



Comhairle Cathrach
& Contae **Luimnigh**

Limerick City
& County Council

LIMERICK CITY GREENWAY (UL TO NTP)

EIAR Part 1

Non-Technical Summary

July 2025

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NON-TECHNICAL SUMMARY

1. INTRODUCTION

This Environmental Impact Assessment Report (EIAR) for the Limerick City Greenway (UL to NTP) has been prepared by Ryan Hanley on behalf of the Limerick City and County Council (LCCC) who proposed to implement and maintain the Project. The EIAR forms an integral part of the applications for consent of the Project, acting as a basis for public consultation and informed comment.

This EIAR has been prepared to support a planning application to An Coimisiún Pleanála which will be made under Section 51(A) of the Roads Act (1993) (As amended).

The proposed Limerick City Greenway (UL to NTP) forms part of a larger cycleway plan. The Limerick Shannon Metropolitan Area Transport Strategy (LSMATS) 2040 references the proposed Greenway as part of Limerick's Cycle Network to develop a consistent, clear and continuous network of urban and suburban cycle networks to ensure cycling becomes a realistic choice as a mode of transport.

The project will form an extension to the already constructed Limerick Smarter Travel, Route 2, which involved the upgrade of an existing pathway, 1.5km in length between University of Limerick and the Kevin Hannan Bridge along the southern bank of the River Shannon and connects directly into Limerick city centre.

It is anticipated that the proposed Greenway will provide a safe transport route connecting the University of Limerick and the National Technology Park (NTP) to Limerick city whilst also enhancing the amenity value of the area.

The EIAR complies with the EIA directive and with the Irish Regulations and will be made available for inspection by the public as part of the pre-planning consultation as required under Section 247 of the Planning and Development Act, 2000 (as amended).

Ryan Hanley was engaged as environmental consultants on the proposed project and commissioned to prepare this EIAR in accordance with the requirements of the EIA Directive and the Irish EIA Regulations.

The EIAR provides information on the receiving environment and assesses the likely significant effects of the proposed project on it and proposes mitigation measures to avoid or reduce these effects. It then provides an assessment of the residual effects of the project taking into account the implementation of mitigation. The function of this EIAR is to provide information to allow the competent authority to conduct the EIA of the proposed project.

All elements of the project have been assessed individually, and cumulatively together, and then in combination with other plans and projects as part of this EIAR.

The preparation of this EIAR has been undertaken in compliance with the provisions of the “Guidelines on the Information to be Contained in Environmental Impact Assessment Reports” (EPA, May 2022), which are intended to guide practitioners preparing an EIAR and the EIAR complies with these Guidelines, as well as the ‘Guidelines for Planning Authorities and An Bord Pleanála on Carrying out Environmental Impact Assessment’, published by the Department of the Department of Housing, Planning and Local Government (DHPLG) in August 2018.

The European Commission also published a number of guidance documents in December 2017 in relation to Environmental Impact Assessment of Projects (Directive 2011/92/EU as amended by 2014/52/EU) including 'Guidance on Screening', 'Guidance on the preparation of the Environmental Impact Assessment Report'. Ryan Hanley has prepared the EIAR with in accordance with these guidelines also.

The purpose of this EIAR is to enable the competent authority to carry out an assessment of the likely significant effects on the environment of Greenway before it is constructed. The EIAR describes the current state of the environment in the vicinity of the proposed development site in an effort to quantify the possible effects, if any, of the construction and operational stages, the recommended mitigation measures, and any residual impacts of the proposed development on the environment. It then provides details of the alternatives considered and the full details of all elements and stages of the proposed development. Following this, the environmental impacts of the proposed development are assessed individually, and cumulatively together, and then in combination with other plans and projects. The requirements for the Greenway will continue for the foreseeable future, thus this EIAR does not consider environmental effects associated with a decommissioning stage of the project. The assessment process that led to the compilation of this document served to highlight any areas where mitigation measures may be necessary in order to protect the receiving environment from any significant negative effects as a result of the proposed development. Where necessary and appropriate, mitigation measures and prescribed and residual impacts are then assessed.

Each impact is described in terms of its quality, extent, duration, significance and type, where possible. A 'Do-Nothing' scenario is also predicted. Residual impacts are also presented following any impact for which mitigation measures are prescribed. The remaining impact types are presented as required or applicable throughout the EIAR.

The companies and staff involved in the production of this EIAR all possess relevant skills, experience and qualifications that are necessary to undertake the assessments that are informed in this EIAR.

2. ALTERNATIVES

A description of the reasonable alternatives studied by the developer are provided in the EIAR along with an indication of the main reasons for the option chosen, taking into account the environmental effects. Using Multi Criteria Analysis (MCA) based on a "Traffic Light System", the options have been assessed against technical, social, environmental and economic criteria. Each option has then been allotted a qualitative score. The assessment was undertaken on the basis of potential impacts and in the absence of design and mitigation measures, which may overcome many of the potential environmental effects identified.

One of the primary objectives of the project is to *"improve comfort, safety and security for walkers and cyclists who travel between the University of Limerick, the National Technology Park and Annacotty Village and to encourage an increase in the paths use"*. This was the basis for the selection for the preferred route. The preferred route is composed of a 'preferred primary route' and several additional links.

The MCA found that although in the economic aspect the design for the alternative route was preferable, the environmental, social and technical factors weighed in and resulted in the preferred route as being described in the EIAR chapters. Furthermore, the preferred route fits into the strategic planning and development objectives set by LCCC.

With mitigation measures in place, no significant environmental impact is anticipated from the proposed works. With mitigation measures in place, no adverse effects on the integrity of any European Sites are anticipated in view of their conservation objectives. This option is likely to be the most beneficial in relation to the connectivity scheme proposed by LCCC.

3. BACKGROUND TO THE PROPOSED DEVELOPMENT

Consultation with statutory and non-statutory bodies in relation to the project was started in 2021 and key stakeholders including LCCC, UL and the IDA were consulted and kept informed during the design process. These consultations involved the issuing of an EIA Scoping report, and a request for feedback and comments.

An EIA scoping report, introducing the proposed Greenway by providing details of the projects preferred route, was prepared by Ryan Hanley and circulated to statutory and non-statutory bodies in March 2021. The information provided in the scoping report was based on information gathered during earlier stages of the project including the Constraints and Options stages, existing environmental databases, reports and mapping.

A public consultation event was held on Thursday 4th August 2022. A virtual public consultation room was also created [refer to <https://www.innovision.ie/limerickcityGreenway>] for members of the public who were unable to attend in person. The plans for the proposed Greenway were displayed and a fly through video with photomontages played on a loop on a screen during the event. Consultation forms were provided to capture the thoughts of attendees, and a similar feedback form was provided in the virtual consultation room.

LCCC (the applicant) and their consultant Ryan Hanley met with An Bord Pleanála to discuss the proposed Greenway in October 2022 and in November 2024 during two pre-application consultation meetings. An Bord Pleanála provided feedback about the proposed project, and this has been incorporated into the design.

Consultation has been carried out with the LCCC Flooding team who advised that design flood levels are being produced under the CFRAM project. The IDA will progress with their own flood defences and design liaison has occurred between the proposed Greenway design team and the IDA flood defence designers to ensure there is no design overlap.

The constraints study examined the key environmental constraints within the study area upon which the construction and installation of a Greenway could have an impact. The purpose of the Constraints Study was to determine constraints that exist, which could affect the design of the Greenway, delay progress, and influence the cost. The report was based on consultation with statutory consultees, publicly available datasets, and collection of a range of environmental and baseline data.

Feedback from the consultation process showed a positive and favourable response to the proposal from the stakeholders who engaged.

The potential impact of the proposed development when considered in combination with other relevant plans and projects has been carried out in each chapter, with the purpose of identifying what influence of the proposed development will have on the surrounding environment when considered in combination with relevant, permitted, proposed and constructed projects in the vicinity of the proposed site.

4. DESCRIPTION OF THE PROPOSED DEVELOPMENT

The proposed route commences west from the existing River Groody bridge at the confluence of the River Groody with the River Shannon (CH 0). The proposed Greenway route will run adjacent to an existing narrow walking track along the southern bank of the River Shannon. The proposed Greenway will rejoin this existing Active Travel path where it is 3.5m wide and 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.

The route will pass by the UL Boat Club and extend eastwards to an existing concrete bridge which will be replaced by a 4.8m long steel bridge deck (Bridge No. 1 @ CH 795). A new 9.6m long steel and concrete bridge will be constructed alongside an existing stone bridge (Bridge No. 2 @ CH 970). The existing bridge across the Plassey Mill race will be replaced with a new 5.4m long steel bridge (Bridge No. 3 @ CH 1000) and an amenity space is proposed adjacent to the Plassey Mill (CH 1010). Access for a future connection to the Black bridge across the River Shannon to Co. Clare will be provided. A new 5.1m long steel bridge (Bridge 4 @ CH 1050) will cross the Plassey Mill race overspill channel.

The route turns southeast and will continue south of a collection of fishing huts and crosses a section of mixed broadleaved woodland and amenity grassland (approx. CH 1050 – CH 1250). The proposed route will replace an existing gravel path and turn east along the existing gravel path to continue along the River Shannon north of the Drumroe Student Village. The proposed Greenway route will pass under the Living bridge (CH 1650), and meander between the River Shannon and the Plassey Mill race to avoid mature trees until it reaches Plassey Beach.

A 12.8m long steel bridge is proposed to obliquely cross the Plassey Mill race at Plassey Bridge (CH-2200 – CH-2245). The existing narrow bridge at the mouth of the Plassey Mill race stream will be retained. The new steel and concrete bridge will facilitate wheelchair users and cyclists to cross the Plassey Mill race whereas the existing bridge is narrow and has steps preventing access to less abled users on the path. There will be a new ramp for wheelchair users and buggies/children's scooters and for people to walk down, from the proposed Greenway path to Plassey Beach providing an amenity that provides access for all. There will be new seating and planting areas provided at the beach.

The proposed Greenway route then passes north of Kilmurray Student Village and reaches a junction (CH 2250). The route south provides access to University Road and to Plassey Park road. The proposed Greenway runs south past the eastern boundary of the Kilmurray Student Village and crosses the entrances to Kilmurray Student Village and the UL Gaelic grounds where it changes from a shared 3.5m wide greenway to Active Travel infrastructure with separate footpaths and cycle lanes along the eastern and western side of University Road. The proposed cycle lanes and footpaths will tie into Active Travel infrastructure which has been constructed along Plassey Park Road as part of the Limerick Metropolitan Cycle Network Study.

The proposed Greenway route continues east at (CH 2250) and traverses amenity grassland and scrub areas where there is an unpaved desire line before turning south (CH 3100) to traverse more grassland and scrub areas, then turns south to join connect to McLaughlan Road in the National Technology Park (NTP) at CH 3500. This section of the route is subject to flooding and it lies within Flood Zone A, so drainage along and under the proposed Greenway has been designed to ensure the path can be utilised as soon as possible after flooding events.

The proposed 3.5m wide greenway changes to Active Travel infrastructure with separate footpaths and cycle lanes along the eastern and western side of McLaughlan Road. The proposed Active Travel infrastructure will connect to existing Active Travel infrastructure on Plassey Park Road. An existing raised table will be converted to a 6m wide Toucan crossing to prioritise crossings for pedestrians and cyclists.

Site clearance includes a range of vegetation clearing, topsoil and subsoil stripping and mounding, and removal of existing infrastructure items which are obstacles to the proposed path. Trees that need to be removed as part of site clearing will be laid on the ground for 24 hours after they are cut down, and then reused onsite during the works, including used to mount Bird and Bat boxes and in the construction of bug hotels. In accordance with LCCC policy for tree replanting, five trees will be planted to compensate for every tree that will be felled.

Temporary construction compounds will be required during the construction period to accommodate workforce and vehicle movements and temporary storage of construction materials. The proposed compound locations have been selected because of their proximity to public roads for delivery access and as locations which are considered to pose minimal intrusion on the environment and community. Their locations were also selected within Flood Zone C areas. There will be 4 No. temporary compounds (and 1 No temporary working area to facilitate installation of prefabricated steel bridges) to support the construction of the proposed greenway, and reinstatement of the temporary compounds will be done following the completion of the construction phase in each section before moving to the next section. Materials will be delivered to the compounds along public roads. Within the compounds there will be separation between works and delivery areas, to ensure invasive species cannot be transported off site and to keep public roads clean of debris.

Construction will be carried out in 5 No. Sections and the construction work in each section will be directly supplied by an adjoining construction compound. The construction works vehicles will be confined to a section and its adjoining compound to prevent spread of invasive species. Work in adjoining sections will be prohibited to minimise the impact of temporary section closures on users of the existing paths. The entire length of each section will be closed to the public and there will be temporary pedestrian diversion routes around each section.

Temporary haul roads are required to facilitate the construction of the proposed path. Approximately 3.9km of haul roads will be developed along the proposed greenway route and will subsequently form the subbase layers of the proposed path. Approximately 0.3km of haul roads that will not coincide with the proposed greenway route (i.e. they are required to connect construction compounds and the temporary works area to existing roads) will be reinstated following the works in that section.

The proposed path 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 interacting at these points. The proposed cycle lanes and footpaths will be segregated from roads, and road crossings will prioritise pedestrians and cyclists by use of raised tables.

Temporary traffic control measures in the form of a static lane closure will be required as part of the construction work on University Road in the University of Limerick, and McLaughlan Road in the National Technology Park in Castletroy.

The path composition is in accordance with TII document on Rural Cycleway Design DN-GEO-03047 .

A total of 26 No. culverts are proposed to be constructed under the proposed path. Open shallow drains to direct surface water to culverts under the path will be constructed alongside the greenway, in

greenfield sites where existing drainage is not present, or in locations where the path severs the natural drainage routes. Positive drainage will be maintained along existing roads and gullies will be adjusted to suit new kerb lines.

There will be 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, bike racks and benches.

Refer to Figure 1 for the Site Location plan and to Figure 2 which illustrates the existing and proposed paths, roads, and active travel infrastructure along the proposed Greenway.

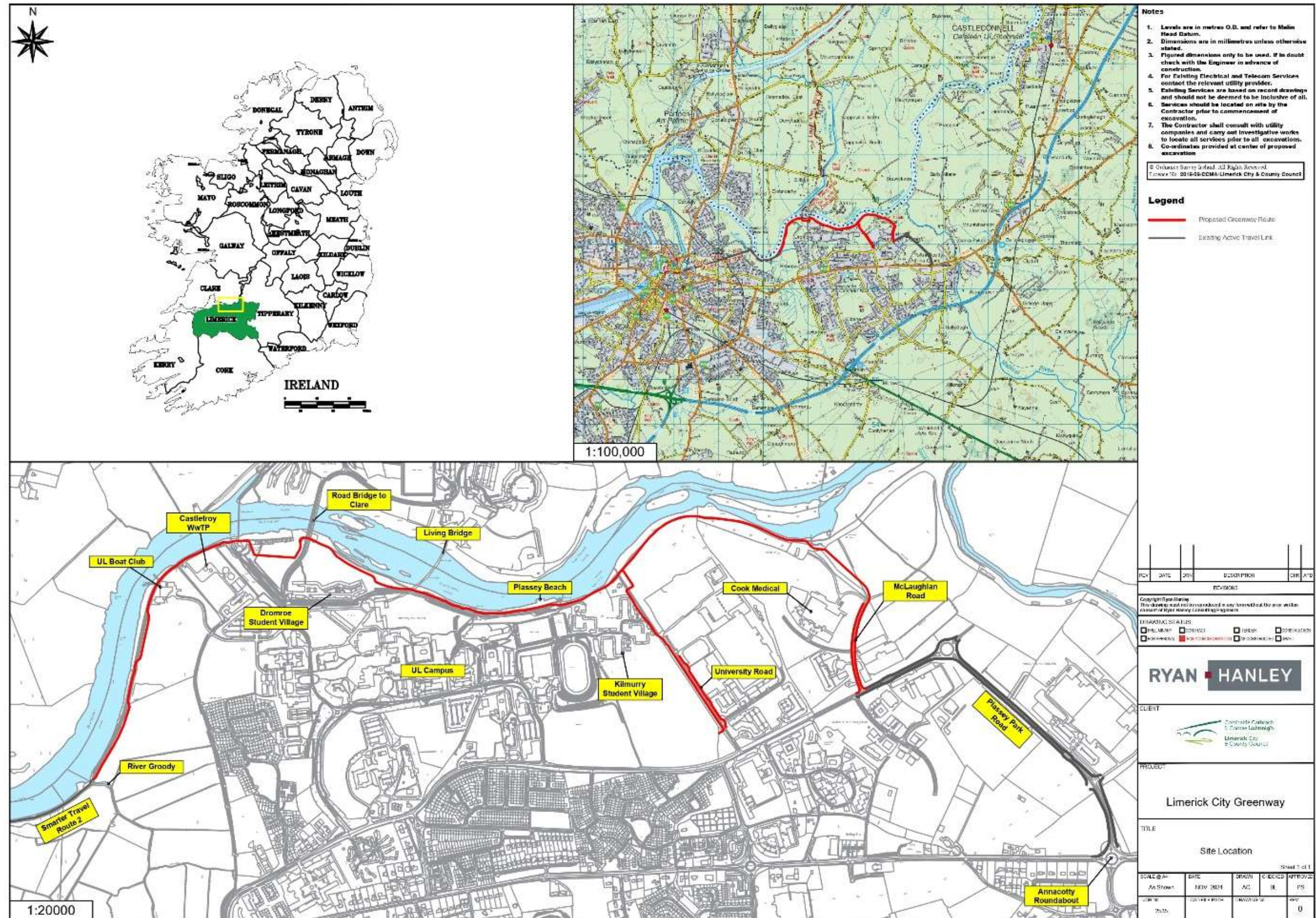


Figure 1 Location of the proposed Greenway.

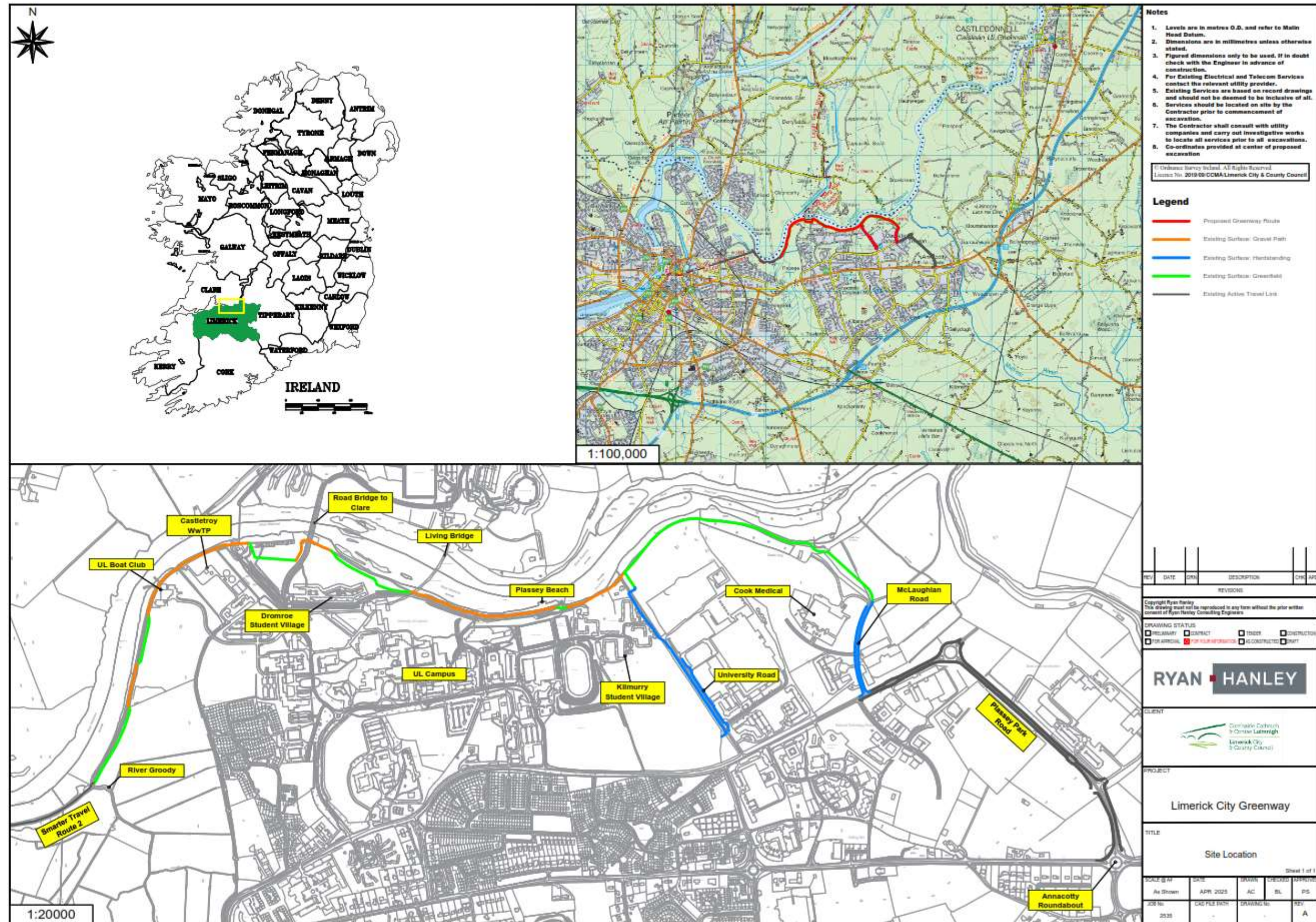


Figure 2: Proposed and Existing infrastructure on the proposed Greenway route

5. POPULATION AND HUMAN HEALTH

In order to assess the population in the vicinity of the site, the Study Area for the Population section of this EIAR was defined in terms of the District Electoral Divisions (DEDs) where the proposed Greenway is located, as well as nearby DEDs which may be affected by the proposed project. The Study Area has a combined population of approximately 1,129 persons, as of 2022 and comprises a total land area of 5.8 square kilometres (Source: CSO Census of the Population 2022).

If the proposed Limerick City Greenway (UL to NTP) were not undertaken, the existing environment would remain as it is, with the loss of the opportunity and benefit to expand the amenity and recreation facilities in the region and the provision of a safe and accessible route into the University campus and Technology Park grounds. The 'Do-Nothing' scenario would result in a lost opportunity in the improvement of facilities to support human health and wellbeing in the surrounding and wider community, the opportunity to extend the existing City Centre to University of Limerick Riverbank Walk (a 3.25km shared walkway/cycleway) which ends at the UL Boathouse further into the University and Technology Park grounds.

The construction phase will have no impact on the population of the Study Area in terms of changes to population trends or density, household size or age structure. There will be no perceptible impact on population demographics during construction phase. There is a potential for the proposed project to influence in positive means the region of Castletroy during the construction phase, primarily resulting from an increase of construction workers on site who might utilise existing hospitality facilities. Disruption and disturbance arising from temporary working areas and access routes will have no significant impacts.

Noise and dust generation from the construction activities can result in temporary local impacts. These will be variable throughout the construction project, depending on the activities underway and the distance from the main construction activities to the receiving locations and properties. However, the project is considered short term, therefore the impact will be considered as such and will vary spatially during the construction phase, constituting a short term slight negative impact.

Traffic generated during the construction phase of the proposed project is not anticipated to have a significant impact on traffic flow in the Castletroy area. Localised traffic disruption is likely to occur at locations of proposed works. In addition, construction traffic and machinery may lead to an increase in local air pollutants, from diesel exhaust emissions. Given the background levels of these air pollutants in the vicinity of the proposed project are likely to be below ambient air quality limit values, based on extensive long-term data from EPA and emissions will be short term in nature, this constitutes a potential short term slight negative impact in terms of air quality and effects on human health.

During the construction phase, short-term negative impact will occur during the loss of a walking route along the River Shannon, as well as short-term negative impact on the visual amenity of the area due to the presence of site compounds, machinery and construction materials. Overall, this has the potential to have a short-term slight to significant negative impact (in the absence of mitigation) but the impacts during the construction phase can be managed through appropriate planning. A Project specific Construction Environmental Management Plan (CEMP) identifies a variety of measures that will be incorporated to mitigate against nuisance including provisions in relation to traffic, noise and dust on the site.

When the Project is operational, a maintenance and monitoring schedule will be put in place by LCCC to ensure that the proposed path is operating to the appropriate design standard and repairs will be made as necessary. This will ensure that there is no risk to human health as the project matures.

During operation, no predicted adverse impacts on population, economic, tourism and amenities are identified. Accordingly, no mitigation measures are considered necessary.

6. BIODIVERSITY

This section of the Environmental Impact Assessment Report (EIAR) describes the potential impacts on the proposed Limerick City Greenway (UL to NTP) on biodiversity, flora and fauna.

This chapter quantifies any potential direct and/or indirect significant effects relating to biodiversity and the identified Key Ecological Receptors. It identifies the measures required to avoid, reduce and mitigate likely significant effects and assesses any residual effect that remain following the implementation of mitigation.

Desktop studies and field surveys were completed. The surveys were designed to detect the presence, or likely presence, of a range of protected species. Designated surveys were conducted for otters, badgers, bats and birds.

The potential of the proposed section of Greenway to result in adverse effects on Natura 2000 Sites (SAC and SPA) as well as Nationally Designated Sites (Natural Heritage Areas) was assessed both in the EIAR and in accompanying Natura Impact Statement (NIS).

The most ecologically significant habitats recorded were those that were associated with the Lower River Shannon SAC. The Greenway is located within the boundary of this SAC and adjacent to at various locations. None of the habitats within the proposed Study Area correspond to habitats listed on Annex I of the EU Habitat Directive.

Desktop study sources were consulted for records of protected, rare and other notable species. Records of rare or protected flora and fauna within 10km of the proposed project were obtained from the National Parks and Wildlife Services (NPWS), National Biodiversity Data Centre (NBDC), Botanical Society for Britain and Ireland (BSBI) and Bat Conservation Ireland (BCI). Chapter 6 of the EIAR includes the results of this desk study, specifying findings on species (common name, scientific name and conservation status).

Three surveys visits were conducted for bird survey, during early and late breeding season, along line transect locations selected as a representative sample of the proposed Greenway footprint and surrounding environs. Chapter 6 of this EIAR, contains details of the bird species observed during the surveys. 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.

During the walkover surveys undertaken during 2021, 2022 and 2024 the Study Area watercourses were searched for signs of otter. The otter survey was undertaken along the route of the proposed Greenway, following the river Shannon's bank. There were no definitive sights for otter, or signs such as spraints, tracks, holt or couch sites however likely trails were observed. The study area was checked for physical evidence of badgers including setts, latrines and paths. A sett like structure was found along the proposed Greenway, between the Engineering Research Building and Thomond College. The area where the structure was observed is surrounded by dry meadows and grassy verges (GS2), mixed broadleaved

woodland (WD1) and depositing/lower river (FW2). However, the structure was identified as a possible fox hole and no fresh signs of activity were observed. No other badger setts or similar structures were identified.

Bat surveys were undertaken for this EIAR. The surveys included visual roost survey and bat activity survey to determine the areas and habitats within the zone of influence of the proposed works which are being used by bats; the diversity and relative abundance of bats present; and if bat roosting is occurring or likely to occur in the zone of influence of the proposed works. The suitability of the proposed project site for bats was also considered and while the site is likely to be used by foraging and commuting bats the proposed project is unlikely to result in loss or damage to any significant roosting habitat.

Macroinvertebrate data was obtained from NBDC (NBDC, 2021) and from the National River Macroinvertebrate Surveys Ireland, 2007-2018 (Feeley et.al, 2020). Data was available immediately upstream of the proposed Greenway, Shannon (Lower)_050 waterbody (Waterbody ID IE_SH_25S012500). The proposed works are temporary and no long-term impacts on these species are anticipated. However, some macroinvertebrate taxa that are sensitive to reductions in habitat and water quality may be present on site. Degradation of these river habitats will be avoided considering future impacts on macroinvertebrate communities.

No fish survey data was available for either Shannon (Lower)_060 waterbody (Waterbody ID IE_SH_25S012600). However, data was obtained from the 2014 Survey of Transitional Waters in the Shannon International River Basin District -Shannon Estuary, Fergus Estuary and Limerick Docks (Kelly et.al, 2015) in conjunction with records from the NBDC, 2021. According to the NBDC (2021) sea lamprey (*Petromyzon marinus*) can be found on site. 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. The proposed works are temporary and no long-term impacts on these species are anticipated.

A thorough and comprehensive assessment was undertaken for the potential significant effects of the proposed project both individually and in combination with other plans and projects on the identified Key Ecological Receptors. Where necessary, mitigation was prescribed to avoid any significant effects. This mitigation includes detailed methodologies that will be followed during the construction, operation and maintenance of the Greenway. Mitigation also includes measures to replace and/or reinstate any loss of habitat and to minimise disturbance to fauna. The mitigation includes a management plan for the treatment of invasive species and for maintaining biosecurity. It also includes a comprehensive programme of monitoring and auditing environmental performance and details of emergency response procedures.

The proposed project has been designed to increase users on the Greenway and to promote cycling as a realistic choice as a mode of transport in the Limerick Metropolitan Area and will form an extension to the already constructed Limerick Smarter Travel, Route 2, which involved the upgrade of an existing pathway. The identified impacts and potential direct and indirect significant effects of the project on biodiversity have been fully identified, assessed, quantified and where necessary and appropriate, mitigated. Residual effects that remain post mitigation have also been assessed. A reasoned conclusion has been reached based on the assessment of the potential direct and indirect impacts, that the proposed project will not result in significant effects on biodiversity, flora and fauna either on its own or in combination with other plans or projects.

7. LANDUSE, SOILS AND GEOLOGY

Land

The surrounding area is primarily industrial, commercial and residential with some agricultural lands. The majority of agricultural lands lay to the north of the River Shannon. The proposed Greenway 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.

The proposed project will not impact on farm buildings or farm facilities. Construction activities may have the potential to impact on agriculture due to noise and/or dust. In the absence of mitigation, the potential impact on agricultural land use in the Study Area ranges from slight to significant negative impact. No impacts on agriculture are anticipated during the operation phase of the Greenway.

Based on this assessment, the impact of the proposed project on agricultural land is imperceptible on a national and county level. It is also anticipated that a temporary not significant to imperceptible impact on agricultural lands within the Study Area during construction, and a temporary not significant neutral impact on properties during its operation.

A section of the construction phase of the proposed Greenway is on an existing walking track and works will constitute a potential temporary not significant to slight negative impact on gravel and grass surfaces. The existing University Road and McLaughlan Road will be resurfaced following surface stripping of concrete (from footpaths) and tar (from the road), and this will incorporate significant improvements in terms of health & safety, technical design, and construction materials resulting in a positive impact on artificial surfaces. Overall, the improvement to the existing routes and construction of new sections of Greenway will constitute a permanent not significant positive impact on artificial surfaces.

Geology

The 'Geological Survey of Ireland Online Database' indicates that the proposed project extends across two bedrock units assigned to the Dinantian Period.

- Dinantian Visean Limestone Formation (Undifferentiated)
- Dinantian Rathkeale Formation; Dark muddy limestone & shaly mudstone

The Geological Survey of Ireland (GSI) records show that there are no County Geological Sites in the vicinity of the proposed project or the surrounding area. The nearest recorded geological site is Ballycar South (IGH 02) which is located approximately 7.0km north-west of the proposed Greenway.

The sources consulted indicate that there are no active quarries within the Study Area. The nearest active quarries are presented below.

Table 7.1 Quarries outside the Study Area

Location	Status	Operators
Gooig Pit, Castleconnell 7.0km outside Study Area	Active	Roadstone Ltd.

Location	Status	Operators
Dereen Sand and Gravel Pit, Portcrusha. 7.5km outside Study Area	Active	Dereen Concrete Ltd.

Upon consultation with the National Landslide Database for Ireland (Landslides Working Group), it was found that there are no known geohazards within the study area or within 10km of the study area..

The 'Geological Survey of Ireland Online Database' and the site investigation indicate that the Study Area comprises the following subsoils:

- Madeground
- Marine/Estuarine Sediments
- Alluvial Minerals
- Tills

Madeground was encountered during the site investigation and ranged in thickness from 0.1 to 2.3 m. The site investigation indicates that localised pockets of made ground are to be found along the route of the proposed Greenway. The pockets of madeground as well as containing some traces of timber and bricks are composed of both reworked glacial and recent subsoils.

Deposits of silts and clays is recorded within the Study Area. The subsoil mapping as presented on the EPA geoportal Database shows these deposits are along the banks of the River Shannon. These deposits are characterised by very fine grained subsoils. It is unlikely that the installation of the Greenway which will be shallow (<0.5m BGL) will have a significant impact on Marine/Estuarine Silts and Clays.

Alluvium soils are typically found at or in the vicinity of a surface watercourse. The EPA geoportal database indicates that Alluvium mineral subsoils are predominantly situated in the eastern areas of the study area. As outlined in Lower Shannon Hydro-Geomorphology Study mixed sediment from the Mulkear River tributary enters the River Shannon and this material is deposited on the left bank as a submerged bar and riverside feature like Plassey beach. With shallow excavations (<0.5m BGL) expected along the route and no in-stream works, it is unlikely that the proposed project may impact on Alluvium in the Study Area.

There are no borehole records to confirm or deny the Teagasc Subsoil mapping as shown on the GSI Online Database. However, It is unlikely that the proposed project will impact on this Glacial Till.

Potential Impacts on Geology

The key effect associated with the construction phase of Greenway is the excavation, handling, storage, processing and transport of any earthworks materials. The estimated volume of excavation anticipated during the construction phase is presented on Table 7.2.

Table 7.2 Volumes of Excavated Material

Origin of Excavation	Total Volume of Excavated Material	Volume of Excavated Material to be Transported Off Site
Excavation of ground along proposed route on Southern banks of River Shannon for the Greenway	7,728 m ³	0 m ³

Loss of Bedrock

Bedrock is not expected to be encountered during excavation works, however it must be noted that the bedrocks present are abundant throughout the Study Area and any portion if removed will be imperceptible in comparison to the volumes retained and as such will not have a significant impact on the bedrock of the Study Area.

Loss of Geological Heritage

There are no sites in the vicinity of the proposed works of sufficient geological or geomorphological importance on a national or county scale to merit consideration for designation as a Natural Heritage Area (NHA). In addition, there are no County Geological Sites (CGSs) in the vicinity of the Study Area.

Loss of Quaternary Geology

The majority of the proposed Greenway route is underlain by made ground and therefore there is a risk that contaminated material may be encountered during the construction phase. No evidence of historic activities which could potentially have contributed to soil contamination were identified in the immediate vicinity of the proposed Greenway during the desk study and/or geotechnical investigations. Although the key risk with made ground is its uncertain origin, on the basis of available evidence and taking into consideration the anticipated volume of made ground to be excavated and reused, the potential impact is regarded as being slight negative.

Soils

The 'General Soil Map of Ireland' classifies the lands within in which the Study Area as 'Alluvial region' and 'Lowland'.

The alluvial region includes the extensive river and estuarine flats associated mainly with the River Shannon. In the vicinity of Limerick City, the Shannon alluvium extends a mile or so on either side of the river. The lowland region mainly occupies central and eastern Limerick. The lowland region, in general coincides with the Carboniferous limestone formations. The topography of the region is gently undulating to easy rolling with most slopes less than 8°.

Potential Impact on Soils

Loss of Soil

As the route of the proposed Greenway traverses areas of land outside of artificial surfaces and soil horizons were encountered during the site investigation, it is likely that the project will have some impact on the soil in the area. Soils underlying the proposed footprint of works are abundant on a local and regional scale. The volume of soils exposed during the construction phase will be also be relatively small. The volume requiring excavation will be offset by its reuse during construction works. Taking into account that any excavated topsoil and subsoil will be used to reinstate the works areas and as a subbase material in conjunction with the mitigation measures as outlined above, the residual impact of the proposed project on the soil in the area is a permanent slight negative impact.

Contaminated Land

Potential effects may arise from the improper management, storage and handling of fuels and lubricants for plant and machinery and of non-hazardous or hazardous liquid and solid wastes during the

construction phase of the proposed Greenway. There is always a risk of localised contamination of soils resulting from an accident, spill or leak.

Two invasive species were identified within the Study Area during surveys carried out in 2021 and 2022; Giant Hogweed (*H. mateggzzianum*) and Himalayan balsam (*I. glandulifera*). Invasive species infestation was found to be extensive throughout the length of the proposed Greenway within the Study Area. Failure to implement appropriate management of soil contaminated with Giant Hogweed or Himalayan balsam during the construction phase of the project could result in the spread and regrowth of the species in other areas.

The maintenance activities associated with the Greenway are predicted to have a potential temporary impact in terms of the improper use of fuels used in plant and machinery for repair work, maintenance of vegetation and grass cutting. Due to the localised and small-scale nature of these works, the potential impact is anticipated to be a temporary not significant negative impact during the operation phase of the project.

8. WATER

The proposed works area is in the lower south-east of the Shannon catchment. The River Shannon river basin district (RBD) is the largest in Ireland and drains a catchment of approximately 11,600 km² before entering the sea via the Shannon estuary. The Shannon RBD is the full catchment including the Shannon Estuary.

The route of the proposed Greenway is located along 2.9km of the south bank of the River Shannon (Shannon (Lower)_060 river waterbody _IE_SH_25S012600), Co. Limerick between where the Groody River joins the River Shannon at the Groody Bridge, to a land drain approximately 60m west of Troy Castle.

The reaches of the River Shannon that meander with the proposed route are typical of an urbanised river catchment. Banks on either side are dominated by dense weed and low shrub cover, with a sporadic tree canopy throughout. Much of the River Shannon catchment is rural, however there are six significant urban centres within the RBD comprising Limerick City (59 km²), Ennis (25 km²), Tralee (22 km²), Mullingar (22 km²), Athlone (11 km²) and Tullamore (30 km²). The River Shannon flows through an area of unsorted alluvial material (glacial till) and is assumed to consist of mixed sediment size sand and gravel, there is some evidence of mixed marine sediments extending up the Shannon valley.

The River Shannon is within the River Shannon lower (060) Protected area for River abstraction and Groundwater abstraction (Limerick City East) for drinking water Article 7, Water Framework Directive (2000/60/EC) and European Communities (Drinking Water, No. 2) regulations SI No. 278/2007. The University of Limerick and surrounding area are supplied by the Limerick City Water Supply Scheme. The scheme is based at Claireville Water Treatment Plant where two public water abstractions feed the plant, one from the River Shannon via a canal feed into the plant 4km upstream from the Study Area and one from the Clonlara head race channel which feeds the Ardnacrusa Hydropower plant and confluences with the River Shannon 5km downstream from the Study Area. There is one groundwater abstraction within close proximity to the Study Area which abstracts for cooling purposes (EPA consultation).

The Lower Shannon provides ample opportunities for a range of recreational activities, such as rowing, kayaking and swimming and are popular with residents, students and tourists in the local area.

The potential impacts of the proposed construction and operation activities on the hydrology, hydrogeology and water quality relate to:

- Works leading to sediment ingress into the watercourse and reduction/decline in habitat and/or water quality;
- Introduction and/or spread of invasive non-native species;
- Loss of riparian and/or marginal habitat within the immediate footprint of the works;
- Noise and disturbance during works; and
- Water contamination and pollution during works.

Mitigation measures will be put in place to protect the groundwater and surface waters within the Study Area and will ensure no leaching of sediment or pollutants to enter the localised groundwater or surface water. No significant effects or deterioration in water quality are anticipated.

The proposed works represent a standalone project relating to the improvement of the existing path and proposed Greenway, which is not part of a broader scheme of physical modifications planned on the River Shannon.

9. AIR QUALITY NOISE AND VIBRATION

Air Quality

National and European statutory bodies have set limit values for various air pollutants. The Clean Air For Europe Directive (Directive 2008/50/EC on ambient air quality and cleaner air for Europe) requires that areas are divided into zones for the assessment and management of air quality. In Ireland, Zone A is the Dublin Conurbation, Zone B is the Cork Conurbation, Zone C is all large towns in Ireland with a population >15,000 and Zone D is all remaining area. Limerick City is categorised as Zone C.

Construction activities may lead to the emission of dust. Dust is classified as matter with a particle size of between 1 and 75 microns (1-75 µm). Sensitivity to dust depends on the duration of the dust deposition, the dust generating activity and the nature of the deposit. Therefore, a higher tolerance of dust deposition is likely to be shown if only short periods of dust deposition are expected and the dust generating activity is expected to stop. The potential for dust to be emitted will depend on the type of activity being carried out in conjunction with environmental factors including levels of rainfall, wind speed and wind direction.

Construction activities such as excavating and earth moving are likely to produce some level of dust during the construction phase of the project. These activities will mainly produce particles of dust greater than 10 microns, these particles are considered a nuisance but do not have the potential to cause significant health impacts. Given that background levels of PM10 and PM2.5 are likely to be below the ambient air quality limit values and as the construction phase of the Greenway is temporary, the potential for dust nuisance and significant levels of PM10 and PM2.5 will be temporary and will vary spatially during the construction phase, constituting a temporary slight negative impact

Construction related traffic originating from the delivery of materials to the site, the removal of surplus excavated material from the site and the transport of workforce to, from and within the site will give rise to emissions of nitrogen dioxide, sulphur dioxide, benzene and carbon monoxide. This has the potential to impact on health and the environment. Given that background levels of nitrogen dioxide, sulphur dioxide, benzene and carbon monoxide are likely to be below ambient air quality limit values

and emissions will be temporary in nature, this constitutes a potential temporary slight negative impact in terms of air quality during the construction phase of the path.

The proposed Greenway is highly adaptable to increasing flood risk due to climate change. OPW National Flood Hazard Mapping shows that almost the entire footprint of the proposed Greenway is within Flood Zone A and several historical flood events have been recorded in the area. However, on review of the 'Planning System and Flood Risk Management' Guidelines for Planning Authorities (2009), a cycle path or path falls under the category of development classified as "Amenity, open space, outdoor space and recreation" and is considered a flood compatible development.

Noise and Vibration

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.

In the absence of specific noise limits, appropriate criteria relating to permissible construction noise levels for a development of this type may be found in the British Standard BS 5228 – 1: 2009: *Code of Practice for Noise and Vibration Control on Construction and Open Sites: Noise*; and NRA *Guidelines for the Treatment of Noise and Vibration in National Road Schemes* (2004). 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.

The NRA '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. The table below 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 9.1 Maximum permissible noise levels at the facade of dwellings during construction

Days and Times	Noise Levels (dB re. 2×10^{-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.

Works associated with the proposed development that may contribute to noise impact during the construction phase are as follows:

- Temporary construction compound set up;
- Construction compound operations;
- Site clearance and installation of temporary access/haul roads;
- Construction of Greenway and surfacing;
- Installation of utilities/ services, construction of drainage infrastructure, installation of lighting;

- Installation of tree root protection system on existing gravel paths;
- Construction of bridges, retaining wall, abutment walls, ramp;
- Construction of drain crossings by culverts;
- Junction re-design; and
- HGV movements.

Five noise sensitive locations (NSLs) were identified based on their proximity to the proposed works. Expected noise levels for NSLs were calculated based on worst case scenario that would only occur during the short span of time, that the listed plant items are at the closest point to each of the noise sensitive locations and assuming that no screening is in place. The worst case scenario is unlikely to occur routinely, if at all.

The average daily construction traffic ranges is estimated from 4 to 24 round trips per day while works are being carried out at each work station. The predicted noise emission levels range between 55 dB and 64 dB $L_{Aeq,1hr}$ with 64 dB $L_{Aeq,1hr}$ being the expected maximum at the any remaining noise sensitive locations along construction traffic routes that are located immediately adjacent to the road (i.e. < 10 m away). These predicted noise levels are within the minimum design criterion of 70dB L_{Aeq} . Therefore, the impact of construction traffic on the local environment is expected to be a temporary not significant impact.

Reference will be made to BS 5228-1: 2009: *Code of Practice for Noise and Vibration Control on Construction and Open Sites Part 1: Noise*, which offers detailed guidance on the control of noise & vibration from demolition and construction activities.

The majority of the construction activities which will be employed during the construction phase of the Greenway with the exception of the installation of two piles at proposed Steel Bridge No. 1, if required, are unlikely to generate perceptible vibrations at the sensitive locations.

In order to sufficiently ameliorate any likely vibration impacts from the proposed works, a schedule of noise and vibration control measures has been formulated for the construction phase and are detailed in the Construction Environmental Management Plan (CEMP).

Reference will be made to 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.

With the implementation of the proposed mitigation measures and monitoring, the likely impact of vibration from the proposed construction works on the local environment will be a temporary imperceptible negative impact.

Based on the assessment of cumulative impact of the proposed Greenway, as well as in combination with all other plans and projects in the vicinity, no significant effects relating to air quality, climate, noise and vibration are anticipated.

10. CLIMATE

The Climate Action Plan sets out key actions to help County Limerick become more climate resilient while enhancing its biodiversity, becoming greener and more sustainable and achieving climate neutrality by 2050.

The targets of the plan include a 50% improvement in the Council's energy efficiency by 2029; a 51% reduction in the Council's greenhouse gas emissions by 2030; reducing the impacts of future climate change related events; and actively engage and inform the community about the climate actions taken.

The plan accounts for Limerick's emissions and the result show that transport is the third largest contributor to GHG emissions, with an estimated 11% of total emissions. Therefore, careful consideration is given to transition to more sustainable transport modes which require significant investment.

The IPCC Sixth Assessment Report (AR6) provides standard definitions for four factors associated with climate risk:

- **Vulnerability:** is the tendency of the receptors to be affected by climate related hazards. It is a product of:
 - **Sensitivity:** which is the degree to which the receptors are affected, either negatively or positively by climate change.
 - **Adaptive capacity:** which is the ability to adjust to potential damage, taking advantage of opportunities or to respond to consequences.
- **Hazards:** are associated with extreme weather-related events and may cause negative or positive impacts to receptors.
- **Exposure:** refers to the presence of receptors in places and settings that could be affected.
- **Responses:** can reduce or increase risks by affecting each of the other factors.

Severe windstorm events have impacted upon Limerick City and County most frequently over the period 1945-2025, with coastal flooding, river flooding, pluvial flooding and heatwaves affecting the County on a number of occasions. Coastal erosion, cold spells, droughts, heavy snowfall, and groundwater flooding have also impacted Limerick City and County, but less frequently.

The greenway, considering its location along the River Shannon is potentially vulnerable to climate change hazards, particularly due to its exposure and sensitivity to flooding, erosion, and extreme weather events. The greenway's proximity to the river makes it highly exposed to the risk of flooding, especially in the context of increased rainfall and more frequent storm events driven by climate change. Higher river flows, combined with rising sea levels, could lead to more frequent and severe flooding events, damaging the path and surrounding infrastructure. Additionally, the greenway may be sensitive to soil erosion and land degradation, as stronger and more frequent storms can erode riverbanks, affecting the stability of the greenway and its accessibility. These climate hazards may disrupt local biodiversity and recreational use of the greenway, undermining its value as a public space and transportation corridor. Adapting the greenway to these threats will require addressing these vulnerabilities through resilient design, flood defences, and ongoing monitoring to safeguard its long-term sustainability.

The potential impacts associated with climate risks are described in Chapter 10 and are ranked in accordance with the risk (i.e. likelihood * magnitude). River and pluvial flooding are the highest ranked risks associated with the proposed Greenway.

The design of the proposed Limerick City Greenway (UL to NTP) was created based on European, national and local policies objectives that aim to reduce GHG emissions to mitigate the effects of climate change through the transition to more sustainable transport modes.

Major potential for modal shift exists amongst commuters with daily journeys of 5 km or less. Ireland's Transport for Net Zero's target is to increase sustainable transport journeys by 500,000 per day. To

meet this target 261,218¹ people need to shift from other transport modes, especially cars, to cycling or walking. This adds to 3,696 km per commuter (16.8km per day for 220 working days/year), and a total of 965 million passenger/km (pkt) per year.

If the proposed Greenway were not to proceed, greenhouse gas emissions (carbon dioxide, carbon monoxide and nitrogen oxides) associated with construction vehicles and activities would not arise. However, the opportunity to further significantly reduce emissions of greenhouse gas to the atmosphere would be lost. The opportunity to contribute to Ireland's commitments under the Paris Agreement and the EU law would also be lost, as there would be no contribution to grow the sustainable transport network and reduce traffic associated emissions. This would be a **long-term slight negative impact**.

The proposed Greenway will promote sustainable travel modes, such as walking and cycling. The proposed Greenway will displace GHG emissions associated with fossil fuel-based traffic. It will assist in reducing overall emissions that would otherwise arise from the usual commuting traffic to University of Limerick and its surrounding areas. This translates into a **long-term moderate positive effect**.

11. LANDSCAPE AND VISUAL

Chapter 11 of the EIAR assesses the likely direct and indirect significant landscape and visual effects of the proposed development. It assesses these effects on both the site itself and within a wider study area surrounding the proposed development site.

The Landscape and Visual Impact Assessment (LVIA) prepared by CSR was informed by a desktop study and several surveys of the site and receiving environment in February and July 2022 and a final visit in February 2024. The assessment is in accordance with the methodology prescribed in the Guidelines for Landscape and Visual Impact Assessment, 3rd edition, 2013 (GLVIA) published by the UK Landscape Institute and the Institute for Environmental Management and Assessment.

The report identifies and discusses the landscape and visual constraints effects in relation to the proposed development of the site starting at the Groody River bridge, running along the southern bank of the River Shannon, and alongside University Road and McLaughlan Road, to Plassey Park Road.

Overall, the character of the study area is strongly influenced by the setting of the existing walking path close to the river, particularly the section on the banks of the River Shannon, and the high proportion of mature trees which are a feature of the existing riverbank walk and of the wider UL campus grounds. Some of these trees are likely associated with the grounds Plassey House which lies near the riverbank.

The landscape character can be divided in two main areas: the UL campus, and the IDA lands to the east.

Within the UL campus, the mature trees, clusters of buildings and open spaces and areas along the riverbank is distinctive. However the campus contains a high proportion of buildings, internal roads and roundabouts. The river corridor which includes the proposed Greenway is somewhat set apart from the main campus, is a quieter and tranquil area. Historic structures also lend a particular character to the area.

¹ CSO 2022 data on commuting to work by transport modes.

The landscape character of the National Technology Parklands to the east of the study area is less distinctive and while the vicinity of the path is largely young trees and scrub with some open fields. It includes some features of historic interest and cultural heritage.

Landscape values are derived from both indications of value as seen in national and local policy, as well as other indications that a landscape or landscape element, is valued. These values can further be categorised in two ways – values which should be conserved, and those that provide opportunity for enhancement. Landscape value can be identified by the presence of landscape designations or policies which indicate particular values, either on a national or local level. These include international designations (such as UNESCO World Heritage sites) national designations, and local designations such as scenic routes, scenic views or amenity designations which are included in County Development Plans. Important tourism, cultural heritage or recreational areas are also indicative of value. In addition, where landscapes do not have designations, a number of criteria are used to assess the value of a landscape. For undesignated landscape in the vicinity of the site, these criteria include:

- Landscape Quality/Condition
- Cultural Heritage/Conservation value
- Aesthetic/Scenic Quality
- Rarity or Representativeness
- Public Accessibility and Recreation Value
- Sense of naturalness

Based on the above criteria, we can describe the landscape values of the site and immediate vicinity, and the wider landscape. These are best described with reference to the landscape character areas:

University of Limerick Campus – Groody River Bridge to Kilmurry Village

The landscape value of the site and immediate vicinity within the University of Limerick grounds (UL boathouse to Kilmurry Village) is considered **High**. The landscape can be described as of high quality and in good condition, with a high number of mature trees which are classed as Category A or B (High or Moderate value) semi natural areas and a number of well- maintained open spaces, both informal and formal. The presence of the River Shannon also contributes to good landscape quality. The Section above has identified several features of cultural heritage value which are a link to the history of the site and add to its quality. This area has high aesthetic qualities, with many areas of high-quality scenery, with a strong sense of naturalness, especially those views towards the river, riverbank and areas of mature trees. The ‘Shore’ areas also has high scenic qualities. Some of the mature trees can be described as features of rarity but this is also within the Lower River Shannon SAC. The area is publicly accessible and has a high recreation value, as a location popular for walking and which is partly along the Lough Derg Way, a waymarked trail which connects from the existing river path, along the river to Limerick City.

IDA National Technology park to Dublin Road

East of the UL Campus, the study area includes the open lands and riverbank east of Kilmurry village, to the rear of the National Technology Park, as well as several roads within the Technology Park. This area is considered of **Medium** value. The vicinity of the riverbank contains some open fields, and though some parts of the path are relatively wide, there are many sections which are several quite overgrown areas where the landcover includes tree groups and scrub but with some mature trees. The landscape quality

is not as high as the neighbouring area within UL, with several overgrown areas and invasive species observed, an overall the areas is not as easily accessed. Overall the aesthetic value is considered Medium, with less of a connection to the river and some areas where vegetation restricts views. This area is still within the SAC. While publicly accessible, this access is less formal than that on the UL grounds and certain parts are overgrown and remote. The area however has a remote feel and a strong sense of naturalness.

The proposed route will traverse more formal areas include the roads University Road, McLaughlan Road and Plassey Park Road. These are of lower landscape value, being existing road corridors, relatively quiet cul-de-sac roads in the case of University Road and McLaughlan Road, while Plassey Park Road is a busier road. Landscape quality here is **Low-Medium**.

Significance of Effect during Construction Phase

- **University of Limerick Campus –River Groody Bridge to Kilmurry Village:** Moderate-Significant, adverse, temporary Landscape Effect during the construction phase. This will be a localised effect, confined to the immediate vicinity of the proposed Greenway and the areas around the construction compounds, and not throughout the wider campus.
- **IDA National Technology park to Plassey Park Road:** Slight-Moderate, adverse, temporary landscape effect. This will be localised, as the majority of this area is slightly more remote and is further away from buildings and other routes, however the requirement for more vegetation clearance will result in a considerable temporary effect on the landscape character.

Significance of Effect during Operational phase

- **University of Limerick Campus – River Groody bridge to Kilmurry Village**
The majority of the areas where the proposed Greenway traverses the UL campus are expected to undergo Not Significant to Slight landscape effects, which are neutral in quality, where the path is simply widened and re-surfaced with some small-scale vegetation loss.

Slight to Moderate, adverse effects result in certain areas– the woodland east of Dromroe village and west of the Living Bridge, where some tree removal is necessary to facilitate an alternative route. However over time, as the vegetation along the path route recovers and the ground layer re-establishes, the effects will reduce. The Plassey Mills rest area, which is located at the end of the disused Plassey Bridge, will also undergo a localised change in character, but this will be less pronounced and considered a Moderate, neutral, localised effect, as there are already some elements (a wider path, stone walls) which render this change less obvious.

The area around Plassey Beach will undergo the most noticeable change, considered of Medium-magnitude. This is a High sensitivity landscape and, in this location, the effects on the localised landscape character of the shore would be considered Moderate, and adverse. Through the shore is a small area (geographically) and the effects do not extend to the wider landscape, the small size of the shore area means it has a lower capacity to absorb new elements and the ramp, retaining wall and railings and removal of several distinctive mature trees, and the widened and hard surfaced path adjacent to the shore, will result in a changed character, as no part of the shore is unaffected. The effect is considered Moderate and range from Long Term/Permanent. Some limited re-vegetation is likely to occur over time once the railings and ramp are in place.

The landscape effects will be very localised to the immediate vicinity of the path, and not perceptible from the wider UL campus landscape.

- **IDA Technology Park-Plassey Park Road:** The landscape effects are considered overall to be overall Slight. The removal of mature trees is likely to be limited, in particular between the Kilmurry village area to just east of the Black/Troy Castle, where the majority of the Tree Groups (classified as B value in the Tree Survey) are retained and thus the wooded character of much of this part of the path will remain.

Along with this, the very dense undergrowth (with its somewhat oppressive character) along this part of the study area will be removed, considerably opening up the character of the path and creating a more inviting atmosphere for the user.

Some tree removal occurs at the end of McLaughlan Road where the path connects to the riverbank and this is not indicated on the Tree Survey, but tree removal was minimised by avoidance of the semi-mature street trees which are adjacent to the road. The proposed Greenway 'spurs' along University Road and the existing McLaughlan Road are considered to result in Not Significant, neutral landscape effects.

12. CULTURAL HERITAGE

The landscape in which this project is proposed is essentially a riverine environment comprising alluvial woodland and open areas of improved amenity greenfield.

Rivers were the highways of Ireland from prehistoric times up to the early 20th -century and provided both a means of transport and food resource. Lands adjacent to rivers are rich in nutrients and ideal for many farming practices and as such, have been attractive locations for human settlement for millennia.

The receiving archaeological environment contains evidence of human activity and settlement from at least the Bronze Age and the River Shannon has been a primary thoroughfare and focus of settlement for millennia. Extant sites of note within the study area include a probable Bronze Age Barrow (RMP: LI006-059----), Plassey Mill complex which may also represent the possible site of Sreelane Castle (RMP: LI005-0052----) and the tower house and associated bawn at Castletroy (RMP: LI006-017001- to 017003-).

The earliest recorded evidence for human settlement in Ireland dates to the Mesolithic period (7000–4000 BC). To date, no Mesolithic artefacts or cultural material have been found in the vicinity of the Greenway. However, within the wider riverine environment of the Shannon, the internationally significant Mesolithic site at Hermitage outside Castleconnell, approx. 4kms from the project area, was excavated during advance works for the Castleconnell Rising Main.

The Neolithic period (4000-2400 BC) began with the arrival and establishment of agriculture as the principal form of economic subsistence, which resulted in more permanent settlement patterns. While there is archaeological evidence for a widespread settlement pattern within the wider region during the Neolithic period, there are no recorded sites or finds from the period within the assessment area.

Metalworking arrived in Ireland with the advent of the Bronze Age period (c. 2400–500 BC). While some communal megalithic monuments, particularly wedge tombs continued to be used, the Bronze Age is characterised by a movement towards single burial and the production of prestige items and weapons, suggesting that society was increasingly stratified and warlike. A possible Barrow of Bronze Age or Iron Age date (RMP: LI006-059----), is recorded in the townland of Castletroy.

Fulachta Fiadh, which may consist of crescent shaped grass covered mounds, are composed of burnt and fire cracked stones associated with a pit or trough. The majority of these sites date from the Bronze Age. Works on the Castleconnell Rising Mains encountered several of these site types in the townland of Ballyvollane.

While there is archaeological evidence for a widespread settlement pattern within the wider region during the Bronze Age and Iron Age periods, there are no recorded sites from the period corresponding to the Irish Iron Age within the assessment area.

As for the Early Medieval Period (c. 400-1169 AD), ringforts are one of the most common monuments in the Irish landscape with up to 60,000 examples in the country. Archaeological excavations indicate that the majority of ringforts were early medieval farmsteads with internal timber buildings and were often surrounded by associated field systems.

The mill at Sreelane – Plassey Mills – may have been built on the site of an earlier mill dating to the late medieval period. The tower house at Castletroy likely dates to the 15th century and another example of this site type was recorded at Sreelane in the Down Survey of 1654-56. A wall remnant on the riverbank at Plassey Bank may represent a surviving fragment of this structure.

The parish of Kulmurray, in which the proposed development is located, is described by Samuel Lewis' *Topographical Dictionary of Ireland* (1837).

There are 6 previously recorded individual monuments/areas of archaeological sensitivity located within the defined study area associated with the proposed project (RMP No. Individual number assigned to site in the Record of Monuments and Places and afforded statutory protection under the National Monuments Act 1930-2014).

- RMP LI006-017001 (Castle): castle of Caladh an Treoigh;
- RMP LI006-017002/LI006-017003: bawn and gate;
- RMP LI006-059----: barrow – unclassified;
- RMP LI006-018----: ringfort – rath; and
- RMP LI005-052----: Plassey Mills (possible site of 'Sreelane Castle').

A review of the Record of Protected Structures in the Castletroy Local Area Plan 2019-2025 and the National Inventory of Architectural Heritage (NIAH) produced five results within the study area.

There is no predicted negative impact on the archaeological and built heritage resource prior to construction, to any of the described above.

The proposed terrestrial works will result in no direct negative impact upon, or changes to, the known heritage resources of sites, monuments and structures. An indirect moderate negative impact is predicted on the settings of Plassey Mill complex and Castletroy Tower-House arising from the construction of the proposed development. However, the ultimate aim of the development is to consolidate and improve the existing amenity at these locations.

Where previously undisturbed areas will be impacted by construction works; advance archaeological testing and archaeological monitoring, will ensure that previously unrecorded archaeological deposits are identified and that appropriate mitigation is employed during construction phase, so as to avoid potential indirect and direct, moderate to profound negative impacts.

There are no predicted negative impacts to the recorded cultural heritage resource during operational phase. There will be a predicted significant direct positive impact to the recorded cultural heritage resource during operational phase.

There are no predicted cumulative impacts to the Cultural Heritage resources by combined elements of this project or with other planned developments in the area.

All identified impacts to the above mentioned cultural heritage elements, will be addressed by mitigation during the pre-construction and construction phases of the proposed project which will provide for the recording and/or avoidance of known and potential cultural heritage features. As a result, there shall be no likely significant adverse residual impact on the cultural heritage resource.

13. MATERIAL ASSETS

The development location is primarily set within both a rural, riverside amenity area and suburban, residential area. Parts of the Greenway will diverge from the riverside route to facilitate access and egress to the wider Castletroy residential areas.

The proposed project will have potential to impact on the following:

- Transport Infrastructure - including Roads & Traffic;
- Waste Management;
- Water Distribution Network
- Drainage Network; including Foul & Storm Water;
- Bord Gáis Distribution Network;
- Electricity Network - including public services, street lighting, etc;
- Broadband Network - Fibre & Satellite;
- Telecommunications Network - including cable & mobile;

Short term slight to moderate negative impact on traffic as a result of the proposed development will be a short-term increase in traffic volumes as a result of construction activity.

Temporary road closures and lane closures will be required to facilitate the construction the proposed project. The regional roads within the proposed development area will remain open for the duration of the proposed works.

Where temporary road closures are required, diversionary measures will be implemented, as detailed in Chapter 13 of the EIAR. Based on this, there will be slight to moderate levels of traffic disruption during construction phase of the proposed development. However, it is not anticipated that these levels will result in notable traffic congestion. A traffic management plan will be put in place which will detail traffic management measures.

Existing Services

There is potential for moderate negative temporary impact on underground services during the construction phase works including watermains. Specifically, installation of the additional drainage/culverting elements of the project along existing carriageway may impact on the existing mains. These impacts may include disruption to the water supply due to accidental damage during excavation works and diversion of existing watermains.

There is an existing potable water distribution network throughout the assessment area, supplied by the Limerick City Water Supply Scheme which is maintained by Irish Water (IW).

Gas distribution services are present along the route at the following locations:

- At the existing road bridge crossing the River Shannon, and
- Along Plassey Park Road,

There is an extensive electricity supply network within the assessment area comprising both overhead power lines and underground services. Proposed Construction Phase works will have a predicted temporary significant negative impact on existing overhead services and underground services.

Waste Management

The Limerick City Greenway (UL to NTP) will produce a significant volume of surplus excavated material during the construction phase.

A Construction & Demolition Waste Management Plan (C&D WMP) is included in the Construction Environmental Management Plan (CEMP) (Part 3 of this EIAR). As outlined in Chapter 7, no soil will be exported off site and excavated material will be reused on site as much as practicable. Where this is not possible, the recycling rates for the C&D waste produced throughout the construction of the Greenway should be maintained at or above 85%, if possible, as outlined in the Waste Management (Planning) Regulations 1997.

Himalayan balsam and Giant Hogweed were identified during walkover surveys and are listed as invasive plants under the EC (Birds and Natural Habitats) Regulations 2011 (S.I. 477/2011). These regulations prohibit the introduction and dispersal of these species. Any soil removed from any effected areas must be managed in accordance with the Invasive Species Management Plan (ISMP) as set out in Chapter 6 and the Construction Environmental Management Plan (CEMP) in Part 3 of this EIAR.

The potential impacts of construction and demolition waste on the environment, given the presence of Himalayan balsam and Giant Hogweed in the study area, are predicted to be permanent and moderate.

During the operational phase, impacts can be potential temporary slight negative, depending on the maintenance activities that will be carried out by LCCC. Such maintenance could generate very small volumes of litter, packaging, concrete, scrap metal, bitumen products or soils that, if not disposed of correctly, could adversely affect the local environment.

With mitigation in place there will be **no predicted negative residual impacts** on the Water Distribution, Drainage, Electricity & Telecommunications networks within the proposed Greenway route area.

There will be a predicted **slight negative residual impact** on Traffic with mitigations in place.

There will be a **predicted significant positive cumulative impact** on Roads and traffic within the Greenway's area due to the nature of the proposed project.

There will be a **predicted neutral residual impact** on Waste Management where abovementioned mitigation measures are implemented during construction phase of the proposed project.

Overall, there will be a **positive significant residual impact** on Material Assets within the Greenway area.

14. INTERACTIONS OF THE FOREGOING

Chapters 5 to 13 of this EIAR identify the potential environmental impacts that may occur in terms of Population and Human Health, Biodiversity, Soils and Geology, Water – Hydrology and Hydrogeology, Air / Noise and Vibration, Climate, Landscape, Cultural Heritage, and Material Assets, as a result of the proposed development. All of the potential impacts of the proposed development and the measures proposed to mitigate them have been outlined in those chapters within the EIAR. However, for any development with the potential for significant environmental impact there is also the potential for interaction amongst these impacts. The result of interactive impacts may either exacerbate the magnitude of the impact or ameliorate it.

A number of instances where there is or was an interaction between the impacts, in the various sections have been identified and details on how any resultant adverse impacts have been averted are presented in the EIAR.

Where any potential interactive negative impacts have been identified in the EIAR, a full suite of appropriate mitigation measures have already been included in the relevant sections of the EIAR and are included in a schedule of mitigation that is included as Chapter 14 of the EIAR.

15. SCHEDULE OF MITIGATION

All the mitigation that is detailed in all other chapters of the EIAR and related appendices is provided in a comprehensive schedule where, for ease of reference, all measures can be accessed by the reader in one location within the document.