

CONSULTANTS IN ENGINEERING, ENVIRONMENTAL SCIENCE & PLANNING

PART VIII REPORT

GREAT SOUTHERN GREENWAY LIMERICK IMPROVEMENT WORKS PHASE 3: CATTLE-PASSES

Prepared for: Limerick City and County Council



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GREAT SOUTHERN GREENWAY LIMERICK IMPROVEMENT WORKS PHASE 3 – CATTLE-PASSES

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as part of the Phase 3 Improvement Works along the Great Southern Greenway in Co. Limerick.

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1. INTRODUCTION

Limerick City and County Council are seeking PART VIII planning approval for Phase 3 of Improvement works to the Great Southern Greenway Limerick. The existing Great Southern Greenway is a 39km walking and cycling off road route running along the old railway line connecting the towns of Rathkeale, Ardagh, Newcastlewest and Abbeyfeale. It is intended that the Great Southern Greenway project will become an international greenway of significance capturing the essence of rural Ireland which will promote West Limerick as a tourist destination and provide opportunities for new visitor growth as well as providing linkage between communities.

The Greenway is 39km in length and can be split into the sections below:

- Rathkeale to Ardagh;
- Ardagh to Newcastlewest;
- Newcastlewest to Barnagh;
- Barnagh to Templeglantine;
- Templeglantine to Abbeyfeale;
- Abbeyfeale to the Kerry Border.

To ensure the greenway has minimal long term disruption to existing farm access and crossings, seven cattle passes are proposed at points along the greenway route. These cattle passes will allow landowners and farmers to move herds either side of the greenway while ensuring greenway users are sufficiently segregated. The proposed cattle passes are vital in providing an enhanced greenway experience to all users. The current conditions do not provide adequate segregation of greenway users and farm activities, which gives rise to a high risk to the health safety and wellbeing of both greenway users and local farmers.

1.1 Project Overview

The Irish Government policy entitled "Smarter Travel: A Sustainable Transport Future" 2009 to 2020, identifies key goals and objectives to be met in order to introduce a national transport network, A National Cycle Policy (NCP) was implemented to run alongside the main "Smarter Travel: A Sustainable Transport Future" document. The NCP aims to create a strong cycling culture in Ireland, while also encouraging recreational cycling. The NCP also identifies the importance of the National Cycle Network in attracting overseas tourists if the project is implemented.

These policies are reinforced in the Strategy for the Future Development of National and Regional Greenways 2018 which recognises the benefits arising from the development of greenways, as a tourism product with the potential to attract overseas visitors, for local communities in terms of economic benefits, and as an amenity for physical activity contributing to the health and wellbeing of the population.

To realise the above and ensure successful delivery of the benefits the greenway can bring to the local area, it was decided that the initial improvement works to the Great Southern Greenway would be split into 3 separate phases as outlined below:

Phase 1 involves widening and surfacing improvement works for the greenway. This includes improvement to drainage, farm crossings, public road junctions and repairs to several bridges along the greenway route. The Phase 1 works began in April 2020 and are expected to be completed in July 2021.

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Phase 2 involves improvement to greenway access points. The need for improved access points has been identified at a number of locations along the greenway, such as at Ardagh Village and at Newcastle West in particular.

Phase 3 includes the design of cattle passes at several locations along the greenway route. These cattle-passes will allow local farms the ability to move cattle across the greenway without negatively impacting greenway users. During the execution of Phase 1 it became apparent that the Phase 3 works are of a high priority as they will improve safety and enhance user experience on the greenway. This report focuses primarily on the Phase 3 works highlighted above.

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2. PLANNING CONTEXT

The following strategies, policies, guidelines and plans support the creation of greenways and are relevant therefore to the Part VIII proposal:

- Project Ireland 2040 National Planning Framework;
- National Development Plan 2018-2027;
- The Government's Smarter Travel Initiative;
- The National Cycle Policy Framework;
- People, Place and Policy Growing Tourism to 2025;
- The Action Plan for Rural Development Realising our Rural Potential;
- Strategy for the Future Development of National and Regional Greenways;
- The Limerick County Development Plan 2010-2016;
- Newcastle West Local Area Plan 2014-2024;
- Abbeyfeale Local Area Plan 2014-2024;
- Rathkeale Local Area Plan 2014-2022.

2.1 Project Ireland 2040 – National Planning Framework:

The National Planning Framework recognises that creating the environment to support job creation in rural areas will be a key enabler to rejuvenating rural towns and villages, sustaining vibrant rural communities and reversing rural decline. The following overarching objectives in relation to tourism, transport and greenways are noted;

National Policy Objective 22:

Facilitate tourism development and in particular a National Greenways, Blueways and Peatway Strategy, which priorities projects on the basis of achieving maximum impact and connectivity at national and regional level.

National Policy Objective 46:

In cooperation with relevant Departments in Northern Ireland, enhanced connectivity between Ireland and Northern Ireland, to include cross-border road and rail, cycling and walking routes, as well as blueways, greenways and peatways.

National Strategic Outcome 3:

Strengthened Rural Economies and Communities – Rural Development; Invest in greenways, blueways and peatways as part of a nationally coordinated strategy.

National Strategic Outcome 7:

Enhanced Amenities and heritage-Amenities and Heritage:

"Implementation of planning and transport strategies for the five cities and other urban areas will be progressed with a major focus on improving walking and cycling routes, including continuous greenway networks and targeted measures to enhance permeability and connectivity".

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2.2 National Development Plan 2018-2027

Launched in conjunction with Project Ireland 2040 – National Planning Framework, the National Development Plan is a ten year strategy for public capital investment totalling almost €116 billion. This document makes provision for the following investment actions.

Rural Regeneration and Development Fund: €1 billion.

Rural Recreation Infrastructure Scheme

This scheme supports the development and necessary maintenance, enhancement or promotion of recreational infrastructure throughout Ireland in light of the huge potential to develop the economic value of Activity and Recreational Tourism by Local Authorities, State Agencies and communities. Initiatives funded covered a broad spectrum, and range from walking trails to greenways and blueways.

Under the Strategic Investment Priorities 2018-2027:

Transition to a Low-Carbon and Climate Resilient Society

Sustainable travel measures, including comprehensive Cycling and Walking Network for metropolitan areas of Ireland's cities and expanded greenways.

2.3 Smarter Travel: A Sustainable Transport Future 2009-2020

Launched in 2009 by the Department of Transport as the national transport policy document for Ireland. One of the main aims of the policy is to develop walking and cycling as viable commuter modes in the short to medium term with a long term aim to fostering a lasting walking and cycling culture in Ireland.

2.4 The National Cycle Policy Framework (NCPF) 2009-2020

The NCPF recognises the positive benefits of cycling as a mechanism to improve quality of life for the countries citizens, by way of improved health but also on a broader communal sense, in terms of a reduction in CO2 emissions and increased social integration as people walk and cycle together. It is an overarching objective of the NCPF that 10% of all trips in Ireland will be made by bike by the year 2020.

2.5 People, Place and Policy Growing Tourism to 2025

The Department of Transport, Tourism and Sport's policy statement People, Place and Policy Growing Tourism to 2025 outlines the Government's objectives for tourism with a view to increase overseas visitors and revenue and employment. The Policy highlights the importance of sustainable development of tourism and recognises the contribution of facilities for activity for activity-based holidays to Ireland's positive image and attraction as a tourist destination. It supports the development and improvement of physical visitor attractions, visitor infrastructure and facilities for visitor activities, including Greenways.

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2.6 Action Plan for Rural Development Realising our Rural Potential

The Action Plan for Rural Development Realising our Rural Potential highlights the potential of activity to contribute to economic growth in rural areas, recognising "Outdoor adventure tourism is a key growth sector worldwide and has been identified as a priority for Irish tourism in future years. The development and promotion of this sector provides opportunities for growth, in rural areas in particular by facilitating businesses to leverage the tourism assets in their area in a sustainable way to support recreational activities such as canoeing, cycling, angling and hill walking".

2.7 Action Strategy for the Future Development of National and Regional Greenways

The publication of the Strategy for the Future Development of National and Regional Greenways to support activity tourism in rural areas is identified as an action point in the Action Plan for Rural Development Realising our Rural Potential. The Strategy seeks to assist in the strategic development of nationally and regionally significant greenways in appropriate locations constructed to an appropriate standard to deliver a quality experience for greenway users. The Strategy also seeks to increase the number and geographical spread of greenways to deliver an increase in activity tourism to Ireland and also a recreational amenity for domestic visitors and locals, thereby promoting physical activity and contributing to a healthier society. The Strategy aims to provide substantially segregated off-road experience linking places of interest, recreation and leisure in areas with beautiful scenery and attractions.

2.8 Limerick County Development Plan 2010-2016

The Limerick County Development Plan 2010-2016 includes specific policies and objectives supporting the proposed development of green infrastructure within the City and County. The following are considered most pertinent in relation to the improvement works to the Great Southern Greenway Limerick:

Chapter 5 – Economic Development

<u>5.5.2 - Tourism</u>

Policy ED P19 - Sustainable development of tourism facilities:

"To promote the development of sustainable tourism facilities and amenities without damage to the local environment's essential qualities or features and their requirements for conservation and management."

Chapter 6 – Community and Recreation

6.10.13 - Walking Routes, Cycling Routes, Right of Way

Objective COM 027 - Co-operation with Other Agencies:

"It is the objective of the Council to co-operate with representative bodies of walking and cycling groups, landowners, **farmers**, local groups and communities, and others to support the improvement and development of walking and cycling routes in an environmentally sustainable manner."

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Objective COM 028 – Encourage Active and Healthy Lifestyle:

"It is the objective of the Council to promote the development of safe and convenient pedestrian and cycling facilities in the towns and villages to minimise the dependence on private motor vehicles and to encourage an active and healthy lifestyle."

Chapter 8 – Transport and Infrastructure

8.2.5 - Cyclists and Pedestrians

Objective IN 08 – Cycle and pedestrian facilities:

"It is an objective of the Council to encourage the successful incorporation of safe and efficient cycle and pedestrian facilities, and accessible cycleways, footpaths and pedestrian routes into the design schemes for residential, educational, employment, and recreational developments. Consideration will be given in these schemes to existing or proposed routes where applicable."

2.9 Newcastle West Local Area Plan 2014-2024

The Newcastle West Area Plan 2014-2024 includes specific policies and objectives supporting the proposed development. The following are considered most pertinent in relation to the improvement works to the Great Southern Greenway Limerick:

Chapter 5 – Economic Development

5.6 - Tourism

Objective ED 6 – Tourism:

"It is the objective of the Council to:

- a) Enhance the tourism potential of the town including the promotion of new tourism products in an environmentally sustainable manner in partnership with other agencies and the local community.
- b) Encourage new development for the tourist industry to be located within the LAP boundary to maximise existing services.
- c) Protect and enhance where possible any biodiversity / natural environment, built and cultural heritage features from unwarranted encroachment of unsuitable development."

Chapter 6 - Transport

6.2 - Movement and accessibility

Objective T1 – Network of pedestrian and cycle facilities:

"It is an objective of the Council to encourage walking and cycling as more convenient, popular and safe methods of movement in Newcastle West through supporting the recommendations of the Walking and Cycling Strategy for Newcastle West (2013)."

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2.10 Abbeyfeale Area Plan 2014-2024

The Abbeyfeale Area Plan 2014-2024 includes specific policies and objectives supporting the proposed development. The following are considered most pertinent in relation to the improvement works to the Great Southern Greenway Limerick:

Chapter 5 - Economic Development

5.6 – Tourism

Objective ED 5 – Tourism:

"It is the objective of the Council to:

- a) Enhance the tourism potential of the town including the promotion of new tourism products in an environmentally sustainable manner in partnership with other agencies and the local community.
- b) Encourage new development for the tourist industry to be located within the LAP boundary to maximise existing services.
- c) Protect the natural, built and cultural heritage features from unwarranted encroachment of unsuitable development."

Chapter 6 – Transport

6.2 – Movement and accessibility

Objective T2 – Network of pedestrian and cycle facilities:

"It is an objective of the Council to encourage walking and cycling as more convenient, popular and safe methods of movement in Abbeyfeale, and facilitate the provision of an attractive and coherent network of offroad footpaths and cycle facilities. This will be achieved by:

- a) The seeking of secure cycle parking facilities at appropriate locations as opportunities arise.
- b) The encouragement of combined off-road footpath and cycleway links along Railway Road and along the River Feale.
- c) A pedestrian/cycle network will be encouraged where identified linking existing and proposed residential areas to each other and to amenity areas and to provide connections to the town centre."

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2.11 Rathkeale Area Plan 2014-2022

The Abbeyfeale Area Plan 2014-2024 includes specific policies and objectives supporting the proposed development. The following are considered most pertinent in relation to the improvement works to the Great Southern Greenway Limerick:

Chapter 5 – Economic Development

<u>5.6 – Tourism</u>

Objective ED 5 – Tourism:

"It is the objective of the Council to:

- a) Enhance the tourism potential of the town including the promotion of new tourism products in an environmentally sustainable manner in partnership with other agencies and the local community.
- b) Encourage new development for the tourist industry to be located within the LAP boundary to maximise existing services.
- c) Protect the natural, built and cultural heritage features from unwarranted encroachment of unsuitable development."

Chapter 6 – Transport

6.3 - Movement and accessibility

Objective T3 – Network of pedestrian and cycle facilities:

"It is an objective of the Council to encourage walking and cycling as more convenient, popular and safe methods of movement in Rathkeale, and facilitate the provision of an attractive and coherent network of offroad footpaths and cycle facilities. This will be achieved by:

- a) Secure cycle parking facilities at appropriate locations as opportunities arise.
- b) Combined off-road footpath and cycleway links will be encouraged along the proposed distributor road and along the Deel river.
- c) A pedestrian/cycle network will be encouraged where identified linking existing and proposed residential areas to each other and to amenity areas and to provide connections to the town centre."

2.12 Assessment

The installation of the proposed cattle underpasses as a solution to enhance both user experience and landowner satisfaction along the greenway route is in accordance with the frameworks, initiatives, development plans, and local area plans outlined in detail above. This will be demonstrated further in the following sections overleaf.

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3. PROJECT DESCRIPTION

3.1 Great Southern Greenway Route

This Part VIII proposal is for the installation of seven cattle-passes in the locations as outlined in Figure 3.1 below. The overall greenway route begins in Rathkeale and runs through Ardagh, Newcastle West, Barnagh, Templeglantine and Abbeyfeale. Although the greenway ends at the Kerry border under the scope of this project, Kerry County Council plan to extend it along the route of the old Limerick to Tralee rail line through Listowel, Tralee and Fenit. Once complete, a first-class walking and cycling amenity spanning much of Co. Kerry and Co. Limerick will be provided.



Figure 3.1: Great Southern Greenway Limerick Route

The Great Southern Greenway in Limerick is considered in line with the National Greenway Strategy and will provide a nationally and regionally important high quality shared cycle way and footpath. Following the proposed improvement works, the greenway will provide a safe, scenic and substantially segregated amenity for the enjoyment of all ages and abilities. It is also envisaged that the greenway will contribute to Ireland's tourism product and make a significant contribution to the rural development of County Limerick.

3.2 Scheme Description

As outlined above, the proposal is to install seven cattle passes (6 underpasses + 1 overpass) on the Great Southern Greenway as part of the phase 3 improvement works. The cattle passes are required to ensure that greenway users are separated from areas of heavy farm traffic to increase safety and user experience. The existing route has a large number of bridges, existing underpasses and gate systems which ensure users are afforded an opportunity to cycle or walk on a predominantly traffic and livestock free route for the majority of the greenway.

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In certain locations farm activity and greenway user segregation was considered to be insufficient and a cattle passage has been proposed. Refer to Figure 3.2 for example of the surface condition of some of the underpass locations, while every effect is made by local farm owners to keep the greenway surface clean in some cases the surface condition is dangerously slippery and poses a significant risk to the safety of greenway users. The success of the project is reliant on the installation of the above-mentioned cattle passes to provide segregation between farm activity and greenway users in location of heavy farm activity.

The proposed development, subject to this Part VIII application, will include provision of seven cattle passes and access controls to facilitate safe pedestrian and cycling movement at the identified farm crossings. The cattle passes will be installed at or below ground and will require earthworks and the diversion of any existing services, refer to Figure 3.3. In location 2B due to the topography of the surround lands which are 1.5-2.5m higher than the greenway level an overpass (farm traffic over greenway) is considered more suitable for this location as an underpass (greenway over farm traffic) is not considered feasible due to surrounding topology as associated risk of flooding.





Figure 3.2: Farm Crossing Surface Condition Examples

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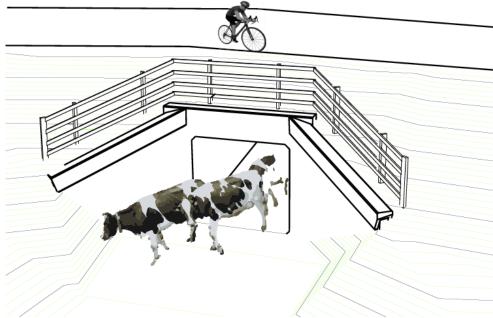


Figure 3.3: Cattle Passage Beneath Greenway

Underpass levels and earthworks will be designed to allow passive drainage systems which will prevent flooding without the need for an active pumped drainage and treatment system. Fencing and gates will be installed to prevent the escape of livestock and ensure the safety of greenway users. Finally, new sections of farm track will also be provided to connect into any existing so farm activities will be able to continue without disruption once the works are complete.

The cattle passes will take the form of precast reinforced concrete box culverts lifted into place in sections. Reinforced concrete wing walls will be used to retain the earthworks and provide an more aesthetically pleasing finish. See more detail on individual cattle underpass design features in Table 3.1 below:

Table 3.1: Cattle Underpass Features

Underpass	Description
Underpass No. 1	Underpass, existing farm machinery crossing to be retained in current location. Refer to drawing P2152-ST01-0001.
Underpass No. 2A	Underpass, existing farm machinery crossing to be retained in current location. Refer to drawing P2152-ST01-0002A.
Underpass No. 2B	Overpass, due to the topography of surrounding land an underpass is not suitable in this location. Both farm machinery and cattle will cross above the greenway level. Refer to drawing P2152-ST01-0002B.
Underpass No. 3	Underpass, existing farm machinery crossing to be retained in current location. Existing cattle passage parallel to greenway to be maintained to allow for required movement of cattle. Refer to drawing P2152-ST01-0003.
Underpass No. 4	Underpass, existing farm machinery crossing to be retained in current location. Existing cattle passage parallel to greenway to be maintained to allow for required movement of cattle. Refer to drawing P2152-ST01-0004.



Underpass	Description
Underpass No. 5	Underpass, existing farm machinery crossing to be retained in current location. Refer to drawing P2152-ST01-0005.
Underpass No. 6	Underpass, existing farm machinery crossing to be retained in current location. Underpass must be installed close to existing ground level due to high water table in the area. Refer to drawing P2152-ST01-0006.

Note that drainage solutions will unique at each underpass location, see Section 3.8 for more detail on this.

3.3 Surface Type

The greenway surfacing will be reinstated to match the asphalt surfacing currently being installed as part of the phase 1 improvement works. This surfacing type will ensure durable and fit for purpose 3.0m wide walk/cycle path suitable for users of all abilities and in accordance with TII Publications DN-GEO-0347 – Rural Cycle Scheme Design and the National Trails Office guidance for Shared Use Trails / Greenways – Blueways. The greenway level will need to be raised by between 1.25m and 2.5m to accommodate the cattle passes, the greenway gradient on approach will be limited to a maximum of 5% (1:20) to ensure minimal disruption to greenway users. Crossfall on the greenway surface shall be 2% or 1:50 to allow surface water to ensure adequate surface water drainage. Surfacing on the cattle passage were the gradient is moderate shall be a crushed stone, where the gradient is steep or ground conditions are poor a concrete surface with corrugated surface finish will be provided for the cattle passage, this shall be agreed with local landowners based on an assessment of site conditions.

3.4 Local Residents and Agricultural Properties

The greenway route traverses through the towns of Rathkeale, Ardagh, Newcastle West and Abbeyfeale, but for the most part the route is through areas of open countryside. The cattle passages are proposed in areas of frequent agricultural traffic. The location of the cattle passages has been designed in consultation with local landowners and farmers. The cattle passages are located to accommodate the typical cattle movements routes. Due to clearance restrictions related to the cattle passage size, a separate farm crossing is provided for farm machinery. Note that due to the gradient restrictions required to ensure the greenway is suitable for all users the cattle underpasses must be located between 15m and 50m (depending on topography) away from the farm machinery crossing to avoid an overly steep gradient.

3.5 Public Lighting

No lighting of the cattle passes is proposed under the current scheme.

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3.6 Ducting

Appropriate ducting or alteration of exiting ducting routes is to be provided for at the construction stage subject to agreement with relevant stakeholders. The ducting for the existing fibre optic cable running throughout the greenway route will be given particular care and will be diverted around the new underpasses to maintain a continuous duct route.

3.7 Architectural Heritage

Based on a desktop there are no historical structures located within the area affected by the proposed cattle passes.

3.8 Drainage and Flooding

A SUDS based drainage system will be designed based on a topographical survey of the surrounding lands which is to be carried out in advance of detailed design. Existing field run off will be diverted around and away from the cattle underpasses to maintain existing overland flow conditions. Storm water runoff from the cattle passage will be managed using the SUDS principals to preserve and protect the water quality in the region.

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4. METHODOLOGY FOR CONSTRUCTION

An outline Construction and Environmental Management Plan (OCEMP) will be prepared for the proposed works. The OCEMP will provide particular focus and detail on how the proposed works will negate any impact on the local environment. The OCEMP shall also take into consideration and align with the findings of both the EIAR and AA Screening. Furthermore, the OCEMP shall set out the design rationale for the proposed works, access details, environmental management (i.e. provision of an Ecological Clerk of Works and the development and implementation of an Environmental Management Plan) and construction methodology.

The preparation and implementation of a detailed Construction Management Plan and Environmental Management Plan shall be the responsibility of the contractor and will be reviewed by the project ecologist preconstruction stage. This will include method statements for all works, particularly excavation works necessary for the installation of the cattle underpasses, construction works and environmental management and supervision.

It is expected that the construction sequence of each underpass will take place as follows:

- 1. Services/utilities location, protection and diversion works.
- 2. Site clearance including removal of all existing farm gates, grates and fencing.
- 3. Installation of SUDS drainage systems for temporary works
- 4. Excavation to formation level.
- 5. Installation of precast box culvert and wing walls.
- 6. Backfilling and embankment grading.
- 7. Installation of fencing.
- 8. Greenway resurfacing.
- 9. Construction of connecting farm tracks.
- 10. Top soiling, seeding and finishing.

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5. HEALTH AND SAFETY

5.1 Traffic Management during Construction

The construction of the cattle passes is to be executed using appropriate traffic management procedures. Although sections of the greenway will be closed to pedestrians and cyclists to accommodate the works, farm operations including the movement of farm vehicles and heavy machinery is expected to continue in the vicinity of the underpass sites. The farm machinery crossings adjacent to the underpasses are to remain accessible to the farm owners during the construction of the cattle passes. This will allow farm activity to continue with minimal disruption during the construction process. The PSCS appointed to the project will be required to develop a detailed project safety and health plan identifying the control measures required to ensure farm and construction activities are adequately segregated and to ensure the safety of both operations.

5.2 Safety during Construction – Earthworks

The risk of burial in earthfalls has been identified in relation to works on box culverts and wingwalls. The backfill could become unstable if earthworks are conducted improperly. Contractor and PSCS will be required to put in place safe systems for the management and control of these risk in compliance with the current Construction Regulations and best practice guidance. Temporary propping may be required and the PSCS will engage a suitably competent temporary works designer for design of the required propping works.

5.3 Safety during Construction – Underground Services

Underground services have been identified at the underpass locations. The PSCS will determine exact location of all services on site and liaise with the relevant service owner to ensure the service is adequately protected from damage during the works.

5.4 Safety in Use – Inspection and Maintenance

The as built records and Maintenance Manual shall highlight the requirements for inspection and maintenance.

5.5 Safety in Use – Unauthorised Access, Collision, Vandalism, etc.

Restrained edges, fencing and gates at all cattle passage locations will maintain segregation between the greenway and connecting farm tracks. This segregation is expected to curb unauthorised access to farm tracks, fields and private lands adjacent to the greenway and reduce the possibility of collision with livestock and farm machinery.

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6. ASSESSMENT AND CONCLUSION

Limerick City and County Council are proposing improvement works to the Great Southern Greenway in Co. Limerick. To ensure the greenway has minimal long term disruption to existing farm crossings, seven cattle passes are proposed at the points of heavy farm activity along the greenway route. These cattle passes will allow landowners and farmers to move livestock either side of the greenway while ensuring greenway users are sufficiently segregated. The proposed cattle passes are vital in providing an enhanced greenway experience and for the increased safety of all users.

The cattle passes described throughout this report aim to improve both greenway user experience and landowner satisfaction along the greenway route in accordance with the frameworks, initiatives, development plans, and local area plans set out by Limerick City and County Council and the relevant townlands. By paying particular attention to the benefits to tourism, cyclists and pedestrians it's apparent that the proposed works conform to the policies that are in place.

Overall, the purpose of this report and its accompanying documents is to demonstrate the proposals suitability and conformity to the planning policy that is in place, while also highlighting the steps to be taken to ensure the works are carried out with the highest concern for both safety and environmental considerations.

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