Chapter 04

Description of the Proposed Development

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4. Description of the Proposed Development

4.1 Introduction

The Barnesmore Gap Greenway project aims to provide an attractive route between the towns of Donegal Town and Ballybofey/Stranorlar in County Donegal, to be used both for recreational purposes and for utility trips by pedestrians, cyclists and people with impaired the wider region, enticing users to explore its surrounding towns and villages and further develop the untapped tourism potential within the region. The project also provides the opportunity to highlight the historical and educational significance of such places, whilst promoting the scenic nature of the surrounding area. At Donegal Town the proposed greenway will connect with the international EuroVelo Route 1 which follows the northern, western and southern coastlines around Ireland, and the route also forms part of the proposed National Cycle Network across Ireland. Furthermore, the scheme provides connectivity to schools, urban centres, healthcare facilities, community centres and places of employment, facilitating day to day utility trips for local residents and the wider area.

This Chapter presents the description of the proposed development, the preferred route of the greenway and its receiving environment. The chapter also details various features of the greenway, including the abandoned railway line, road crossings, trailheads for access, bridge structures, drainage provisions and boundary treatments, as well as outlining the construction and operational phases of the development.

It should be noted that surveys, assessments and information that form the basis of this Environmental Impact Assessment Report (EIAR) are based on the design of the project as described in this chapter, which has been developed to a stage that permits a fully informed Environmental Impact Assessment (EIA) to be carried out by the competent authority. Where mitigation measures have been identified in this EIAR, it will be a contractual requirement that the appointed Construction Contractor implement those measures, in addition to standard construction methodologies.

4.2 Project Description

The settlements of Donegal Town, and Ballybofey and Stranorlar are separated by the Barnesmore Gap, a scenic glacial valley that provides the only communication gap through the ‘Bluestack Mountains’ in southern County Donegal. This mountain pass provides the main transportation link between north and south Donegal, as well as electrical power lines and telecommunication cables. The N15 National Road and the former West Donegal rail line pass through Barnesmore Gap, providing the only direct route from the main population centres of Letterkenny and Derry to South Donegal and beyond along the central section of the Atlantic Coast. An aerial view of Barnesmore Gap is shown in Figure 4-1.

Figure 4-1 - Barnesmore Gap Valley (Source - Ireland's Content Pool)

The proposed route of the greenway mainline is approximately 31km in length and will be a bi-directional shared walking, wheeling, and cycling route. There is a further 6.5km of links which provide additional connectivity and integration to surrounding amenities and active travel routes, which gives a total length of 37.5km for the proposed development. Refer to General Arrangement Drawings (60701883-ACM-HGN-SW_ZZ_ZZ_ZZ-DR-HG-0096-0126) in Volume 3 of the EIAR, and Figure 4-9 to Figure 4-12 below.

The proposed development, described from southwest to northeast, starts in Donegal Town, where a trailhead will be established adjacent to Railway Park Road and the St. John Bosco Community Centre. At each trailhead there will be off road parking provided, and at the major trailheads there will be Changing Places facilities.

The greenway route follows the abandoned railway line eastwards out of Donegal Town, using an existing stone railway bridge structure (S01) across the River Eske at Ch. 750 (Figure 4-2).

Figure 4-2 - Existing Railway Bridge Structure at River Eske in Donegal Town (S01)

A new underpass (S02) will be required to be constructed under the N56 Donegal Bypass road at Ch. 1,080, and there will be an adjacent link to Drumlonagher on the southern side of the N56. On the eastern side of the N56 the route continues along the former rail line for c.500m before diverging in a northeast direction along field boundaries, in the valley between two drumlins at Keeldrum and Drumbarren. Along this section there will be a greenway spur at Ch. 2,950, that heads south-eastwards for 0.9km to Clar Chapel on the southern side of the N15 where a new underpass (S03) will be provided. This spur will provide a 4km long safe route for pedestrians and cyclists from the residential community at Clar to Donegal Town that will bypass the busy roundabout at Drumlonagher. The underpass will also provide a safe crossing of the busy N15 road for the local community.

When the greenway meets the L6525, at Ch. 3,230, the route then travels in a northern direction for 0.3km, crossing the L65351 local road at Ch. 3,350. These local road crossings will provide access to the greenway for people living in the surrounding rural area in the hinterland of Donegal Town.

Where it splits; the ‘Mainline’ continues to the north, crossing the River Eske and associated SAC on a multi-span bridge (S04, single span across the river) and entering the Coillte lands of Lougheask Demesne. An existing car park will be upgraded to provide a trailhead at this location. From the trailhead, a section of an existing forest trail (forming part of the Bluestack Way) will be upgraded to reach the east of the demesne and the entrance to Lough Eske Castle. Connectivity to the north of the demesne, Lough Eske Castle, Harvey’s Point Hotel and the local road leading to Lough Eske Angling Centre will be provided by the existing Bluestack Way trail.

Figure 4-3 - New River Eske Crossing Location (S04)

From the entrance to Lough Eske Castle, the greenway follows the south side of Lough Eske and along a short section of local road which crosses the River Eske on the existing road bridge (NIAH listed structure, Ref: 40909421 and RPS, Ref 40801105). This bridge (S05 Figure 4-5) will be retrofitted to provide a segregated active travel facility within the existing parapets and formalise a yield arrangement for vehicular traffic, as shown on Lough Eske Bridge Detail Drawing 60701883-ACM-HGN-SW_ZZ_ZZ_ZZ-DR-HG-0132. The greenway then continues south through the townland of Corveen, running alongside the south side of Lough Eske and field boundaries until it meets the 'loop' section north of St Francis National School. This loop will be created by a section of greenway travelling east to west south of the River Eske crossing, across agricultural fields with views across to the Bluestack Mountains, before passing through Clarlougheask and crossing the L1945 at Ch. 6,100.

Figure 4-4 - Existing Road Bridge over River Eske (S05)

The route then continues south and east where it provides connectivity to St Francis National School at Ch. 6,700 and heads towards the northern side of the N15. The route follows the abandoned rail line for a short distance before crossing the N15 via a new underpass (S07) at Mullanalamphry. Once on the southern side of the N15 the route follows parallel to the

national road behind the existing layer of trees and vegetation. It crosses the River Lowerymore tributary on an existing railway bridge (S08) and then follows on the northern side of the stream towards the local road L2595, in the townland of Keadew Lower. The route runs parallel to the local road for approximately 400m until it crosses it at grade at Ch. 10,240 and enters an area of Coillte forestry in Keadew Upper. At this point the route realigns with the path of the abandoned railway line (Figure 4-5) and continues along it until the south side of Ballybofey and Stranorlar, approximately 18km.

Figure 4-5 - Abandoned Railway Corridor

A link is provided to Biddy's O'Barnes at Ch. 12,350 where a trailhead will be established. The route, passing through Barnesmore Gap, will provide incredibly scenic views of the glacially carved valley, before running alongside the northern shore of Lough Mourne.

Figure 4-6 - Barnesmore Gap Glacial Valley

A link is provided from Goland to Cappry at Ch. 24,680, to meet the proposed TEN-T Active Travel facility adjacent to the Roadhouse Bar and Restaurant and to provide connectivity to Cappry. A short section of the link will utilise the existing local road and an existing crossing of the Burn Daurnett. The main route continues to follow the abandoned rail line towards Ballybofey and Stranorlar, through another area of Coillte forestry and through agricultural land. A further connection is provided to Sessiaghoneill National School and Sessiaghoneill Church.

The main route diverges from the rail line to the southwest of the twin towns around the Lawnsdale housing estate. The rail line historically would have passed directly through where the Lawnsdale housing estate is located. The greenway route provides an access point into Lawnsdale, but the route bypasses the housing estate to the south, before turning north on the eastern side of the Lawnsdale housing estate and entering a railway cutting. The route follows the railway cutting through The Beeches housing estate, where it meets Navenny St on the north side at Ch. 29,300.

Figure 4-7 - Abandoned Railway Corridor at The Beeches

An at grade crossing will be required for the route at this point, and it will cross the River Finn using a new deck on the existing railway bridge piers (S20) to continue north (Figure 4-8). On the north side of the River Finn the route will follow the historic rail line before diverging to the north where it meets a proposed trailhead adjacent to The Base enterprise centre. From the trailhead, the greenway then continues along Railway Road in both directions providing connectivity to the leisure centre and schools in the town, shown in Drawing 60701883-ACM-HGN-SW_ZZ_ZZ_ZZ-SK-HG-0003. A further link is to be provided along the remainder of the abandoned railway line towards Ballybofey. This link provides improved connectivity to the urban core of Ballybofey south of the River Finn, as well linking an existing access for the sports pitches on both sides of the railway line.

Figure 4-8 - Existing Railway Piers in River Finn (S20)

The proposed route overview is shown in Figure 4-9 to Figure 4-12.

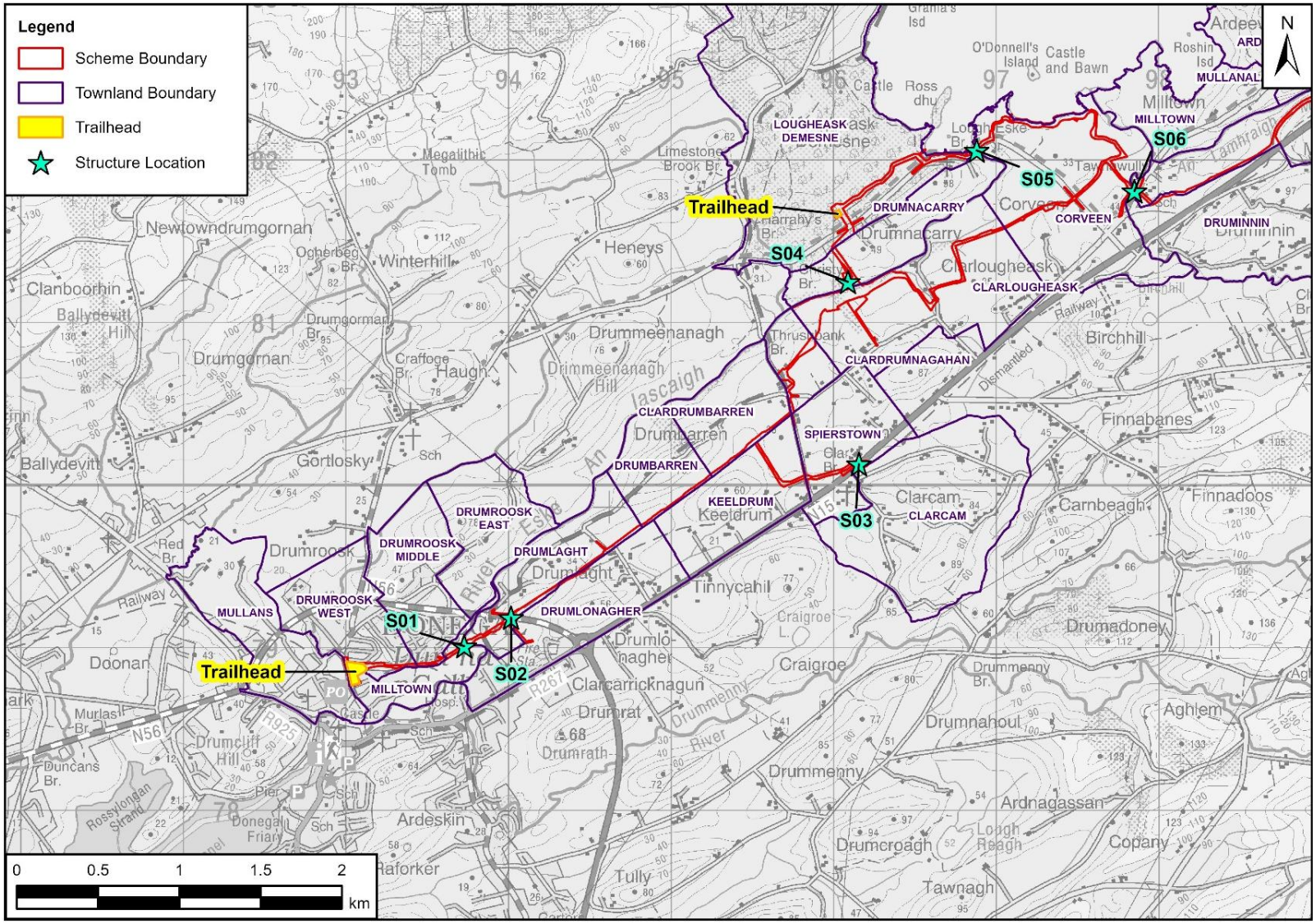

Figure 4-9 - Proposed Route Overview - 1 of 4

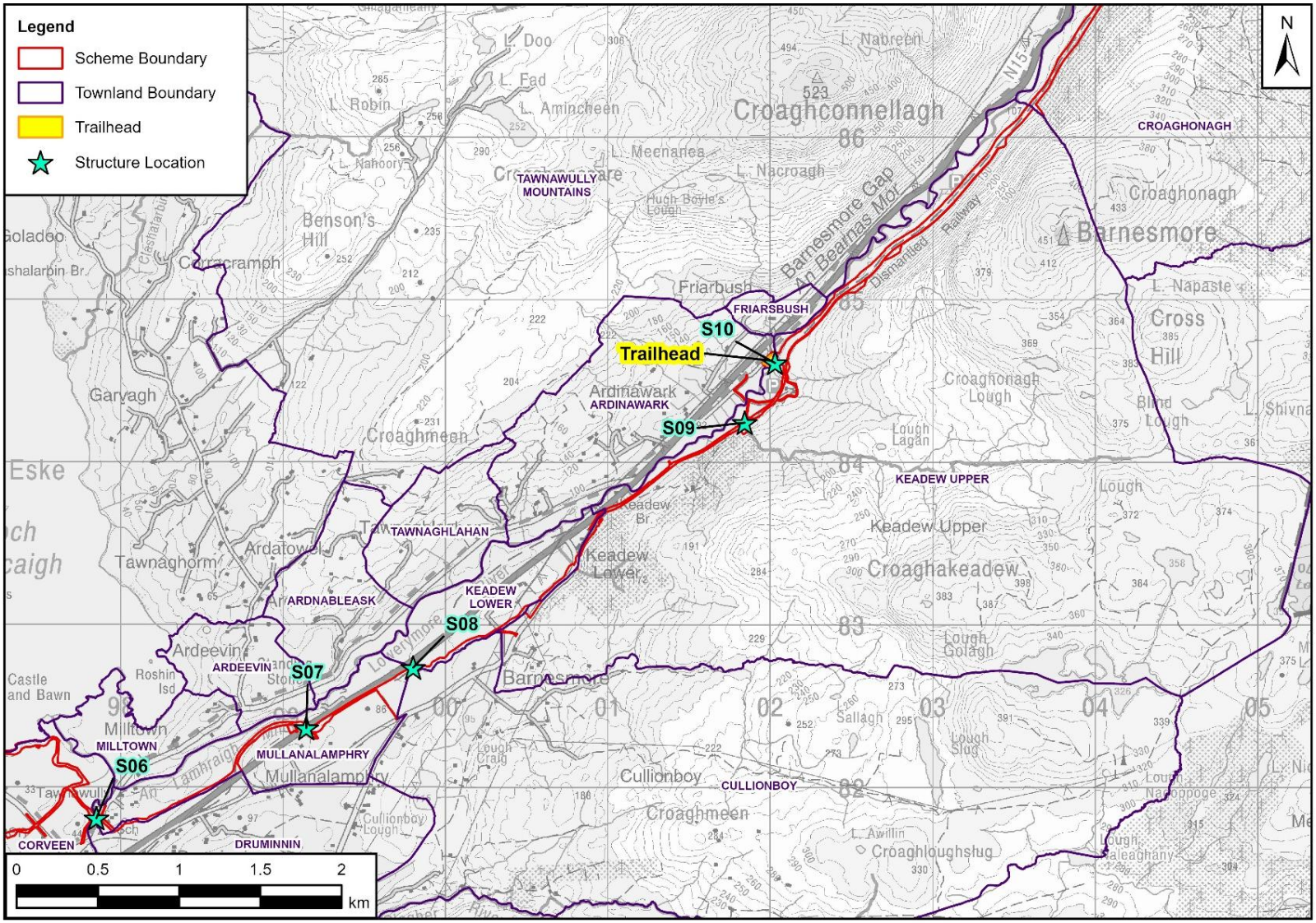

Figure 4-10 - Proposed Route Overview – 2 of 4

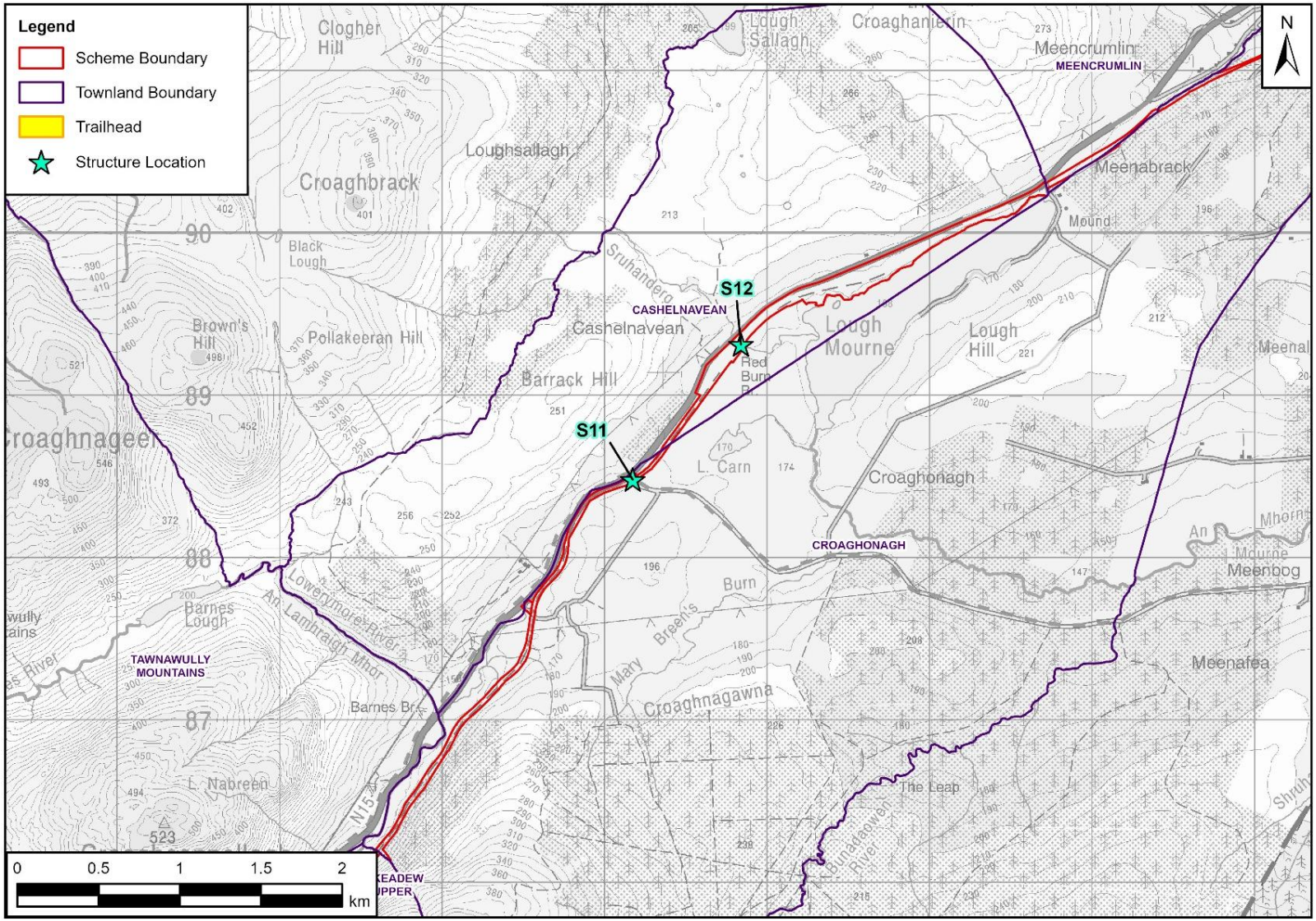

Figure 4-11 - Proposed Route Overview – 3 of 4

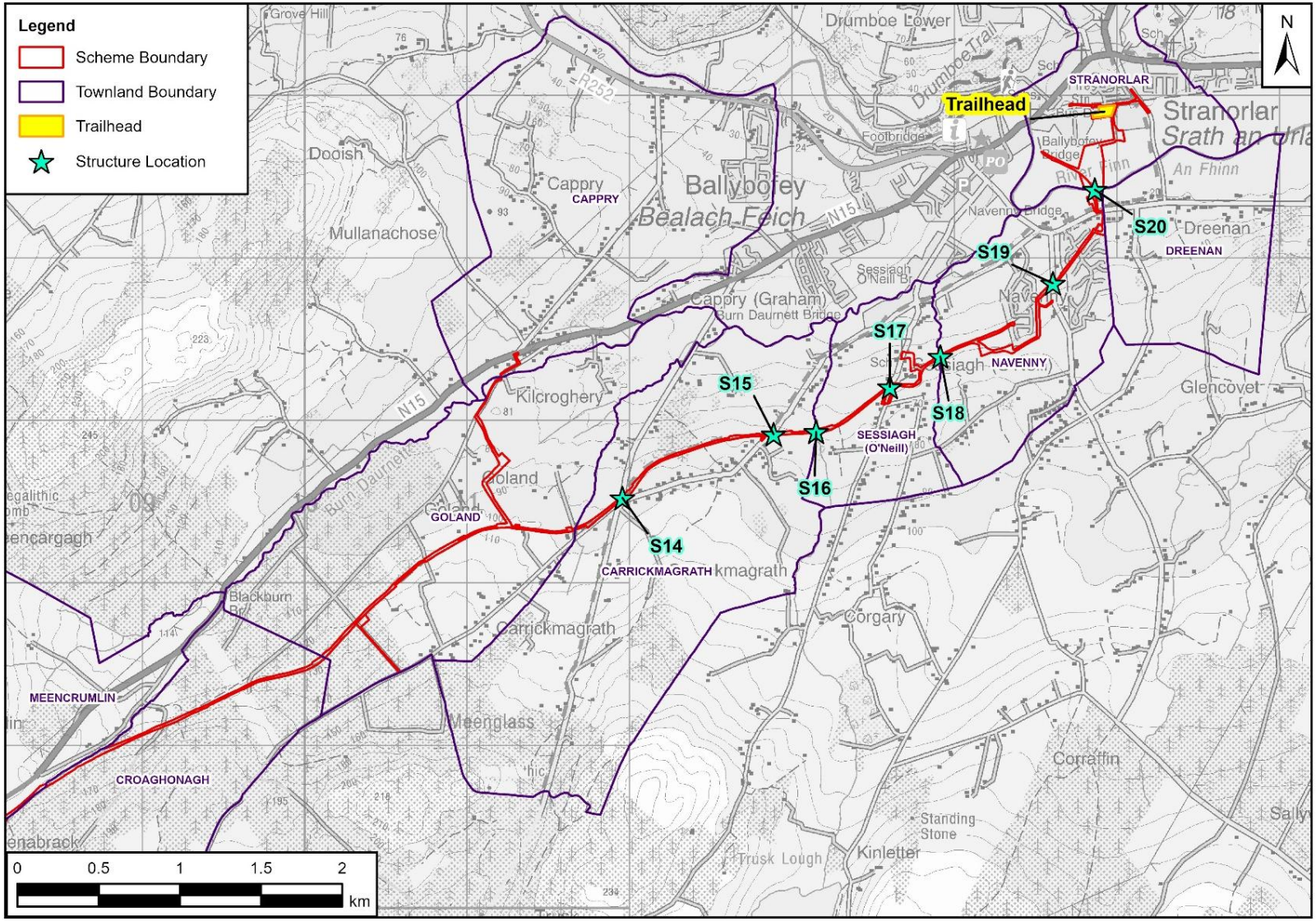

Figure 4-12 - Proposed Route Overview – 4 of 4

4.3 Proposed Development

4.3.1 Greenway Design Principles

In line with the objectives of the scheme, the design standards and the Code of Best Practice for National and Regional Greenways, the design of the greenway has been undertaken to maximise the benefits with respect to the following:

- safety,
- segregation from vehicular traffic,
- accessibility for user of all age groups and abilities,
- security,
- attractiveness,
- coherence,
- comfort,
- high quality of service,
- durability,

and minimise, where possible, the impacts on:

- the environment,
- landowners, and
- maintenance requirements.

The following design standards were applied as part of the design process. Where deviations from standard have been deemed necessary due to engineering or environmental constraints, departures and relaxations from standard have been developed in line with TII guidance.

- Transport Infrastructure Ireland (April 2021) *Design Phase Procedure for Road Safety Improvement Schemes, Urban Renewal Schemes and Local Improvement Schemes DN-GEO-03030;*
- Transport Infrastructure Ireland (February 2025) *Rural Cycle Scheme Design (Offline & Greenway) DN-GEO-03047;*
- Transport Infrastructure Ireland (May 2023) *Geometric Design of Junctions DN-GEO-03060;*
- Transport Infrastructure Ireland (May 2023) *Rural Road Link Design DN-GEO-03031;*
- Transport Infrastructure Ireland (May 2023) *Cross Sections and Headroom DN-GEO-03036;*
- Transport Infrastructure Ireland (December 2000) *Subways for Pedestrians and Pedal Cyclists Layout and Dimensions DN-GEO-03040;*
- Transport Infrastructure Ireland (July 2004) *Design Criteria for Footbridges DN-STR-03005;*
- Transport Infrastructure Ireland (June 2015) *Edge of Pavement Design DN-DNG-03062;*
- Transport Infrastructure Ireland (July 2021) *The Treatment of Transition Zones to Towns and Villages on National Roads DN-GEO-03084;* and
- National Transport Authority (September 2023) *Cycle Design Manual*.

The greenway has been designed as a ‘cycleway that caters for people walking, wheeling and cycling in a mainly recreational environment.’, in accordance with TII Publication DN-GEO-03047.

4.3.2 Greenway Profile

The proposed development will be divided into several sections, and each section will have a general common requirement with regards to construction methodology. The four main classifications are:

- Abandoned Railway Corridor
- Offline greenfield
- Offline woodland
- Existing and new structures

The greenway cross section has been designed to be 3m in width with 1m verges either side as illustrated in Figure 4-13 below. In areas close to the urban centres of Donegal Town, and Ballybofey/Stranorlar, the paved areas will be 4m wide as illustrated in Figure 4-14 below. The area between the verges and greenway boundary includes earthworks, drainage and landscaping, and the boundary is marked by new or existing fencing and vegetation, outlined further in Section 4.3.4. Figure 4-15 and Figure 4-16 are examples of greenways in County Mayo and County Limerick. The examples show sections of greenway in rural areas that have no fencing or fencing on a single side of the corridor.

Figure 4-13 - Typical Cross Section of 3.00m Wide Greenway

Figure 4-14 - Typical Cross Section of 4.00m Wide Greenway

Figure 4-15 - Great Western Greenway, Mulranny, County Mayo (Source – Greenways Ireland [Greenways Ireland, your 2023 Guide to Greenways in Ireland])

Figure 4-16 - Limerick Greenway, County Limerick (Source – Greenways Ireland [Greenways Ireland, your 2023 Guide to Greenways in Ireland])

The vertical profile has been designed, where possible, to meet the requirements in TII Publication DN-GEO-03047. Gradients have been kept to less than 3% across most of the route, however existing topography dictates that some short sections (<150m) have a gradient of up to 5%.

The extent of the earthworks is determined by the cross sections and horizontal and vertical profiles. While the extent of earthworks has been minimised where possible by following the existing topography, in some cases cut and fill is required to maintain gradients to the required standards and provide an accessible and attractive facility.

On the abandoned railway corridor, minimal earthworks will be required as the vertical profile follows the existing profile for the majority. In offline greenfield areas, and on the approach to underpasses and bridges, cut and fill will be required in some locations.

4.3.3 Greenway Pavement

The primary consideration for the cycleway pavement design is to ensure that it provides adequate levels of service, specifically ride quality, skid resistance, maintenance need, and construction cost. The greenway pavement structure will be a Type A Bituminous material base/binder and surface course owing to expected high user volumes and significant cumulative riding quality impact on user experience is expected. The pavement structure for the route can be found in Table 4-1. Pavement Type A2 will be the primary design owing to the potential for the route to be lightly trafficked by vehicles with less than 0.2 million standard axles (msa) over the pavement design life. Where it is anticipated that the route will not take traffic loading, Pavement Type A1 will be utilised to provide cost saving benefits.

It is assumed that the subgrade has a minimum CBR of 2.5%. Where subgrade design CBRs determined are less than 2.5%, for example in offline areas with peat, a floating ('no dig') construction technique will be implemented. This will involve the use of geogrid, geotextile and 6F2 capping on top of the sub-formation (or existing surface where possible), overlain by the pavement makeup as described above.

In order to maximise the benefits of constructing the greenway on an abandoned railway corridor, it is proposed to reduce the thickness of the subbase layer to 100mm in these areas. The pavement structural design on the railway can be found in Table 4-2.

Table 4-1 - Pavement Structural Design - General

Pavement Course	Type A1 (Cycleway and Pedestrian only)	Type A2 (Light Traffic [<0.2 MS])
Surface Course	Dense Bitumen Macadam surface course with grade 100 penetration binder, with 6mm aggregate, 20 mm thick (formal description AC 6 close surf 70/100)	Dense Bitumen Macadam surface course with grade 100 penetration binder, with 6mm aggregate, 20 mm thick (formal description AC 6 close surf 70/100)
Base/Binder	Dense Macadam binder course with grade 100 penetration binder, with 20mm aggregate, 50mm thick (formal description AC 20 dense bin 70/100)	Dense Macadam binder course with grade 100 penetration binder, with 20mm aggregate, 50mm thick (formal description AC 20 dense bin 70/100)
Subbase	Unbound Granular Material 150mm thick (UGM A)	Unbound Granular Material 200mm thick (UGM A)
Capping (if required)	300 mm thick capping layer	300 mm thick capping layer
Geotextile (if required)	Woven polypropylene geotextile of width 4.50m (typical) will be used as separation layer if required	

Table 4-2 - Pavement Structural Design - Railway

Pavement Course	Pavement on Abandoned Railway
Surface Course	Dense Bitumen Macadam surface course with grade 100 penetration binder, with 6mm aggregate, 20 mm thick (formal description AC 6 close surf 70/100)
Base/Binder	Dense Macadam binder course with grade 100 penetration binder, with 20mm aggregate, 50mm thick (formal description AC 20 dense bin 70/100)
Subbase	Unbound Granular Material 100mm thick (UGM A)

Figure 4-17 - Finished Pavement and Edge Treatment; South East Greenway, County Kilkenny / County Wexford (Source – South East Greenway [Visitors Homepage - South East Greenway])

Figure 4-18 - Finished Pavement; South East Greenway, County Kilkenny / County Wexford (Source – South East Greenway [Visitors Homepage - South East Greenway])

4.3.4 Boundaries and Verges

The boundary treatment between the greenway and privately owned lands is dependent on several factors including livestock control, security and privacy for adjacent landowners and the safety of users of the greenway.

Where possible, the design seeks to avoid the construction of new fencing, and existing boundaries will be retained where present and possible to do so. Where dense vegetation

exists alongside the route, it is proposed that no fence will be installed to promote cohesion with the surrounding natural environment. Standard post and rail fence will be used along the boundary of the greenway for sections of the route where dense existing vegetation does not exist, and stock proof fencing will be installed in areas where livestock are found in adjacent fields. The fencing design is shown on Drawing Nos 60701883-ACM-HFE-SW_ZZ_ZZ_ZZ-DR-HG-0001 -0031 in Volume 3.

Sections of the proposed development that run adjacent to, or through private farmland will require to be adequately fenced on both sides. Timber stock proof fencing with native hedgerows is proposed for these areas. The offline section of the route largely follows the line of existing field boundaries, so existing fencing and hedgerows are already present on one side. New stockproof fencing will be installed and native hedgerows will be planted on the other side of the greenway where a new field boundary is required.

For the safety of greenway users, post and rail fencing will be constructed as edge protection adjacent to structures. Mature vegetation exists alongside long sections of the abandoned railway line, and it will be retained, but some additional stock proof fencing may be required. Accommodation works, including gates and holding pens will also be provided where the proposed development passes through individual parcels of land. Screen fencing will also be provided in consultation with individual landowners.

Verges will typically be 1.0m wide, providing lateral clearance between the greenway and vertical objects, as well as providing a flat area for pavement runoff to infiltrate. In some locations where space is constrained, for example on some sections along the abandoned railway line, the verges will narrow to 0.5m.

4.3.5 Access Points, Junctions, & Crossings

The greenway will be accessible from several locations, including formal trailheads, dedicated spurs and connections and from the local road network at various crossing points.

The trailhead locations are shown in Table 4-3:

Table 4-3 - Proposed Trailhead Locations

Location / Description	Chainage (m)
Donegal Town (St. John Bosco Community Centre)	00
Lough Eske Demesne	650 (Eske Loop)
Biddy's O'Barnes	12310
Stranorlar (The Base Enterprise Centre)	30060

Additional access points will be provided at locations which have been identified as short journey start/end points and provide links to other infrastructure. The list of additional access points can be found in Table 4-4 below.

Table 4-4 - Proposed route access points

Location / Description	Chainage (m)
Drumlonagher	1040
Existing Car Park beside Clar Chapel	925 (Clar Link)
Mullanamphry	8800
Dearg Line L65541	17300
Meenglass L30441	25450
Coppering Heights L30441	26410
Sessiaghoneill National School link L28142	27550
Lawnsdale Housing Estate	27900
Ballybofey	29600
Stranorlar – Finn Valley Centre	30300

Location / Description	Chainage (m)
Cappry N15	1310 (Goland Link)

Finally, there are also several locations where the proposed greenway interacts with the public road network where it can be accessed. These are outlined in Table 4-5 below.

Table 4-5 - Interactions with the public road network

Location / Description	Chainage (m)
Mill Lane L19951	870
Local Road L19952	1800
Local Road L65251	3230
Local Road L65251	460 (Clar Link)
Local Road L65351	3350
Local Road L19453	540 (Eske Loop)
Local Road L19453	1350 (Eske Loop)
Local Road L19453	6100
St Francis National School L19752	6700
Local Road L25951	10260
Local Road Woodland	24080
Local Road L65441 Goland	810 (Goland Link)
The Beeches	28950
Navenny Street L30443	29350

Crossings of local roads have been designed as at-grade, vehicle priority junctions. Greenway users will be encouraged to yield to vehicle traffic using signage, road markings and access control/chicanes. Jug handle type approaches will be implemented where required and the design has considered visibility requirements for both greenway users and vehicular traffic, in accordance with TII publications DN-GEO-03047 and DN-GEO-03060. Road crossings are designed so the greenway meets the road at right angles, maximising the greenway user's visibility of road traffic. Figure 4-19 and Figure 4-20 show the typical road crossing details where the greenway meets a local road.

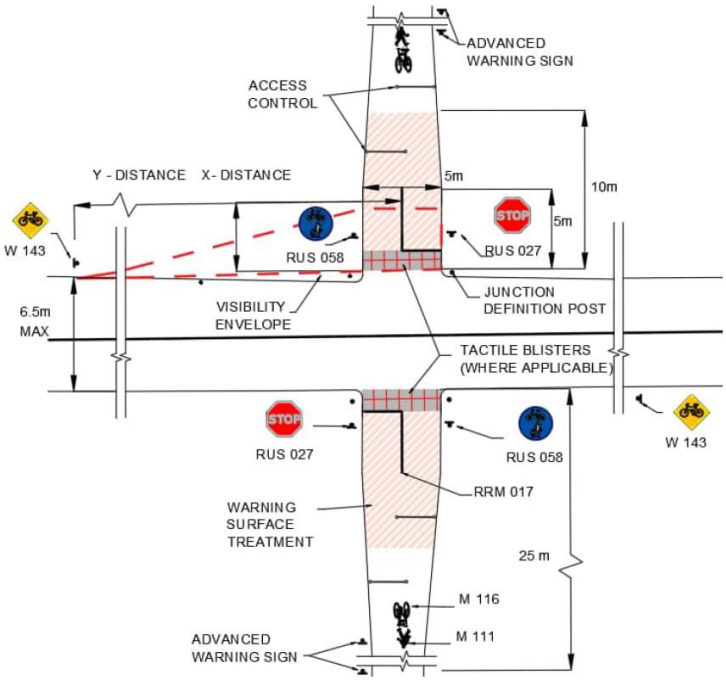

Figure 4-19 - Local & Regional Road Carriageway Crossing Detail

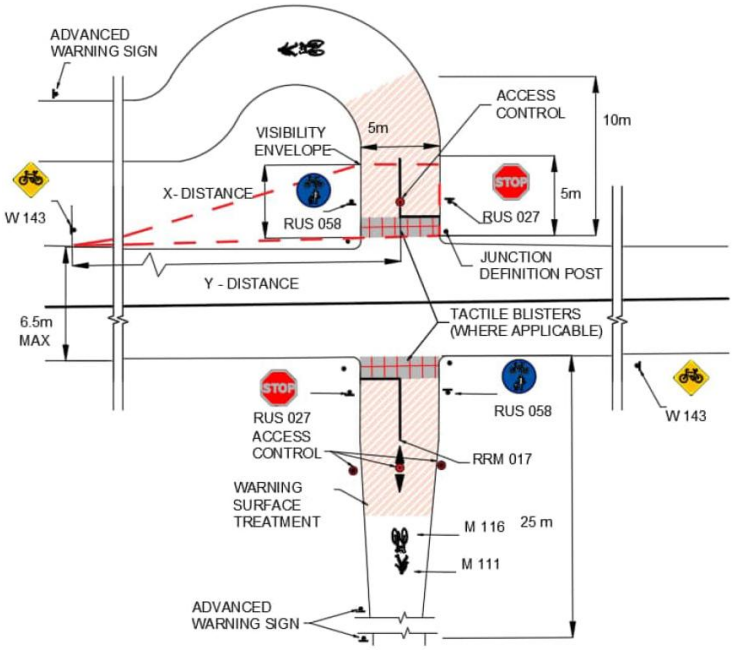

Figure 4-20 - Jug Handle Crossing Detail

Crossings of private accesses are designed so that priority lies with the greenway user, requiring vehicular traffic to give way to cyclists and pedestrians. The alignment of the greenway will be maintained across access to avoid an undulating vertical profile, and gradients approaching crossings are kept to 3% or less to facilitate safe and efficient stopping.

For landowners with land on either side of the greenway, accesses will be provided as required for crossing movements of machinery and animals, on a like for like basis. The default gate type that is to be provided is a single field gate per TII standard CC-SCD-00309. Gates will be hung on opposite piers either side of the greenway, and when opened, will temporarily close off the greenway to allow the landowner to cross. Illustrated in Figure 4-21 and Figure 4-22, and in Drawing No. 60701883-ACM-HGN-SW_ZZ_ZZ_ZZ-DE-HG-0002. In some circumstances where there is a known need for a wider crossing, double field gates per TII standard CC-SCD-00310 will be provided – for example where there is forestry existing or planned on the far side of the greenway, and large machinery will need to cross in the future. Animal pens/corrals may also be provided where necessary.

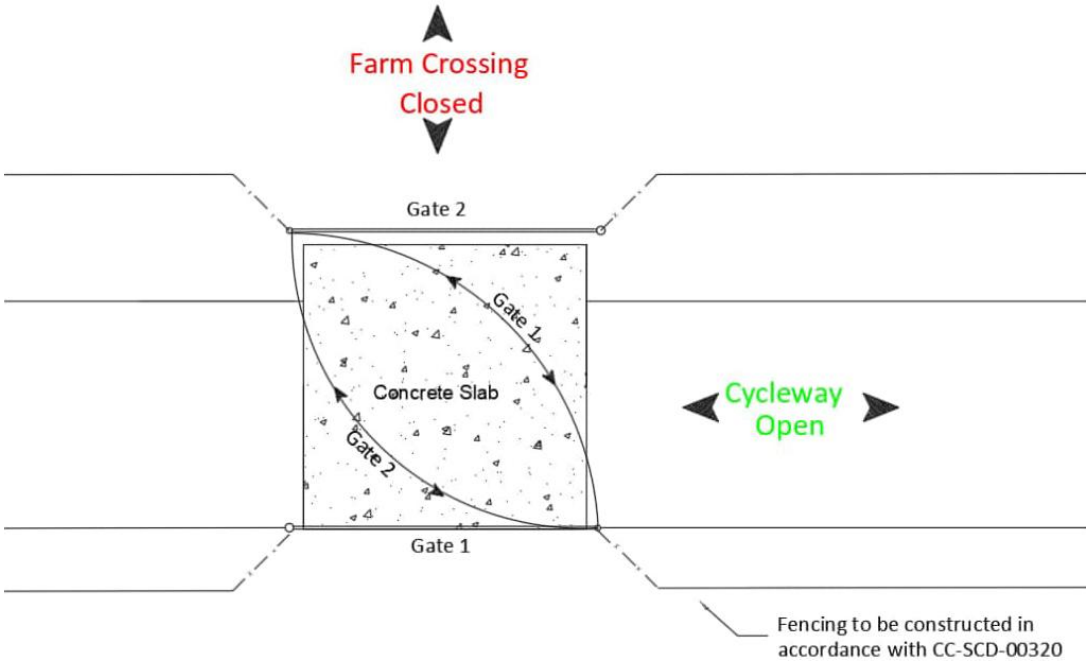

Figure 4-21 - Farm Crossing Gate Detail (Open for Greenway Users)

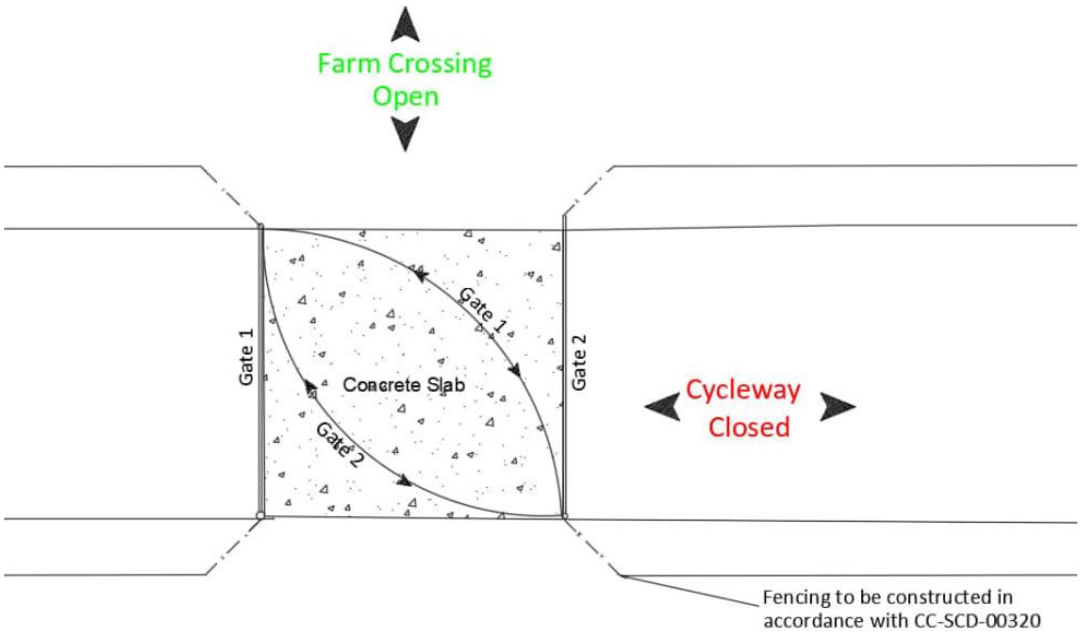

Figure 4-22 - Farm Crossing Gate Detail (Closed for Greenway Users)

At locations where the proposed greenway route is running along an access track currently used by landowners, gate access and a new access track in adjoining fields may be provided. Alternative access tracks may be required at some locations where the abandoned railway line is currently being used for access by landowners.

Chicanes (staggered approach barriers) (Figure 4-23) will be used at crossing points of local roads and access/egress of the greenway to reduce cyclist speeds to a minimum and encourage dismount for road crossings. In all cases, infrastructure to slow cyclists will be located on the greenway and not on the public road.

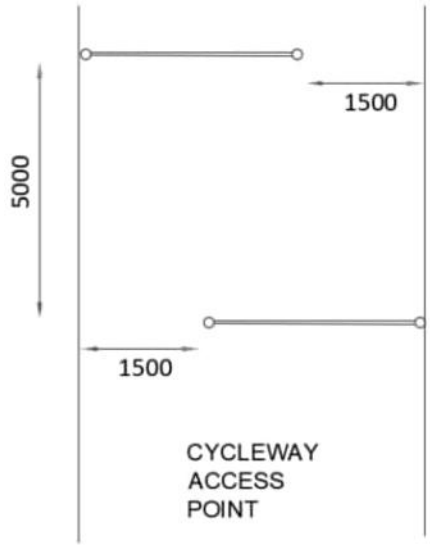

Figure 4-23 - Staggered Approach Barrier

4.3.6 Structures

The proposed development includes 91 No. structures in totality, these consist of minor structures (culverts), new river bridges, existing structures (road and river crossings), 1 No. new underpass under the N56 and 2 No. new underpasses under the N15.

The proposed and existing structures (not including minor culverts) and their approximate locations are listed below in Table 4-6.

Table 4-6 - Proposed Structures

Description	Type	Reference	Chainage (m)
N56 Underpass	Subway	S02	1100
Watercourse crossing	Culvert	PC07	2940
River Eske crossing	Bridge	S04	Lough Eske Loop West 55
Watercourse crossing	Culvert	PC08	4275
Clarlougheask - Carbbeagh	Culvert	PC09	4820
Watercourse crossing	Culvert	PC10	5330
Field Ditch	Culvert	PC11	6420
Watercourse crossing at St Francis'	Bridge	S06	6670
Watercourse crossing	Culvert	PC13	6800
Watercourse crossing	Culvert	PC14	6970
Watercourse crossing	Culvert	PC15	7220
N15 Underpass	Subway	S07	8220
Biddy's O'Barnes	Bridge	S10	12310
Watercourse crossing	Culvert	PC17	25050
Sessiagh View Road crossing (west abutment existing)	Bridge	S17	27260
River Finn bridge (existing piers)	Bridge	S20	29470
Field Ditch	Culvert	PC03	Clar Link 350
N15 Underpass (Clar)	Subway	S03	Clar Link 800

Table 4-7 - Existing Structures

Description	Type	Reference	Chainage (m)
River Eske crossing	Underbridge	S01	750
River Eske mouth	Underbridge	S05	Lough Eske Loop East 950
River Lowrymore crossing	Underbridge	S08	9025
River Lowrymore crossing (tributary)	Underbridge	S09	11680
Dearg Line Road crossing	Overbridge	S11	17250
River Dearg crossing	Underbridge	S12	18330
Meenglass Road	Overbridge	S14	25400
Coppering Heights Road	Overbridge	S15	26460
Unnamed watercourse crossing	Underbridge	S16	26720
Unnamed watercourse crossing	Underbridge	S18	27660
Navenny Street Road	Overbridge	S19	28700
Burn Daurnett crossing	Bridge	S13A	Goland Link 1080

4.3.6.1 Repair of Existing Structures

Several existing bridges and minor structures (spans less than 2 m) are noted which are to be incorporated within scheme. These mostly consist of masonry arch bridges and stone clapper bridges. The minor structures on the scheme are typically buried structures for drainage and do not require widening. All stone clapper bridges on the scheme are minor structures, whereas the masonry arch bridges on the scheme were a combination of drainage structures and railway over/underbridges.

The masonry arch rail bridges consist of 4 No. overbridges (greenway to pass underneath, i.e. bridge over greenway) and 7 No. underbridges (greenway on bridge, i.e. bridge under

greenway). The designation of over- and underbridges is conventionally done on the basis of the relationship of the bridge to the primary passage of the two crossing passages. In the above definition, the greenway is the primary passage for convenience of terminology.

For the overbridges, no modification works are envisaged to the structure beyond typical maintenance and repair works highlighted in the following paragraphs. Minor groundwater was observed on the old railway line at these locations and so dewatering works will be required prior to construction of the greenway carriageway.

Each one of these structures will require repair works to secure their future use, however the condition of these bridges will vary substantially with each requiring a differing level of repair. The following non-exhaustive list covers the typical types of repairs envisaged as part of the scheme:

- Vegetation clearance
- Masonry repointing
- Masonry replacement
- Concrete Saddling to Masonry Arches located over watercourses
- Parapet renewal
- Surfacing works

The repairs listed above are those typically carried out on all structures across Ireland under annual maintenance and asset management regimes. All repairs should aim to increase the residual design life of the structures to avoid requirements for future replacement works.

The existing retaining walls on the old railway line will be retained.

4.3.6.2 New Structures

The new structures on the scheme comprise 3 No. national road underpasses, 1 No. road overbridge, 3 No. river bridges, and 9 No. minor drainage structures. In addition to the new bridges, 1 No. river bridge will be constructed on the remnants of the River Finn Viaduct. The proposed drainage structures will comprise precast box or pipe culverts; the widths and heights of which is outlined in Section 4.3.8. The new structures options are shown on the following drawings Volume 3 of the EIAR:

- G.A. Details Of Underpass S02 - BGGP-ACM-SBR-S02-DR-CB-30001
- G.A. Details Of Underpass S03 - BGGP-ACM-SBR-S03-DR-CB-30001
- G.A. Details Of Riverbridge S04 - BGGP-ROD-SBR-RVB_S04-DR-CB-30001-30002
- G.A. Details Of Riverbridge S06 - BGGP-ROD-SBR-RVB_S06-DR-CB-30001
- G.A. Details Of Underpass S07 - BGGP-ACM-SBR-S07-DR-CB-30001
- G.A. Details Of Riverbridge S10 - BGGP-ROD-SBR-RVB_S10-DR-CB-30001
- G.A. Details Of Overbridge S17 - BGGP-ROD-SBR-OVB_S17-DR-CB-30001
- G.A. Details Of Riverbridge S20 - BGGP-ROD-SBR-RVB_S20-DR-CB-30001

4.3.6.2.1 Underpasses

The underpasses will cross the N56 (1 No.) and N15 (2 No.) national roads and will be constructed with precast concrete box culvert units. The box culverts will be installed in 2m segments over the length of the proposed underpasses and will require traffic lane closures of the national roads during their construction.

At the 40m long N56 underpass (Ch. 950), the internal width is 6m to provide for the 4m facility width over this section of the greenway and a 1m lateral clearance to the walls of the box culvert on each side.

The 26m long N15 underpass at Clar is adjacent to the disused Clar Bridge (masonry arch structure). An internal arch of Clar Bridge will be incorporated into the eastern portal of the underpass. However, it is not proposed to have them structurally connected. The internal

width will be 5 m to accommodate the 3 m greenway width on this spur with 1m clearances on each side.

At the 26m long N15 Druminin underpass (Ch. 8,250), the width is increased to 5.5m to account for the minor curve of the horizontal alignment for the 3m facility width at this point. Reinforced concrete wingwalls will be provided at the portals to the underpasses.

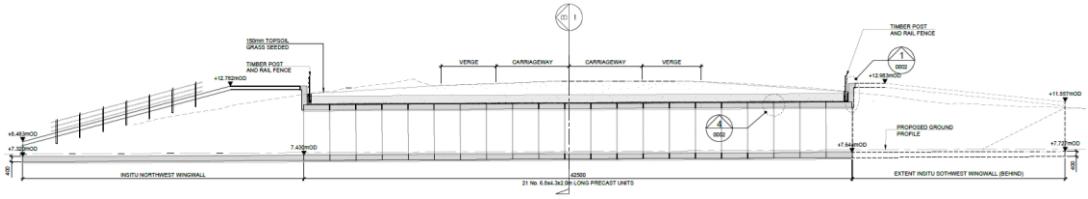

Figure 4-24 - N56 Underpass

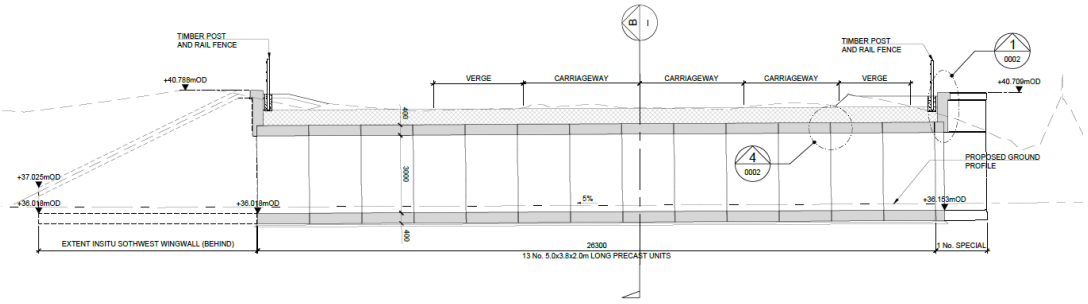

Figure 4-25 - N15 Underpass (Clar Bridge)

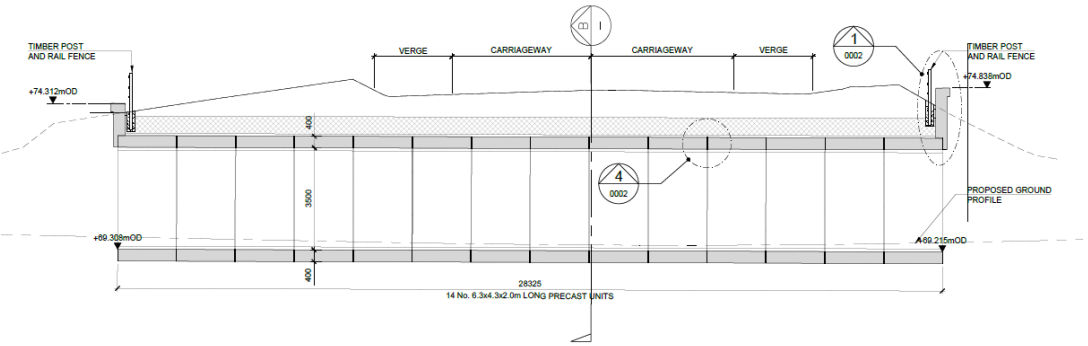

Figure 4-26 - N15 Underpass

4.3.6.2.2 Road Overbridge

The only proposed road overbridge on the scheme is located at Sessiagh View to the south of Ballybofey. This bridge will be replacing a previous rail bridge that existed at the site, from which the original abutments remain and are visible on road. The bridge at this location will be a single span, 24m long structure with a 1% longitudinal gradient and a straight plan alignment. The deck consists of a symmetric u-frame with weathering steel box-girders forming the pair of above-deck longitudinal girders. Intermediate transverse beams are spaced at 1.5m centres. The deck consists of precast concrete deck slabs made composite with the transverse beams. The end supports consist of reinforced concrete abutment walls and bankseats. The abutments consist of reinforced concrete abutment walls and bankseats. It is not proposed to reuse the previous abutments due to their close proximity to the existing carriageway. The foundations will consist of spread foundations due to the close proximity of the footing to rock. The steel deck will have a rigid connection to the abutment and not require bearings or movement joints (integral construction). A minimum headroom clearance of 5.7m to the roadway below is provided throughout.

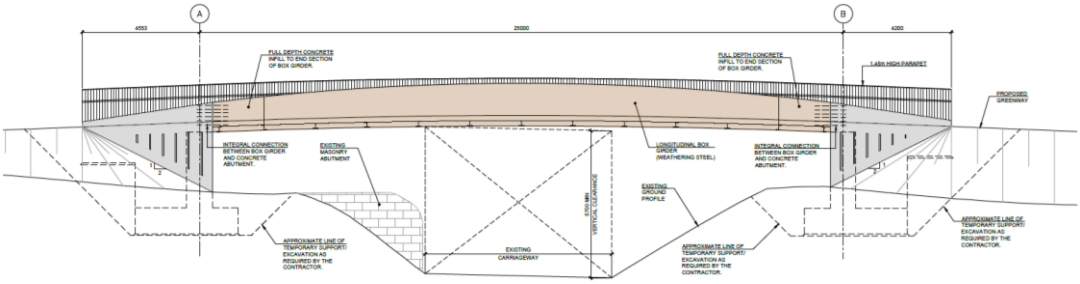

Figure 4-27 - Sessiagh View Overbridge

4.3.6.2.3 River Bridges

The (5) river bridges are highlighted as below:

- **River Eske Viaduct:** This is a 175 m long, 6-span viaduct in a steep topography at the beginning of the Lough Eske Loop. The plan alignment of the proposed structure is an S-shape and features a 4m width between the parapet railings throughout. The bridge maintains a vertical gradient of 2.9% over its alignment and approaches. The longest span of 40m is across the River Eske. The remaining spans vary from 14.5m to 38.8m. No in-river works are proposed for this structure. The deck consists of an asymmetrical U-shaped weathering steel box-girder that features an alternating upstand on the inside of each curve. The intermediate supports comprise slender concrete-infilled steel tubular piers that are rigidly connected to the deck. The end supports comprise of reinforced concrete abutment walls and bankseats. A mix of piled and pad foundations are proposed given the anticipated rock level close to the riverbank. As per the intermediate piers, the deck will be rigidly connected to the abutments and, as such, the structure is classed as integral (no bearings or movement joints).

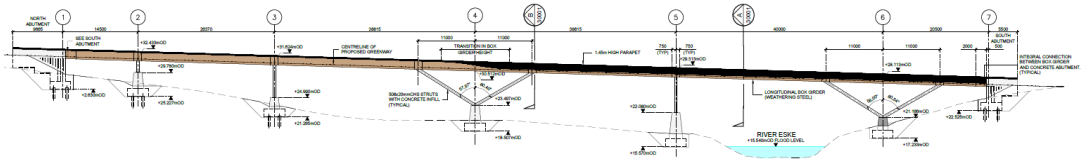

Figure 4-28 - River Eske Viaduct

- **Clogher River Bridge:** This is a single-span, 24m long bridge adjacent to St. Francis National School. The bridge meets the existing local road at the crest of a hill and so has a vertical gradient of approx. 2.5%. The plan alignment of the proposed structure is straight and features a 4m width between the parapet railings throughout. No in-river works are proposed for this structure. The deck consists of a symmetric u-frame with weathering steel box-girders forming the pair of above-deck longitudinal girders. Intermediate transverse beams are spaced at 1.5m centres. The deck consists of precast concrete deck slabs made composite with the transverse beams. The end supports consist of reinforced concrete abutment walls and bankseats. Pad foundations are proposed given the close proximity of rock to the existing ground level. The deck will be rigidly connected to the abutments and, as such, the structure is classed as integral (no bearings or movement joints).

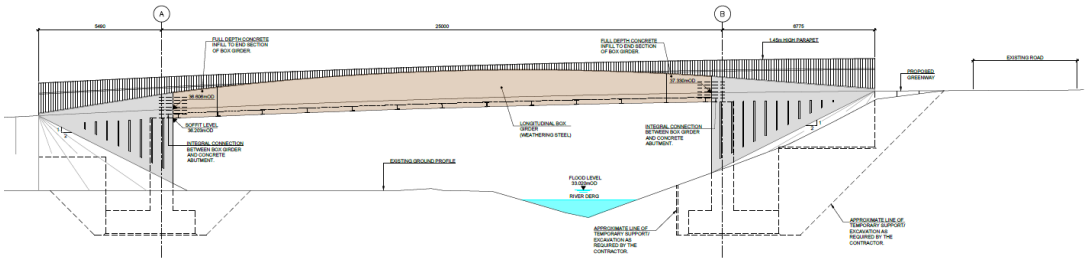

Figure 4-29 - Clogher River Bridge

- **Lowrymore River Bridge:** This is a single-span, 24m long structure connecting the Biddy's Trailhead to Biddy's O'Barnes pub. Due to the level change on both

riverbanks, the bridge maintains a 5% vertical gradient across its length. The plan alignment of the proposed structure is straight and features a 4m width between the parapet railings throughout. No in-river works are proposed for this structure. The deck consists of a symmetric u-frame with weathering steel box-girders forming the pair of above-deck longitudinal girders. Intermediate transverse beams are spaced at 1.5m centres. The deck consists of precast concrete deck slabs made composite with the transverse beams. The end supports consist of reinforced concrete abutment walls and bankseats. Pad foundations are proposed given the close proximity of rock to the existing ground level. The deck will be rigidly connected to the abutments and, as such, the structure is classed as integral (no bearings or movement joints).

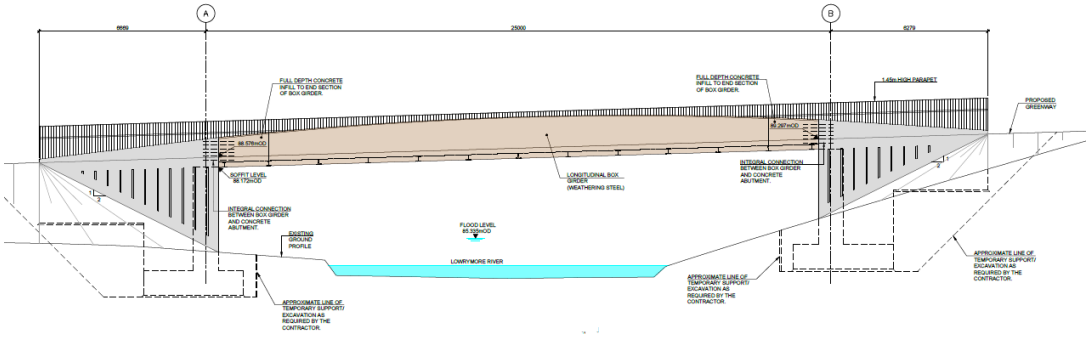

Figure 4-30 - Lowerymore River Bridge

- **River Finn Viaduct:** The proposal is to construct a new deck structure on the remaining piers from the old railway viaduct over the River Finn SAC. The overall length of this four-span structure will be approx. 54m in length; with intermediate spans of approx. 13.5m in length. To tie in with the existing piers, the deck is proposed to have a 4% vertical gradient in the longitudinal direction on the southern end span and a 2% gradient on the northern internal and end span. The high point of the bridge is at the southern internal span. The plan alignment is a gentle curve with a radius of 270m and maintains a 5m width between parapet railings. The deck consists of a precast concrete slab on a pair of lattice girders fabricated from weathering steel. This form has been chosen to echo the old railway viaduct which was of similar construction. In order to minimise the impact to the existing piers, the deck will be articulated with bearings at each pier and at the end abutments, the northern of which is the original abutment from the old railway bridge. The southern approach spans feature an S-curve to the west in order to avoid the rear garden of the dwelling to the immediate south of the viaduct. These spans comprise a precast concrete deck slab with steel beams (instead of the lattice beams over the river). The southern abutment will be reinforced concrete abutment wall and bankseat. Pad foundations are proposed given the close proximity of rock to the existing ground level.

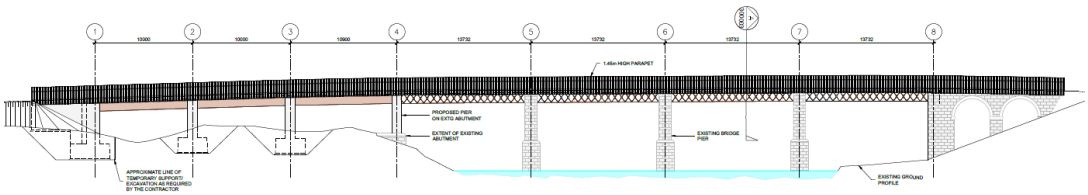

Figure 4-31 - River Finn Viaduct

4.3.7 Car Parks, Trailheads and Welfare Amenities

Ancillary Infrastructure along the route has been designed in line with the TII Publication DN-GEO-03047 Rural Cycleway Design and the Department of Transport, Tourism and Sports Greenways and Cycle Routes Ancillary Infrastructure Guidelines. This includes the provision of trailheads, rest areas, cycle parking, connections, lighting and wind breaks.

Trailheads are formal points of entry to the Greenway and are an integral part of the route experience. Four trailheads have been identified along the proposed development route in accordance with the minimum requirements as set out in Table 6.1 of DN-GEO-03047. At

these facilities it is proposed to provide car parking, as well as rest areas and bicycle parking. Additional facilities and amenities, including toilet facilities will be provided at some of the trailheads depending on the Level of Service (LOS), also in accordance with DN-GEO-03047. All the facilities at the trailheads will be accessible to disabled users, with dropped kerb access, tactile paving crossing, accessible parking and wider doors to access toilet blocks. The trailheads also include rest areas for users of the greenway in the form of picnic benches and seating as well as information boards displaying the greenway route and key information.

The Level of Service (LoS) refers to the appropriate provision required for any section of the route. The LoS is determined by the volume and type of likely demand along these sections, as shown in the Table below from the Ancillary Infrastructure Guidelines. The Rural Cycleway Design standards provide further detail on provision; maximum spacing between ancillary infrastructure and include a 'Level 4' LoS provision.

Figure 4-32 - Changing Places - Stormont, Belfast.

Figure 4-33 - LoS Level 4 Example, Limerick Greenway (Source – Limerick Greenway [Limerick Greenway | Limerick.ie])

Figure 4-34 - Rathkeale Trailhead, Limerick Greenway (Source – Limerick Greenway [Limerick Greenway | Limerick.ie])

Ancillary Infrastructure Level of Service (LoS) Levels				
Quality of Service	Typical Setting	Projected Main Users	Likely Demand Type	Level of Ancillary Infrastructure
Level 1	Large residential area and/ or a nearby busy visitor attraction.	High recreation and utility use for the community and visitors.	Walk, cycle, jog, pram, dog walk, Segway, wheelchair and other.	**Very High**. Most ancillary infrastructure elements are appropriate for these locations, and also including pocket recreation facilities such as playgrounds and refreshment points.
Level 2	Small residential area or a local minor visitor attraction.	Short duration cross community and/or visitors.	Walk, cycle, jog, pram, in-line, dog walk, Segway, wheelchair and other.	**High**. Most ancillary infrastructure elements are appropriate for these locations.
Level 3	Rural area with a low population, no significant visitor attractions.	Half or full day recreation, community members and visitors.	Mainly cycling with some walking.	**Low**. Some rest areas and arts pieces may be appropriate in addition to way finding and service signage.

Figure 4-35 - Ancillary Infrastructure Level of Service (LoS) Levels

In the towns of Donegal, and Ballybofey/Stranorlar, the LoS Level is Level 1. These are larger residential areas and/or are close to busy visitor attractions. The provisions provided in these towns are the main terminal points of the greenway and include an increased number of seats, bicycle parking, e-bike charging, toilet, drinking water, and car parking. A third Level 1 trailhead will be provided at Biddy's O'Barnes in the middle of the route.

At Lough Eske, a LoS Level 2 trailhead will be provided, and three LoS Level 3 rest areas will be provided along the route, meeting the demand for smaller residential areas and/or scenic and amenity areas. Level 4 rest areas will also be provided at regular intervals along the route. Further details on the provision at trailheads and rest areas is provided in the section below.

4.3.7.1 Trailheads

In accordance with DN-GEO-03047, which outlines the spacing and type of provision for ancillary infrastructure, the proposed route will have four trailheads, each of which will have varying numbers of car parking spaces available.

Table 6.1 of DN-GEO-03047 outlines the minimum provision of Level 1-4 ancillary infrastructure and the required amenities such as toilets, bins and shelters, and notes that parking capacity is to be determined on the basis of anticipated level of use. A demand analysis exercise has therefore been undertaken to determine the number of car parking spaces required. In Donegal Town and Stranorlar the area of the trailheads include existing car parking spaces; these have been included in the total numbers and further analysis has been undertaken to ensure capacity is adequate for both weekday and weekend greenway usage.

Refer to Table 4-8 below for the number of car parking provisions provided, Table 4-9 for ancillary infrastructure provided at Level 1 trailheads, Table 4-10 for ancillary infrastructure provided at the Level 2 trailhead and Table 4-11 for additional Level 3 ancillary infrastructure. Refer to Drawings Trailhead Layouts - 60701883-ACM-HGN-SW_ZZ_ZZ_ZZ-DR-LV-0001, 0002, 0003 & 0006 for proposed Trailhead layouts in Volume 3 of the EIAR.

Table 4-8 - Trailheads & Car Parking

Location	Regular spaces	Accessible spaces	EV charging spaces	Universal EV charging spaces	Minibus parking
Donegal Town	91 (includes 60 existing)	7 (includes 3 existing)	0	4	1
Lough Eske	30	2	0	0	0
Biddy's O'Barnes	30	2	2	0	1
Ballybofey/Stranorlar	89 (includes 33 existing)	4 (including 2 existing)	2	3	3

Table 4-9 - Level 1 Ancillary Infrastructure at Trailheads

Element	Donegal Town	Biddy's O'Barnes	Ballybofey / Stranorlar
Seating	4x Benches each seating 2 people; 8 total.	7x Benches each seating 2 people; 14 total.	4x Benches each seating 2 people; 8 total.
Waste collection (subject to agreement with maintaining organisation)	1x General mixed waste 1x Dry recyclable waste 1x Organic/food waste	1x General mixed waste 1x Dry recyclable waste 1x Organic/food waste	1x General mixed waste 1x Dry recyclable waste 1x Organic/food waste
Cycle parking	22x Standard bicycle parking in the vicinity of the seating/picnic tables.	10x Standard bicycle parking in the vicinity of the seating/picnic tables.	32x Standard bicycle parking in the vicinity of the seating/picnic tables.
	4x Accessible bicycle parking in the vicinity of the seating/picnic tables.	4x Accessible bicycle parking in the vicinity of the seating/picnic tables.	4x Accessible bicycle parking in the vicinity of the seating/picnic tables.
Picnic table (suitable for all users, regard shall be had toward CARA guidelines).	3x picnic tables each seating 4 people; 12 total.	8x picnic tables each seating 4 people; 32 total.	3x picnic tables each seating 4 people; 12 total.
Information tables and mapping	Map of the cycle network, locations of services and tourist attractions, information on flora and fauna, information on Built Heritage – architectural and archaeological, leave No Trace guidelines, telephone numbers for emergency services.		
E-bike charging (subject to agreement with maintaining organisation)	2x Electric bicycle parking	2x Electric bicycle parking	2x Electric bicycle parking
Shelter	1x Shelter covering 2x picnic table and sheltered from wind.	1x Shelter covering 3x picnic table and sheltered from wind.	1x Shelter covering 1x picnic table and sheltered from wind.
	1x Shelter covering 2x benches and sheltered from wind.	1x Shelter covering 2x benches and sheltered from wind.	1x Shelter covering 2x benches and sheltered from wind.
Water points	Drinking water source outside, accessible 24/7.		
Additional lighting	Provided in the vicinity of: picnic tables and shelter; toilets; and bicycle repair station.		
Toilets (subject to agreement with maintaining organisation)	2x toilets (including one Changing Places facility, baby changing facilities).	2x toilets (including one Changing Places facility, baby changing facilities).	2x toilets (including one Changing Places facility, baby changing facilities).
Bicycle repair	Air pump, bicycle mount, and set of tools for basic repairs: Allen keys, fork wrench set, screwdrivers, spoke spanner, chain tool.		
Restaurant / cafe / kiosk / supermarket	Directional signage to the services to/from the Greenway, as appropriate.		
Accommodation	Directional signage to the services to/from the Greenway, as appropriate.		
Connection to public transport	Directional signage to the services to/from the Greenway, as appropriate.		

Table 4-10 - Level 2/ Ancillary Infrastructure at Trailheads

Element	Lough Eske
Seating	3x Benches each seating 2 people; 6 total.
Waste collection (subject to agreement with maintaining organisation)	Leave no trace signage
Cycle parking	22x Standard bicycle parking in the vicinity of the seating/picnic tables.
	2x Accessible bicycle parking in the vicinity of the seating/picnic tables.
Picnic table (suitable for all users, regard shall be had toward CARA guidelines).	1x picnic tables each seating 4 people; 4 total.

Information tables and mapping	Map of the cycle network, locations of services and tourist attractions, information on flora and fauna, information on Built Heritage – architectural and archaeological, leave No Trace guidelines, telephone numbers for emergency services.
E-bike charging (subject to agreement with maintaining organisation)	N/A
Shelter	1x Shelter covering 1x picnic table and sheltered from wind. 1x Shelter covering 2x benches and sheltered from wind.
Water points	N/A
Additional lighting	N/A
Toilets (subject to agreement with maintaining organisation)	N/A
Bicycle repair	Air pump.
Restaurant / cafe / kiosk / supermarket	Directional signage to the services to/from the Greenway, as appropriate.
Accommodation	N/A
Connection to public transport	Directional signage to the services to/from the Greenway, as appropriate.

Table 4-11 - Additional Level 3 Ancillary Infrastructure

Element	River Eske Crossing	Lough Mourne (Rest Area)	Carrickmagrath
Seating	2x Benches each seating 2 people; 4 total.	3x Benches each seating 2 people; 6 total.	2x Benches each seating 2 people; 4 total.
Waste collection (subject to agreement with maintaining organisation)	Leave no trace signage	Leave no trace signage	Leave no trace signage
Cycle parking	8x Standard bicycle parking in the vicinity of the seating/picnic tables.	10x Standard bicycle parking in the vicinity of the seating/picnic tables.	8x Standard bicycle parking in the vicinity of the seating/picnic tables.
	1x Accessible bicycle parking in the vicinity of the seating/picnic tables.	1x Accessible bicycle parking in the vicinity of the seating/picnic tables.	1x Accessible bicycle parking in the vicinity of the seating/picnic tables.
Picnic table (suitable for all users, regard shall be had toward CARA guidelines).	1x picnic tables each seating 4 people; 4 total.	2x picnic tables each seating 4 people; 8 total.	1x picnic tables each seating 4 people; 4 total.
Information tables and mapping	Information to be provided on the immediate surroundings of the context or area on as-needed basis (e.g. a landmark).	Information to be provided on the immediate surroundings of the context or area on as-needed basis (e.g. a landmark).	Information to be provided on the immediate surroundings of the context or area on as-needed basis (e.g. a landmark).
E-bike charging (subject to agreement with maintaining organisation)	N/A	N/A	N/A
Shelter	N/A	N/A	N/A
Water points	N/A	N/A	N/A
Additional lighting	N/A	N/A	N/A
Toilets (subject to agreement with maintaining organisation)	N/A	N/A	N/A
Bicycle repair	N/A	N/A	N/A

Element	River Eske Crossing	Lough Mourne (Rest Area)	Carrickmagrath
Restaurant / cafe / kiosk / supermarket	N/A	N/A	N/A
Accommodation	N/A	N/A	N/A
Connection to public transport	N/A	N/A	N/A

4.3.7.1.1 Donegal Town Trailhead Car Park

It is proposed to develop a trailhead at the start of the greenway in Donegal Town, to include part of the lands adjacent to the St John Bosco Community Centre and the lands north of the existing Railway Park road. Railway Park will be realigned to the north to maximise the space that can be utilised by the trailhead. It will include a car park which will have a total of 103no parking spaces, including EV and accessible spaces, and there will also be provision for bus pull in bays to the western side of the trailhead. Vehicles will access the car park from Tirchonaill Street, next to the St. John Bosco Community Centre. This trailhead is located at least 208m northeast of the Lough Eske and Ardnamona Wood SAC boundary, 309.5m northeast of the Donegal Bay (Murvagh) SAC boundary and 307m northeast of the Donegal Bay SPA boundary and at its closest point. There are no hydrological connections from this trailhead to these European designated sites.

4.3.7.1.2 Lough Eske Trailhead Car Park

It is proposed to develop a trailhead in the forestry area southwest of Lough Eske. The car park utilises an existing access road and car park. The access road and car park is currently unpaved and accessed from the local road. The car park will have 32no spaces, 2 of which is for accessible parking, 0 for EV charging, 0 minibus spaces, and has a surface area of 515m^2. This trailhead is located at least 240m north of the Lough Eske and Ardnamona Wood SAC boundary at its closest point. There are no hydrological connections from this trailhead to the Lough Eske and Ardnamona Wood SAC.

4.3.7.1.3 Biddy's O'Barnes Trailhead Car Park

It is proposed to develop a trailhead adjacent to Biddy's O'Barnes, northeast car park for the pub. The trailhead shares an existing access road from the N15, with a separate access into the car park itself. The car park will have 35no spaces, 2 of which are for accessible parking, 2 for EV charging, 1 minibus space, and has a surface area of 960m^2. This trailhead is located at least 1.1km northeast and 1.5 km upstream of the Lough Eske and Ardnamona Wood SAC boundary via the Lowerymore River.

4.3.7.1.4 Ballybofey/Stranorlar Trailhead Car Park

It is proposed to develop a trailhead in Ballybofey/Stranorlar. The trailhead will incorporate state owned lands east of The Base enterprise centre and the existing car park for the enterprise centre. The car park will have 101no spaces, including EV and accessible spaces, and 3no minibus spaces. The car park is accessed from Railway Road. This trailhead is located at least 150m north of the River Finn SAC boundary at its closest point. There are no hydrological connections from this trailhead to the River Finn SAC.

4.3.7.2 Rest Areas

In addition to the Level of Service (LoS) Levels 1, 2 and 3 trailheads and rest areas, outlined in Section 4.3.7.1, there are a number of Level 4 rest areas proposed along the route. As per the requirements of the Rural Cycleway Design standards, these are located at a maximum spacing of 2km. Where feasible, and in areas of particular scenic beauty, they are proposed at more regular intervals. They have also been provided at locations where the greenway user may need to exert more effort due to the vertical profile.

Minimum provision at Level 4 rest areas is proposed to be seating and bike parking for 2 people, as per the requirements of the Rural Cycleway Design standards. Some Level 4 rest areas may be upgraded to include a picnic table or information signage.

In total there are 21no Level 4 rest areas proposed, and these are shown on General Arrangement Drawings Nos. 60701883-ACM-HGN-SW_ZZ_ZZ_ZZ-DR-HG-0096 – 0126 (Refer to Volume 3 of the EIAR).

4.3.7.3 Welfare Amenities

Sanitary facilities will be provided at Donegal Town, Biddy's O'Barnes, and Ballybofey/Stranorlar, and will include toilets, accessible toilets and baby changing facilities. A Changing Places toilet will be provided at the trailheads in Donegal Town and Ballybofey/Stranorlar. Changing Places are larger, accessible restrooms that have the correct equipment, including a hoist and changing bench, designed to support those who need assistance. These facilities will be maintained and serviced by Donegal County Council. In accordance with PE-PMG-02047 and DN-GEO-03047, toilet facilities will be composting 'dry' toilets.

Picnic tables are proposed at each Level 1, 2 and 3 trailhead/rest area, and provision of shelter and drinking water is proposed at Level 1 trailheads.

4.3.7.4 Waste Management

Waste facilities are proposed at each of the Level 1trailheads. Bins (to include dry recyclable waste and food waste) will be provided and serviced by Donegal County Council.

Waste bins, which will also function as dog fouling receptacles, will also be located at the 3 major trailheads. Donegal County Council will be responsible for the waste management of these bins and receptacles.

'Leave No Trace' signage will be provided at the Level 3 and Level 4 rest areas.

4.3.8 Scheme Drainage

4.3.8.1 General

The drainage design for the proposed greenway will be designed in accordance with the following TII publication standards:

- Transport Infrastructure Ireland (February 2025) *Rural Cycleway Design (Offline & Greenway) DN-GEO-03047;*
- Transport Infrastructure Ireland (February 2024) *Drainage Systems for National Roads DN-DNG-03022*;
- Transport Infrastructure Ireland (June 2015) *Drainage of Runoff from Natural Catchments (including Amendment No.1 dated June 2015) DN-DNG-03064*
- Transport Infrastructure Ireland (June 2015) TII Edge of Pavement Details *(including Amendment No.1 dated June 2015) DN-DNG-03062*.

As per TII DN-DNG-03022, the design intent is to achieve the efficient removal of surface water to provide safety, provide effective sub-surface drainage to maximise the lifespan of the pavement and earthworks, and minimise the impact of the runoff on the receiving environment.

To achieve those three major objectives, the proposed greenway will utilise:

- New over-the-edge drainage ditches for the interception of surface water from the greenway
- New pre-earthworks drainage ditches for the interception and diversion of surface runoff from adjacent land away from the greenway.
- New filter drains within the verge where the greenway is in cut.
- New carrier drains where surface water needs to be conveyed below roads.
- Attenuation swales for the attenuation of runoff from the greenway surface.

- Pipe or box culverts where the greenway crosses watercourses and field ditches and bridge structures for major watercourse crossings.
- If there are any locations where existing ditches can be utilised, these may be incorporated into the drainage design if the capacity within the channels is sufficient for the flows.
- For trailheads, the design will include for permeable, flood resilient materials such as Grasscrete or similar porous paving for new areas of car parking and resin bound gravel for new areas of congregating spaces. Additional impermeable surfacing will be minimised and attenuation in the form of swales or basins will be provided.

The greenway drainage design is shown on Drainage Drawings 60701883-ACM-HDG-SW_ZZ_ZZ_ZZ-DR-DR-0001 – 0031 and Trailhead drainage design at Donegal Town is shown on Trailhead Drainage Drawing 60701883-ACM-HDG-SW_ZZ_ZZ_ZZ-DR-DR-0053 in Volume 3 of the EIAR.

4.3.8.2 Existing Environment

The Barnesmore Gap Greenway is located within Barnesmore Gap, between Donegal and Ballybofey and crosses several watercourses that discharge to Lough Eske, Lough Mourne, the Finn River, the Mourne Beg River, or the Atlantic Ocean. The greenway is located within the Donegal Bay North (HA37) hydrometric area and the Foyle hydrometric area (HA 01).

The Donegal Bay North catchment drains a total area of 804km^2. The catchment is divided into five sub-catchments and has 72 surface water bodies. The Foyle catchment drains a total area of 2,919km^2 and is divided into nine sub-catchments with 41 river waterbodies.

Some of the watercourses crossed or in close proximity to the proposed greenway include the River Eske, Drumrooske Middle Stream, Drumbrooske East Stream, Limestone Brook, Clardrumbarren Stream, Carbbeagh Stream, Clogher River, Lowrymore River, Milltown Stream, Mullanalamphry Stream, Keadew Lower Stream, Barrack Hill Stream, Mourne Beg Stream, Cashelnavean Stream, Burn Daurnett, Sessiagh Stream, and the River Finn.

4.3.8.3 Drainage Outfalls

The vertical geometry of the proposed greenway and the location of watercourses has dictated the outfall locations. The surface water runoff will be attenuated in a swale or infiltration trench and released to adjacent watercourses at the greenfield runoff rate to mimic the existing hydraulic conditions and minimise impacts on the receiving environment. As per DN-DNG-03022, the return period for greenfield runoff rate is the 1 in 100 year storm event, calculated using the IH124 method, taking into account catchment area, soil conditions and rainfall values. There will be no requirements for small scale bank works (e.g. construction of new engineered outfalls) at WFD waterbodies.

Where ditches or filter drains are required to convey the runoff from adjacent land, these will run adjacent to the greenway at the toe of the earthworks slopes and will discharge to the nearest watercourse, following the topography of the existing ground.

The drainage outfalls are shown on Drainage Drawings 60701883-ACM-HDG-SW_ZZ_ZZ_ZZ-DR-DR-0001 – 0031 (Refer to Volume 3 of the EIAR).

4.3.8.4 New Greenway Drainage

Drainage will largely consist of over the edge drainage along the length of the development. Along the abandoned railway corridor, existing ditches will be cleaned and regraded and attenuation swales added to control runoff to existing watercourses. In offline sections the drainage has been designed to connect to existing watercourses, making use of existing drainage channels as far as possible and providing new attenuation. In some areas, pre earthworks drainage is required at the toe of the embankment to catch runoff from adjacent lands, this will be in the form of filter drains or ditches. Filter drains will also be provided where the greenway is in cut, and carrier drains in situations where the outfall from the swale may have to cross the greenway prior to enable discharge to a watercourse.

Swales are shallow, vegetated ditches designed to manage surface water runoff, prevent erosion, and enhance water quality. Detention basins are vegetated depressions that attenuate surface water runoff by providing temporary storage and a controlled release of runoff. These will be installed along the greenway route, particularly in areas where natural drainage solutions are needed. Both the swales and detention basins are designed with 1:4 side slopes for improved maintenance access and safe egress.

Infiltration trenches are linear excavations usually filled with permeable granular material, that allows for the temporary storage of water before it infiltrates into the ground. These will be installed along the greenway route where space is constrained and the provision of a swale is not feasible.

A crossfall of 1% has been provided along the length of the greenway pavement to facilitate drainage and prevent standing water. Crossfall on verges will be kept to a minimum to allow for infiltration and to limit the overall runoff.

Where the proposed greenway intercepts a watercourse, a pipe, box culvert, or clear span bridge structure will be required to maintain the connectivity of watercourses. Where suitable habitat for fish is present in a watercourse, the invert of the culvert will be embedded. The size of the watercourse will also dictate whether a culvert or bridge is required. Where pipes, culverts, and bridges are required as part of the greenway drainage design, an application has been made to the Office of Public Works (OPW) for Section 50 consents where required. All relevant Section 50 approvals have been obtained.

Table 4-12 outlines the watercourse crossings which require Section 50 consent. All crossings have been reviewed to ensure adequate cover has been provided above the structure.

Table 4-12 - Watercourse Crossings - Section 50

Crossing Reference	Structure Reference	Chainage	Watercourse Name	Arterial Drainage Channel	Structure Type	Diameter (m)
C3	PC03	Clar Link 350	Unnamed	NO	Circular	1.35
C5	S04	Lough Eske Loop 55	River Eske	NO	Bridge	N/A
C10	PC07	2940	Unnamed	NO	Circular	1.2
C11b	PC08	4275	Unnamed	NO	Circular	1.5
C12	PC09	4820	Carbbeagh	NO	Box Culvert	1.83
C13	PC10	5330	Drumnagahan	NO	Circular	1.2
C15	PC11	6420	Milltown	NO	Circular	1.5
C16	S06	6670	River Derg	NO	Bridge	N/A
C17	PC13	6800	Unnamed	NO	Circular	1.2
C18	PC14	6970	Unnamed	NO	Circular	1.5
C19	PC15	7220	Unnamed	NO	Circular	0.9
C29	S10	Biddy's 200	Lowerymore River	NO	Bridge	N/A
C51	PC17	25050	Unnamed	NO	Box Culvert	1.8
C56	S20	29470	River Finn	NO	Bridge	N/A

In addition to the major watercourse crossings outlined above, there are a number of smaller crossings of ditches and minor watercourses. These include 68 No. existing culverts/bridges and 34 No. new crossings.

4.3.8.5 Trailhead Drainage

The proposed trailheads will be designed to maximise permeable surfacing where possible, in order to reduce the runoff rate, reduce level of attenuation required and minimise the risk of flooding. Where additional impermeable surfacing is proposed, drainage will be attenuated

by a swale or a basin and released at the greenfield runoff rate to mimic the existing hydraulic conditions and minimise impacts on the receiving environment.

All new car parking areas are proposed to be constructed from a cellular porous paving solution such as Grasscrete or Truckcell, which provides approximately 90% permeability and captures hydrocarbon spills such that each pocket can be emptied and refilled with soil/grass seed in the event of die-back. A small number of gullies will be provided to account for the slight reduction in permeability, and these will convey runoff to attenuation swales or basins prior to discharge.

There are areas of existing impermeable car parking (bitumen macadam) at the Donegal Town and Stranorlar trailheads, which are proposed to be retained along with the existing drainage regime.

At Donegal Town, where the existing Railway Road is proposed to be realigned with new gullies installed, a petrol interceptor will be installed prior to discharge to an attenuation pond. To provide some betterment, the drainage regime for the existing car park will be formalised to include for gullies at surface level and attenuation to greenfield runoff prior to discharge.

For the amenity areas where greenway users will congregate, permeable resin bound gravel is proposed to minimise the impact of additional runoff. Sections of the greenway that are in areas at higher risk of flooding will be surfaced with permeable asphalt paving.

The drainage design for the trailhead at Donegal Town is shown on Trailhead Drainage Drawing 60701883-ACM-HDG-SW_ZZ_ZZ_ZZ-DR-DR-0053 in Volume 3 of the EIAR.

4.3.9 Earthworks

4.3.9.1 Scope of Earthworks

The proposed scheme will involve extensive earthworks to construct the greenway alignment, trailheads, drainage systems, and associated infrastructure elements including new structures. Key activities include:

- Excavation: Removal of vegetation, topsoil, subsoil and rail ballast (where present and required) along the abandoned railway corridor and offline greenfield sections.
- Cut and Fill: Grading to achieve proposed greenway profile, including embankments and cuttings.
- Material Reuse: Reuse of suitable excavated materials (e.g., topsoil, subsoil) for boundaries, verges and embankments.
- Import/Export: Import of suitable materials (e.g., surface course, sub-base, crushed stone for capping) and export of unsuitable materials (e.g., contaminated soil, vegetation).

4.3.9.2 Ground Investigations

A ground investigation (GI) programme was conducted along the proposed scheme to assess subsurface conditions and inform the design of earthworks and related geotechnical aspects of infrastructure elements including new structures. The investigation was carried out by Northwest Geotech Ltd on behalf of ROD-AECOM. The GI programme consisted of a combination of windowless sampler (WS) boreholes, cable percussion (CP) boreholes, trial pits (TP) and dynamic probes (DP), with a total of 27 boreholes (12 no. WS and 15 no. CP), 53 no. TP and 33 no. DP completed across the scheme. Lab testing was carried out on samples comprising general material classifications, environmental / ground aggressivity classification and earthworks compaction/CBR tests.

The subsurface profile generally consists of three main layers. The near-surface layer, ranging up to 3.2m in depth below ground level (BGL), comprises of topsoil and Made Ground. Made Ground occasionally contains materials such as concrete, bricks and plastic pipes, particularly in urbanised areas. These materials were also identified in some of the trial pits, requiring careful excavations and waste management during construction.

Following topsoil and Made Ground units, very soft to firm slightly sandy slightly gravelly silty clays/clayey silts with high organic content and spongy pseudo-fibrous peat units are encountered up to a depth of 6.5m BGL. Thicknesses of these soils reach up to 3m and they occasionally consist of roots, plant material and decaying timber.

The deeper layers are dominated by medium dense to very dense/firm to stiff glacial tills, which consists mainly of sand and gravel deposits. Boulder layers are frequently encountered, leading to refusal in several boreholes and trial pits.

Observations from the GI programme also indicate the presence of groundwater at depths of between 0.3 and 5.0m BGL in some boreholes and trial pits, as evidenced by water strikes and seepages, respectively. Refusal due to dense gravels/cobbles and boulders are common, particularly in glacial till zones. Soft ground areas consisting of peat and organic soils will need to be treated with care. As given in the next subsection, use of geotextile reinforced unbound granular layers will be required to ensure stability of embankments. Steep slopes in areas with dense gravel and boulders may require retaining or reinforced soil solutions.

4.3.9.3 Embankments and Slopes

The embankments and slopes along the greenway are designed to ensure stability and safety. The typical slope ratio for embankments and slopes is 1V:2.5H in greenfield sections and 1V:2H along the railway line, although these may be steepened up to a range of 1V:1H to 2.5V:1H in constrained areas with the use of reinforcing elements (e.g., geosynthetics, soil nails, anchors) to maintain stability.

Embankments will be constructed in layers, with each layer being compacted to required compaction/density level before the next layer is added. This will ensure the long-term stability of the embankments. In addition, per DN-GEO-03047-03 Rural Cycleway Design (Offline & Greenway) (TII Publications, August 2022), the use if geotextile reinforced unbound granular layers will be utilised to cross very soft ground including peatlands. Refer to Section 4.5.7 for the construction methodology and description of construction works.

4.3.9.4 Material Balance and Quantities

The earthworks for the proposed scheme will involve both cut and fill operations to achieve the desired vertical and horizontal alignment of the greenway route. The primary objective is to balance the cut and fill volumes as much as possible to minimise the need for importing or exporting materials, thereby reducing the environmental impact and construction costs.

A significant design basis for the greenway is the re-use of existing earthworks along the abandoned railway line as far as practicable. Additional cut/fill operations along the railway line have been kept to a minimum, with the exception of areas particularly constrained with respect to width or for the construction of new structures such as the national road underpasses.

Where required, cut operations will primarily consist of topsoil, subsoil including peat, and in some areas rock. The topsoil will be stripped and stored separately for reuse in landscaping and verge construction. The remaining excavated material will be used for fill operations where required. Fill material will be required to construct embankments and level the greenway route. It is anticipated that this fill will all be sourced from the cut operations. In addition, surface, sub-base and capping layers will be formed by the selected imported material.

The Cut/Fill volumes for the proposed route can be found in Table 4-13. Plan and Profile Drawings 60666974-ACM-HGN-SW_ZZ_ZZ_ZZ-DR-CH-0057 to 0081 shows the areas of cut and fill along the length of the scheme (Refer to Volume 3 of the EIAR).

Table 4-13 - Cut/Fill Volumes – Material Balance

Cut/Fill	Volume (m^3)
Cut*	105,000
Fill*	75,000

Cut/Fill	Volume (m^3)
Net (Cut)*	30,000

**Volumes estimates calculated using Autodesk Civil 3D. Comparison between proposed surface level and existing ground surfaces, with additional cut volumes calculated for capping, sub-base and pavement make-up.*

To prepare the preliminary quantity estimate, the width of the greenway is assumed to be equal to 3.0m or 4.0m for surfacing, with an additional 0.5m added for sub-base and 1.0m added for capping quantities estimations. Capping and sub-base quantities are calculated based on the use of the railway ballast where it exists in situ. Topsoil quantity is estimated by taking width of the greenway as 5.0 to 6.0m including allowance of 1.0m for each verge.

The design assumes approximately 60-70% of excavated material on site is acceptable fill and can be incorporated into the works, based on the GI and ground conditions observed on site. Any surplus material, including topsoil, will be reused on site as landscaping or general fill for the construction of verges, softening earthworks slopes and for the grading of ancillary infrastructure.

Table 4-14 shows the calculated material balance of the proposed greenway.

Table 4-14 - Material Balance

Material Import	Volume (m^3)	Comments
Surface	2,150	
Base/Binder	5,400	
Subbase	19,500	
6F2 Capping	23,500	
Class 1/2 Acceptable Fill	0	Fill required will be sourced on site from the volumes of cut
Drainage Aggregate	19,000	
Topsoil (On site storage)	**Volume (m^3)**	**Comments**
Topsoil	15,800	All topsoil to be reused on site

Table 4-15 shows the expected HGV trips associated with the import of material. Sectional analysis of the scheme, covered further in Section 4.5.7, shows that the majority of the earthworks operations are in Sections 1 and 3, where there are more offline greenfield sections. Some surplus material from Section 1 will be required in Section 2 and 3. It is assumed that this will be moved using the local road network and has therefore been added to the total HGV trips in the table. Trips have been doubled as it is expected that each trip will include a return journey where the HGV will be empty.

Table 4-15 - HGV Trips

Import/Export	No. of Trips	No. of Journeys
Import (pavement and capping)	4,250	8,500
Import (drainage and other construction materials)	1,750	3,500
Additional movements using public road network between areas of site (earthworks)	650	1,300
Total	**6,650**	**13,300**

4.3.9.5 Topsoil Management

Topsoil will be stripped from the construction area and stored in designated stockpiles in compounds and temporary working areas, for reuse in landscaping and verge construction. The topsoil will be managed to prevent contamination and erosion, with stockpiles being covered to protect them from wind and water erosion.

4.3.9.6 Environmental Considerations

The earthworks will be carried out in accordance with best practice guidelines to minimise environmental impact. This includes the use of erosion control measures, to prevent soil runoff into nearby watercourses. Additionally, all excavated material will be managed in accordance with waste management regulations, with any contaminated material being disposed of at licensed facilities.

The route is also designed to follow the existing topography and the abandoned railway line as much as possible to reduce the need for extensive earthworks and minimising disturbance to the natural landscape. Landscape Mitigation Plan Drawings 60701883-ACM-ELS-SW_ZZ_ZZ_ZZ-DR-LV-0001-0031 outline vegetation to be removed and retained, as well as additional planting to be undertaken to restore the landscape upon completion of the earthworks.

4.3.9.7 Waste Management

Materials and waste arising from the proposed development will be managed in accordance with the principles of the waste management hierarchy as outlined in the European Waste Framework Directive (Directive 2008/98/EC as amended, including by Directive 2018/851/EU), as transposed into Irish Law by the European Communities (Waste Directive Regulations 2011 (SI No.126 of 2011), as amend by the European Union (Waste Directive) (Amendment) Regulations 2016 (SI No. 315 of 2016) and the European Union (Waste Directive) Regulations 2020 (SI No. 323 of 2020) i.e. prevention, reduction, preparing for reuse, recycling, other recoveries, and, as the least preferred option, disposal (which includes landfilling and incineration without energy recovery).

As indicated in Section 4.3.9, any surplus excavated material, including topsoil, will be reused on site as general fill for the construction of verges, softening earthworks slopes and for the grading of ancillary infrastructure requiring no off site management.

The proposed development will require the demolition of six buildings (mainly farm outbuildings) and a livestock pen, as outlined in Table 4-16. The composition of the specific waste streams arising will be determined by surveys (including asbestos survey), but the preliminary estimates include a volume of mixed construction and demolition waste included in Table 4-17.

Table 4-16 - Demolitions

Chainage	Type
Eske Loop 1750	Uninhabited dwelling
Eske Loop 2450	Cattle crush
4200 (south of greenway along access route)	Farm outbuildings
24720	Farm outbuildings
24890	Farm outbuildings
26300	Farm outbuildings
Sessiaghoneill 200	Farm outbuildings

Table 4-17 below outlines the waste types, sources and quantities from the proposed development.

Table 4-17 - Waste Type, Source(s) & Quantities

Waste Type	Source(s)	Estimated Quantity	Action
(Surplus) Soil	Excavation for greenway alignment	60,000t	To be reused on site for the construction of verges, embankment slopes and landscaping
Construction waste including concrete, steel, timber and paint	Construction and repair of structures, shuttering, temporary	45t	Material procurement to be optimised to reduce concrete

Waste Type	Source(s)	Estimated Quantity	Action
	signage, fencing, road markings		waste, timber shuttering to be reused. Any excess material to be segregated and disposed of appropriately
Demolition waste, mixed waste	Demolition of outbuildings/farm sheds	400t	To be reused where possible as mass fill/aggregate on site. Segregated skips to recycle other material. Hazardous waste to be disposed of at licensed facility
Demolition waste, mixed waste	Pavement arisings from Railway Road	1080t	To be reused as aggregate on site
Non-hazardous waste, such as plastic, paper / cardboard and food waste	Offices, packaging, canteens and welfare facilities	6t	Inclusion of recycling facilities in site compounds
Oils/Hydrocarbons	Unused fuel and oil changes from machinery and plant	<1t	Appropriate storage, mitigation measures including spill kits

Any contaminated vegetation (Invasive Species) will be managed in accordance with the Invasive Species Management Plan in Appendix G of the CEMP (Appendix 4.1). This will include disposal to authorised facilities by licensed waste carriers and applications for necessary licenses. Other vegetation cleared will be mulched and/or composted. The Ballynacarrick Landfill at Ballintra, 10km south of Donegal Town, is the closest licensed waste disposal site to the proposed development as identified by EPA.

4.3.10 Utilities and Services

4.3.10.1 Existing Services

Information regarding utilities and services was collated from various utility providers, and these have been reviewed against the proposed development. Where the proposed development clashes with existing utilities and services, these will be addressed by a combination of permanent diversions, lowering/raising of the service or protection in place. Uisce Éireann and ESB have been consulted with respect to potential clashes, and the greenway alignment has been designed to avoid clashes with existing services where possible.

The following potential utility clashes have been identified:

Table 4-18 - Potential Utility Clashes

Utility Provider	Location	Chainage	Type
ESB, UE, Eir	Donegal Town Trailhead	0	Various
Eir	Mainline	870	Underground Duct
UE	Mainline	870	Water main
ESB	N56 Underpass	1060	Underground Cable
ENET	N56 Underpass	1060	Underground Duct
UE	N56 Underpass	1060	Water main
Eir	N56 Underpass	1090	Underground Duct
Eir	Mainline	1810	Underground Duct
Eir	Mainline	3230	Underground Duct
UE	Mainline	3240-3350	Water main

Utility Provider	Location	Chainage	Type
Eir	Mainline	3350	Underground Duct
UE	Mainline	4990	Water main
Eir	Mainline	6125	Underground Duct
ESB	Mainline	8490	Underground Cable
UE	Mainline	10000-10190	Water main
ESB	Mainline	16140	Underground Cable
ESB	Mainline	18320	Pole
ESB	Mainline	18730	Pole
ESB	Mainline	19035	Pole
ESB	Mainline	19150	Pole
ESB	Mainline	20160	Pole
ESB	Mainline	20420	Pole
UE	Mainline	20700	Manhole
UE	Mainline	21040-21190	Water main
UE	Mainline	21305-21335	Water main
UE	Mainline	24750-25005	Water main
Eir	Mainline	25420	Underground Duct
UE	Mainline	26420	Water main
ESB	Mainline	27400	Pole
Eir	Mainline	28945	Underground Duct
UE	Mainline	28945	Water main
ESB	Mainline	28945	Underground Cable
ESB, UE, ENET, Eir	Stranorlar Trailhead	30060	Various
UE	Clar Spur	520	Water main
ESB	Lough Eske Loop	50	Overhead Line
Eir	Biddies	255	Underground Duct
UE	Goland	15	Water main
ESB	Goland	230	Pole
Eir	Sessiaghoneill Link	180	Underground Duct
ESB	Ballybofey Link	15	Pole

The proposed development crosses numerous other overhead utilities, but at this stage it is expected that they will remain in place and can be accommodated by the development.

4.3.10.2 New Services

New multi-use longitudinal ducting will be provided as part of the scheme between Ch.850 – 10350, for future service provision.

4.3.11 Signage

Clear directional signage will be provided along the route to help with wayfinding. Road markings and signage at road crossings will be in line with Figure 5.1 and Figure 5.2 of TII DN-GEO-03047 as shown below in Figure 4-36 and Figure 4-37.

Traffic Signs and markings shall be provided in accordance with TSM. Combination of signs and markings may vary depending on layout of cycleway crossing.

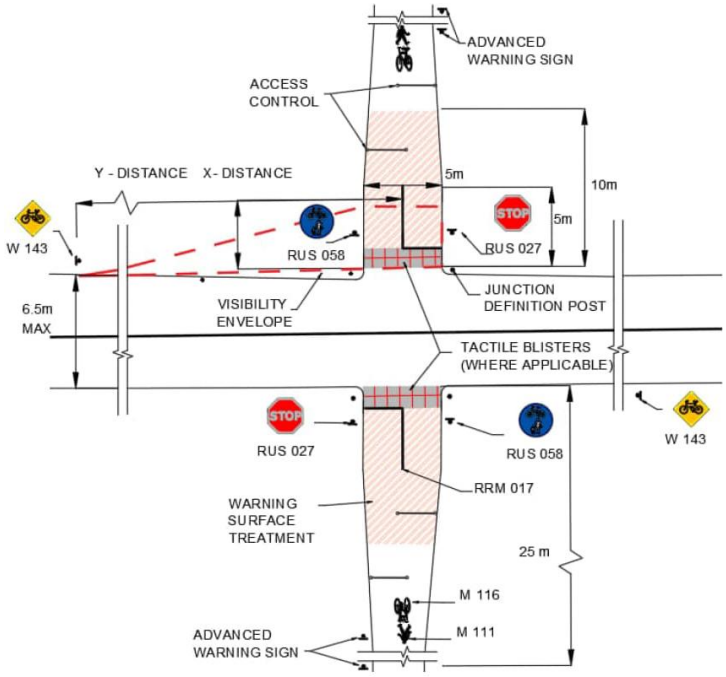

Figure 4-36 - Local & Regional Road Carriageway Crossing Detail

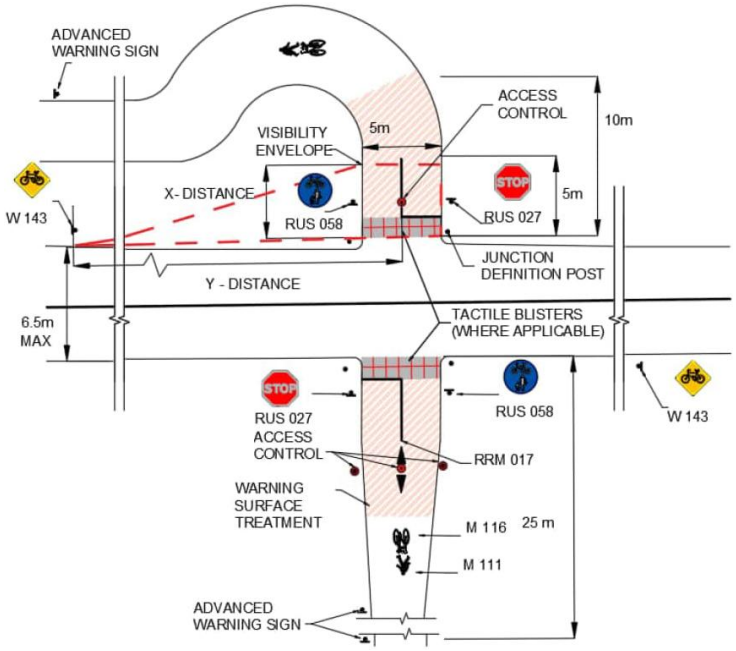

Figure 4-37 - Jug Handle Crossing Detail

Any signs on public roads to direct users to the greenway will be in line with Department of Transport Tourism and Sport's *'Greenway Design and Brand Guidelines'* (2018) as shown in Figure 4-38 below. These will be used to direct users to the main entry and egress trailheads along the greenway and will commence at the nearest town, village or junction with the nearest national road. Where possible, existing poles will be re-used to reduce sign clutter.

Figure 4-38 - Example Statutory Direction Signs

At road crossings, direction signage will be in line with Figure 4-39 below, which shows an example of the new NCN branding.

Figure 4-39 - On Road direction signage

Along the route there will be on route directional signage will be used where deemed necessary to help guide users. These will be in line with Figure 4-40.

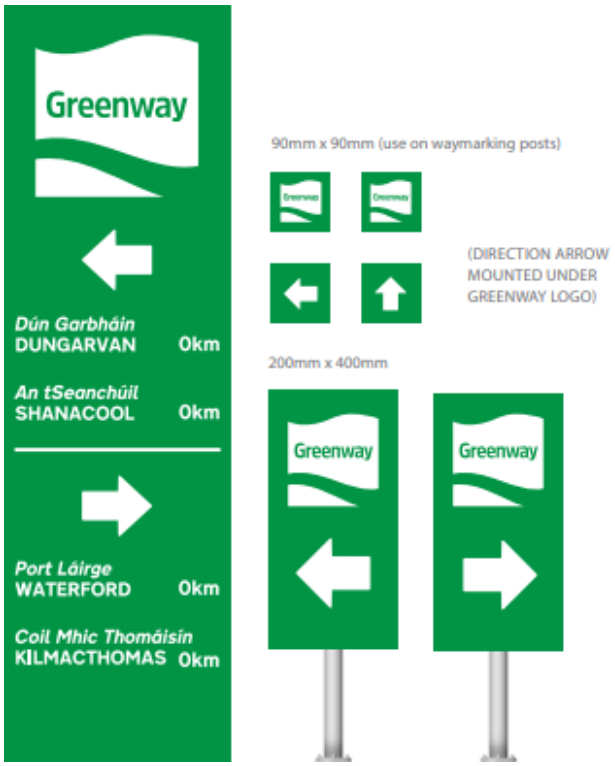

Figure 4-40 - On route directional signage

At the four trailhead locations, information panels will be constructed in line with the Department of Transport Tourism and Sport's *'Greenway Design and Brand Guidelines'* (2018) and '*Greenways and Cycle Routes Ancillary Infrastructure Guidelines'* (2022). These will be A0 or double A1 in size and will contain a map of the route with a "you are here" pointer along with information on distances to destinations. There will be an easily identifiable scale on the map in kilometres and towns and villages along the route will be identified. At trailheads and rest areas on or near the abandoned railway line, information boards will also highlight the history of the railway and the story of the route.

Warning signs will be provided to require that dogs are maintained on a leash for the duration of their visit to the greenway, and that dog owners are required to pick up and dispose of dog excrement using the bins provided. Educational signage will also be provided alerting dog owners to the environmental impacts that dog excrement can have on water bodies and habitats if it is not collected and is washed away naturally.

4.3.12 Lighting

The majority of the proposed development will not be lit, however lighting is proposed in the trail heads at Donegal Town, Biddy's and Stranorlar, as well as the lengths of greenway closest to the towns; Ch.0-1050 (Donegal Town) and Ch.27500 – 30050 (Ballybofey/Stranorlar and Sessiaghoneill link).

Where lighting is to be provided along the greenway, provision will be in accordance with the Bat Conservation Trust guidance (BCT, 2023), to include the following elements:

Lighting will be a warm-white colour of 2200K or less.

Lighting will be LED and have no upward light spill and a sharp horizontal cut off.

Lighting outside the intended area of illumination will be minimised. Where light spill cannot be avoided, louvres, cowls or shields will be fitted to the columns.

Lux levels on roads and paths will be set to the minimum required by BS 5489-1:2020, P4.

Low level lighting such as bollards will be incorporated where possible.

Consideration will be given to switch off of lighting during certain hours at night.

Lighting will also be provided in underpasses along the route to maintain user safety. It is not anticipated that lighting will be required at minor side road crossings.

4.3.13 Landscaping

The majority of the preferred route follows either the abandoned railway corridor or field boundaries in offline sections. In these scenarios existing treelines and hedgerows will be retained in place, both side along the railway line and on one side in offline sections. In offline sections, new native hedgerows will be planted alongside the other side of the greenway to reinforce or re-establish traditional field boundaries.

There are some offline sections (Ch.3800 – 4050, Ch.6450 – 6600, 27300 – 27550, 29600 - 29800) where the preferred route does not follow an existing field boundary, due to topographical constraints or landowner preference. In these cases, new native hedgerow will be planted on both sides of the proposed greenway, where a new field boundary is required. Species rich grass will be sown on the slopes of embankments and cuttings, and blocks of native woodland will be planted at periodic intervals where land is available.

In offline sections in woodland, existing vegetation will be retained alongside the greenway.

In areas transitioning towards urban edges or more developed settings, the scheme will incorporate native woodland belts to soften the interface between the greenway and adjacent built form, while contributing to visual screening and long-term landscape structure.

At the urban trailheads, landscape interventions include structural planting around car park perimeters to soften the visual presence of hard surfacing and built elements such as signage and bathroom facilities. For the intermediate rural trailheads, a more discreet approach has been adopted. These are located in areas with some degree of natural screening – where

small, wooded areas or existing planting provides visual containment. New tree and shrub planting will be introduced where necessary to bolster this screening and to create a sense of enclosure appropriate to the scale and character of the surrounding landscape. Car parking areas will be surfaced with permeable, visually recessive materials such as cellular grass paving to reduce glare and prevent a stark visual contrast with surrounding vegetation. The landscaping design is shown on Landscape Mitigation Plan Drawing Nos 60701883-ACM-ELS-SW_ZZ_ZZ_ZZ-DR-LV-0001-0031.

4.3.14 Accessibility for Mobility Impaired Users

The proposed development route and facilities have been designed in accordance with TII's 'Rural Cycleway Design (Offline & Greenway)' (DN-GEO-03047) (2025), including access and inclusivity for mobility impaired. Access to the route is at grade with no steps proposed along the length of the proposed development route. All facilities at the trailheads have been designed to be accessible to persons with disabilities, with dropped kerb access, tactile paving crossing, accessible parking, and wider doors to access toilet blocks.

4.3.15 Embedded Mitigation

In locations where there are constraints caused by existing infrastructure or environmental considerations, the width of the scheme will be reduced by reducing or removing grass verges or, where necessary, reducing the width of the greenway to a minimum of 2.5m.

As described in Section 4.3.12 above, lighting will be designed to reduce impact on sensitive ecological habitats. There will be no lighting provided along the greenway except along lengths of greenway closest to the towns, at trailheads/car parks and in underpasses to maintain user safety.

Where possible, existing trees and hedges will be left in place to avoid disturbing ecological habitats.

Instream works have been limited to culvert installation and masonry repointing at S12 and the number of watercourse crossing structures has been limited to those which are strictly necessary for the scheme to progress.

The route has been developed to follow the existing topography as much as possible to minimise cut and fill quantities, reducing the environmental impact of transportation and waste.

4.4 Land Acquisition

4.4.1 Land Acquisition

Provision of the proposed development requires the acquisition of land for construction and operation of the development. The land acquisition has been sub-divided into temporary acquisition and permanent acquisition. Temporary acquisition has been sought where the lands are required temporarily to facilitate the construction/demolition of discreet elements of the works. Permanent land acquisition has been sought where the lands are required permanently to enable the operation of the Proposed Development through its lifetime. Rights of Way will be established where access is required across the greenway to reduce the impact of severance.

The total land take including both permanent and temporary acquisition comprises approximately 113ha of land. The permanent acquisition for the proposed development totalling 108ha is categorised below (areas are approximate):

- 2.6ha classified as Public Road;
- 87.2ha classified as Agricultural Land;
- 15.4ha classified as Forestry;
- 0.7ha classified as Curtilage;

- 1.3ha classified as Commercial;
- 0.2ha classified as Riverbed, and
- 1.1ha classified as Open Space and Amenity.

Note that approximately 30ha of the classified as Unregistered, the majority of which is along the abandoned railway line.

The proposed land acquisition is necessary for the construction, operation, and maintenance of the proposed development.

4.4.2 Farm Crossings and Proposed Accesses and Tie-ins

In accordance with the Code of Best Practice, where possible the route of the proposed greenway follows field and property boundaries to reduce severance.

In some cases, this has not been possible, due to topographical or environmental constraints, or where the abandoned railway corridor runs between parcels of land owned by the same landowner. In some cases, the landowner has requested the route is moved away from the boundary. Where required, accommodation works will be provided for access across the greenway, so that the impact of the severance is minimised. Further details on the crossings and accommodation works provided is outlined in Section 4.3.5. Alternatively, with agreement from the landowner, severed land parcels may be included as part of the Voluntary Land Acquisition Agreement (VLAA) and become part of the development.

4.5 Construction Phase

4.5.1 Introduction

This section includes information of the Construction and Environmental Management Plan (CEMP), construction methodologies, construction of temporary access roads / tracks and construction compounds, works sequencing, waste management and construction programme.

Construction of the greenway will be carried out in compliance with the Construction and Environmental Management Plan (CEMP).

For the purposes of this construction methodology the proposed development has been split into three sections, as shown in Table 4-19 below. These sections have been split based on the predominant classification of the greenway corridor (i.e. abandoned railway or greenfield) and broadly have a similar number of trailhead and major structures. This construction methodology anticipates that work could be undertaken on all three sections simultaneously. Each section has a main compound and several temporary working areas as outlined in Section 4.5.3.

Table 4-19 - Construction Sections

Section	Location	Summary	Total Length	Comments
Section 1	Ch.0 – 10+300 including Lough Eske Loop and Clar Link	Largely offline greenfield construction from Donegal Town to southwest of Gap	14.7km	2no trailheads and 5no major structures
Section 2	Ch.10+300-20+500	Abandoned Railway corridor (mountainside and bog) from southwest of Gap to Lough Mourne	11.4km	1no trailhead and 1no major structures
Section 3	Ch.20+500 – 30+100 including Goland Link	Largely abandoned Railway corridor (forestry and agricultural land) from Lough Mourne to Stranorlar	11.3km	1no trailhead and 2no major structures

An indicative sequence of works has been developed, breaking down the main construction activities in each section and assigning gangs to each activity.

4.5.2 Traffic Management Plan

Construction of much of the development will take place away from public roads and therefore impacts on traffic will largely be restricted to site access/egress points, which will be located where the greenway interacts with the local road network. Where the proposed development crosses local roads, traffic management will be in accordance with Chapter 8 of the TSM, to allow construction works to continue and maintain traffic flow along the road.

There is more significant traffic disruption expected at the locations of the 3no national road crossings, where underpasses will be constructed using a 'cut and cover' method. This will require 1-2 weekend closures with 24 hour working for each underpass

Temporary (short term) road closures will also be required for the installation of the following structure on a local road:

- Installation of new abutment and deck over Sessiagh View

Temporary traffic management will be required at the following locations on the local road network for sections of online active travel connections and local road realignments:

- Railway Road, Donegal Town
- Tirchonaill Street, Donegal Town
- L1945, Lough Eske
- Navenny Street, Ballybofey
- Railway Road, Stranorlar

4.5.3 Construction Compounds and Temporary Construction Areas

A number of compounds and temporary working area have been identified to facilitate the construction of the works. They are shown in Temporary Construction Areas and Compound Locations Drawing No. 60701883-ACM-HGN-SW_ZZ_ZZ_ZZ-DR-HG-0901 (Refer Volume 3 of EIAR). The compounds and working areas vary in size and will likely include welfare facilities, stores, offices, material storage areas, plant storage and parking for site and staff vehicles. They may remain in place for the duration of the construction programme or may be scaled up or down during particular activities on site.

3no main compounds will be situated at trailhead locations, with a number of satellite working areas situated at regular intervals along the development. Overall, there will be 22no working areas and multiple direct access points from the local road network. Works will be undertaken in each direction from the compounds, typically 500-2000m depending on the spacing of compounds in a given area.

Access to the works locations will be from the construction compound or a direct access point. The compounds will be accessed via public roads, or through private lands which will form part of the land take for the development.

Following completion of construction these areas will be cleared and re-instated. Temporary buildings and containers, parking areas and material such as rubble, aggregates and unused construction materials will be removed as appropriate.

Table 4-20 below indicates the location of the proposed compound and works areas.

Table 4-20 - Compound and Working Area Locations

Description	Location	Chainage (m)	Type	Estimated Area (m^2)	Reinstatement
Compound No. 1	Donegal Town	000	Main Compound	7000	Trailhead Car Park
Working Area No. 1	N56	1120	Temporary Works Area and Access – N56 Underpass	2500	Agricultural Field
Working Area No. 2	Clar	700 (Clar Spur)	Temporary Works Area – N15 Underpass	2700	Agricultural Field

Description	Location	Chainage (m)	Type	Estimated Area (m^2)	Reinstatement
Working Area No. 3	Clardrumnagahan	3500	Temporary Works Area	2200	Planting and Rest Area
Working Area No. 4	River Eske South	4200	Temporary Works Area and Access – River Eske Crossing	11400	Agricultural Field, Rest Area
Working Area No. 5	River Eske North	100 (Lough Eske Loop)	Temporary Works Area and Access – River Eske Crossing	6700	Agricultural Field
Working Area No. 6	Lough Eske Demesne	650 (Lough Eske Loop)	Temporary Works Area	3000	Trailhead Car Park
Working Area No. 7	St Francis NS	6650	Temporary Works Area and Access – River Derg Crossing	4800	Agricultural Field and Greenway
Working Area No. 8	N15 North	8150	Temporary Works Area and Access – N15 Underpass	2000	Agricultural Field and Access Track
Working Area No. 9	N15 South	8350	Temporary Works Area and Access – N15 Underpass	2800	Agricultural Field, Greenway and Access Track
Working Area No.10	N15 South	8800	Temporary Works Area and Access	2000	Agricultural Field and Access Track
Working Area No. 11	Coillte land east of Keadew Lower	10550	Temporary Works Area	2300	Rest Area, Greenway and Storage Area
Compound No. 2	Biddy's	12150	Main Compound	4000	Trailhead Car Park
Working Area No. 12	Meenbog Wind Farm Access	16200	Temporary Works Area	3000	Agricultural Field
Working Area No. 13	Derg Line	17300	Temporary Works Area	550	Agricultural Field
Working Area No. 14	Coillte land near Goland	23550	Temporary Works Area	2800	Forestry
Working Area No. 15	Carrickmagrath	25450	Temporary Works Area	1700	Greenway and Rest Area
Working Area No. 16	Coppering Heights	26400	Temporary Works Area	800	Storage Area
Working Area No. 17	Sessiaghnoneill	27250	Temporary Works Area and Access – Sessiagh View Crossing	500	Agricultural Field
Working Area No. 18	Sessiaghnoneill	27300	Temporary Works Area and Access – Sessiagh View Crossing	1200	Agricultural Field
Working Area No. 19	Sessiaghnoneill School	27530	Temporary Works Area	1400	Greenway and Planting
Working Area No. 20	River Finn South	29350	Temporary Works Area – River Finn crossing	2500	Storage Areas
Working Area No. 21	River Finn North	29550	Temporary Works Area – River Finn crossing	1000	Agricultural Field
Working Area No. 22	River Finn North	29550	Temporary Works Area – River Finn crossing	2000	Agricultural Field
Compound No. 3	Stranorlar	30100	Main Compound	4300	Trailhead Car Park

At locations where permanent gated crossing points for agricultural purposes are proposed along the proposed development, a temporary gated arrangement will be constructed to allow crossing of the works. This will facilitate the safe passage from one side of the works to the other by landowners, farm machinery and animals. This will comprise of temporary fencing and a gated system similar to the permanent arrangement which can be used during the construction phase.

4.5.4 Construction Environmental Management Plan

A CEMP will be developed for the scheme as the design progresses.

Prior to any demolition, excavation or construction a Construction Environmental Management Plan (CEMP) will be produced by the successful contractors for each element of the proposed development. The CEMP will set out the Contractor's overall management and administration of the construction project. A Construction Environmental Management Plan has also been prepared as part of this EIAR, see Appendix 4.1. The CEMP will be developed by the Contractors during the pre-construction phase, to ensure commitments included in the statutory approvals are adhered to, and that it integrates the requirements of the Environmental Operating Plan (EOP). The Contractors will be required to include details under the following headings:

- Details of working hours and days.
- Details of emergency plan - in the event of fire, chemical spillage, flooding, cement spillage, collapse of structures or failure of equipment or road traffic incident within an area of traffic management. The plan must include contact names and telephone numbers for: Local Authority (all sections/departments); Ambulance; Gardaí and Fire Services.
- Details of chemical/fuel storage areas (including location and bunding to contain runoff of spillages and leakages).
- Details and locations of construction plant storage, temporary offices.
- Traffic management plan (to be developed in conjunction with the Local Authority – Roads Section) including details of routing of network traffic; temporary road closures; temporary signal strategy; routing of construction traffic; programme of vehicular arrivals; on-site parking for vehicles and workers; road cleaning; other traffic management requirements.
- Truck wheel wash details (including measures to reduce and treat runoff).
- Dust management to prevent nuisance (demolition & construction).
- Site run-off management and water quality protection measures.
- Noise and vibration management to prevent nuisance (demolition & construction).
- Landscape management.
- Management of contaminated land and assessment of risk for same by suitably qualified, trained and licenced personnel.
- Stockpiles.
- Project procedures & method statements for:
    - Site clearance, site investigations, excavations;
    - Diversion of services;
    - Excavation and/or blasting (through peat, soils & bedrock);
    - Piling;
    - Temporary hoarding & lighting;
    - Storage and Treatment of peat and soft soils;
    - Disposal of surplus geological material (peat, soils, rock etc.);

- Earthworks material improvement; and
- Protection of watercourses from contamination and silting during construction. Including monitoring measures.
- Site Compounds.

The production of the CEMP will also detail areas of concern with regard to Health and Safety and any environmental issues that require attention during the construction phase. Adoption of good management practices on site during the construction and operation phases will also contribute to reducing environmental impacts.

4.5.4.1 Environmental Operating Plan (EOP)

The Environmental Operating Plan (EOP) is defined as a document that outlines procedures for the delivery of environmental mitigation measures and for addressing general day-to-day environmental issues that can arise during the construction phase of a construction project.

Before any works commence on site, the Contractor will be required to prepare an Environmental Operating Plan (EOP) in accordance with the TII/NRA *Guidelines for the Creation and Maintenance of an Environmental Operating Plan*. The EOP will set out the Contractors approach to managing environmental issues associated with the construction of the road and provide a documented account to the implementation of the environmental commitments set out in the EIAR and measures stipulated in the planning conditions. Details within the plan will include:

- All Environmental commitments and mitigation measures included as part of the planning approval process and any requirements of statutory bodies such as the National Parks and Wildlife Services as well as a method documenting compliance with the measures.
- A list of all applicable environmental legislation requirements and a method of documenting compliance with these requirements; and
- Outline methods by which construction work will be managed to avoid, reduce or remedy potential adverse impacts on the environment.

To oversee the implementation of the EOP, the Contractors will be required to appoint a Site Manager to ensure that the mitigation measures included in the EIAR, the EOP and the other statutory approvals are executed in the construction of the works and to ensure that those mitigation measures employed are implemented throughout the duration of the construction phase.

An Outline Environmental Operating Plan has been included in Appendix 4.1 of this EIAR and will be further developed by the Contractors. The EOP is contained as an appendix within the CEMP.

4.5.4.2 Environmental Construction Guidelines

The TII/NRA Environmental and Construction Guidelines provide guidance with regard to environmental best practice methods to be employed in construction on National Road Schemes. The following construction guidelines will be adhered to by the contractor:

- TII (December 2005) Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes CC-ENV-01103*;*
- TII (December 2005) *Guidelines for the Treatment of Bats during the Construction of National Road Schemes CC-ENV-01102;*
- TII (December 2005) *Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes CC-ENV-01101;*
- NRA (January 2005) *Guidelines for the Testing and Mitigation of the Wetland Archaeological Heritage for National Road Schemes PE-ARC-02008*;
- TII (December 2006) *Guidelines for the Protection and Preservation of Trees, Hedgerows and Scrub Prior to, During and Post Construction of National Road Schemes GE-ENV-01110;*

- TII (December 2025) *Air Quality Assessment of Proposed National Roads - Standard PE-ENV-01107. Revision 2;*
- TII (December 2020) *The Management of Invasive Alien Plant Species on National Roads – Standard GE-ENV-01104;*
- TII (December 2020) *The Management of Invasive Alien Plant Species on National Roads – Technical Guidance GE-ENV-01105;*
- TII (October 2004) *Guidelines for the Treatment of Noise and Vibration in National Road Schemes PE-ENV-01110;*
- TII (December 2006) *Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes CC-ENV-01104;*
- TII (December 2017) *The Management of Waste from National Road Construction Projects GE-ENV-01101;* and
- TII (December 2007) *Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan GE-ENV-01109.*

This is a non-exhaustive list and relevant guidance current at the time of construction will be followed. It is proposed to employ these guidelines, as and where relevant, on this project.

4.5.5 Resource and Waste Management Plan

In keeping with the Northern & Western Regional Assembly (NWRA) Regional Spatial and Economic Strategy (RSES) and the Connacht Ulster Regional Waste Management Plan (CURWMP) aims of *efficiently using, reusing, and conserving natural resources by managing waste and optimising technologies that promote a circular economy,* a Resource and Waste Management Plan (RWMP) has been prepared and is included in the Construction Environmental Management Plan (CEMP) as Appendix E. This is underpinned by:

- TII's Circular Economy Policy, Strategy and Greenways and Rural Cycleways Guide, including principles such as material re-use, establishing digital material logs and minimising construction plant
- Legislation including Waste Management Act 1996, Environmental Protection Agency Act 1992 and Litter Pollution Act 1997
- EPA guidance (Best Practice Guidelines for the preparation of resource & waste management plans for construction & demolition projects, EPA 2021
- The Waste Hierarchy, with waste prevention and minimisation being the first priority, followed by reuse and recycling

The purpose of the RWMP is to ensure that the production of waste is minimised where possible, and that waste arising during construction is managed and disposed of appropriately. The RWMP is a live document that will be amended and updated to reflect current conditions on site as the project progresses. The Contractor will also appoint a suitable site representative as Waste Manager (who may also be the Site Environmental Manager), who will have overall responsibility for the management of waste.

The Contractor's RWMP should contain the following elements:

- Details of waste segregation and storage (e.g. tanks, skips, bins, containers or areas within the compounds)
- Details of where and how materials are to be disposed of, i.e. landfill or other appropriately licensed waste management facilities, and details of all relevant permits, licenses and record keeping;
- Details of how waste will be recycled and reused within the project as far as possible
- Details of how and where hazardous waste (such as hydrocarbons or chemical waste) will be disposed where necessary
- Details of waste sources and quantities, including from site clearance, excavations and disposal

- Details of construction vehicle management
- Details of dust and noise remediation measures

4.5.6 Construction Programme

4.5.6.1 Duration of Works

A detailed construction programme will be developed in advance of the construction of the project. It is likely that the construction of the development will be progressed as a single construction contract with the construction phase potentially lasting up to 24 months depending on the approach taken by the contractor. For this report, a construction period of 24 months (104 weeks) has been assumed. A Construction Environmental Management Plan (CEMP) has also been prepared as part of this EIAR in Appendix 4.1.

Construction working hours will be 08.00 – 18.00 Monday to Friday with reduced hours on Saturday (08.00 – 14.00) and the site will be closed on Sundays and during public holidays. Works other than the pumping out of excavations, security and emergency works will not be undertaken outside these working hours without the written permission of Donegal County Council. Works shall not be permitted on Sundays or Bank Holidays.

24 hour working will be required for the construction of the three underpasses under the N15/N56 national roads. Each underpass location will require 1-2 weekends where construction activities take place outside of normal working hours (24 hours a day) while the national road is closed.

4.5.6.2 Works Sequencing

The sequencing of the works will be outlined in the detailed programme developed prior to construction, and will take into account the following items:

- Traffic management, with particular consideration given to closures of the national road
- Seasonality with respect to site clearance and works near rivers
- Minimising disruption to residents, commercial businesses and tourist attractions
- Reducing as far as possible the cut/fill imbalance and mass haul requirements.
- Health, Safety and Welfare requirements
- All mitigation measures identified in the EIAR and in any conditions of statutory Approval

Works will largely be undertaken in the following sequence; however, it is expected that the construction programme will involve works at multiple areas being undertaken concurrently.

1. Pre-construction works will include diversion works of services and utilities, along with vegetation clearance, archaeological testing and resolution, ground investigation and fencing. Some of these activities are dependent on the seasonal timing of the award of the main contract.
2. The establishment of the works compounds and the connection of services for their operation will be undertaken at the start of the works, along with the construction of access roads.
3. This will then be followed by site clearance and topsoil stripping of the site in stages. This will be phased to keep just ahead of the major earthworks' movements. Initial works on permanent and temporary boundary fences will also be undertaken as a preliminary operation, with further boundary works required on completion of the main construction works. Accommodation works where required for access, as well as temporary access routes and haul routes through the site will be key early activities.
4. The contractor will construct elements of the permanent drainage system as early as practicable to facilitate earthworks haul routes, control drainage from the works and to avoid flows onto adjacent land and/or untreated discharges to watercourses.

5. Works to the new structures will be significant elements of the construction phase and may be constrained by seasonality in some locations.
6. The bulk earthworks will be undertaken along with capping and geogrid where required. Where earthworks will be minimal in nature, i.e. along the railway corridor, operations will be able to move quicker from clearance to drainage and pavement activities. Pavement activities, including subbase, binder and surface course will follow in all areas once the earthworks and sub-formation is complete.
7. Trailheads will be constructed after the main greenway alignment as they are proposed to be used as site compounds.
8. The last activities to be completed will be signs and road markings, followed by the removal and reinstatement of temporary site compounds to pre-work conditions.

4.5.6.3 Construction Traffic

Assuming a 24 month construction programme, an indicative sequence of works has been developed, breaking down the main construction activities in each section and assigning gangs to each activity. The anticipated number of HGV journeys have therefore been estimated against pavement, earthworks and drainage activities, and the peak volume of HGV movements identified.

Furthermore, numbers of car/van movements for site staff have also been estimated based on the amount of construction activity on site at any given time. These numbers are outlined in the table below.

Table 4-21 - Construction related HGV and LGV Journeys

Construction Month	Number of additional daily LGV journeys*	Number of additional daily HGV journeys
1	18	0
2	55	0
3	164	40
4	182	80
5	164	80
6	128	80
7	146	89
8	109	69
9	128	78
10	91	38
11	73	18
12	73	18
13	109	43
14	109	43
15	109	43
16	128	34
17	128	34
18	109	34
19	55	25
20	73	25
21	73	25
22	55	25
23	36	0

Construction Month	Number of additional daily LGV journeys*	Number of additional daily HGV journeys
24	18	0

** Based on TII Publication RE-ENV-01109 N22 Carbon Benchmarking and Analysis. 'The on-site observations also revealed, that 1 in 12 construction workers share a lift (8.33%), 50% travel by car (25% by small car, and 25% by large car), and 45% travel by van.'*

4.5.7 Construction Methodology

The type of construction along the proposed development can broadly be classified in four ways:

- Abandoned Railway Corridor
- Offline Greenfield
- Offline Woodland
- Structures

The general construction sequence of each classification is shown below:

Abandoned railway corridor

Initially, trees and areas of vegetation that have grown within the railway corridor are to be cleared. Trees and areas of vegetation that are running alongside the railway corridor may need to be cut back but will be retained in situ. Fencing will then be installed, where required.

Existing drainage ditches will be used where possible, with new attenuation and outfalls to watercourse provided. Drainage channels will be cleaned and crossings repaired.

In general, the existing rail capping will be taken as the formation level. Where required, this will be made good by removing and replacing the top layer with subbase before the pavement is laid. Once pavement is complete, verges will be completed using topsoil stripped from the site, and all new road markings and signage will be installed.

Any remaining permanent fencing that was not installed prior to the general construction, will be installed and any temporary construction facilities removed.

Offline greenfield alignment

These sections will require greater quantities of cut and fill earthworks operations compared to the sections along the abandoned railway corridor. Initially trees and areas of vegetation along the proposed route of greenway are to be cleared. Habitat clearance is to be minimised where possible. Fencing will then be installed, where required.

The existing topsoil will be excavated and associated overburden will be stored. Any required cut/fill operations will then be undertaken, with existing ground level will be excavated to sub-formation level. New drainage ditches are to be constructed, along with attenuation ponds and new pipe crossings. Any future use ducting, where required, will then be laid.

Geotextile, geogrid and a 300mm layer of capping are to be placed to make the formation level, followed by the pavement construction. Once pavement is complete, verges will be completed using topsoil stripped from the site, planting will be undertaken and all new road markings and signage will be installed.

Any remaining permanent fencing that was not installed prior to the general construction, will be installed and any temporary construction facilities removed.

Offline woodland

There are some localised sections which traverse woodland. These sections need particular care and attention to minimise the environmental impact of the construction of the proposed development, particularly with respect to site clearance and invasive species management. The two areas where the greenway traverses offline woodland are outlined below:

- Lougheask Demesne (Ch.350-550 Eske Loop), approximately 100m north and 610m southwest of the Lough Eske and Ardnamona Wood SAC. This area is outside the

Lough Eske and Ardnamona Wood SAC and there is no potential to affect Qualifying Interests of this European site at this location. In advance of construction, the route of the alignment will be micro-sited in consultation with the Arborist and ECoW in order to minimise the loss of mature trees, and to protect the trees along the greenway that are to be retained. Furthermore, invasive species (including Rhododendron) in the corridor will be removed, providing an opportunity to improve the biodiversity of the area.

- Lough Eske (Ch.1350-1650 Eske Loop), within the Lough Eske and Ardnamona Wood SAC. Within the SAC ecological and topographical surveys have been undertaken to determine the presence of mature, native trees. The greenway alignment has been designed to avoid these trees. The ecological surveys indicated that the prevailing tree species in the area is Rhododendron, an invasive species. These plants will be cleared from the area providing an opportunity to improve the biodiversity in the area and the construction of greenway route will predominantly utilise these areas of clearance.

Existing and new structures

For new structures, all temporary cut off walls/sheet piles will be constructed initially along with measures for sedimentation control such as silt fencing and cut off ditches. Piling platforms (if required) and any required ground improvements within the footprint of the temporary cut off wall will then be installed.

The bridge support zone will then be excavated to the required formation level, followed by the casting in of in-situ abutment foundations, abutment wall and wingwalls. Approach embankments will then be constructed and backfilled to abutments as required for stability during installation of beams or trusses. All beams/girders and decks will then be erected before completing the required backfill to abutments.

Verges will then be constructed with required drainage, along with the erection of the parapet system before surfacing is completed.

4.5.8 Description of Construction Works

A description of the construction works is provided below, broken down by work construction activity. For each activity an estimation of the construction plant has been provided.

4.5.8.1 Clearing and Grubbing

Trees, areas of vegetation and debris will be cleared from the proposed greenway corridor. Prior to works commencing, access should be established from the relevant compound or direct access from local road (with appropriate temporary traffic management to be in place). Site clearance will include the removal of existing vegetation on the footprint of the proposed development, including any roots of existing vegetation. Any low branches overhanging and extending over the proposed development are to be cut back. All vegetation not on the line of the proposed development is to be retained. Any material removed as part of the site clearance is to be mulched and reused in landscaping works where possible or recycled off-site.

Machinery required will include excavators, chainsaws, mulchers, skid steer loaders and dump trucks.

4.5.8.2 Fencing and Protection

Fencing will be installed early in the construction phase to delineate the works area, secure the site from the public and provide a livestock proof boundary. In some areas temporary fencing will be required where the permanent fencing cannot yet be installed. Temporary fencing to be constructed of timber post with 900mm sheep wire. Temporary fencing will be taken down and reused on other areas of the site, where possible. Temporary construction crossings and landowner crossings, as well as access controls, will be installed at direct accesses from local roads.

Permanent fencing will be constructed from timber post and wire mesh. Posts are to be driven where ground conditions allow, otherwise concrete foundations to be provided.

4.5.8.3 Earthworks

The earthworks for the proposed development of the greenway will involve the removal of topsoil and overburden from footprint of works to expose the subgrade, prior to cut and fill operations, to establish the formation level and allow for the placement of capping, geogrid and geotextile, where required. Most earthworks are confined to offline, greenfield areas.

Initially, topsoil will be excavated by excavators and transferred for storage by dump trucks. Topsoil is to be stored on site for reuse; stored on stockpiles along the route or in compound or working areas. Areas of cut will be excavated, with acceptable fill being reused on site for embankment structural fill and unacceptable fill used for verges and earthworks side slopes. Any areas containing invasive species will be removed in line per the Invasive Species Management Plan.

Fill material is to be placed for embankment construction where required. Fill material to be placed will be compacted in layers. F ill material will be sourced from adjacent excavations on site to minimise transportation. For offline greenfield areas, geogrid and geotextile will be placed on subgrade and 6F2 capping material is to be imported, placed and compacted to construct to formation level.

Machinery required will include excavators and dozers (for excavation and grading), dump trucks (for transporting cut/fill material), and rollers (for compacting fill).

4.5.8.4 Drainage, Culvert and Swale Installation

The proposed development of the greenway requires the installation of drainage ditches, pipes and culverts for water drainage, including excavation and placement of pipes. Additionally, swales will be installed to manage surface water runoff along the route, promoting sustainable drainage and preventing erosion.

The following description contains input from the CIRIA C753 SuDS manual and the CIRIA C698 SuDS Construction manual on construction stage methodology.

Key activities during construction include site access, storage of materials, site drainage, and protection from erosion, pollution, sedimentation and over-compaction. Key protection areas such as buffer zones, filter strips, and trees will be identified at an early stage prior to any construction to avoid damage to the natural environment. Sediment traps and barriers will be installed early in the process, before the start of earthworks construction to avoid sediment discharging to nearby watercourses.

General: Construction runoff can come with high sediment loads and will be properly managed to mitigate impacts due to sediment like build-up in storage systems, pollution of receiving waters, and clogging of infiltration systems. Sediment traps and silt fencing will be installed before any major site earthworks/groundworks take place. The swales and the ditches can serve a dual purpose of managing sediment during the construction prior to their use as swales during operation. Runoff control used in combination with sediment traps to divert water around earthworks areas and remove silt will be used. Mitigation measures will be put in place to minimise risks of pollution due to oils and hydrocarbons from construction machinery. These will include measures such as maintenance of machinery, booms on watercourses, drip trays, designated areas for refuelling, and storage facilities. Works in watercourses will be undertaken during the time of the year that minimises risks of flooding and impacts to fisheries where applicable.

Construction of swales, PED ditches, and OTE ditches: Swales, PED ditches, and OTE ditches are shallow depressions that receive, convey, and attenuate runoff prior to discharge to the watercourses. Material will be excavated to form the depression according to the design. The excavation works will take place from the side of the swale and ditch features to avoid unnecessary vehicular traffic, compaction, and sediment impact to the feature. The CIRIA SuDS manual recommends that swales should receive runoff once vegetation has been established and at a stage where construction sediment loads will not cause rapid siltation in the features. The formation of ditch and swale depressions will occur during the earthworks

phase, but final construction will take place at the end of the programme. Any silt or sediment deposited during construction should be removed and areas that have been subject to over-compaction should be rehabilitated. The construction of swales and ditches at an early stage will help with the management of runoff and assist in settling sediments resulting from construction. The establishment of vegetation and sediment removal will take place after site works are complete and before the start of the maintenance period. Inspections of drainage features should be completed as necessary to ensure proper construction.

Construction of pipes: Filter and carrier drains will be constructed by excavating a trench according to the design requirements. The pipe will be laid with appropriate bedding and backfill materials. Any required testing of the pipes will be done to ensure the pipes have been correctly joined and installed.

Construction of culverts: For the construction of any pipe or box culverts, the culvert will be constructed offline to allow the existing channel to remain in place as long as possible. The pipe/box culvert will be installed first, followed by headwalls or wingwalls, and required backfilling. Any necessary rip/rap or scour protection measures will be installed next followed by the installation of the natural bed. Excavated material from the natural channel can be used at the upstream and downstream tie-in of the culverts and within box culverts to make up the embedment. Where fish are present, consideration will be required for resting pools upstream and downstream of the culvert. The watercourse will then be diverted through the new culvert and allow for greenway construction activities to proceed. Appropriate machinery for the size and type of culvert will be utilised.

Machinery required will include excavators, backhoe loaders, crawler cranes (for culverts), wheel loaders, and dump trucks.

4.5.8.5 Pavement

The pavement construction includes subbase, binder and surface layers. Initially, a subbase of unbound granular material Type A Cl 804 is to be paver laid and compacted to create the required crossfall. A 50mm layer of binder material will then be paver laid and compacted with lightweight (2t) twin drum rollers. 6t dump trucks may be required to transport the blacktop material to the paver. A 20mm layer of surface course will then be laid and compacted as above.

Machinery required will include excavators, dump trucks, pavers, and rollers.

4.5.8.6 Trailhead Construction

Car parks within trailheads will be constructed of permeable cellular paving and include geogrid, subbase, geotextile, plastic/concrete cellular paving and topsoil layers, along with kerbing, drainage, signage and road markings.

Initially, the site will be cleared and levelled as these will be utilised as compounds or working area during the construction of the greenway. This will be following by the placement and compaction of the subbase of unbound granular material Type A Cl 804. Drainage requirements within the car parks, including drainage carrier pipes, gully pots, outfalls and attenuation, will then be installed. Kerbing will be laid, followed by the laying of geotextile, sand and concrete/plastic cellular paving layers. Finally, soft landscaping areas will be made up of laying of soil and grass seed, followed by the installation of signage and road markings.

Machinery required will include excavators, dump trucks, and rollers

4.5.8.7 Bridge Construction

River and Overbridge Construction - General

The construction of the river bridges and overbridge consist of three main phases:

- Excavation for Substructure Foundations
- Construction of Substructure Base, Abutments and Piers
- Installation of Bridge Deck

Note that the Construction Environmental Management Plan (CEMP) in Appendix 4.1 contains details surrounding the water protection and pollution prevention measures at each of the structures to be constructed along the proposed development.

Excavation for Substructure Foundations

In advance of any excavations for foundations near watercourses, temporary cut off walls/sheet piles will be constructed along with measures for sedimentation control including silt fencing and cut off ditches with sedimentation traps.

Excavation for the substructure foundations will begin with excavations to formation level for the associated abutments and intermediate piers. The excavations will then be stabilised using temporary works (shoring, trench boxes, etc.). Once any temporary works are in place dewatering equipment, if required, is to be installed to ensure formation level remains dry.

Machinery required will include large excavators (for excavating), dump trucks (to remove spoil), and dewatering pumps (to ensure area remains dry).

Construction of Substructure Base, Abutments and Piers

Once the excavations are complete and safe, construction of the substructure will commence. Initially, shuttering will be erected for the reinforced concrete abutments followed by the installation of reinforcement cages. Concrete will then be poured and allowed to cure the appropriate amount of time. Once fully cured the formwork will be struck and removed. Waterproofing will then be applied to any buried concrete faces to prevent exposure to surrounding ground conditions. Back of wall drainage will be installed at the abutments followed by backfilling and compaction.

Machinery required will include articulated trucks, concrete mixer; dump trucks (for transporting backfill material), rollers and compactors (for proper compaction), drainage installation equipment, and a mobile crane (for shuttering and reinforcement).

Installation of Bridge Deck

After the completion of the substructure base, abutments and piers, the bridge deck can be installed. Steel box girders and transverse beams (as single lift) will be transported to site and erected. Once the steel girders and transverse beams are in place precast concrete deck slabs will be installed and continuity with substructure and transverse beams will be established via in-situ concrete stitches. Combined waterproofing and surfacing will then be installed followed by the installation of paving, drainage, landscaping and finishes.

Machinery required will include articulated trucks and a mobile crane (for lifting the deck).

River Eske Viaduct Construction

The following sets out the sequence of activity associated with the River Eske crossing.

Establish Site, Sedimentation Control and Substructure Foundations

Initially, the works site will be established on both sides of the river, and sedimentation and pollution control and monitoring measures will be implemented prior to breaking ground. A triple layer of silt fencing will be installed parallel to the works area, along with interceptor ditches with straw bales and settlement ponds. Site clearance will then be carried out to provide sufficient space for the works to be carried out. Once the area is clear, any utilities protections or diversions will be undertaken. For the construction of the River Eske Viaduct, the existing overhead electrical lines will be protected or diverted as per requirements set by the statutory undertaker.

Once the sedimentation control measures and enabling works have taken place, temporary cut off walls will be installed prior to the excavation and piling for the substructure foundations. The foundations will then be excavated behind the cut off wall and dewatered using a pump which will outfall to a settlement pond.

Piling will then be undertaken for the abutments and piers. The final choice of pile type will be subject to detailed site investigation and design, but are likely to be micropiles. In the event that bored piles are necessary, a permanent steel casing will be provided to ensure the risk of contamination will be minimised. Once piling is complete, construction of the reinforced concrete pile caps will be undertaken, involving shuttering, placement of reinforcement cages

and pouring and curing of concrete. Management of concrete will be carefully controlled in accordance with the CEMP.

Machinery required will include excavators and dump trucks (for establishing sedimentation control measures and excavating foundations), a piling rig and dewatering pumps.

Substructure Base, Abutments and Piers

Once the pile caps/foundations have been constructed, the abutments and pier plinths will be constructed on both sides of the river. Initially, shuttering will be erected for the reinforced concrete abutments followed by the installation of reinforcement cages. Concrete will then be poured and allowed to cure the appropriate amount of time. Once fully cured the formwork will be struck and removed. Waterproofing will then be applied to any buried concrete faces to prevent exposure to surrounding ground conditions. Back of wall drainage will be installed at the abutments followed by backfilling and compaction.

At this point a detailed survey will be undertaken establish the position of the abutment and pier plinth tie-ins. At the same time, off-site fabrication of the steel piers and deck at a can be undertaken concurrently, as well as a trial erection off site.

Machinery required will include articulated trucks, concrete mixer; dump trucks, rollers and compactors (for proper compaction), drainage installation equipment, and a mobile crane (for shuttering and reinforcement).

Installation of Bridge Deck

Once the substructure is complete, the V-shaped tubular steel piers will be transported to site and erected, along with temporary bracing. This will be followed by concrete infill to the piers.

The steel superstructure will then be transported to site in segments and erected on the piers/abutments (waterproofing and surfacing to be applied off-site at workshop location). Transportation will be via articulated lorries and low loaders using the temporary accesses created north and south of the river to the adjacent road network.

To provide full deck continuity, field welding and encapsulation of the superstructure will be undertaken at segment joints, followed by the final abutment stitches at the ends to make the structure fully integral. Finally, the paving, drainage, landscaping and finishes will be applied to the structure and approaches, followed by the removal of any temporary pollution control measures once all permanent works are complete and vegetation is established.

Machinery required will include articulated trucks/low loaders and a mobile crane (for lifting the deck).

River Finn Viaduct Construction

The following sets out the sequence of activity associated with the River Finn crossing.

Establish Site, Sedimentation Control and Substructure Foundations

Initially, the works site will be established on both sides of the river, and sedimentation and pollution control and monitoring measures will be implemented prior to breaking ground. A triple layer of silt fencing will be installed parallel to the works area, along with interceptor ditches with straw bales and settlement ponds. Site clearance will then be carried out to provide sufficient space for the works to be carried out.

The existing abutment will be utilised on the north side of the River Finn, so new substructure foundations are only required on the south side. This will be constructed by excavating to formation level, stabilising using temporary works and dewatering if required. An existing ditch will be piped east of the proposed structure. The concrete pads will then be constructed for the southern abutment and approach span piers.

Machinery required will include excavators and dump trucks (for establishing sedimentation control measures and excavating foundations), concrete trucks and dewatering pumps.

Substructure Base, Abutments and Piers

Once the foundations have been constructed, the southern abutment and approach span piers will be constructed. Initially, shuttering will be erected for the reinforced concrete abutment followed by the installation of reinforcement cages. Concrete will then be poured

and allowed to cure the appropriate amount of time. Once fully cured the formwork will be struck and removed. Waterproofing will then be applied to any buried concrete faces to prevent exposure to surrounding ground conditions. Back of wall drainage will be installed at the abutments followed by backfilling and compaction.

Bearing plinths and pads will be installed on the new southern approach span substructure, existing masonry piers and the existing northern abutment. At this point a detailed survey will be undertaken establish the position of the abutment and pier plinth tie-ins . At the same time, off-site fabrication of the steel lattice girders and curved universal beam sections can be undertaken concurrently, as well as a trial erection at the workshop.

Machinery required will include articulated trucks, dump trucks, rollers and compactors (for proper compaction), drainage installation equipment, and a mobile crane (for shuttering, reinforcement and bearing pads).

Installation of Bridge Deck

Once the substructure is complete, the steel superstructure will be transported to site in segments and erected on the piers/abutments, followed by the erection of the precast concrete deck slabs. There will also be in-situ concrete stitches required to the steel girders. Transportation will be via articulated lorries and low loaders using the temporary accesses created north and south of the river to the adjacent road network.

Once the superstructure is in place, installation of kerbs and parapets will follow, along with waterproofing and surfacing. Paving, drainage, landscaping and finishes will then be installed at the southern end.

On the northern side, construction of the concrete saddle to the masonry arches will take place on northern abutment, followed by installation of precast concrete deck slabs and parapets as described above. Finally, the removal of any temporary pollution control measures will take place once all permanent works are complete and vegetation is established.

Machinery required will include articulated trucks/low loaders and a mobile crane (for lifting the deck).

Underpass Construction

To construct the underpass the following sequence of events has been established. Temporary weekend road closures will be required to undertake the construction.

Excavation and Foundation

Initially, the existing carriageway and sublayer to formation level for underpass and retaining wall will be excavated. The excavations will then be stabilised using temporary works (shoring, trench boxes, etc.). Once any temporary works are in place dewatering equipment, if required, is to be installed to ensure formation level remains dry.

Machinery required will include large excavators (for excavating), dump trucks (to remove spoil), and dewatering pumps (to ensure area remains dry).

Once the excavations are complete and safe, any upfill required from formation level will be placed to blinding level, followed by pouring the concrete blinding.

Machinery required will include excavators (for placing upfill), dump trucks (to placing upfill), and concrete ready-mix trucks (for blinding).

Underpass, Retaining Wall & Headwall Construction

Following upfill and blinding, the precast underpass box units will be positioned in place. Precast retaining walls and precast headwalls will then be installed. With all precast units in place any joints and connections between will be sealed.

Machinery required will include a mobile crane (for lifting precast sections into place) and articulated trucks (for delivering precast elements to site).

Once all precast sections are in place and joints are sealed, all buried sections of concrete will be waterproofed, and a drainage system installed at the back of wall to prevent future damage from ground water. Backfill will then be placed and compacted to the rear and top of

the underpass and retaining walls. Carriageway surfacing will be laid in accordance with the specifications to ensure a smooth and continuous finish at the finished level. With the carriageway surface complete, the temporary traffic management can be removed and the road reopened.

Machinery required will include excavators (for backfilling and grading), dump trucks (for transporting backfill material), rollers and compactors (for proper compaction), pavers, lorries and drainage installation equipment.

Existing Bridges Retrofit

Prior to breaking ground any environmental controls (e.g., silt fences, spill kits) are to be set up to protect any watercourse below. Temporary access routes will then be installed to reduce the area of affected land. With temporary access routes installed and clearly defined, full scaffolding to provide a stable, safe working platform will be erected. This will likely be a scaffold within the arch barrel and standard independent scaffolding on the bridge elevations (spandrels and parapets).

Machinery required will include large excavators (for excavating), scaffolding trucks (delivery of scaffolding); and mobile elevated work platform (MEWP), for close inspections.

With temporary works platforms in place, the masonry arch bridge will require repair and repointing. The masonry will be cleaned (elevations and arch barrel) to remove vegetation, loose mortar, and biological growth. All failed, loose, or soft mortar joints will be raked out (removed) to a specified depth (e.g., 25-50mm) using hand tools or small power tools. The joints will then be repointed using a specified, breathable mortar (typically a lime-based mortar to match the existing construction). This is often done by hand to ensure joints are fully packed. Any significantly damaged or displaced stones (voussoirs) will be identified, removed, and either repaired or replaced.

Machinery required will include pressure washer (for cleaning the stonework), handheld pneumatic breakers (for carefully raking out mortar joints), mortar mixer (for preparing the pointing mortar), and grout pump (for deep voids if found, can be used to inject a flowable lime grout to consolidate the arch).

With all repairs and repointing undertaken, the existing bridge will have a waterproofing layer applied over the entire new concrete saddle. A new drainage system (e.g., weep holes) will be installed to manage water on the deck. The original parapet walls will be reinstalled or a new, compliant greenway parapet/handrail system will be installed. The final greenway surface (e.g., tarmac, resin-bound gravel) will then be laid followed by the dismantling of the temporary works and landscape works.

Machinery required will include telehandler / forklift (for lifting parapet sections, bags of sub-base, and paving materials), tarmac paver (for laying the final surface), vibrating roller (for compacting the sub-base and final surface); and excavator with landscaping rake (for reinstatement of surrounding areas).

Masonry Arch Concrete Saddling will require locating any buried services and undertake temporary diversions in conjunction with the utility owner. Masonry will be exposed by excavating down to arch extrados, and the surface prepared with installation of dowels (if masonry found not to provide sufficient bond to concrete). This will be followed by the erection of formwork at ends of exposed extrados and installation of the mesh reinforcement. With the mesh reinforcement a controlled pour of concrete for the saddle will be laid and left to cure. Waterproofing will then be applied to concrete saddle, followed by build-up of backfill and finally the greenway surfacing course.

Machinery required will include small excavator and handheld equipment, pressure washer (for cleaning the stonework), telehandler / forklift (for lifting formwork), concrete ready-mix trucks (for blinding), dump trucks (for transporting backfill material), and rollers and compactors (for proper compaction).

4.5.9 Accidents and Emergencies

As outlined in Section 4.5.2 and Appendix 4.1 CEMP, the majority of the construction works will take place away from public roads and will not affect access for emergency service

vehicles on the public road network. However, where road closures or lane closures are required to undertake construction works, the Contractor will ensure that emergency vehicles will not be negatively impacted by the works. The Construction Traffic Management Plan (CTMP) will be developed in conjunction with TII, DCC and representatives from the emergency services. The Incident Response Plan in Appendix F of the CEMP provides detail on the response process to unprecedented events.

4.6 Operational Phase

4.6.1 Responsibility

The route lies within the Donegal Couty Council authority area. Operation matters and maintenance will be the responsibility of Donegal County Council. The operational team will have responsibility for the operation and emergency planning for the amenity. The emergency team will respond to all emergencies as reported to them and will put the emergency plan into place which include cooperation with the emergency services.

4.6.2 Maintenance Activities

The proposed greenway will be managed in accordance with standards set out in the following documents:

- 'Strategy for the Future Development of National and Regional Greenways', Department of Tourism, Transport and Sport (2018).
- 'Embracing Ireland's Outdoors National Outdoor Recreation Strategy', Department of Rural and Community Development and the Gaeltacht (2023)
- 'Code of Best Practice for National and Regional Greenways', Department of Transport (2021)

As per the Code of Best Practice (Section 3.2.16) Donegal County Council will be responsible for the upkeep and maintenance of the Greenway. This includes general upkeep, such as maintenance to lighting, vegetation, fencing and drainage. Donegal County Council will also provide management of litter facilities and toilet facilities, general maintenance of trail heads, and routine maintenance work as required. To promote responsible outdoor recreation, users will also be encouraged to follow the seven principles of 'Leave No Trace' through provision of appropriate signage along the greenway route.

A Management and Maintenance Plan has been developed and is included in Appendix 4.2.

4.6.3 Accidents and Emergencies

The proposed development will provide measures in an event of accidents and emergencies. The following measures are proposed:

- **Marker posts** – marker posts will be erected at frequent intervals (500m in accordance with DN-GEO-03047) to inform people of their location when in need and to direct them to the nearest access.
- **Accessibility** – the proposed greenway will be accessible via existing car parks and level crossings to emergency vehicles.

4.6.4 Safety and Security

There is no vehicular access to the greenway from the public access points. At all at grade crossings, there will be chicanes which will be removable for emergency services and maintenance access which will be available within a key coded box. Only key personnel and emergency services will have access to the key codes to get access. The code to open the local key coded box and retrieve the key will be the same for all public access points along the greenway.