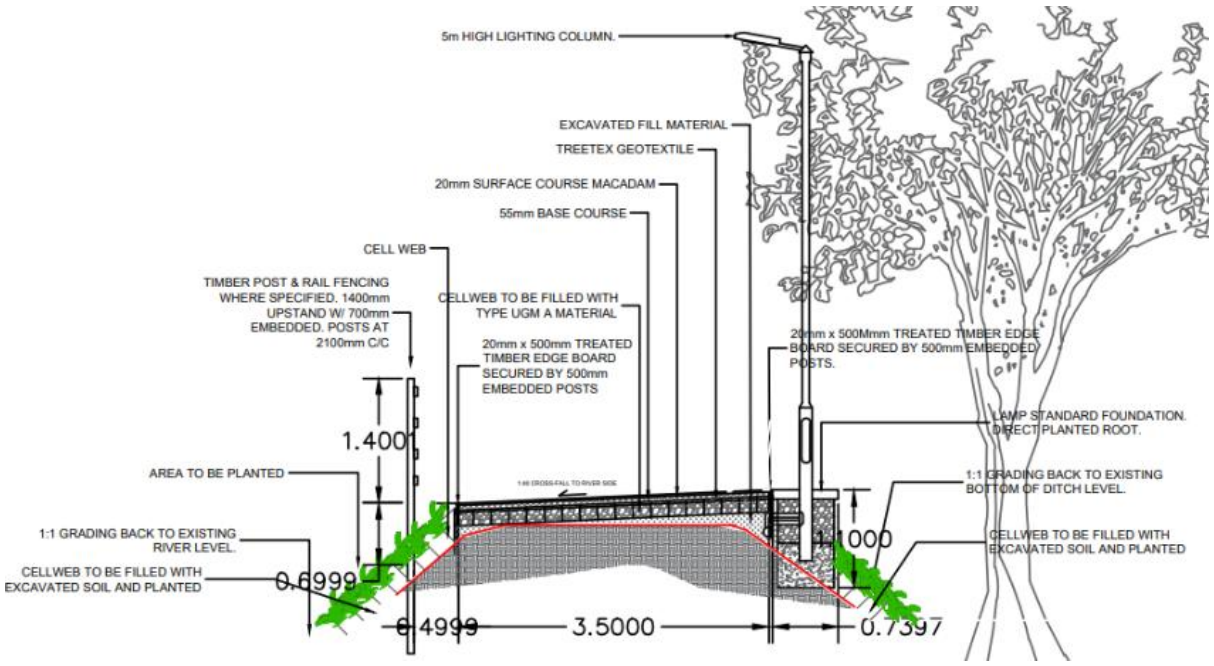

Figure 3-135: Tree root protection along proposed Greenway (Red line is existing ground level)

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.

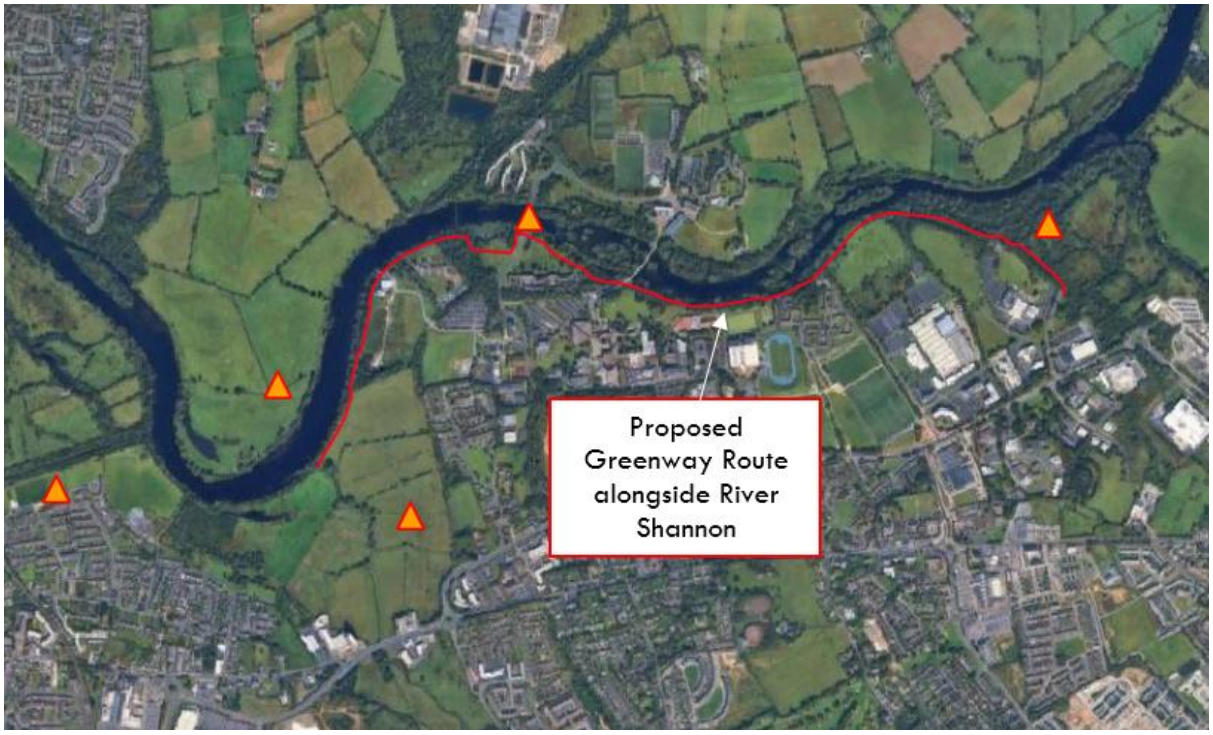

Figure 3-136: Past Flood Events OPW database (www.floodinfo.ie)

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)

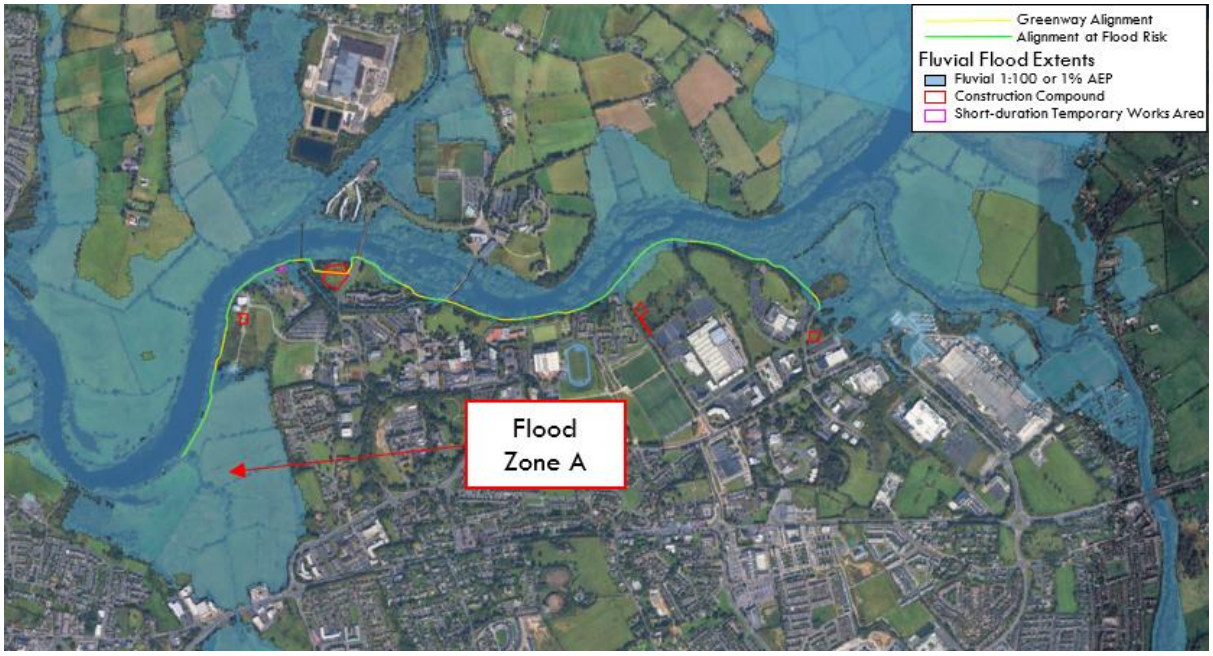

Figure 3-138: Sections of Greenway at Flood Risk (1 in 100 or 1% AEP)

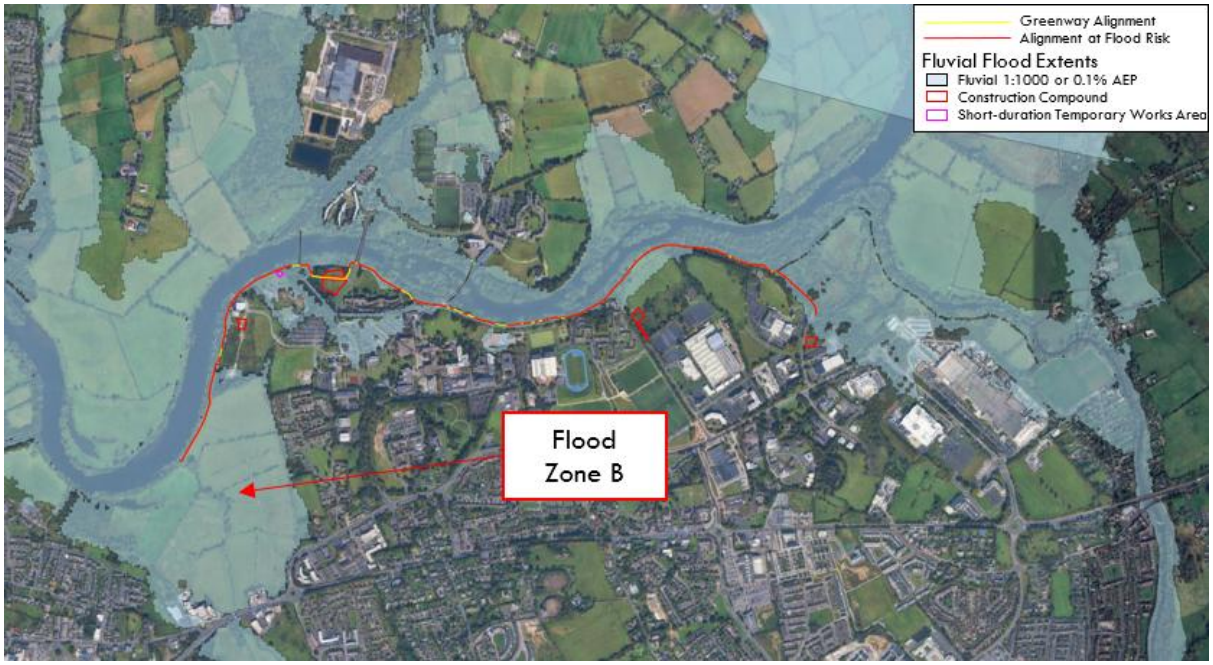

Figure 3-139: Sections of Greenway at Flood Risk (1 in 1000 or 0.1% AEP)

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 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 planning 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 approximately 305 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 Receiving Environment

Given the location, nature and size of this proposed development and the proposed construction methodology (refer to section 4.18 of the EIAR) it is considered for the purpose of this Biodiversity Management Plan that the likely receiving environment is the zone immediately around the construction site, and downstream catchment.

4.1 Designated Areas

The proposed development is located within and directly adjacent to the Lower River Shannon SAC (see Figure 5.1). It has been determined that there is a potential interaction between the works and this SAC, therefore its conservation objectives and the potential adverse effects to the site and its Qualifying Interest have been outlined in the NIS. The Lower River Shannon SAC Qualifying Interests (QIs) are as follows:

- Sandbanks which are slightly covered by sea water all the time [1110]
- Estuaries [1130]
- Mudflats and sandflats not covered by seawater at low tide [1140]
- Coastal lagoons [1150]
- Large shallow inlets and bays [1160]
- Reefs [1170]
- Perennial vegetation of stony banks [1220]
- Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]
- Salicornia and other annuals colonising mud and sand [1310]
- Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]
- Mediterranean salt meadows *(Juncetalia maritimi)* [1410]
- Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260]
- Molinia meadows on calcareous, peaty or clayey-silt-laden soils *(Molinion caeruleae)* [6410]
- Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) [91E0]
- *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029]
- *Petromyzon marinus* (Sea Lamprey) [1095]
- *Lampetra planeri* (Brook Lamprey) [1096]
- *Lampetra fluviatilis* (River Lamprey) [1099]
- *Salmo salar* (Salmon) [1106]
- *Tursiops truncatus* (Common Bottlenose Dolphin) [1349]
- *Lutra lutra* (Otter) [1355]

The River Shannon and River Fergus Estuaries SPA is located 3.7km southwest and 8km downstream of the proposed works. Due to distance, scale and dilution factors it is considered that the proposed works will not result in any likely significant effects with the qualifying interests of the SPA.

The following protected Natural Heritage Areas were assessed through the Source Pathway Receptor model; Woodcock Hill Bog, Gortacullin Bog, Grageen Fen and Bog, Doon Lough and Bleanbeg Bog. Sixteen Proposed Natural Heritage Areas are also located in close proximity to the site. Extensive site synopsises for these areas and pathway for effects can be found in Table 6.3 of Chapter 6 of the EIAR for the development.

The habitats within the Study Area were surveyed by Ryan Hanley Ecologists and contracted ecologists between 2020-2025. A large proportion of the habitats are within the Lower River Shannon SAC, a site of international conservation importance. It was noted that three dominant habitats of high importance were present within and adjacent to the proposed Greenway, these habitats are depositing/lowland rivers (FW2) of International Importance, riparian woodland (WN5) of Local Importance (higher value) and Annex I habitat - Alluvial forest (91E0). The River Shannon forms the northern boundary of the study area and greatly influences the adjacent low-lying habitats.

4.2 Site Surveys

The following points summarise the information gathered and analysed by field surveys of the Study Area regarding flora and fauna;

- Otter as an ecological receptor have been assigned as Local Importance (High value) on the basis of suitable riparian habitats along the study area.
- Badger as an ecological receptor has been assigned Local Importance (Lower value) on the basis that the habitats within the Study area are unlikely to support a badger population of Local Importance.
- Bats as an ecological receptor have been assigned as Local Importance (Higher value) on the basis of the potential for a population within the study area.
- Reptiles and Amphibians as ecological receptors have been assigned as Local Importance (Lower value) on the basis of the potential for a population within the study area.
- Invertebrates as ecological receptors have been assigned as Local Importance (Lower value) on the basis of the potential for a population within the study area.
- Macroinvertebrates as ecological receptors have been assigned as Local Importance (Lower value) on the basis of the potential for a population within the study area.
- No protected flora was identified, and no species listed on Annex II of the EU Habitats Directive or additional flora listed in the Flora (Protection) Order (2022) or the Irish Red Data Book were recorded.
- Himalayan balsam (*Impatiens glandulifera*) and Giant hogweed (*Heracleum mategzzianum*) were found in considerable volume along the length of the proposed greenway route, their specific locations are shown in Figure 6.6, 6.7 and 6.8 of the EIAR.
- Bird species were recorded during walkover surveys in 2021/22 and 2023/24, the following species were recorded within the vicinity of the development site and are considered Red Listed species; Swift (Apus apus), Grey Wagtail (Motacilla cinerea), Lapwing (Vanellus vanellus), Kestrel (Falco tinnunculus), Redwing (Turdus iliacus), Curlew (Numenius arquata).
- Wintering Birds as an ecological receptor have been assigned as Local Importance (Lower value) on the basis of the potential for a population within the study area.

- Breeding Birds as an ecological receptor have been assigned as Local Importance (Higher value) on the basis of the potential for a population within the study area.

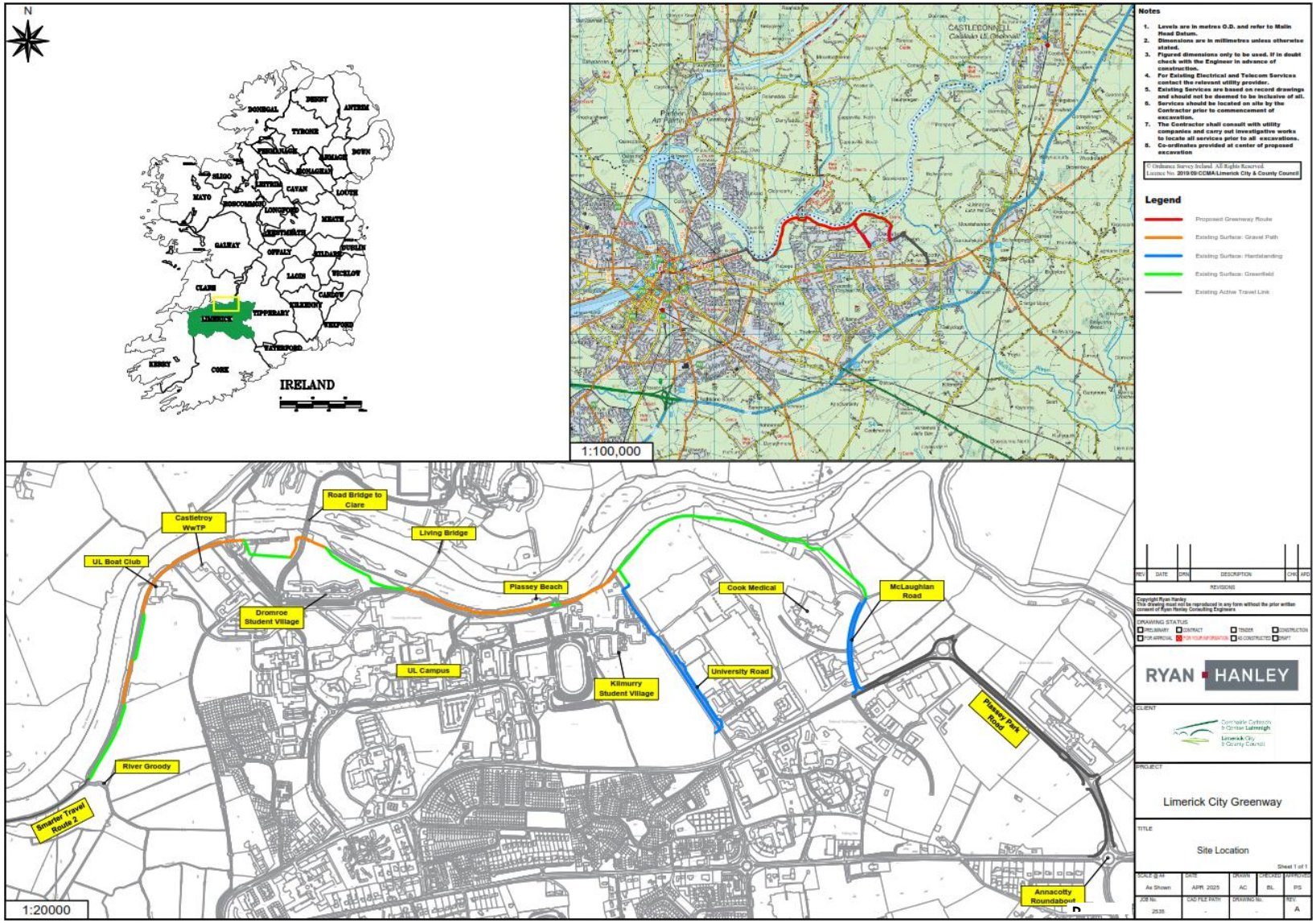

Figure 4-1: Location of the proposed Limerick City Greenway (UL to NTP)

The full list of habitats identified during the site visits are listed in Table 6.13 of the EIAR. An extensive overview and evaluation of each habitat listed can be found in 6.4.1.1. Table 6.14 of the EIAR provides a summary of the habitat importance/ecological value and identifies the habitats classified as Key Ecological Receptors (KERs).

4.3 Habitats and Flora

The proposed greenway will be used by pedestrians and cyclists for recreational and transport/commuting uses. The proposed greenway will be surfaced with porous tarmac which will correspond to Fossitt's classification of habitats as Buildings & Artificial Surfaces (BL3). Roads, car parks, pavements, yards, paths and driveways elsewhere in the study area are also categorised as BL3. The amenity grassland found along the proposed Greenway is associated with lawns of various buildings and institutions, as well as sports fields.

Given that the study area is dominated by highly modified habitats including amenity grassland and buildings and artificial surfaces, no protected flora was recorded during the survey. No species listed on Annex II of the EU Habitats Directive or additional flora listed in the Flora (Protection) Order (2022) or the Irish Red Data Book were recorded during the survey. However, there is a record of one FPO species, Opposite-leaved pondweed (*Groenlandia densa)* occurring in the area during the year 1833.

Three habitats regarded as International Importance are located within the study area of the proposed development as well as nine habitats regarded as Local Importance (Higher Value). All nine Local Importance (Higher Value) habitats are KERs, however only one habitat of International Importance (FW2) is regarded as a KER. The remaining two habitats are considered to be of International Importance (ED2 and GS2) because of their occurrence within the SAC designation, however, upon further investigation they can be ruled out as KER.

Annex I habitat (EU Habitats Directive) Alluvial forests 91E0 with *Alnus glutinosa* and *Fraxinus excelsior* is present within the Zone of Influence of the proposed works, 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 the southern bank of the river although not in a continuous manner. This habitat is considered of International Importance.

Habitat type 3260 '*Floating River Vegetation*' is known to be present throughout most major rivers in the Lower Shannon River SAC and is therefore highly likely to be present in the vicinity of the proposed works.

The WFD status of the waterbodies within the Study Area includes good status for the Mulkear (Limerick) River_050, and moderate status for the Lower River Shannon_060 waterbody. With regards to each river body's ability to meet the WFD objectives by 2027, the Mulkear (Limerick) River_050 is "*Not at risk*", the Lower River Shannon_060 is "*Under Review*". Limerick Dock and the Upper Shannon Estuary are both classed as having "Poor" WFD status and are "*At Risk*". The study area runs along the boundary of two groundwater bodies. Limerick City East which begins below the southern banks of the Lower Shannon River and Limerick City North which begins on the Northern banks of the same river. Limerick City North has a "Good" WFD status and is "*Not at risk*". Limerick City East has a "Good" WFD status but is currently "*At Risk*".

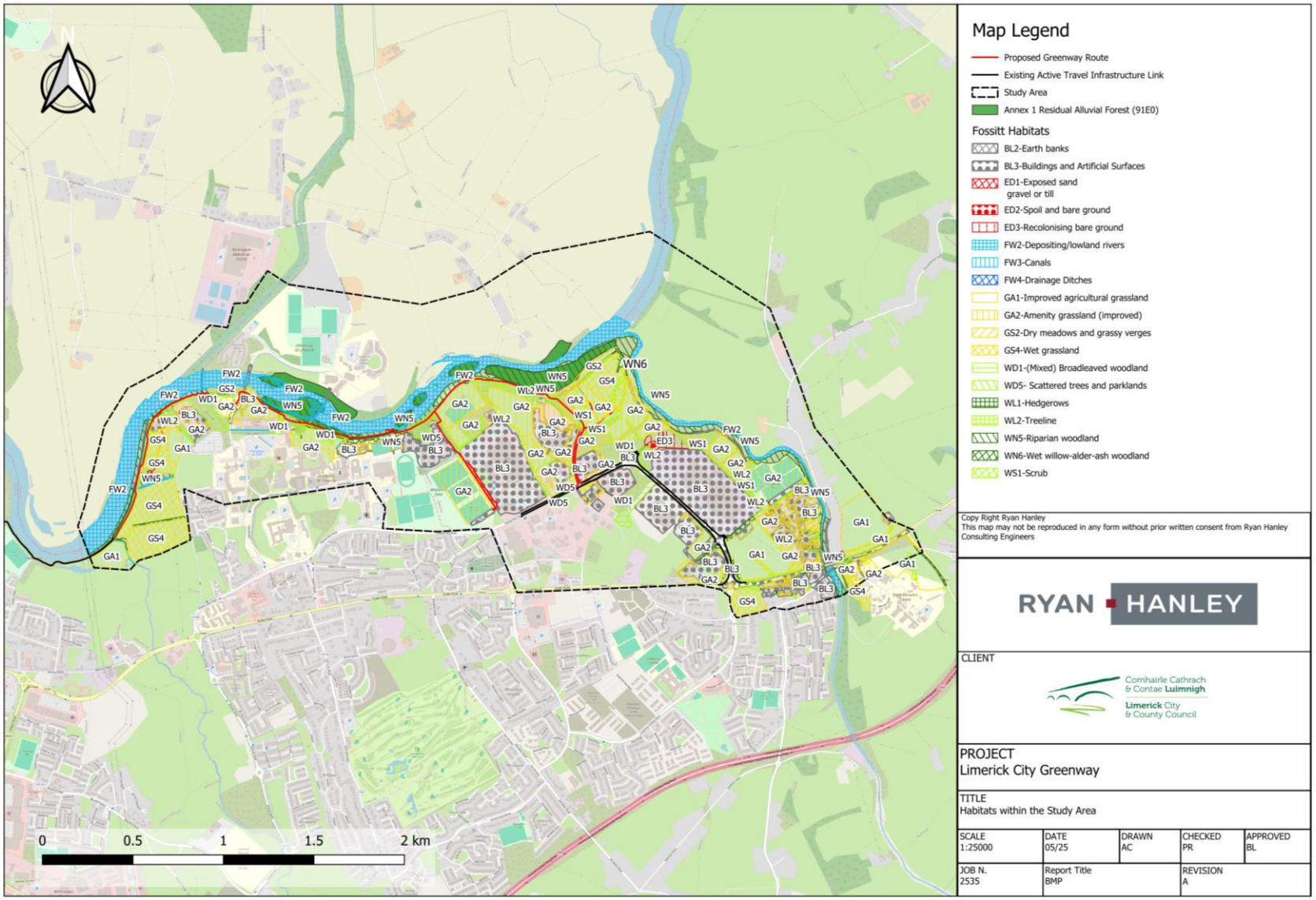

Figure 4-2: Overview of Fossitt Habitats recorded within the study area of the proposed greenway

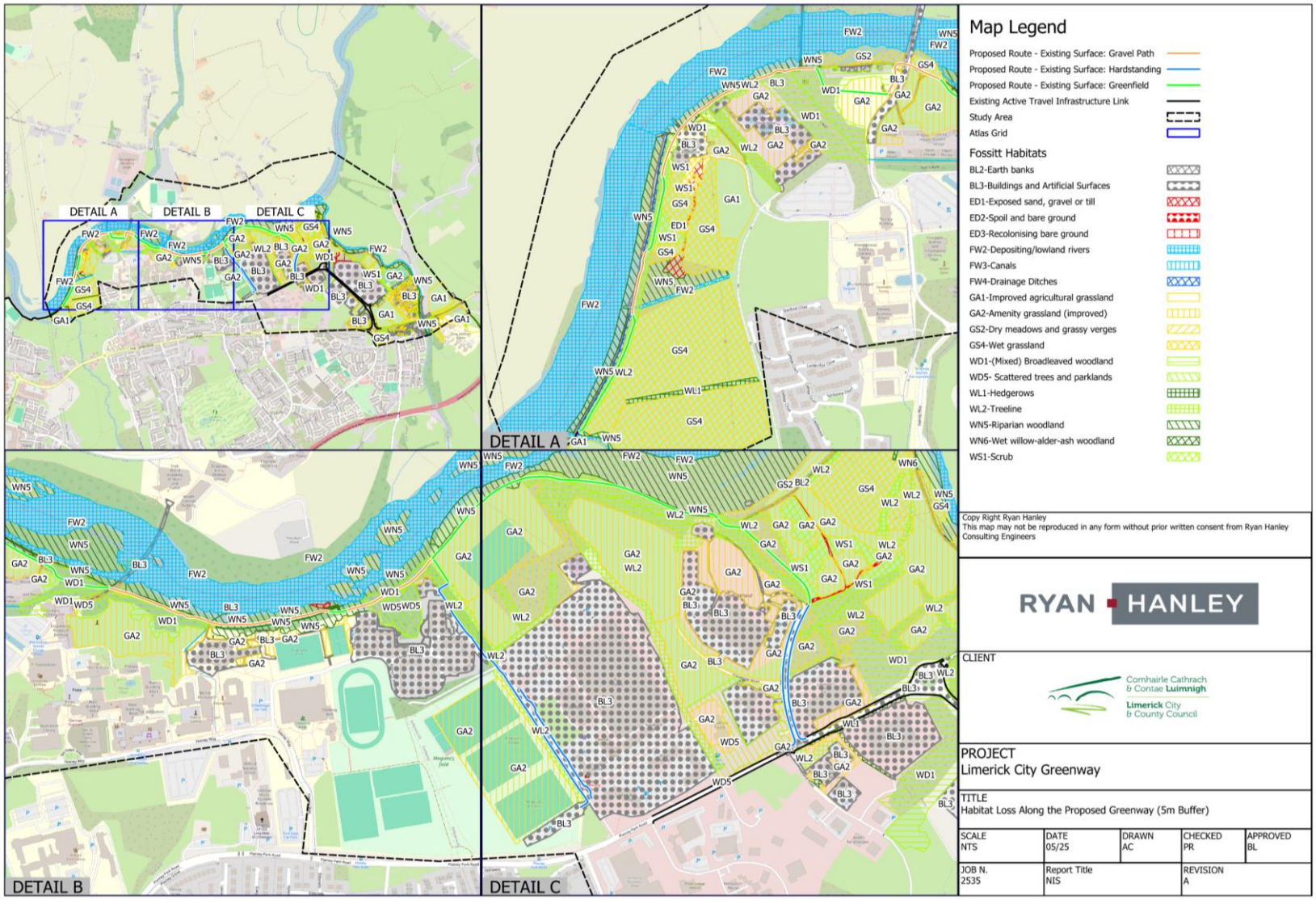

Figure 4-3: Detailed view of Fossitt habitats recorded within the study area of the proposed greenway

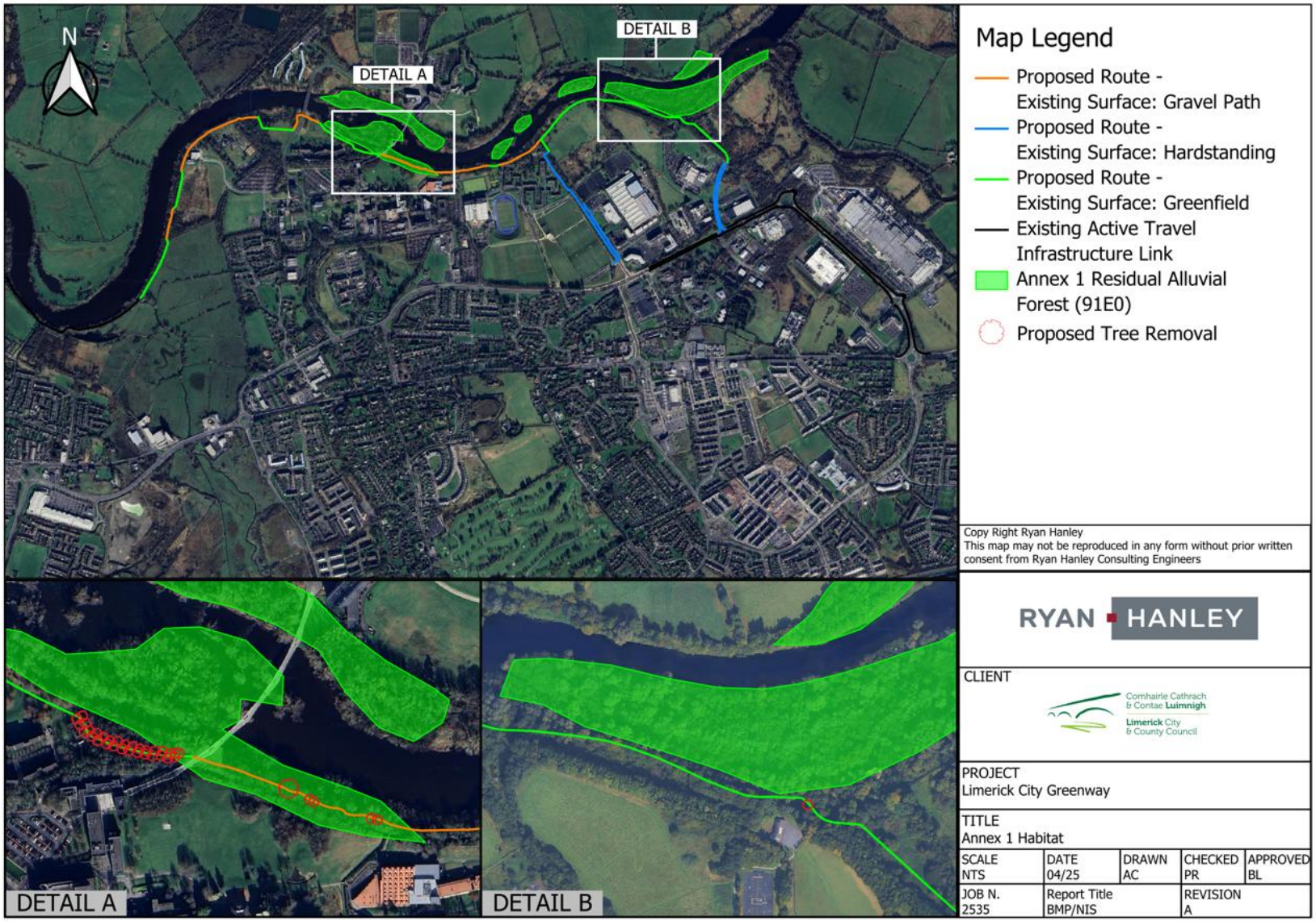

Figure 4-4: Annex I habitat presence in the proximity of the proposed Greenway

Table 4.1 Habitats recorded within the study date and habitats significance

	Habitat	Code	Receptor Importance/ Ecological Value	Key Ecological Recptor
1	Earth banks	BL2	Local importance (lower value)	No
2	Buildings & Artificial Surfaces	BL3	Local importance (lower value)	No
3	Exposed sand, gravel or till	ED1	Local importance (lower value)	No
4	Spoil and bare ground	ED2	Local importance (lower value)	No
5	Recolonising bare ground	ED3	Local importance (lower value)	No
6	Depositing/lowland Rivers	FW2	Local importance (higher value)	Yes
7	Canals	FW3	Local importance (higher value)	Yes
8	Drainage ditches	FW4	Local importance (higher value)	Yes
9	Improved Agricultural grassland	GA1	Local importance (lower value)	No
10	Amenity grassland (improved)	GA2	Local importance (lower value)	No
11	Dry meadows and grassy verges	GS2	Local importance (lower value)	No
12	Wet grassland	GS4	Local importance (higher value)	Yes
13	(Mixed) broadleaved woodland	WD1	Local importance (higher value)	Yes
14	Scattered trees and parklands	WD5	Local importance (lower value)	No
15	Hedgerows	WL1	Local importance (higher value)	Yes
16	Treelines	WL2	Local importance (higher value)	Yes
17	Riparian woodland	WN5	Local importance (higher value)	Yes
18	Wet willow-alder-ash woodland	WN6	Local importance (higher value)	Yes
19	Scrub	WS1	Local importance (higher value)	Yes

4.4 Fauna

Fauna evaluation in this section was assessed in accordance with the receptor importance classification methodology outlined in NRA (2009); "Guidelines for Assessment of Ecological Impacts of National Roads Schemes".

Of the faunal species recorded or known to be present in the area, there are three species of International Importance:

- Otter is listed under Annex II and Annex IV of the EU Habitats Directive and is also protected under the Wildlife Act (as amended);
- Salmon is listed on Annex II of the EU Habitats Directive. Otter and Salmon are two of the qualifying interests (QI) present in the Lower Shannon SAC. However, it is not considered that these species will be significantly affected by the proposed project; and
- Sea Lamprey (Petromyzon marinus) was recorded by the NBDC on site and it is a qualifying interest of the Lower Shannon SAC and listed as Annex II of the EU Habitats Directive. No instream works are proposed as part of the works so it is not considered that this species will be significantly affected by the proposed scheme.

A high level of bat activity and species diversity was recorded during the survey period. The study area provides a diversity of habitats including treelines, hedgerows, and many foraging opportunities for bats. Light pollution here is typically low and the area has good landscape connectivity with surrounding habitats. The suitability of the proposed project site for bats was considered and while the site is likely to be used by foraging and commuting bats the proposed scheme is unlikely to result in loss or damage to any significant roosting habitat as such bats are classified as Local Importance (Higher value).

The other species recorded such as bird species are classified as Local Importance (Higher value) in the context of the proposed project. These species are common and widespread in the local area and are not dependent on the site of the proposed works.

The low-medium quality of habitats within the study area overall, coupled with the limited records of fauna species protected under the Wildlife Act (as amended) from both the desktop study and field walkovers, would suggest that no additional fauna species populations utilise the study area in higher than local significance.

5 Habitat Management Action Plan

The proposed development area is considered to be of high ecological value at a local level. It is extremely important that all measures should be taken to preserve the current ecological receptors at the site and to increase biodiversity in the operational phase, and recommendations are proposed in Sections 5.1 to 5.3 of this report to achieve this.

Following completion of the construction of the Greenway, it is proposed to reinstate the construction and temporary works areas. Where opportunity exists, enhancement measures may be employed which will be carried out in liaison with the competent authority and the appointed Ecological Clerk of Works (ECoW). Upon completion of the site works, all plant and machinery will be removed. The grasslands adjacent to the site will be left to regenerate naturally and site fencing will be removed. 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. As stated in Ch. 4 of the EIAR, thinning of branches and vegetation will be reused on site for the production of insect hotels, further promoting biodiversity during and after the construction phase.

The action plan measures will follow a suitable ecological calendar to ensure that habitat and species are not disturbed during the proposed works.

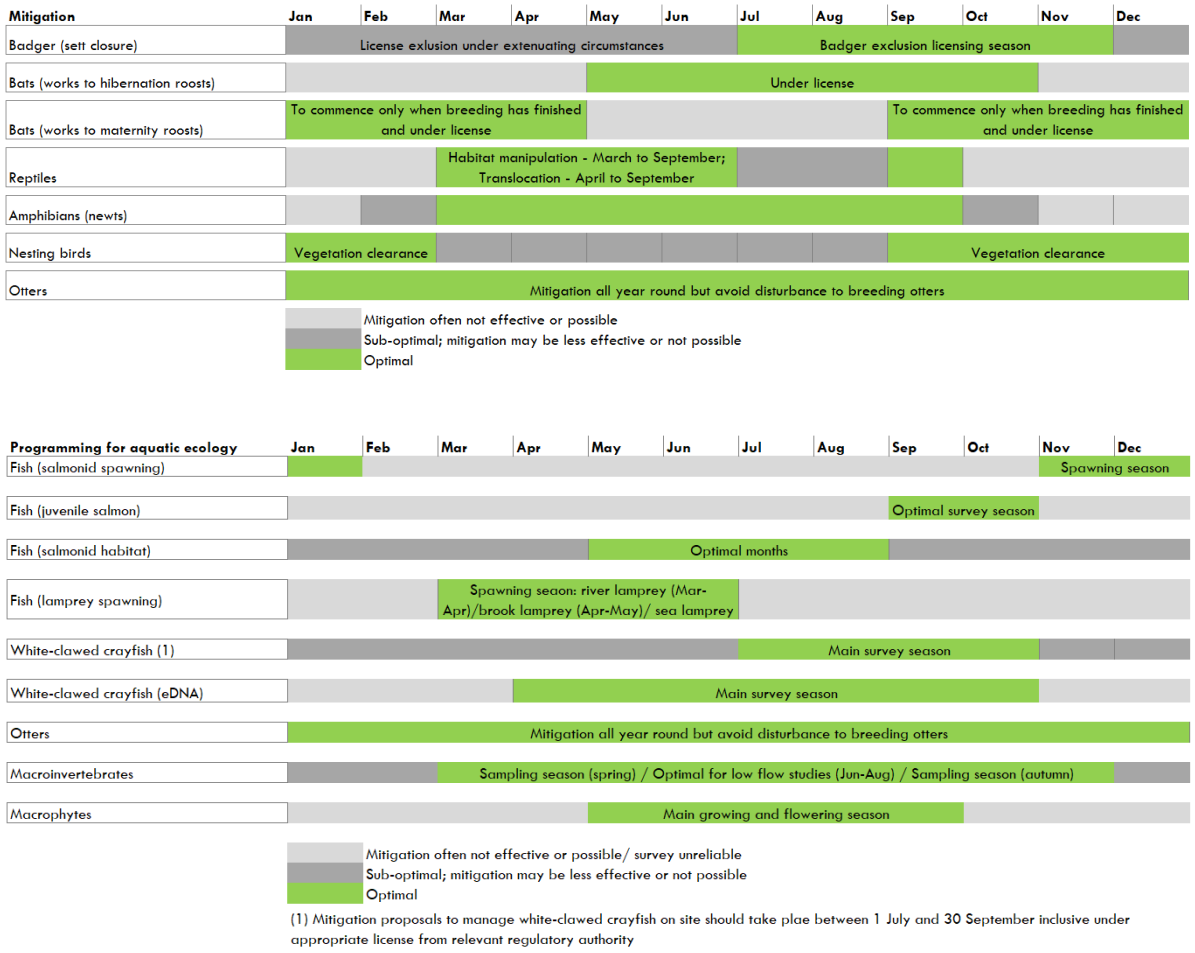

Figure 4.1 Ecological calendar for implementation of mitigation measures and action plan

5.1 Ecological Clerk of Works

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 Greenway.

The ECoW will hold a minimum University degree in Environmental Science, (NFQ Level 8); Minimum of 5 years' post-graduate experience in ecological assessment, appraisal techniques and mitigation monitoring.

- The ECoW will be responsible for biodiversity monitoring elements and providing on-site toolbox talks. The conduction of regular site visits during construction by the ECoW, must occur to access qualifying interests and protected species.
- The ECoW shall be onsite part time until all works have finished, and all machinery has been demobilised and has left the site. All staff will be trained by the ECoW in the identification of qualifying interests and protected species within the SAC.
- All staff will be inducted by the ECoW through a toolbox talk in the identification of invasive species and noxious weeds and the associated biosecurity measures required when working on site.
- The ECoW will be responsible for monitoring water quality throughout the works duration. Alarmed sondes will be employed to measure turbidity in the main channel upstream and downstream of the works area during the construction phases.
- The ECoW will maintain a monitoring log and provide frequent reports to the project team and relevant statutory authorities. They will record, report and follow up on all ecological breaches, if they occur.

5.2 Invasive Species

The desktop study and site visits have identified significant amounts of invasive species within the Greenway 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.

An Invasive Species Management Plan (ISMP) has been established for the site and 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).
- Control measures such as the application of glyphosate to Japanese knotweed will be timed for early growth stages in April and May, with follow-up treatments in late summer. Himalayan balsam will be hand-pulled before mid-June to prevent seed set. Monitoring of treated areas will be carried out throughout the growing season and for at least three years post-treatment to assess efficacy and inform adaptive management. All works will be overseen by the Ecological Clerk of Works to ensure adherence to best practice and legal obligations.

- 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 machinery and construction related vehicles arriving and leaving the site will be checked and monitored for the presence of plant material e.g. leaves roots and rhizomes from non-native invasive species.
- 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.
- Any Giant hogweed identified during the site survey will 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, potentially killing the plant with one application.
- Contaminated material will be stockpiled off site. The area will be clearly marked, lined with a root barrier membrane and be of sufficient size to hold all the material to be excavated.
- Regular investigative monitoring surveys on the effectiveness of invasive species treatment measures must be conducted.
- Seeds may survive in the excavated material for up to 18 months. A two-year monitoring programme of control, which will extend beyond the works period will be required.

5.3 Landscaping

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.

- Tree roots will be protected by using non-invasive construction methods such as; avoidance of digging into the existing gravel track so as not to encounter tree roots and installing Cellweb®TRP (or equivalent) tree root protection directly onto the existing gravel path and build-up of subsequent layers 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.
- Where dense tree coverage exists along the Greenway, service ducts for the public lighting will be installed by moling or non-dig techniques which allows for trench-less installations of services without having to excavate trenches and protecting tree roots from damage.
- 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.

- 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 48 hours prior to works.
- Tree removal will be avoided where possible, however, if it must take place, tree removal will be confined to mainly younger trees and trees of less value, Category A and B trees will be avoided. A qualified Arborist is to be on site to assist in the setting out of certain parts of the path where the proposed route is close to existing trees to avoid as many trees as possible.
- There are 61 No. trees proposed for removal and there are 305 No. new native Irish trees to be planted. New trees will be selected from 26 No. native Irish trees listed on the Preliminary Design (Landscaping Visuals) drawings including but not exclusively Native Oak (Q. *robur)*, Birch (*B. pubescens)*, Willow (*salix sp)*, and Alder (*Alnus)*.
- The 305 No. new native Irish trees should be planted in the optimal planting season (November to April). Planting tree species should be avoided during the dormant season (late October to mid-March), planting during the dormant season allows for the establishment of tree roots before optimal conditions.
- 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 gravel removal will be carried out during prolonged wet weather.
- The Preliminary Design (Landscaping Visuals) drawings are included in Appendix II with details on the proposed biodiversity and landscape enhancement measures.
- The monitoring of survival and establishment/successful rates of the proposed 305 No. new native Irish trees must be conducted during the first two years of seeding.
- The ongoing monitoring of invasive species colonisation, maintenance scheduling and habitat structure must be conducted regularly.

5.4 Fauna

5.4.1 Disturbance/ Avoidance

No badger activity was established within the study area, however, the activity status of this species could change in the intervening period between the site surveys and the commencement of construction of the scheme.

The habitat is unlikely to support badgers but the Precautionary Approach will be implemented along with Best Practice to avoid badgers entering the site or spoil heaps. An additional badger survey should be undertaken prior to construction works commencing to identify any potential badger activity.

As no bat roosts were identified within the study area no specific mitigation in relation to roost loss is recommended. General protective measures are outlined as follows:

- Where possible, treelines and hedgerows shall be retained. Any trees requiring removal to facilitate construction works must be subject to a visual inspection to identify potential for bat roosts. The removal of liner features can result in the disconnection of commuting corridors such as hedgerows and treelines.
- Where possible, these linear features should be reconnected using native hedgerow or tree species to compensate for the loss of these features.
- Where possible, conduct monitoring for protected habitats and species using appropriate methodologies.
- Post construction monitoring surveys are to be conducted in order to assess if fauna is traversing through the proposed Greenway.
- Records of any fauna mortality due to the proposed works or infrastructure must be documented. Monitoring of faunal mortality and causes of mortality is necessary.

Breeding birds have been identified as KERs of the proposed works as there were significant populations recorded as likely to be impacted by the proposed works. The proposed works will result in the loss of some habitat for breeding birds in the form of some scrub, vegetation and some individual trees.

- To limit potential impacts of construction on breeding birds, woody vegetation removal, including treelines and any hedgerows, will not be permitted during the breeding bird season (1st of March to the 31st of August inclusive).
- 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. All plant and equipment for use will comply with BS 5228-1: 2009: Code of Practice for Noise and Vibration Control on Construction and Open Sites Part 1: Noise, as specified in Chapter 9- Air & Climate, Noise & Vibration.

Approximately 3km of the proposed Greenway route will be constructed adjacent to the River Shannon encompassing some of its riverbanks and sections of land that lie within or in close proximity to the Lower River Shannon SAC, this is shown in Figure 5.1. Along these stretches, bank slopes and riparian zones will be retained and protected wherever feasible, to preserve important habitat for otters (*Lutra lutra*), a qualifying interest of the SAC. These riparian areas are essential for breeding, foraging, and sheltering. While some temporary disturbance or loss of riparian vegetation may occur during construction, particularly where works are immediately adjacent to the riverbank, such areas will be allowed to naturally regenerate post-construction. During construction, measures including sediment control, fencing, and buffer zones will be implemented to minimise habitat degradation and avoid direct impacts on otter resting places or foraging areas.

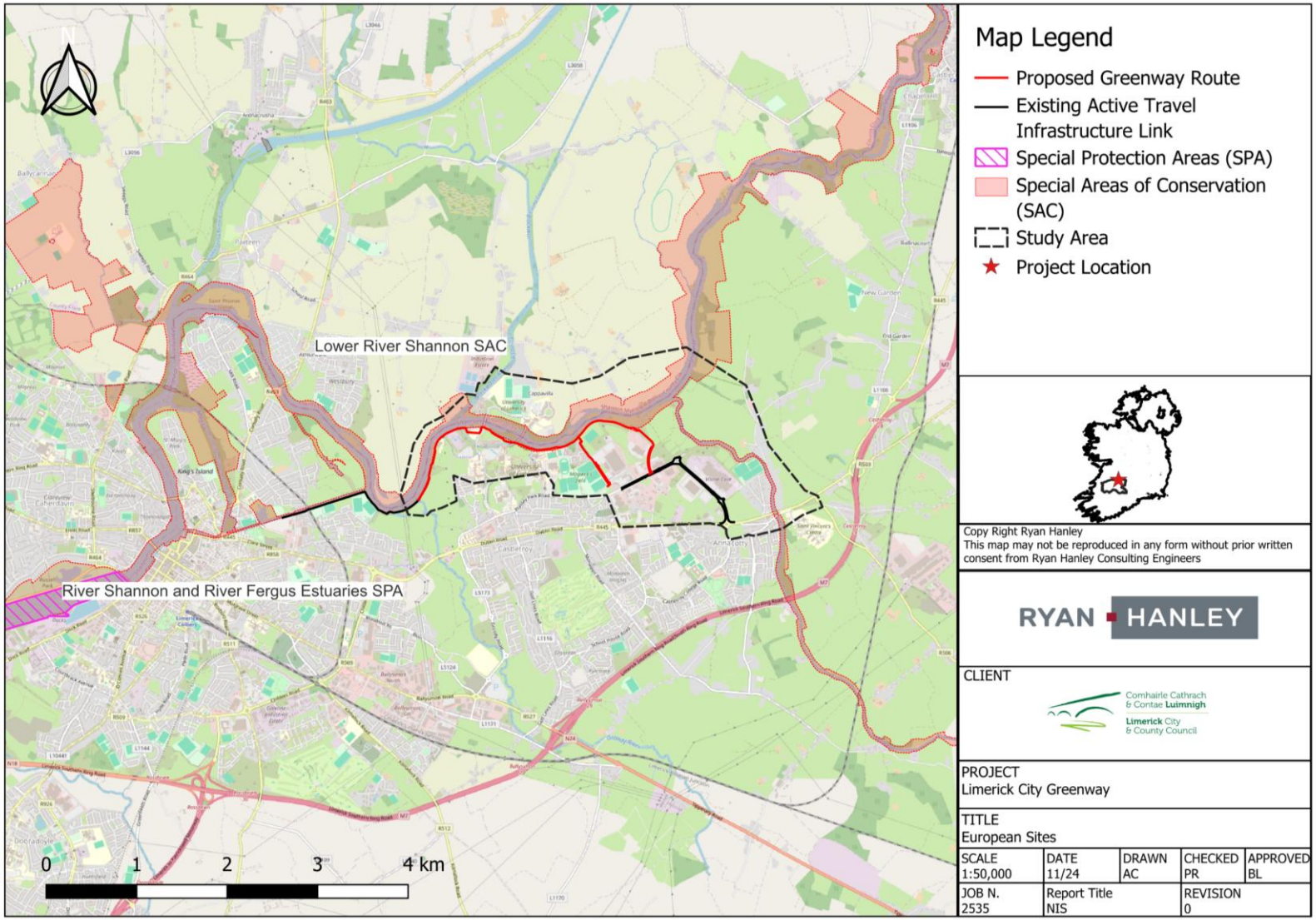

Figure 5.1 European sites within the Zone of Influence of the proposed greenway

5.4.2 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, 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 3,000oKelvin, 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.

Lanterns are mounted at 0o degree tilt and are fully cut off type with no light output above the horizontal plane.

At 5m mounting height ~35m distance spacings between lighting columns is achieved and this enables the works to avoid siting columns near mature trees favoured by bat population. The height of the columns also mitigates against vandalism which can be an issue when placing luminaires in isolated locations.

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.

5.4.3 Water Quality

The proposed scheme has been identified as potentially giving rise to adverse effects on watercourses within the study area. The following measures should be adopted during construction works:

- Pre-construction monitoring of water quality, such as pH, turbidity, conductivity, nutrients and hydrocarbons, must be undertaken.
- The regular monitoring of water quality in the surrounding waterbodies must be undertaken during the construction of the proposed works. Monitoring such as sampling should occur upstream and downstream of the proposed works to detect pollution incidents, especially after rainfall events.
- Visual inspections should be performed regularly for signs of sediment runoff or algal blooms.

- No abstraction from any watercourses will be permitted to facilitate the works. Consumables or waste will be removed from all sampling locations and returned to the site compound for disposal.
- Alarm sondes will be triggered when there is a 20% difference between NTU value recorded in the upstream and downstream sondes. There will be no storage of machinery (including drill rigs) fuel, samples, or chemicals (e.g. bentonite, drilling fluid) in areas prone to flooding (all construction compounds will be located in Flood Zone C areas) or within 20m of any drain or watercourse.
- Storage tanks 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 should be maintained on-site to enable a rapid and effective response to any accidental spillage or discharge. Waste oils and hydraulic fluids shall be collected in suitable leak-proof containers and transported from the Site and Off-Site Areas for disposal or recycling.
- Machinery used on Site shall be regularly inspected 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, stored and disposed of 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.

Post-construction monitoring of water quality should be undertaken for at least six months in the vicinity of the proposed works to verify no change in water quality.

6 Conclusion

The site is considered to be of significant ecological importance due to the proximity of the Lower River Shannon SAC. There will be locally significant losses of amenity grassland and wooded habitat and in respect of KERs associated with these and other habitats within the proposed development study area. Environmental management and design measures are proposed, chiefly to limit tree and hedge clearance along the route and to control and limit sediment and potential contaminant runoff, to protect watercourses against water quality and structural effects and to provide mitigation though an equivalent level of hedge and tree species planting and reinstatement along the route.

The potential for effects on European sites downstream of the proposed project was considered. 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.

Once mitigation measures which are mentioned above are implemented and followed in regard to the proposed development, the works will not adversely affect biodiversity, KERs nor the European sites.

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Appendix A Preliminary Design Drawings

Appendix B Landscape Architecture Drawings

Appendix C Structural Design Drawings

Appendix D Site Visuals

Plate D - 1: Amenity grassland (improved) GA2

Plate D - 2: Living Bridge

Plate D - 3: View of the proposed path with WN5 and view of the path with riparian woodland habitat along its edges

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

Plate D - 5: Amenity grassland (GA2) east of Kilmurry Student Village

Plate D - 6: R445 bridge at Annacotty village crossing the River Mulkear

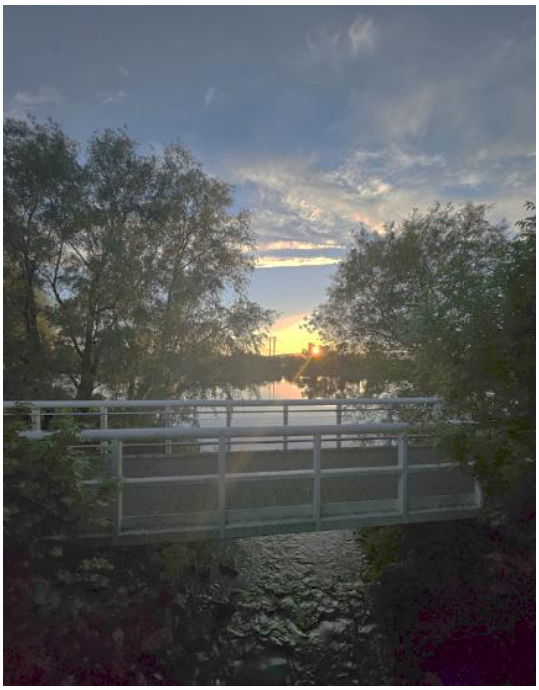

Plate D - 7: Bridge over the Groody River, west end of the proposed greenway

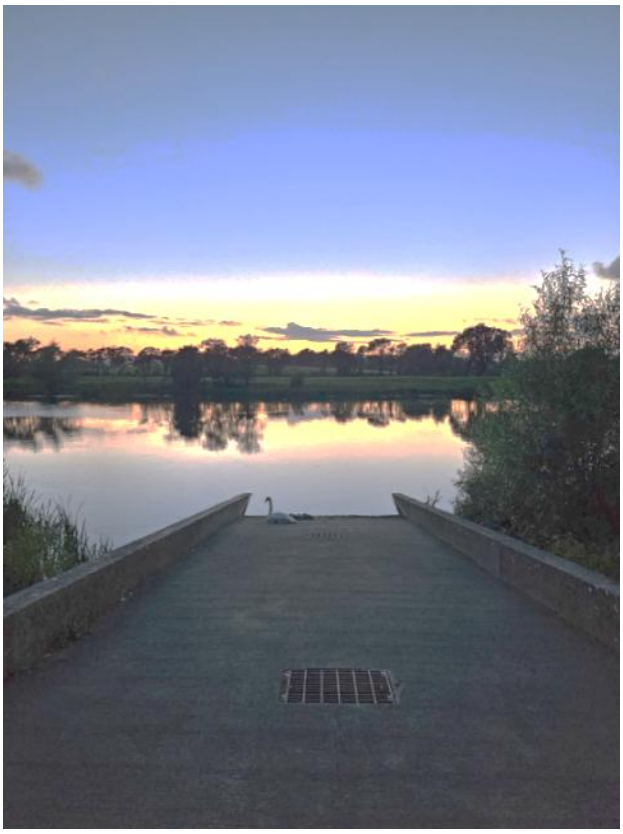

Plate D - 8; UL Pontoon into the River Shannon

Appendix G

Construction Environmental Management Plan

Comhairle Cathrach & Contae Luimnigh

Limerick City & County Council

Limerick City Greenway

(UL to NTP)

Construction Environmental Management Plan

AUGUST 2025

RYAN HANLEY now Stantec

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Unit 1203, Building 1000, Gateway Business Park, New Mallow Road, Cork.
Innovation House, Moneen Road, Castlebar, Co Mayo, F23 E400.

Client	Limerick City and County Council
Project No.	2535
Project Title	Limerick City Greenway (UL to NTP)
Report Title	Construction Environmental Management Plan

Rev.	Status	Author(s)	Reviewed By	Approved By	Issue Date
0	*Draft* for client review	L. Shally	H. Kenny	B. Larkin	November 2024
1	Updated for revised route	L. Shally	H. Kenny	B. Larkin	December 2024
1.1	Issued	L. Shally	H. Kenny	B. Larkin	July 2025
2	Issued	L. Shally	H. Kenny	B. Larkin	August 2025

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Abbreviations

AASR	Appropriate Assessment Screening Report
BPM	Best Means Practicable
CEMP	Construction Environmental Management Plan
CMS	Construction Management System
ECoW	Ecological Clerk of Works
EMS	Environmental Management System
EPA	Environmental Protection Agency
EWC	European Waste Code
IAPS	Invasive Alien Plant Species
ISMP	Invasive Species Management Plan
IRP	Incident Response Plan
KPI	Key Performance Indicator
LCCC	Limerick City and County Council
LoW	List of Waste
MRF	Materials Recovery Facility
NPWS	National Parks and Wildlife Services
NIS	Natura Impact Statement
NTP	Notice to Proceed
NTU	Nephelometric Turbidity Unit
RA	Risk Assessment
SAC	Special Areas of Conservation
SDS	Safety Data Sheet
SPA	Special Protection Areas
TTMP	Temporary Traffic Management Plan
UL	University of Limerick
WEEE	Waste Electrical and Electronic Equipment
WFD	Water Framework Directive
WMP	Waste Management Plan
WSA	Waste Storage Area

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

1.1 General

The Construction Environmental Management Plan (CEMP) has been prepared by Ryan Hanley on behalf of Limerick City and County Council (LCCC) for the proposed Limerick City Greenway (UL to NTP) project in Co. Limerick.

This CEMP defines the project specific environmental mitigation measures, which are detailed in the Environmental Impact Assessment Report (EIAR) and Natura Impact Statement (NIS) as well as other documents that are to be put in place and procedures to be followed for the scope of construction works, both permanent and temporary, for the Limerick City Greenway (UL to NTP).

The CEMP is considered a '*live*' document and prior to commencing construction on site, the appointed Construction Management Team will prepare a detailed CEMP. The detailed CEMP will be based on the contents of this CEMP and will define environmental measures and procedures to manage construction works regarding risk to the environment in more detail.

The CEMP is an integral part of the site health, safety, environmental and quality management system and constitutes a component of the Construction Health and Safety Plan documentation. The CEMP is also subject to the requirements of the project quality management system with respect to documentation control, records control, and other relevant measures.

1.2 Site 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 Figure 1-1). The proposed Greenway will extend between the River Goody bridge and Plassey Park Road.

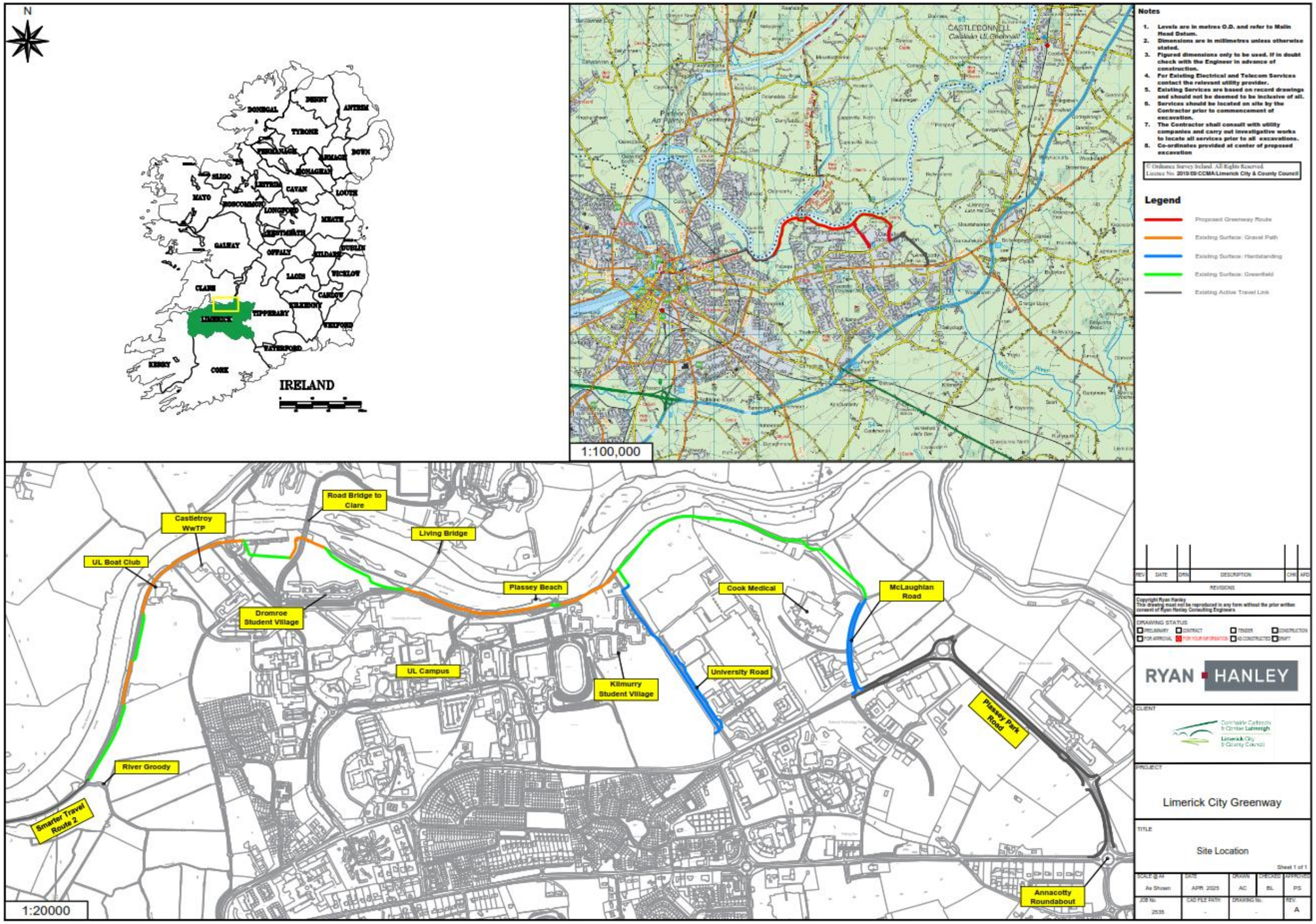


Figure 1-1: Location Map

1.3 Purpose of this Document

The purpose of this document is to communicate applicable environmental guidance and instruction to all contractors, sub-contractors, and employees in order to address and prevent potential environmental effects that may arise while carrying out any construction activity for the proposed works.

This CEMP is to be read in conjunction with the EIAR and NIS. This CEMP will assist the appointed contractor in the development of the detailed CEMP as well as a suite of Construction Phase Management Plans including waste, surface water and traffic. The objectives of the detailed CEMP developed by the contractor appointed by LCCC to construct the works, prior to commencement of construction activities and will also include any planning conditions imposed by LCCC.

The detailed CEMP will be overseen by personnel such as the Site Manager and Environmental Manager, as outlined in Section 5.1 of this report.

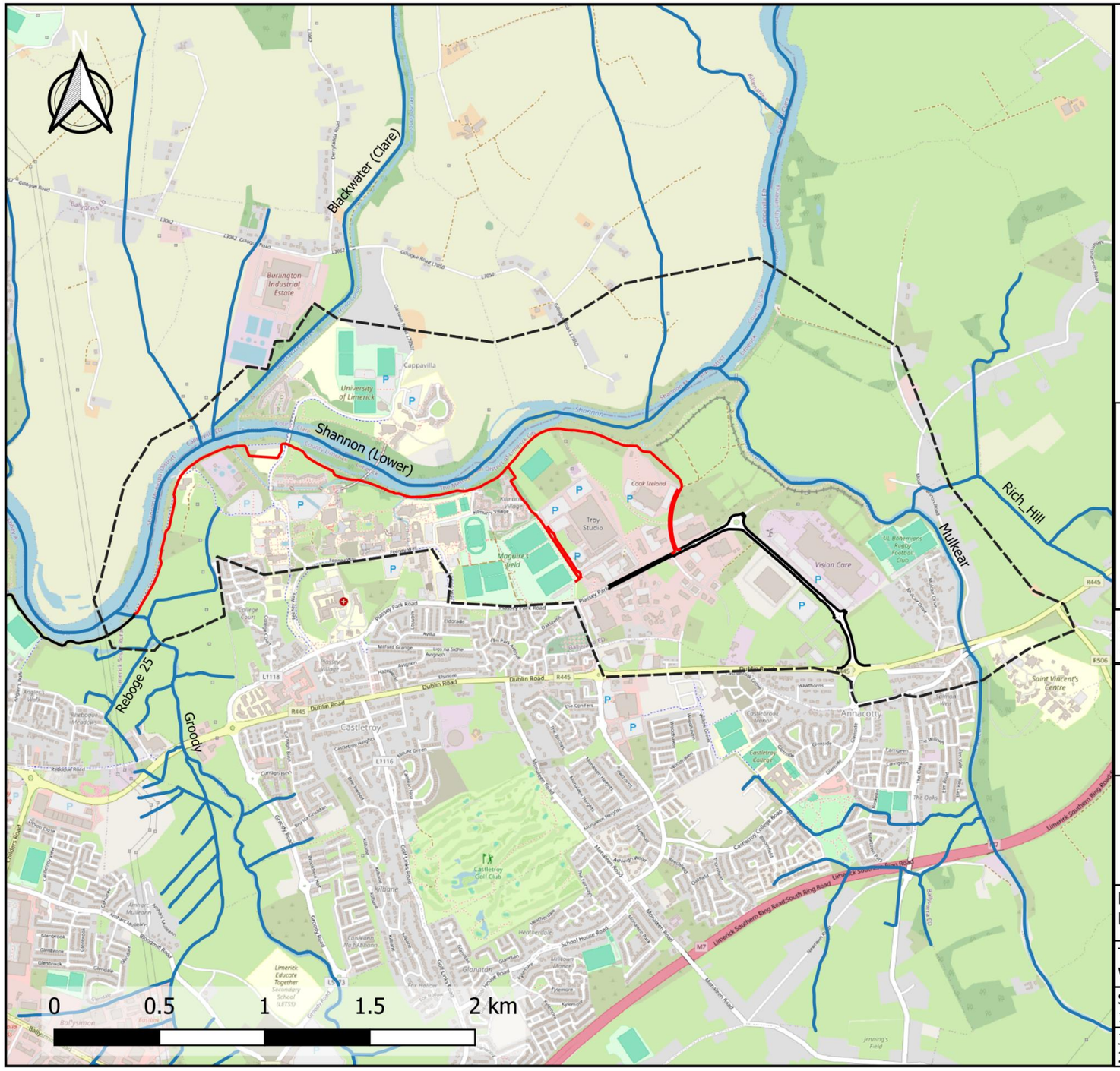
1.4 Description of Ecological Site Surveys Undertaken

Site survey visits were made by the Ryan Hanley team and contracted Ecologists between 2020 and 2024 with a focus on the variety of 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 on-site observation and scientific analysis. The surveys undertaken for the Limerick City Greenway (UL to NTP) Project included:

Survey Type	Dates
Preliminary Multi-Disciplinary walkover survey	Nov 2020 and April 2022
Ecology habitat survey	May 2021 and April 2022
Aquatic Ecology Appraisal	Oct 2023
Water Framework Directive (WFD) Assessment – RHAT survey	July 2024
Badger Surveys	May 2021, July 2024, August 2025
Bat Surveys	July 21, Sept 2021, June & July 2024, and August 2025
Breeding Bird Survey	June 2021, April and June 2022, and May and June 2023
Winter bird Surveys	Nov 2021 to March 2022 and October 2023 to March 2024
Invasive Alien Plant Species Surveys	Nov 2020 and May 2021 – June and July 2024 , August 2025
Otter Surveys	May 2021, July 2024 and August 2025
Tree Surveys and arboriculture impact assessment	May and June 2021 and Feb 2024

All surveys were undertaken by professional ecologists with the professional experience and necessary qualifications required to carry them out. Habitats recorded within the study area of the greenway are illustrated in Figure 1-3.



Map Legend

- Proposed Greenway Route
- Existing Active Travel Infrastructure Link
- Watercourse
- Study Area
- ★ Project Location

RYAN HANLEY

CLIENT
Comhairle Cathrach & Contae Luimnigh
Limerick City & County Council

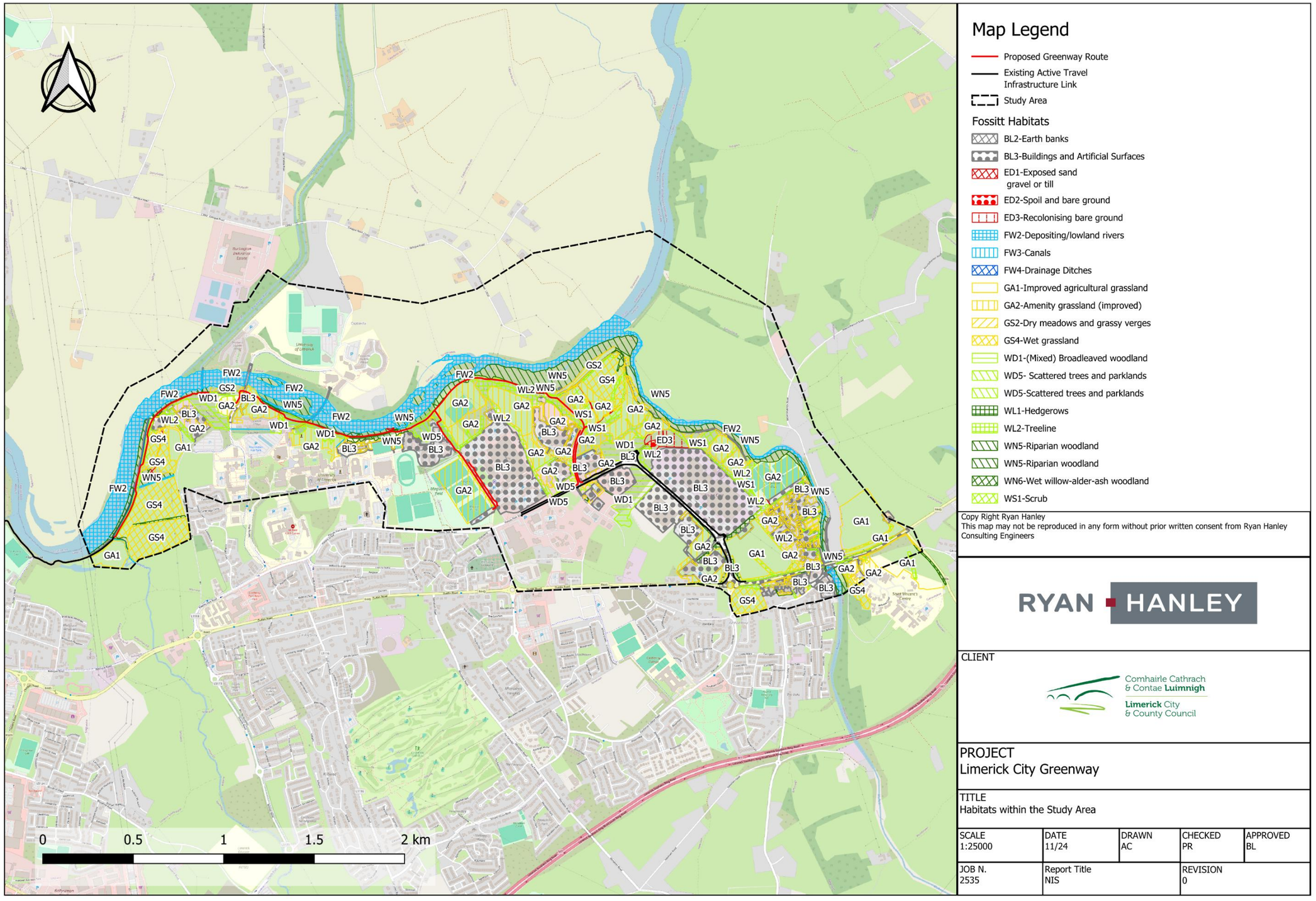
PROJECT
Limerick City Greenway

TITLE
Watercourses

SCALE	DATE	DRAWN	CHECKED	APPROVED
1:25000	11/24	AC	PR	BL

JOB N.	Report Title	REVISION
2535	EIAR	0

Figure 1-2: Study Area



RYAN HANLEY

CLIENT

Comhairle Cathrach & Contae Luimnigh
Limerick City & County Council

PROJECT
Limerick City Greenway

TITLE
Habitats within the Study Area

SCALE	DATE	DRAWN	CHECKED	APPROVED
1:25000	11/24	AC	PR	BL

JOB N.	Report Title	REVISION
2535	NIS	0

Figure 1-3: Fossitt Habitats Recorded within the Study Area

2. Targets and Objectives

Proposed construction phase works will be designed and carried out to approved standards, which will include specified materials, standards, specifications, and environmental codes of practice.

2.1 Key Site Targets

The key site targets are as follows:

- Ensure construction works and activities are completed in accordance with mitigation and approaches presented in this CEMP, EIAR, NIS and associated documentation;
- Ensure construction works and activities are completed in accordance with all documents prepared as part of the assessment of the proposed development;
- Ensure construction works and activities have minimal impact/disturbance to the local landowners, academic facilities, accommodation and the local community;
- Ensure construction works and activities have minimal impact on the natural environment;
- Adopt a sustainable approach to construction; and
- Provide adequate environmental training and awareness for all project personnel.

2.2 Key Site Objectives

The key site objectives from an environmental perspective are as follows:

- Using recycled materials, if possible, e.g., timber, excavated stone and overburden material;
- Ensure sustainable sources for materials supply where possible;
- Avoidance of any pollution incident or near miss as a result of working around or close to existing watercourses and having emergency measures in place;
- Keeping all watercourses free from obstruction and debris;
- Keep impact of construction to a minimum on the local environments, watercourses, and wildlife;
- Correct fuel storage and refuelling procedures to be followed;
- Good waste management and housekeeping to be implemented;
- Air, dust, and noise pollution prevention to be implemented;
- Implementation of monitoring of the works and any adverse effects that it may have on the environment. Construction methods and designs will be altered where it is found there is an adverse effect on the environment;
- Follow the principles of Waste Hierarchy to minimise waste and disposal to landfill;
- Comply with all relevant water quality legislation listed throughout this document; and
- Ensure a properly designed, constructed, and maintained drainage system appropriate to the requirements of the site is always kept in place.

2.3 Construction Phase Live Document

As outlined in the Introduction above, the CEMP is to be considered a '*live*' document and as such will be reviewed on a regular basis. Updates to the CEMP may be necessary due to any changes in environmental management practices, design, and/or contractors. As detailed in more detail in the later sections, the procedures agreed in this CEMP and developed further in the detailed CEMP will be audited by the environmental manager regularly throughout the construction phase to ensure compliance.

Triggers for amendments to the CEMP will include:

- When there is a perceived need to improve performance in an area of environmental impact;
- As a result of changes in environmental legislation applicable and relevant to the project;

- Where landowner accommodation works are agreed which necessitate a change;
- As a result of changes to the project design;
- Where the outcomes from auditing establish a need for change;
- Outcomes of third-party consultations;
- Where work method statements identify changes to a construction methodology to address high environmental risk; and
- As a result of an incident or complaint occurring that necessitates an amendment.

The contractor will ensure that the CEMP remains up to date for the duration of the construction period.

2.4 Conditions on planning as specified by An Bord Pleanála

This section will be populated with any and all additional requirements under conditions imposed by An Board Pleanála (ABP) should the Board decide to grant development consent for the Limerick City Greenway (UL to NTP) project.

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

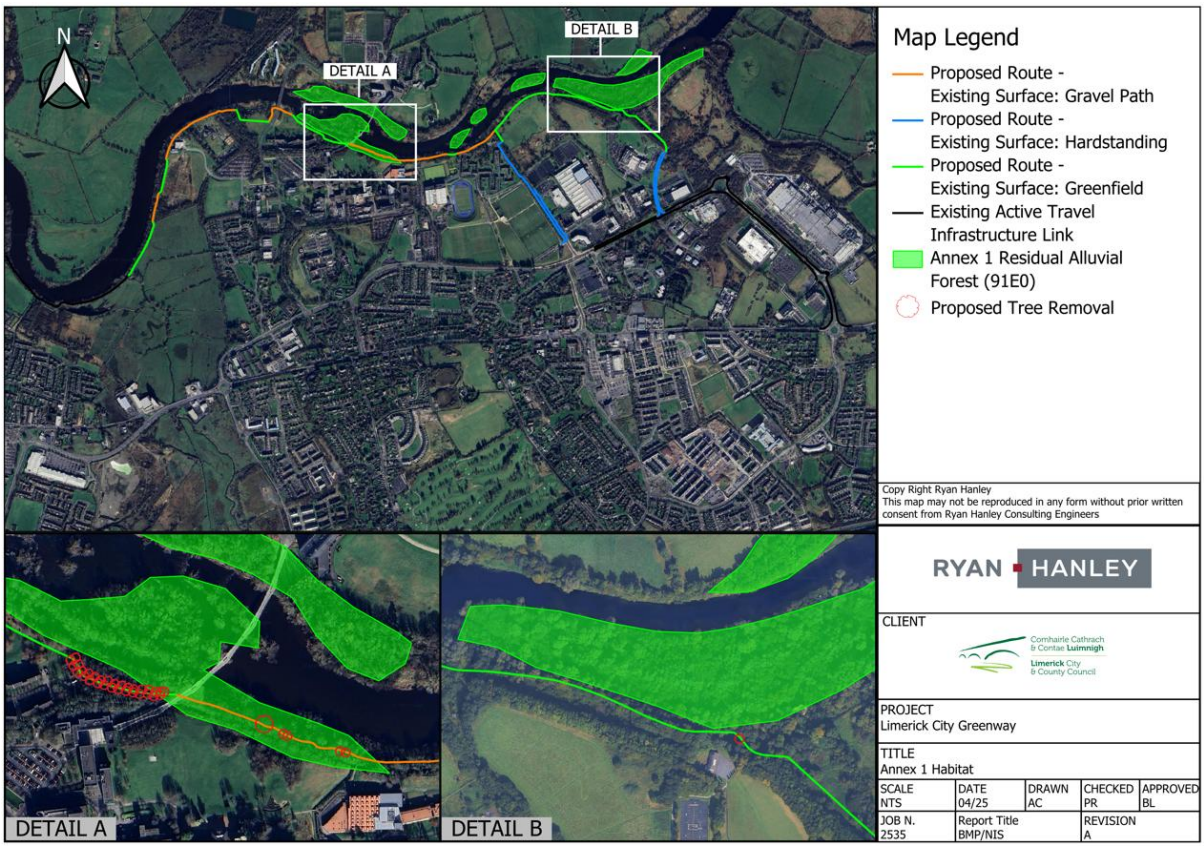


Figure 3-38: Extent of Annex 1 Alluvial Forest interactions with existing path and proposed Greenway route

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

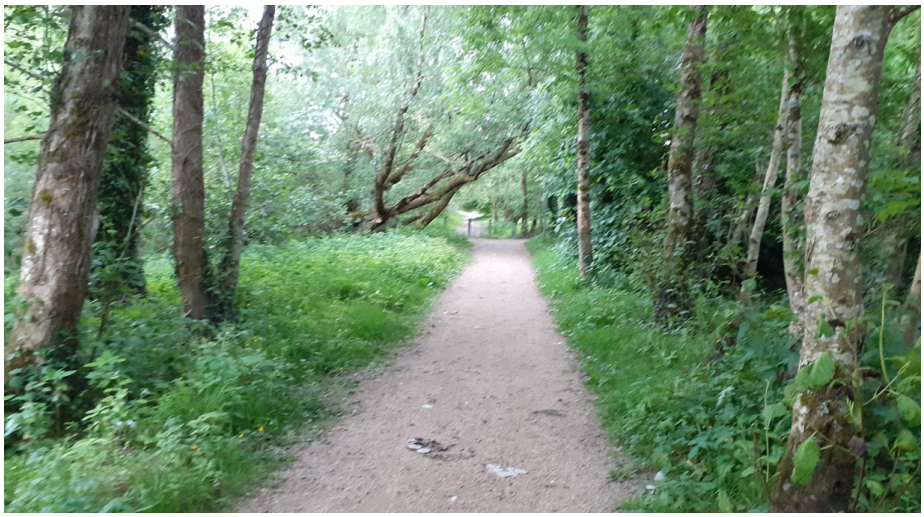


Figure 3-53: Existing path east of Kilmurray Student village approaching the land boundary between UL and the IDA

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.

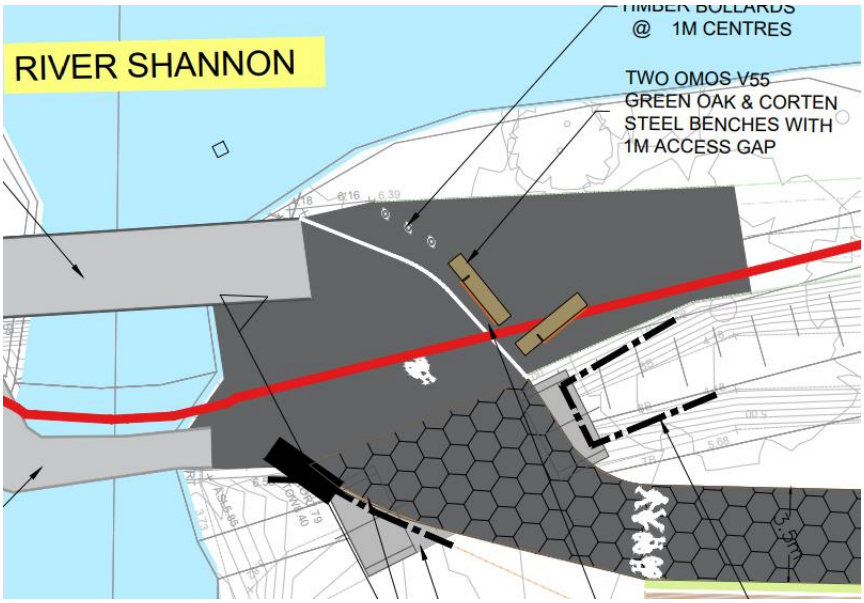


Figure 3-75: Proposed rest area at Groody Bridge

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.

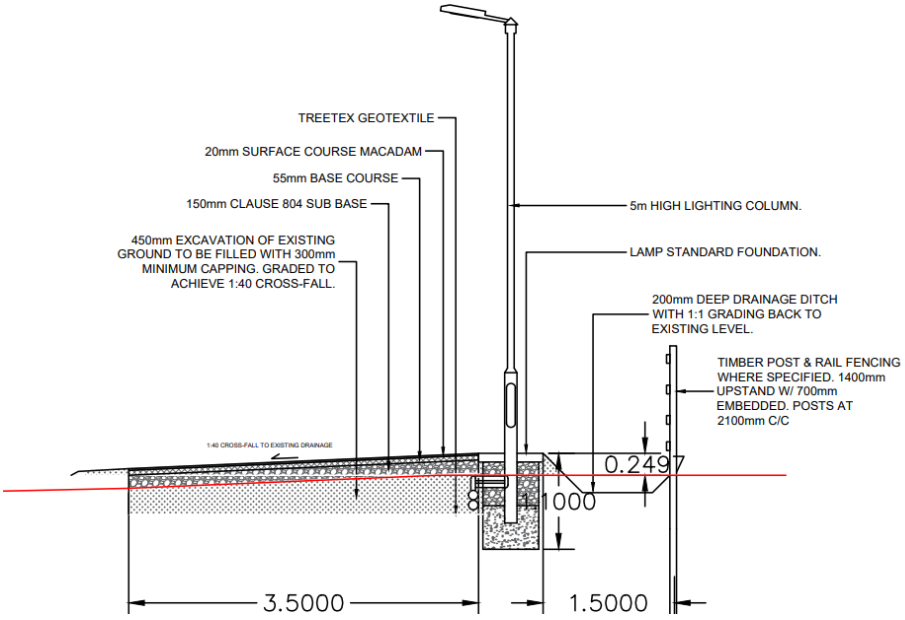


Figure 3-77: Proposed cross section of 3.5m greenway, public lighting column, and land drain

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

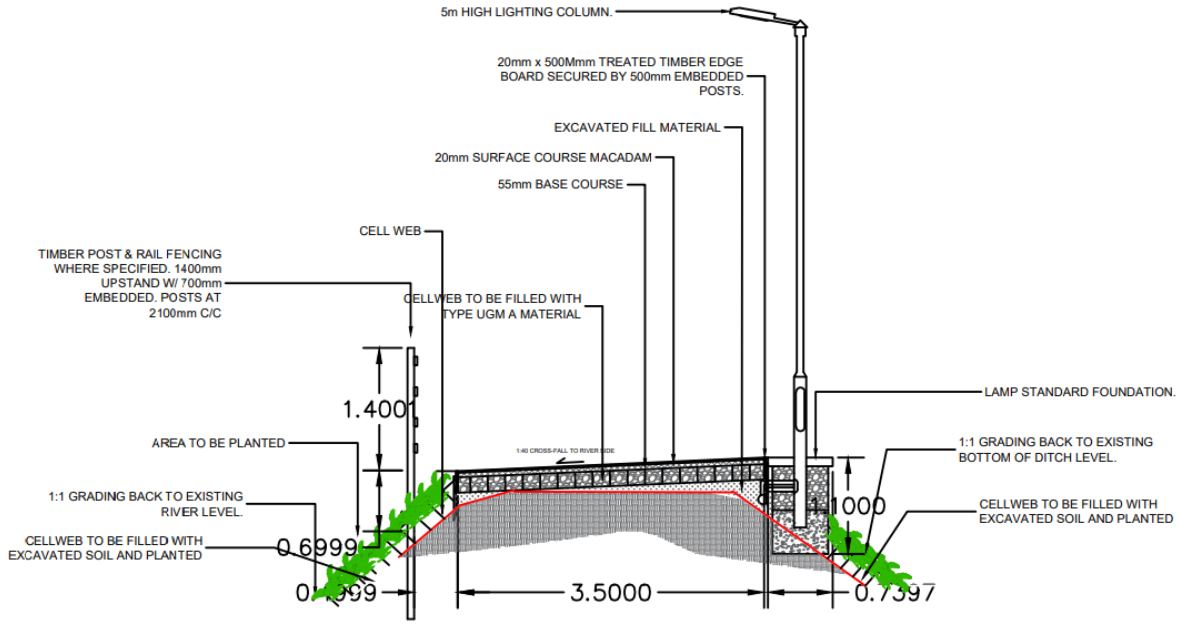


Figure 3-80: Replacement of gravel path with proposed 3.5m wide Greenway

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.

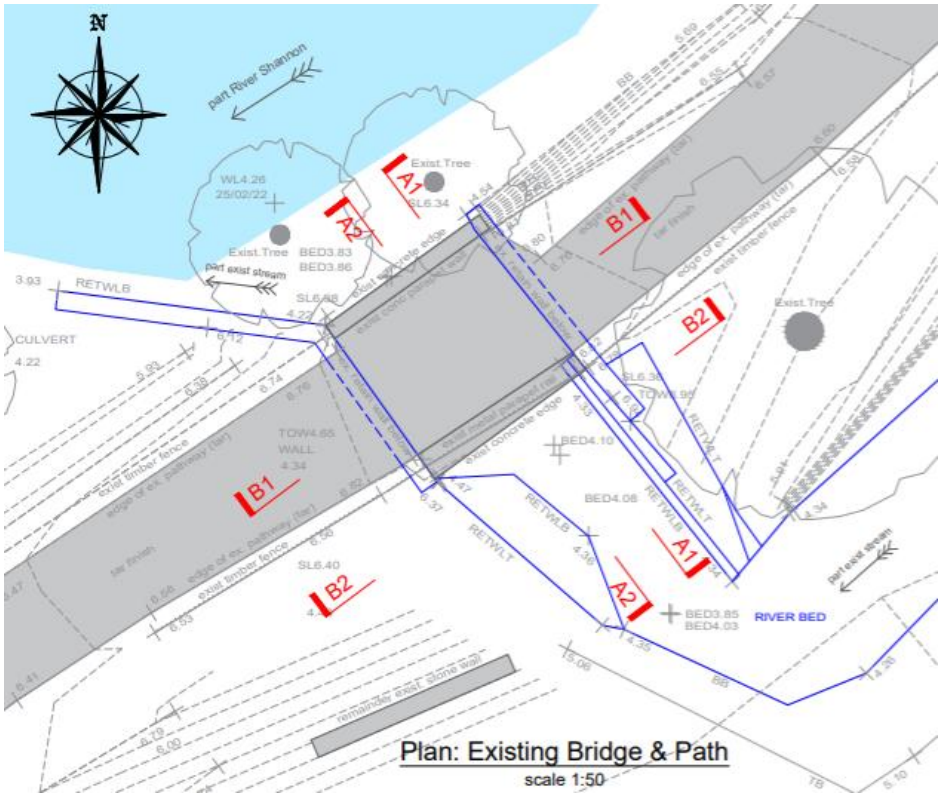


Figure 3-82: Plan of existing Bridge 1 (refer to drawing RHA-XX-DR-S-SP0010)

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.

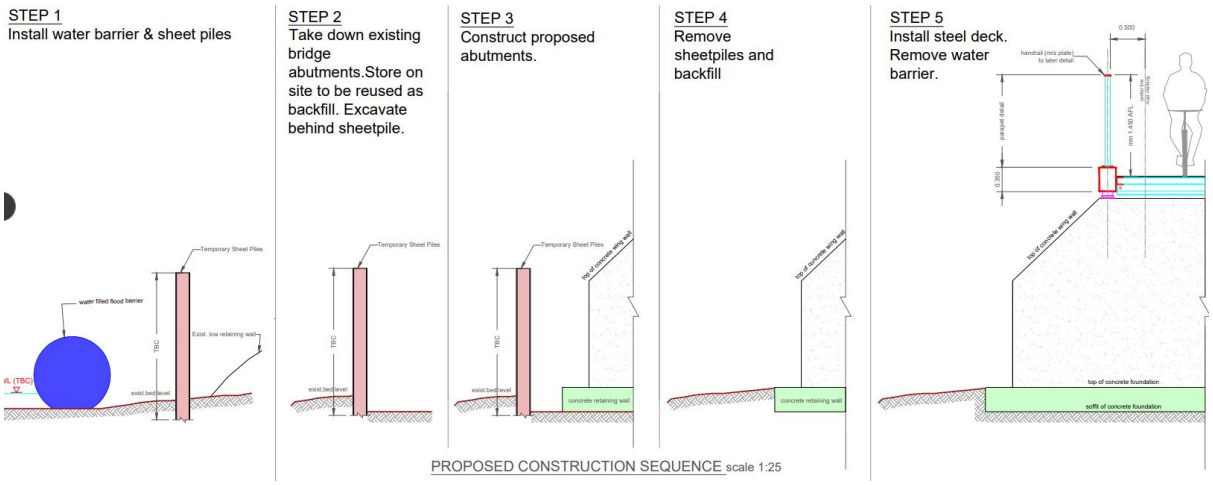


Figure 3-83: Proposed construction sequence for Bridge 1 (refer to drawing RHA-XX-DR-S-SP0012)

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.

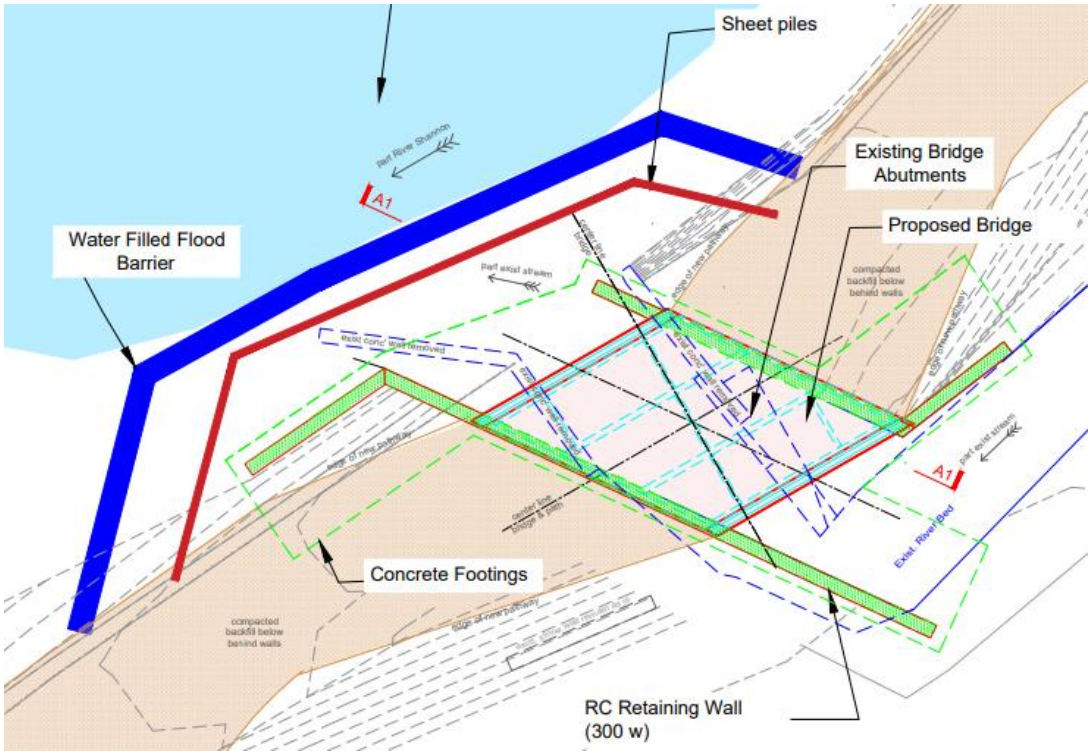


Figure 3-84: Proposed plan of Bridge 1, with ecology protection measures (refer to drawing RHA-XX-DR-S-SP0012)

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.

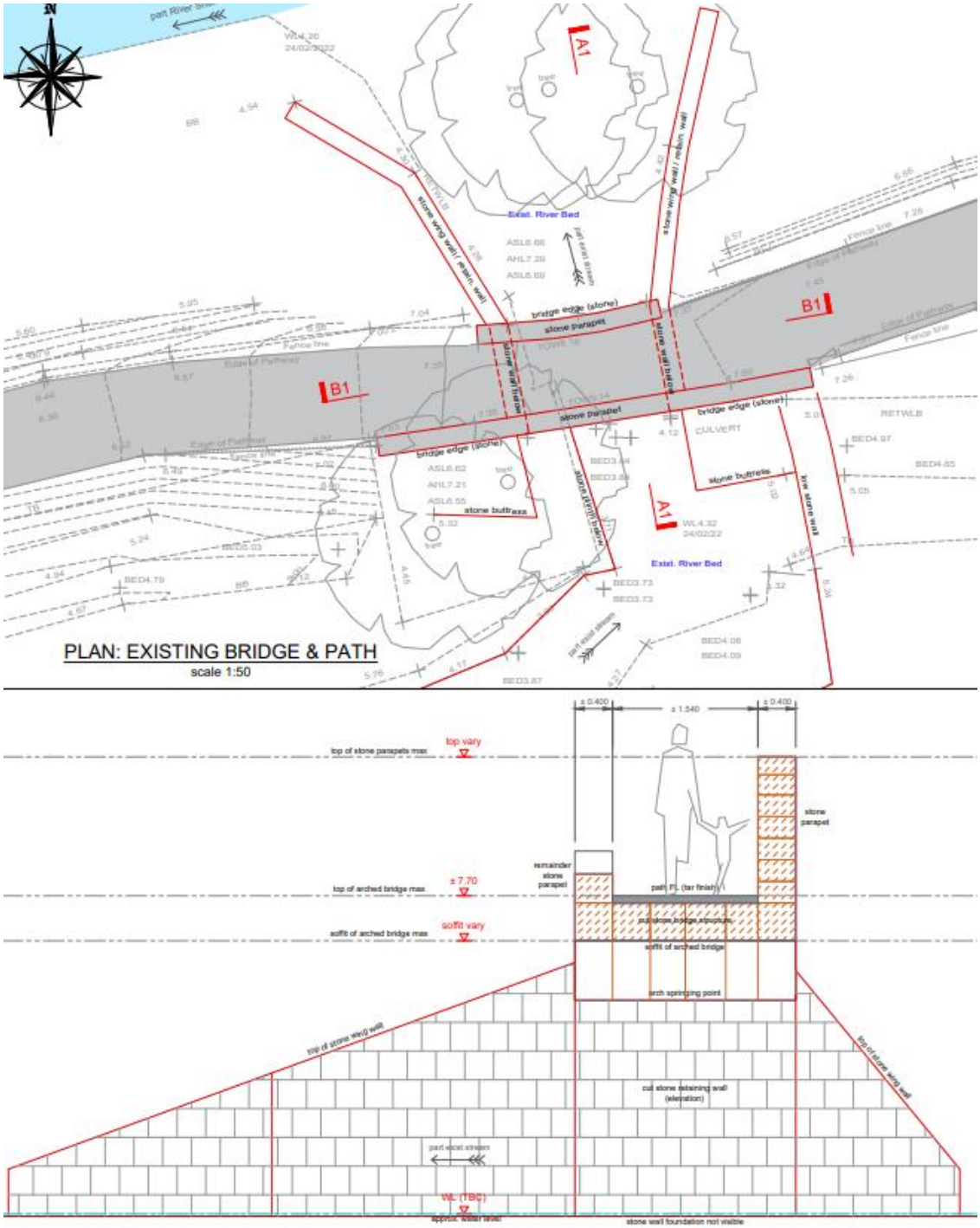


Figure 3-89: Existing plan and section for Bridge 2 (refer to drawing RHA-XX-DR-S-SP0020)

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.

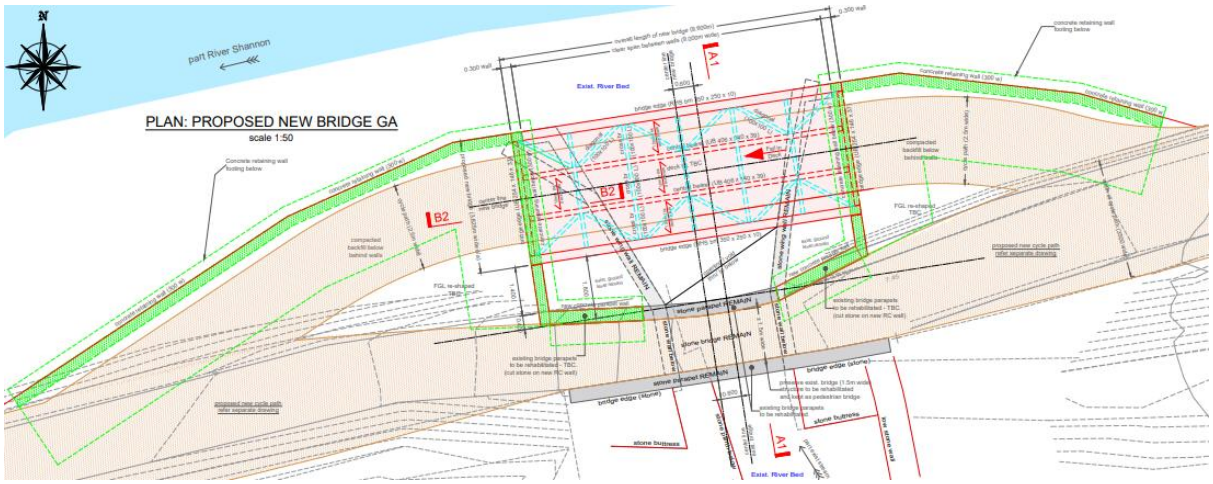


Figure 3-90: Plan for the proposed new bridge 2 alongside the existing stone bridge (refer to drawing RHA-XX-DR-S-SP0021)

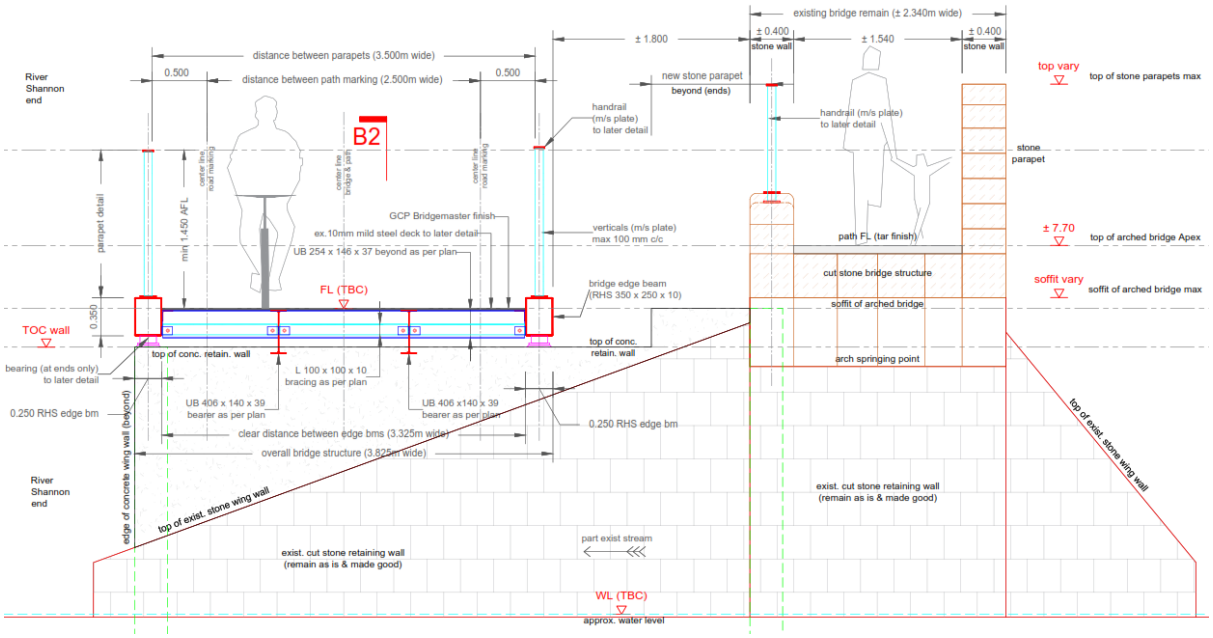


Figure 3-91: Section for the proposed new bridge 2 alongside the existing stone bridge (refer to drawing RHA-XX-DR-S-SP0021)

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.

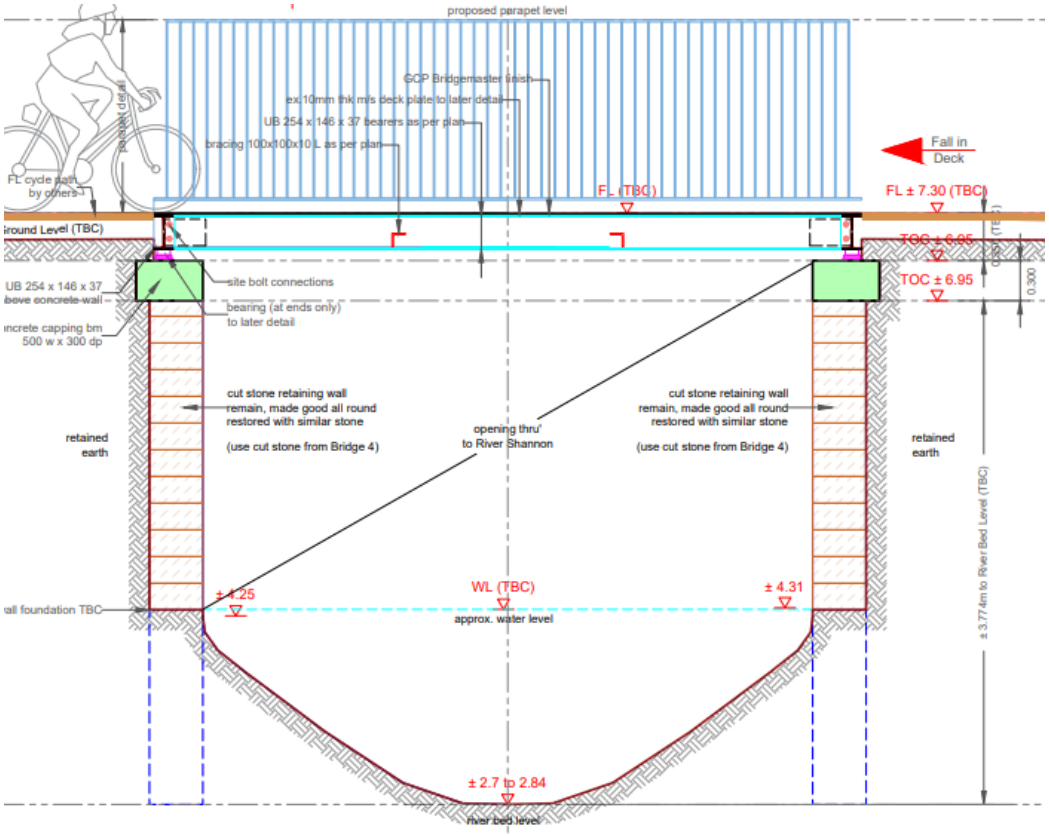


Figure 3-93: Proposed deck replacement for Bridge 3 with new concrete plinths on existing stone abutments

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.

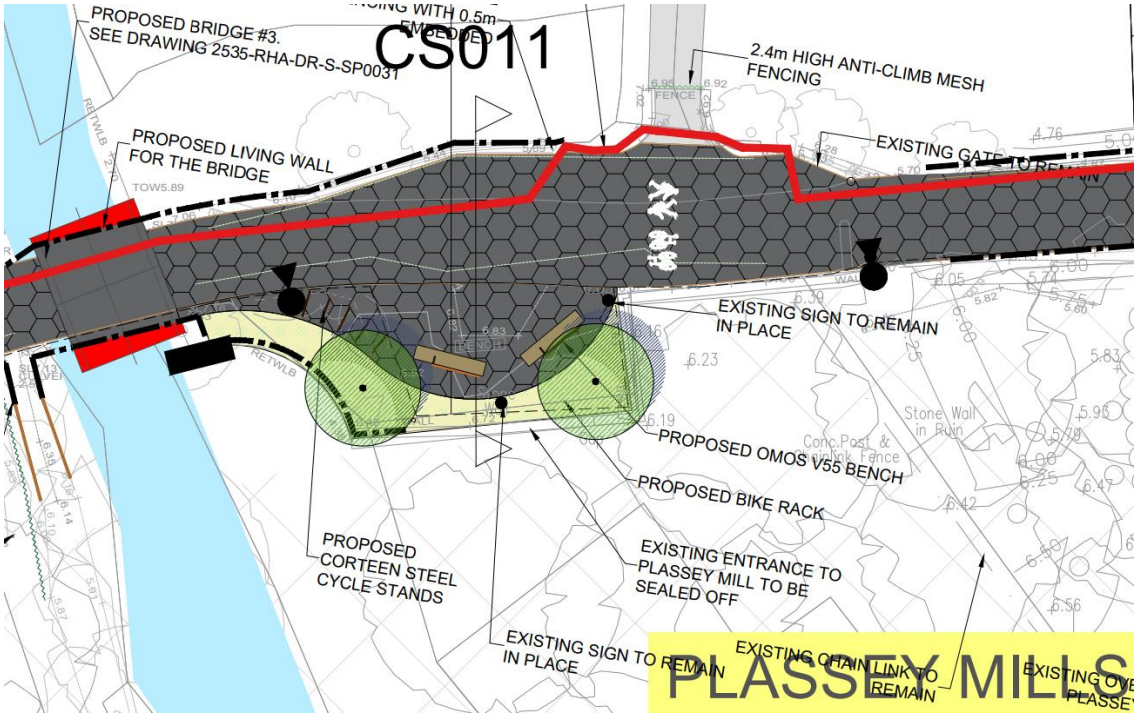


Figure 3-94: Proposed rest area at Plassey Mill

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.

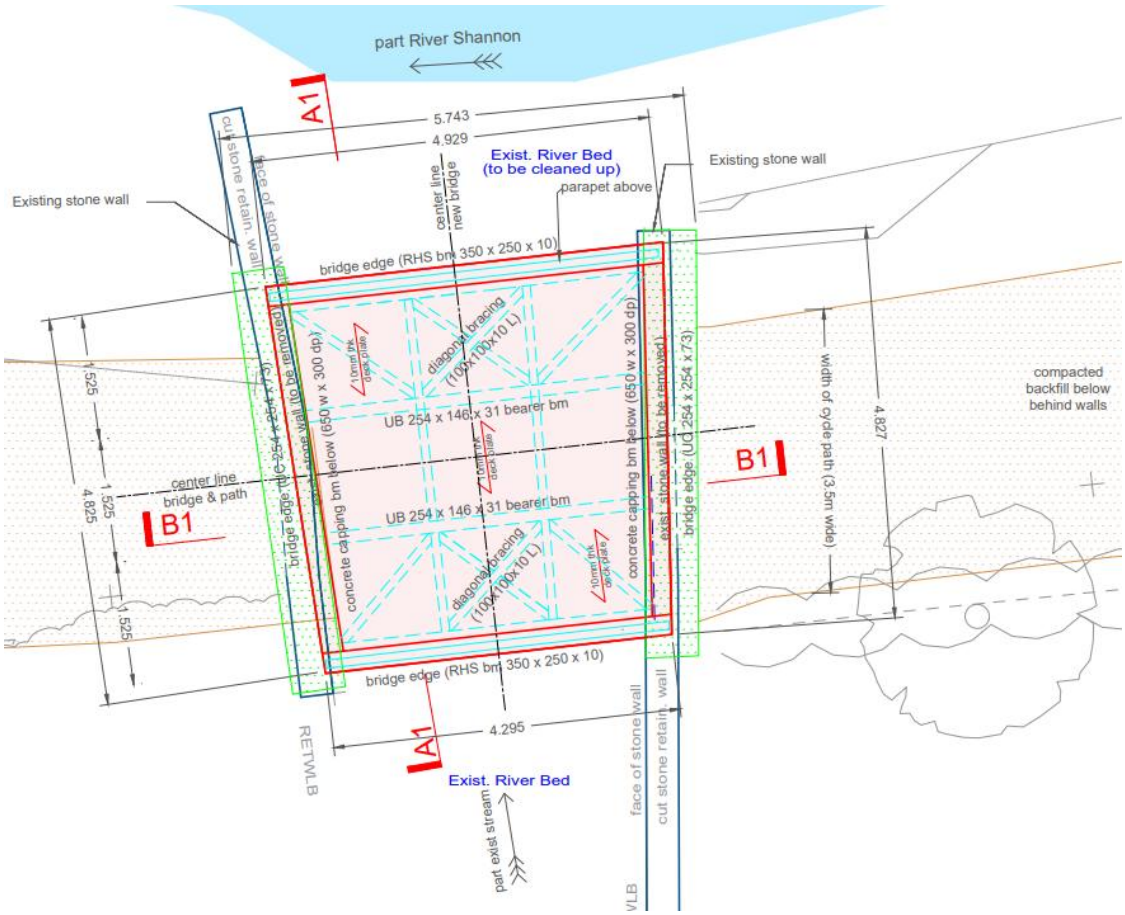


Figure 3-96: Proposed plan of Bridge 4 deck replacement

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.

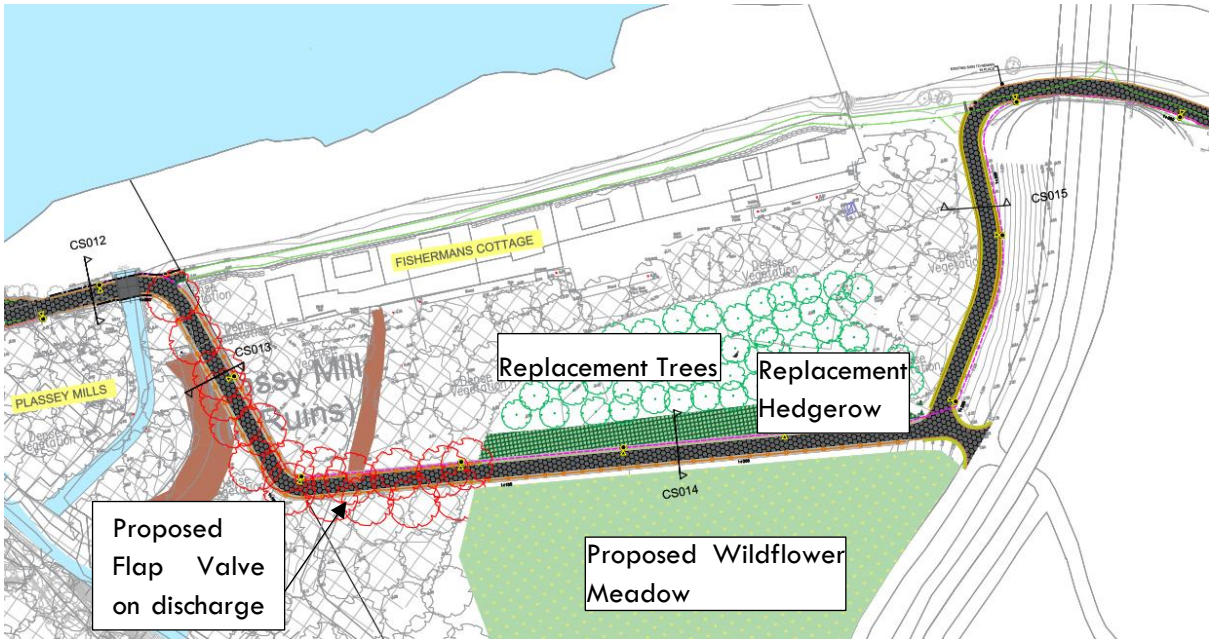


Figure 3-97: Proposed route south of Fisherman cottages

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.

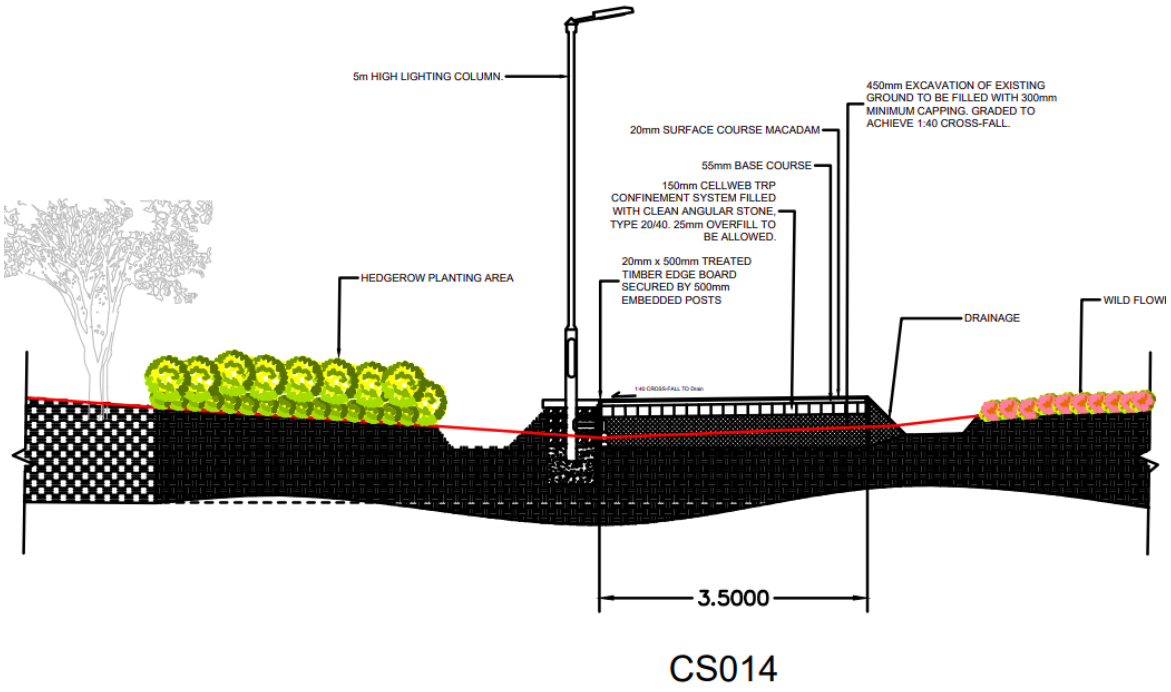


Figure 3-98: Cross Section 014 along proposed Greenway south of the Fisherman Cottages

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.

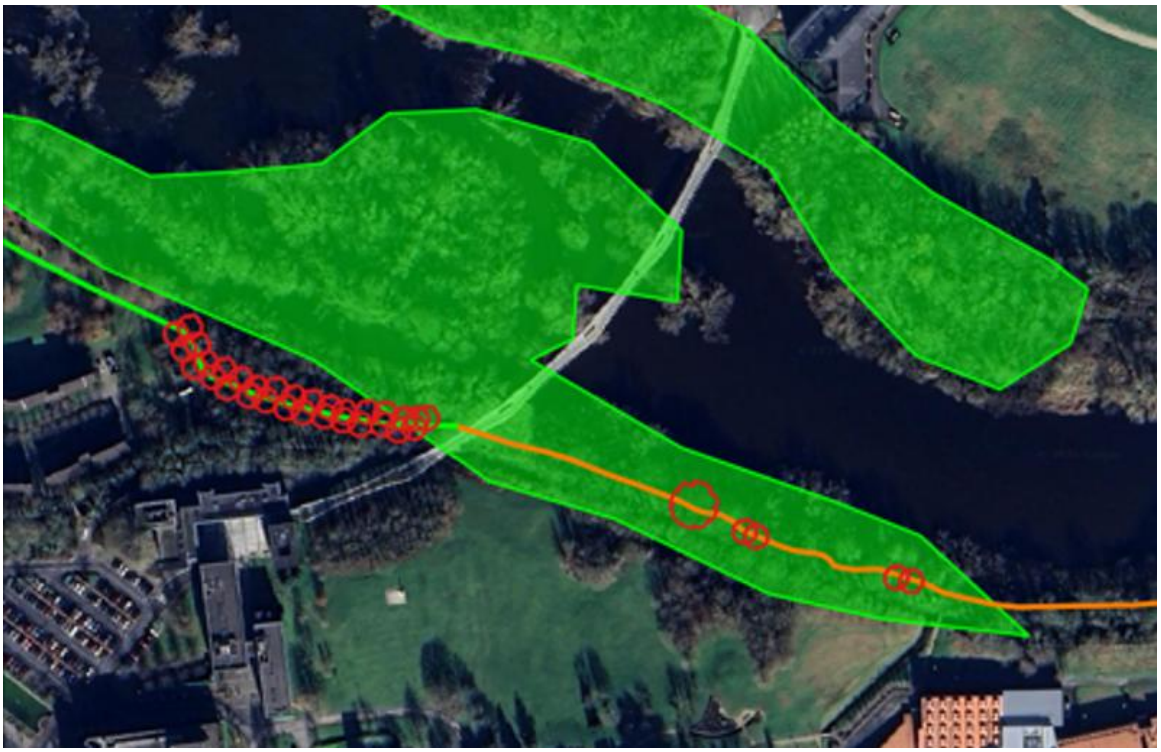


Figure 3-100: Existing Annex 1 Alluvial woodland

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)

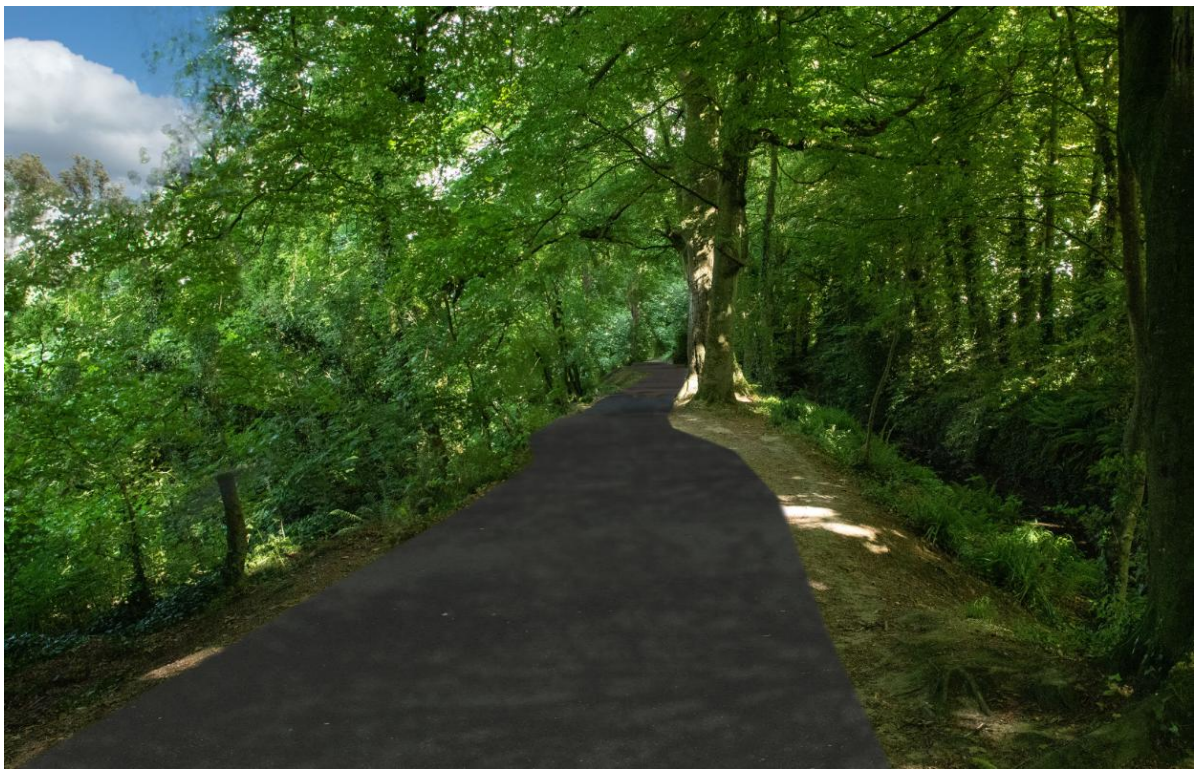


Figure 3-104:Proposed Greenway in the Annex 1 Alluvial Woodland

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.

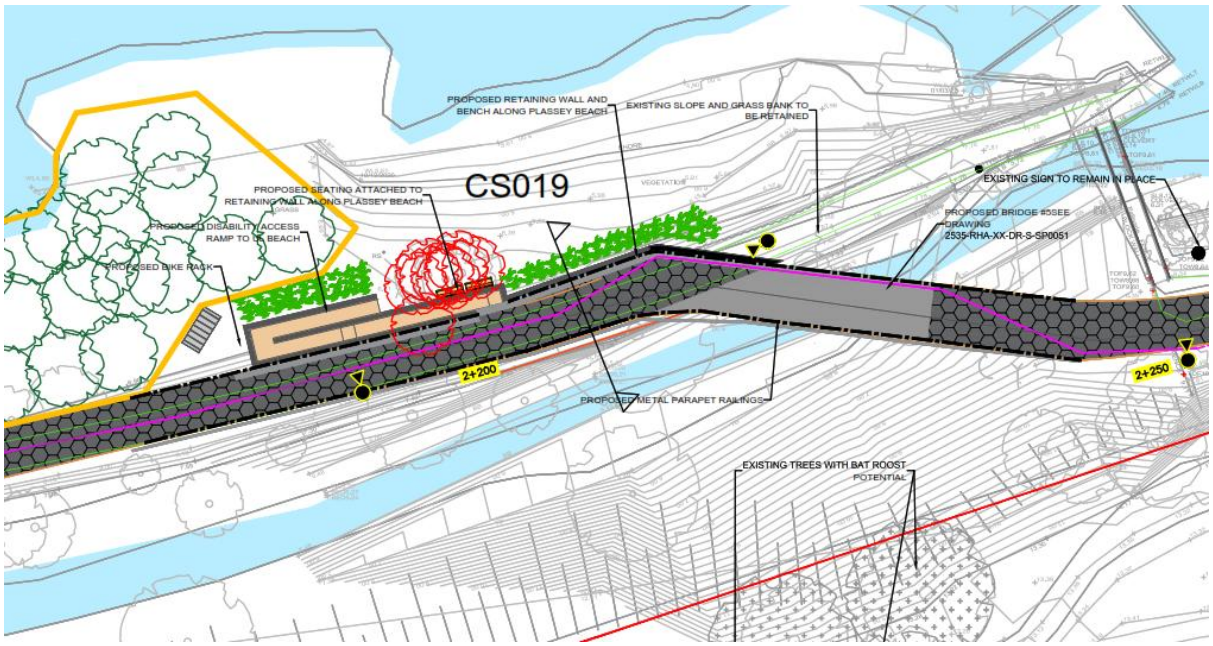


Figure 3-105: Proposed plan of ramp and Bridge 5 at Plassey Beach

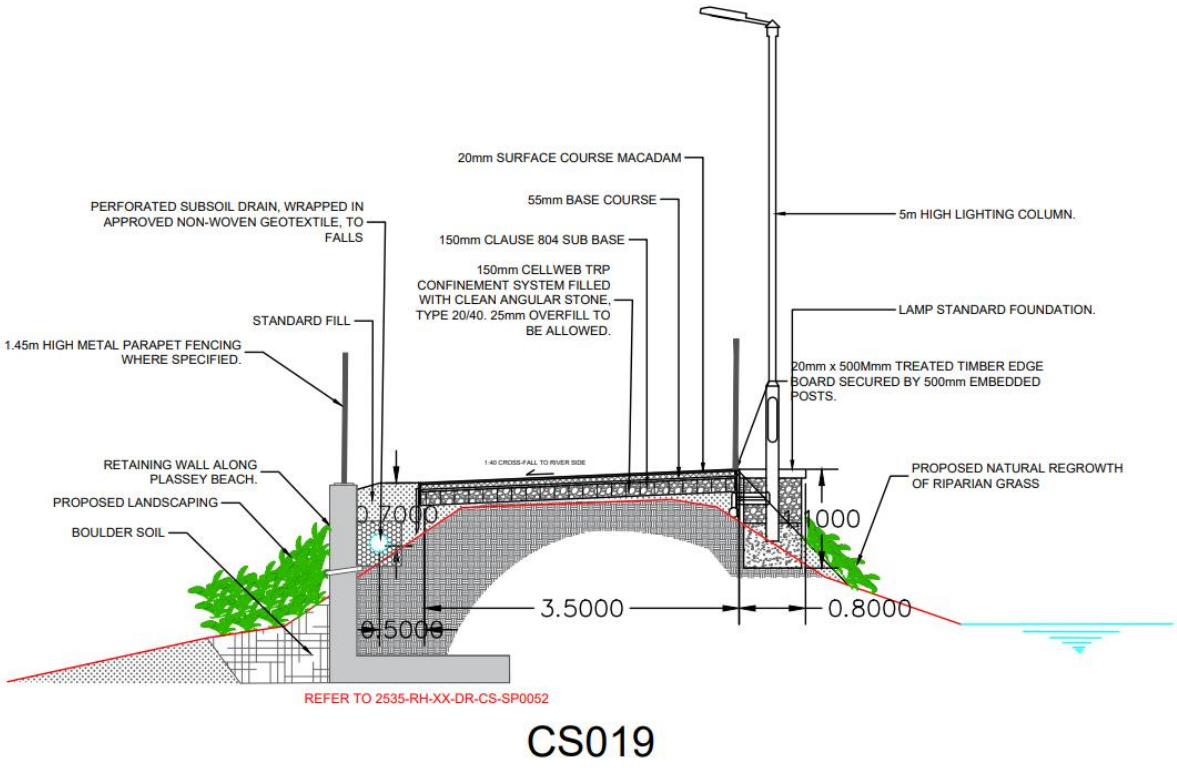


Figure 3-106: Proposed section of retaining wall for ramp at Plassey Beach

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.

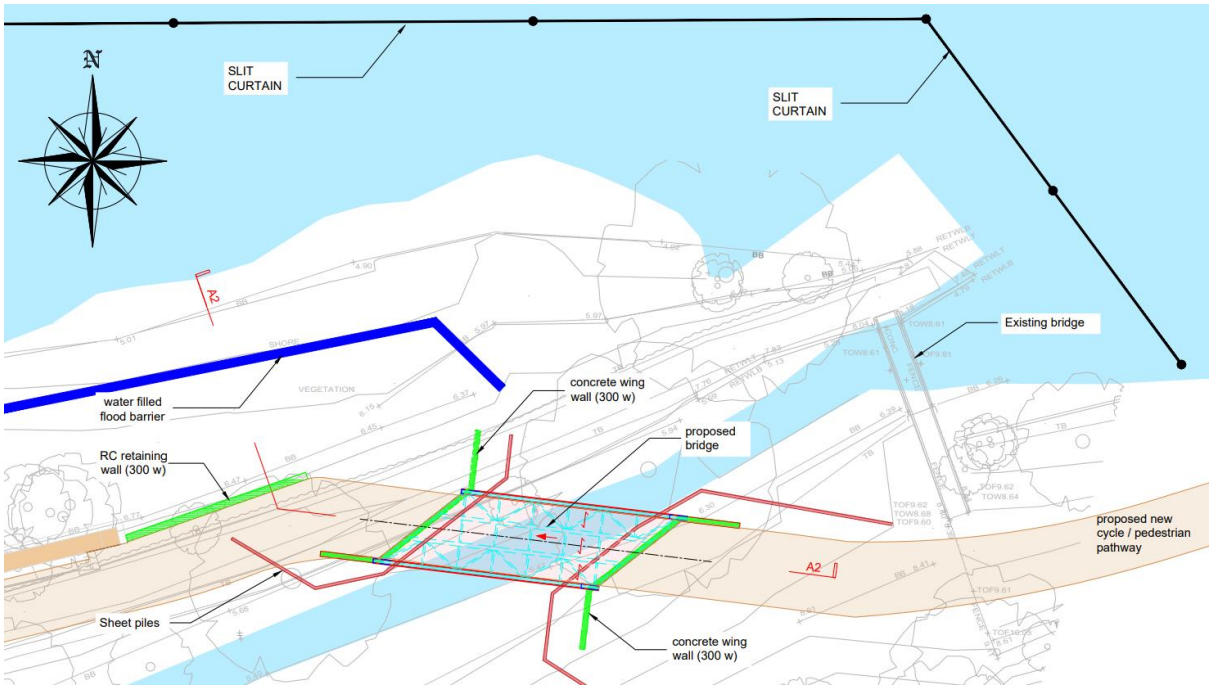


Figure 3-109: Plan of proposed Bridge 5 and proposed Ramp, showing proposed Silt Curtain, Sheet piles and water filled flood barrier (refer to drawing RHA-XX-DR-S-SP0052)

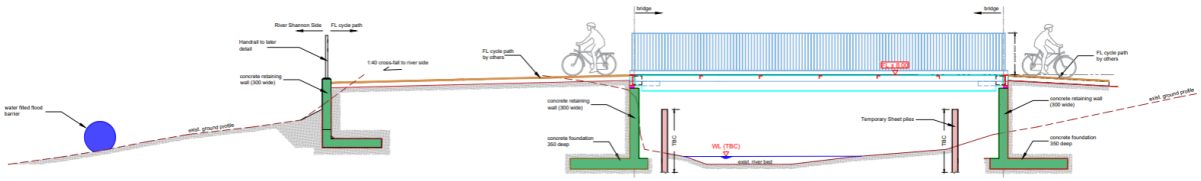


Figure 3-110: Section of retaining wall for proposed Ramp and Abutment walls for proposed Bridge 5 (refer to drawing RHA-XX-DR-S-SP0052)

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

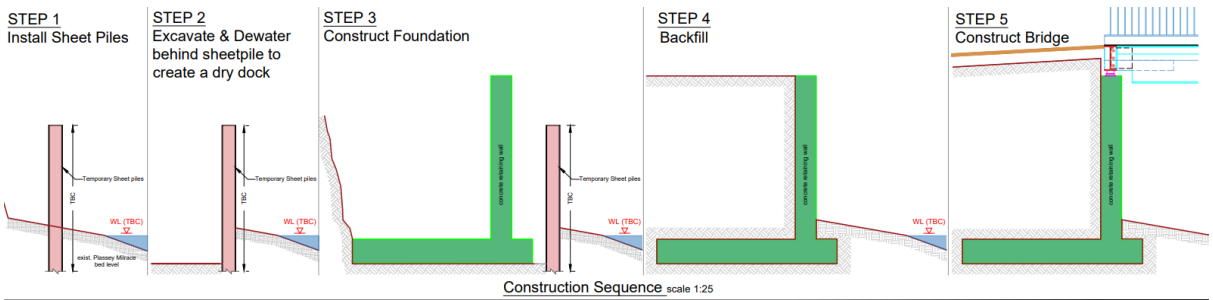


Figure 3-111: Construction sequence for abutment structures to support the steel deck of Bridge 5 (refer to drawing RHA-XX-DR-S-SP0052)

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.

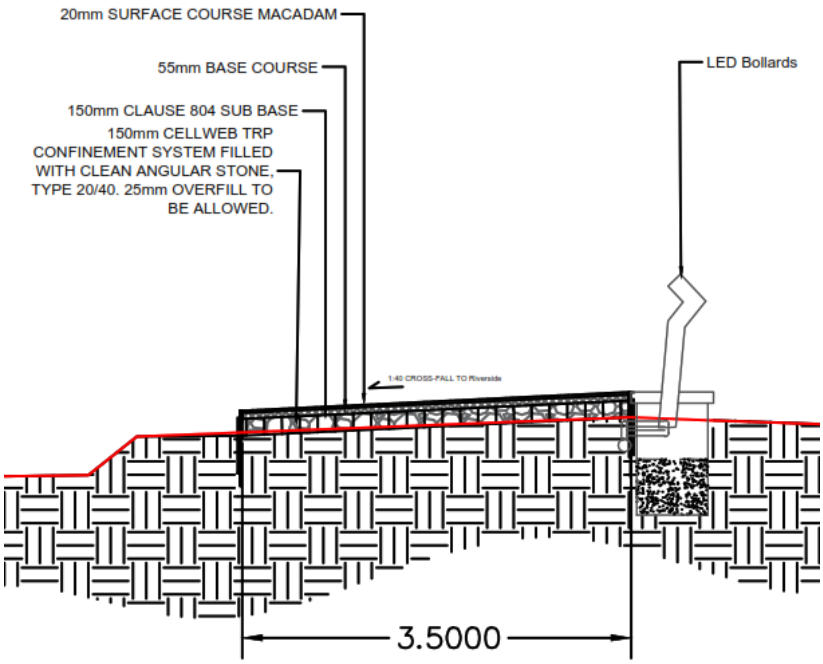


Figure 3-112: Proposed tarmac path and public lighting north of Kilmurray Student Village

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.

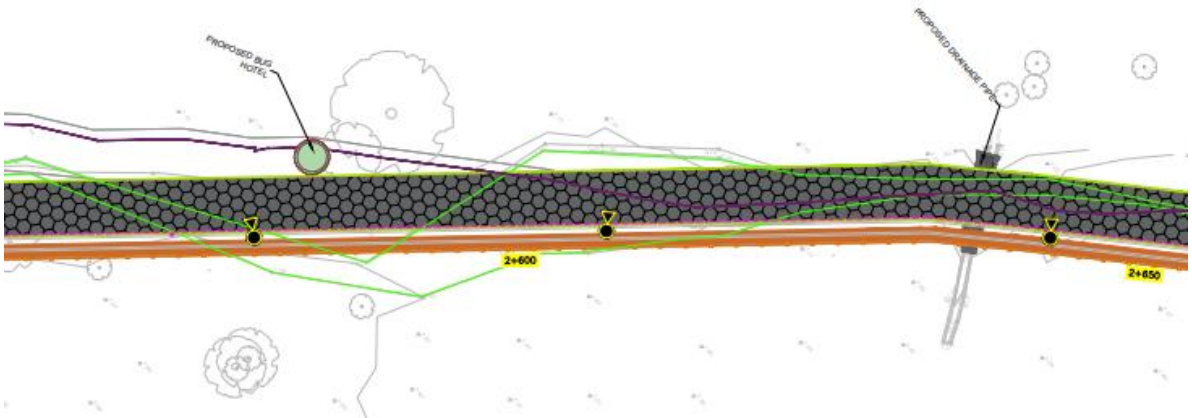


Figure 3-114: Proposed Greenway to replace existing grass desire line

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.

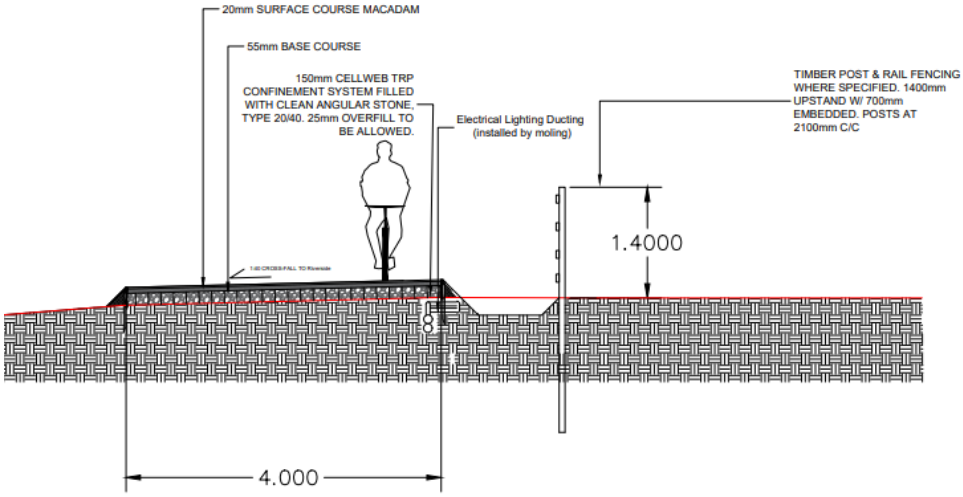


Figure 3-115: Proposed Greenway cross section in green field

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.

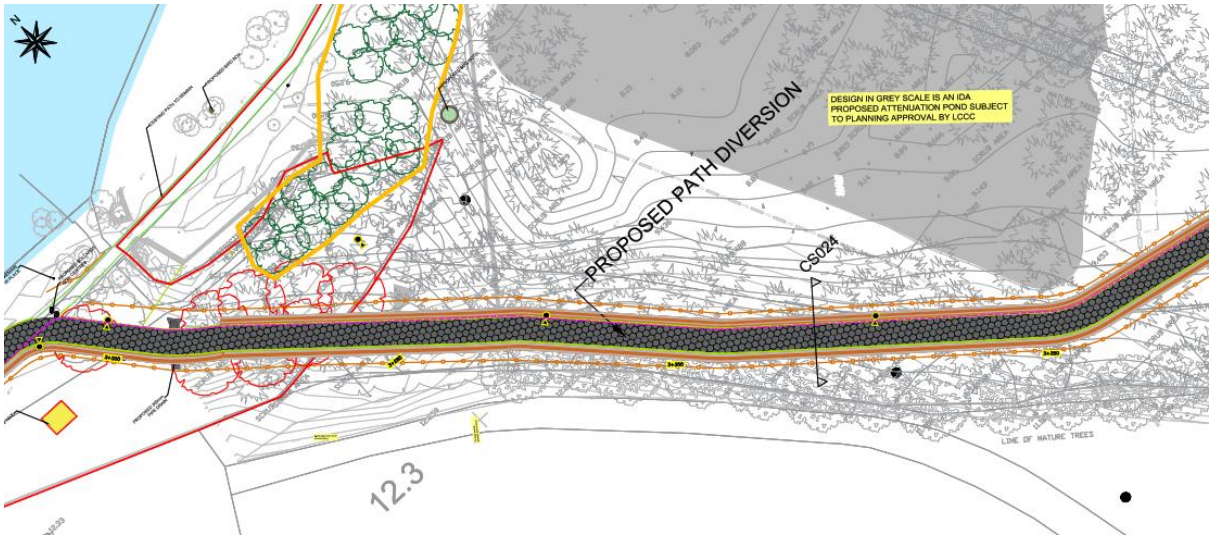


Figure 3-116: Proposed drainage alongside proposed path to manage surface water

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.

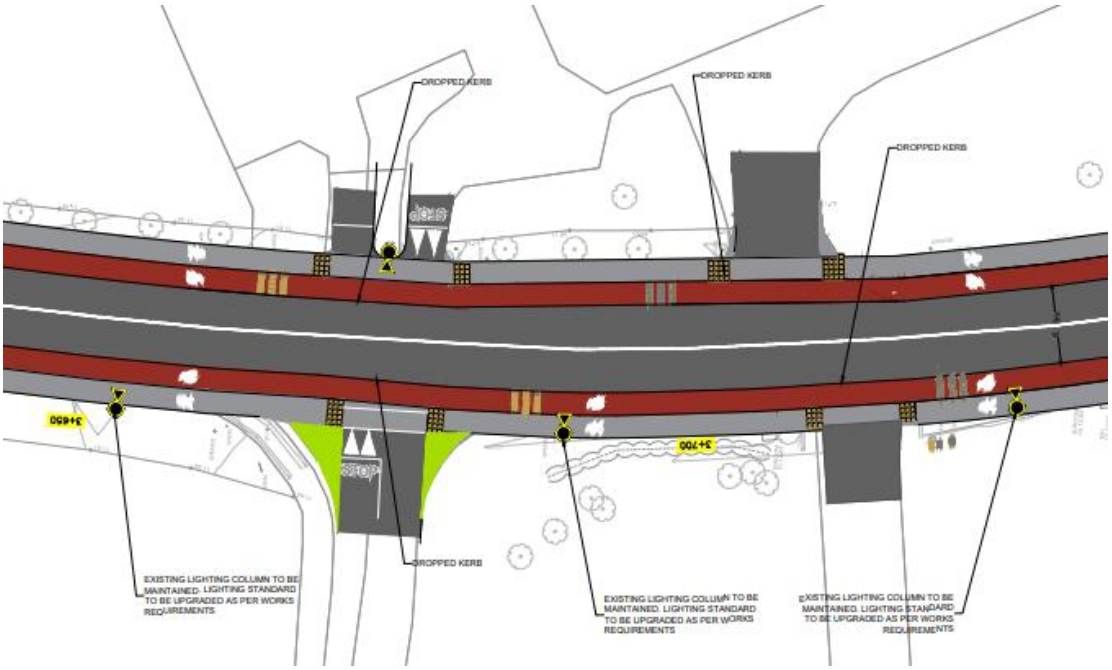


Figure 3-118: Proposed plan for footpaths and cycle lanes alongside McLaughlan Road

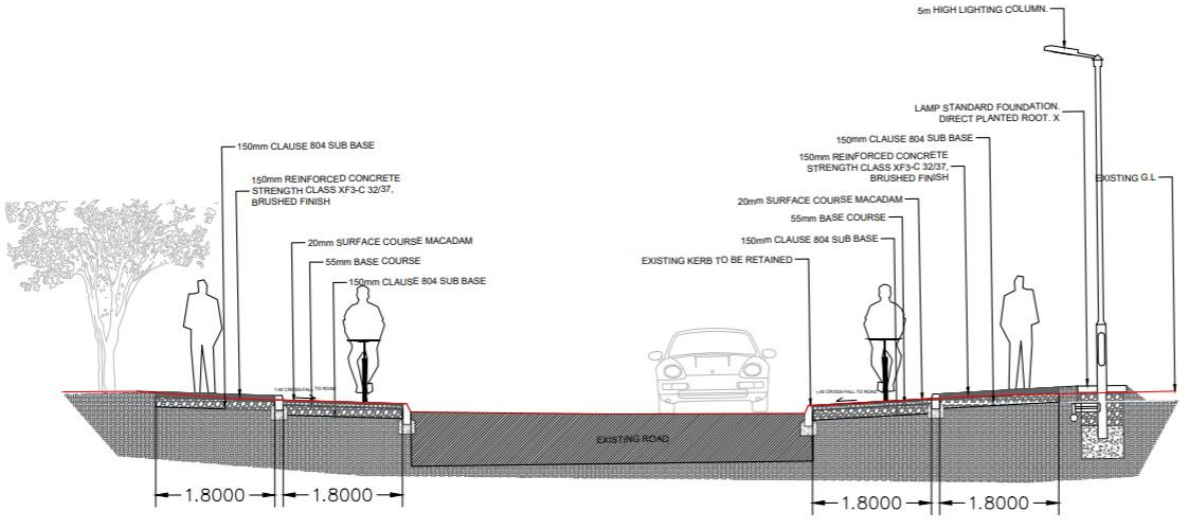


Figure 3-119: Proposed cross section for footpaths and cycle lanes alongside McLaughlan Road

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.

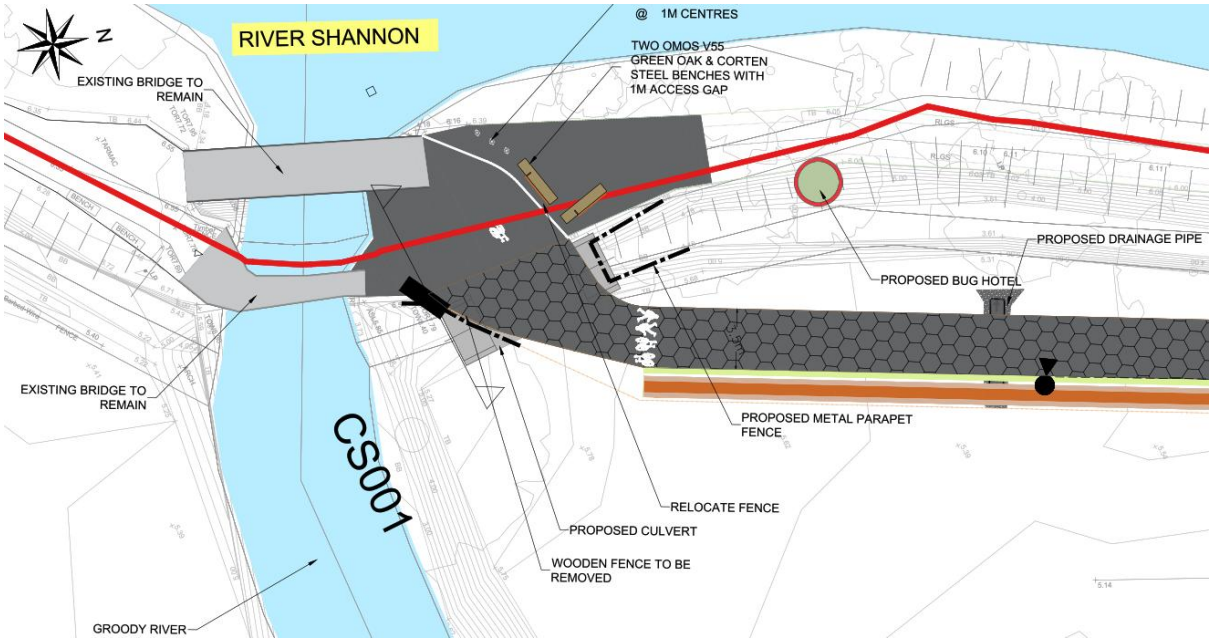


Figure 3-125: proposed amenity/rest area east of Groody Bridge

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.

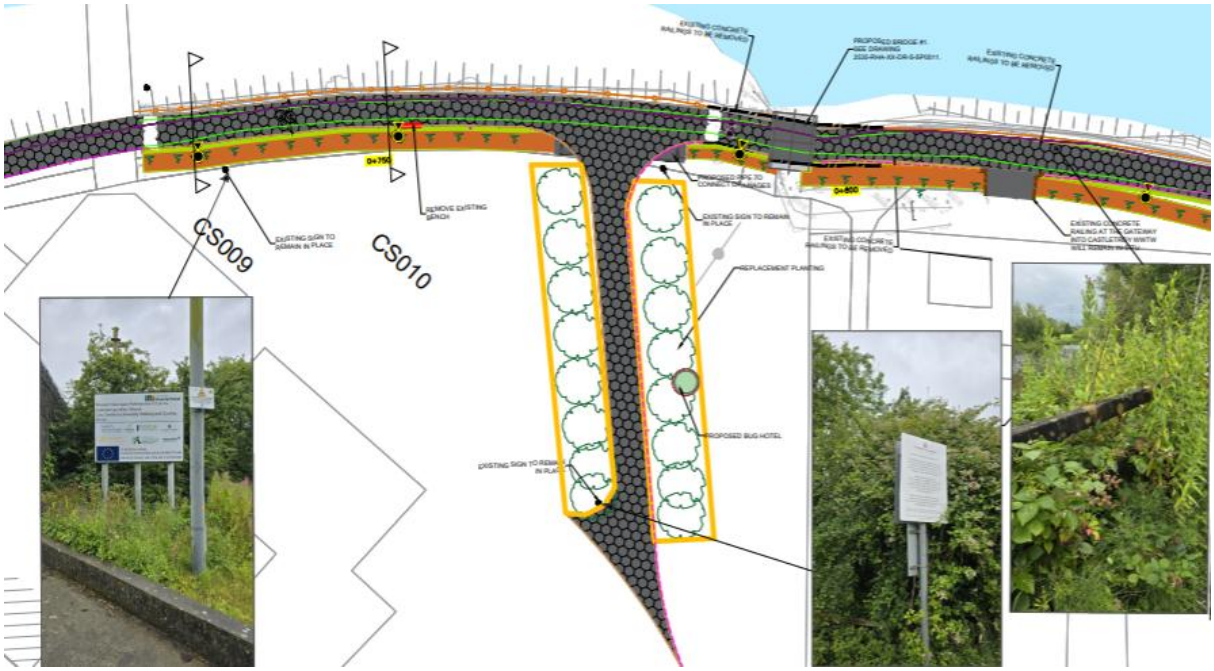


Figure 3-126: Proposed tree planting area west of proposed Bridge 1

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.

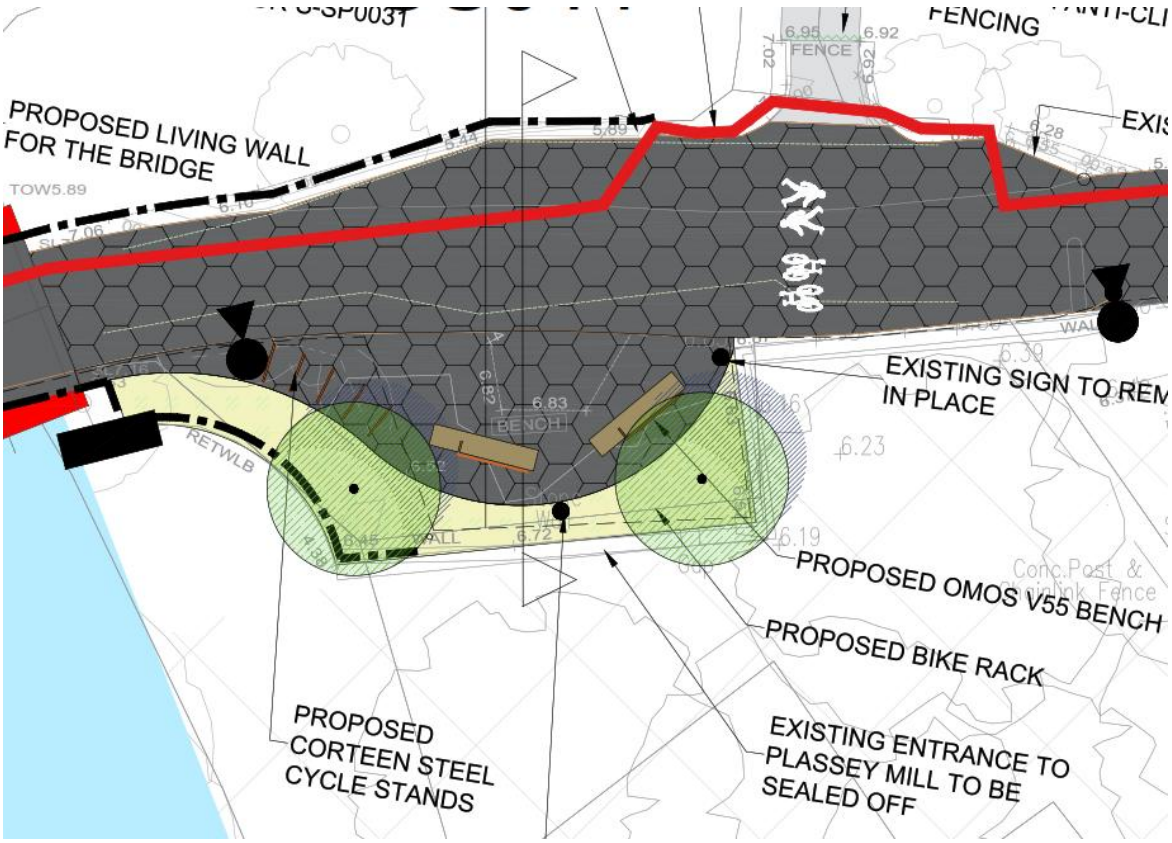


Figure 3-127: Proposed amenity/rest area at Plassey Mills

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 along the riverbank to the benefit of bats, especially the Lesser Horseshoe bat.

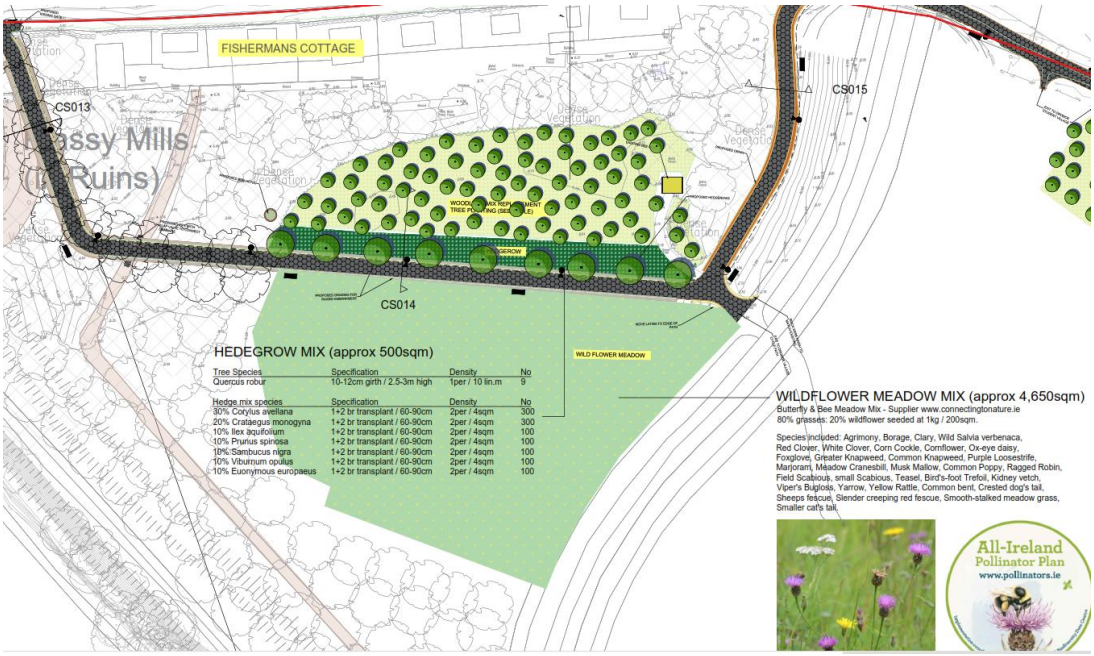


Figure 3-128: Proposed landscaping south of the Fisherman cottages

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.

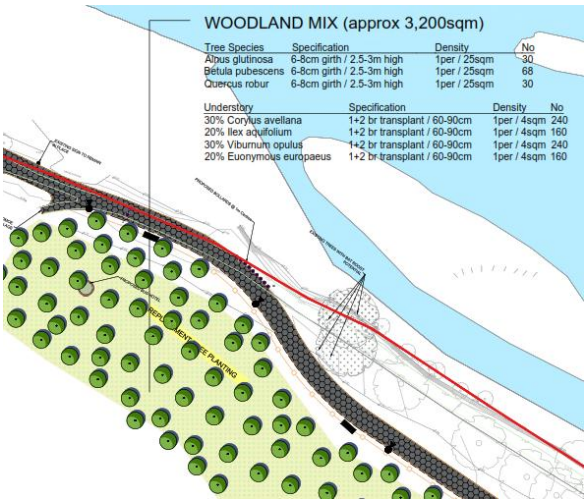


Figure 3-129: Proposed tree planting area north of Dromroe Student Village

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.

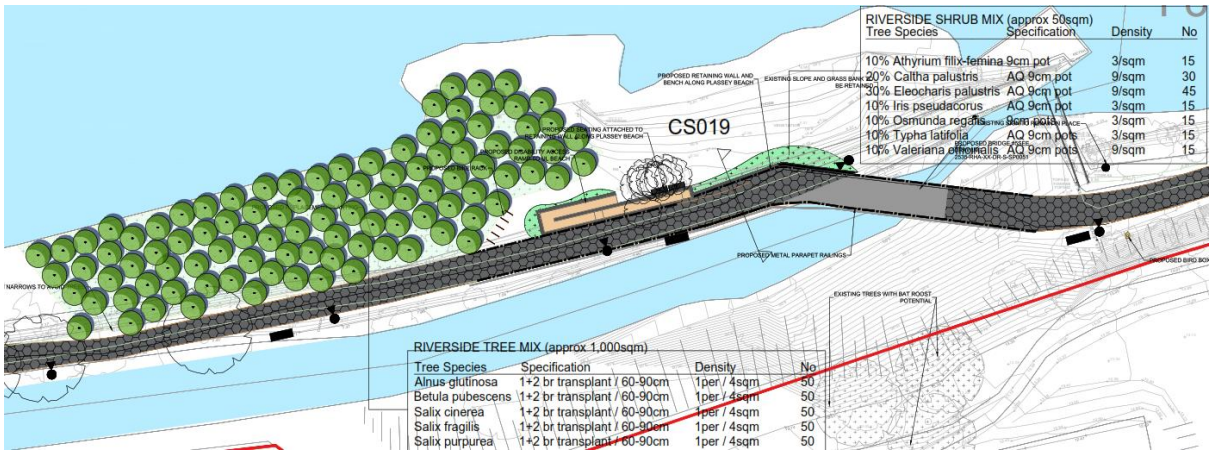


Figure 3-130: Proposed native Irish trees and new riverside shrubs at Plassey Beach

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.

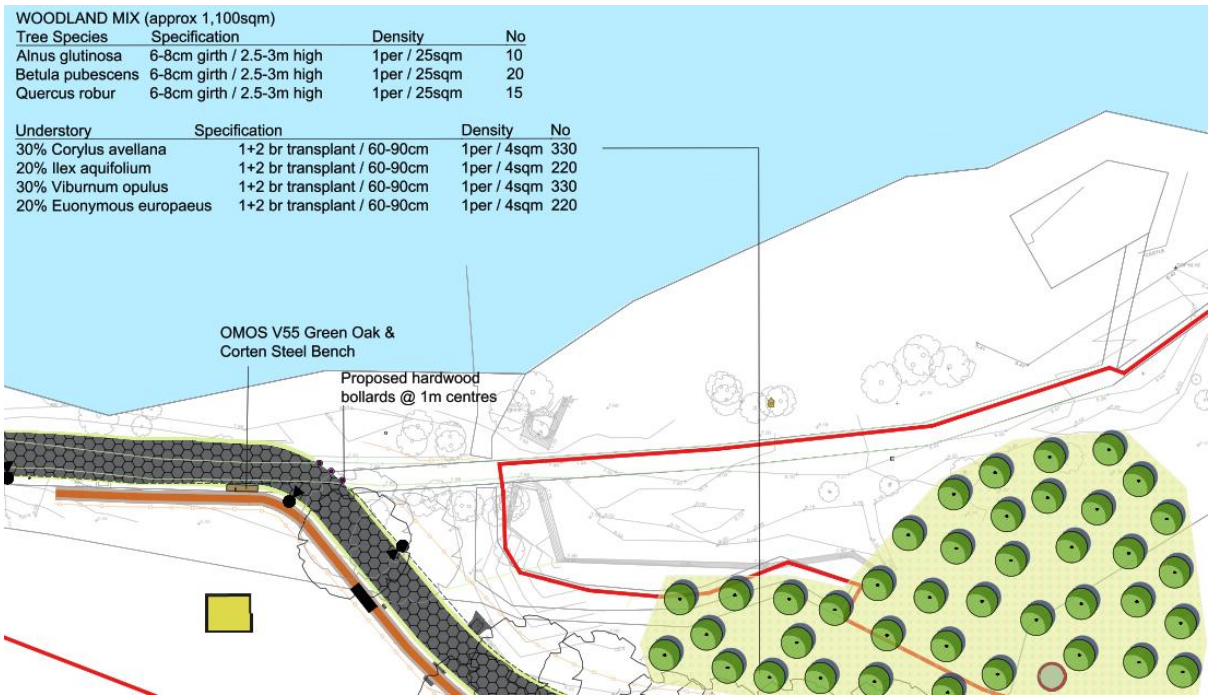


Figure 3-131: Proposed replacement tree planting east of Cook Medical

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.

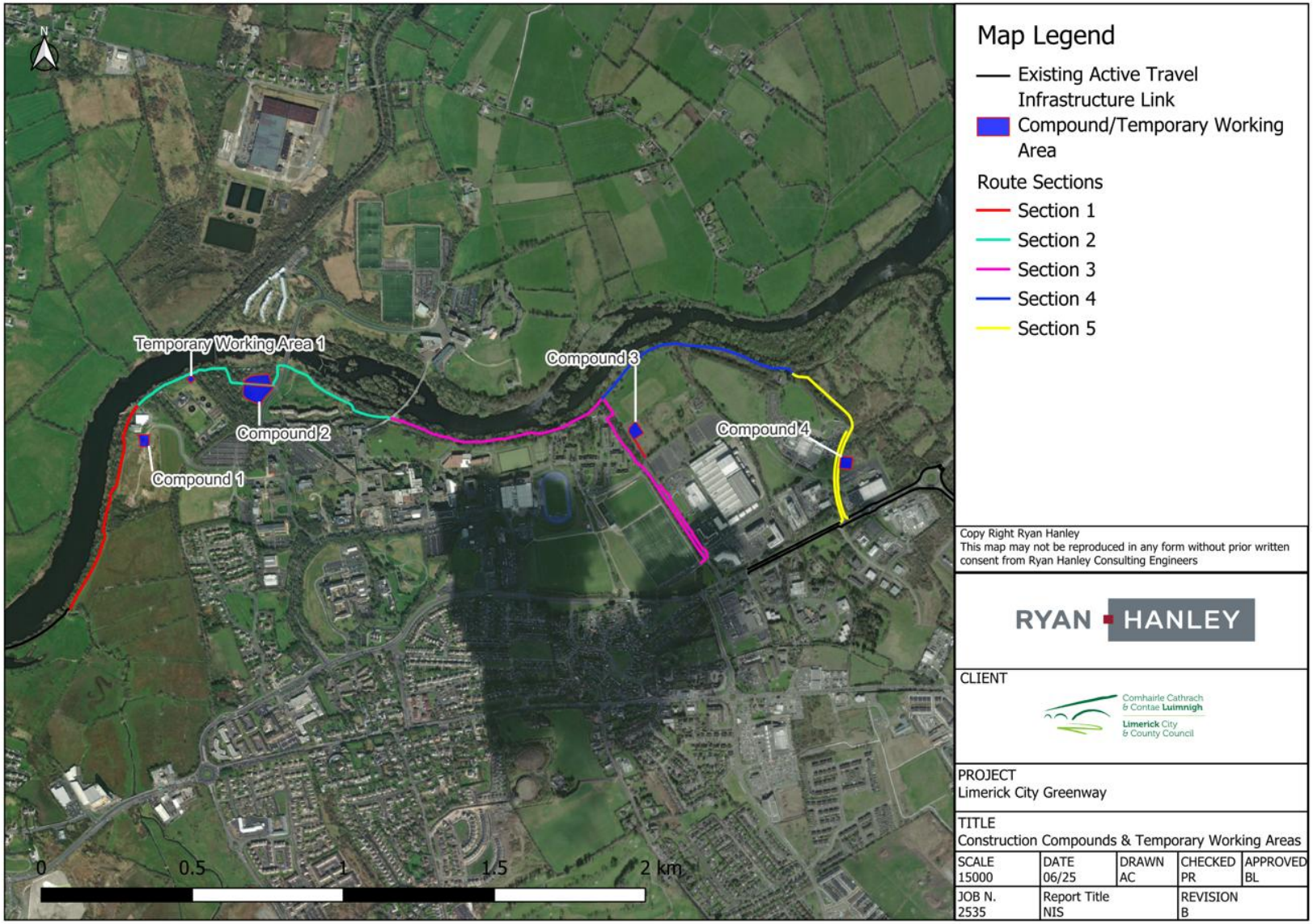


Figure 3-134: Proposed Sections, Compounds and Temporary Working area

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 'Cellweb®TRP' system (or equivalent) to enable plant regrowth along the bank. Refer to Figure 3-135 for an example.

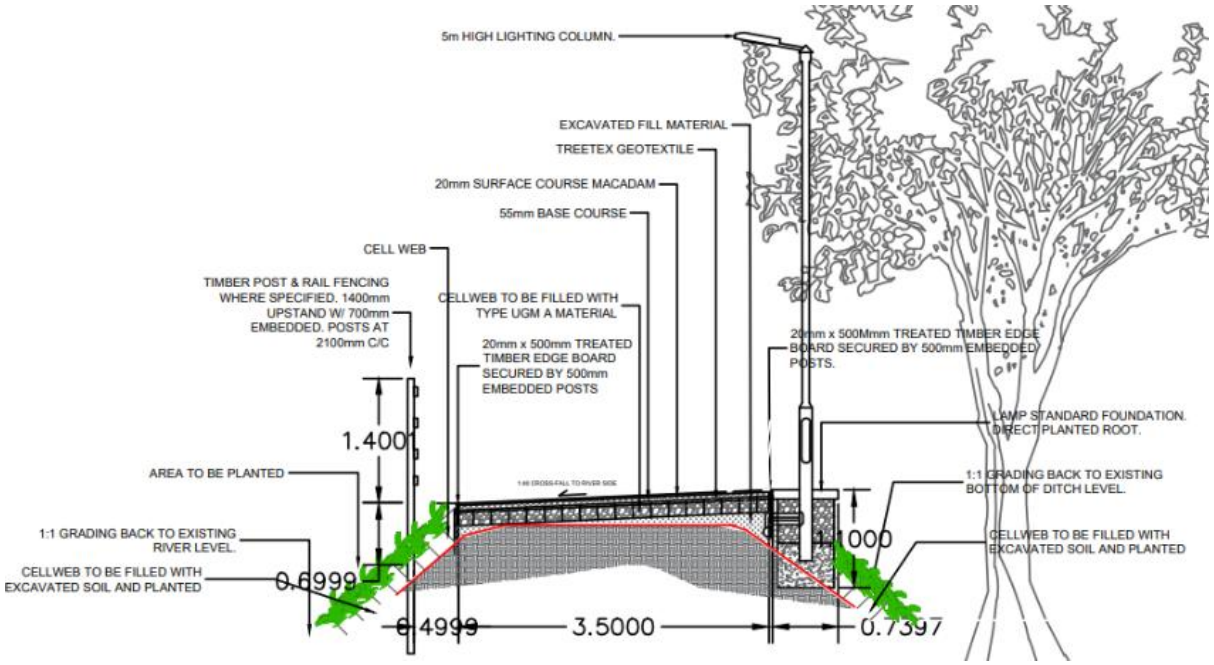


Figure 3-135: Tree root protection along proposed Greenway (Red line is existing ground level)

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.

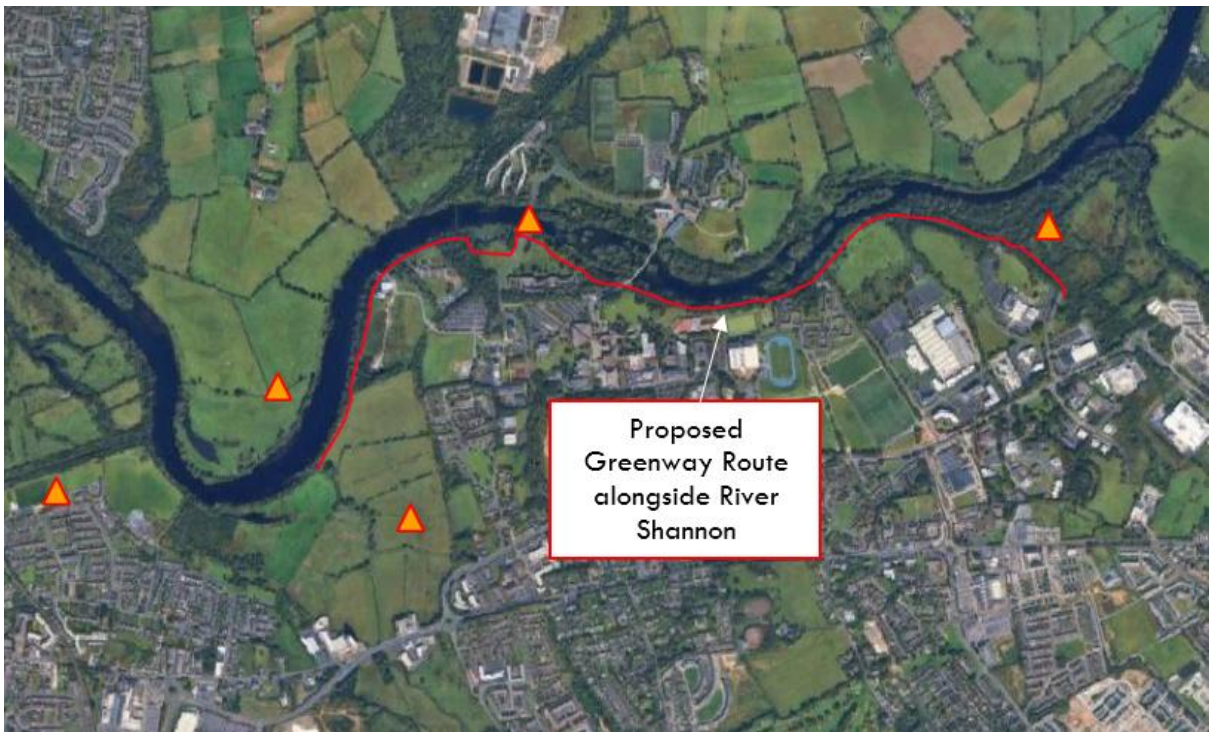


Figure 3-136: Past Flood Events OPW database (www.floodinfo.ie)

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)

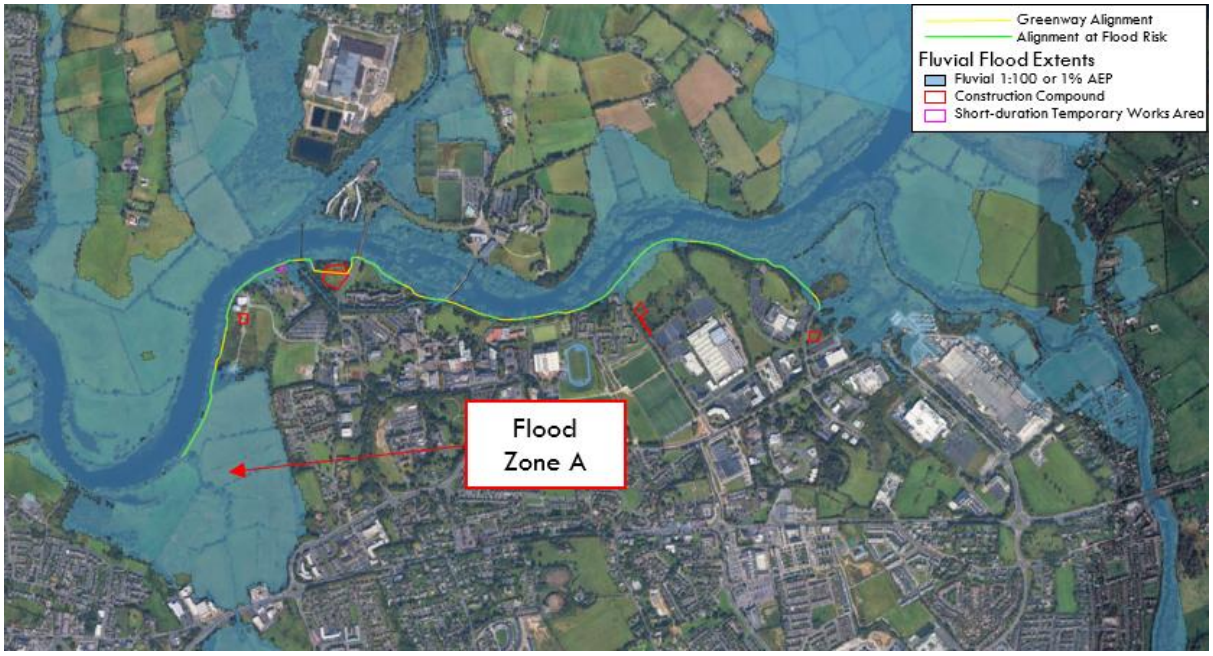


Figure 3-138: Sections of Greenway at Flood Risk (1 in 100 or 1% AEP)

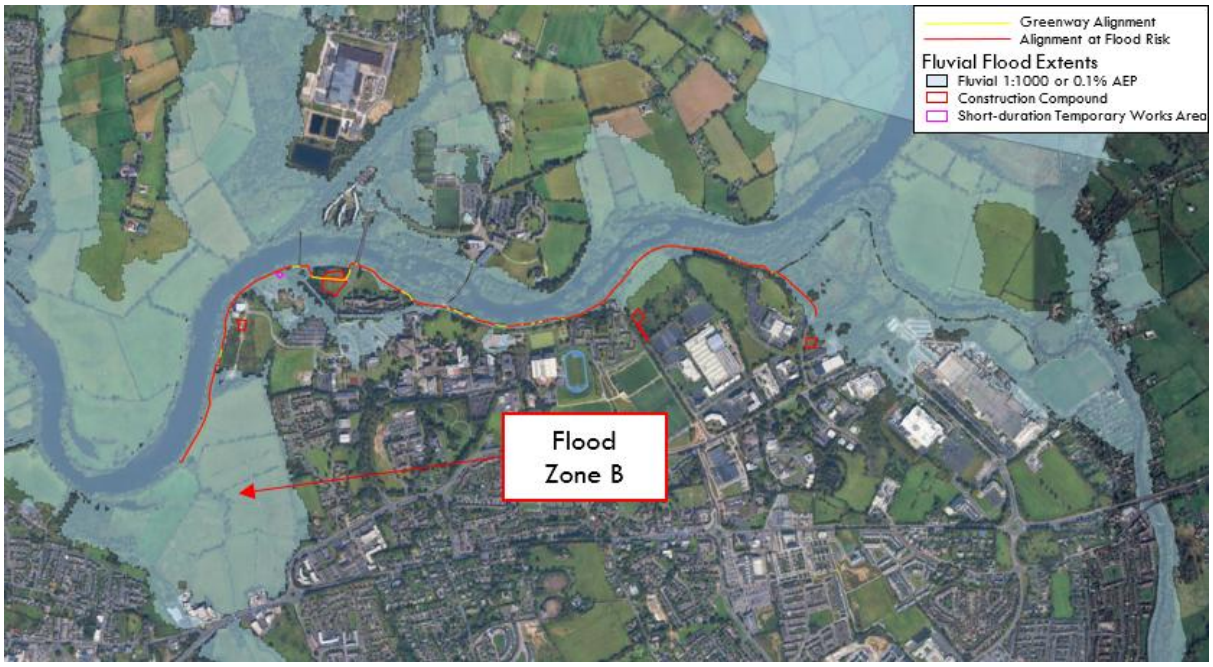


Figure 3-139: ***Sections of Greenway at Flood Risk (1 in 1000 or 0.1% AEP)***

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 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 planning 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 approximately 305 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. Environmental Management

4.1 Introduction

The following sections give an overview of the construction management, waste management and invasive alien species control plans for the proposed works.

4.2 Construction Management Plans

A suite of construction management plans will be prepared by the appointed contractor to be incorporated into the detailed CEMP. These management plans be bound by the mitigation measures identified within this CEMP, NIS and associated documents and will reflect the requirements of the relevant consent applications (including planning) and any conditions by the Consenting Authority in advance of the final contract signing. The Construction Management Plans will comply with all requirements identified and include the topics listed in Sections 4.2.2 to 4.2.8 as a minimum.

4.2.1. Prevention Pollution Control Measures

The following measures will be put in place to prevent the transportation of potential silt laden water or pollutants from entering any of the drains and /or watercourses in the vicinity of the site or any of the wider environments including downstream watercourses.

- Excavation works will not take place during periods of high rainfall, and shall be scaled back or suspended if heavy rain is forecast;
- There will be no release of suspended solids to any watercourse as a direct or indirect result of the proposed works;
- Any requirement for temporary fills or stockpiles will be damped down or covered with polyethylene sheeting as required to avoid sediment release associated with heavy rainfall;
- Prior to the commencement of groundworks, silt fencing will be erected on the northern and eastern sides of the project site to prevent any runoff from the perimeter of the site. These will be embedded into the local soils to ensure all site water is captured and filtered; and
- Ground disturbance should be kept to a minimum, water from excavations should be filtered. Exposed surfaces should be re-vegetated as soon as possible following construction.

4.2.2. Dust Control

The '*Dust Minimisation Plan*' will be based on the industry guidelines in the Building Research Establishment document "*Control of Dust from Construction and Demolition Activities*."

The generation of dust and particulate matter is dependent on the construction activity being carried out and environmental factors such as rainfall, wind speed and wind direction. A worst-case scenario has been assumed in the assessment. In order to predict and reduce the volume of dust emissions pertaining to the construction phase of the proposed development, a dust minimisation plan has been developed and is included in the Construction Environmental Management Plan (CEMP). The construction works boundary is described in Section 2 of this CEMP, detailed in Chapter 4 of the EIAR and associated project drawings provided in Appendix 4A of the EIAR.

The following measures will be implemented in order to minimise dust impact:

- All site roads within the construction works boundary shall be regularly inspected, cleaned and maintained during the construction phase.
- Hard surface roads within the construction site boundary shall be regularly cleaned and dampened down to prevent the generation of dust;

- Any road that has the potential to give rise to dust emissions must be regularly inspected and watered during periods of dry and/or windy weather to minimise the movement of dust particles to the air and ensure that dust does not cause a nuisance;
- Speeds shall be restricted on hard surface roads and vehicles transporting materials with dust potential must ensure that the material is enclose or covered with tarpaulin at all times;
- The construction traffic routes as identified in Chapter 12 of the EIAR, shall be regularly inspected for cleanliness and cleaned as necessary to minimise the movement of dust particles to the air, as detailed in the CEMP;
- The dust minimisation plan shall be reviewed at regular intervals during the construction phase to ensure that best practice and procedures are in place to minimise dust emissions;
- All plant and materials shall be stored in dedicated compound areas on site;
- Stockpiling of material will be minimised, and stockpiles will be covered or fenced to prevent wind whipping. Materials which have the potential to produce dust will be removed from site as soon as possible;
- In the event of dust nuisance occurring outside the site boundary, movement of materials must be terminated immediately, and procedures implemented to rectify the problem; and
- A record of all dust and air quality complaints will be maintained, along with details of the cause of emissions and the measures implemented to reduce emissions. All records will be made available to LCCC.

4.2.3. Noise & Vibration Control

The potential noise impact of the proposed development on the surroundings will occur during the construction phase, much of which will be generated by construction plant and machinery.

There is no published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project. Local authorities normally control construction activities by imposing limits on the hours of operation and consider noise limits at their discretion. The majority of the construction activity is expected to occur during normal working hours.

The following documents contain guidance in relation to acceptable noise control on construction sites:

- British Standard BS 5228 – 1: 2009+A1:2014: Code of Practice for Noise and Vibration Control on Construction and Open Sites: Noise;
- British Standard BS 5228-1: 2009: Code of Practice for Noise and Vibration Control on Construction and Open Sites Part 2: Vibration; and
- National Roads Authority (NRA) Guidelines for the Treatment of Noise and Vibration in National Road Schemes (2004);

In the absence of specific noise limits, criteria relating to permissible construction noise levels for a development of this type may be found in the abovementioned documents and is summarised below.

BS 5228-1:2009 *Code of Practice for Noise and Vibration Control on Construction and Open Sites: Noise* sets out a procedure for determining the impacts of construction noise on surrounding receptors. **Table 4.1** sets out the threshold noise levels (L_{AEQ}) as set out in the Standard. The Standard recommends that total noise levels during construction should not exceed the threshold levels.

Table 4.1 Noise Threshold Levels determined in accordance with BS 5228-1:2009+A1:2014

Assessment Category and Threshold Value Period (L_{AEQ})	Threshold Value (dB)		
	Category A	Category B	Category C
Monday to Friday 07:00 to 19:00hrs Saturdays (07:00 – 13:00)	65	70	75
Monday to Friday 19:00 to 23:00hrs Saturday (13:00 – 23:00) Sunday (07:00-23:00)[i]	55	60	65
Monday – Sunday (23:00 – 07:00)	45	50	55

Note:

Category A: threshold values to use when ambient noise levels (when rounded to nearest 5 dB) are less than these values

Category B: threshold values to use when ambient noise levels (when rounded to nearest 5 dB) are the same as Category A values

Category C: threshold values to use when ambient noise levels (when rounded to nearest 5 dB) are higher than Category A values

The NRA (now known as Transport Infrastructure Ireland or TII) Guidelines for the Treatment of Noise and Vibration in National Road Schemes (2004) also recommends threshold noise levels for the construction phase of road projects. **Table 4.2** indicates the maximum permissible noise levels at the facade of dwellings during the construction period as recommended by the NRA (Now TII). These limits are widely applied in Ireland to construction projects.

Table 4.2 Maximum permissible noise levels at the facade of dwellings during construction

Days and Times	Noise Levels (dB re. $2x10^{-5}$ Pa)	
	$L_{Aeq(1hr)}$	L_{Amax}
Monday to Friday 07:00 to 19:00hrs	70	80
Monday to Friday 19:00 to 22:00hrs	60*	65*
Saturdays 08:00 to 16:30hrs	65	75
Sundays & Bank Holidays 08:00 to 16:30hrs	60*	65*

***Note:** Construction activity at these times, other than that required for emergency works, will normally require the explicit permission of the relevant local authority.

Based on the above, Table 4.3 suggests noise limits considered suitable for the construction of the proposed development. Given that the majority of receptors are located adjacent to local access routes, streets and roads, the Category B levels from Table 4.1 have been applied along with the TII (formally NRA) guidance levels. The threshold values specified in Table 4.3 should be adopted as the noise criteria at receptors

Table 4.3 Suggested noise levels at receptors during construction based on BS 5228:2009 and TII (formally NRA) Guidance

Days and Times	Noise Levels (dB re. $2x10^{-5}$ Pa)	
	$L_{Aeq(1hr)}$	L_{Amax}
Monday to Friday 07:00 to 19:00hrs	70	80
Monday to Friday 19:00 to 23:00hrs	60	65
Saturdays 07:00 to 16:30hrs	65	75
Sundays & Bank Holidays 07:00 to 23:00hrs	60	65
Night-time 23:00 to 07:00	50	60

The TII (formally NRA) guidelines from 2004 detail the permissible vibration levels during construction phase for national road schemes and it is generally accepted that vibration from construction activities will be limited to these values as outline in Table 4.4 below.

Table 4.4 *Allowable Vibration During Construction Phase*

Allowable vibration (in terms of peak particle velocity) at the closest part of sensitive property to the source of vibration, at a frequency of		
Less than 10Hz	10 to 50 Hz	50 to 100Hz (And above)
8 mm/s	12.5 mm/s	20 mm/s

In order to sufficiently improve the likely noise and vibration impacts from the proposed works, a schedule of noise and vibration control measures has been formulated for the construction phase. Best practice measures for noise control will be adhered to onsite during the construction phase of the proposed project in order to mitigate the potential temporary slight to significant negative impact associated with this phase of the Project. The measures include:

- All construction operations shall comply with guidelines set out in British Standard documents '*BS 5228-1: 2009: Code of Practice for Noise and Vibration Control on Construction and Open Sites: Noise*,' which offers detailed guidance on the control of noise & vibration from demolition and construction activities;
- All construction operations shall comply with guidelines set out in British Standard documents '*BS 5228-1: 2009: Code of Practice for Noise and Vibration Control on Construction and Open Sites Part 2: Vibration,*' which offers detailed guidance on the control of vibration from demolition and construction activities.
- Establishing channels of communication between the contractor/developer, Local Authority and residents; inform affected residents of time of anticipated noise impact 24 hours in advance;
- Appointing a site representative responsible for matters relating to noise and vibration;
- Construction noise will be limited by prescribing that standard construction work will be restricted to the specified working hours;
- Materials will be selected taking account of the characteristics for generation of noise and/or vibration emissions from each item. All materials and machinery used on site shall comply with relevant E.U. and Irish legislation in relation to noise emissions. The timing of on- and off-site movements of machinery near occupied properties will be controlled;
- Erection of noise screening (abatement) enclosures as necessary around noisy processes and items such as generators, consaw operations, heavy mechanical machinery or high duty compressors;
- Placing of noisy/vibratory machinery as far away from sensitive properties as permitted by site constraints and the use of vibration isolated support structures where necessary;

- Training and supervision of operatives in proper techniques to reduce site noise, and self-monitoring of noise levels, if appropriate;
- Where, noise levels at noise sensitive locations (NSLs) are anticipated to exceed the daytime noise criteria, hoarding for noise abatement extending to a height of 2.4 m will be erected between the works area and the NSL. If such measures are installed, the construction operations are expected to meet or be less than the 70 dB LAeq(1hr) criterion in most cases;
- Limiting the hours during which site activities likely to create high levels of noise or vibration are permitted;
- Monitoring typical levels of noise and vibration during critical periods and at sensitive locations where noise monitoring will be conducted during construction activities that have been identified as potentially exceeding the 70 dB $L_{Aeq(1hr)}$ criterion at NSLs. Vibration monitoring will measure the maximum PPV at each location over a sample period of 15 minutes, detailed notes will be taken in relation to the primary vibration sources and measurements will be conducted at the locations on a cyclical basis over the course of a typical day.

- The following mitigation measure shall be implemented in relation to exhaust emissions during the construction phase:
    - Machinery will be switched off when not in use; and
    - All construction vehicles and plant will be maintained in good operational order.
-

Map Legend

- Proposed Greenway Route
- Existing Active Travel Infrastructure Link
- ★ Project Location

Limit set at NSLs in Ireland and in the UK are typically 55 dB(A) during the day and 45 dB(A) at night averaged over a period of generally either 15 minutes or 30 minutes (technically this is referred to as Leg (15) or Leg (30)

RYAN HANLEY

CLIENT

Comhairle Cathrach & Contae Luimnigh
Limerick City & County Council

PROJECT
Limerick City Greenway

TITLE
Noise Sensitive Locations

SCALE	DATE	DRAWN	CHECKED	APPROVED
1:25,000	11/24	AC	PR	BL

JOB N.	Report Title	REVISION
2535	EIAR	0

Figure 4.1 Noise Sensitive Locations (NSL) Map

4.2.4. Traffic Management

Localised traffic disruptions during the construction phase of the proposed development will be mitigated through the use of industry standard traffic management measures. These measures will be designed in accordance with the '*Guidance for the Control and Management of Traffic at Roadworks – Second Edition*' (Dept. of Transport; Road Safety Authority of Ireland – 2010).

A design stage Traffic Management Plan (TMP) with detailed drawings has been developed in advance of the construction phase which provides a basis for the management of traffic during the execution of the works by the contractor incorporating road disruptions, diversions and/or closures where necessary.

Local access will be maintained where possible throughout construction phase of the various sections of the Greenway with diversionary routes as detailed Chapter 13 of the EIAR. Any Increased vehicular activity during construction phase will be managed by the Traffic Management Plan

- Construction works will be sequenced so as to avoid unnecessary interruption to road users insofar as is practicable;
- All residents and interested parties shall be consulted when planning these road closures to optimise the timing of same;
- A complete schedule of road closures will be published in advance of the works commencing to facilitate residents in making alternative arrangements where necessary; and
- All road closures will be agreed in advance with LCCC and implemented as per conditions set out in Traffic Management Plans and Road Opening Licences.

All excavations on roads will be temporarily reinstated - with a permanent reinstatement to follow after 6 months - as per the following guidance:

- Guidelines for Managing Openings in Public Roads (April 2017) – for Local and Regional Roads.; and
- Requirements for the Reinstatement of Openings in National Roads (TII, May 2019) – for National Roads.

The following mitigation measures will also be required.

- Road signage on the public road network must comply with the Department of the Transport's Traffic Signs Manual "*Chapter 8 - Temporary Traffic Measures and Signs for Roadworks";*
- The contractor shall provide general condition and structural surveys of all transport infrastructure (roads, bridges, access tracks) on all routes, including haulage routes, that may be impacted as a result of the proposed scheme before works commence on site and after completion and provided to the relevant PSDP engineer;
- Site entrance locations from public roads may require a durable bound surface;
- Secure and visible junctions must be developed between access roads and public roads;
- A durable bound surface is required on access roads for a minimum distance of 10m from the public road;
- Adequate drainage to be maintained at all times to ensure that no surface water from the site or site access discharges to the public roads; and
- Cleaning regime for plant to be implemented in order to minimise mud/dust or other contaminants on public roads.

4.2.5. Water Quality and Soil

A '*Pollution Prevention and Control Management Plan*' will be put in place. The Plan will include the requirement for the best practice and adherence to Irish guidelines or international guidelines where relevant. This plan will

be included as part of the detailed CEMP and will include mitigations specified within the environmental reporting prepared for the project.

Material storage and handling measures will be implemented to contain potential sources of soil/groundwater pollution. Contractors will ensure that spill kits will be always accessible to construction personnel and all spills will be reported to the site environmental manager.

All contractors shall be responsible for ensuring the following measures (as well as measures specified in NIS and any relevant Environmental Management Plans) are adhered to implemented, monitored and audited:

- Engagement of an Ecological Clerk of Works (ECoW) to supervise the proposed works and implement the recommended mitigations, toolbox talks, surveys of the bankside and all areas where bank side work is proposed as well as other duties;
- Where bank side works are proposed, excessive ingress of sediment into the watercourse should be prevented where possible. Sediment barriers such as sediment netting/fences or silt traps should be used to temporarily trap sediment to prevent sediment transport into the river;
- Bankside works should be undertaken at times of good weather and low flow in the River where there is no potential for the works area to become inundated with water and no potential for significant volumes of surface water runoff from the works area;
- All works undertaken on the banks should be fully consolidated to prevent scour and run off of silt. Consolidation may include use of protective and biodegradable matting (coirmesh) on the banks and also the sowing of grass seed on bare soil;
- Dewatering of any excavation will be undertaken as necessary. In the event that dewatering pumps and silt filtration systems are required then they will be positioned in strategic locations adjacent to the excavation;
- Temporary or permanent loss of riparian and marginal habitat during both the pre- and post-construction phases should be avoided;
- To prevent noise and disturbance to designated species and habitats where possible, works should be timed to avoid the key periods of sensitivity for migratory fish species. Works and construction activities should also be confined to standard daylight hours. In order to reduce disturbance to fish species, areas where bank side works are required should be accessed from the bank/ existing path;
- There will be no refuelling of machinery near the river channel. Refuelling will take place at designated locations in the site compound on an impermeable surface at distances of greater than 30 metres from the watercourse;
- No vehicles will be left unattended when refuelling and a spill kit including an oil containment boom and absorbent pads will always be on site;
- Any fuel that is stored on the site will be in a double skinned, bunded container that will be located within a designated site compound at a location that is removed from the river;
- During the construction phase site materials will be stored in temporary construction compounds in Flood Zone C area which are outside of the present-day high likelihood flood extent. Site managers should regularly consult the Met Eireann flood warnings website https://www.met.ie/warnings/today if significant flooding is expected;
- Sediment barriers such as sediment netting/ fences or silt traps should be used to temporarily trap sediment and prevent sediment transport into watercourse, at all interfaces of the works area with a waterbody in advance of construction works on the banks of the watercourse;
- Works undertaken on the banks should be fully consolidated to prevent scour and run off of silt, Consolidation may include use of protective and biodegradable matting (coirmesh) on the banks and may also the sowing of grass seed on bare soil;

- Particular care to prevent run-off of sediment or pollutants into the river should be taken at the Compound Site 1, Compound Site 2 and Compound Site 3, where their proximity to the River as having the potential for the highest surface runoff;
- All construction materials and plant should be stored in the site compounds. Compounds will be located on ground that is not prone to flooding (in Flood Zone C). A geotextile layer will be laid across the entire compound 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;
- Excess top-soil and sub soil will be removed and mounded on the compound footprint;
- All vehicles should be regularly maintained and checked for fuel and oil leaks; and
- Guidelines for minimizing 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 (IFI) guidelines and Transport Infrastructure Ireland (TII) guidelines.

Stockpiles

- Daily monitoring of excavations and works areas by a suitably qualified person such as the Environmental Manager (EM) or the Environmental Clerk of Works (ECoW) will occur during the construction phase.
- Run-off from works, stockpile and/or compound areas will be monitored and observed daily by ECoW to ensure that it is not impacting on any local watercourses.
- Large volumes of excavated material will not be allowed to accumulate within the temporary working areas unless to be left as a permanently mound to on the river side of the path.
- Any stockpiling of soils will be confined to compound areas and runoff will be prevented by the use of a silt fence or bund
- Stockpiles will not be located adjacent to watercourses and shall be surrounded with a continuous silt fence;

4.2.6. Biodiversity

The proposed development area is of high ecological value at a local level. It is extremely important that all measures should be taken to preserve the current ecological receptors at the site and to increase biodiversity in the operational phase.

The following measures will be implemented on site for the protection of flora and fauna:

- Any measures specified within the Natura Impact Statement (NIS) and Biodiversity Management Plan (BMP);
- 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 Greenway;
- The ECoW will hold a minimum University degree in Environmental Science, (NFQ Level 8); Minimum of 5 years' post-graduate experience in ecological assessment, appraisal techniques and mitigation monitoring;
- The ECoW will be responsible for biodiversity monitoring elements and providing toolbox talks;
- 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 $CaCO_3$), molybdate reactive phosphorus (mg/l P), ammonia (mg/l NH_3), 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 (NH_4), 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 48 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 gravel removal will be carried out during prolonged wet weather;
- Works shall be carried out during daytime hours only (08:00-18:00);
- Full Method Statements and Risk Assessments shall be provided and approved prior to the commencement of works;
- Tree roots will be protected by using non-invasive construction methods;
    - Avoidance of digging into the existing gravel track so as not to encounter tree roots;
    - Installing Cellweb®TRP tree root protection directly onto the existing gravel path and build up od subsequent path layers 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;
    - Where dense tree coverage exists along the Greenway, service ducts for the public lighting and CCTV will be installed by Moling technique which allows for trench-less installations of services without having to excavate trenches and protecting tree roots from damage; and
- The outdoor lighting scheme, designed for proposed development, has taken into account published best practice including BS EN 5489-1: 2020 to minimise the impact of outdoor lighting upon bat populations. Warm white LED lanterns are specified which are considered least disruptive to the emergence of bats from roosts at dusk, and subsequent movement from habitats to foraging locations.

4.2.7. Refuelling, Fuel and Hazardous Material Storage

The following mitigation measures will be implemented to avoid release of hydrocarbons at the site:

- Refuelling of machinery will be carried out in a contained bunded area in the temporary construction compounds on impermeable ground by trained staff and spill kits at appropriate locations;
- Refuelling areas in the compounds will be identified prior to commencement of the project;
- Refuelling shall not be undertaken adjacent to any watercourses;
- All machinery and plant used will be regularly maintained and serviced and will comply with appropriate standards to ensure that leakage of diesel, oil and lubricants is minimised; and
- Fuels, oils, greases, and hydraulic fluids will be fully bunded (110 percent) at a designated area within the works compounds used for the storage of materials and machinery.

4.2.8. Cement Based Products Control Measures

The following mitigation measures will be implemented to avoid release of cement at the site:

- Precast concrete products and culverts will be used where possible, however where necessary, concrete pouring will be planned for dry days where possible by following weather forecasts;
- Concrete pours will be supervised by the Construction Manager;
- Where concrete is delivered to the site and pour is complete, the concrete truck will be directed to a designated tank filling area (which shall be) lined with an impermeable membrane and permitted to fill the concrete hopper/tank before leaving site to return to the origin quarry;
- No discharges of washed water shall be permitted in the construction compounds; and
- Ensure pour site is free of standing water and plastic covers will be ready in case of sudden rainfall event.

4.3 Invasive Species Management and Biosecurity Measures

Invasive alien species (IAS) surveys were carried along the route of the proposed site from 2020 to 2025 to identify the presence and location of any invasive species (listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011). A number of invasive alien species (IAS) including Himalayan balsam (Impatiens glandulifera) and Giant hogweed (Heracleum mategzzianum) were recorded during these walkovers and documented growing within the Study Area of the proposed Greenway project. A Invasive Species Management Plan (ISMP) has been developed outlining advanced treatment, biosecurity and best practice measures (Ryan Hanley, 2024).

All personnel that will be working on the proposed greenway route will be educated through tailored toolbox talks to recognise each of the invasive species present within the footprint of the works. 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. Personnel must be familiar with the location of all biosecurity zones, and emergency procedures should they encounter Giant Hogweed material. Only those who have been inducted into biosecurity measures on-site should enter the biosecurity zones within the works area. Should any risk of contaminated material escaping be observed by the site supervisor, additional toolbox talks and any additional necessary training that is needed will be given.

Maintaining biosecurity measures at all times in an area where invasive species are present is essential to prevent further spread. Biosecurity measures are also necessary in areas where invasive species are not present, but where there is risk of contaminated material being brought to site- i.e., site machinery being used on multiple sites, construction staff travelling between infested and not infested sites. Careful preparation of the site and planning of the works is crucial to successful treatment of invasive species.

At all site locations during the construction stage, the contractor will adhere to the following best practice biosecurity measures to avoid the spread and introduction of invasive species where applicable:

- Adherence to biosecurity and best practice measures outlined in the Invasive Species Management Plan (ISMP);
- An Environmental Clerk of Works should be on site to monitor and oversee the implementation of this ISMP and this installation of the biosecurity zones;
- Pre-construction surveys 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;
- All staff will be trained by the ECoWs through tookbox talks in the identification of invasive species and noxious weeds and the associated biosecurity measures required when working on site;
- Fence off (biosecurity zones) 8m from the furthermost stand of invasive species in infested areas prior to and during construction where possible to avoid spreading seeds or plant fragments around or off the construction site. If this is not possible the biosecurity zones will be determined by a suitably qualified person in agreement with the site manager;
- Clearly identify and mark out infested areas. Erect signs at the construction site entrances and by the biosecurity zones to inform site users of the risk;
- Dedicated biosecurity zone entry and exit points should be created for operators on foot and for mobile plant equipment;
- Personnel working on or between biosecurity zones should ensure their clothing and footwear are cleaned where appropriate to prevent spread;
- Avoid, if possible, using machinery with caterpillar tracks in infested areas. Machinery tyres and tracks must be cleared prior to exiting the biosecurity zones;
- Clearly identify and mark out areas where contaminated soil is to be stockpiled in the temporary construction compounds, which will not be within 50m of any watercourse. Biosecurity zones need to be fenced and surround all stockpiles of contaminated soils containing invasive species;
- Infested areas which will not be excavated will be protected by a root barrier membrane if they are likely to be disturbed by machinery;
- Appropriate silt barriers will be installed in drains that may occur within infested areas;
- Biosecurity facilities must be installed on-site prior to site works commencing. Installation of a dedicated footwear and vehicular wheel wash down facility, into a contained area by the entrance and exit points of the construction site and in the biosecurity zones, away from drains and watercourses. All run-off will be isolated and treated as contaminated material;
- Vehicles entering and leaving the construction site and biosecurity zones will be cleaned using stiff-haired brush and pressure washers, paying special attention to any areas that might retain seed and plant material;
- 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), consideration should be given to designating vehicles or machinery to specific sites to prevent spread;
- Vehicles leaving the site to be inspected for any plant material and will be washed down into a dedicated wastewater contained storage area then tinkered off site to a licenced waste facility; and
- If soil is imported to the site for landscaping, infilling or embankments, the contractor shall gain documentation from suppliers that it is free from invasive species.

4.4 Waste Management

This section of the CEMP contains a summary of the information to be contained within a project Waste Management Plan (WMP), which will set out the best practice procedures during the excavation and construction stages of the proposed scheme. A WMP will be developed further by the contractor prior to construction. Section 4.4.1 below, identifies the key legislation relevant to waste management requirements. All waste disposals will be recorded by the contractor through a Waste Disposal Register.

4.4.1. Legislation

The primary legislative requirement applicable to the project and that governs waste management in Ireland is The Waste Management Act 1996 and its subsequent amendments. The Waste Management Act 1996 provide for measures to improve performance in relation to waste management, recycling, and recovery. The Act also provides a regulatory framework for meeting higher environmental standards set out by other national and EU legislation.

4.4.2. Waste Management Hierarchy

Waste management actions that can be undertaken on site should follow the principles of the waste hierarchy, where preventing waste is the preferred option and sending waste to landfill should be the last resort (**Figure 4.1**). The primary aim of a WMP is to prevent and minimise to amount of waste generated. Reuse and recycling of waste generated on site, reduces the quantities of waste required for disposal which is considered as last resort. Waste will be segregated and disposed of appropriately. Working methods will be reviewed to ensure waste minimisation and sustainability during construction.

Figure 4-1: Schematic of the Waste Hierarchy Model (Waste Framework Directive, 2020).

4.4.3. Construction Phase Waste Management

4.4.3.1. Description of the Works

The Limerick City Greenway (UL to NTP) will produce a significant volume of excavated material during the construction phase. Excavations for the proposed scheme, pedestrian/road crossings and road works will give rise to a surplus volume of material during the construction phase of the proposed scheme. The excavated material will be reused as a subbase layer and/or edge grading. It is anticipated that no soil will require exporting off site. There will be Bitumous Material and Concrete arising from existing road/footpath surfaces on University Road, and McLaughlan Road.

The main non-hazardous and hazardous waste types arising from the construction phase of the project are outlined in Table 4..5 below. The List of Waste (LoW) code (as effected from 1st of June 2015 and referred to as the European Waste Code of EWC) for each waste stream is also shown.

Table 4.5: Expected waste material arising during the Construction Stage.

Waste Material	LoW Code
Soil, stones and dredged spoil	17 05
Bituminous mixtures, coal tar and tarred products	17 03
Concrete, Bricks, Tiles and Ceramics	17 01

Metals (including their alloys)	17 04
Waste Hydraulic Oils*	13 01
Wastes of Liquid Fuels*	13 07

Note 1 * - Denotes Hazardous Materials.

Where hazardous materials are used/encountered on site, i.e. bituminous mixtures containing coal tar, timber with paint; a specialist contractor will be engaged. The specialist contractor will be licensed under the 'Waste Management (Collection Permit) Regulations, 2007' (as amended). All contaminated materials will be disposed of at an appropriately licensed facility.

The estimated construction and demolition waste resulting from the proposed scheme is provided in Table 4.6 There will be Bitumous Material and Concrete arising from existing road/footpath surfaces on University Road, and McLaughlan Road.

Table 4.6: Estimated C&D Waste resulting from the proposed scheme

Origin of Waste	LoW Code	Estimated Tonnage of Waste
Red Section	17 05/17 03	0
Cyan Section	17 05/17 03	
Magenta Section	17 05/17 03	897
Purple Section	17 05/17 03	
Yellow Section	17 05/17 03	
Orange Section	17 05/17 03	
Green Section	17 05/17 03	
Miscellaneous	17 01, 17 04, 13 01, 13 07	746
	Total	**1643**

4.4.3.2. Proposals for Minimisation, Reuse and Recycling of Construction Waste

All current and applicable waste management legislation will be applied and adhered to. Contractors that are engaged in the transport of waste off-site will comply with the provisions of the Waste Management Act (1996) (as amended), associated Regulations and the Waste Management Plan prepared in accordance with '*Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects (2021)*'. The Contractor must handle, transport, and dispose of waste in a manner that ensures that no adverse environmental impacts occur as a result of any of these activities. A waste collection permit to transport the waste which has been issued by the National Waste Collection Permit Office must be held by the relevant contractor.

Waste receiving facilities must also be appropriately licensed or permitted for the waste being received. Operators of such facilities cannot receive any waste, unless in possession of a waste permit granted by the Local Authority under the '*Waste Management (Facility Permit & Registration) Regulations 2007*' (as amended) or a waste license granted by the EPA. The permit/license held will specify the type and quantity of waste

able to be received, stored, sorted, recycled and/or disposed of at the specific site. The contractor shall provide details of all proposed waste facilities to the Contract Administrator before works commence on site. It has been confirmed that there are appropriate facilities in the area available to receive and process waste material.

The construction compounds for the proposed works will have a dedicated Waste Storage Area (WSA) for any construction waste generated. Receptacles/skips or bays will be provided for relevant recyclable material.

Construction workers on site will generate waste e.g., organic/food waste, dry mixed recyclables (wastepaper, newspaper, plastic bottles, aluminium cans, and tins), mixed non-recyclables and potentially sewage sludge from temporary onsite welfare facilities. Waste electrical and electronic equipment (WEEE), waste batteries and waste printer/toner cartridges may also be generated from site offices. There are numerous specialist waste service contractors in the Limerick City, County and Munster region.

Examples of appropriate measures that should be taken to ensure construction waste generated is minimised, are as follows;

- Ordering of materials should be on an '*as needed*' basis to prevent over supply to site. Co-ordination is required with suppliers enabling them to take/buy back surplus stock;
- Purchase of materials pre-cut to length to avoid excess scrap waste generated on site;
- Request that suppliers use least amount of packaging possible on materials delivered to the site;
- Ensuring correct storage and handling of goods to avoid unnecessary damage that would result in their disposal;
- Ensuring correct sequencing of operations; and
- Use reclaimed/ recycled materials in the construction works where practicable.

The contractor will address the role of monitoring and inspections to ensure that waste produced on site is dealt with in a safe, efficient, and legal manner. All waste generated on site will be segregated and placed in appropriate waste streams designated for recycling, reuse, or disposal. Waste streams will be monitored and Key Performance Indicator's (KPIs) maintained for all waste taken on site, recording quantity (tonnage) of individual waste streams. Records will be maintained.

4.4.3.3. Reuse

Possibilities for re-use of clean non-hazardous excavation material as fill on the site or in landscaping works will be considered following appropriate testing to ensure material is suitable for its proposed end use. Where excavation material cannot be re-used within the proposed works, every effort will be made to send material for re-use as a by-product, recovery or recycling as far as is reasonably practicable. If any material is to be reused on another site or construction projects in the vicinity as a by-product (and not as a waste), this will be done in accordance with Article 27 of the European Communities (Waste Directive) Regulations where the material is classified as a construction by-product.

A guide to by-products under Article 27 was produced by the EPA in 2020 and provides guidance on assessment, classification and submitting a notification of material. Plastic packaging, pallets etc. can be used to cover materials on site or reused for the delivery of other materials.

Many construction materials can be reused a number of times before they must be disposed of – examples listed below:

- It may be possible to reuse stone as aggregate backfilling material in some locations;
- Plastic packaging etc. can be used to cover materials on site or reused for the delivery of other materials; and
- Excavated subsoil will be reused as fill where possible and timber can be used several times for shuttering of concrete.

4.4.3.4. Recycling

As outlined in Section 4.4.2, if a certain type of construction material cannot be reused onsite, then recycling is the most suitable option.

All waste that is produced during the construction phase including dry recyclables will be deposited in the on-site dedicated waste skips initially and sent for subsequent recycling at an offsite facility.

4.4.3.5. Record Keeping

A recording system to be put in place to record construction waste generated on site. The system will enable the contractor to maintain records for all waste material which leaves the site, either for reuse on another site, recycling, or disposal.

The licensed waste contractor employed to remove waste from the site will be required to provide documented records for each movement of waste off-site. Each record will contain the following:

- Consignment Reference Number;
- Material Type(s) and European Waste Catalogue (EWC) Code(s);
- Company Name and Address of Site of Origin;
- Trade Name and Collection Permit Ref. of Waste Carrier;
- Trade Name and Licence Ref. of Destination Facility;
- Date and Time of Waste Dispatch;
- Registration no. of Waste Carrier vehicle;
- Weight of Material;
- Signature of Confirmation of Dispatch detail;
- Date and Time of Waste Arrival at Destination; and
- Site Address of Destination Facility.

4.4.3.6. Basic Waste Management Training

The appointed Environmental Manager or Waste Manager will communicate effectively with all employees on site in relation to the aims and objectives of the WMP. All employees working on site will be trained in materials management and should be able to:

- Distinguish reusable materials from those suitable for recycling;
- Ensure maximum segregation at source;
- Co-operate with site manager on the best locations for stockpiling reusable materials;
- Separate materials for recovery; and
- Identify and liaise with waste contractors and waste facility operators.

4.4.3.7. Waste Management Plan Conclusion

The details provided above outline some of the main objectives that are to be adhered to for the preparation of the detailed WMP to be completed at construction stage. The appointed contractor will be required to produce the detailed WMP prior to commencement of works.

5. Environmental Management Implementation

5.1 Responsibilities

5.1.1. The Contractor

A contractor will be appointed to undertake the works. The Contract will allocate responsibility for compliance with the terms of this CEMP and detailed CEMP during construction.

All staff and subcontractors have the responsibility to:

- Work to agreed methods and procedures to eliminate and minimise environmental impacts and note areas of sensitive receptors;
- Understand the importance of avoiding pollution on-site, including water, noise and dust and report all incidents to avoid or limit environmental impact; and
- Co-operate with site inspections and audits as required.

The contractor shall appoint an Environmental Manager who will be the project focal point relating to construction-related environmental issues. In general, the Environmental Manager will maintain responsibility for monitoring the Works and the contractors/sub-contractors from an environmental perspective. The Environmental Manager will act as the regulatory interface on environmental matters by reporting to and liaising with the Employer's Representative, LCCC representatives (if appropriate), and other statutory bodies as required. The Environmental Manager will report directly to the Environmental Manager.

5.1.2. Site Manager

A Site Manager will be appointed by the contractor to oversee the day-to-day management of working areas within the site and ensure that effective, safe, planned construction activities are delivered on an ongoing basis to the highest standards. The Site Manager will be a suitably qualified, competent, and experienced professional that will oversee site logistics, communicate regularly with construction staff, accommodate project-specific inductions for staff on site and ensure that all work is compliant with the relevant design standards and health and safety legislation.

5.1.3. Environmental Manager

An Environmental Manager will be appointed by the contractor to ensure that the CEMP is effectively implemented. The Environmental Manager will be a suitably qualified, competent, and experienced professional that would perform the necessary tasks, review environmental procedures, and consult with the members of the construction team and stakeholders as requited. The Environmental Manager would be responsible for:

- Preparing, maintaining, and implementing the CEMP;
- Establishing, implementing, and maintaining the Environmental Management System (EMS) in line with ISO 14001;
- Conducting regular environmental inspections and audits as specified in the contract and checking adherence to the CEMP;
- Ensuring that construction occurs in accordance with the relevant environmental requirements and that such compliance is adequately recorded and documented;
- Completing a site inspection and compiling an environmental compliance report on a monthly basis;
- Attending site and stakeholder meetings as required;
- Keeping up to date with relevant environmental best practices and legislative changes;
- Liaising with relevant staff to prepare Method Statements and relevant plans for all activities where there is a risk of environmental damage;
- Having a detailed level of knowledge on all aspects of environmental information associated with the proposed development at University Limerick greenway;
- Ensuring all personnel have undertaken adequate environmental inductions, awareness briefings and training (inducting subcontractors); and

- Managing and responding to environmental incidents and ensuring that all incidents are recorded and reported in an appropriate manner.

5.2 Environmental Awareness and Training

Environmental training and awareness are considered a crucial element in the appreciation and implementation of the detailed CEMP. The detailed CEMP will be distributed to members of the project team, including subcontractors as necessary to ensure that environmental and health and safety requirements are adequately communicated.

The Site Manager and the Environmental Manager will be responsible for ensuring that all people on-site are provided with relevant information concerning environmental obligations. All staff and operatives will receive a site-specific safety and environmental induction prior to commencing any work on-site. Toolbox talks will be provided to all staff for (but not limited to) working with concrete and biosecurity requirements on site. Training records for staff will be held on a central database. Training and awareness will be targeted at sensitive environmental elements including:

- Good Housekeeping practices, including storage of material etc;
- Archaeology;
- Traffic Management;
- Waste Management;
- Landscaping restrictions and requirements;
- Noise abatement;
- Dust control;
- Sensitive receptors (people, wildlife, water, soil etc);
- List of mitigation measures and how they will be implemented and by who doing or avoiding what and why;
- Emergency responses e.g., to an oil or fuel spill;
- Ecology – protected flora and fauna identification; and
- Awareness, when to stop working or report a concern to the supervisor or manager (taking responsibility).

5.2.1. Environmental Induction

The Environmental Induction will be integrated into the general site induction on a case-by-case basis for each member of staff employed on-site depending on their assigned roles and responsibilities on site. Where necessary, the Environmental Induction will as a minimum include:

- An outline of the CEMP structure;
- A discussion of the applicable Works Method Statements;
- The roles and responsibilities of staff, including contractors, in relation to environmental management;
- Pollution incident control and reporting;
- Basic details and information regarding the WMP; and
- An outline of the Environmental Incident Management Procedure.

5.2.2. Toolbox Talks

Toolbox talks will be held by the Environmental Manager or Site Manager at the commencement of works, or at the commencement of new activities. The aim of the toolbox talks is to identify the specific work activities that are scheduled for that day or phase of work. In addition, the necessary work method statements and sub plans would be identified and discussed prior to the commencement of the day's activities. The toolbox talks will include training and awareness on topics including:

- On-site Ecological Sensitivities both aquatic and terrestrial;

- Sediment and erosion control;
- Good site practice;
- Fuel storage; and
- Materials and waste procedures.

Site meetings will be held on a regular basis involving all relevant site personnel. The objective of site meetings is to discuss the coming week's activities and identify the relevant work method statements and sub plans that will be relevant to that week's activities. Additionally, any non-compliance identified during the previous week would also be discussed with the aim to reduce the potential of the same non-compliance reoccurring.

During construction of the proposed development, all staff will be made aware of and adhere to the most up to date version of the Health & Safety Authority's '*Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) Regulations 2013*'. This will encompass the use of all necessary Personal Protective Equipment and adherence to the site Health and Safety Plan.

5.3 Environmental Legislative and Regulatory Requirements

A register of regulatory, legal, and other requirements will be developed by the Environmental Manager. This will be a summary list of the major environmental legislation and other requirements with which the project must comply. A typical register of environmental legislation is divided into several categories, which include:

- General Environmental Legislation;
- Flora & Fauna;
- Emissions to Air and Dust generation;
- Emissions to Water & Groundwater and water pollution;
- Waste Management; and
- Noise & Vibration.

For each piece of legislation, the following information will be provided:

- Index Number;
- Title of Legislation;
- Summary of Legislation; and
- Relevance.

All legislation included in this Register can be readily accessed on http://www.irishstatutebook.ie/ or will be available through the Construction Manager's office. The Register of Legislation will be reviewed and updated on a minimum six-monthly basis. This is a controlled document and as such will comply with all the requirements of the contractor document control procedure as part of the contractor's quality management procedure.

5.4 Stakeholders Liaison

The contractor will put in place a Communications Strategy (to be reviewed and agreed by the Employer and Employer's Representative) which will provide a two-way mechanism for members of the public to communicate with a designated member of the contractor's staff and for the contractor to communicate essential information on aspects of the works. The communications strategy will include:

- Procedures to inform stakeholders affected by the construction phase on schedules for any activity which is likely to affect them, and minimise any disruption;
- Preparation and distribution of information leaflets/notices to be distributed to affected parties;
- Sight and road signage;
- A Public Information Programme to provide construction and temporary traffic management information to road users, residents, businesses, consumers, trade organisations and other relevant parties; and
- Details of a contact name and number for any complaints that may arise during the works.

A complaints register/tracking system will form part of the communications strategy, and all complaints will be handled in an efficient manner. The register will have prescribed methodologies for documenting and actioning complaints received from the public and the relevant stakeholders.

6. Emergency Incident Response Plan

6.1 Overview

It shall be the responsibility of the contractor to develop an (Emergency) Incident Response Plan (IRP) which shall be subject to approval by the Employer's Representative.

The contractor shall be required to comply as a minimum with requirements for incident management in accordance with the procedures outlined in the LCCC Incident Management and Emergency Response Plan Procedure and associated documents. The contractor's IRP will take LCCC's incident management requirements into account and will form part of the contractor's detailed CEMP.

The primary objective of the IRP shall be to ensure the safety to all workers and visitors on the works site.

The IRP will detail the emergency incident response procedures that will ensure that all countermeasures proceed in a controlled manner so that greater damages are avoided and the possible effects upon persons, the environment and property are avoided or minimised.

The contractor will include within the plan, a pollution incident response procedure that is site/activity specific and will include at a minimum; locations and operating procedures for emergency equipment, identification of pollution scenarios, staff training and responsibilities as well as Safety Data Sheets (SDS) of all chemicals on site.

The IRP will be regularly reviewed by the contractor and amended to ensure it is applicable to the current construction activities, outlining the associated risks and recommended emergency responses procedures.

The IRP will provide a list of emergency contacts depending on the incident, a number of these is provided in Table 6.1 below. The IRP shall also detail the contact details for the personal assigned responsibility of following up once an incident has occurred and the procedure to be adhered to in such an event.

6.2 Incident Reporting

In the event of an incident occurring, the contractor shall be required to outline in a report at the minimum the following points:

- A detailed description of the incident, including the location, time, weather conditions, affected parties;
- Potential contributing factors;
- Negative effects;
- Current mitigation control measures in place; and
- Recommended improvements/ corrective actions to reduce risk of recurrence.

The contractor shall submit to the Employer's Representative an initial incident report as detailed above, within a 24-hour period of the incident occurring. Incidents shall be reported to the relevant Emergency Services.

6.3 Emergency Contact Details

The IRP shall include emergency contact details for key personal and emergency services, methods of notifying local authorities, statutory bodies, and relevant stakeholders. These numbers will be posted at suitable noticeboards/welfare facilities. Emergency Contracts will include (but not limited to):

Table 6-.1: Emergency Contacts

Contact	Telephone no.
Emergency Services – Ambulance, Fire, Gardaí	999/112
Hospital – University Hospital Limerick, St Nessans Road, Dooradoyle, Limerick	(061) 301 111
ESB Emergency Services	1850 372 999
Gas Networks Ireland Emergency	1850 20 50 50
Gardaí – Mayorstone Park Garda Station, Limerick	(+353) 61456980
Health and Safety Co-ordinator - Health & Safety Services	TBC
Health and Safety Authority	1890 289 389
Project Supervisor Construction Stage (PSCS)	TBC
Project Supervisor Design Process (PSDP)	TBC
Client: Limerick City & County Council (LCCC)	(+353) 61 556000

6.4 Resources and Training

The contractor shall ensure that the relevant staff will be trained in the implementation of the IRP. A list of all staff that received training on the topic shall be provided to the Employer's Site Representative outlining the person's name, contact number and the date the training was provided.

6.5 Emergency Access and Equipment

The contractor shall ensure that at each of the proposed work locations, there will be adequate space provided during construction to allow for emergency access routes. These emergency access routes shall be maintained for the duration of the construction stage.

Locations of pollution control plant/spill kits shall be provided by the contractor to the Employer's Site Representative. All pollution control equipment shall be checked regularly throughout the duration of the site works to ensure that it is in working order.

6.6 Site Evacuation/Fire Drill

A site evacuation/fire drill procedure will provide the basis for carrying out the immediate evacuation of all site personnel in the event of an emergency. The following steps will be taken:

- Notification of the emergency. Provision of a siren, fog-horn or congruent notify all personnel of an emergency;
- An assembly point will be designated in the construction compound area and will be marked with a sign. All site personnel will assemble at this point;
- A roll call will be carried out by the Site Security Officer to account for all personnel on site; and
- The Site Security Officer will inform the Site Manager when all personnel have been accounted for. The Site Manager will decide the next course of action, which will be determined by the situation that exists at that time and will advise all personnel accordingly.

All personnel will be made aware of the evacuation procedure during the site induction. The Fire Services Acts of 1981 and 2003 require the holding of fire safety evacuation drills at specified intervals and the keeping records of such drills.

6.7 Spill Control Measures

Every effort will be made to prevent an environmental incident during the construction and operational phase of the project. Oil/fuel spillages are one of the main environmental risks that will exist on the site which will require an emergency response procedure. The importance of a swift and effective response in the event of such an incident occurring cannot be over emphasised. The following steps provide the procedure to be followed in the event of such an incident:

- Stop the source of the spill and raise the alarm to alert people working in the vicinity of any potential dangers;
- If applicable, eliminate any sources of ignition in the immediate vicinity of the incident;
- Contain the spill using the spill control materials, track mats or other material as required. Do not spread or flush away the spill;
- If possible, clean up as much as possible using the spill control materials;
- Set up temporary barriers or exclusion zones to keep personnel and the public away from the contaminated area;
- Contain any used spill control material and dispose of used materials appropriately using a fully licensed waste contractor with the appropriate permits so that further contamination is limited;
- Spill containment zones will be located within the temporary construction compounds, on impermeable areas and equipped with all necessary materials to respond to any potential spill;
- Notify the EM immediately giving information on the location, type, and extent of the spill so that they can take appropriate action;
- The Site Manager will inspect the site and ensure the necessary measures are in place to contain and clean up the spill and prevent further spillage from occurring; and
- The EM will notify LCCC as the appropriate regulatory body and the Environmental Protection Agency (EPA), if deemed necessary.

The importance of a swift and effective response in the event of such an incident occurring cannot be over emphasised. Any environmental incident must be investigated in accordance with the following steps:

- The EM must be immediately notified;
- If necessary, the EM will inform the appropriate regulatory authority. The appropriate regulatory authority will depend on the nature of the incident;
- The details of the incident will be recorded on an Environmental Incident Form which will provide information such as the cause, extent, actions, and remedial measures used to follow the incident. The form will also include any recommendations made to avoid reoccurrence of the incident;
- If the incident has impacted on an ecologically sensitive receptor, such as a sensitive habitat, protected species, or designated conservation site (SPA or SAC), the EM will liaise with a project ecologist; and
- A record of all environmental incidents will be kept on file by the EM and the Main Contractor. These records will be made available to the LCCC and EPA if required.

The EM will be responsible for any corrective actions required as a result of the incident e.g., an investigative report, formulation of alternative construction methods or environmental sampling, and will advise the Main Contractor as appropriate.

6.8 Corrective Action

Where an incident has occurred, or a site audit/ inspection has identified a non-conformance, it is imperative that a reoccurrence of a similar incident is avoided. Once the source of the incident has been identified, appropriate measures shall be implemented. Depending on the correction action required, these measures may involve additional training to site personal, updating construction activity procedures, providing additional pollution protection equipment. Revised work methods, training requirements or any corrective action required to ensure an incident does not reoccur will be documented by the contractor in an updated IRP and CEMP.

6.9 Emergency Incident Response Plan – Key Points

- The IRP is a live document and shall be updated regularly by the contractor as necessary to include corrective actions implemented, revisions to regulations, and requests from Employer's Representative;
- The IRP shall full comply;
- Detail list of key personal to be contacted in the event of an emergency/incident;
- Notification of incident and detailed incident investigation report provided to the Employer's Representative;
- Identify and implement corrective actions;
- Site specific pollution emergency response plan for risks associated with chemical/fuel spills; and
- Initial training to staff prior to construction work commencing and regular training (e.g., Toolbox Talks) throughout the duration of the construction stage.

7. Mitigation and Monitoring Proposals

This section of the CEMP groups together all mitigation measures and monitoring proposals currently identified for the proposed development including those specified in the environmental reporting prepared for the project.

The mitigation measures are presented in the following pages, and a reference number has been applied to each of the measures for ease of reference.

Presenting the mitigation measures and monitoring proposals in tabular format provides an easy to audit list that can be reviewed and reported on during the project. This can be further expanded on, if necessary.

Ref No.	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
General					
MM1	Detailed CEMP and Method Statements	CEMP Sections 4.2.	A suite of **Construction Management Plans** will be prepared by the appointed contractor and included within the detailed CEMP. **Method Statements** will be provided for all works and will be approved by the Employer's Representatives prior to the commencement of constructions works. The CEMP will be distributed to members of the project team, including subcontractors as necessary to ensure that environmental and health and safety requirements are adequately communicated.		
MM2	Safety Induction	CEMP Section 5.2	All staff and operatives will receive a site-specific safety and environmental induction prior to commencing any work on-site. All personnel involved with the project shall be informed of the requirement for protection of designated habitats including the aquatic environment, i.e., River Shannon SAC, and best practice methodologies to be employed.		
MM3	Toolbox Talks	CEMP Section 5.2	Toolbox talks will be provided to all staff for (but not limited to) working with concrete and biosecurity requirements on site. Toolbox talks will be held by the Environmental Manager or Site Manager at the commencement of works, or at the commencement of new activities.		
MM6	Health and Safety	CEMP Section 4.2	During construction of the proposed development, all staff will be made aware of and adhere to the most up to date version of the Health & Safety Authority's '*Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) Regulations 2013*'. This will encompass the use of all necessary Personal Protective Equipment and adherence to the site Health and Safety Plan.		
MM7	Health and Safety	General	Appropriate fencing will be erected around any excavations to prevent uncontrolled access to this area. Appropriate health and safety signage will also be erected on this fencing and at locations around the site.		
MM8	Ecological Walkover Survey	CEMP Section 4.2.6 & 4.3	An ecological walkover survey by the project ecologist and construction team will be complete prior to the commencement of works.		
MM9	Emergency Incident Response Training	CEMP Section 6.4	The contractor will ensure that the relevant staff will be trained in the implementation of the IRP. A list of all staff that received training on the		

Ref No.	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			topic shall be provided to the Employer's Site Representative outlining the person's name, contact number and the date the training was provided.		
MM10	Emergency Access Routes	CEMP Section 6.5	The contractor shall ensure that there will be adequate space provided during construction to allow for emergency access routes. These emergency access routes shall be maintained for the duration of the construction stage.		
MM11	Site Evacuation Procedure	CEMP Section 6.6	A site evacuation/fire drill procedure will be established by the contractor and will provide the basis for carrying out the immediate evacuation of all site personnel in the event of an emergency.		
Flora and Fauna					
Biodiversity - General					
MM13	Biodiversity	CEMP Section 4.2.6	▪ The surrounding immediate construction area will be fenced off, or otherwise demarcated, to prevent inadvertent intrusion from construction plant; ▪ Adherence to LCCC Biodiversity Action Plan and Key Objectives; and ▪ Planting as per the proposed Landscape Plan shall be included at construction stage.		
Trees and Hedgerows					
MM16	Protection of Vegetation during Construction	General	▪ Good planning and site management will be followed during construction works to ensure areas are not adversely impacted by construction activities; ▪ Recommendations for the specific measures advised regarding management of the trees in relation to this development will be detailed in the Method Statements.		

Ref No.	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
MM17	Protection of Vegetation during Construction	General	▪ Removal of scrub vegetation will be performed in winter outside of the bird breeding season (1st March – 31st August); and ▪ Tree felling/Hedgerow cutting should be preceded by a competent assessment as to the presence of any protected wildlife species, where required specialist advice should be sought if necessary.		
MM18	Protection of Vegetation post-construction	General	▪ The proposed Landscape Plan should be fully implemented and monitored to ensure success of the planting scheme through periodic surveys. Additionally invasive species should be controlled to limit their growth and spread along the greenway route.		
Vegetation					
MM18	Invasive Species	CEMP Section 4.3	▪ A risk assessment and biosecurity method statement must be provided by the contractor prior to commencing works. ▪ Good construction site hygiene should be employed on site. ▪ Any material that is imported onto any site will be verified by a suitably qualified ecologist to be free from any invasive species listed on the 'Third Schedule' of Regulations 49 & 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I 477 of 2011).		
Water Quality, Soil and Groundwater					
MM19	Water Quality	General and CEMP 4.2.5 & CEMP 4.2.7.	▪ The works site and area will be strictly demarcated to prevent any machinery operation and movement or works activities on adjacent land or fields outside the site. ▪ There will be no storage of machinery (including drill rigs), fuel or chemicals in areas prone to flooding or within 30m of any drain or watercourse.		

Ref No.	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			▪ Refuelling of machinery will be carried out off site or in a contained bunded area on site. ▪ Spill kits will always be present on sites and wherever fuel bowsers are parked or operating where there is interaction with an open waterway; ▪ Hydraulic fluid leaks will be addressed, using the Spill kit that will be present on the site as soon as they are identified. ▪ The plant in question will immediately be moved to a safe area where leakage of fluid into the water way is not possible. ▪ Storage tanks 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 should be maintained on-site to enable a rapid and effective response to any accidental spillage or discharge. ▪ Waste oils and hydraulic fluids shall be collected in suitable leak-proof containers and transported from the Site and Off-Site Areas for disposal or recycling. ▪ Where feasible, all construction machinery shall use biodegradable oils and fuels. ▪ Machinery used on site shall be regularly inspected 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		

Ref No.	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			handled, stored, and disposed of 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. ▪ Works shall not be carried out during or immediately following heavy rainfall events, when the potential for surface water and overland runoff is increased.		
MM20	Excavation	CEMP Section 4.2.5.	▪ Topsoil will be stripped as necessary to prepare for open cut trench excavation. ▪ Topsoil will be stockpiled for reuse within the works area or stored for reuse in a dedicated site compound which will be protected with silt fences. Where it is necessary to store topsoil for a significant period, it will be sown with grass seed to prevent any windblow or water erosion and subsequent run-off. ▪ Excavated material will be reused where possible. In the event it is not required for re-use, it will be removed by a licenced waste contractor. ▪ A silt filtration system will be used, as appropriate, to prevent contamination of any drains or watercourse.		
MM21	Pollution Control – Site Compound	CEMP Section 2.3.4, 4.2.1 & 4.2.7.	▪ The compound will be adequately buffered to prevent any surface water run off or will incorporate a surface water collection and treatment system if required. The compound areas will be monitored and observed daily to ensure that it is not impacting on any local watercourses. The site compound will also include the following mitigations:		

Ref No.	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			▪ Bunded (minimum 110% bunding of all fuels) and impermeable containment areas for plant refuelling, maintenance, washing, storage of fuels and site generators. The bunded area shall have sufficient volume to contain any spills and all mitigation measures for these activities are outlined below in their various sections; ▪ A dedicated waste storage area for any construction waste generated. All skips or bays will be labelled/signage for segregated recyclable material i.e., a skip labelled for recycled timber; ▪ A wheel wash area for construction and delivery vehicles. ▪ Availability of a designated wash out tank for wash out of concrete trucks following concrete pours.		
MM22	Pollution Control	CEMP Section 4.2.5	▪ Dewatering of any excavation will be undertaken as necessary. In the event that dewatering pumps and silt filtration systems are required then they will be positioned in strategic locations adjacent to the excavation.		
MM23	Pollution Control	CEMP Section 4.2.1 & 4.2.7.	▪ Material storage and handling measures will be implemented to contain potential sources of soil/groundwater pollution. Contractors will ensure that spill kits will be accessible to construction personnel at all times and all spills will be reported to the site environmental manager; ▪ All liquids, solids and powder containers will be clearly labelled and stored in sealable containers; ▪ All liquid and hazardous materials will be stored in a designated and temporarily bunded areas with appropriate signage. This area should be within the construction compound or at an alternative location agreed with the Site Environmental Manager;		

Ref No.	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			▪ All bunding must have a minimum capacity of 110% of the volume of the largest tank or 25% of the total storage capacity, whichever is the greater. Bunding shall be impermeable to the substance that is being stored in the tank; ▪ Where a contractor is responsible for materials stored in a bunded area, that contractor shall implement measures for the regular inspection of bunds and emptying of rainwater (when uncontaminated); ▪ Material storage areas will be at a safe distance from live construction activities; ▪ Spill kits will be provided in areas where liquids are stored and refuelling areas; ▪ Chemicals/fuels/materials brought on-site must be accompanied by a Safety Data Sheet (SDS). A copy of the SDS should be provided to the Site Manager and kept in a file in the site office; ▪ Materials will be stored in accordance with any specific requirements of the SDS; ▪ A complete register of all SDSs in use on-site will be maintained and retain copies of all SDS on-site; ▪ Ordering of materials will be completed in such a manner as to minimise quantities present on-site; ▪ Excess materials will not be stored on-site for extended periods; ▪ Contractors will be responsible for ensuring the regular maintenance of construction plant and equipment, to prevent leaks		
MM24	Refuelling Fuel and Hazardous Material	CEMP Section 4.2.7	▪ All machinery and plant used will be regularly maintained and serviced and will comply with appropriate standards to ensure that leakage of diesel, oil and lubricants is minimised;		

Ref No.	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			▪ Fuels, oils, greases, and hydraulic fluids will be fully bunded (110%), works compounds used for the storage of materials and machinery will be located in a designated area; ▪ Refuelling of machinery will be carried out off site (if convenient and situation allows) or in a contained bunded area on site.		
MM25	Cement Based Products	CEMP Section 4.2.8	▪ Concrete pouring will be planned for dry days were possible by following weather forecasts; and ▪ Where concrete is delivered to the site and pour is complete, truck will be directed to a designated concrete washout area which will be lined with an impermeable membrane.		
MM26	Fuel/ Oil Spillages	CEMP Section 6.7	▪ An emergency incident response procedure will be established for oil/fuel spillages.		
Air Quality & Climate, Noise & Vibration					
MM27	Dust	CEMP Section 4.2.2	▪ Site roads/access paths shall be regularly cleaned and maintained as appropriate; ▪ Hard surface roads shall be swept to remove mud and aggregate materials from their surface while any un-surfaced roads shall be restricted to essential site traffic only. Furthermore, any road that has the potential to give rise to fugitive dust must be regularly dampened by water sprinklers, as appropriate, during dry and/or windy conditions; ▪ Vehicles using site roads shall have their speeds restricted where there is a potential for dust generation. Vehicles delivering material with dust potential should be always enclosed or covered with tarpaulin to restrict the escape of dust; ▪ Vehicles exiting the site areas shall make use of a wheel wash facility where appropriate, prior to entering onto public roads, to		

Ref No.	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			ensure mud and other wastes are not tracked onto public roads. Public roads outside the site should be regularly inspected for cleanliness and cleaned as necessary. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions; ▪ Material handling systems and site stockpiling of materials should be designed and laid out to minimise exposure to wind. Water misting or sprays shall be used as required if particularly dusty activities are necessary during dry or windy periods. Spoil stockpiles that will remain in-situ for a duration greater than 6 months will be hydroseeded and maintained throughout the construction phases to prevent dust; ▪ At all times, dust levels and extent as well as control the procedures put in place will be strictly monitored by the site engineer and the environmental manager and assessed and reviewed as necessary. In the event of dust nuisance occurring outside the site boundary, satisfactory procedures will be implemented to rectify the problem, in consideration of all stakeholders including pedestrians and cyclists; ▪ The dust minimisation plan shall be reviewed at regular intervals during the construction phase to ensure the effectiveness of the procedures in place and to maintain the goal of minimisation of dust using best practice and procedures;		
MM28	Noise	CEMP Section 4.2.3	▪ Management of Noise emissions will be following British Standard BS5228:2009 – Noise and Vibration control on construction and open sites Part 1 – Noise; ▪ Any plant such as generators and pumps which are required to work outside the site working hours, shall be surrounded by an acoustic		

Ref No.	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			enclosure, or fitted with other approved noise reduction measure to the approval of the Employer's representative; ▪ Plant and machinery with low inherent potential for generation of noise and/or vibration will be selected. All construction plant and equipment to be used on-site will be modern equipment and will comply with the European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations; ▪ The best means practicable (BPM), including proper maintenance of plant, no idling of plant etc. will be employed to minimise the noise produced by on site operations; ▪ All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the works; ▪ Compressors will have attenuated models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers; and ▪ Machinery which are used intermittently, will be shut down or throttled back during those periods when they are not in use.		
MM29	Noise & Vibration Standards	General	It is recommended that appointed contractor(s) be required to adopt practices set out in British Standard BS 5228:2009 Code of practice for noise and vibration control on construction and open sites Part 1: Noise and Part 2: Vibration (2009). Measures recommended in the standard include: ▪ Appointing a project representative responsible for noise and vibration issues, and for liaising with local representatives. A clear communication channel should be established between all parties prior to project commencement; ▪ Requiring that contractors ensure that site personnel are familiar with potential noise and vibration issues, and that personnel apply		

Ref No.	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			a common-sense approach to eliminating unnecessary noise emissions; ▪ Use of quieter plant and methods where possible; ▪ Installation of temporary barriers or enclosures around local sources such as compressors and generators; and ▪ Limiting times of activities which may generate elevated noise or vibration emissions.		
Waste Management					
MM30	Waste Management	CEMP Section 4.4	All current and applicable waste management legislation will be applied and adhered to. Contractors that are engaged in the transport of waste off-site will comply with the provisions of the Waste Management Act (1996) (as amended), associated Regulations and the Waste Management Plan prepared in accordance with '*Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects* (2006)'. As such, the contractor must handle, transport, and dispose of waste in a manner that ensures that no adverse environmental impacts occur as a result of any of these activities. A collection permit to transport waste must be held by the relevant contractor which has been issued by the Local Authority where the waste has been generated i.e., LCCC		
MM31	Waste Management	CEMP Section 4.4	▪ The construction compound for the proposed scheme should have a dedicated Waste Storage Area (WSA) for any construction waste generated. Receptacles/skips or bays will be provided for each recyclable material.		
MM32	Segregation of Waste	CEMP Section 4.4	▪ All waste generated on site will be segregated and placed in appropriate waste streams designated for recycling, reuse, or disposal.		
MM33	Waste Documentation	CEMP Section 4.4.3.5	▪ A recording system to be put in place to record construction waste generated on site. The system will enable the contractor to maintain		

Ref No.	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			records for all waste material which leaves the site, either for reuse on another site, recycling, or disposal; ▪ The licensed waste contractor employed to remove waste from the site will be required to provide documented records for each movement of waste off-site; ▪ All information will be entered into the waste management system to be maintained on site.		
Existing Services					
MM34	Existing Services	General	The contractor must adhere to the ESB Code of Practice for Avoiding Danger from Overhead Electricity Lines, 2008 and the HSA Code of Practice for Avoiding Danger from Underground Services, 2010.		
MM35	Existing Services	General	▪ Prior to excavation, the contractor will assess record drawings and the results of the Site Investigation in order to determine the exact depth and location of the existing service networks within the works area; ▪ Prior to any excavation works all known existing underground services will be clearly marked on the ground. These will be located by personnel trained in the location of underground services; and ▪ All overhead electrical lines will be clearly marked and delineated with goalposts, Crossing points, onsite in accordance with the ESB Networks Code of Practice. All exclusion zones to be clearly identified on site and appropriate plant and machinery selected for works within the exclusion zone with particular attention given to maximum reach of the machinery being used for lifting operations while constructing for excavation works.		
MM36	Existing Services	General	▪ Any anticipated clashes between the existing utilities and the proposed works will be identified during the design phase and any		

Ref No.	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			diversions necessary to avoid accidental clashes during the construction phase will be designed, planned, and agreed with the utility company in advance of the construction phase of the Scheme.		
Archaeology and Built Heritage					
MM37	Archaeological Monitoring	General	The area under assessment in this report comprises an area spanning the southern bank of the River Shannon, approximately 2kms to the east of Limerick City in the townlands of Dromore, Sreelane, Newcastle, and Castletroy. The proposed development extends for approximately 4.5kms within mixed use landscape. In the event that any previously unrecorded archaeological features are uncovered during monitoring of ground works then they will be recorded and securely cordoned off while the IW Project Archaeologist, the LCCC Archaeologist and the NMS are consulted to determine appropriate further mitigation measures, which may entail preservation in situ (by avoidance) or preservation by record (archaeological excavation).		

8. Programme of Works

8.1 Construction Schedule

The finalised construction works programme was not available at the time of formulating this outline CEMP, however it should include the following will be subject to the following constraints.

The following mitigation calendar shall 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.

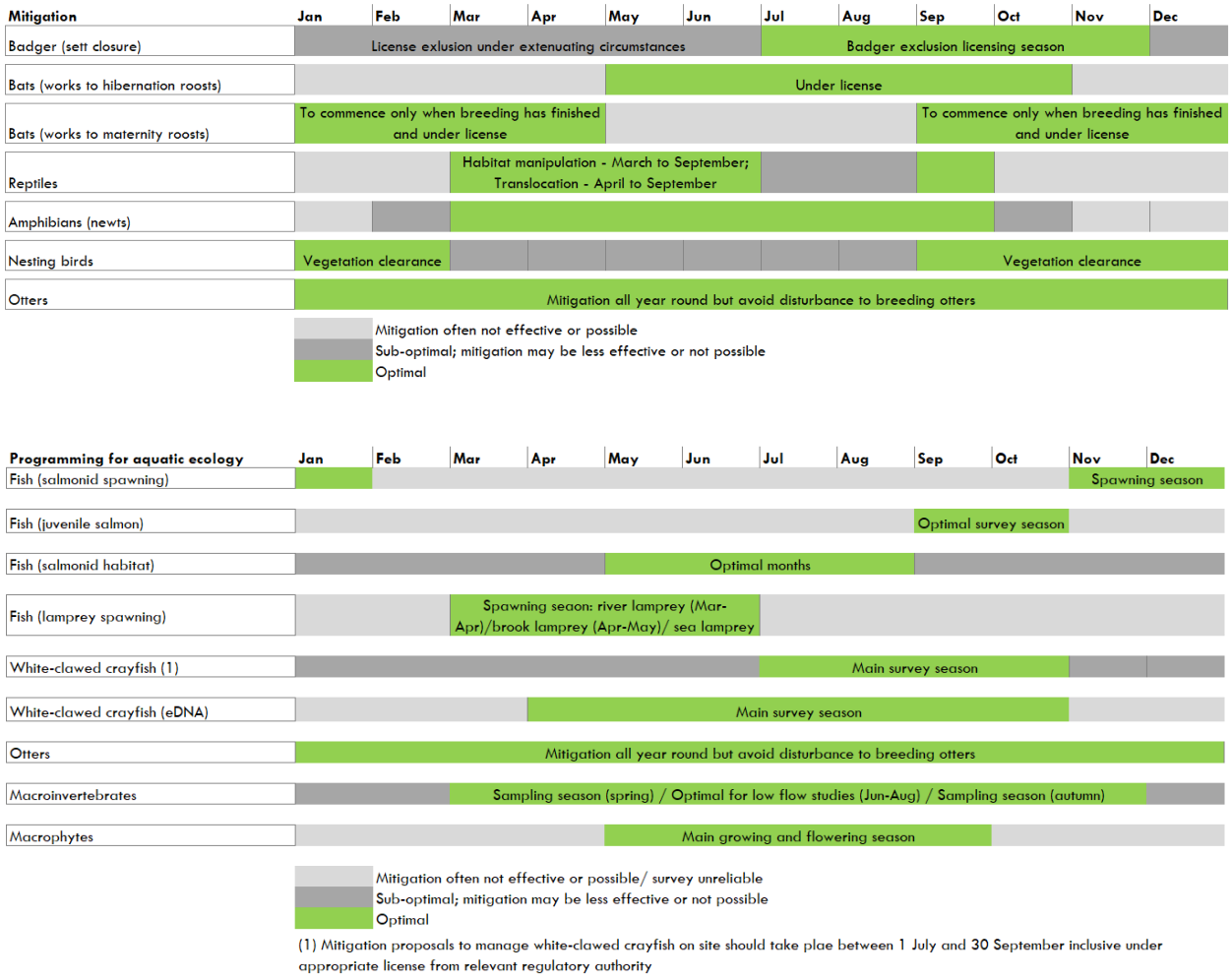


Figure 8-1: Ecological calendar

8.1.1. Ecological Clerk of Works

Where the construction programme does not allow this seasonal restriction to be observed, vegetated areas will be inspected by a suitably qualified ecologist for the presence of breeding birds prior to clearance as outlined in Section 4.2.6 of this CEMP.

8.1.2. Tree and scrub clearance

To avoid impacting on bird nesting sites, vegetation (e.g., hedgerows, woodland, tree, scrub, and grassland) will not be removed between 1st of March and 31st of August inclusive, to avoid impacts on nesting birds.

Although the Wildlife Acts provide an exemption from this seasonal restriction for road construction, there is no exemption provided for intentional nest destruction.

8.1.3. National Holidays

- Christmas non-working time is from the beginning of the third week of December to the end of the first week of January; and
- Other non-working times including bank holidays, '*builders*' holidays etc.

8.2 Working Hours

The normal working times are set out in the section below. Works other than safety requirements, security and emergency works will not be undertaken outside these working hours without the written permission from LCCC. This permission, if granted, can be withdrawn at any time should the working regulations be breached.

Night is defined as 18:00 to 08:00hrs.

No rock breaking works or works involving the using of pneumatic breaking equipment shall take place between the hours of 22:00 and 07:00. Should rock occur on sections where any night works are specified then alternative working hours shall be agreed with the Employer's Representative.

It is proposed (unless otherwise specified by the Local Authority or planning conditions) that the construction activities will operate during daylight hours and between dawn and dusk during shortened daylight hours. During daylight hours the following will constitute the normal working hours;

- Monday to Friday – 08:00 to 18:00;
- Saturday – 08:00 to 13:00; and
- Sundays or Bank Holidays – no works permitted.

Where additional or alternative working hours are required, these will be agreed in advance via written agreement with LCCC. Approval to vary the prescribed hours may be sought based on the following considerations:

- Traffic management issues;
- Safety requirements including risk to the public;
- Sequential/timing measures;
- Requirements of other authorities (e.g., ESB, Eircom); and
- Public interest.

Emergency work may include the replacement of warning lights, signs and other safety items on public roads, the repair of damaged temporary works and all repairs.

9. Compliance and Review

9.1 Site Inspections and Environmental Audits

Daily and weekly environmental inspections of construction activities will be carried out by the Environmental Manager and the Site Construction Manager in accordance with the CEMP to ensure all controls to prevent environmental impact, relevant to the construction activities taking place at the time, are in place.

9.2 Auditing

It will be the responsibility of the contractor to implement the mitigation and monitoring measures specified in the AA Screening Report and the CEMP. The contractor will also ensure that all construction staff understand the importance of implementing the mitigation measures. The implementation of the mitigation measures will be overseen by the Environmental Manager.

Throughout the construction phase, environmental audits will be carried out by a suitably qualified and experienced person. A schedule of audits will be agreed with the Employers Representative in advance of commencement of works. The purpose of the environmental audits is to identify any underlying causes of non-compliance and determine whether the CEMP is being properly implemented and maintained. Audits also allow for the identification of system and performance improvement opportunities. The contractor may carry out the environmental audit themselves or appoint external personnel acting on their behalf. The results of environmental audits will be provided to the project management team.

An audit of compliance with the pre-commencement mitigation measures will be completed by the Environmental Manager prior to the commencement of construction. Monthly audits of compliance with the construction phase mitigation measures will be completed as construction is ongoing. The findings of each audit will be documented by the Environmental Manager and made available to LCCC and other statutory bodies on request.

Once the scheme is operational and has been commissioned, a report of compliance with operational phase mitigation measures will be completed.

9.3 Environmental Compliance

The following definitions shown in Table 9.1 shall apply in relation to the classification of Environmental Occurrences during construction:

Table 9.1: Environmental Occurrences

Occurrence	Definition
Environmental Near Miss	An occurrence which if not controlled or due to its nature could lead to an Environmental Incident.
Environmental Occurrence	Any occurrence which has potential, due to its scale and nature, to migrate from source and have an environmental impact beyond the site boundary.
Environmental Exceedance Event	An environmental exceedance event occurs when monitoring results indicated that limits for a particular environmental parameter has been exceeded. An exceedance will immediately trigger an investigation into the reason for the exceedance occurring and the application of suitable mitigation where necessary.
Environmental Non-Compliance	A non-compliance occurs when there is non-fulfilment of a requirement, and includes any deviations from established procedures, programmes and other arrangements related to the Environmental Management System (EMS).

The proposed greenway project will comply with all relevant environmental regulations and guidance set out by key regulatory bodies, including the Environmental Protection Agency (EPA), the National Parks and Wildlife Service (NPWS), and other relevant authorities. The proposed development will adhere to the provision set out

in the Habitats Directive and Birds Directive, ensuring the protection of the Qualifying Interests of the Lower River Shannon Special Area of Conservation. Specific measures to prevent pollution will be in line with the Water Framework Directive and the European Communities (Water Policy) Regulations. Compliance will be ensured through monitoring, audits and consultations with the relevant authorities and any mitigation measures will be undertaken in accordance with their recommendations.

9.4 Corrective Action Procedure

A corrective action is implemented to rectify an environmental problem on-site. Corrective actions will be implemented by the Site Manager/Environmental Manager, as advised by LCCC, or the Employer's Representative. Corrective actions may be required as a result of the following:

- Environmental audits;
- Environmental Inspections and Reviews;
- Environmental Monitoring;
- Environmental Incidents; and
- Environmental Complaints.

A Corrective Action Notice will be used by the Employer's Representative to communicate the details of the action required to the main contractor. A Corrective Action Notice is a form that describes the cause and effect of an environmental problem on site and the recommended corrective action that is required. The Corrective Action Notice, when completed, will include details of close out and follow up actions.

If an environmental problem occurs on site that requires immediate attention, direct communication between the Site Manager/Environmental Manager will be conducted. This will then be passed down to the site staff involved. A Corrective Action Notice will then be completed.