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Natura Impact Statement

TEN-T Priority Route Improvement Project, Donegal

Appendix 1: Project Description

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NIS

March 2026

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List of Abbreviations

The following is a list of abbreviations used within this Appendix to the Natura Impact Statement (NIS).

List of Abbreviations	
A5 WTC	A5 Western Transport Corridor
AADT	Annual Average Daily Traffic
AEP	Annual Exceedance Probability
AOD	Above Ordnance Datum
BMP	Biodiversity Management Plan
CGSJ	Compact Grade Separated Junction
CIRIA	Construction Industry Research and Information Association
CPO	Compulsory Purchase Order
CSO	Central Statistics Office
CUL	Culvert
DMURS	Design Manual for Urban Roads and Streets
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EOP	Environmental Operating Plan
EPA	Environmental Protection Agency
ESB	Electricity Supply Board
HGV	Heavy Goods Vehicle
IFI	Inland Fisheries Ireland
ISMP	Invasive Species Management Plan
MAC	Maritime Area Consent
MARA	Maritime Area Regulatory Authority
MED	Material Extraction and/or Deposition
NIS	Natura Impact Statement
NMU	Non-Motorised User
NPF	National Planning Framework
NRA	National Roads Authority (now TII)
OPW	Office of Public Works
PAG	Project Appraisal Guidelines
PMG	Project Management Guidelines
PRC	Primary Route Connector (N15 in Section 1)
RCD	Road Construction Detail
RSA	Road Safety Audit
RSIA	Road Safety Impact Assessment
RSNI	Roads Service Northern Ireland
SAC	Special Area of Conservation
SCD	Standard Construction Detail
SPA	Special Protection Area
SSD	Stopping Sight Distance
TEN-T	Trans European Network - Transport
TII	Transport Infrastructure Ireland
TMP	Traffic Management Plan

1 PROJECT DESCRIPTION

1.1 Introduction

This chapter provides a description of the Proposed Development, details of engineering design, land requirements and construction and operational requirements. The design of the Proposed Development has been developed to the point where all the potential environmental impacts can be identified and assessed. The contractor will be required to implement the environmental commitments as set out in the Environmental Impact Assessment Report (EIAR) and Natura Impact Statement (NIS) and as required by any approval as may be granted.

This appendix of the (NIS) is supported by the drawings included in Appendix 2 which contains general arrangement drawings for Section 1, 2 and 3 of the Proposed Development to illustrate the location of key features described in the chapter. Full design and technical drawings are also included in Volume D: Book of Drawings of the EIAR.

1.2 Competent Experts

The primary authors of this chapter are set out below.

Sections 1 and 2 contained within this chapter have been prepared by Eamon Cox, a qualified Civil Engineer with over 31 years of experience, working within RPS (a Tetratech Company). Eamon holds a Bachelor of Civil & Environmental Engineering (Hons) BE and a Diploma in Project Management. Eamon is a Chartered Engineer (CEng) and a longstanding member of Engineers Ireland. Eamon is also a Registered Professional Consulting Engineer within the Association of Consulting Engineers of Ireland (ACEI) and a licensed Professional Engineer in the US (Massachusetts). Eamon has extensive experience in the design and construction of road related projects and is a qualified Road Safety Audit, team leader. Eamon's experience includes the feasibility and development of major transportation projects through options selection, preliminary and detailed design and the associated management of the EIAR / Environmental Reports and CPO process and in the construction of road schemes. This has included planning and design and management of utility infrastructure.

Section 3 contained within this chapter have been prepared by Eamon Daly, a qualified Civil Engineer with over 30 years of experience, working with Egis Engineering Ireland. Eamon holds a Bachelor of Civil Engineering (Hons) BE, a Master of Engineering Science in Transportation Engineering MEngSc. Eamon is a Chartered Engineer (CEng) and a Fellow of Engineers Ireland (FIEI). He is also a Fellow Professional Consulting Engineer (FConsEI ACEI). Eamon has extensive experience in the design and construction of road related projects. He has worked for on feasibility studies, preliminary and detailed designs including the management of the EIAR/Environmental Reports and CPO processes and in the construction of road schemes. This has included planning and design and management of utility infrastructure.

Gareth McElhinney is the Environmental Coordinator for the Proposed Development. He is a Technical Director in RPS with over 26 years' experience. He holds a BE in Civil Engineering, a Postgraduate Diploma in Environmental Sustainability, and a Masters in Business Studies. He is a Chartered Engineer and Fellow with Engineers Ireland, a Registered Consulting Engineer with ACEI and a Project Management Professional with PMI. Gareth is experienced in the delivery of infrastructure projects across the environment and transport sectors and as part of multi-disciplinary teams. These projects include offshore wind, roads and greenways, water and healthcare infrastructure, oil & gas exploration, and environmental engineering.

1.3 Overview of Proposed Development

The N13, N14 and N15 (part of) national primary roads form part of the TEN-T in Donegal, which is a selection of strategic transport corridors throughout the European Union (EU) that have been identified to play a key role in the mobility of goods and passengers through the EU. *Regulation (EU) 2024/1679 of the European Parliament and of the Council of 13 June 2024 on Union guidelines for the development of the trans-European transport network, amending Regulations (EU) 2021/1153 and (EU) No 913/2010 and repealing Regulation (EU) No 1315/2013,* sets the requirements for the TEN-T network.

Letterkenny, the largest town in Donegal (22,549 (CSO, 2022)), is connected to Derry via the N13, to Lifford (the County Town) via the N13-N14 and to Ballybofey/ Stranorlar via the N13-N15. The TEN-T routes in Donegal are broadly described below:

- **N13:** A strategic route that connects Letterkenny with Derry City, Northern Ireland, to the north and via the N15 Ballybofey/ Stranorlar to Sligo and Galway/Limerick (via N17) to the south. The N13 connects with three other national routes including: the N14 to Lifford, the N56 (national secondary route) to Letterkenny and north Donegal and the N15 in Ballybofey/Stranorlar.

- **N14:** A strategic route that connects Letterkenny to Lifford and links via the Lifford bridge over the River Foyle to the existing A5 and Strabane in County Tyrone, Northern Ireland. The existing A5 in Northern Ireland, on the Derry City to Dublin route, passes to the west of Strabane, adjacent to the county boundary with Donegal, and is the key route linking the northwest of Ireland and Donegal via the N14 and N15 to the N2 in Monaghan and on to Dublin.

- **N15:** A strategic route that connects from Sligo to Donegal Town and continues north easterly through Ballybofey/ Stranorlar to Lifford where it connects to the N14 and links to Strabane in County Tyrone, Northern Ireland. The section between Stranorlar and Lifford does not form part of the TEN-T network.

These TEN-T strategic routes in Donegal connect to the principal road network north and eastward in Northern Ireland and southeast to Dublin (via the A38 crossing of the River Foyle and the current A5) and south to Limerick/Galway (via the N17 and N15 to Sligo). The routes are core strategic and critical economic infrastructure. They are particularly important for both tourism and industry, and are the only access to regional and international hubs. The routes provide the only available transport option to the northwest due to the lack of rail infrastructure (with Sligo and Derry being rail passenger only) or access to Tier 1 ports or airports within 100 km of the region.

The TEN-T Priority Route Improvement Project, Donegal (hereafter referred to as the “Proposed Development” or “Project”) consists of the following sections of road network in Donegal (see Figure 1.1):

- **Section 1** – N15/N13 Ballybofey/ Stranorlar Urban Region

- **Section 2** – N56/N13 Letterkenny to Manorcunningham

- **Section 3** – N14 Manorcunningham to Lifford/Strabane/A5 Link

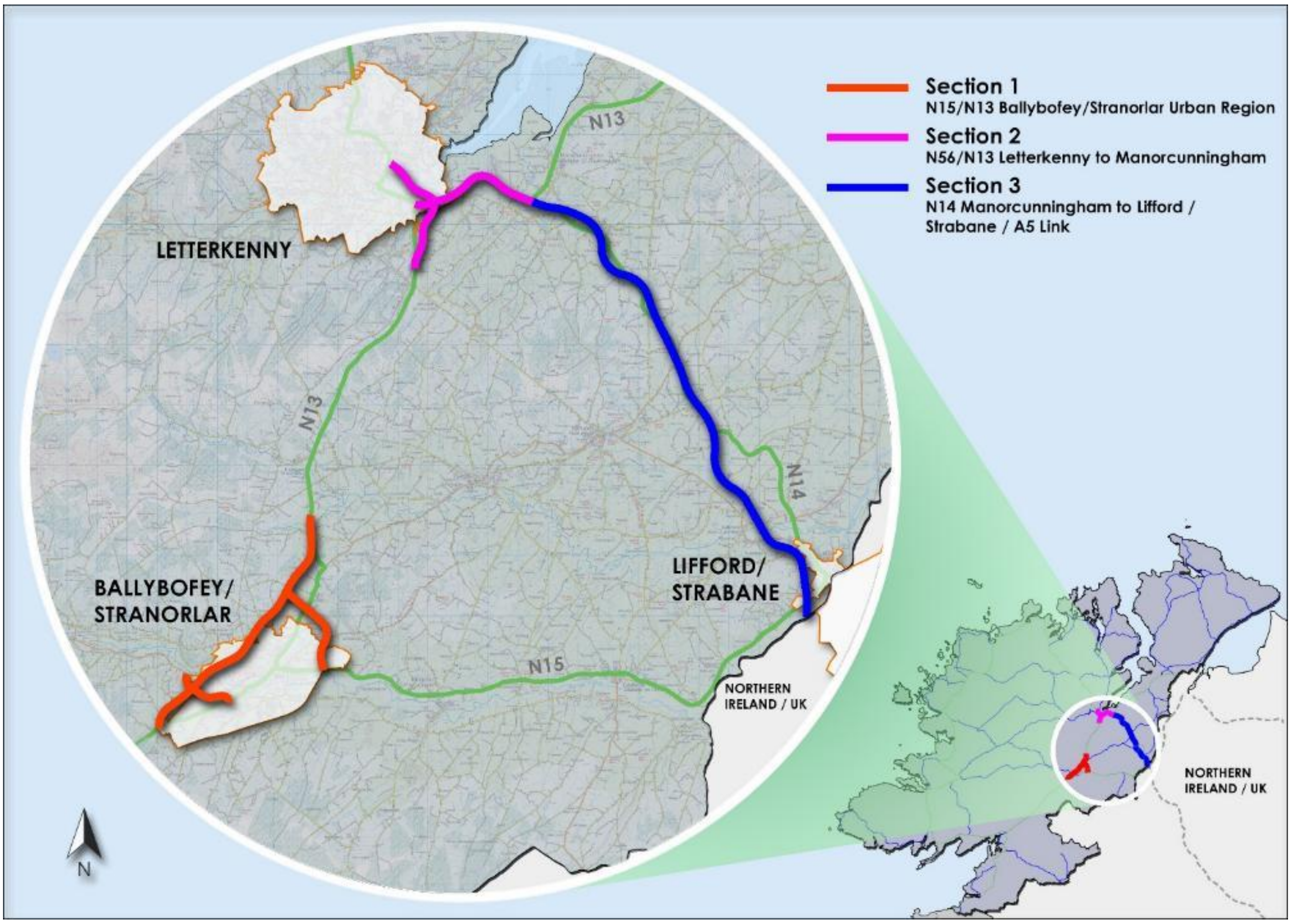

Figure 1.1: Proposed Development Location

The Project for the purposes of this Appropriate Assessment to be carried out by An Coimisiún Pleanála (hereinafter referred to as the Commission) includes the three sections of the Proposed Development referenced above.

An overview of the Proposed Development and each section is provided in the drawings in Appendix 2: NIS Drawings.

- Section 1 General Arrangement Drawings are Drawing 1 (Sheets 1 to 8)
- Section 2 General Arrangement Drawings are Drawing 2 (Sheets 1 to 5)
- Section 3 General Arrangement Drawings are Drawing 3 (Sheets 1 to 10)

1.4 Design Standards

The Proposed Development is designed to comply with Transport Infrastructure Ireland (TII) design standards for national roads. The most relevant standards are included in Section 1.16 at the end of this chapter.

The Proposed Development is also designed in accordance with Department of Transport (DoT) Traffic Signs Manual (2021, updated 2025) and Design Manual for Urban Roads and Streets (DMURS) (Department of Transport, 2013, updated 2025).

1.5 Development of the Design and Design Parameters

The alignment designs have been developed in cognisance of the environmental and engineering constraints that exist within each section of the Proposed Development.

The design development has been an iterative process undertaken in parallel with the environmental assessment. As environmental impacts are identified and quantified, refinements have been made to the design where feasible to avoid or reduce significant environmental impacts.

Consideration has also been given to the need to reduce the carbon footprint of the Proposed Development and to encourage modal shift away from motorised vehicles in favour of non-motorised forms of transport, and to reduce fossil fuel usage. In addition, the integration of the TII's Circular Economy Strategy and TII's Sustainability Implementation Plan further contributes towards the Project's sustainability through optimisation of the design and generation and use of materials to minimise the volume of material required to be imported and exported for construction, and the establishment of an active travel network throughout the project, including park and share / cycle facilities.

As all sections provide an upgrade to the national primary road network and TEN-T network in the county, design speeds of 100 km/h have been selected as appropriate for the mainline with varied design speeds selected for the side roads and link roads ranging between 30 km/h and 100 km/h.

Typical cross-section designs are discussed in the following sections with further detail on the design of each of the three sections of the Proposed Development detailed in Section 1.7 (Section 1), Section 1.8 (Section 2) and Section 1.9 (Section 3)r.

The selection of road type and access to the Proposed Development has been developed to comply with the relevant Regulations, Standards and Policies, including but not restricted to the TEN-T Regulation, TII design standards and Ireland's Government Road Safety Strategy current at the time of the design.

1.5.1 Road Design – Cross Sections

1.5.1.1 Mainline Cross Section

The cross-sections for the Proposed Development were determined using the steps and guidance in the TII publications DN-GEO-03031 (Rural Road Link Design Standards, May 2023) and DN-GEO-03036 Cross Sections and Headroom Standards, May 2023) and with cognisance with other policies and regulatory requirements. The mainline cross section configurations are illustrated in Figure 1.2 and Figure 1.3.

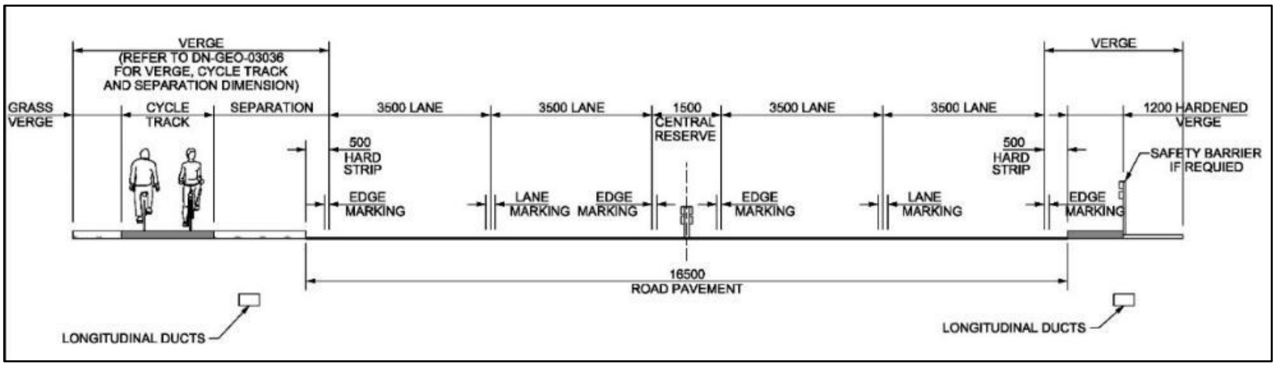

Figure 1.2: Type 2 Divided Road Cross Section

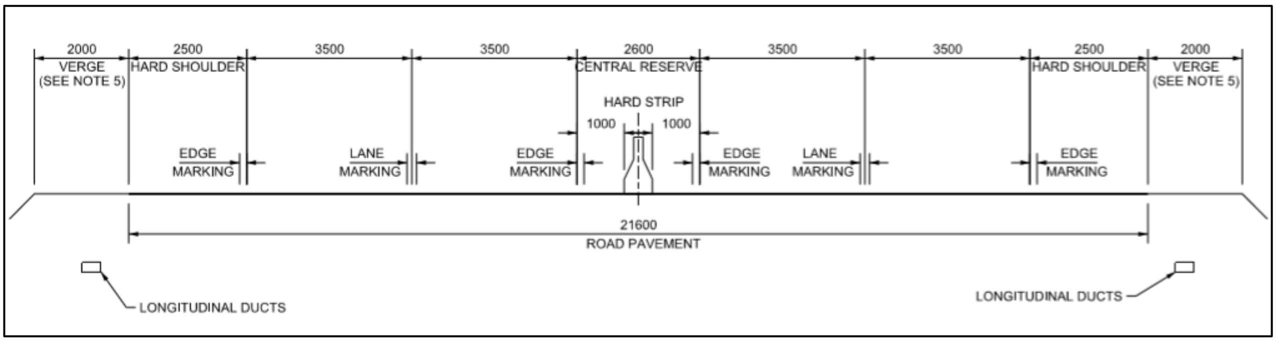

Figure 1.3: Type 1 Dual Carriageway Cross Section

1.5.1.2 Tie-ins to Existing National Roads

At the tie-ins to the existing national road network, Type 1 Single Carriageway cross section will be used, as shown in Figure 1.4.

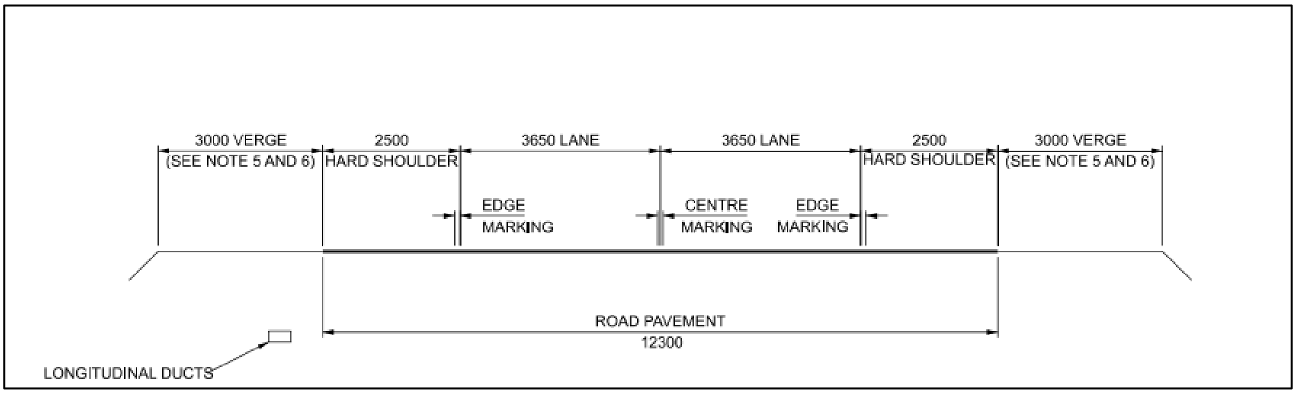

Figure 1.4: Type 1 Single Carriageway

1.5.1.3 Link Roads and Slip Road Cross Section

At some locations, the actual cross sections have been amended where necessary based on design and development requirements, particularly along the transition to the existing road network. Link roads and slip roads are illustrated in the General Arrangement drawings, Drawings 1 (Section 1), 2 (Section 2) and 3 (Section 3), in Appendix 2:

- **Link Roads** – Link roads are connector roads separate from the mainline carriageway, which are used to connect the mainline carriageway to the local, regional and other national road network. The link road section configurations are illustrated in Figure 1.5 and Figure 1.6.

- **Slip Roads** – Slip roads are connector roads within a junction between a mainline carriageway and the local or regional road network, or vice versa, which meets the local road/regional road network at-grade. Traffic using a slip road usually has to yield to traffic already on the mainline or on the local/regional road network.

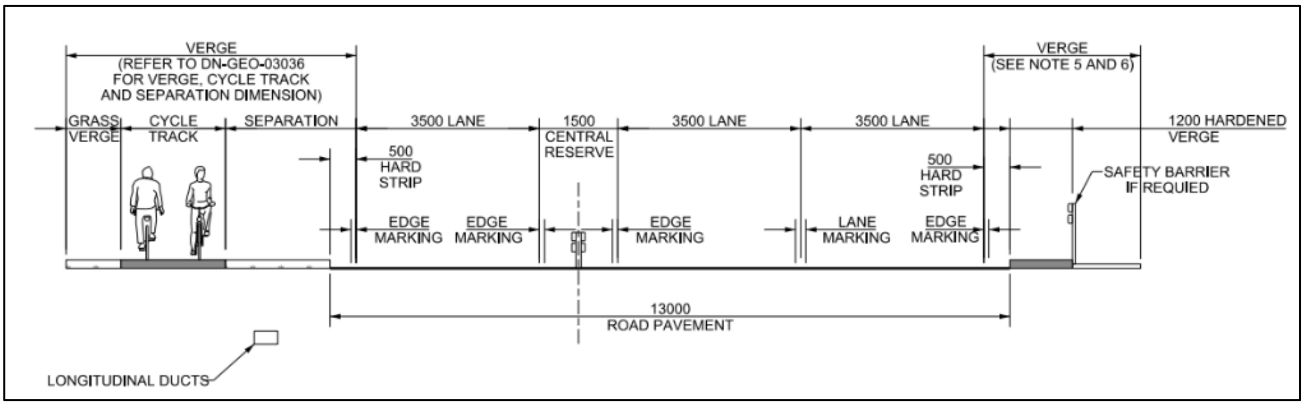

Figure 1.5: Type 3 Divided Road Cross Section

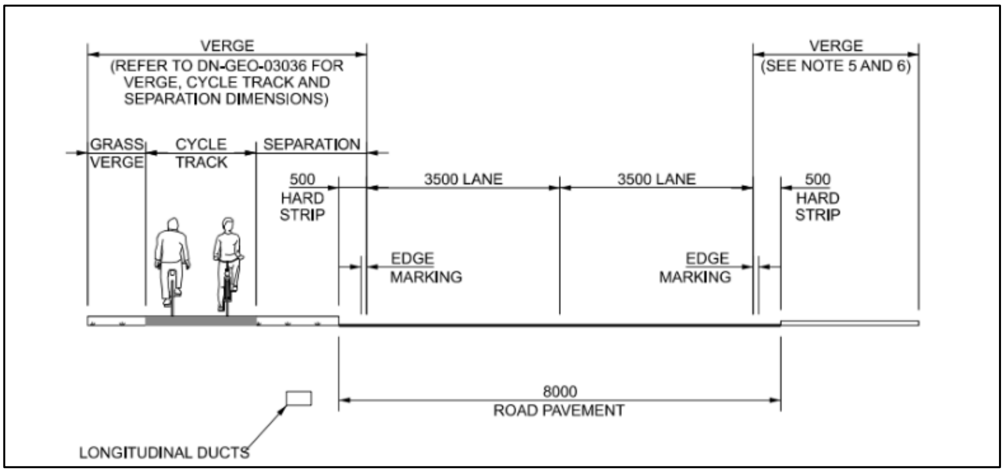

Figure 1.6: Type 2 Single Carriageway Cross Section

1.5.1.4 Side Road Cross Section

Side roads were designed in accordance with TII publication DN-GEO-03031. The minimum carriageway width provided for realigned side roads is 5.5 m with 2.5 m verges. Public side roads will generally be bridged over or under the mainline route where it is necessary or extinguished where there is no significant adverse impact or significant community severance. A typical cross section of realigned side roads is illustrated in Figure 1.7.

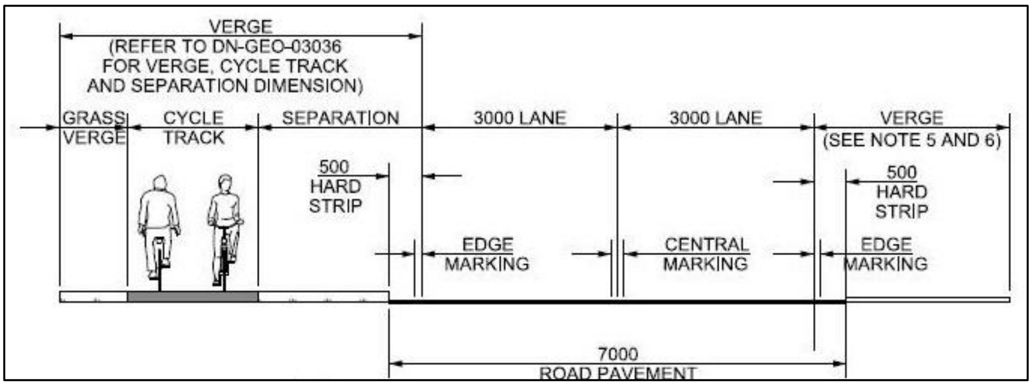

Figure 1.7: Type 3 Single Carriageway Side Road Cross Section

The type and location of side roads for each section are further described in Section 1.7.3 (Section 1), Section 1.8.3 (Section 2) and Section 1.9.3 (Section 3).

Details regarding drainage proposed on side roads, as well as drainage associated with cycleways is provided in Section 1.5.8.2.

1.5.2 Horizontal and Vertical Alignment

The horizontal and vertical alignments for the three sections have been developed in accordance with TII standard DN-GEO-03031.

The horizontal and vertical alignments consider all identified constraints and have avoided and sought to minimise impacts in so far as practicable. Desirable minimum design standards have been applied with relaxations and departures from minimum standards only applied where necessary.

Vertical alignments have evolved to achieve a balance in earthwork quantities where feasible, to minimise the import and export of material, and thus contribute to the reduction of the environmental impact and carbon footprint for the project.

The horizontal and vertical alignments of the roads and design features shown herein have been designed to an advanced level to allow for a full assessment of the environmental impacts associated with same. Minor variations including of horizontal or vertical alignments may occur in response to any specific issues arising during detailed design and construction but subject in all cases to no additional environmental impacts being likely to arise as a result of same.

1.5.3 Junction Design

A junction strategy has been carried out with consideration of tie-in locations/ constraints to the existing road network, traffic analysis and consistency.

The traffic analysis examined the preliminary engineering, traffic, safety and economic justifications for junction access strategies for the Proposed Development and recommended the preferred location and form of these junctions to assist with preliminary costing analysis. The traffic analysis is detailed further in Chapter 6: Traffic & Transportation Assessment of the EIAR.

In determining suitable junction locations consideration is given to:

- The tie-in locations of each section.
- The level of demand for vehicles wishing access to and from the surrounding area.
- The level of demand for access to other principal routes.

TII publications provide guidance on the type of junction recommended for different design flows. The selection process of junctions depends on the volume of traffic and the proportion of minor road flow compared with major road flow.

1.5.3.1 Single Carriageways

Single carriageways allow for the following types of junctions:

- Priority junctions.
- Roundabouts.
- Compact grade separated junctions.

1.5.3.2 Type 2 Divided Roads

Type 2 Divided Roads allow for the following types of junctions:

- Roundabouts.
- Compact Grade Separated Junctions.
- Left-in/Left-out.

1.5.3.3 Type 3 Divided Roads

Type 3 Divided Roads allow for the following types of junctions:

- Left-in/Left-out or ghost island priority
- U-turn facility with right turn.
- At grade roundabouts.
- Compact grade separation Junctions.

1.5.3.4 Type 1 Dual carriageways

Type 1 dual carriageways allow for the following types of junctions:

- Roundabouts.
- Grade Separated Junctions.
- Left-in/Left-out.

Access to private lands and dwellings off the proposed mainline carriageways have been avoided by diverting existing accesses onto the local road network. By removing all accesses onto the proposed mainline carriageway the overall safety of the road is improved. Where, in a small number of cases, almost exclusively at the transition to the existing national road network, access cannot be provided to private lands and dwellings via local roads or access tracks, access will be maintained to the National Road.

Type and location of junctions for each road section are further described in Sections 1.7.2 (Section 1), Section 1.8.2 (Section 2) and Section 1.9.2 (Section 3).

1.5.4 Active Travel Network

1.5.4.1 Active Travel Objectives

The inclusion and promotion of active travel forms a key component of the Project. This responds to the need to promote physical and mental health benefits, and to encourage a modal shift towards cycling and walking modes of transport. To achieve this promotion of health benefits, dedicated shared pedestrian/ cycling facilities are provided as part of the Proposed Development. This provision is also a key element in addressing national policy including in respect to climate action and delivery of the National Cycle Network.

1.5.4.2 Active Travel Facility

Each section includes a Type 2 Divided Road cross-section which includes a 3 m wide active travel facility (shared cycleway/ footway) providing extensive, longitudinal facilities for non-motorised users. The active travel facility is separated from the nearest edge of the closest traffic lane by a minimum of 6 m, except at structure locations where the separation distance is reduced to 3 m.

Additionally, there are Type 1 Single Carriageway and Type 1 Dual Carriageway and Type 3 Divided Road cross sections included within Sections 1 and 2 respectively. To provide a holistic active travel network, cycle/ pedestrian facilities have been included with these Type 1 road elements. This includes the active travel facility located adjacent to the Type 1 Single Carriageway Road and Type 3 Divided Road in Section 1 and the active travel facility located remotely from the Type 1 Dual Carriageway in Section 2.

Connections to the existing road network, from the above facilities, are provided where appropriate in each section.

1.5.4.3 Park and Share / Cycle Facilities

Park and share/ cycle facilities are provided at designated locations along the Proposed Development and form hubs at which motorists can park their own car and car share with other motorists or avail of public transport (public bus) in order to complete an ongoing journey or park their car while they utilise the active travel facilities for commuting, exercise or amenity usage. Immediate access to the wider active travel network is provided at each park and share/ cycle facility.

The proposed location and layout of the Park and Share facilities are shown in the drawings in Appendix 2 as below.

- Section 1 Drawing 1.
- Section 2 Drawing 2.
- Section 3 Drawing 3.

The park and share/ cycle facilities are equipped with car parking spaces, cycles stands and picnic areas. Provision for HGV and bus parking are also provided within the Lifford and Pluck Roundabout park and share / cycle sites. While it is not proposed to provide toilet facilities with this project, each park and share/ cycle area will have service connections to utilities to enable the potential inclusion of such facilities in the future. Charging facilities for electric vehicles will also be provided which will support the DoT's Electric Vehicles Charging Infrastructure Strategy 2022-2025.

1.5.4.4 Access to Amenities

Access to local amenities and the local active travel network (existing footways, cycleways) will be provided at interface points with the proposed active travel network for the Project to ensure connectivity between proposed and existing networks.

1.5.5 Pavement Design

A flexible pavement has been designed for the Proposed Development in accordance with TII publication DN-PAV-03021 for a 40-year design life. Low noise surfacing has been proposed in the design.

1.5.6 Watercourse Crossings / Other Structures

1.5.6.1 Watercourse Crossings

The proposed structures that cross watercourses for the Project are categorised as:

- **Major River Bridges** - comprising major bridge structures crossing the River Finn (one each in Section 1 and Section 3), River Swilly (Section 2) and the River Deele (Section 3).
- **River Bridges** - comprising standardised bridge structures crossing small rivers, tributaries and small watercourses, that are unsuitable/ too large to be accommodated by culverts.
- **Culverts** - comprising structures that accommodate small watercourses that pass beneath the Proposed Development either on their current alignment or on a diverted alignment.

Proposed structures have been designed in accordance with TII publication AM-STR-06008, NRA Guidelines for the crossing of watercourses during the construction of National Road Schemes, and Loughs Agency Guidelines for fisheries protection during development works (Foyle and Carlingford areas).

The type and location of river/ watercourse structures for each road section are further described in Sections 1.7.10 (Section 1), Section 1.8.10 (Section 2) and Section 1.9.10 (Section 3).

Major River Bridges

'Major River Bridges' are defined as road-over-river bridges with spans greater than 50 m and are classified as Category 3 Structures. The following major river bridges form part of the Proposed Development:

- River Finn Crossing (Section 1) River Bridge N15R024 (Drawings 1).
- River Swilly Crossing (Section 2) River Bridge N56R005 (Drawings 2).
- River Finn Crossing (N14/N15 to A5 Link) (Section 3) River Bridge (Drawings 3).
- Deele River Bridge (Section 3) River Bridge N14R144 (Drawing 3).

Further details of these Major River Bridges are provided in Section 1.7.6 (Section 1), Section 1.8.6 (Section 2) and Section 1.9.6 (Section 3).

River Bridges

River Bridges are defined as road-over-river bridges and are Category 2 structures where the spans range from 7 m to 50 m. These are summarised individually in the sections below. The sites are generally rural countryside locations with agricultural grassland, scattered buildings and a few nearby villages and small towns.

Culverts

Culverts are described in the following section.

1.5.6.2 Other Structures

Overbridges and Skewed Overbridges

The overbridges have been designed as standard overbridges (0 to 37 degrees skew) and skewed overbridges (>37 degrees skew).

Each of the standard proposed overbridge structures are three span integral bridges. The bridge decks are formed from precast prestressed concrete W-beams acting compositely with a cast in-situ reinforced concrete deck slab.

The end supports will take the form of reinforced concrete bank-seats. The intermediate pier supports will take the form of reinforced concrete circular piers. It is expected that spread foundations will be adequate for the proposed structures. Where necessary, compacted 6N fill (a well-graded granular material) will be provided between the foundation and the natural ground strata to achieve the required bearing capacity.

The standard overbridges vary in width from 12 m to 17.5 m and in skew from 0 degrees to 37 degrees. There are 14 no. standard overbridges proposed.

Each of the skewed overbridge structures are also three span bridges. The bridge decks are formed from precast prestressed concrete W-beams acting compositely with a cast in-situ reinforced concrete deck slab. The superstructures will be monolithic with the intermediate piers supports but will be supported by structural bearings at the abutments.

The end supports will take the form of reinforced concrete abutments with inspection galleries. The intermediate pier supports will take the form of reinforced concrete circular columns. It is expected that spread foundations will be adequate for the proposed structures. Where necessary, compacted 6N upfill will be provided between the foundation and the natural ground strata to achieve the required bearing capacity.

The skewed overbridges vary in width from 13 m to 16 m and in skew from 43 degrees to 54 degrees. There are 3 skewed overbridges proposed.

Underbridges

'Underbridges' are defined as bridges which carry the mainline carriageway over various regional, local and link roads. There are 16 no. underbridges proposed.

The required square clear spans are 9 m to 20 m. Approximately half the sites have roads crossing at skew greater than 30 degrees. All the underbridges are single span.

Spread foundations will be adequate for the proposed underbridge structures. Where necessary, compacted 6N fill will be provided between the foundation and the natural ground strata to achieve the required bearing capacity.

Three different structural arrangements are proposed depending on the span, skew, and cover depth at the underbridge sites:

- Buried box / portal.
- Precast (PC) beam deck on integral abutments.
- PC beam deck with dead deck areas on integral abutments.

Active Travel Bridges

Three active travel overbridges are included in the Proposed Development. The proposed bridge superstructure is a bow-string arch, Vierendeel steel truss (typical elevation shown in Figure 1.8).

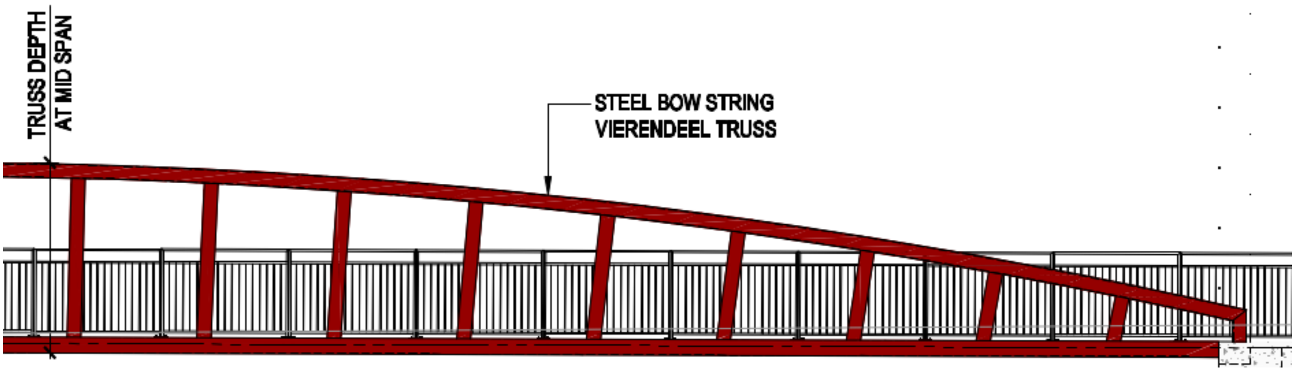

Figure 1.8: Elevation of Proposed Active Travel Bridge Superstructure (Midspan to Abutment)

- The proposed bridge superstructure consists of steel, bow string arch Vierendeel trusses. The rise of the bow-string arch truss would be approx. 3 m at midspan. The active travel bridges over carriageways achieve a min. 5.7 m headroom.
- 1.45 m tall pedestrian/ cycle parapets will be bolted to the steel superstructure. This facilitates replacement after the 30 to 50-year design life of steel parapets has expired.
- 1.45 m tall pedestrian/ cycle parapets will also be provided along active travel path approaches to the active travel bridges where there is a wall adjacent, or where there are slopes falling to a watercourse or road.

- Away from the active travel path, timber fencing in accordance with CC-SCD-00300 shall be provided along the top of retaining walls and wingwalls, and along maintenance access walkways at the crest of slopes falling to a road or watercourse.

- For Section 2, weathering steel is proposed for the crossing of the Isle Burn. A paint protection system is proposed for the bridges over the proposed N14, and the bridge over the existing N13 due to the likelihood of salt spray from the road underneath.

- The internal width on the active travel bridge is 4 m, which consists of 3.0 m active travel facility plus 2 x 0.5 m lateral clearance to parapets.

- The prefabricated truss decks would be quick to install, which would minimise road closure durations.

- Embankment fill ramp approaches are proposed, as it is low cost and blends into the landscape. For the active travel overbridge crossing the N13, on the northern side, where space is constrained, reinforced soil slopes are proposed between the legs of the zigzag ramp approaches as the grass finish is preferable to a hard engineered solution such as concrete or steel.

Culverts

Culverts, minor watercourse crossings and cross drains are proposed along the road development, either for existing watercourses or for road drainage, boundary ditches or swales.

Culverts with a clear span or internal diameter greater than 2.0 m are classified as structures in accordance with DN-STR-03001 (TII, December 2025). The location of these culvert structures in Sections 1, 2 and 3 is shown in the general arrangement drawings in Appendix 2.

Culverts requiring OPW Section 50 approvals are included in Section 4.6.10 for Section 1, Section 4.7.10 for Section 2 and Section 4.8.10 for Section 3.

Culverts consist of buried concrete box, arch, portal or pipe type cross sections as shown in Figure 1.9.

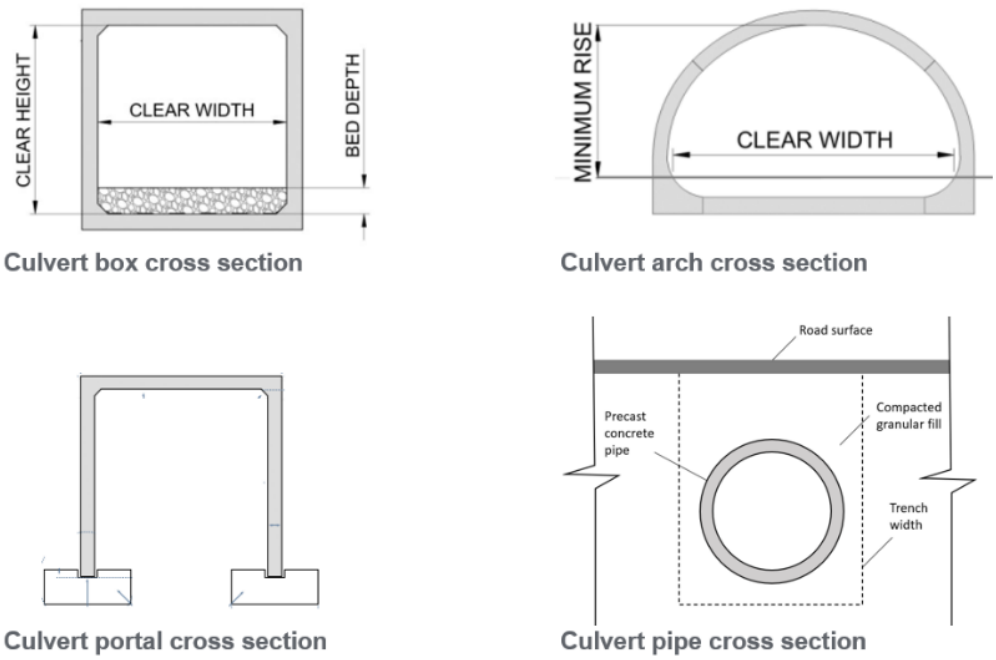

Figure 1.9: Culvert Types

Precast construction is preferable to in-situ concrete construction to reduce the risk of watercourse contamination, and for buildability and economic reasons.

Wingwalls can either be precast or in-situ concrete construction depending on contractor preferences. Wingwalls are generally flared at a 30 to 70-degree angle to the watercourse axis. An apron slab is generally provided for scour protection and overturning stability. Spread foundations are generally adequate for culvert structures.

Environmental Noise Barriers

Environmental noise barriers are proposed alongside the mainline carriageway where noise attenuation is needed for sensitive receptors, e.g., residential areas, along the route. The height, length, and reflective / absorptive requirements of each environmental noise barrier run is determined according to specific locations. Refer to Chapter 14: Noise & Vibration. The structural configuration shall be in accordance with TII Standard Construction Detail No. CC-SCD-00323

Gantries

Advanced directional sign gantries for the Proposed Development will adopt the standardised structural configurations given in DN-STR-03010 (TII, February 2017).

Masts

Utility masts for the Proposed Development will accommodate utility diversions for High Voltage Lines, locations for these masts were developed in consultation with ESB Networks.

Underpasses

Active Travel Underpasses are provided to accommodate active travel facilities under the road carriageways. The width of the active travel facility is generally 3.0 m, although a reduced width at structure cross sections is justified in constrained locations. There is a requirement for 0.5 m lateral clearance on both sides. Generally, an internal box width of 4 m and internal height 3 m is adequate. Precast box, precast UAN or in-situ box/portal structural types are generally appropriate for these underpasses.

The details of Active Travel Underpasses are described in Section 1.7.7 (Section 1), Section 1.8.7 (Section 2) and Section 1.9.7 (Section 3).

The locations of Active Travel Underpasses are shown on the general arrangement drawings in Appendix 2:

Accommodation Underpasses are provided in consultations with landowners have taken place to agree the principle of accommodation roads and underpasses and to identify land take requirements. A precast UAN box, precast joined portal or in-situ concrete buried box is viable at most sites. The internal box width varies between 3 m and 5 m and the internal box height varies between 2.5 m and 5 m.

The details of Accommodation Underpasses are provided in Section 1.7.7 for Section 1 and Section 1.9.7 for Section 3. There are no Accommodation Underpasses in Section 2.

The locations of Accommodation Underpasses are shown on the general arrangement drawings in Appendix 2:

Retaining walls - Retaining walls are proposed on Sections 1 and 2 of the Proposed Development. A gravity retaining wall in the form of a proprietary modular system such as Redi-Rock or a similar alternative will be used at all locations. The details of retaining walls are provided in Section 1.7.7 for Section 1 and Section 1.8.7 for Section 2. There is no retaining walls proposed in Section 3. Retaining walls with a design retained height of greater than 1.5 m are classified as structures in accordance with DN-STR-03001 (TII, December 2025).

1.5.6.3 OPW Section 50 consent

Where required, OPW Section 50 consent has been obtained for watercourse crossings.

1.5.7 Maritime Area

The Proposed Development interacts with parts of the Maritime Area in Letterkenny and Lifford, where the high-water mark extends from, respectively, Lough Swilly and Lough Foyle.

The Maritime Area Regulatory Authority (MARA) cannot grant a MAC in respect of registered privately owned lands in the Maritime Area. Where registered privately owned lands, or private rights or interests in relation to lands, in the Maritime Area are required for the purposes of the Proposed Development, any such privately owned lands, rights, and interests will be acquired via the Compulsory Purchase Order (CPO) process.

In accordance with the requirements of the Maritime Area Planning Act 2021, as amended, Donegal County Council applied to MARA for a Maritime Area Consent (MAC) for the state-owned part of the Maritime Area that is required for the purpose of the Proposed Development at the proposed River Swilly bridge crossing. MARA granted the MAC, reference MAC20240012, on 28 November 2025[1].

1.5.8 Drainage

The drainage system is designed in accordance with sustainable drainage design principles and guidance provided in the following documents:

- TII Publication Standards
- CIRIA C648 Control of water pollution from linear construction projects.
- CIRIA C532 Control of water pollution from construction sites: guidance for consultants and contractors.

The treatment of surface water run-off prior to outfall discharge, spill containment measures and attenuation treatment facilities will be provided at all locations prior to discharge.

1.5.8.1 Management of Flood Risk

Flood Risk Assessments have been completed for all major river crossings where the Proposed Development is located. These assessments are detailed in Chapter 11: Water.

1.5.8.2 Drainage Approach

The following sections describe the design approach to drainage for the Proposed Development.

Interceptor Ditches

Interceptor ditches will be located to fully intercept the overland flow from the natural catchments adjacent to the Proposed Development, both during construction and the operational phases. The interceptor ditches will collect surface water runoff at the top of the cuttings or the base of the embankments where the adjacent land falls towards the Proposed Development. The interceptor ditches will prevent surface water from adjacent land from flowing onto the proposed works and prevent ponding of water at the toe of the embankments. Any land drains that are interrupted by the new works will be diverted or discharged into an interceptor ditch. Interceptor ditches will generally discharge into existing land drains, streams, and rivers when possible. Cross-drains will be provided to convey flow from the interceptor ditches beneath the Proposed Development to the outfall/discharge locations where required.

Mainline Surface Water Drainage

A drainage system for the Proposed Development has been designed such that surface water drainage and sub-grade drainage will be provided for the mainline carriageway, link roads and all new sections of local and regional roads. The design approach across all three sections ensures that mainline road surface drainage is carried by means of a road drainage network to surface attenuation features before discharging to

1 Available: MAC20240012 - MARA - Maritime Area Regulatory Authority

watercourses at 1/100 greenfield run-off rates. The design also includes other road alignments to be captured by the mainline drainage network and fully attenuated.

A Groundwater Risk Assessment in accordance with DN-DNG-03065 was carried out to determine the requirement for the provision of sealed road drainage on the Proposed Development. The assessment is based on Method C in the above standard and generates a Response Category as per Table A.4 in Appendix A of the Standard. The results of this assessment are presented in Section 10.5.4 of Chapter 10: Land Soils and Hydrogeology.

For the mainline and sideroads the drainage systems that will be used are in accordance with the following criteria:

- Cuttings and low embankments in non-sealed areas: filter drains and/or grassed surface water channels.
- Cuttings and low embankments in sealed areas (due to vulnerable aquifers): concrete surface water channels with separate sub surface drain/filter drain.
- Embankments-non sealed areas: over the edge or surface water channels.
- Embankments in sealed areas: concrete surface water channels.
- Kerbed junctions: drainage kerbs/kerbs and gullies.

Viaducts and Bridge Structures

For the river bridges, a sealed drainage system will capture the runoff on the bridge deck and connect to the road drainage network. From here, it will be conveyed to an attenuation pond before discharging to the respective rivers. These rivers are: River Finn (SAC) (Sections 1 and 3), River Deele (Section 3), River Swilly Burn (Section 3) and River Swilly (Section 2).

Side Roads and Link Roads

Side roads include regional, local and minor access roads. Some of them require kerbs at locations such as at bridge or junction locations. In these situations, the road will be drained using gullies or drainage kerbs with carrier drains and a separate filter drain in areas where groundwater drainage problems exist, in areas with large cuttings or in shallow embankments. Surface water channels will be placed in cases where these embankments are higher than 1.5 m. Piped drains will collect the water and discharge it to an outfall, interceptor ditch or to the mainline drainage system. The final outfalls will be to existing watercourses or infiltration trenches where no watercourses are accessible or near the outfall.

Minor access roads and access tracks will be drained over the edge to interceptor ditches and will be conveyed to a final outfall as mentioned above.

Some side roads or some sections of them are attenuated before discharging to watercourses depending on the type of road (traffic, catchments,) and the area available to provide ponds.

All proposed new link roads are provided with attenuation facilities to ensure that there is no worsening of peak flow rates at site boundaries up to the 1 in 100-year flood event in accordance with DN-DNG-03022-(HD33) Drainage Systems for National Roads.

Active Travel Network

Drainage for active travel was designed in accordance with the TII Publication DN-DNG-03065 Road drainage and the water environment.

The active travel network will be drained by the one of the following three methods:

- Over the edge to adjacent interceptor ditches.

- Into mainline and sideroad drainage systems. Where convenient, adjacent drainage systems for the mainline and sideroads in the form of filter drains and surface water channels will take pavement runoff from the cycle tracks.

- Where neither of the above methods are suitable, a unique filter drain or surface water channel will be provided specifically for the active travel drainage.

Outfalls and Attenuation Ponds

Attenuation ponds will be provided at all major surface water outfalls. They are designed in accordance with DN-DNG-03063-(HD 103) Vegetated Drainage Systems for Road Runoff. Additionally, where discharge is to ground via infiltration, infiltration basins/ trenches are provided as the outfall.

The attenuation ponds will be designed as hybrid wetlands (Figure 1.10). Hybrid wetlands are features with a permanent pool of water that provides both attenuation and treatment of surface water runoff. They can support emergent and submerged aquatic vegetation along their edge and in shallow wetland (permanent water) zones. This helps enhance treatment processes and has biodiversity benefits. Attenuation storage is provided above the permanent water level. All attenuation ponds will be lined to ensure they meet the requirements of the groundwater vulnerability assessment and to ensure that they maintain a permanent water level.

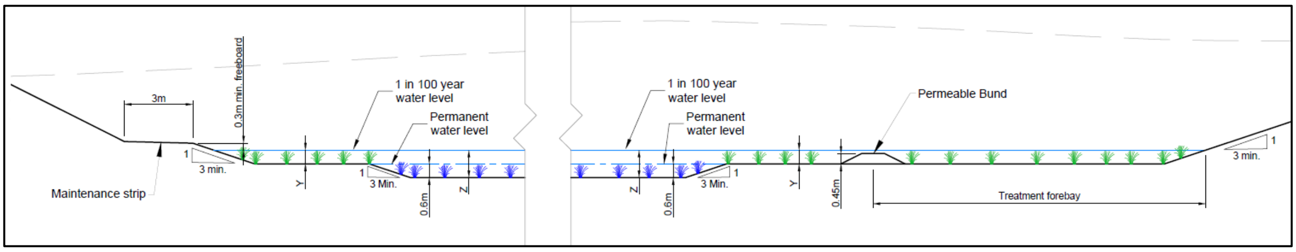

Figure 1.10: Cross Section through Attenuation Pond Hybrid Wetland

Surface water discharge from attenuation facilities will be released at a rate so as not to increase flooding downstream of any discharge point up to the 1 in 100-year return period storm event. Discharge will be provided from the attenuation measures at the green-field runoff rate.

Attenuation ponds are designed to cater for storm water storage up to and including the 1 in 100-year return period storm event with a 20% increase in flows to cater for the effects of climate change. An additional 300 mm freeboard is included at all attenuation facilities. An overflow discharge facility will be provided for storms in excess of the freeboard. Where attenuation ponds are located in areas liable to flooding, e.g. river floodplains, ponds will be designed for a 1 in 100-year return period and an assessment of the impact of the pond on the hydraulic regime of the watercourse shall be undertaken and the pond bunded to a level 500 mm above the adjacent 1 in 100 year flood level.

A total of 50 major outfalls across the mainline and link road drainage networks have been identified all of which require attenuation measures prior to being discharged to either an existing watercourse or to ground.

There are numerous smaller drainage networks associated with side roads. Where it was possible and where they represent high trafficked roads with large catchments, they have been attenuated. Some of them have been connected to the mainline drainage network and therefore attenuated through one of the mainline ponds. When this was not possible, small attenuation ponds have been located in areas available where some side road networks can be attenuated before discharging to surface watercourses.

There is one infiltration basin within Section 1 where the attenuation pond outfalls to ground. The infiltration basin will cater for storm water storage up to and including the 1 in 100-year return period storm event with a 20% increase in flows to cater for the effects of climate change. An additional 300 mm freeboard is included at all attenuation facilities.

Pond Access & Maintenance

Access shall be provided to attenuation pond facilities for maintenance. Accesses are designed in accordance with CC-SCD-02754 (RCD/2700/101) Accommodation Works Field Access and the access tracks are in accordance with CC-SCD-00706 (RCD/700/6) Access Road/ Service Road. Where there is potential for risk of entry to open water bodies, e.g. at attenuation ponds, secure fencing will surround the body of open water to prevent unauthorised access.

1.5.8.3 Pollution Control

Potential pollution impacts posed by the Proposed Development on the receiving water environment have been assessed in accordance with DN-DNG-03065- (HD 45) Road drainage and the water environment. The method employed assesses the effects of routine runoff on surface water bodies and also groundwater bodies.

1.5.9 Services and Utilities

1.5.9.1 General

The Proposed Development traverses a significant area of both rural, suburban and urban environments. There will be impacts to existing utilities and services during construction which will require temporary and/or permanent diversions. Temporary disruptions during construction will be minimised and there will be no permanent disruption to services.

Diversion or conflicts with existing services and utilities including overhead and underground electricity lines, transmission gas mains, watermains and communication cables are detailed in Chapter 16: Material Assets: Non-Agriculture.

1.5.9.2 Ducting

ITS (Intelligent Transport System) infrastructure will be provided as part of the road development. This will include provision of ITS communications ducting and chambers in accordance with DN-ITS-03029 (TII, May 2019). Ducting will consist of a total of six 100 mm diameter ducts in each verge of the mainline (i.e. four TII Communication ducts and two TII Unassigned ducts). Chambers (1.75m x 0.75m in plan) are provided every 250m. Transverse ducts underneath the mainline and linking the verge ducting on both sides of the mainline will be provided every 500 m.

1.5.9.3 Public Lighting

It is proposed to provide lighting at mainline junctions for reasons of safety, in accordance with the TII guidance in DN-LHT-03038 Design of Road Lighting for the National Road Network.

Where the unlit distance between lit sections of adjacent mainline junctions is less than four times the desirable minimum stopping sight distance (SSD) then mainline lighting over the full extents shall be provided.

The lighting design shall also follow best practice in relation to environmental issues, particularly in strictly limiting light to areas where required for traffic safety thereby limiting nuisance light spill. Among the measures to be employed in this regard shall be:

- The use of LED lanterns which are very energy-efficient, which focus light accurately where it is required, and minimise spill light.
- LED lanterns have long maintenance intervals, thus reducing maintenance costs and carbon-generating maintenance journeys and transport.
- The design shall employ lanterns mounted at zero degrees tilt to the horizontal, so that no light is emitted above the horizontal plane, thus minimising sky glow.

- In general, lighting columns no higher than ten metres shall be used to further limit light spill and enhance the daytime appearance of the installation. In some instances, such as at larger roundabouts, columns of 12 m height will be necessary.
- As far as possible, fully recyclable materials shall be specified.
- Lighting will not be provided for the active travel network in rural areas, in accordance with TII guidance DN-GEO-03047- Rural Cycleway Design (Offline and Greenways).
- In Section 2 the active travel underpasses will be lit due to their proximity to urban areas.
- Lighting will be provided at the following park and share / cycle facilities only, due to their proximity to urban areas and junctions with lighting proposed. The lighting infrastructure will be lower intensity than the road lighting described above.
    - Facility 1.02 (Ballybofey Link Road South Roundabout in Section 1).
    - Facility 2.01 (Dry Arch Roundabout in Section 2).
    - Facility 3.01 (N13/N14 Pluck Roundabout in Section 3).
    - Facility 3.02 (Ballinalecky Junction in Section 3).
    - Facility 3.03 (Ballindrait Junction in Section 3).
    - Facility 3.04 (Lifford Junction – N14/N15 Roundabout in Section 3).

1.5.9.4 Signals, Controls and Signage

There are no traffic signals, junction controls or variable message signs proposed however the spare duct provisions shall future proof the road infrastructure in urban locations and as part of the wider Intelligent Transportation System (ITS) network should the need arise.

Directional and Regulatory road signage shall be provided in accordance with the Traffic Signs Manual, and amendments, as published by the Department of Transport. Sign faces for the Mainline will be for the 100 kph design speed proposed.

Road Markings, Reflective Markings and Road Studs will be provided in accordance with the Traffic Signs Manual and in accordance with Series 1200 of the Specification for Road Works as published by TII.

Directional signage will be provided along the new national roads to provide advance warning to users of the approaching junctions and routes to key destinations. The design of tourist signage and the confirmation of destinations to be included along the route shall be agreed in conjunction with Donegal County Council and Fáilte Ireland and in accordance with the TII document ‘Policy on the Provision of Tourist and Leisure Signage on National Roads’ March 2011.

Where existing official authorised signage requires removal or updating arising from the Proposed Development (for example due to construction works associated with the Proposed Development, or outside of the Proposed Development where a route is downgraded or realigned), such signage will be replaced appropriately by a separate contractor and in agreement with Donegal County Council in accordance with standard practice following the main construction works.

Temporary traffic signs during construction will comply with Chapter 8 of the Traffic Signs Manual.

All road signage shall comply with the requirements of the Traffic Signs Manual in relation to the use of the Irish Language.

1.5.10 Hazards

The TII *Project Appraisal Guidelines for National Roads Unit 7.0 – Multi Criteria Analysis (PE-PAG-02031)* guidance document identifies two principal road safety criteria:

- Collision reduction
- Security of road users

The assessment also includes the findings of the following two safety reports:

- Road Safety Audit (RSA) Stage F Part 1 Report completed as a comparative assessment of the options from a road safety perspective, in accordance with the requirements of GE-STY-01024.
- Road Safety Impact Assessment (RSIA) undertaken in accordance with PE-PMG-02001, to compare the options in terms of potential road safety implications of each option, while considering the safety benefits and dis-benefits arising from each option.

Forgiving roadside measures incorporated into the design, where possible, include:

- Locating headwalls outside of the Clear Zone, i.e. an obstacle-free area with a flat and gently graded ground. This provides motorists with room and opportunity to regain control of their vehicle in case of a run-off.
- Roadside features such as signs and lighting columns within the clear zone to be provided with passively safe poles.
- Embankments shall be provided with 1:3 slopes where space permits.
- Cut slopes to be no steeper than 1:2 within the clear zone.

The Design has been subjected to independent Road Safety Audits. Any safety concerns identified in the Road Safety Audits have been addressed to the satisfaction of the audit team so that the safety of all road users is prioritised. Additional Road Safety Audits (Stage 2) will be carried out prior to construction, following construction and prior to road opening (Stage 3) and also post opening with live traffic to address any operational issues (Stage 4), The following presents a general description of these hazards and the measures taken within the design development to mitigate them.

1.5.10.1 Single Fixed Hazards

Single fixed hazards include non-deformable objects or obstructions that could cause harm to road users.

The Proposed Development has been designed to incorporate a clear zone, where possible, adjacent to the live traffic lanes. This will enable a vehicle that has left the carriageway unintentionally to be able to slow down and stop, or re-join the carriageway safely, without meeting any fixed hazards. Such hazards can include culvert headwalls, gantries, other signage and lighting columns.

Where it is not possible to remove a hazard from the clear zone, vehicle restraint systems (barriers) are used to protect errant vehicles from colliding with the fixed hazard. Where possible, objects in the clear zone will be designed to be deformable and passively safe avoiding the need for vehicle restraint systems.

1.5.10.2 Continuous Hazards

Continuous hazards include linear features or hazards over a continuous length of the Proposed Development that could cause harm to road users. These typically include, but are not limited to:

- Embankments greater than 2 m in height.
- Rock and/or cutting faces.

- Watercourses parallel to the Proposed Development.

The Proposed Development has been designed with safety measures included, in an effort to reduce injury severity, where a loss of control incident results in a vehicle leaving the carriageway. Examples of such safety measures include:

- Forgiving roadside edges (including the clear zone described above).
- Embankments with 1:3 slopes and cuttings with 1:2 slopes, where space permits.
- Cutting slopes, particularly rock faces, sufficiently set back from the live traffic lanes.
- Rock traps along rock faces to prevent loose material rolling onto the carriageway.
- Earth bunds or vehicle restraint barriers to prevent road users entering watercourses.
- Central median with vehicle restraint barrier to prevent road users coming into contact with oncoming traffic.
- Separation between the shared footway / cycleway and trafficked lanes to reduce risks to vulnerable road users.

1.5.10.3 Dynamic Hazards

Dynamic hazards occur where there is a risk of moving vehicles or road users coming into contact with each other. These typically include:

- Vehicles coming into contact with vulnerable road users, such as locations where the active travel network crosses the Proposed Development.
- Road users coming into contact with other moving objects, such as objects falling from an overbridge.
- Vehicles coming into contact with other moving vehicles.
- Vehicles coming into contact with Deer (refer to the following section)

The Proposed Development has been designed in accordance with TII geometric design standards to ensure sufficient visibility is provided for all road users to enable them stop and/or make evasive manoeuvres safely.

Local traffic movements on side roads that cross the mainline have been accommodated by the provision of side road overbridges and underbridges that maintain local connectivity without the need to interface with the mainline, avoiding the risk of conflict and potential accidents.

On the proposed divided roads/ dual carriageways, vehicles are separated from on-coming traffic by the presence of a barrier within the central reserve.

1.5.10.4 Deer

A deer collision risk assessment has been undertaken for the project. This risk assessment is included as an Appendix to Chapter 9A in Volume C: Technical Appendices of the EIAR.

In Section 1, two locations were identified as moderate risk and one as low risk. The mitigation proposed is cutting of roadside vegetation up to 15 m from the road edge plus the provision of fixed warning signs.

In Section 2, one location was identified as low risk. The mitigation proposed is cutting of roadside vegetation up to 15 m from the road edge plus the provision of fixed warning signs.

In Section 3, one location was identified as high risk. The mitigation proposed is cutting of roadside vegetation up to 15m from the road edge, the provision of fixed warning signs, deer fencing and a deer underpass at approximate chainage 4+500m. Details of the deer underpass are provided in Table 1.35 (N14A045).

1.6 No Net Biodiversity Loss

The County Donegal Development Plan 2024-2030 contains policy BIO-P-3 that sates the following:

> *[…]"d. Require that large-scale developments result in no net biodiversity loss and include a site-specific comprehensive Biodiversity Management Plan (BMP), as part of any planning proposal.*
>
> *This policy will be implemented by the Council in so far as same can be practicably and reasonably achieved within the context of Strategic Infrastructure Projects including, but not restricted to, the TEN-T Priority Route Improvement Project, Donegal, the Bridgend to County border project scheme, the Buncrana Inner relief Road and Greenways."*

Similarly, in 2023 TII published their Biodiversity Plan that contains the following under Objective 4:

Medium Term:	*Strive to achieve no net loss of biodiversity on all new projects by 2025.*
Long Term:	*Strive to achieve a net gain for biodiversity on all new projects by 2030.*

In the absence of a published Irish metric in advance of the preparation of the EIAR to calculate biodiversity loss, a bespoke metric has been developed by RPS in-house ecologists for this Project. This Biodiversity Metric can be used to calculate the pre-construction and post-construction biodiversity value of the Project to demonstrate that there is no net biodiversity loss as a result of the construction of the Proposed Development.

Within the Biodiversity Metric, habitats within the development footprint are used as a proxy for biodiversity. Different habitat types can be assigned a specific value based on their area, distinctiveness and condition to calculate a biodiversity value. The biodiversity values can then be combined to calculate the overall biodiversity value. This is done for both the pre-construction and post-construction habitats to determine what if any loss in biodiversity value has occurred. This is the no net loss calculation.

As a first step, the biodiversity value is calculated for each of the pre-construction habitats within the boundary of the Proposed Development. This is the pre-construction baseline 'biodiversity value.' Separate calculations were undertaken using the Biodiversity Metric for each individual section of the Proposed Development as well as the whole of the Project, i.e. all three sections combined. This is the current biodiversity value of all of the habitats present within the CPO boundary.

As part of the construction works, the existing habitats within the CPO boundary will be retained, reinstated. modified, or lost. Habitats not impacted or necessary for the construction works will, where possible, be retained. Habitats physically disturbed by the construction works will be reinstated or modified and this includes the verges, embankments, attenuation ponds and other landscape designs within the CPO boundary. Habitats under the permanent infrastructure will be lost.

Retained and reinstated habitats will have no net change in biodiversity value. Therefore, to achieve a no net loss in biodiversity, the modified habitats must be replaced with habitats of a higher ecological value to offset the habitats that are lost. The ecologists and the landscape architect have worked together to develop a post-construction landscape and biodiversity habitat design that, where possible, provides higher value habitats to offset any lost habitats. The Biodiversity Metric was then used to calculate a post-construction biodiversity value. Again, this was undertaken for each individual section of the Proposed Development as well as the whole of the Project. This is the post-construction biodiversity value of all of the habitats present within the CPO boundary.

The difference between the pre- and post-construction biodiversity values then indicates that no net loss in biodiversity has been achieved.

Further information on the methodology and the calculations is contained in the separate Biodiversity No Net Loss report.

As detailed in the Biodiversity No Net Loss report, the calculations undertaken using the design and the Biodiversity Metric demonstrate that no net loss in biodiversity has been achieved for the Proposed Development.

Additionally, a Biodiversity Management Plan (BMP) has been developed for the Proposed Development, in accordance with BIO-P-3 and is included as Appendix C4.03 in Volume C: Technical Appendices of the EIAR. This BMP takes details the management measures required to integrate the post-construction habitats with the landscape design (including landscape mitigation measures) to achieve no net loss in biodiversity for the Proposed Development.

1.7 Design- Section 1 N15/ N13 Ballybofey/Stranorlar Urban Region

The Section 1 mainline is approximately 9.7 km long and runs from south to north and to the west of Ballybofey/ Stranorlar. Additionally, there are two link roads located to the south and the north of the towns providing connections from the Proposed Development to the existing N15 and R252 (Ballybofey), N13 (north of Stranorlar) and N15 (to Lifford) respectively.

The interfaces with the existing roads include:

- Tie-in to N15 south of Dooish.
- Tie-in to R252 Glenties Road at Cappry from Ballybofey Link Road North.
- Tie-in to N15 Ballybofey/ Cappry (Graham) from Ballybofey Link Road South.
- Tie-in to N13 north of Meenavoy.
- Tie-in to N13 at Tircallan.
- Tie-in to N15 at Treanamullin

Section 1 including the nomenclature given to its major components is illustrated below in Figure 1.11. For more detail on Section 1 including the alignment please refer to the general arrangement drawings in Appendix 2.

The Proposed Development in Section 1 can be summarised under the following elements. The lengths of the individual sections are approximate.

Roads:

- Mainline Section 1.1 which is 0.5 km of Type 1 Single Carriageway cross section between the existing N15 southern tie in and Dooish Junction (Drawing 1, sheet 1 of 8).
- Mainline Section 1.2 which is 8.6 km of Type 2 Divided Road bypassing Ballybofey/ Stranorlar between Dooish Junction and Meenavoy Junction (Drawing 1, sheets 1, 2, 4, 5, 6 and 7 of 8).
- Mainline Section 1.3 which is 0.6 km of Type 1 Single Carriageway cross section between Mainline Section 1.2 (Meenavoy Junction) and the existing N13 to the north of the Proposed Development (Drawing 1, sheet 7 of 8).
- Ballybofey Link Road (north and south sections) which is 2.1 km Type 2 Single Carriageway connecting Mainline Section 1.2 to the local road network at Ballybofey (Drawing 1, sheets 2 and 3 of 8).
- N15 Primary Road Connector which is 3.1 km of Type 3 Divided Road connecting Mainline Section 1.2 to the existing N15 Lifford Road (Teevickmoy Junction to Treanamullin Junction) (Drawing 1, sheets 6 and 8 of 8).
- Provision of approximately 10.6 km of additional Type 1, Type 2 and Type 3 Single Carriageway roads not already mentioned above (includes new and realigned).

Junctions:

- Three compact grade-separated junctions, one each at Cappry (Drawing 1, sheet 2 of 8), Teevickmoy, and Tircallan/ Dunwiley (both shown on Drawing 1, sheet 6 of 8), including structures, link roads and roundabouts.
- Three at-grade roundabout type junctions at tie-in transition points at Dooish (Drawing 1, sheet 1 of 8), Meenavoy (Drawing 1, sheet 7 of 8), and Treanamullin (Drawing 1, sheet 8 of 8).

Structures:

- 360 m long, seven span bridge (ref: N15R024) over the River Finn and flood plain at Ballybofey/ Stranorlar (clear span over the river channel).
- Two river/stream bridges.
- Seven overbridges.
- Five underbridges.
- Three underpasses (including active travel / mammal underpass).
- Culverts, gantries and environmental barriers.

Active Travel:

- Provision of active travel infrastructure. This includes connections to existing infrastructure and three new Park and Share / Cycle facilities, one each near Dooish, Cappry, and Meenavoy as illustrated in Appendix 2 Drawings.

Other Works:

- Access roads.
- Provision of attenuation ponds, flood compensation measures, watercourse diversions and associated drainage infrastructure.
- Provision of existing utility diversions and new utility infrastructure.
- Provision of landscape planting, signage, lighting, safety barrier, and other works ancillary to the construction and operation of the Proposed Development.

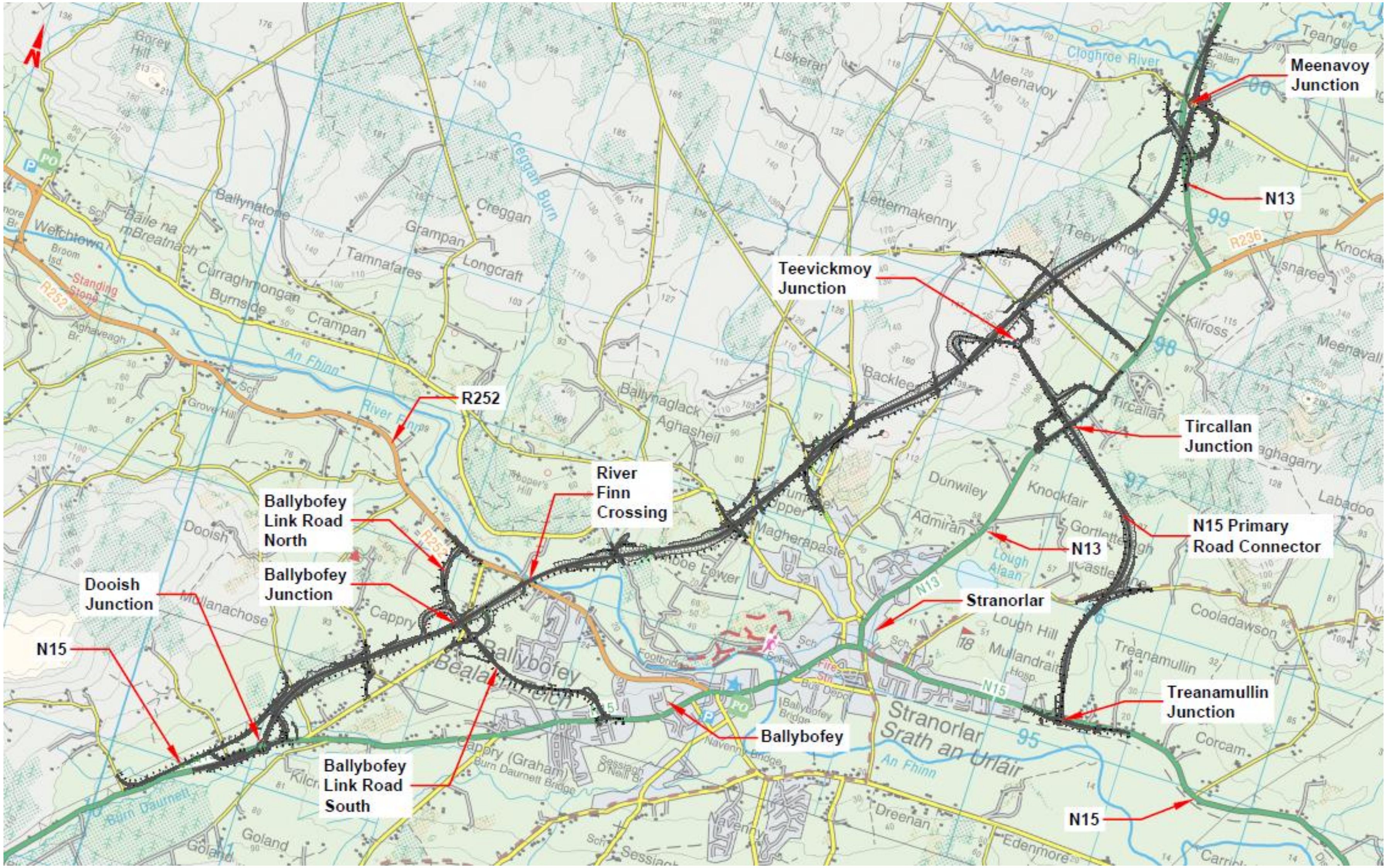

Figure 1.11: Section 1 Proposed Development

1.7.1 Roads

To achieve the best possible user safety, journey time reliability, average speed targets and capacity for freight, passenger and public transport, a Type 2 Divided Road is proposed along approximately 8.6 km of the mainline. Figure 1.2 illustrates the Type 2 Divided Road cross section. This road cross section also fully accommodates segregated Active Travel facilities enabling modal shift and further aiding Park and Share and Park and Cycle/ Walk alternatives on the network. Predicted traffic volumes are considered while the transition to alternative fuels is augmented by regular and strategically positioned EV Charge hubs along the TEN-T network as per Regulation (EU) 2023/1804 on the deployment of alternative fuels infrastructure.

The traffic flows on the proposed N15/ N13 are predicted to grow, in the central growth scenario, to approximately 12,200 AADT for the scheme Opening Year 2032 with higher flows in future years (approximately 13,200 in 2047 – the Design Year). This includes the government target of 30% EVs on the Irish road network by 2030 with a much greater percentage expected by the Proposed Development in the design year.

For link roads and other roads, a combination of traffic volumes, route consistency/ tie-in, safety and design requirements determined the most appropriate cross section.

The main cross sections used on Section 1 are discussed below.

1.7.1.1 Section 1 – Road Cross Sections

Section 1 mainline cross section is shown in Table 1.1.

Table 1.1: Type of Road – Section 1 Mainline

Road Name	Type of Road from DN-GOE-03031 Table 6.1	Design / Posted Speed (km/hr)
Mainline Section 1.1 (N15 tie-in)	Type 1 Single (7.3m Carriageway)	100 / 100
Mainline Section 1.2	Type 2 Divided Road 2+2 Lanes (2 x 7.0m Carriageways)	100 / 100
Mainline Section 1.3 (N13 tie-in)	Type 1 Single (7.3m Carriageway)	100 / 100

Link road cross-sections for Section 1 are provided in Table 1.2.

Table 1.2: Type of Road – Section 1 Link Roads

Road Name	Type of Road from DN-GOE-03031 Table 6.1	Design / Posted Speed (km/hr)
Ballybofey Link Road and Junction	Type 2 Single (7.0m Carriageway)	85 / 80
N15 Primary Road Connector	Type 3 Divided Road (1 x 7.0m and 1 x 3.5m Carriageways)	100 / 100

Table 1.3 lists the slip roads within Section 1.

Table 1.3: Design Speed – Section 1 Slip Roads

Road Name	Junction Type	Design / Posted Speed (km/hr)
Ballybofey NB Link	Compact Grade Separated	30 / 50
Ballybofey SB Link	Compact Grade Separated	30 / 50
Teevickmoy NB Link	Compact Grade Separated	30 / 50
Teevickmoy SB Link	Compact Grade Separated	30 / 50
Tircallan NB Link	Compact Grade Separated	30 / 50
Tircallan SB Link	Compact Grade Separated	30 / 50

1.7.1.2 Alignment

The proposed mainline includes three parts, as shown in the general arrangement drawings in Appendix 2.

The longest part of the proposed mainline is Mainline Section 1.2 (approximately 8.6 km long) which comprises a Type 2 Divided Road cross section. Mainline Section 1.2 starts at Dooish Junction, where it joins Mainline Section 1.1 and continues in a north-westerly direction through Cappy to Ballybofey Junction, after which it crosses the River Finn, continuing to Teevickmoy Junction and then onto Meenavoy Junction where it joins Mainline Section 1.3.

The two other parts of the proposed mainline are Mainline Section 1.1 and Section 1.3 (0.5 km and 0.6 km respectively) which transition to the existing N15 and N13 National Roads at either end of Section 1. Both are Type 1 Single Carriageway cross section. Mainline Section 1.1 extends from the southern N15 tie-in to the Dooish Junction. Mainline Section 1.3 extends from Meenavoy Junction to the northern N13 tie-in.

In addition to the mainline alignments described above, connections will be provided to the existing local road network at existing and proposed junctions by means of new proposed single carriageway local roads and realignments of existing roads.

The Proposed Development includes a link road on the southern side of the River Finn connecting the Mainline Section 1.2 to both Ballybofey town and the R252. There are three sections to the link road, namely, Ballybofey Link Road North, Ballybofey Link Road North/South and Ballybofey Link Road South. The Ballybofey Link Road North connects from Mainline Section 1.2 north to the existing R252 tie-in, and the Ballybofey Link Road South connects from Mainline Section 1.2 south to the existing N15 at Cappry (Graham) in Ballybofey town. The Ballybofey Link Road North/South runs under the mainline at Cappry via underbridge N15U018 with a roundabout either side of the mainline. The total length of the Ballybofey Link Road (all sections) is approximately 2.1 km and is a Type 2 Single Carriageway cross section.

The N15 Primary Road Connector connects the Teevickmoy Junction on Mainline Section 1.2 to Treanamullin Junction on the existing N15. The length of the N15 Primary Road Connector is approximately 3.1 km and it is a Type 3 Divided Road cross section

Where the proposed mainline severs existing side roads, side road connectivity will be maintained where practicable including the inclusion of proposed bridges over or under the mainline as shown in Drawing 1.

1.7.2 Junctions

Six junction locations have been identified for Section 1, at the following locations:

- **Dooish Junction** (Drawing 1, sheets 1 of 8) – Southwestern tie-in of Section 1 to the existing N15. Transition between Mainline Section 1.1 and Mainline Section 1.2.
- **Ballybofey Link Road North/South** (Drawing 1, sheets 2 and 3 of 8) – Located to the southwest of the River Finn Bridge, the Ballybofey Link Road (a Type 2 Single Carriageway 2.1 km long) provides a junction to Mainline Section 1.2 at Cappry, and to the local road network including the R252 (north of Mainline Section 1.2) and the N15 (south of the Mainline Section 1.2).
- **Teevickmoy Junction** (Drawing 1, sheet 6 of 8) – Intermediate junction between the proposed Mainline Section 1.2 and the proposed N15 Primary Road Connector (a Type 3 Divided Road 3.1 km long).
- **Meenavoy Junction** (Drawing 1, sheet 7 of 8) – Northern tie-in between the Mainline Section 1.2 and the existing N13 at Callan Bridge, north of Kilross. Transition between Mainline Section 1.2 and Mainline Section 1.3.
- **Tircallan Junction** (Drawing 1, sheet 6 of 8) – Intermediate junction between Teevickmoy Junction and Treanamullin Junction on the N15 Primary Road Connector where it crosses the existing N13.
- **Treanamullin Junction** (Drawing 1, sheet 8 of 8) – The junction between the proposed N15 Primary Road Connector and the existing N15 east of St Joseph's Hospital, Stranorlar.

1.7.2.1 Dooish Junction

A roundabout has been chosen for the following reasons:

- The junction ties in with the existing N15 from the south.
- The N15 approaches have different cross sections. The N15 northeast of the junction is a Type 2 Divided Road and the N15 south-west of the junction is a single carriageway. A roundabout provides a safe transition between single and Type 2 Divided Road (2+2 lanes).
- A roundabout facilitates connectivity to the local road network and local settlements/attractions (the community at Cappry).
- A roundabout is consistent with junction types already operating on the Donegal national primary road network.

1.7.2.2 Ballybofey Link Road North/ South

A compact grade separated junction has been chosen for the following reasons:

- The proposed location at Cappry enables access to be provided to both the busy regional road R252 and existing N15 into Ballybofey via a new link to the south of the town centre.
- This junction will provide the main access to Ballybofey. There is a high volume of traffic turning at this junction and a compact grade separated junction provides a safe way of providing this turning manoeuvre while not interrupting the mainline traffic flow.
- The mainline will be separated vertically from the existing road network in order to accommodate a grade separated junction, cross the existing R252 and cross the River Finn. The compact grade separated junction allows for the mainline TEN-T traffic to proceed unimpeded, providing better journey time savings and segregating local and strategic traffic.

1.7.2.3 Teevickmoy Junction

A compact grade separated junction has been chosen for the following reasons:

- The proposed location at Teevickmoy enables the Proposed Development to tie in with a nearby straight section of the existing N13.

- This junction will provide the main access to Stranorlar, and to the N15 leading to Lifford. There is a high volume of traffic turning at this junction and a compact grade separated junction provides a safe way of providing this turning manoeuvre while not interrupting the mainline TEN-T / National Primary traffic flow.

- The mainline is elevated at this point as it crosses high ground, while the link road approaching from the N13 is climbing from lower land. The difference in levels between the link road and the mainline will facilitate a grade separated junction without the need to place the mainline in a cutting, which would significantly increase earthworks and impact on landscape if an at-grade junction (such as a roundabout) were to be used instead. The compact grade separated junction allows for the mainline TEN-T / National Primary traffic to proceed unimpeded, providing better journey time savings than a roundabout.

1.7.2.4 Meenavoy Junction

A roundabout has been chosen for the following reasons:

- The N13 approaches have different cross sections. The N13 south of the junction is a Type 2 Divided Road and the N13 north of the junction is a single carriageway. A roundabout provides a safe transition between single and dual carriageways.

- A roundabout facilitates connectivity to the local road network and local attractions east and west of the junction; replacing an existing crossroad junction at Callan Bridge considered to be road safety problem.

- A roundabout is consistent with junction types already used on the Donegal TEN-T / National Primary road network.

1.7.2.5 Tircallan Junction

A compact grade separated junction has been chosen for the following reasons:

- This junction will provide the main access to Stranorlar from the Proposed Development via the N15 Primary Road Connector. There is a moderate volume of traffic turning at this junction and a compact grade separated junction provides a safe way of providing this turning manoeuvre while not interrupting the N15 Primary Road Connector traffic flow.

- The mainline will be separated vertically from the existing road network in order to accommodate a grade separated junction, and the topography of the local area lends itself well to this separation. The compact grade separated junction allows for the dominant N15 Primary Road Connector traffic to proceed unimpeded, and without a forced interface with local traffic, providing better journey time savings and safety than a roundabout.

1.7.2.6 Treanamullin Junction

A roundabout has been chosen for the following reasons:

- At this tie-in location, the roundabout approaches have different cross sections. The N15 Primary Road Connector north of the junction is proposed as being a Type 3 Divided Road and the N15 to the east and west is a single carriageway, without hard shoulders. A roundabout provides a safe transition between these different cross sections.

- A roundabout facilitates connectivity to the road network and local attractions.

- A roundabout is consistent with junction types already used on the Donegal TEN-T / National Primary road network.

1.7.3 Side Roads

The proposed mainline is connected to the existing road network through a series of junctions, slip roads and link roads. At these connections the existing road network is impacted and realignment or modification has been required.

The proposed mainline will cross the existing road network at locations without providing connection to the existing road network. At these crossings the existing road network will be impacted and realignment or modification to the existing road network has been designed. These sections of existing road network are referred to as side roads (or local roads). Each side road is either bridged, realigned or closed as shown in the sideroads and junctions Drawing 1.

1.7.4 Access Roads

Access roads shall be provided to allow access to lands severed by the project. They also serve properties where existing access is affected. Access Roads are generally 4.0m in width with 1.0m verges on either side and in compliance with TII Publications standard detail drawings CC-SCD-00706. Passing bays have also been provided for in accordance with the standards where the length of the access roads exceeds 250m.

New field and domestic house entrances are provided to replace existing entrances impacted by the proposed road development. Field accesses will be in accordance with TII Publications standard detail drawings CC-SCD-02754. Domestic accesses will be in accordance with TII Publications standard detail drawings CC-SCD-02753.

Surface dressing and an asphalt concrete dense binder course shall be provided for access roads on steep gradients (over 5%) and for accesses to private dwellings or farmsteads.

The details of the proposed access roads and the landowner parties they serve across the proposed road development are outlined in Table 1.4. Access Road and accesses are shown in Drawing 1.

Table 1.4: Section 1 Access Roads

Reference Number	Approx. Mainline Chainage	Approximate Length	Plot ID / Landowner Reference	Comments
AR 1.01	Mainline 1.1 0+000m	20m	1005	Access to park and share / cycle site
AR 1.02	Mainline 1.1 0+120m	35m	1005	Access to attenuation pond and lands severed form the proposed road development
AR 1.03	Mainline 1.1 0+270m (On L-6564 Connector)	280m	1005, 1008 & 1900	Access to lands from L-6564 Connector
AR1.03A	Mainline 1.1 0+270m (On AR1.03)	35m	1005, 1008 & 1900	Access to lands from access road
AR 1.04	Mainline 1.1 0+270m (On L-6564 Connector)	30m	1005	Access to dwellings severed by the proposed road development
AR 1.05	Mainline 1.2 0+220m (On L-2794 Connector)	80m	1014	Access to dwelling
AR 1.06	Mainline 1.2 0+300m (On Existing N15)	135m	1015	Access to attenuation ponds
AR 1.07	Mainline 1.2 0+450m (On L-6564 Connector)	140m	1016, 1013 & 1018	Access to lands severed by the proposed road development
AR 1.08	Mainline 1.2 0+460m	240m	1016,1018, 1013 & 1019,	Access to lands severed by the proposed road development
AR 1.09	Mainline 1.2 1+050m (On L-6584 Connector)	250m	1019, 1020, 1021, 1023 & 1024	Access to lands severed by the proposed road development

Reference Number	Approx. Mainline Chainage	Approximate Length	Plot ID / Landowner Reference	Comments
AR.1.10	Mainline 1.2 1+700m (On Capry Road Tie In)	60m	1027	Access to park and share / cycle site
AR 1.11	Mainline 1.2 1+720m (On Ballybofey Link Road)	250m	1036, 1029	Access to lands severed by the proposed road development
AR 1.12	Mainline 1.2 1+780m (On Ballybofey Link Road)	100m	1153 & 1027	Access to land
AR 1.13	Mainline 1.2 1+780m (On Ballybofey Link Road)	30m	1038 & 1039	Access to lands severed by the proposed road development
AR 1.14	Mainline 1.2 1+780m (On Ballybofey Link Road)	50m	1039 & 1040	Access to lands severed by the proposed road development
AR 1.15	Mainline 1.2 1+780m 780m (On Ballybofey Link Road)	320m	1041,1042,1043 1133-1141,1950	Access to attenuation pond and dwellings
AR 1.16	Mainline 1.2 2+300m	150m	1027 & 1045	Access to attenuation pond and lands severed by the proposed road development
AR 1.17	Mainline 1.2 3+000m (On L-2754 Connector)	200m	1050	Access to attenuation pond and lands severed by the proposed road development
AR 1.18	Mainline 1.2 3+010m (On L-2754 Connector)	175m	1052	Access to attenuation pond
AR 1.19	Mainline 1.2 3+910m (On L-2784 Connector)	75m	1054& 1060	Access to lands severed by the proposed road development
AR 1.20	Mainline 1.2 4+110m (On L-2734 Connector)	180m	1067 & 1068	Access to lands severed by the proposed road development
AR 1.21	Mainline 1.2 4+500m (On L-2724 Connector)	110m	1067 & 1068	Access to attenuation pond
AR 1.22	Mainline 1.2 4+4750m (On L-27241 Connector)	40m	1070	Access to dwelling
AR 1.23	Mainline 1.2 4+750m (On L-2724 Connector)	80m	1073, 1074 & 1075	Access to dwelling and lands severed by the proposed road development
AR 1.23A	Mainline 1.2 4+500m (On L-2724 Connector, AR1.23)	30m	1145 & 1146	Access to dwelling and lands severed by the proposed road development
AR 1.23B	Mainline 1.2, 4+900m	185m	1075 & 1077	Access lands severed by the proposed road development
AR 1.24	Mainline 1.2 6+000m (On LX-1004)	190m	1087 & 1095	Access to lands severed by the proposed road development

Reference Number	Approx. Mainline Chainage	Approximate Length	Plot ID / Landowner Reference	Comments
AR 1.25	Mainline 1.2 6+210m (On LX-1004)	135m	1088	Access to attenuation pond and Access to lands severed by the proposed road development
AR 1.26	Mainline 1.2 6+850m (On L-7084 Connector)	435m	1082, 1083 & 1182	Access to dwelling and lands severed by the proposed road development
AR 1.27	Mainline 1.2 6+850m (On L-7084 Connector)	95m	1082, 1083, 1085 & 1903	Access to existing road / dwellings from realigned side road
AR 1.28	Mainline 1.2 7+950m (On L-6674 Connector)	35m	1054	Access to attenuation pond and lands severed by the proposed road development
AR 1.29	Mainline 1.2 6+000m (On LX-1004)	25m	1183	Access to lands severed by the proposed road development
AR 1.30	Mainline 1.2 8+550m (On L-6674 Connector)	50m	1112 & 1147	Access to existing road / dwellings from realigned side road
AR 1.31	Mainline 1.2 8+550m (On LX-1007)	55m	1125	Access to attenuation pond and lands severed from the proposed road development
AR 1.32	Mainline 1.2 8+200m (On LX-1011 Connector)	70m	1049 & 1054	Access to lands severed by the proposed road development
AR 1.33	Mainline 1.2 8+550m	85m	1125	Access to park and share / cycle site
AR 1.34	Mainline 1.3 0+450m	60m	1126	Access to attenuation pond and existing road from realigned side road
AR 1.35	Northern Link Road 2+100m (On L-2714 Connector)	40m	1099	Access to attenuation pond and lands severed from the proposed road development
AR 1.36	Northern Link Road 2+100m (On L-2714 Connector)	370m	1099 & 1100	Access to attenuation pond and lands severed from the proposed road development
AR 1.37	Northern Link Road 3+050m (on Treanamullin Tie In)	55m	1103, 1148 & 1149	Access to existing road / dwellings from realigned side road
AR 1.37A	Northern Link Road 3+050m 050m (on AR 1.37)	135m	1101	Access to attenuation pond
AR 1.38	Northern Link Road 3+050m (on Treanamullin Tie In)	65m	1103	Access to attenuation pond and lands severed from the proposed road development
AR 1.39	Northern Link Road 3+050m (on N15 Treanamullin Tie In)	30m	1104, 1101, 1102 & 1150	Access to existing road / dwellings from realigned side road
AR 1.40	Northern Link Road 3+050m (on N15 Treanamullin Tie In)	35m	1101	Access to attenuation pond and lands severed from the proposed road development
AR 1.41	Mainline 1.2 1+780m (On LX-1003)	55m	1144 & 1950	Access to existing road / dwellings from realigned side road

Reference Number	Approx. Mainline Chainage	Approximate Length	Plot ID / Landowner Reference	Comments
AR 1.42	Mainline 1.2 5+100m (on L-2424 Connector)	35m	1071 & 1077	Access to existing road / dwellings from realigned side road
AR 1.43	Mainline 1.2 2+150m (On R252 Tie In)	165m	1162, 1052 & 1155	Access to attenuation pond and lands severed from the proposed road development
AR 1.44	Mainline 1.3 0+250m	40m	1125	Access to existing road

1.7.5 Active Travel Network

The active travel networks included throughout Section 1 include approximately 21 km of shared pedestrian / cycle facilities. These facilities include pedestrian / cycle paths located adjacent to and remote from the proposed mainlines, connections to the local road network and connections to local amenity areas and areas of interest, including park and share / cycle facilities described below.

The active travel network has been designed to provide an amenity facility for leisure use, enhance local access to other amenities (such as football pitches, woodland walks) through active travel and maintain local connectivity through use of active travel.

In addition to the mainline shared cycleway/footway, Section 1 also includes active travel facilities in the following locations:

- Connection to existing active travel network at existing N15 (Dooish) at Ch 0+000 m.
- Connection to existing active travel network at existing N15 (Cappry) at Ch 0+225 m.
- Connection to existing Cappry Rovers Football Club at Ch 1+000 m.
- Connection to existing active travel network at Ballybofey at Ch 1+900 m.
- Connection into existing and proposed woodland facilities at Holywell and Drumboe Woods at Ch 3+275.
- Connection to existing active travel network at Drumboe lower at Ch 3+900 m.
- Connection to existing active travel network at Dunwiley at Ch 4+500 m.
- Connection to facilitate access to Dunwiley ring Fort at Ch 4+900 m.
- Park and Share / Cycle facilities at Ch 1+100 m, 1+750 m and 8+550 m.
- Connection to existing community along the existing N13 (downgraded) at Meenavoy at Ch 8+550 m.

1.7.6 Structures

The location and detail for the proposed overbridge structures included within Section 1 are presented in Table 1.5. Each structure family type follows a standard form described above in Section 1.5.6.

Table 1.5: Section 1 Location and Detail for Proposed Overbridges

Structure Ref	Approx. Chainage	Description	Mainline Cross-section	Mainline Cross-section Width (m)
N15O003	Mainline Section 1.2 00+250 m	Local road tie to existing N15 over mainline	Type 2 Divided Road with cycle track	33.0
N15O011	Mainline Section 1.2 01+050 m	Local road at Cappry over mainline	Type 2 Divided Road with cycle track	28.5
N15O040	Mainline Section 1.2 03+950 m	Local road Drumboe Lower over mainline	Type 2 Divided Road with cycle track	34.5
N15O057	Mainline Section 1.2 05+700 m	Farm Access at Lettermakenny over mainline	Type 2 Divided Road with cycle track	30.3
N15O028	N15 Primary Road Connector 02+750 m	Local road at Castlebane over link road that runs from mainline to the existing N15	Type 3 Divided Road with cycle track	20.3
N13O069	Mainline Section 1.2 06+850 m	Local road at Teevickmoy over mainline	Type 2 Divided Road with cycle track	29.0
N13O084	Mainline Section 1.2 08+275 m	Local road at Meenavoy over mainline	Type 2 Divided Road with cycle track	28.5

The location and detail for the proposed underbridges included within Section 1 are presented in Table 1.6.

Table 1.6: Section 1 Location and Detail for Proposed Underbridges

Structure Ref	Approx. Chainage	Description	Mainline Cross-section	Mainline Cross-section Width (m)
N15U014	N15 Primary Road Connector 0+700 m	Grade separated Junction: Old N13 under N15 Primary Road Connector	Type 2 Divided Road with cycle track	28.5
N15U018	Mainline Section 1.2 01+800 m	Grade separated Junction: Ballybofey Link from R252 to existing N15 under mainline	Type 2 Divided Road with cycle track	28.5
N15U031	Mainline Section 1.2 03+050 m	Local road Drumboe Lower under mainline and watercourse diversion.	Type 2 Divided Road with cycle track	28.5
N15U047	Mainline Section 1.2 04+600 m	Local road at Dunwiley under mainline	Type 2 Divided Road	21.5
N15U063	Mainline Section 1.2 06+200 m	Grade separated Junction: link under mainline from mainline to existing N13 and N15	Type 2 Divided Road with cycle track	28.5

1.7.6.1 River Finn Crossing (N15R024)

The proposed River Finn Crossing is the largest structure in Section 1 of the Project and is required to carry the proposed N15 over the River Finn, flood plain and associated Special Area of Conservation (SAC) and the R252 Regional Road.

The structure comprises a seven-span arrangement. The spans are: 43 m, 55 m, 85 m, 55 m, 43 m, 39.5 m and 39.5 m giving a total bridge length of 360 m. The 85 m main span will cross the River Finn and the existing R252 regional road.

The primary environmental constraint for the bridge is the River Finn which is a SAC with six qualifying interests:

- Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) [3110]
- Northern Atlantic wet heaths with Erica tetralix [4010]
- Blanket bogs (* if active bog) [7130]
- Transition mires and quaking bogs [7140]
- Salmo salar (Salmon) [1106]
- Lutra lutra (Otter) [1355]

The River Finn SAC comprises almost the entire freshwater element of the River Finn and its tributaries, rising in the Bluestack mountains and flowing through Ballybofey/ Stranorlar. From its crossing with the Proposed Development just west of Ballybofey/ Stranorlar, the River Finn flows east to Castlefin and Cloughfin and then north to Lifford/ Strabane where it meets the Mourne River (Norther Ireland) and becomes the River Foyle and flows into Lough Foyle. The River Finn SAC is contiguous with the River Foyle and Tributaries SAC in Northern Ireland for the portion of the River Finn just east of Castlefin north to Lough Foyle. The River Finn is noted for being one of the most prolific salmon and grilse rivers in Donegal and the Foyle catchment.

The River Finn SAC includes the river and river banks along the section of the River Finn that overlaps with the Proposed Development. At the crossing point of the centreline of the Mainline and the River Finn, the width of SAC is approximately 75 m.

Any construction activities within the River Finn watercourse are prohibited and the 85 m main span includes setback zones to the SAC boundary. The 360 m long bridge spans the entire flood plain and will reduce any risks of flooding, and impact on the SAC and reduces the permanent land take required compared to a shorter bridge with longer approach embankments.

The southern bridge pier is set back from the channel south of the R252 road, where temporary construction works occur at nearest just over 5m from the SAC boundary and approximately 8 m from the River Finn wetted channel. The southern piers and abutment construction areas are outside the 0.1% AEP flood zone with low probability of flooding during construction. On the northern bank, the closest pier to the river is set c. 5m back from the SAC boundary and approximately 15 m in total from the River Finn wetted channel. However, the temporary construction works area is contiguous with the SAC boundary (approximately 10 m back from the River Finn wetted channel).

An existing disused railway line runs parallel to the R252 at the southern end of the proposed crossing. There is potential for this railway line to be converted into a greenway in the future. The bridge's southernmost span will cross the abandoned railway line with suitable clearance and headroom for the potential future development.

The proposed option for the bridge is a varying depth weathering steel multi-girder composite deck bridge. This option will have a structural depth of approximately 4.5 m at the main span intermediate supports and 2 m away from the supports. The substructure consists of cast in-situ reinforced concrete piers and abutments supported by bored pile foundations. Following construction of the reinforced concrete sub-structure, the superstructure of the steel girder option will be lifted into position in braced pairs by a large crane prior to casting the concrete deck.

The proposed bridge option has an uncomplicated form and is architecturally pleasing due to the open aspect achieved and the arched elevation of the main span girders. The plate girders fabricated from weathering steel provide a rustic appearance and there is architectural merit in a structure that does not hide its load carrying members and these are fully on display in a multi-girder bridge. The proposed solution offers clean lines and will provide an aesthetically pleasing aspect when viewed from close by or from underneath with no fussy details on display.

1.7.6.2 Cloghroe River Bridge (N13R085)

Cloghroe River is salmonid spawning and nursery habitat, and the riverbanks provide habitat suitable for otter. The existing river alignment is problematic as it meanders under the Proposed Development alignment, therefore a realignment is proposed to enable a perpendicular crossing. This will require robust mitigation to reinstate a channel that mimics natural habitat and ensures fish passage during construction and operation.

The proposed bridge abutment faces will be set back 5 m from the edge of the realigned river channel. A 3 m wide ‘no working zone’ each side of the river channel shall be maintained during construction. Surface run off controls such as silt fencing will be implemented during the works to avoid sediment pollution into the river.

To achieve 5 m abutment setback from the riverbank crest, the required clear square span is 18 m. This span will enable a 3 m wide ‘no working zone’ behind the riverbank crest during construction. The level of the proposed N13 Link Road carried by the bridge is constrained by a tie-in with a nearby road, so the headroom under the bridge is limited.

The recommended structure type is precast MY beam & solid slab on integral abutments, as this achieves a high span-to-depth ratio with maximised clearance over the riverbanks. This is needed for maintenance access and is desirable for light penetration and aesthetics.

1.7.6.3 Backlees River Bridge (N15R042)

Backlees River is a trout stream and fish passage is required. It is a tributary of the River Finn SAC. It is proposed to maintain the natural river alignment and natural riverbanks. However, culvert S1-CUL.14 on the Backlees River will be constructed just upstream of the proposed Backlees River Bridge (Drawing 1 sheet 4 of 8) under access road AR1.20.

To achieve min. 5 m environmental abutment setback from the river and accommodate the accommodation farm track alignment, the required clear skew span is 43 m at a skew of 15 degrees. This will ensure a 3 m wide ‘no working zone’ behind the riverbank crest during construction. Surface run off controls such as silt fencing shall be implemented during the works to avoid sediment pollution into the river.

The recommended structure type is a single span, steel girder composite deck slab on integral full height bridge abutments. Wingwalls are flared at 30-70 degrees to the river axis. The proposed bridge deck soffit level will provide adequate headroom over the accommodation farm track and adequate freeboard over flood levels. Spread foundations are likely to be suitable (see Table 1.7 for bridge and culvert locations and measurements).

The structure type is proposed for the following reasons:

- Steel girders can be prefabricated in lengths convenient for transport, spliced together on site then lifted into position. The local roads around this site are narrow with tight corners so this flexibility is necessary.
- Weathering steel girders can achieve a 120-year design life without maintenance.
- Integral abutments avoid the need for bearings and expansion joints, which require maintenance every 30-50 years.

Table 1.7: Section 1 Proposed River Bridges

Structure Ref	Approx. Chainage	Structure Type	Description	Mainline Cross-section	Mainline Cross-section Width (m)	Clear Square Span (m)
N15R024	Mainline Section 1.2 02+435 m	River bridge	River Finn Crossing: Mainline over R252 & River Finn	Type 2 Divided Road with cycle track.	26	227
N13R085	Mainline Section1.3 00+300 m	River bridge	Cloghroe River Bridge: Carries link road over Cloghroe River. Salmonid spawning & nursery habitat. A clear span bridge with a stream realignment. Near to existing river bridge: DL-N13-001.00. Instream works shall only be undertaken during the period 1 May to 30 September.	Type 1 Single Carriageway with cycle track.	17.3	10
N15R042	Mainline Section 1.2 04+100 m	River bridge	Backlees River Bridge: Carries the proposed N15 mainline carriageway & active travel path over Backlees River and a farm accommodation track.	Type 2 Divided Road with cycle track.	28.5	43

1.7.7 Underpasses, Active Travel bridges, Culverts and Retaining Walls

The location and detail of underpasses included in Section 1 are presented in Table 1.8.

Table 1.8: Section 1 Proposed Underpasses

Structure Ref	Approx. Chainage	Description	Mainline Cross-section	Mainline Cross-section Width (m)	Clear Square Span (m)
N15A012	N15 Primary Road Connector 00+550 m	Farm underpass	Type 2 Divided Road with active travel	28.5	4
N15P030	Mainline Section 1.2 03+000 m	Active travel and accommodation road underpass	Type 2 Divided Road with active travel	28.5	10.5
N15P032	Mainline Section 1.2 03+240 m	Active travel & mammal underpass	Type 2 Divided Road with active travel	28.5	12

There are no active travel bridges proposed in Section 1.

Culverts and minor watercourse crossings with a clear span or internal diameter greater than 2.0 m are considered structures and are presented in Table 1.9.

Table 1.9: Section 1 Culvert and Minor Watercourse Crossing Structures

Culvert Reference	Chainage	Referenced Mainline / Side Road	Location X	Location Y	Culvert Diameter (m) / Width (m) x Height (m)	Approx. Length (m)
S1-CUL.01	1+300 m	L-6564 Connector	610,325.8	892,814.7	3.2 x 2	51.8
S1-CUL.08	0+355 m	L-6564 Connector	610,950.2	893,514.2	2.5 x 2.2	27.9
S1-CUL.10	0+208 m	L-2794 Connector	611,121.6	893,424.5	2.5 x 2.5	34.8
S1-CUL.11	0+200 m	L-2794 Connector (Farm access)	611,186.9	893,459.5	2.75 x 2.25	6.9
S1-CUL.13	0+155 m	L-2754 Connector	613,070	895,329.3	2.5 x 1.8	26.7
S1-CUL.14	0+335 m	L-2734 Connector (Domestic Access)	613,843.1	896,090	6.0 x 2.5	8.5
S1-CUL.19	0+680 m	LX-1004	616,047.2	897,558.8	2.8 x 2.1	25.1
S1-CUL.20	0+470 m	LX-1004 (Farm Access)	615,975.8	897,356.4	2.8 x 2.1	12.3
S1-CUL.21	1+610 m	N15 Primary Road Connector	616,046.8	897,083	3.5 x 2.1	56.7
S1-CUL.22	1+765 m	N15	616,174.8	896,976.5	4.5 x 2.2	56.5

Culvert Reference	Chainage	Referenced Mainline / Side Road	Location X	Location Y	Culvert Diameter (m) / Width (m) x Height (m)	Approx. Length (m)
		Primary Road Connector				
S1-CUL.25	0+375	L-2714 Connector (Farm Access)	616599.0	896194.1	5.0 x 4.5	76.6
S1-CUL.28	0+155	Mullaghagarry at N15 Treanamullin Tie-in	616597.4	895195.3	Twin culverts 2.3 x 2.7 each	34.0
S1-CUL.30	0+505	L-6674 Connector	616076	899417.5	2.4 x 2.1	87.2
S1-CUL.31	0+025	LX-1011 Connector	616094.4	899720.4	4.5 x 2.2	45.4
S1-CUL.34	0+310	L-6674 Connector	615927.5	899542.3	3.5 x 2	42.2
S1-CUL.35	n/a	LX-1004 (Cycleway)	615981.5	899607.2	3.5 x 2	26.9
S1-CUL.36	8+500	Mainline Section 1.2	616039.4	899660.4	3.5 x 2	30.7
S1-MWC.06	0+150	AR 1.41	610772.41	893127.82	2.5 x 2.25	11.1
S1-MWC.07	0+135	AR 1.41/ Mainline 1.1	610776.96	893092.93	2.5 x 2.25	58.9

The location and detail of retaining walls included in Section 1 are presented in Table 1.10.

Table 1.10: Section 1 Retaining Walls

Structure Ref	Location	Approximate Length (m)	Approximate Max Effective Retained Height (m)
N15W011	Mainline 1.2, Ch 01+070	25.2	1.6
N15W018	Ballybofey Link Road Ch 01+850	106	1.7
N15W020	Mainline 1.2, Ch 01+950 to Ch 02+245	295.8	9.9
N15W021	R252 and AR1.43	147.5	2.1
N15W034	Mainline 1.2, Ch 03+380	77	9.7
N15W046	Mainline 1.2, Ch 04+625	54	3.4

1.7.8 Flooding and Flood Compensation Areas

Flood compensatory storage areas are proposed in Section 1 including:

- Burn Daurnett River at proposed tie-in to existing N15 south of Ballybofey from Mainline Section 1.1. A flood compensatory area is proposed adjacent to the N15 to offset the loss of floodplain storage associated with the road embankment. The flood compensatory area is connected to the river via a drainage pipe.
- Cloghroe River adjacent to the tie-in to existing N13 north of Stranorlar from Mainline Section 1.3. Flood compensatory storage areas are provided adjacent to the Cloghroe River to offset any loss of floodplain

storage at the relevant flood levels. An underground storage tank is also provided for flood compensation storage.

- Mullaghagarry River Crossing adjacent to the tie-in to existing N15 east of Stranorlar from the N15 Primary Road Connector. Flood compensatory storage is provided adjacent to this river crossing to offset any potential loss of floodplain storage associated with the embankment.

1.7.9 Stream Diversions/ Realignments

At several locations, the existing natural flow paths are proposed to be altered slightly to suitably align the proposed culvert crossings with the road alignment. These are relatively minor diversions in all but one case: there is one notable permanent stream realignment in Section 1, required to accommodate the proposed Cloghroe River Bridge (Mainline Section1.3 at Chainage Ch00+300 m). The proposed realignment reach comprises salmonid habitat. The diversion has been designed into the Proposed Development to match pre-existing morphology. Proposed bridge abutments will be a minimum of 5 m from the bank of the newly diverted channel. The permanent diversion channel shall be constructed off-line with the river running in its natural course until the bridge northern abutment is in place. Earthworks ‘plugs’ will remain in place until the new channel has been excavated and reinstated; lined with locally sourced, washed rounded gravel and rock material. When the newly formed channel is ready to be wetted, dams will be placed at the upstream and downstream ends, and the existing channel will be destocked of fish (under appropriate licence as set out in Chapter 9B Biodiversity Aquatic) before diverting it into the new channel. Instream works will only occur May 1st to September 30th of any year. The abandoned channel, once dewatered, shall be infilled and the construction of the southern abutment will then commence prior to laying of the bridge superstructure. Water quality protection measures will be employed as set out in Chapter 11 Water and Chapter 9B Biodiversity - Aquatic. Hydromorphology shall be restored according to measures set out in Chapter 9B Biodiversity Aquatic, Section 9B.6.1.1 (Stream Diversion and Channel Realignment Measures) notably:

- Newly formed channel base widths will be designed to match the width of the original channel.
- Newly formed channel sections shall mimic (or improve) the existing habitats. They will incorporate instream substates of locally sourced, washed, rounded gravels and meanders that give rise to flow type variation (riffle, glide and pool sequences) as found in fish bearing waters.
- New channel sections shall be fully constructed in dry conditions using appropriate water management measures, i.e., offline construction, temporary diversion, dam and pump over, piping/fluming.

1.7.10 Drainage Infrastructure

The following drainage features are proposed for Section 1:

- 39 No. culverts for watercourse crossings requiring OPW consent;
- 7 No. drainage networks on the mainline carriageway;
- 16 No. drainage networks alongside roads;
- 22 No. attenuation ponds with 22 No. outfalls;
- 1 No. Infiltration basin.

Design details regarding Section 1 proposed culverts are outlined in Table 1.11.

Table 1.11: Section 1 Proposed Culvert Schedule

Culvert Reference	Chainage	Referenced Mainline / Side Road	Location X	Location Y	Culvert Diameter (m) / Width (m) x Height (m)	Approx. Length (m)
S1-CUL.01	1+300 m	L-6564 Connector	610,325.8	892,814.7	3.2 x 2	51.8
S1-CUL.02	0+600 m	L-6564 Connector	610,840.2	893,300.1	1.2Ø	34.1
S1-CUL.03	0+455 m	Mainline Section 1.1	610,938.5	893,210	1.2Ø	30.5
S1-CUL.04	0+550 m	Farm Access	611,106.4	893,808.6	1.2Ø	9.0
S1-CUL.05	0+530 m	Farm Access	611,091.1	893,789.5	1.2Ø	9.0
S1-CUL.06	0+105 m	L-6564 Connector	611,028.5	893,750.4	1.5Ø	21.8
S1-CUL.07	0+270 m	L-6564 Connector (Farm Access)	610,964.8	893,601.1	1.5Ø	15.2
S1-CUL.08	0+355 m	L-6564 Connector	610,950.2	893,514.2	2.5 x 2.2	27.9
S1-CUL.09	0+220 m	Mainline Section 1.2	611,008.4	893,484	1.8Ø	37.4
S1-CUL.10	0+208 m	L-2794 Connector	611,121.6	893,424.5	2.5 x 2.5	34.8
S1-CUL.11	0+200 m	L-2794 Connector (Farm access)	611,186.9	893,459.5	2.75 x 2.25	6.9
S1-CUL.12	0+060 m	L-2754 Connector (Farm Access)	613,055.9	895,453.8	1.8 x 1.8	18.3
S1-CUL.13	0+155 m	L-2754 Connector	613,070	895,329.3	2.5 x 1.8	26.7
S1-CUL.14	0+335 m	L-2734 Connector (Domestic Access)	613,843.1	896,090	6.0 x 2.5	8.5
S1-CUL.15	4+800 m	Mainline Section 1.2	614,244.5	896,588.4	1.2 Ø	110.5
S1-CUL.16	0+830 m	L-2724 Connector	614,254.4	896,181.4	1.2Ø	81.9
S1-CUL.17	0+895 m	L-2724 Connector (Farm Access)	614,279.3	896,114.1	1.2Ø	13.9
S1-CUL.18	0+680 m	N15 Primary Road Connector	615,370	897,660	1.5Ø	33.1
S1-CUL.19	0+680 m	LX-1004	616,047.2	897,558.8	2.8 x 2.1	25.1
S1-CUL.20	0+470 m	LX-1004 (Farm Access)	615,975.8	897,356.4	2.8 x 2.1	12.3
S1-CUL.21	1+610 m	N15 Primary Road Connector	616,046.8	897,083	3.5 x 2.1	56.7
S1-CUL.22	1+765 m	N15	616,174.8	896,976.5	4.5 x 2.2	56.5

Culvert Reference	Chainage	Referenced Mainline / Side Road	Location X	Location Y	Culvert Diameter (m) / Width (m) x Height (m)	Approx. Length (m)
		Primary Road Connector				
S1-CUL.23	2+195 m	N15 Primary Road Connector	616,490	896,688	1.2Ø	84.4
S1-CUL.23A	1+650	N15 Primary Road Connector	616543.7	896551.0	1.2Ø	78.9
S1-CUL.24	2+445	N15 Primary Road Connector	616571.4	896458.1	1.2Ø	86.9
S1-CUL.25	0+375	L-2714 Connector (Farm Access)	616599.0	896194.1	5.0 x 4.5	76.6
S1-CUL.26	0+250	L-2714 Connector	616702.0	896291.7	1.5Ø	7.8
S1-CUL.27	3+175	N15 Primary Road Connector	616362.5	895774.7	1.5Ø	32.0
S1-CUL.28	0+155	Mullaghagarry at N15 Treanamullin Tie-in	616597.4	895195.3	Twin culverts 2.3 x 2.7 each	34.0
S1-CUL.29	7+920	Mainline Section 1.2	616041.7	899079.3	1.5Ø	73.5
S1-CUL.30	0+505	L-6674 Connector	616076	899417.5	2.4 x 2.1	87.2
S1-CUL.31	0+025	LX-1011 Connector	616094.4	899720.4	4.5 x 2.2	45.4
S1-CUL.32	0+410	LX-1011 Connector (Farm Access)	616258.2	899361	1.8Ø	22.5
S1-CUL.33	0+615	L-6674 Connector	616139.1	899324.7	2.0 x 2.0	46.2
S1-CUL.34	0+310	L-6674 Connector	615927.5	899542.3	3.5 x 2	42.2
S1-CUL.35	n/a	LX-1004 (Cycleway)	615981.5	899607.2	3.5 x 2	26.9
S1-CUL.36	8+500	Mainline Section 1.2	616039.4	899660.4	3.5 x 2	30.7
S1-CUL.37	0+040	L-6674 Connector (Domestic Access)	615799.9	899767.1	1.5Ø	6.9
S1-CUL.38	0+095	L-6674 Connector	615841.1	899729.3	1.5Ø	20.0

Design details regarding drainage networks on the mainline carriageway and side roads is provided below in Table 1.12.

Table 1.12: Section 1 Carriageway Drainage Network Details.

Drainage Network Ref.	Mainline / Side Road (No.)	Chainage	Outfall
S1-ML-DN-01	Mainline Section 1.2	6+220 to 8+550	Outfall 01
	L-7084 Connector	0+248 to 0+715	
	L-6674 Connector	0+475 to 0+612	
	Meenavoy Junction	0+000 to 0+227	
	Mainline Section 1.3	0+000 to 0+534	
	LX-1011 Connector		
S1-ML-DN-02	Mainline Section 1.2	5+857 to 4+600	Outfall 06
	L-2724 Connector	0+000 to 0+974	
S1-ML-DN-03	Mainline Section 1.2	4+600 to 3+250	Outfall 08
	L-2724 Connector	0+210 to 0+361	
S1-ML-DN-04	Mainline Section 1.2	3+250 to 2+267	Outfall 09
S1-ML-DN-05	Mainline Section 1.2	1+769 to 2+267	Outfall 10
	LX-1004	0+000 to 0+274	
	L-2794 Cappry Road Tie-in	0+000 to 0+222	
	Ballybofey Link Road	0+700 to 0+795	
S1-ML-DN-06	Mainline Section 1.2	0+965 to 1+769	Outfall 11
	L-2794 Cappry Road Tie-in	0+000 to 0+222	
	Ballybofey Link Road	0+000 to 0+700	
	Ballybofey NB Link	0+000 to 0+349	
S1-ML-DN-07	Mainline Section 1.2	0+000 to 0+965	Outfall 13
	L-6564 Connector	0+000 to 0+272	
	Dooish Junction	-	
	Mainline Section 1.1	0+358 to 0+530	
	L-6584 Connector	0+000 to 0+118	
S1-SR-DN-01	Mainline Section 1.3	0+227 to 0+592	Outfall 21
S1-SR-DN-02	L-6674 Connector	0+000 to 0+475	Outfall 02
S1-SR-DN-03	L-6674 Connector	0+612 to 0+840	Outfall 19
S1-SR-DN-04	L-7084 Connector	0+715 to 1+510	Outfall 22
S1-SR-DN-05	L-7084 Connector	0+000 to 0+248	Outfall 17
S1-SR-DN-06	Mainline Section 1.2	5+857 to 6+220	Outfall 03
	Teevickmoy NB Link	0+085 to 0+860	
	N15 Primary Road Connector	0+000 to 0+700	
	Teevickmoy SB Link	0+000 to 0+300	
S1-SR-DN-07	N15 Primary Road Connector	0+700 to 2+260	Outfall 15

Drainage Network Ref.	Mainline / Side Road (No.)	Chainage	Outfall
S1-SR-DN-08	L-2714 Connector	0+220 to 0+438	Outfall 18
S1-SR-DN-09	L-2714 Connector	0+000 to 0+220	Outfall 16
	N15 Primary Road Connector	2+260 to 2+858	
S1-SR-DN-10	Treanamullin Tie-in	0+000 to 0+294	Outfall 04
	N15 Treanamullin Tie-in	0+000 to 0+160	
	Treanamullin Junction		
	N15 Primary Road Connector	2+858 to 3+086	
S1-SR-DN-11	N15 Treanamullin Tie-in	0+160 to 0+512	Outfall 05
S1-SR-DN-12	L-2734 Tie-in	0+000 to 0+357	Outfall 07
	L-2784 Connector	0+102 to 0+210	
S1-SR-DN-13	Ballybofey Link Road	0+795 to 1+964	Infiltration Pond 01
S1-SR-DN-14	L-6584 Connector	0+118 to 0+412	Outfall 20
S1-SR-DN-15	L-2794 Connector	0+000 to 0+271	Outfall 12
	LX-1001	0+000 to 0+223	
S1-SR-DN-16	Mainline Section 1.1	0+000 to 0+358	Outfall 14
	AR 1.41	0+000 to 0+235	
	L-6564 Connector	0+272 to 1+619	

Design details regarding attenuation pond and outfalls is provided in Table 1.13.

Table 1.13: Section 1 Proposed Attenuation Pond Details and Outfall Locations

Ref. No.	Attenuation Pond Details							Outfall locations	
	Easting	Northing	Total Catchment Drainage Area (ha)	Greenfield Runoff Rate (l/s)	Pavement Area (ha)	Attenuation Pond – Volume of Storage (m^3)	Invert Level of Attenuation Pond (m)	Easting	Northing
1	616,085.76	899,846.10	12.65	90.51	5.73	8,051.00	74.15	616,290.71	899,943.80
2	615,945.45	899,605.90	0.55	3.92	0.44	313.00	76.35	616,008.33	899,645.63
3	615,964.13	897,049.48	8.06	57.63	4.22	5,072.00	65.03	616,025.54	897,050.45
4	616,268.74	895,137.81	1.02	7.29	0.79	590.00	13.45	616,334.30	895,098.87
5	616,788.55	895,188.94	0.37	2.68	0.28	210.00	12.84	616,610.79	895,150.89
6	614,177.73	896,142.51	10.10	72.28	3.08	6,418.00	65.56	614,288.09	896,093.34
7	613,823.67	895,992.82	0.42	3.02	0.42	239.00	64.87	613,868.95	896,024.06
8	613,194.63	895,527.92	7.61	54.47	2.56	4,806.00	35.87	613,059.73	895,468.45
9	612,772.26	895,281.69	2.48	17.75	2.02	1,541.00	22.50	612,742.79	895,053.33
10	612,375.01	894,958.57	2.36	16.84	1.44	1,462.00	25.72	612,442.55	894,995.98
11	611,903.76	895,155.84	6.47	46.26	2.98	3,998.00	24.29	611,887.78	895,216.90
12	611,175.74	893,412.23	0.65	4.61	0.41	370.00	71.34	611,208.69	893,488.44
13	611,113.58	893,541.17	5.79	41.40	2.80	3,804.00	72.09	611,208.69	893,,488.44
14	610,774.54	893,029.67	2.37	16.93	1.63	1,487.00	75.29	610,847.52	893,052.81

Ref. No.	Attenuation Pond Details							Outfall locations	
	Easting	Northing	Total Catchment Drainage Area (ha)	Greenfield Runoff Rate (l/s)	Pavement Area (ha)	Attenuation Pond – Volume of Storage (m^3)	Invert Level of Attenuation Pond (m)	Easting	Northing
15	616,454.01	895,931.08	3.20	22.91	1.93	2,027.00	32.87	616,496.32	895,900.87
16	616,353.85	895,361.73	2.72	19.43	0.93	1,689.00	18.41	616,578.64	895,221.80
17	614,734.51	898,155.91	0.35	2.49	0.22	196.00	138.19	614,728.39	898,128.23
18	616,678.53	896,266.77	0.17	1.20	0.16	92.50	34.80	616,711.71	896,278.44
19	616,184.46	899,208.96	0.39	2.80	0.20	221.00	79.29	616,266.95	899,331.62
20	611,554.07	893,849.49	0.35	4.50	0.27	751.00	68.50	611,566.04	893,776.56
21	616,053.70	900,126.27	1.37	9.83	0.45	773.00	76.14	616,312.63	900,190.26
22	616,059.84	897,889.37	0.89	6.34	0.66	513.00	76.04	615,989.78	897,849.88

1.8 Design – Section 2 N56/ N13 Letterkenny to Manorcunningham

Section 2 is located to the south and east of Letterkenny and comprises three distinct arms from the proposed Dromore junction as follows:

- South from the proposed new Dromore Junction to meet the existing N13 at Listellian.
- Northwest from the proposed new Dromore Junction through Bonagee Junction, a new bridge over the River Swilly, and meeting the existing N56 at the proposed new Ballyraine Junction. The existing roundabout on the N56 is known locally as the Creamery Roundabout at Ballyraine.
- East from the proposed new Dromore Junction along the existing N13 to the N13/ N14 Pluck Roundabout at Raymoghy (Section 3 interface).

The existing N13 from the proposed Dromore Junction west to the Dry Arch Junction and the proposed link road from the Dry Arch Junction north to the proposed Bonagee Junction also form the corridor.

The Section 2 mainline is approximately 9.0 km long and connects with the existing national road network as follows:

- Tie-in to existing N13 at Listellian (proposed online junction).
- Tie-in to existing N13/N56 at Bonagee (existing Dry Arch roundabout to be improved).
- Tie-in to existing N56/R245 at Ballyraine (existing roundabout to be improved).
- Tie-in to the existing N13 dual carriageway at Dromore (proposed online junction).
- Tie-in to the existing N13/N14 in proximity to Pluck roundabout at Raymoghy (Section 3 interface).

Details of existing and proposed junctions together with their connecting arms in Section 2 are provided in Figure 1.12. For more detail on Section 2 including the alignment please refer to the general arrangement drawings in Appendix 2, Drawing 2.

The proposed works can be summarised under the following elements. The lengths of the individual sections are approximate.

Roads:

- Mainline Section 2.1 which is 0.3 km of Type 1 Single Carriageway extending from the N13 southern tie-in to the Listellian Junction (Drawing 2, sheet 1 of 5).
- Mainline Section 2.2 which is 2.1 km of Type 2 Divided Road extending from the Listellian Junction to the Dromore Junction (Drawing 2, sheets 1 and 2 of 5).
- Mainline Section 2.5 which is 0.6 km of Type 2 Divided Road extending from the Dromore Junction to the Bonagee Junction (Drawing 2, sheet 2 of 5).
- Mainline Section 2.6 which is 1.4 km of Type 2 Divided Road extending from the Bonagee Junction to Ballyraine junction (Drawing 2, sheets 2 and 3 of 5).
- Mainline Section 2.3 which is 0.7 km of Type 1 Dual Carriageway (realigned and improved) extending from Dry Arch Junction to Dromore Junction (Drawing 2, sheet 2 of 5).
- Mainline Section 2.4 which is 3.5 km of Type 1 Dual Carriageway (realigned and improved) extending from Dromore Junction to the interface with Section 3 west of the existing N13/N14 Pluck Roundabout (Drawing 2, sheets 4 and 5 of 5).

- Bonagee Link which is 0.4 km of Type 2 Divided Road extending from the Dry Arch Junction to the Bonagee Junction (Drawing 2, sheet 2 of 5).

- Provision of approximately 12.1 km of additional Type 1, Type 2 and Type 3 Single Carriageway roads not already mentioned above (includes new and realigned).

Junctions:

- One grade-separated junction at Trimragh (Drawing 2, sheet 4 of 5): this includes an overbridge structure, two roundabouts, slip roads and connections to realigned local roads. This junction replaces the existing at grade legacy junction with a collision history.

- Five new at-grade roundabout junctions at:
    - Listellian (Drawing 2, sheet 1 of 5).
    - Dromore (Drawing 2, sheet 2 of 5).
    - Bonagee (Drawing 2, sheet 2 of 5).
    - Modified and upgraded roundabout at the existing Dry Arch roundabout (Drawing 2, sheet 2 of 5) and
    - Modified and upgraded roundabout at the existing Creamery roundabout (townland of Ballyraine) (Drawing 2, sheet 3 of 5).

- The tie-in at the Pluck Roundabout (interface between Section 2 and Section 3 is addressed in Section 3).

Structures:

- One signature three-span bridge crossing over the River Swilly at Letterkenny (235 m long).

- Three overbridges.

- Three underbridges.

- One active travel road overbridge.

- One active travel river bridge.

- Two active travel underpasses near Dromore Junction.

- Modifications to an existing accommodation underpass east of Trimragh Junction.

- Various culverts, gantries, environmental noise barriers and retaining wall structures.

Active Travel:

- Provision of active travel infrastructure: this includes connections to existing infrastructure and a new Park and Share / Cycle facility located at Dry Arch Junction as illustrated in Appendix 2 (Drawing 2).

Other Works:

- Access roads.

- Provision of attenuation ponds, flood compensatory measures, watercourse diversions and associated drainage infrastructure.

- Provision of existing utility diversions and new utility infrastructure.

- Provision of landscape planting, signage, lighting, accommodation works ancillary to the construction and operation of the Proposed Development.

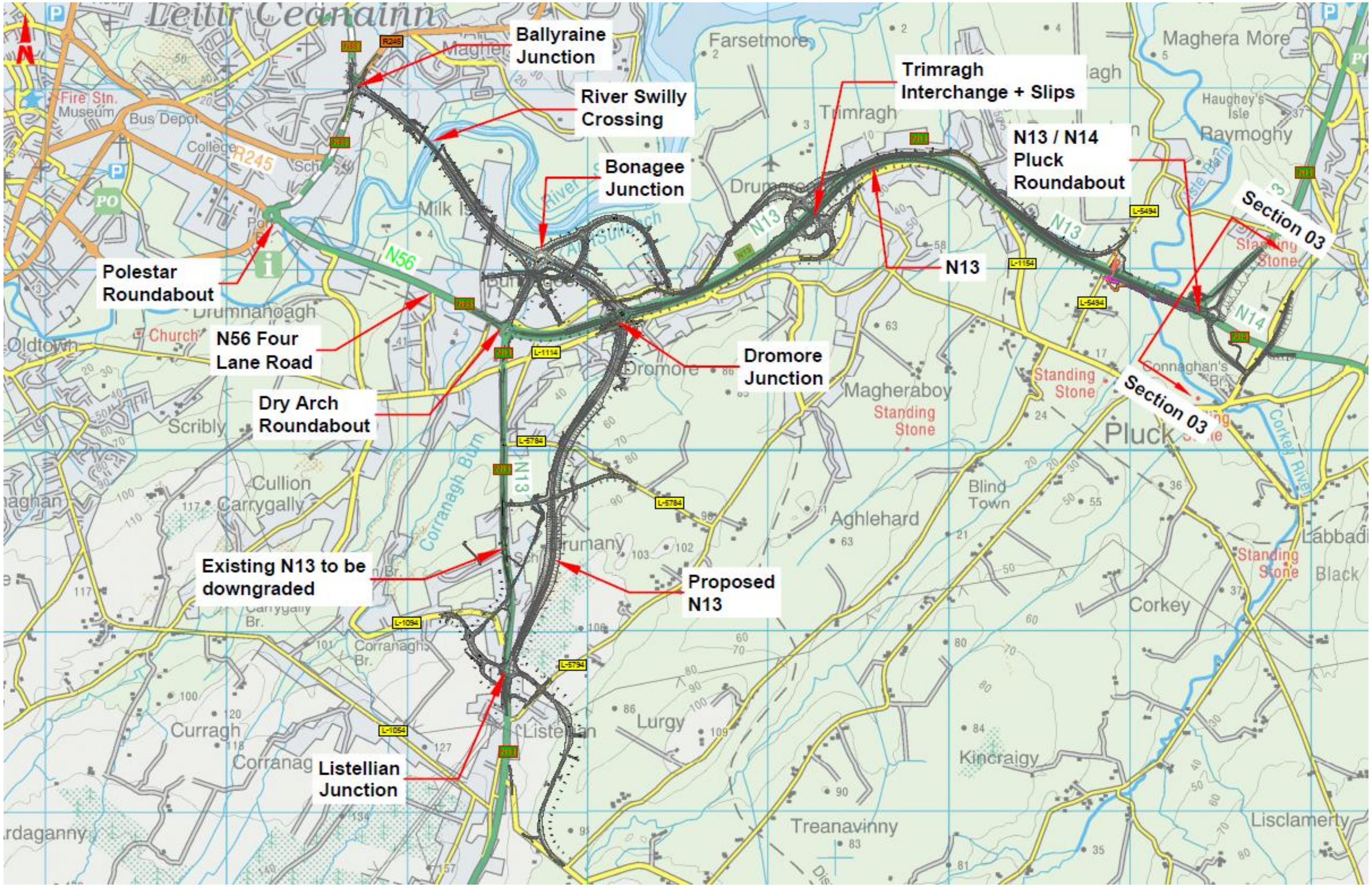

Figure 1.12: Section 2 Proposed Development

1.8.1 Roads

To achieve the best possible user safety, journey time reliability, average speed targets (NPF) and capacity for freight, passenger and public transport, a Type 2 Divided Road is proposed along approximately 4.1 km of the Mainline Section 2.2, 2.5 and 2.6 with an additional 0.4 km of Type 2 Divided Road between the proposed Bonagee Junction and the existing Dry Arch Roundabout (Bonagee Link). Figure 1.2 illustrates the Type 2 Divided Road cross section. This road cross section also fully accommodates segregated active travel facilities enabling modal shift and further aiding Park and Share and Park and Cycle/Walk alternatives on the network. Predicted traffic volumes are considered while the transition to alternative green fuels is augmented by regular and strategically positioned EV Charge hubs along the TEN-T network as per Regulation (EU) 2023/1804 on the deployment of alternative fuels infrastructure.

The traffic flows on the existing N56 between Dry Arch and Polestar Roundabout (1.5 km to the west) are predicted to grow to approximately 42,000 AADT for the scheme Design Year 2047. To accommodate these predicted traffic volumes and other considerations such as safety, obstacles to road widening, current 'lifeline route' status and constructability impact, and route consistency, a new offline Type 2 Divided Road and River Swilly crossing is proposed. This will improve overall network resilience within Letterkenny and onward access to northwest Donegal. It will also enable modal shift and public transport options in conjunction with park and share/walk/cycle hub at the Dry Arch Junction as well as tie-in with the N56 junction and active travel upgrades as set out in the Letterkenny Plan and Local Transport Plan 2023-2029.

The traffic flows on the existing N13 between Dry Arch Roundabout and Pluck Roundabout, Mainline Sections 2.3 and 2.4, approximately 4.5 km, are predicted to grow to approximately 26,900 AADT for the scheme Design Year 2047. To address safety issues with the existing road section, ensure journey time reliability, route consistency and make best use of existing legacy dual carriageway, predominantly online improvements to upgrade the existing road to a modern Type 1 dual carriageway are proposed. Figure 1.3 illustrates a Type 1 dual carriageway cross section.

1.8.1.1 Section 2 – Road cross section

Using the above guidance and predicted traffic volumes for the Design Year as outlined in the Transport Modelling Report (Appendix C6.01 in Volume C: Technical Appendices of the EIAR), Section 2 mainline cross sections have been selected as shown in Table 1.14.

Table 1.14: Type of Road – Proposed Development Section 2 Mainline Carriageways

Road Name	Type of Road (DN-GEO-03031 Table 6.1)	Design / Posted Speed (km/hr)
Mainline Section 2.1 (N13 southern tie-in to Listellian junction)	Type 1 Single (7.3 m carriageway)	100 / 100
Mainline Section 2.2 (N13 Listellian junction to Dromore junction)	Type 2 Divided Road 2+2 Lanes (2 x 7.0 m carriageways)	100 / 100
Mainline Section 2.3 (N13 Dry Arch junction to Dromore junction)	Type 1 Dual Carriageway 2+2 Lanes (2 x 7.0 m carriageways)	85 / 80
Mainline Section 2.4 (N13 Dromore junction to Pluck Roundabout)	Type 1 Dual Carriageway 2+2 Lanes (2 x 7.0 m carriageways)	100 / 100
Mainline Section 2.5 (N13 Dromore Junction to Bonagee Junction)	Type 2 Divided Road 2+2 Lanes (2 x 7.0 m carriageways)	100 / 100
Mainline Section 2.6 (Bonagee Junction to N56 Ballyraine Junction at Creamery Roundabout)	Type 2 Divided Road 2+2 Lanes (2 x 7.0 m carriageways)	100 / 100

Section 2 includes Bonagee Link which connects the Dry Arch Junction and Bonagee Junction providing increased connectivity, network resilience and a direct connection to the Park and Share / Cycle facility and active travel network. Link road cross-sections have been selected as shown in Table 1.15.

Table 1.15: Type of Road – Section 2 Link Roads

Road Name	Type of Road (DN-GEO-03031 Table 6.1)	Design / Posted Speed (km/hr)
Bonagee Link	Type 2 Divided Road 2+2 Lanes (2 x 7.0 m carriageways)	85 / 80

Section 2 includes Slip Roads at the Trimragh Junction. The slip roads provide full connectivity of local roads north and south of the N13 dual carriageway by means of an overbridge with roundabout junctions. The slip roads are designed in accordance with the Compact Grade Separated Junction layout in DN-GEO-03060 and are shown in Table 1.16.

Table 1.16: Design Speed – Section 2 Slip Roads

Road Name	Junction Type	Design / Posted Speed (km/hr)
Trimragh EB Link - Slip Road	Grade Separated	30 / 50
Trimragh WB Link - Slip Road	Grade Separated	30 / 50

1.8.1.2 Alignment

Mainline Section 2.1 is the transition from the existing N13 National Road to the Proposed Development at Listellian Junction. It is a Type 1 Single Carriageway cross section, approximately 0.3 km in length.

A Type 2 Divided Road (2+2 lanes) is proposed between the new Listellian Junction on the existing N13 and the new Dromore Junction (Mainline Section 2.2). This proposed Type 2 Divided Road is approximately 2.1 km long between the junctions and follows a south-north alignment east of the existing N13. Starting at the southern and highest point at Listellian, the proposed new Type 2 Divided Road has a downhill gradient of between 4.5 to 5.0% travelling northward to the new Dromore Junction on the existing N13.

North of the proposed Dromore Junction a Type 2 Divided Road (2+2 lanes) is proposed which will connect the townlands of Dromore and Ballyraine via a new three-span bridge crossing of the River Swilly. This proposed Type 2 Divided Road is approximately 2.0 km long (Mainline Section 2.5 and 2.6) and will connect the new Dromore Junction (located on the existing N13) to the new Ballyraine Junction at the existing N56/R245 Creamery Roundabout at Ballyraine. An intermediate junction is proposed at the town boundary of Bonagee and Dromore which provides local connection and access to Bonagee industrial zone.

The 0.4 km Bonagee Link road from the new Bonagee Junction to the improved Dry Arch Junction will ensure network resilience and connection to the Park and Share / Cycle facility and overall active travel network.

The existing N13 between the Dry Arch roundabout and Pluck roundabout (4.4 km length) has a Type 1 dual carriageway cross section that is to be retained and improved (Mainline Section 2.3 and 2.4). Existing N13 carriageway realignment works are proposed at Trimragh to the eastbound lanes and at the Dromore Junction approaches. All existing at-grade local and private direct accesses to the N13 along this section will be closed with designated access points located at Dry Arch, Dromore, Trimragh and at Pluck (Section 3 interface). Section 2 works include works up to approximate chainage CH3+450 on Mainline Section 2.4 just to the west of the existing Pluck Roundabout. The proposed new Pluck Roundabout, including all tie-ins, will be constructed as part of the Section 3 works.

A section of the N13 between the proposed improved Dry Arch Junction and the new Listellian Junction will be downgraded with reduced speed limit and limited access closed in parts and closed to through traffic allowing only safe local school, residential and farm access. The existing carriageway between the improved Dry Arch Junction and the L-1114 (approximately 200 m to the south), provides right-turn facilities on the approaches to the roundabout and the L-1114 local road; these facilities will be retained.

South of the L-1114 junction, the existing N13 carriageway will be narrowed to a local road cross-section with pedestrian facilities. The existing vertical gradient (>7%), horizontal alignment and design standards are such that 5% gradients combined with frequent steps and/or ramps will be provided for active travel users.

In addition to the mainline alignments described above, connections will be provided to the existing local road network at existing and proposed junctions by means of new proposed single carriageway local roads and realignments of existing roads.

Where the proposed mainline severs existing side roads, side road connectivity will be maintained where practicable through the inclusion of proposed bridges over or under the mainline.

1.8.2 Junctions

Six junction locations have been identified for Section 2, at the following locations:

- **Listellian Junction** (Drawing 2, sheets 1 of 5) – Southern tie-in of Section 2 to the existing N13. Transition between Mainline Section 2.1 and Mainline Section 2.2.

- **Dromore Junction** (Drawing 2, sheet 2 of 5) – Tie-in between the Mainline Section 2.2 and the existing N13 at Dromore. Transition between Mainline Section 2.2 and Mainline Section 2.5.

- **Bonagee Junction** (Drawing 2, sheet 2 of 5) – Intermediate junction between Dromore Junction and Ballyraine Junction. Transition between Mainline Section 2.5 and Mainline Section 2.6.

- **Ballyraine Junction** (Drawing 2, sheet 3 of 5) – Located to the tie-in between Mainline Section 2.6 and the existing N56 and R245 at the existing Creamery Roundabout.

- **Dry Arch Junction** (Drawing 2, sheet 2 of 5) – The existing Dry Arch Roundabout with tie-ins to the N13 connecting to the proposed Dromore Junction, and a connection to the Bonagee Link to Bonagee Junction.

- **Trimragh Junction** (Drawing 2, sheet 4 of 5) – A new junction on the existing N13 dual carriageway at Trimragh. This is Mainline Section 2.4.

1.8.2.1 Listellian Junction

Listellian Junction is a new roundabout junction located at the southern tie-in with the existing N13 road. A roundabout junction has been chosen for the following reasons:

- The N13 southern approach is a single carriageway cross section and the N13 northern approach is a Type 2 Divided Road cross section. A roundabout provides a safe transition between single and dual carriageways.

- A roundabout facilitates connectivity to the local road network and local facilities (e.g. St Patrick's National School).

- A roundabout is consistent with junction types found nearby on the network.

1.8.2.2 Dromore Junction

Dromore Junction is a new junction located on the existing N13 east of the Dry Arch Junction. A roundabout design has been chosen for the following reasons:

- The existing N13 approaches from the east and west are Type 1 dual carriageways. The new realigned N13 approach from the south and the approach from the north are Type 2 Divided Roads. A roundabout provides a safe transition between these different road types.
- A roundabout solution works best with the steep local topography and the adjacent development.
- A roundabout provides connectivity to the adjacent road network and local attractions.
- A roundabout is consistent with junction types found nearby on the network.

1.8.2.3 Bonagee Junction

Bonagee Junction is a new junction located in the Bonagee area of Letterkenny. A roundabout design has been chosen for the following reasons:

- Proximity to SAC – an environmental constraint. A roundabout will have less land take compared to other junction arrangements for Type 2 Divided Roads such as Compact Grade Separated Junction.
- A roundabout solution works best with the local topography and the adjacent development.
- A roundabout is consistent with the junction types found nearby on the network.
- A roundabout facilitates connectivity to the local road network and local facilities (including the Park and Share / Cycle facility on the proposed Bonagee Link).

1.8.2.4 Ballyraine Junction (existing N56/R245 Creamery Roundabout)

Ballyraine Junction is an existing roundabout (N56/R245 Creamery Roundabout) located at the western tie-in with the existing N56/ R245 roads. An improved roundabout design has been chosen for the following reasons:

- The proposed River Swilly crossing is a new approach to the existing roundabout. This new dual carriageway cross section with traffic flows cannot be accommodated at the existing roundabout.
- The N56 and R245 are single carriageway. A roundabout provides safe transition between single and divided road cross sections.
- A roundabout facilitates connectivity to the local road network and local attractions.
- A roundabout is consistent with junction types found nearby on the network.
- Given the urban location an improved roundabout design will also facilitate signals at this junction should a need arise in the future which would be in-keeping with other nearby junctions in Letterkenny.

1.8.2.5 Dry Arch Junction

Dry Arch roundabout is an existing roundabout located at the western tie-in. An improved roundabout design has been chosen for the following reasons:

- The proposed Bonagee Link is a Type 2 Divided Road and new approach to the existing roundabout.
- The eastern N13 approach is a Type 1 dual carriageway. The western approach is a dual carriageway with reduced lane widths and reduced posted speed limit due to its urban setting. The southern approach will be downgraded from national road status to local relief road status. A roundabout provides a safe transition between these different road types.
- A roundabout facilitates connectivity to the local road network and local attractions (including the Park and Share / Cycle facility on the Bonagee Link).
- A roundabout is consistent with junction types found nearby on the network.

1.8.2.6 Trimragh Junction

Trimragh Junction is a new grade separated junction located along the existing Type 1 dual carriageway, between the proposed Dromore Junction and the new Pluck Roundabout to the east at the interface between Section 2 and Section 3 of the Proposed Development. Trimragh Junction allows the amalgamation and closure of several existing nearby legacy at-grade junctions. Trimragh Junction maintains the continuity of access for local users along this section of the dual carriageway and offers a safer road network through grade separation and improved design.

1.8.3 Side Roads

The proposed mainline is connected to the existing road network through a series of junctions, slip roads and link roads. At these connections the existing road network is impacted and realignment or modification has been required.

The proposed mainline will cross the existing road network at locations without providing connection to the existing road network. At these crossings the existing road network will be impacted and realignment or modification to the existing road network has been designed. These sections of existing road network are referred to as side roads (or local roads). Each side road is either bridged, realigned or closed as shown in Drawing 2.

1.8.4 Access Roads

Access roads shall be provided to allow access to lands severed by the project. They also serve properties where existing access is affected. Access Roads are generally 4.0m in width with 1.0m verges on either side and in compliance with TII Publications standard detail drawings CC-SCD-00706. Passing bays have also been provided for in accordance with the standards where the length of the access roads exceeds 250m.

New field and domestic house entrances are provided to replace existing entrances impacted by the proposed road development. Field accesses will be in accordance with TII Publications standard detail drawings CC-SCD-02754. Domestic accesses will be in accordance with TII Publications standard detail drawings CC-SCD-02753.

Surface dressing and an asphalt concrete dense binder course shall be provided for access roads on steep gradients (over 5%) and for accesses to private dwellings or farmsteads.

The details of the proposed access roads and the landowner parties they serve across the proposed road development are outlined in Table 1.17.

Table 1.17: Section 2 Access Roads

Reference Number	Approx. Mainline Chainage	Approximate Length	Plot ID / Landowner Reference	Comments
AR 2.01	L-1064 Connector 0+215m	110 m	2001, 2002 & 2003	Access to existing road / lands from realigned side road
AR 2.02	L-1064 Connector 0+400m on Existing Local Road	165 m	2004 & 2005	Access to existing road / lands from realigned side road
AR 2.03	L-1064 Connector 0+500m	35m	2004 & 2005	Access to lands severed by the proposed road development
AR 2.04	L-1064 Connector 0+560m	25m	2004 & 2005	Access to lands severed by the proposed road development
AR 2.05	L-1064 Connector 0+690m	80m	2006	Access to attenuation pond and lands severed by the proposed road development

Reference Number	Approx. Mainline Chainage	Approximate Length	Plot ID / Landowner Reference	Comments
AR 2.06	L-1064 Connector 0+800m	80m	2007,2016	Access to lands severed by the proposed road development
AR 2.07	Mainline 2.2 0+500m (On L-1094 Connector)	30m	2017	Access to attenuation pond
AR 2.08	Mainline 2.2 1+250m (On L-5784 Connector)	30m	2042	Access to attenuation pond and lands severed by the proposed road development
AR 2.09	Mainline 2.2 1+250m (On L-5784 Connector)	65m	2038, 2039	Access to existing road / dwelling from realigned side road
AR 2.10	Mainline 2.2 1+250m (On L-5784 Connector)	45m	2044	Access to existing road / dwelling from realigned side road
AR 2.11	Mainline 2.2 1+960m (On L-58141 Connector)	25m	2126 & 2052	Access to existing road / dwelling from realigned side road
AR 2.12	Mainline 2.6 1+1200 (on LX-2011)	70m	2070	Access to lands severed by the proposed road development
AR 2.13	Mainline 2.6 1+120m (on LX-2011)	65m	2070	Access to attenuation pond and lands severed by the proposed road development
AR 2.14	Mainline 2.6 0+750	465m	2071, 2084 & 2900	Access to attenuation pond, existing road and lands severed by the proposed road development
AR 2.15	Mainline 2.6 0+350m	140m	2086	Access to attenuation pond and lands severed by the proposed road development
AR 2.16	N56 Tie-In 0+060m	150m	2090 & 2901	Access to existing road / dwellings from realigned side road
AR 2.17	Mainline 2.4 0+300m (On LX-2005)	45m	2094	Access to attenuation pond and lands severed by the proposed road development
AR 2.18	Mainline 2.4 0+250m (On LX-2005)	50m	2105	Access to dwelling
AR 2.19	Mainline 2.4 0+875m	25m	2095 & 2097	Access to attenuation pond and lands severed by the proposed road development
AR 2.20	Mainline 2.4 1+500m (On L-5494 Connector)	150m	2107	Access to attenuation pond
AR 2.21	Mainline 2.4 1+960m (On L-5494 Connector)	25m	2145	Access to existing road / dwellings from realigned side road
AR 2.22	Mainline 2.4 3+010m (On L-5494 Connector)	25m	2116	Access to attenuation pond
AR 2.23	Mainline 2.1 0+100 (On L-5794 Tie In)	150m	2011, 2010 & 2009	Access to lands severed by the proposed road development
AR 2.24	Mainline 2.2 0+500 (On Lx-2004)	60m	2024, 2137 & 2140	Access to existing road / dwellings from realigned side road

Reference Number	Approx. Mainline Chainage	Approximate Length	Plot ID / Landowner Reference	Comments
AR 2.25	Mainline 2.4 1+400m (On L-1154 Connector)	90m	2119, 2067 & 2133	Access to existing road / dwellings from realigned side road
AR 2.26	Mainline 2.1 0+250 (On L-1094 Connector)	355m	2013 & 2113	Access to existing road / dwellings from realigned side road
AR 2.26A	Mainline 2.1 0+250 (On AR 2.26)	125m	2017, 2014 & 2015	Access to lands from realigned side road
AR 2.27	Mainline 2.2 1+350 (On L-5784 Connector)	70m	2038	Access to lands from realigned side road
AR 2.28	Mainline 2.3 0+250 (On LX-2009)	55m	2065	Access to lands severed by the proposed road development
AR 2.29	Mainline 2.6 0+000 (On LX-2013)	100m	2134 & 2086	Access to lands severed by the proposed road development
AR 2.30	Mainline 2.6 0+000 (On LX-2013)	45m	2091	Access to lands severed by the proposed road development
AR 2.31	Mainline 2.5 0+200 (On LX-2011	145m	2076	Access to attenuation pond and lands severed by the proposed road development
AR 2.32	Mainline 2.1 0+250 (On L-1064 Connector)	140m	2011, 2010 & 2007	Access tie-in to existing road
AR 2.33	Mainline 2.2 0+450 (On existing N13)	25m	2142, 2023,2026 & 2141	Access tie-in to existing road
AR 2.34	Mainline 2.6 0+350m	115m	2086	Access to attenuation pond and lands severed by the proposed road development
AR 2.35	Mainline 2.6 0+450m	105m	2086	Emergency access to river swilly and access to lands severed by the proposed road development
AR 2.36	Mainline 2.6 0+570m	110m	2071	Emergency access to river swilly and access to lands severed by the proposed road development
AR 2.37	Mainline 2.6 0+800m (On AR2.14)	45m	2084	Access to attenuation pond and lands severed by the proposed road development
AR 2.38	Mainline 2.6 0+950m (On AR2.14)	20m	2082, 2071 & 2900	Access tie-in to existing road
AR 2.39	Mainline 2.4 0+250m (On L-11141 Connector, 0+220)	50m	2093, 2105 & 2078	Tie-in to existing access road
AR 2.40	Bonagee Link, 0+160m	60m	2900	Access to park and share facility

1.8.5 Active Travel Network

Active travel networks included throughout Section 2 include approximately 16 km of shared pedestrian / cycle facilities. These segregated facilities include pedestrian / cycle paths located either adjacent to or remote from the proposed mainlines, connections to the local road network and connections to local amenity areas and areas of interest, including park and share / cycle facilities described below.

All pedestrian/cycle crossings of the mainline carriageway are grade separated.

The active travel network has been designed to provide an amenity facility for leisure use, enhance local access to other amenities (such as football pitches, woodland walks) through active travel and maintain local connectivity through use of active travel.

It is also critical for modal shift and moving towards greener transport solutions.

In addition to the mainline shared cycleway/footway, Section 2 also includes active travel facilities in the following locations:

- Connection to St. Patrick’s National School at Ch 0+850.
- Connection to existing community at Cullion Road at Ch. 0+550 m.
- Connection to the existing community along the existing N13 Lurgybrack section, also includes a second connection to St Patrick’s School.
- Connection to existing Donegal cycle route at Dromore at Ch 2+300 m.
- Connection to an old inactive rail bed and potential future greenway at Dromore.
- Connection to the existing active travel segregated facilities along the N56 Four Lane Road at Dry Arch roundabout.
- Connection to the existing active travel segregated facilities at Ballyraine Junction.
- Connection with a proposed Park and Share / Cycle facility and proposed bus stop adjacent to the Dry Arch Roundabout at Ch 0+200 m.
- Connection from Dromore to the N13/N14 Pluck Roundabout along the local road network linking communities from Ch 0+000m to 3+650 m.

1.8.6 Structures

The location and detail for the proposed overbridges included within Section 2 are presented in Table 1.18. Each structure family type follows a standard form described above in Section 1.5.6.

Table 1.18: Section 2 Proposed Overbridges

Structure Ref	Approx. Chainage	Description	Mainline Cross-section	Mainline Cross-section Width (m)
N13O012	Mainline Section 2.4 01+200 m	Grade separated Junction, Local road crossing over mainline	Type 1 Dual Carriageway	41.2
N13O013	Mainline Section 2.2 01+250 m	Drumany local road crossing over mainline	Type 2 Divided Road with cycle track	34.0
N13O023	Mainline Section 2.2 02+300 m	L-1114 local road crossing over mainline	Type 2 Divided Road with cycle track	33.7

The location and detail for the proposed underbridges included within Section 2 are presented in Table 1.19.

Table 1.19: Section 2 Proposed Underbridges

Structure Ref	Approx. Chainage	Description	Mainline Cross-section	Mainline Cross-section Width (m)
N56U011	Mainline Section 2.6 01+080 m	Local road crossing under mainline (for both NMU and MU)	Type 2 Divided Road with cycletrack	32.3
N56U014	Bonagee Link 00+350 m	Proposed local road crossing under mainline (for both NMU & MU)	Type 2 Divided Road with cycletrack	25.5
N56U016	Mainline Section 2.5 00+180 m	Proposed local road crossing under mainline (for both NMU & MU)	Type 2 Divided Road	24.5

1.8.6.1 River Swilly Crossing (N56R005)

The River Swilly Crossing is required to carry the proposed N56 route over the River Swilly. The River Swilly is designated part of the Lough Swilly Special Area of Conservation (SAC) and Special Protection Area (SPA).

The structure comprises a three-span varying depth post-tensioned concrete box girder bridge. The span arrangement of 63 m, 108 m, and 63 m gives a total bridge length of 234 m. The river is prone to flooding and there is a flood berm located on the southern bank at the proposed crossing location. The primary environmental constraint at this location is the River Swilly which is designated part of the Lough Swilly SAC and SPA. The SAC has seven qualifying interests including otter. The SPA is designated for multiple special conservation interest bird species. The Lough Swilly SPA is downstream of the proposed bridge crossing however it is within the flight path of commuting birds such as black headed gull and curlew upstream in the estuary outside of the SPA. There was therefore a preference for a low-level bridge which did not interfere with the commuting birds' flightpath.

The 108 m main span crosses both the river and the flood berm as well as providing setback zones to the SAC boundaries and construction activities within the watercourse will be prohibited. At the crossing point of the centreline of the Mainline and the River Swilly, the width of SAC is approximately 85 m.

The eastern pier of the bridge is set behind the combined raised flood embankment and backing toe-drain at a distance of over 50 m from the tidal River Swilly wetted channel. This is of approximately 3 m set back from the SAC boundary. The western pier is located approximately 5 m from the Lough Swilly SAC boundary and a total of 15 m from the Swilly wetted channel on gently sloping, rough grassland. No temporary construction works will take place inside the SAC.

The depth of the box girder varies from 5.3 m at the intermediate supports to 2.3 m away from the supports. The substructure consists of cast in-situ reinforced concrete piers and abutments supported by bored pile foundations. Following construction of the reinforced concrete sub-structure, the superstructure will be constructed via balanced cantilever method. The exposed concrete faces of this option will require nominal maintenance over its entire lifespan minimising whole life costs. Concrete is recognised as being a durable material with little maintenance required even in coastal areas such as the proposed crossing location.

The proposed bridge structure has an uncomplicated form and is architecturally pleasing due to the arched elevation of the girder. Structurally efficient and architecturally pleasing ratios of backspans to main span of 0.625 are achieved and the structure has excellent symmetry. A concrete box girder offers clean lines and is known to be aesthetically pleasing when viewed from close by or from underneath with no fussy details on display and a consistency of materials across the girder, deck slab and substructure.

1.8.6.2 Other Structures

N13R034 is an existing buried multi-culvert type structure that will be retained as is.

N13A016 is an existing access underpass, the northern end of which is to be demolished with a new wingwall constructed to facilitate the proposed alignment of the access travel facility.

Details of these existing structures are provided in Table 1.20.

Table 1.20: Section 2 Other Structures

Structure Ref	Approx. Chainage	Description	Mainline Cross-section	Mainline Cross-section Width (m)
N13R034	Mainline 2.4 03+400 m	Existing River Bridge over Isle Burn (buried multi culvert type structure).	Type 1 Dual Carriageway	27.8
N13A016	Mainline 2.4 01+560 m	Existing underpass, northern section to be demolished for L-5494 Connector with remaining underpass retained for Active Travel.	Type 1 Dual Carriageway	30.3

1.8.7 Underpasses, Active Travel bridges, Culverts and Retaining Walls

The location and detail of underpasses included in Section 2 are presented in Table 1.21.

Table 1.21: Section 2 Proposed Underpasses

Structure Ref	Approx. Chainage	Description	Mainline Cross-section	Mainline Cross-section Width (m)
N56P018	Mainline 2.5 00+470 m	Active travel underpass crossing under mainline	Type 2 Divided Road	38.2
N56P019	Mainline 2.3 00+620 m	Active travel underpass crossing under mainline	Type 1 Dual Carriageway	41.2

The location and detail of Active Travel Bridges included in Section 2 are presented in Table 1.22.

Table 1.22: Section 2 Proposed Active Travel Bridges

Structure Ref	Approx. Chainage	Description	Mainline Cross-section	Mainline Cross-section Width (m)
N13F031	Mainline 2.4 03+160 m	Active travel overbridge crossing over mainline	Type 1 Dual Carriageway	41.2
N13F034	Mainline 2.4 03+400 m	Active travel river bridge	N/A	N/A

Culverts with a clear span or internal diameter greater than 2.0 m are considered structures and are presented in Table 1.23.

Table 1.23 Culvert Structures

Culvert Reference	Chainage	Referenced Mainline / Side Road	Location X	Location Y	Culvert Diameter (m) / Width (m) x Height (m)	Approx. Length (m)
S2-CUL.17	n/a	AR 2.31	620033.1	910812.2	2.5 x 2.0	9.0
S2-CUL.18	1+630	Mainline 2.5	619895.2	910961.2	2.9 x 2.1	83.1
S2-CUL.19	0+550	LX-2011	619894.2	911013.5	2.9 x 2.5	34.5
S2-CUL.20	0+150	LX-2010	619821.5	911146.7	2.9 x 3.3	65.0
S2-CUL.22	0+238	LX-2011	619599	910969.5	2.5 x 3.4	25.4
S2-CUL.23	1+218	Mainline 2.6	619522.8	911135.7	3.3 x 3.5	71.0
S2-CUL.29	0+151	L-1154 Connector WB	621262.8	911076.1	3.5 x 2.0	26.6
S2-CUL.30	0+120	Trimragh WB Link	621216.6	911187.9	3.5 x 2.0	37.9
S2-CUL.31	0+048	Trimragh Link	621223.0	911270.0	3.5 x 2.0	66.9
S2-CUL.32	0+128	L-5494 Connector	621221.6	911446.9	3.5 x 4.0	79.2

The location and detail of retaining walls in Section 2 are presented in Table 1.24.

Table 1.24: Section 2 Proposed Retaining Walls

Structure Ref	Location	Approximate Length (m)	Approximate Max Effective Retained Height (m)
N13W006	Mainline 2.3, Ch 00+550	45	2.3
N13W008	Mainline 2.4, Ch 00+825	58	1.8
N13W002 (WB)	L11141 Connector, Ch00+120 to Ch00+245	125	2.8

1.8.8 Flooding and Flood Compensation Areas

Flood storage compensation areas are proposed within Section 2 to the north of the proposed Bonagee Junction Roundabout. The flood compensation areas effectively mitigate the impacts of the proposed route alignment on flood impact locally.

1.8.9 Stream Diversions/ Realignments

At several locations, the existing natural flow paths are proposed to be altered slightly to suitably align the proposed culvert crossings with the road alignment. These are relatively minor diversions in all but one case: Farsetmore stream in relation to installation of 3 no. culverts (S2-CUL.30, S2-CUL.31, S2-CUL.32) and a realignment upstream of the existing N13 culvert. It is envisaged that the new culverts and realigned channel shall be constructed offline. Where instream works are required, water management techniques shall be employed (temporary diversion, fluming or dam and pump over) to allow works in the dry. Instream works may only occur May 1st to September 30th of any year owing to fisheries restrictions on this channel. When the newly formed channel is ready to be wetted, dams will be placed at the upstream and downstream ends, and the existing channel will be destocked of fish (under appropriate licence as set out in Chapter 9B -

Biodiversity - Aquatic) before diverting it into the new channel. Rigorous mitigation measures for water quality protection (mainly related to potential suspended solids losses) will be employed to prevent water quality degradation. Sensitive reinstatement of open channel sections shall be undertaken to mimic natural step-pool and riffle run habitats. Water quality protection measures will be employed as set out in Chapter 11 Water and Chapter 9B Biodiversity Aquatic. Hydromorphology shall be restored according to measures set out in Chapter 9B Biodiversity Aquatic, Section 9B.6.1.1 (Stream Diversion and Channel Realignment Measures) notably:

- Newly formed channel base widths will be designed to match the width of the original channel.
- Newly formed channel sections shall mimic (or improve) the existing habitats. They will incorporate instream substates of locally sourced, washed, rounded gravels and meanders that give rise to flow type variation (riffle, glide and pool sequences) as found in fish bearing waters.
- New channel sections shall be fully constructed in dry conditions using appropriate water management measures, i.e., offline construction, temporary diversion, dam and pump over, piping/fluming.

1.8.10 Drainage Infrastructure

The details and locations for the proposed drainage culverts, proposed outfalls and attenuation ponds included within Section 2 are provided in Chapter 11: Water. The following drainage features are proposed for Section 2:

- 37 No. culverts for watercourse crossings.
- 2 No. drainage networks on the mainline carriageway.
- 10 No. drainage networks on side roads.
- 12 No. attenuation ponds with 12 No. outfalls.

Design details regarding Section 2 proposed culverts are outlined in Table 1.25.

Table 1.25: Section 2 Proposed Culvert Schedule

Culvert Reference	Chainage	Referenced Mainline / Side Road	Location X	Location Y	Culvert Diameter (m) / Width (m) x Height (m)	Approx. Length (m)
S2-CUL.01	0+166	L-1064 Connector	619703.6	907809.6	1.2Ø	26.3
S2-CUL.02	0+515	L-1064 Connector (Farm Access)	619719.5	908155.4	1.2Ø	8.0
S2-CUL.03	0+540	L-1064 Connector	619762.1	908164.3	1.2Ø	40.8
S2-CUL.04	0+558	L-1064 Connector (Farm Access)	619795.9	908169.9	1.2Ø	8.3
S2-CUL.05	0+677	L-1064 Connector	619816.4	908290.7	1.2Ø	20.1
S2-CUL.06	0+904	L-1064 Connector	619831.2	908512.8	1.2Ø	55.4
S2-CUL.07	0+235	L-1094 Connector	619394.2	908731.2	1.2Ø	20.4
S2-CUL.08	0+129	L-1094 Connector	619392.5	908819.9	1.2Ø	20.2

Culvert Reference	Chainage	Referenced Mainline / Side Road	Location X	Location Y	Culvert Diameter (m) / Width (m) x Height (m)	Approx. Length (m)
S2-CUL.09	0+024	LX-2004	619314.1	908971.1	1.2Ø	32.7
S2-CUL.10	0+190	L-5784 Connector	619676.7	909646.2	1.2Ø	10.1
S2-CUL.11	0+160	L-5784 Connector	619636.6	909698.2	1.2Ø	21.2
S2-CUL.12	0+400	L-5784 Connector	619863.3	909773.3	1.2Ø	28.1
S2-CUL.13	1+411	Mainline 2.2	619770.4	909885.8	1.5Ø	45.7
S2-CUL.14	1+680	Mainline 2.2	619878.1	910133	1.2Ø	45.9
S2-CUL.15	1+687	Mainline 2.2 (Farm Access)	619851.1	910159.7	1.2Ø	10.0
S2-CUL.16	0+130	L-1114 Connector	620046.6	910650	1.25 x 1.75	52.6
S2-CUL.16A	0+625	Mainline 2.3	620101.0	910731.3	1.75 x 1.75	59.1
S2-CUL.17	n/a	AR 2.31	620033.1	910812.2	2.5 x 2.0	9.0
S2-CUL.18	1+630	Mainline 2.5	619895.2	910961.2	2.9 x 2.1	83.1
S2-CUL.19	0+550	LX-2011	619894.2	911013.5	2.9 x 2.5	34.5
S2-CUL.20	0+150	LX-2010	619821.5	911146.7	2.9 x 3.3	65.0
S2-CUL.21	0+200	Bonagee Link	619581.6	910840.2	2.0 x 3.2	48.4
S2-CUL.22	0+238	LX-2011	619599	910969.5	2.5 x 3.4	25.4
S2-CUL.23	1+218	Mainline 2.6	619522.8	911135.7	3.3 x 3.5	71.0
S2-CUL.24	0+942	Mainline 2.6	619339.1	911329.9	1.25 x 1.35	67.7
S2-CUL.25	0+750	Mainline 2.6	619221.5	911499.2	2.0 x 2.5	95.2
S2-CUL.26	0+056	LX-2005	619964.5	911226.6	1.5 x 2.6	41.0
S2-CUL.27	0+325	LX-2005	620215.2	911241.3	1.2Ø	31.3
S2-CUL.27A	0+458	LX-2005 (Farm Access)	620312.4	911142.9	1.2Ø	13.5
S2-CUL.27B	0+390	LX-2005 (Farm Access)	620276.8	911209.2	1.2Ø	20.4
S2-CUL.28	0+695	LX-2005	620390.3	910918.6	1.5Ø	35.5
S2-CUL.29	0+151	L-1154 Connector WB	621262.8	911076.1	3.5 x 2.0	26.6
S2-CUL.30	0+120	Trimragh WB Link	621216.6	911187.9	3.5 x 2.0	37.9
S2-CUL.31	0+048	Trimragh Link	621223.0	911270.0	3.5 x 2.0	66.9
S2-CUL.32	0+128	L-5494 Connector	621221.6	911446.9	3.5 x 4.0	79.2
S2-CUL.33	2+635	Mainline 2.4	622410.8	911220.6	1.2Ø	89.4
S2-CUL.34	2+928	Mainline 2.4	622640.7	911068.34	1.8Ø	75.7

Design details regarding drainage networks on the mainline carriageway and side roads is provided in Table 1.26.

Table 1.26: Section 2 Carriageway Drainage Network Details

Drainage Network Ref.	Mainline / Side Road (No.)	Chainage	Outfall
S2-ML-DN-01	Mainline 2.1 + 2.2 Listellian Junction L-5784 Connector L-58141 Connector L-11141 Connector Dromore Junction Mainline 2.4 Mainline 2.5 L-1064 Connector L-11141 Connector	0+000 to 2.364 - 0+300 to 0+784 0+000 to 0+458 0+135 to 0+274 - 0+000 to 0+220 0+205 to 0+564 1+200 to 1+326 0+000 to 0+250	Outfall 05
S2-ML-DN-02	Mainline 2.4 Trimragh Junction L-1154 Connector EB L-5494 Connector Trimragh WB Link	0+700 to 1+415 - 0+000 to 0+305 0+000 to 1+030 0+000 to 0+340	Outfall 09
S2-SR-DN-01	L-1064 Connector AR 2.34 Listellian Junction AR 2.34	0+139 to 1+200	Outfall 01
S2-SR-DN-02	L-1094 Connector L-1094 / LX-2004 Junction AR 2.28 LX-2004	0+045 to 0+458 - 0+040 to 0+353 0+000 to 0+110	Outfall 02
S2-SR-DN-03	LX-2004 L-5784 Connector	0+110 to 0+400 0+078 to 0+300	Outfall 03
S2-SR-DN-04	LX-2009 LX-2011	0+028 to 0+304 0+178 to 0+740	Outfall 11
S2-SR-DN-05	Bonagee Link	0+114 to 0+430	Outfall 04
S2-SR-DN-06	Mainline 2.6	0+440 to 1+330	Outfall 06
S2-SR-DN-07	Mainline 2.6	0+160 to 0+440	Outfall 07
S2-SR-DN-08	LX-2010 Dromore Junction LX-2010 Bonagee Junction Mainline 2.5 L-11141 Connector	0+000 to 0+749 - 0+000 to 0+274 - 0+000 to 0+205 0+250 to 0+350	Outfall 12
S2-SR-DN-09	L-11141 Connector	0+350 to 1+225	Outfall 08
S2-SR-DN-10	L-5494 Connector	1+030 to 2+093	Outfall 10

Design details regarding attenuation pond and outfalls is provided in Table 1.27.

Table 1.27: Section 2 Proposed Attenuation Pond Details and Outfall Locations

Ref. No.	Attenuation Pond Details							Outfall locations	
	Easting	Northing	Total Catchment Drainage Area (ha)	Greenfield Runoff Rate (l/s)	Pavement Area (ha)	Attenuation Pond – Volume of Storage (m^3)	Invert Level of Attenuation Pond (m)	Easting	Northing
1	619,889.418	908,312.272	1.656	16.13	1.132	793	89.266	620,014.4	908,275.508
2	619,218.194	909,029.663	1.776	17.296	0.772	851	92.822	619,207.8	909,103.96
3	619,569.217	909,729.556	1.79	17.438	0.882	857	61.715	619,583.1	909,764.597
4	619,510.998	910,798.814	0.552	5.378	0.48	243	1.969	619,536.1	910,832.264
5	619,984.873	911,080.825	18.959	184.679	11.43	9,299	1.417	619,978.6	911,202.441
6	619,272.069	911,526.450	2.048	19.953	1.862	985	1.3	619,238.2	911,551.28
7	619,032.408	911,816.693	1.062	10.343	0.559	459	5.333	619,084.1	911,775.622
8	620,799.231	911,295.331	1.181	11.503	0.69	583	1.828	620,843.3	911,429.385
9	621,267.942	911,562.239	7.126	69.419	5.07	3,420	2.417	621,219	911,625.643
10	622,807.578	911,039.897	1.835	17.873	0.686	915	2.13	622,739.7	911,157.954
11	619,533.722	911,034.733	2.067	20.134	0.753	1,019	0.536	619,516.7	911,096.939
12	620,241.474	911,266.207	1.915	18.654	1.844	941	2.051	620,205.8	911,296.037

1.9 Design – Section 3 N14 Manorcunningham to Lifford/ Strabane/ A5 Link

The Section 3 mainline route corridor is approximately 18.1 km long and extends from approximately 0.3 km west of the proposed N13/N14 Pluck Roundabout (interface with Section 2) to the border with Northern Ireland on the River Finn to the south of Lifford. This section includes the proposed cross border link with the A5 (N14/N15 to A5 Link), that will connect to a proposed Trunk Road T3 in Northern Ireland which will in turn connect to the proposed A5 WTC to be pursued by the Northern Ireland Department for Infrastructure (See Figure 1.13), and discussion in Section 1.9.1.1 below. Refer also to Appendix 2, Drawing 3 (Sheets 1 to 10).

The interfaces with the existing road network include:

- N13 at Manorcunningham (interface with Section 2) (N13/N14 Pluck Roundabout).
- “Left-in Left-out” northbound connection to existing N14 Local Road at Drumoghill (Drumoghill Junction).
- “Left-in Left-out” southbound connection to existing N14 at Doorable (Drumoghill Junction).
- R236 / existing N14 east of Raphoe (R236 Ballinalecky Junction).
- Existing L2444 local road, to be upgraded to the R264 at Ballinadrait and existing N14 at Rossgeir (Balindrait Junction).
- Tie-in to N15.

The Proposed Development can be summarised under the following elements. The lengths of the individual sections are approximate.

Roads:

- 0.3 km of Type 1 Dual Carriageway (realigned and improved) extending from the proposed N13/N14 Pluck Roundabout westwards to the interface with Section 2 (Drawing 3, sheet 1 of 10).
- 17.5 km of Type 2 Divided Road Road extending from Manorcunningham (N13/N14 Pluck Roundabout) to Lifford (Lifford Junction) (Drawing 3, sheets 1 to sheet 10 of 10).
- 0.3 km of Type 2 Divided Road extending from Lifford (Lifford Junction) to the Northern Ireland Border (N14/N15 to A5 Link) (Drawing 3, sheet 10 of 10).
- 16.0 km of Type 1, Type 2 and Type 3 Single Carriageway roads being realigned as part of the Proposed Development.

Junctions:

- N13/ N14 Pluck Roundabout.
- Drumoghill Junction (northbound left in/left out at Drumoghill and southbound left in/left out at Doorable.
- R236 Ballinalecky Junction.
- Ballindrait Junction.
- N14/N15 Lifford Junction.

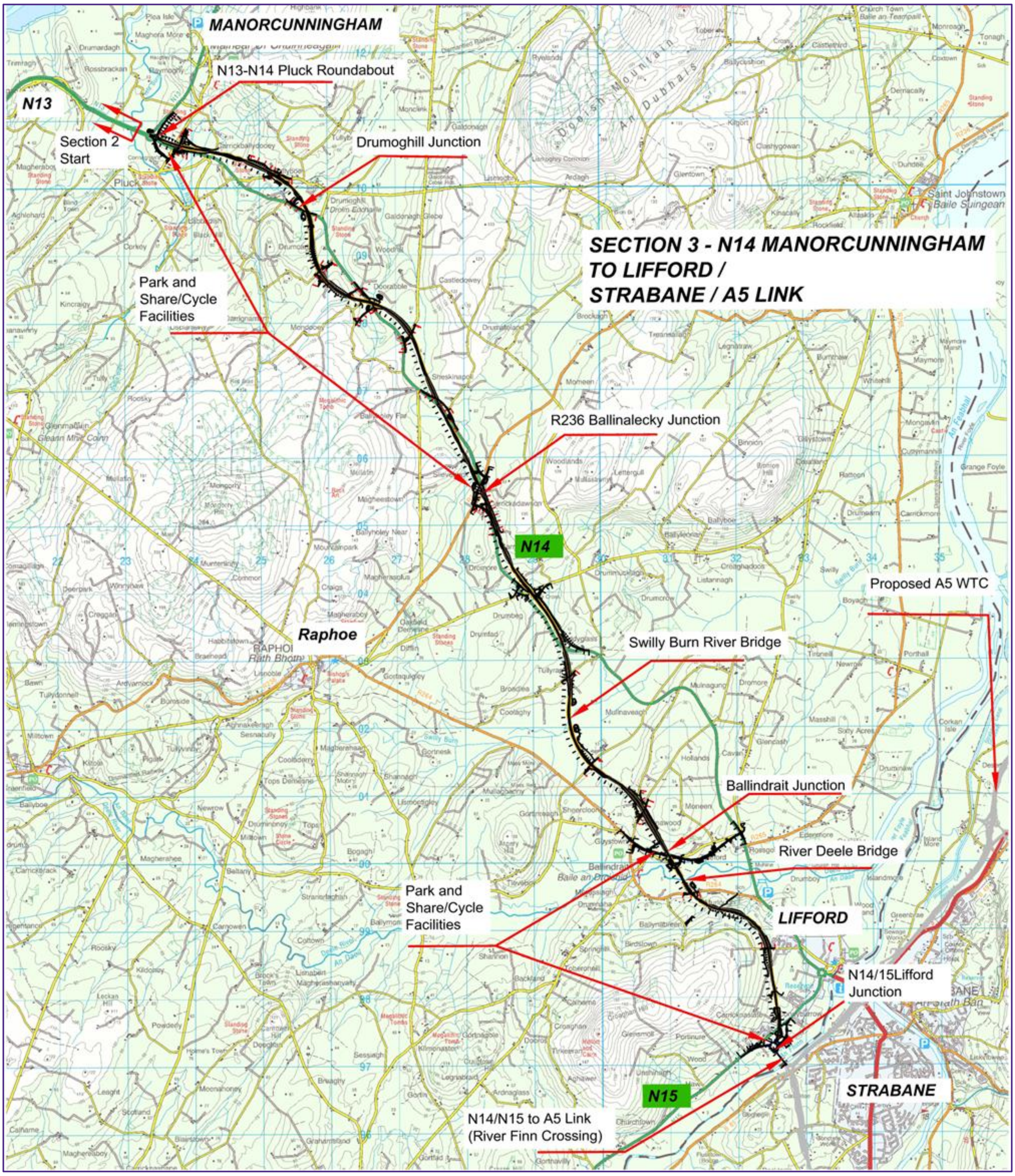

Figure 1.13: Section 3 Proposed Development

Structures:

- 287 m long, clear-span bridge over the river Finn at the proposed N14/N15-A5 Link, south of Lifford
- Two river bridges
- Seven road overbridges
- Eight road underbridges
- Two active travel underpasses
- Four accommodation underpasses
- One active travel overbridge
- One bat house in the vicinity of Ballindrait
- One deer / mammal underpass
- Various culverts, gantries, and environmental noise barriers

Active Travel

- Provision of active travel infrastructure: this includes connections to existing infrastructure and four new Park and Share / Cycle facility located at Pluck Roundabout, R236 Ballinalecky Junction, Ballindrait Junction and N14/N15 Lifford Junction, as illustrated in Drawing 3.

Other Works:

- Access roads and accommodation roads.
- Provision of attenuation ponds, flood compensatory measures, watercourse diversions and associated drainage infrastructure.
- Provision of existing utility diversions and new utility infrastructure.
- Provision of landscape planting, signage, lighting, accommodation works ancillary to the construction and operation of the Proposed Development.

1.9.1 Roads

To achieve best possible user safety, journey time reliability, average speed targets and capacity for freight, passenger and public transport, a Type 2 Divided Road is proposed for the mainline. Figure 1.2 illustrates the Type 2 Divided Road cross section. This road cross section also fully accommodates segregated active travel facilities enabling modal shift and further aiding Park and Share and Park and Ride/Walk alternatives on the network. Predicted traffic volumes were considered particularly freight and commercial while the transition to alternative green fuels is augmented by regular and strategically positioned EV Charge hubs along the TEN-T network as per that regulation. In addition, traffic figures include the government target of 30% EVs on the Irish road network by 2030 with a much greater percentage expected by the Proposed Development design year.

The N14 Manorcunningham to Lifford/ Strabane/ A5 Link section connects to dual carriageway roads at the northern end with the existing N13 dual carriageway to Letterkenny. At the southern end, the road will connect with the existing N15 (Lifford to Stranorlar), with a link across the River Finn to Northern Ireland, the N14/N15 to A5 Link. This link will connect to a proposed Trunk Road T3 in Northern Ireland which in turn will connect to the proposed A5 WTC. Further details on this proposed cross-border connection are provided in the next Section 1.9.1.1.

Cross section analysis assessed the carriageway types under Safety, Environment, Accessibility and Social Inclusion, Integration and Physical Activity. The Type 2 Divided Road has a significant accident reduction and other safety benefits compared to the Type 1 Single Carriageway. Ireland's Government Road Safety Strategy 2021 - 2030 directs that going forward only divided national primary roads can be posted 100 kph. The Proposed Development mainline is therefore a divided cross section. This also supports the National Planning Framework First Revision National Strategic Outcome 2 objective of 'improving average journey times targeting an average inter-urban speed of 90 kph'.

Similarly, the environmental benefits are greater for the Type 2 Divided Road. This is generally as a result of the Type 2 Divided Road being a more flexible alignment as the Single Carriageway has to provide for a minimum 50% full overtaking design standards. It is therefore easier to modify and realign the Type 2 Divided Road alignment to avoid or reduce environmental impacts. The Type 2 Divided Road is preferred over the single carriageway option.

For link roads and other roads, a combination of traffic volumes, route consistency/ tie-in, safety and design requirements were key factors in determining the most appropriate cross section.

1.9.1.1 N14/N15 to A5 Link

Section 3 of the Proposed Development includes the N14/N15 to A5 Link south of Lifford to the border with Northern Ireland on the River Finn where it will connect to a proposed Trunk Road T3 (A5 Western Transport Corridor to Land Frontier), which in-turn will connect to the proposed A5 Western Transport Corridor (WTC). A proposed Trunk Road T3 (of approximately 79 metres of new road) will provide a link between the proposed A5 WTC in Northen Ireland and the Project, meeting at the border between Northern Ireland and Ireland.

In Northern Ireland, the proposed A5 WTC is currently divided into three sections. Section 1 of the A5 WTC will connect to a proposed Trunk Road T3 which in turn will connect to the N14/N15 to A5 Link section of the Proposed Development. Section 1 of the A5 WTC is being advanced through the statutory planning process in Northern Ireland.

In June 2025, the High Court in Northern Ireland made a judgement regarding the A5 WTC whereby the permission granted for sections 2 and 3 of the A5 WTC was quashed. That decision has been appealed to the Court of Appeal in Northern Ireland.

The proposed N14/N15 to A5 Link (which link, together with a proposed Trunk Road T3, is shown in red on Figure 1.14 below), including the proposed bridge over the River Finn (i.e. the link between the N14/N15 Lifford Junction and a proposed Trunk Road T3) will not be constructed until such time as a proposed Trunk Road T3 / Section 1 of the A5 WTC has been constructed or is under construction. As described in the following Section 1.9.1.2, the section of the Proposed Development from Ballindrait Junction to the N14/N15 Lifford Junction is an essential element of the Project and can operate effectively without the N14/N15 to A5 Link should construction of the N14/N15 to A5 Link be delayed or not proceed. In the scenario without the proposed N14/N15 to A5 Link, traffic will still use the existing N14/ N15 /A38 River Foyle bridge crossing at Lifford/ Strabane for traffic travelling to and from Northern Ireland (as shown in green on Figure 1.14 below). Further information on this scenario is presented in Section 4.14.10.

The scenarios with and without the N14/ N15 to A5 Link (which is the Proposed Development's connection to a proposed Trunk Road T3 and the A5 WTC) are considered in the EIAR.

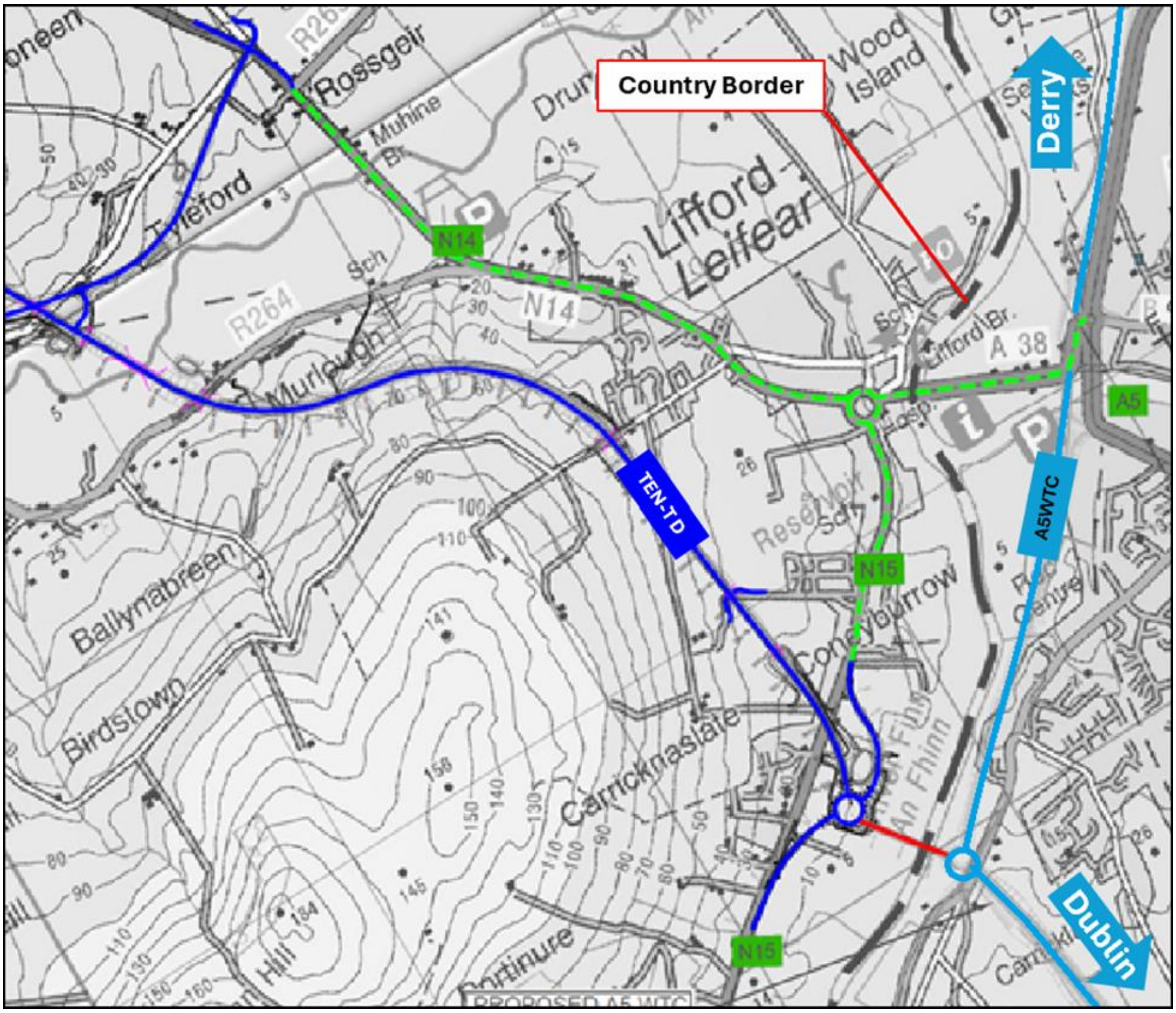

Figure 1.14: Cross Border Connections (Existing and Proposed A5WTC)

1.9.1.2 Ballindrait Junction to N14/N15 Lifford Junction

The proposed new Type 2 Divided Road (2+2) between the proposed Ballindrait Junction and N14/N15 Lifford Junction, even without the N14/N15 to A5 Link, is an essential element of the Proposed Development. It delivers on continued improvement of the Donegal TEN-T Comprehensive Network, as per Regulation (EU) 2024/1679. This section, bypassing Lifford and ribbon development along the existing N14, will enhance the efficiency and safety performance of the road network through a high quality TEN-T corridor while addressing legacy substandard junctions and accesses along the existing TEN-T network. The new active travel provision included as part of the Project, which forms part of the National Cycle Network, provides a coherent and linked up active travel network between Lifford/Strabane and Letterkenny (Regional Centre, NPF), connecting with existing urban facilities as well as the cross-border North West Greenway Network (Lifford-Strabane) and the Lifford to Castlefin Greenway. This will complete missing links to significantly expand the active travel network for local communities within Lifford, Strabane, Ballindrait and the wider northwest region. This section also includes the proposed modal hub at Lifford. The modal hub allows seamless and efficient integration of active travel ~ public transport ~ private vehicle modes. The modal hub is located at a strategically important interchange, approximately 500 m from the Ireland/ Northern Ireland border. Regulation (EU) 2023/1804 of the European Parliament and of the Council of 13 September 2023 on the deployment of alternative fuels infrastructure and repealing Directive 2014/94/EU requires rest areas to be provided along the TEN-T Comprehensive Network with a maximum distance of 60 km between these rest areas. Following the withdrawal of the United Kingdom from the EU, the next section of TEN-T comprehensive network is approximately 66 km southeast of Lifford in Co. Monaghan, already exceeding the 60 km maximum requirement. Therefore, the Park and Share facility at Lifford is considered a critical element of Section 3 of the Project in order to comply with Regulation (EU) 2023/1804. The Park and Share facility will also encourage modal shift and the transition to sustainable, low carbon alternatives within the urban centres of Lifford, Ballindrait and Strabane (NI), within the Northwest City Region and along the core Northwest~Northern Ireland~Dublin transport corridor.

Furthermore, this section will contribute towards enhanced cross-border and Northwest connectivity.

1.9.1.3 Section 3 – Road cross section

In considering all these factors, the mainline cross sections have been selected as shown in Table 1.28. The segregated cycle track is a shared pedestrian/cycle facility adjacent to for remote from the Type 2 Divided Road.

Table 1.28: Type of Road – Section 3 Mainline

Section	Road Name	Type of Road from DN-GOE-03031 Table 6.1	Design / Posted Speed (km/hr)
3	**Mainline Section 3**	Type 2 Divided Road 2+2 Lanes (2 x 7.0 m) carriageways	100 / 100

Link road cross-sections for Section 3 have been developed based on predicted traffic volumes for the Design Year 2047 (See Table 1.29) as outlined in the Transport Modelling Report (Appendix C6.01).

Table 1.29: Type of Road – Section 3 Link Roads

Section	Road Name	Type of Road from DN-GOE-03031 Table 6.1	Design / Posted Speed (km/hr)
3	**L2444 Ballindrait Link Road**	Type 3 Single (6.0 m) Carriageway	85 / 80

Table 1.30 lists the slip roads within Section 3 used for the Proposed Development.

Table 1.30: Design Speed – Section 3 Slip Roads

Section	Road Name	Junction Type	Design / Posted Speed (km/hr)
3	**Drumoghill Junction – North Link**	Compact Grade Separated	30 / 50
3	**Drumoghill Junction – South Link**	Compact Grade Separated	30 / 50
3	**R236 Ballinalecky Junction Link North**	Compact Grade Separated	30 / 50
3	**R236 Ballinalecky Junction Link South**	Compact Grade Separated	30 / 50
3	**Ballindrait Junction Link North**	Compact Grade Separated	30 / 50
3	**Ballindrait Junction Link South**	Compact Grade Separated	30 / 50

1.9.1.4 Alignment

The existing section of the N14 road, which is approximately 17.5 km in length, commences at the Pluck Roundabout, the junction between the N13 and N14 near Manorcunningham and continues as a single carriageway in a south easterly direction to Lifford. There is an existing border crossing into Northern Ireland at Lifford/Strabane, across the River Foyle (north of the confluence of the River Finn and Mourne River).

The mainline of Section 3 (N14) of the Proposed Development will be a Type 2 Divided Road, approximately 17.5 km long. At its northern extent it commences at the N13/ N14 Pluck Roundabout, where it connects to Section 2, and follows a similar alignment as the existing N14 for approximately 800 m. The corridor then continues in a similar westerly direction offline towards Drumoghill before turning south through Drumcairn towards the existing N14 at Sheskinapoll. The corridor then aligns in a south easterly direction for approximately 4 km to Feddyglass running close to the existing N14. At this point, the corridor crosses the existing N14 continuing to the townland of Tamnawood. From here the corridor continues in a south easterly direction to Murlough and then curves around to the east side of Croaghan Hill and subsequently extends in a southerly direction between Conneyburrow and Beechwood Park crossing the existing N15 to a proposed roundabout, the N14/N15 Lifford Junction. This junction will provide connection back to Lifford and the existing bridge crossing into Strabane, along with a connection to the existing the N15 travelling south toward Ballybofey/ Stranorlar. The junction will also provide access to the proposed N14/N15 to A5 Link creating a new bridge over the River Finn to Northern Ireland, where it will connect to a proposed Trunk Road T3 which in turn will connect to the proposed A5 WTC.

Where the proposed mainline severs existing side roads, side road connectivity will be maintained where practicable through the inclusion of proposed bridges over or under the mainline.

1.9.2 Junctions

The road cross section for Section 3 has been determined to be a Type 2 Divided Road. Five junction locations have been identified for Section 3 at the following locations:

- **N13/ N14 Pluck Roundabout**- Northern tie-in of Section 3 to the N13. This location overlaps with the Section 2 eastern tie-in.
- **Drumoghill Junction**- northbound left in/left out at Drumoghill and southbound left in/left out at Doorable.
- **R236 Ballinalecky Junction**- Crossing point with the R236, which aligns from Raphoe to Derry.
- **Ballindrait Junction.**
- **N14/N15 Lifford Junction**- Southern tie-in to the existing N15, providing a connection back to Lifford, and a connection to the proposed N14/N15 to A5 Link.

The choice of junction has been determined as follows:

1.9.2.1 N13/N14 Pluck Roundabout

At the northern tie-in of the Proposed Development to the N13 a roundabout has been chosen for the following reasons:

- There are high levels of traffic on the N13 to the north and west.
- Each of the roads connecting at this location have a different cross section and a roundabout provides a safe transition between these links. The N13 west of the junction is a Type 1 dual carriageway, the N13 north of the junction is a single carriageway, and the proposed N14 is proposed to be a Type 2 Divided Road.
- A roundabout facilitates access to the residual local road network.

1.9.2.2 Drumoghill Junction

Drumoghill / Doorable Junction is the first of three intermediate junctions on Section 3, and comprises a compact grade separated junction with the existing N14 (to be downgraded) split between two locations. The Drumoghill/Doorable Junction comprises two access points in the form of "left-in/left-out" junctions in close proximity to Drumoghill Village for northbound traffic (~Ch 2+300) and Doorable for southbound traffic (~Ch 4+000).

The proposed junction configuration provides for free-flowing traffic on the mainline while accommodating access to the Proposed Development for local traffic. Local traffic movements remain unaltered from the existing arrangement by the provision made to retain the existing N14 with two underbridges N14U026 and N14U044.

1.9.2.3 R236 Ballinalecky Junction

At the crossing point with the R236 a compact grade separated junction has been chosen for the following reasons:

- The approximate proposed design year mainline traffic is 9,000 AADT with the side road traffic being in the order of 2,300 AADT.

- A compact grade separated junction allows for the mainline traffic, which constitutes the majority of traffic to proceed unobstructed, providing better journey time savings than a roundabout.

1.9.2.4 Ballindrait Junction

A compact grade separated junction has been chosen for the following reason:

- The Ballindrait Junction will maintain connectivity on the realigned L2444 and R265 avoiding the necessity for local traffic to interfere with mainline strategic traffic.

- As traffic volumes are predicted to be >2,000 AADT on this link with the proposed junction, the provision of a CGSJ allows local traffic to make the required turning movements safely.

- A compact grade separated junction allows for the mainline traffic, which constitutes the majority of traffic to proceed unobstructed, providing better journey time savings than a roundabout.

1.9.2.5 N14/ N15 Lifford Junction

At the southern tie-in between the N14 and the existing N15, as well as the proposed N14/N15 to A5 Link, a roundabout has been chosen for the following reasons:

- The proposed N14 mainline and N14/N15 to A5 Link have a Type 2 Divided Road cross section and the two proposed links to the existing N15 carriageway have a Type 2 Single Carriageway cross section. A roundabout provides a safe transition between Single and Dual/Divided carriageways.

- The tie-in location is constrained with a roundabout proposed at the tie-in of the N15 to the N14/N15 to A5 link. The provision of a compact grade separated junction would not be possible without significant impact on adjoining properties.

- If there are delays in the construction of the N14/N15 to A5 Link due to delays in the construction of a proposed Trunk Road T3 and A5 WTC in Northern Ireland (or same does not proceed), then the roundabout option will still facilitate connecting to the existing N15.

1.9.3 Side Roads

The proposed mainline is connected to the existing road network through a series of junctions, slip roads and link roads. At these connections the existing road network is impacted and realignment or modification has been required.

The proposed mainline will cross the existing road network at locations without providing connection to the existing road network. At these crossings the existing road network will be impacted and realignment or modification to the existing road network has been designed. These sections of existing road network are referred to as side roads (or local roads). Each side road is either bridged, realigned or closed as shown in the Drawing 3.

1.9.4 Access Roads

Access roads shall be provided to allow access to lands severed by the project. They also serve properties where existing access is affected. Access Roads are generally 4.0m in width with 1.0m verges on either side and in compliance with TII Publications standard detail drawings CC-SCD-00706. Passing bays have also been provided for in accordance with the standards where the length of the access roads exceeds 250m.

New field and domestic house entrances are provided to replace existing entrances impacted by the proposed road development. Field accesses will be in accordance with TII Publications standard detail drawings CC-SCD-02754. Domestic accesses will be in accordance with TII Publications standard detail drawings CC-SCD-02753.

Surface dressing and an asphalt concrete dense binder course shall be provided for access roads on steep gradients (over 5%) and for accesses to private dwellings or farmsteads.

The details of the proposed access roads and the landowner parties they serve across the proposed road development are outlined in Table 1.31.

Table 1.31: Section 3 Access Roads

Reference Number	Approx. Mainline Chainage	Approximate Length	Plot ID / Landowner Reference	Comments
AR 3.01	0+300m	20 m	3001	Access to existing road / land from realigned side road
AR 3.02	0+300m	355 m	3125	Access to existing road / dwelling from realigned side road
AR 3.03	0+400m	55m	N/A	Access to attenuation pond
AR 3.04	0+300m	645m	3001,3004	Access to existing road (L6004-2) and lands severed by the proposed road development
AR 3.05	0+300m	25m	3124	Access to existing road / dwelling from realigned side road
AR 3.06	0+300m	25m	3002	Access to lands from realigned side road
AR 3.07	1+800m	240m	3001	Access to attenuation pond
AR3.08	1+800m	585m	3005, 3006, 3007	Access to lands severed by the proposed road development
AR 3.09	1+800m	150m	N/A	Access to attenuation pond
AR 3.10	1+800m	42m	3007	Access to lands from realigned side road
AR 3.11	1+800m	50m	3006	Access to lands Severed by the proposed road development from realigned side road
AR 3.12	2+300m	40m	3008	Access to lands from realigned side road
AR 3.13	2+600m	53m	N/A	Access to attenuation pond 04
AR 3.13B	2+400m	50m	N/A	Access to attenuation pond 03
AR 3.14	3+500m	40m	3019	Access to lands severed by the proposed road development
AR 3.15	3+500m	147m	3021/3022	Access to lands and dwellings severed by the proposed road development
AR 3.16	3+500m	10m	3021	Access to house severed by the proposed road development

Reference Number	Approx. Mainline Chainage	Approximate Length	Plot ID / Landowner Reference	Comments
AR 3.17	3+500m	5m	3021	Access to house severed by the proposed road development
AR 3.18	3+500m	48m	3017	Access to lands severed by the proposed road development
AR 3.19	3+500m	20m	3017	Access to lands from realigned side road
AR 3.20	3+500m	253m	3021	Access to lands severed by the proposed road development
AR 3.21	3+500m	125m	3017	Access to lands severed by the proposed road development
AR 3.22	4+500m	180m	3030	Access to attenuation pond and lands severed by the proposed road development
AR 3.23	4+500m	42m	N/A	Access to attenuation pond
AR 3.24	4+400m	32m	N/A	Access to attenuation pond
AR 3.25	4+500m	30m	3025	Access to lands severed by the proposed road development
AR 3.26	5+200m	14m	3033	Access to lands from realigned side road
AR 3.27	5+200m	20m	3033	Access to lands from realigned side road
AR 3.28	5+200m	12m	3033	Access to lands from realigned side road
AR 3.29	6+100m	12m	3165	Access to lands from realigned side road
AR 3.30	6+400m	37m	3165	Connection to existing road network
AR 3.31	6+400m	30m	N/A	Access to attenuation pond
AR 3.32	7+600m	1000m	3130/3131/3039/3040/3041	Access to lands severed by the proposed road development
AR 3.33	7+700m	30m	3041/3130/3131	Access to houses severed by the proposed road development
AR 3.34	7+700m	253m	N/A	Access to attenuation pond
AR 3.35	7+900m	73m	3042	Access to lands / dwelling from realigned side road
AR 3.36	8+200m	28m	3044	Access to lands severed by the proposed road development
AR 3.37	9+100m	417m	3044/3045	Access to lands severed by the proposed road development
AR 3.38	9+100m	10m	3045	Access to lands severed by the proposed road development
AR 3.39	9+400m	58m	3044/ 3045/3054/3055/3056/3057	Access to existing road, houses and land severed by the proposed road development
AR 3.40	9+300m	56m	3050/3051	Access to houses severed by the proposed road development
AR 3.41	10+600m	250m	3064/3065	Access to lands severed by the proposed road development
AR 3.42	10+600m	35m	3065	Access to land/ building severed by the proposed road development
AR 3.43	10+900m	440m	3065	Access to land and attenuation pond
AR 3.44	10+900m	22m	3065	Access to land severed by the proposed road development
AR 3.45	12+100m	550m	3070	Access to attenuation pond
AR 3.46	12+200m	30m	3071	Access to land from realigned side road
AR 3.47	13+00m	206m	3074	Access to lands severed by the proposed road development
AR 3.48	13+300m	225m	3074/3075	Access to existing road and lands severed by the proposed road development

Reference Number	Approx. Mainline Chainage	Approximate Length	Plot ID / Landowner Reference	Comments
AR 3.49	13+300m	100m	3075	Access to lands severed by the proposed road development
AR 3.50	13+300m	357m	3081	Access to lands severed by the proposed road development
AR 3.51	13+500m	23m	3085	Access to house from realigned side road
AR 3.52	13+700m	140m	3090	Access to Houses severed by the proposed road development
AR 3.53	13+800m	41m	N/A	Access to attenuation pond
AR 3.54	14+100m	115m	N/A	Access to attenuation pond
AR 3.55	14+100m	33m	3092	Access to attenuation pond and land Severed by the proposed road development
AR 3.56	14+100m	25m	N/A	Access to attenuation pond
AR 3.57	14+100m Ballindrait link	56m	N/A	Access to attenuation pond
AR 3.58	14+600m	66m	N/A	Access to attenuation pond
AR 3.59	16+100m	198m	3105/3106	Access to lands severed by the proposed road development, access to active travel facility
AR 3.60	16+100m	425m	3108/3109	Access to existing road and lands severed by the proposed road development
AR 3.61	16+800m	230m	3110	Access to dwelling and lands severed by the proposed road development
AR 3.62	17+000m	555m	3112	Access to lands severed by the proposed road development
AR 3.63	N15 East Tie-In	38m	3113/3114	Connection to existing road network
AR 3.64	N15 East Tie-In	135m	N/A	Access to attenuation pond
AR 3.65	N15 East Tie-In	70m	3120	Access to lands severed by the proposed road development
AR 3.66	N15 West Tie-In	215m	3144/3146/3147/3148/ 3149/3150/3151/3152/ 3153/3154	Access to existing road and lands severed by the proposed road development
AR 3.67	L5524-1 Woodhill	60m	3126	Access to existing L5524-1 from realigned L5524-1
AR 3.68	Ballindrait Link Ch 1+790m	40m	N/A	Access to existing L-2444
AR 3.69	Ballindrait Link Ch 1+830m	40m	3072	Access to house and lands severed by the proposed road development
AR 3.70	Ch 14+850	175m	3101	Access to lands severed by the proposed road development
AR 3.71	Ch 14-860	185m	3089	Access to lands severed by the proposed road development

1.9.5 Active Travel Network

The active travel networks throughout Section 3 include approximately 26 km of shared pedestrian / cycle facilities. These facilities include pedestrian / cycle paths located adjacent to and remote from the proposed mainlines, connections to the local road network and connections to local amenity areas and areas of interest, including park and share / cycle facilities described below.

The active travel network has been designed to provide an amenity facility for leisure use, enhance local access to other amenities (such as football pitches, woodland walks) through active travel and maintain local connectivity through use of active travel.

In addition to the mainline shared cycleway/footway, Section 3 also includes Non-Motorised User (NMU) facilities as part of the cross section in the following locations:

- Ballindrait Link Road Type 2 single carriageway cross-section, which connects the R264 to the existing N14 at Rossgeir.
- A connection from the mainline at Croaghan Hill to Murlough, connecting to the existing R264 near St. Patrick's Church, Murlough, and the termination point for the Northwest Greenway Route 3.
- Park and share / cycle facilities at Ch 0+100, 7+600, 14+000 and 17+500.
- Connection to the existing local road network at approximate Ch 2+200 which will facilitate any future greenway project along the disused railway line. An underpass is also being provided where the mainline crosses the disused railway line.
- Numerous connections to the local road network.

1.9.6 Structures

The location and detail for the proposed overbridges included within Section 3 are presented in Table 1.32. Each structure family type follows a standard form described in Section 1.5.6 above .

Table 1.32: Section 3 Proposed Overbridges

Structure Ref	Approx. Mainline Chainage	Description	Mainline Cross-section	Mainline Cross-section Width (m)*
N14O003	00+350	L1154 and L1294 (Type 3 Single carriageway) crossing mainline and cycle track. The overbridge will have a cycletrack within the verge.	Type 2 Divided Road with cycletrack	29.3
N14O051	05+170	L1214 (Galdonagh Road) over mainline. Cycletrack runs within verge of mainline (5.5 m separation from edge of road pavement)	Type 2 Divided Road with cycletrack	32.3
N14O062	06+240	Existing N14 over mainline	Type 2 Divided Road with cycletrack	28.5
N14O076	07+650	Grade Separated Junction: R236 over N14 Mainline. Includes cycle track within the verge of overbridge.	Type 2 Divided Road with cycletrack	28.5
N14O108	10+800	L6104 over mainline	Type 2 Divided Road with cycletrack	29.8
N14O132	13+240	L2414 over mainline (Tamnawood)	Type 2 Divided Road with cycletrack	31.0
N14O161	16+110	Lifford Common Road	Type 2 Divided Road with cycletrack	39.2

* Total widths from back of verge to back of verge

The location and detail for the proposed underbridges included within Section 3 are presented in Table 1.33.

Table 1.33: Section 3 Proposed Underbridges

Structure Ref	Approx. Mainline Chainage	Description	Mainline Cross-section	Mainline Cross-section Width (m)*
N14U018	01+850	L1274 (to Drumoghill) under mainline	Type 2 Divided Road with cycletrack	28.0
N14U026	02+600	Existing N14 at Drumoghill under mainline	Type 2 Divided Road with cycletrack	28.9
N14U034	03+480	L5574 under mainline	Type 2 Divided Road with cycletrack	32. 5
N14U044	04+410	Existing N14 under mainline	Type 2 Divided Road with cycletrack	29.0
N14U094	09+430	Existing N14 under mainline. (Tullyrap / Whitecross side road)	Type 2 Divided Road with cycletrack	25.0
N14U122	12+200	L2424 under mainline	Type 2 Divided Road with cycletrack	29.8
N14U140	14+000	Grade Separated Junction L2444 crossing under mainline	Type 2 Divided Road with cycletrack	29.6
N14U146	14+650	R264 crossing the mainline at Murlog	Type 2 Divided Road with cycletrack	27.7

* Total widths from back of parapet upstand to back of parapet upstand.

1.9.6.1 River Finn Crossing (N14/N15 to A5 Link) N14R175

The proposed River Finn Crossing (N14/N15 to A5 Link) is at the southern end of Section 3 of the Proposed Development, south of Lifford. This crossing is required to carry the proposed N14/N15 to A5 Link over the River Finn, the floodplain, and its associated Special Area of Conservation (SAC) and to connect to a proposed Trunk Road T3 (A5 Western Transport Corridor to Land Frontier) in Northern Ireland (which will connect to the proposed A5 WTC).

The link has an overall length of approximately 450 m between the proposed N14/N15 Lifford Junction in Ireland and the roundabout connecting a proposed Trunk Road T3 and the A5 WTC in Northern Ireland. The length of the N14/N15 to A5 Link within the SAC boundaries (including both the River Finn SAC in Ireland and the River Foyle and Tributaries SAC in Northern Ireland) is approximately 230m.

The Finn Valley is broad. The flood plain on the west side of the river is approx. 250 m wide while on the east side it is approx. 70 m wide.

Hydraulic analysis has been carried out and defined a minimum soffit level of 7.56 m OD to provide freeboard over flood levels, and a minimum bridge length of approximately 160 m to avoid increasing upstream flood risks. The recommended structure type satisfies these minimum requirements.

The proposed A5 WTC is on embankment where it runs parallel to the River Finn.

An 8-Span Steel Composite Bridge is proposed to be installed over the River Finn as part of the N14/N15 to A5 Link.

The overall length of the bridge is approximately 287 m with the following span arrangement:

- **West Approach Spans**: One 26 m span and five 33 m spans.
- **Main Span:** 63 m.
- **East Approach Span:** 33 m.

The proposed structural arrangement consists of four pairs of braced plate girders made composite with a Reinforced Concrete (RC) deck slab. A half cross section of the proposed structure is shown in Figure 1.15.

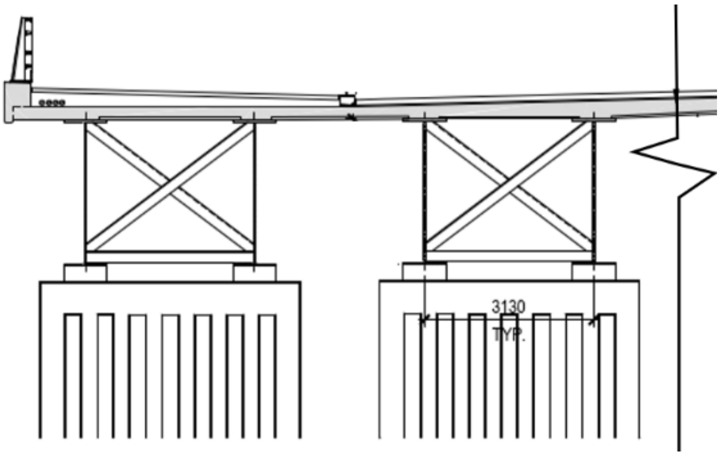

Figure 1.15: Half Cross Section of the Proposed River Finn Crossing (N14/N15 to A5 Link)

The proposed bridge deck is continuous over piers, with bearing supports on RC piers with RC bored pile foundations. The bridge deck end supports consist of RC columns, embedded behind Reinforced Earth (RE) walls, supported on RC bored pile foundations. The west abutment is fully articulated with bearings, movement joint and abutment gallery for maintenance access. The east abutment is fully integral due to the short end-to-inner span ratio.

The steel composite bridge deck construction provides a simple elegant crossing which will minimise impact on the landscape. The proposed structure maximises headroom clearance and achieves an open, light appearance in elevation. Weathering steel is proposed which has an aesthetically pleasing reddish-brown colour and avoids the need for paint maintenance. A pattern profile finish will be provided on large areas of exposed concrete at the abutments.

1.9.6.2 Swilly Burn Bridge (N14R114)

The bridge deck consists of pre-cast concrete prestressed beams composite with RC deck slab supported on a full height integral RC abutment with RC bored pile foundations. The skew angle between the road-to-river axis is 43 degrees, and the bridge accommodates this at a 30-degree skew span with a widened deck and a ‘dead’ deck area each side of the carriageway. This enables a fully integral abutment which avoids the maintenance and abutment gallery associated with bearings and expansion joints. The clear skew span is 30 m which is within the range for Prestressed Concrete (PC) beams. The site is adjacent to the existing N14 and R264 roads, facilitating transport and delivery of long bridge beams.

The abutments are setback 5 m from the riverbank crest to provide a natural bank and enable a 3 m wide ‘no working zone’ behind the riverbank crests. No instream works are required. The Swilly Burn contains a population of the invasive alien Asian Clam and therefore no instream works are allowed, no construction plant or machinery will be allowed in the river, and no abstraction will be permitted at this location. During construction biosecurity measures will be put in place to ensure no risk of transference during construction including adherence to biosecurity protocols as set out in the Water Users Code of Practice (Invasive Species Ireland, 2008). The abutment and wingwalls could consist of either an RC wall, or skeletal RC columns embedded in a RE wall.

Ground investigations indicate poor ground conditions at the site, therefore piled RC foundations are proposed. The proposed bridge deck soffit level provides adequate freeboard over flood levels with a minimum of 2.5 m clearance over the riverbanks for inspection and maintenance access. The proposed general arrangement effectively reduces the skew span of the bridge, which enables a slimmer deck depth to be provided. The road embankment level on the bridge approach is governed by the bridge deck level so a relatively slim deck depth offers savings in embankment fill. The proposed structure is low profile which will blend into the landscape. Pattern profile finish could be provided to the large, exposed faces of the substructures.

1.9.6.3 Deele River Bridge (N14R144)

The proposed Deele River bridge will carry the proposed N14 mainline carriageway over the River Deele and floodplain. The overall length of the bridge is approx. 108 m. It consists of three spans (24 m, 60 m and 24 m) with the central span crossing the River Deele. The mainline carriageway on the bridge approaches is supported on a fill embankment over the floodplain. The River Deele is canalised at this location, with berms either side to control riverbank erosion and reduce the frequency of flooding on adjacent grassland farmland.

The area is not particularly ecologically sensitive and there are no adjacent European sites, although the Deele discharges to the River Foyle further downstream (part of the River Finn SAC in Ireland and the River Foyle and Tributaries SAC in Northern Ireland).

The overall length and span arrangement of the bridge is driven by hydraulic conveyance requirements to accommodate the River Deele in flood conditions. Four flood relief culverts (3 m internal height and 6 m internal width) are required on the north floodplain to satisfy OPW requirements. The culverts are setback a minimum of 20 m behind the north bridge abutment.

The intermediate piers of the bridge must be setback a minimum of 5 m from the crest of the Deele riverbanks to provide space for sediment control measures and to avoid modification to the riverbanks/berms.

The proposed bridge provides adequate clearance over the 100-yr flood levels.

Following evaluation of various options for the bridge, a three-span steel composite bridge was identified as the preferred option and is being proposed at this location. The proposed bridge consists of steel girders acting composite with an RC deck slab. The girders may be constant depth or haunched over the piers. It is an economical form of construction for this span range and is low maintenance. The proposed design is a fully integral bridge (i.e., no bearings or expansion joints) which reduces maintenance liabilities. Weathering steel girders are proposed which avoids the need for any paint maintenance, although testing would be required to confirm the atmospheric saline classification.

The elevation of the bridge is a low, slim profile and the aesthetics are unobtrusive. A pattern profile finish will be specified on any large areas of exposed concrete.

The location and detail for the proposed standard river bridges included within Section 3 are presented in Table 1.34.

Table 1.34: Section 3 Proposed River Bridges

Structure Ref	Approx. Mainline Chainage	Description	Mainline Cross-section	Mainline Cross-section Width (m)
N14R114	11+460	Swilly Burn River crossing. 100-year flood level 4.17 m AOD Near to existing river bridge: DL-N14-011.00	Type 2 Divided Road with cycletrack and forward visibility	33
N14R144	14+400	River Deele river crossing. 100-year flood level 6.0 m AOD Near to existing river bridge: DL-N14-012.00	Type 2 Divided Road with cycletrack & widened central median	25
N14R175	17+500	River Finn Crossing (A5 Link). Bridge carrying N14/N15 to A5 link road over the River Finn & its SAC floodplain.	Type 2 Divided Road with cycletrack.	24

1.9.6.4 Other Structures - Bat House

A bat house is proposed to be constructed in the area of Ballindrait in order to mitigate for the loss of a building, which is a roost for soprano pipistrelles, and the potential impact of the proposed road scheme on the soprano pipistrelle maternity roost located in this area.

The proposed location of the Bat House is in within the CPO at Chainage 14+700m, north of the River Deele, south of the abandoned railway line and west of Attenuation Pond 12.

The building will consist of the following

- 4m x 4m (internal floor space) 1½ storey (internal height of 4.5m from floor level to highest point of roof space) building constructed from concrete block rendered with plaster (insulation between the two walls).
- A-roof, constructed of natural slate.
- The ground floor entrance will be a solid door (locked).
- Facia/Soffit and drain pipes as required.

Further details on the bat house are detailed in Chapter 9A Terrestrial Biodiversity and Appendix K to Appendix C9A.01 Terrestrial Ecology Baseline Report C9.02 Sources of Information to Inform the Desktop Study.

1.9.7 Underpasses, Active Travel bridges and Retaining Walls

The location and detail of underpasses included in Section 3 are presented in Table 1.35.

Table 1.35: Section 3 Proposed Underpasses

Structure Ref	Approx. Mainline Chainage	Description	Mainline Cross-section Width (m)
N14P021	02+190	Installation of underpass along existing abandoned railway to facilitate any future cycle facility/Greenway	25
N14A045	04+500	Deer underpass	40
N14A027	02+740	Agricultural underpass for Landowner 3,015	65
N14P142	14+200	Active travel underpass	61
N14A143	14+300	Agricultural underpass under link road to accommodate landowner 3,094 - beside watercourse	41
N14A167	16+750	Accommodation underpass for Croaghan House (Protected Building) and Farm (Landowner 3,110/3,111)	30
N14A170	17+000	Accommodation underpass for Landowner 3,112 (Farmer) connecting dwelling to farmyard.	20

The location and detail of Active Travel bridges included in Section 3 are presented in Table 1.36.

Table 1.36: Section 3 Proposed Active Travel bridges

Structure Ref	Approx. Mainline Chainage	Description	Mainline Cross-section	Mainline Cross-section Width (m)
N14F174	17+400	Bridge carries active travel path over the proposed N14 mainline carriageway near to Lifford. Connection between residential area to Lifford and TEN-T cycleway /footway. Proximity of SAC means embankments are preferable to structural ramps.	Type 2 Divided Road	21.5

Culverts with a clear span or internal diameter greater than 2.0 m are considered structures and are presented in Table 1.37.

Table 1.37 Culvert Structures

Culvert Reference	Chainage	Referenced Mainline / Side Road	Location X	Location Y	Culvert Diameter (m) / Width (m) x Height (m)	Approx. Length (m)
S3-CUL.01	0+272	Access Road 3.03	223,996.6	410,631.1	4.0 x 3.0	25.80
S3-CUL.02	0+535	Mainline	223,983.5	410,613.4	4.0 x 3.2	52.70
S3-CUL.03	0+500	LX 3014 Link south	223,950.4	410,554.8	4.0 x 4.0	66.80
S3-CUL.04	0+722	Mainline	224,176.8	410,587.5	8.0 x 3.8	60.00
S3-CUL.05	0+670	Existing N14	224,068.2	410,481.6	8.0 x 3.6	58.00
S3-CUL.06	1+100	Mainline	224,520.4	410,451.4	12.0 x 3.2	60.00

Culvert Reference	Chainage	Referenced Mainline / Side Road	Location X	Location Y	Culvert Diameter (m) / Width (m) x Height (m)	Approx. Length (m)
S3-CUL.07	2+035	Mainline	625,328.6	910,089.1	4.2 x 3.5	60.00
S3-CUL.14	0+500	LX 3014 Doorable	626,624.4	908,209.5	4.2 x 1.9	23.23
S3-CUL.15	4+477	Mainline	626,616.0	908,307.6	3.7 x 2.2	60.00
S3-CUL.16	0+097	Access Road 3.22	626,617.9	908,340.2	3.7 x 2.3	22.71
S3-CUL.20	7+418	Mainline	628,033.2	905,744.5	3.2 x 1.9	60.00
S3-CUL.21	0+271	Access Road 3.32	628,367.6	905,092.9	2.8 x 1.4	16.50
S3-CUL.22	8+185	Mainline	628,348.5	905,052.7	2.8 x 1.5	34.60
S3-CUL.23	0+457	R236 LX 3014 Link South	628,342.7	904,959.7	2.2 x 1.5	23.66
S3-CUL.24	0+032	L2374 Whitecross	628,709.5	904,062.1	6.0 x 2.5	23.00
S3-CUL.26	10+055	Mainline	629,245.3	903,432.3	2.2 x 1.9	47.20
S3-CUL.27	10+395	Mainline	629,404.4	903,144.2	9.5 x 2.85	36.20
S3-CUL.29	11+641	Mainline	629,469.3	901,895.5	2.8 x 2.2	58.00

There are no retaining walls proposed in Section 3.

1.9.8 Flooding and Flood Compensation Areas

The proposed River Finn bridge is part of the N14/N15 to A5 Link in Section 3. The A5 WTC team conducted a flood modelling assessment that included the proposed TEN-T link bridge. The results showed that the TEN-T link bridge will have a negligible effect on flood storage capacity. There is therefore no requirement for flood compensation areas in Section 3.

1.9.9 Stream Diversions/ Realignments

At several locations, the existing natural flow paths are proposed to be altered slightly to suitably align the proposed culvert crossings with the road alignment. These are relatively minor diversions in all but one case: Swilly Burn tributary (EPA name Drumbeg, Site W3-12) at Tullyrap will require an extensive realignment over a total length of approx. 1km (Ch.9+200 to 10+200). The existing N14 at this location will be realigned to the east of the proposed new road to avoid requirement for a series of extensive culverts. The proposed realignment will be to the west of the proposed road and adequate land take has been included to create a meandering channel which is marked “Tullyrap Water Diversion” in the General Arrangement Drawing 3 (sheets 5 and 6 of 10). There is a newly created channel with morphology designed to mimic ‘natural’ and the location of proposed culverts S3-CUL-24, S3-CUL-25 and S3-CUL-26. Water quality protection measures will be employed as set out in Chapter 11 Water and Chapter 9B Biodiversity Aquatic. Hydromorphology shall be restored according to measures set out in Chapter 9B Biodiversity Aquatic, Section 9B.6.1.1 (Stream Diversion and Channel Realignment Measures) notably:

- Newly formed channel base widths will be designed to match the width of the original channel.
- Newly formed channel sections shall mimic (or improve) the existing habitats. They will incorporate instream substates of locally sourced, washed, rounded gravels and meanders that give rise to flow type variation (riffle, glide and pool sequences) as found in fish bearing waters.
- New channel sections shall be fully constructed in dry conditions using appropriate water management measures, i.e., offline construction, temporary diversion, dam and pump over, piping/fluming.

1.9.10 Drainage Infrastructure

The details and locations for the proposed drainage culverts, attenuation ponds and details and outfall locations included within Section 3 are provided in Chapter 11: Water. The following drainage features are proposed for Section 3:

- 34 No. culverts for watercourses and minor watercourse crossings.
- 13 No. drainage networks on the mainline carriageway.
- 23 No. drainage networks on side roads.
- 24 No. attenuation ponds with 20 No. outfalls.

Design details regarding Section 3 proposed culverts are outlined in Table 1.38.

Table 1.38: Section 3 Proposed Culverts Schedule

Culvert Reference	Chainage	Referenced Mainline / Side Road	Location X	Location Y	Culvert Diameter (m) / Width (m) x Height (m)	Approx. Length (m)
S3-CUL.01	0+272	Access Road 3.03	223,996.6	410,631.1	4.0 x 3.0	25.80
S3-CUL.02	0+535	Mainline	223,983.5	410,613.4	4.0 x 3.2	52.70
S3-CUL.03	0+500	LX 3014 Link south	223,950.4	410,554.8	4.0 x 4.0	66.80
S3-CUL.04	0+722	Mainline	224,176.8	410,587.5	8.0 x 3.8	60.00
S3-CUL.05	0+670	Existing N14	224,068.2	410,481.6	8.0 x 3.6	58.00
S3-CUL.06	1+100	Mainline	224,520.4	410,451.4	12.0 x 3.2	60.00
S3-CUL.07	2+035	Mainline	625,328.6	910,089.1	4.2 x 3.5	60.00
S3-CUL.08	0+401	LX 3014 Drumoghill	625,688.4	909,592.3	1.8 x 1.4	24.50
S3-CUL.09	2+663	Mainline	625,614.3	909,542.1	1.8 x 1.4	60.00
S3-CUL.10	0+100	LX 3014 Drumoghill	625,401.5	909,757.9	2.0 x 1.8	53.50
S3-CUL.11	0+021	Access Road 3.12	625,368.5	909,786.9	2.0 x 1.7	19.00
S3-CUL.12	4+100	Mainline	626,237.2	908,336.4	1.2	62.00
S3-CUL.13	0+288	LX 3014 Doorable	626,514.5	908,378.7	1.2	31.80
S3-CUL.14	0+500	LX 3014 Doorable	626,624.4	908,209.5	4.2 x 1.9	23.23
S3-CUL.15	4+477	Mainline	626,616.0	908,307.6	3.7 x 2.2	60.00
S3-CUL.16	0+097	Access Road 3.22	626,617.9	908,340.2	3.7 x 2.3	22.71
S3-CUL.17	5+715	Mainline	627,352.9	907,318.7	1.2	49.82
S3-CUL.18	6+550	Mainline	627,652.9	906,538.5	2.0 x 1.8	48.40
S3-CUL.19	0+683	LX 3014 Sheshkinapoll	627,742.5	906,532.2	2.0 x 1.8	36.00
S3-CUL.20	7+418	Mainline	628,033.2	905,744.5	3.2 x 1.9	60.00
S3-CUL.20A	0+080	Ballinalecky Junction link North	628,067.0	905,904.7	3.2 x 1.9	25.00
S3-CUL.21	0+271	Access Road 3.32	628,367.6	905,092.9	2.8 x 1.4	16.50
S3-CUL.22	8+185	Mainline	628,348.5	905,052.7	2.8 x 1.5	34.60
S3-CUL.23	0+457	R236 LX 3014 Link South	628,342.7	904,959.7	2.2 x 1.5	23.66
S3-CUL.24	0+032	L2374 Whitecross	628,709.5	904,062.1	6.0 x 2.5	23.00

Culvert Reference	Chainage	Referenced Mainline / Side Road	Location X	Location Y	Culvert Diameter (m) / Width (m) x Height (m)	Approx. Length (m)
S3-CUL.25	0+911	LX 3014 Tullyrap	629,260.6	903,504.7	2.0 x 1.9	50.20
S3-CUL.26	10+055	Mainline	629,245.3	903,432.3	2.2 x 1.9	47.20
S3-CUL.27	10+395	Mainline	629,404.4	903,144.2	9.5 x 2.85	36.20
S3-CUL.28	11+930	Mainline	629,632.8	901,674.1	2.0 x 1.8	60.00
S3-CUL.29	11+641	Mainline	629,469.3	901,895.5	2.8 x 2.2	58.00
S3-CUL.30	1+500	L2444 Ballindrait	631,572.8	900,091.6	2.0 x 1.8	66.00
S3-CUL.31	14+935	Mainline	631,471.4	899,390.0	1.8 x 1.8	60.00
S3-CUL.32	15+140	Mainline	631,666.6	899,303.9	1.2	44.50
S3-CUL.33	15+556	Mainline	632,067.2	899,179.1	1.2	50.70

Design details regarding drainage networks on the mainline carriageway and side roads is provided in Table 1.39.

Table 1.39: Section 3 Carriageway Drainage Network Details

Drainage Network Ref.	Mainline / Side Road (No.)	Chainage	Outfall
S3-ML-DN-01	Mainline	0+071 to 1+880	Outfall 02
S3-SR-DN-01	N13/N14 Pluck Roundabout N13 Pluck Tie-in LX 3014 Link North N13 Derry Tie-in	3+655 to 3+759 0+000 to 0+116 0+000 to 0+452	Outfall 01
S3-SR-DN-02	L1294 Manorcunningham Local Road LX 3014 Link North	0+000 to 0+400 0+116 to 0+420	Outfall 02
S3-SR-DN-03	L1274 Drumoghill Link	0+000 to 0+430	Outfall 03
S3-ML-DN-02	Mainline	1+880 to 2+625	Outfall 04
S3-SR-DN-04	Drumoghill Junction North Link LX 3014 Drumoghill	0+000 to 0+156 0+000 to 0+482	Outfall 05
S3-ML-DN-03	Mainline	2+625 to 3+920	Outfall 06
S3-SR-DN-05	L5574 Mondooey Lower	0+000 to 0+308	Outfall 06
S3-ML-DN-04	Mainline	3+920 to 4+390	Outfall 07
S3-SR-DN-06	Drumoghill Junction South Link LX 3014 Doorable	0+000 to 0+198 0+088 to 0+280	Outfall 07
S3-SR-DN-07	Mondooey	0+000 to 0+392	Outfall 07
S3-ML-DN-05	Mainline	4+390 to 5+630	Outfall 07
S3-SR-DN-08	L1214 Galdonagh	0+000 to 0+305 0+000 to 0+254	Outfall 08
S3-ML-DN-06	Mainline	5+630 to 6+550	Outfall 09
S3-SR-DN-09	LX 3014 Sheshkinapoll	0+212 to 0+710	Outfall 09

Drainage Network Ref.	Mainline / Side Road (No.)	Chainage	Outfall
S3-ML-DN-07	Mainline	6+550 to 7+570	Outfall 10
	Ballinalecky Junction Link North	0+000 to 0+083	
	R236 LX 3014 Link North	0+000 to 0+255	
	R235 Ballinaleckey Tie-in West	0+385 to 0+732	
	Ballinalecky Junction Link South	0+000 to 0+183	
S3-SR-DN-10	R236 Ballinalecky	0+145 to 0+385	Outfall 10
S3-SR-DN-11	R236 LX 3014 Link South	0+134 to 0+603	Outfall 11
S3-ML-DN-08	Mainline	7+570 to 9+400	Outfall 12
S3-SR-DN-12	LX 3014 Tullyrap	0+000 to 0+573	Outfall 12
S3-SR-DN-13	LX 3014 Tullyrap	0+573 to 1+071	Outfall 12
S3-SR-DN-14	LX 3014 Tullyrap	1+071 to 1+567	Outfall 12
S3-ML-DN-09	Mainline	9+400 to 11+400	Outfall 13
S3-ML-DN-10	Mainline	11+400 to 13+417	Outfall 13
S3-SR-DN-15	L6104 Broadlea	0+000 to 0+266	Outfall 13
S3-SR-DN-16	L2424 Mullinavegh	0+000 to 0+321	Outfall 13
S3-SR-DN-17	L2414 Tamnawood	0+268 to 0+396	Outfall 13
S3-ML-DN-11	Mainline	13+417 to 14+480	Outfall 14
S3-SR-DN-18	Ballindrait Link North	0+000 to 0+231	Outfall 15
S3-SR-DN-19	L2444 Ballindrait	0+000 to 0+435	S3-PED-IT-07
S3-SR-DN-20	L2444 Ballindrait	0+435 to 1+520	Outfall 16
S3-SR-DN-21	L2444 Ballindrait	1+520 to 2+004	Outfall 17
	BLX 3014 Rossgeir	0+000 to 0+192	
	BLX 3014 Rossgeir Link North	0+000 to 0+148	
S3-SR-DN-22	Ballindrait Junction Link North	0+000 to 0+144	Outfall 14
S3-ML-DN-12	Mainline	14+480 to 15+746	Outfall 14
S3-SR-DN-23	R264 Murlog	0+000 to 0+227	Outfall 14
S3-ML-DN-13	Mainline	15+746 to 17+540	Outfall 18
	L6144 Lifford Common Road	0+000 to 0+192	
	Lifford Junction	0+000 to 0+497	
	▪ N15 West Link	0+000 to 0+038	
	▪ N15 Lifford Tie in West	0+000 to 0+443	
	▪ N15 Lifford Tie in East		

Design details regarding attenuation pond and outfalls are provided in Table 1.40.

Table 1.40: Section 3 Proposed Attenuation Pond Details and Outfall Locations

Ref. No.	Pond Easting	Pond Northing	Total Catchment Drainage Area (ha)	Greenfield Runoff Rate (l/s)	Pavement Area (ha)	Attenuation Pond – Volume of Storage (m3)	Invert Level of Attenuation Pond (m)	Outfall Easting	Outfall Northing
1	623,314	910,846	2.65	24.8	1.15	1,261	6.2	623,194	910,783
2	623,857	910,648	5.4	44.2	3.74	3,089	3.5	623,857	910,484
3	625,200	910,065	1.72	12.1	1.63	1,060	24	625,225	910,009
4	625,571	909,563	4	32.7	3.1	2,361	42	625,513	909,618
5	626,514	908,209	1.44	12.1	1.07	817	78	626,619	908,406
6	626,687	908,370	4.05	35.5	2.93	2,292	76	626,619	908,406
7	627,706	906,578	3.21	26.6	2.43	1,861	83.2	627,784	906,526.
8	628,063	905,580	3.18	22.9	3	1,949	71	627,973	905,558
9	628,990	903,989	5.5	42.6	4.03	3,258	29	629,802	903,097
10	629,519	902,357	6.06	49.6	4.72	3,536	3	629,509	902,128
11	629,553	901,975	6.72	54.9	5.25	3,918	3.9	629,509	902,128
12	630,929	899,922	3.41	28.9	2.5	1,953	9.6	631,177	899,723
13	631,260	899,643	5.9	54.3	3.74	3,287	5.5	631,177	899,723
14	631,357	899,995	2.34	15.68	1.35	959	7	631,462	899,978
15	631,570	900,196	1.22	8.17	1.01	742	8	631,462	899,978
16	632,547	897,349	9.23	81.4	6.83	7,776	7	632,679	897,086

1.10 Programme

1.10.1 Overview

If the three sections of the Proposed Development are constructed at the same time, then this will require a 60-month construction period (five years).

However, a phased approach may also be taken to the construction of the Proposed Development. In such circumstances, each section of the Proposed Development is estimated to take 36 months to construct (3 years each). Further, a phased approach may be taken to the procurement and construction of each section of the Proposed Development. These decisions are dependent on the detailed design process and budgetary approval that may be required after any approval as may be granted by the Commission for the Project.

For the purposes of considering and evaluating the construction impacts of the Proposed Development, the NIS has considered the worst-case scenario, that being the construction of the three sections of the Proposed Development at the same time over a period of 60 months, where there will be overlap between the construction of the sections.

Assessment of the stages of the construction of the Proposed Development will include for the following essential preconstruction surveys and advance/ enabling works.

1.10.1.1 Working times

Construction works will typically be undertaken on a six-day working week:

- Monday to Friday between 07:00 and 19:00; and
- Saturdays between 08:00 and 16:00.

No construction works, save for emergency works and/or dewatering, will be permitted outside of these hours or on Sundays or Public Holidays without the prior agreement of Donegal County Council. Examples of where agreement may be reached to work outside of the above hours include

- Transport, delivery and lifting into place of large construction elements manufactured off-site, e.g. bridge beams.
- Road or lane closures to facilitate utilities diversions.
- Other activities, e.g. office-based work, walkover surveys and/or inspections.

In addition, under certain circumstances, e.g. storm or bad weather events, construction related activity may have to take place outside of the above hours to protect the public, the environment, the works, plant, machinery, etc.

1.10.1.2 Further Investigations and Survey Works

Significant site investigation, topographical surveys, archaeological investigations and environmental surveys have been completed to date. The completed survey work has provided the information necessary to undertake a full and complete assessment of the Proposed Development as documented in the EIAR and the NIS.

Further investigations and verification surveys will be undertaken after any approval as may be granted by the Commission for the Project. These investigations and surveys are typically undertaken in advance of the mobilisation of the main works contractor to site so that the information can be taken into consideration in the planning and execution of the construction works. They include some further detailed ground investigations, hydrogeological investigations, archaeological investigations, topographical surveys, structural condition surveys, well surveys, ecological surveys and other environmental surveys that will be used to further inform the detailed design and verify the information presented.

1.10.1.3 Utilities and Services Diversions

Given the potential for temporary disruption of supplies and the phasing of construction works some utilities and services diversions will, as required, be undertaken in advance of the main works contract.

1.10.1.4 Invasive Alien Plant Species Treatment and/or Removal

An advance works contract will, as required, be undertaken to treat and/or remove stands of invasive alien plant species, such as Japanese knotweed, within the CPO boundary. TII's standard and technical documents on the management of invasive alien plant species (GE-ENV-01104 and 01105) shall be complied with. An Invasive Species Management Plan (ISMP) is included at Appendix 13 of the NIS.

1.10.1.5 Fencing and Site Clearance

Fencing and some site clearance works will be undertaken as required in advance of the main works contract.

A fencing contract will be undertaken, as required, to delineate the extents of the Proposed Development and secure the permanent Proposed Development boundary. Where undertaken, the site boundary will be fenced-off and site access points will be constructed to provide access for construction vehicles from the existing road network. This will involve some works adjacent to existing roads and may require temporary traffic diversions.

Some site clearance works may be undertaken to meet seasonal constraints. This includes tree and hedgerow clearance outside of the bird nesting season where possible, the timing of tree felling to avoid impacts on roosting bats and closing any active badger setts in the appropriate season. If vegetation clearance will occur during the bird nesting season, vegetation must be checked for nests in advance by experienced Ecologist or Ecological Clerk of Works. If nests are present, a derogation licence will be sought.

1.10.1.6 Mobilise Contractor to Site

The main works contractor shall utilise compound locations for storage of plant and machinery, refer to the general arrangement drawings contained in Appendix 2 to see the location of the proposed site compounds for each section.

1.10.1.7 Construction

The construction works will include, but are not limited to, the following main components:

- Temporary works to establish construction compounds.
- Site clearance.
- Advanced works.
- Fencing.
- Water management.
- Demolition.
- Utility diversions.
- Excavation (including blasting and mechanical rock breaking) and deposition of earthworks materials including processing of materials.
- Temporary traffic management / road diversions.
- Drainage works.
- Structures.
- Kerbing.
- Roadworks (foundations, capping, sub-base, base construction, bituminous pavement surfacing).
- Active travel (footways / cycle tracks).

- Park and Share / Cycle facility areas.
- Ancillary roadworks including safety barriers, signage and road markings.
- Accommodation works for landowners such as access roads, entrances, fences, gates, walls, ducting and reconnection of severed services.
- Environmental mitigation.
- Landscaping.
- Signing and road marking.
- Remediation works during defects period.
- Handover.

1.10.1.8 Demobilise Main Contractor from Site

The contractor shall demobilise from site, removing all waste and surplus materials.

1.10.2 Construction Section 1

The construction phase for Section 1 will last approximately 36 months. Section 1 has the following distinct parts:

- Mainline southern tie-in to the River Finn Crossing, including the Ballybofey Link Road.
- Mainline River Finn Crossing to the northern tie-in, including the proposed grade separated junction at Teevickmoy.
- N15 Primary Road Connector from the mainline to the tie-in with the N15 at Treanamullin.

1.10.3 Construction Section 2

The construction phase for Section 2 will last approximately 36 months. Section 2 has the following distinct parts:

- Mainline southern tie-in at Listellian north to Dromore junction and west to the River Swilly Crossing, including the links in the vicinity of Dry Arch Roundabout / Bonagee.
- Mainline River Swilly Crossing to the tie-in at Ballyraine.
- Realignment and improvement of the existing Dual Carriageway between Dry Arch Roundabout and the interface with Section 3 at Pluck Roundabout, including the proposed grade separated junction at Trimragh.
- Works to downgrade the existing N13 from Dry Arch Roundabout south to Listellian.

1.10.4 Construction Section 3

The construction phase for Section 3 will last approximately 36 months. Section 3 has the following distinct parts:

- Mainline northern tie-in at the interface with Section 2 to Swilly Burn River.
- Swilly Burn River to River Deele River.
- River Deele River to Lifford Junction.
- N14/N15 to A5 Link including the River Finn Crossing to Northern Ireland.

1.10.5 Interface between Section 2 and Section 3

Section 2 and Section 3 meet just west of the existing Pluck Roundabout and east of where the dual carriageway crosses the Isle Burn, at approximate Section 2 chainage Ch 3570.

Should Section 2 proceed in advance of Section 3, then Section 2 will tie-in with the existing dual carriageway just west of the existing Pluck Roundabout and east of where the dual carriageway crosses the Isle Burn, at approximate Section 2 chainage Ch 3570. The proposed Active Travel running to the south of the existing dual carriageway will tie-in with the existing Pluck Roundabout. Other ancillary works, e.g. road markings, will also be constructed up to the existing Pluck Roundabout. Traffic from the N13 Derry direction and the N14 Lifford direction will continue to use the existing Pluck Roundabout.

Should Section 3 proceed in advance of Section 2, then Section 3 will include the construction of the new N13/N14 Pluck Roundabout including realignment of the approach roads to/from Letterkenny (N13), Derry (N13) and Lifford (N14). Section 3 will then terminate on the existing dual carriageway just west of the proposed Pluck Junction and east of where the dual carriageway crosses the Isle Burn, at approximate Section 2 chainage Ch 3570.

1.11 Construction Phase

This section outlines the significant factors that need to be considered for the construction phase of the Proposed Development. Further details regarding the construction activities for each section can be found in the following Section 1.12 (Section 1), Section 1.13 (Section 2) and Section 1.14 (Section 3).

1.11.1 Site/ Ground Investigations

Prior to procurement of the construction contract, it is likely that further site/ ground investigations will be carried out to supplement the investigations undertaken for the preliminary design and environmental assessments. The results of the previous investigations and the ground conditions are described in Chapter 10: Land, Soil & Hydrogeology. Further investigations will include confirmatory ground investigations involving boreholes, trial pits, test trenching, and material sampling and testing. A specialist and experienced site/ ground investigations contractor will be procured to carry out this work prior to construction commencing.

Additional archaeological testing will also be necessary. This work will be carried out in order to further manage the risk of encountering unexpected archaeological remains during the main construction contract. The work will include topsoil stripping and excavation of archaeological test trenches, supervised by an experienced archaeologist. This process will enable any unrecorded feature of archaeological significance to be identified and resolved prior to the commencement of the main construction contract.

As detailed in Chapter 10: Land Soils and Hydrogeology, additional hydrogeological testing of groundwater bodies will be required to monitor dewatering activities at cuttings or other excavations in bedrock as well as to provide further clarify of groundwater yields in the area of Holywell in Section 1

Confirmatory ecological surveys will be required to verify existing conditions, as detailed in Chapter 9A: Biodiversity Terrestrial and Chapter 9B: Biodiversity Aquatic, prior to construction commencing. These are non-invasive, walkover surveys. The ecological surveys will also provide information on mobile species and any changes, e.g. new bat roosts, active badger setts, that need to be addressed prior to construction commencing.

Verificatory structural surveys of existing buildings identified as sensitive receptors will be offered to landowners to verify their structural condition prior to construction starting. The condition of the structures will, subject to the consent of the landowners, be monitored during the construction period to record changes.

Pre-construction condition surveys will be undertaken of the public road network that will be used for the haulage of materials for the construction works. The pre-construction surveys will record details of, inter alia: the pavement condition, drainage, culverts, defects, etc. During construction, quarterly surveys (every 3-months) will be undertaken to record any deterioration of the public road that is being used for the haulage of materials for the construction works. Where the deterioration requires intervention and the deterioration is attributable to the construction works, repairs will be carried out to rectify as appropriate.

1.11.2 Land Requirements

There will be approximately 688 hectares of land permanently required for the construction and operation of the Proposed Development with a further approximate 8.5 hectares of land temporarily required for the construction of the Proposed Development and associated construction compounds. Within this required land, there will be the acquisition of 37 No. dwelling houses and associated outbuildings, 4 No. disused houses, 17 No. non-residential properties (including commercial buildings, agricultural buildings, outbuildings, and disused buildings), and 1 pump house for the Proposed Development.

Lands temporarily acquired for the construction of the Proposed Development will be handed back to the landowner, in a similar condition, following completion of the works at that location. Such works can vary but may include access regrading to lands remaining with the landowner.

1.11.2.1 Site Preparation Works and Traffic Management

All on-site drainage, erosion and sediment control measures for the construction works will be in place and functioning prior to the commencement of any other earthworks/ site clearance.

A Construction Traffic Management Plan (TMP) has been prepared and is contained in Appendix C4.02 in Volume C: Technical Appendices to the EIAR and includes proposals for completing construction activities, including:

- Access to roadworks or construction site.
- Traffic Management Signage.
- Routing of Construction Traffic.
- Road Closures.
- Speed Limits.
- Road Cleaning.
- Road Condition.
- Details of Working Hours and Days.
- Details of Emergency Plan.
- Communication.
- Traffic Management diagram / drawing.
- Traffic Management implementation.
- Cessation of traffic management.
- Cleanup / Removal of works.

1.11.2.2 Site Clearance Works

Works will include for site clearance of vegetation within the lands required for construction. Prior to commencing construction, any fencing not already in place will be erected to clearly identify the site boundaries. Trees and other vegetation to be retained will be clearly marked and protected from construction activities. Local soils and seedbanks identified for re-use by the ecology/landscape specialists will be removed and stored in a suitable location.

All material stockpiles, including topsoil, subsoil, stones, gravel, sand, etc. will be stored away from watercourses, rivers, streams, and drains. Stockpiles will be built neatly and well-shaped to ensure, as far as possible, they are weatherproof and to reduce run-off. The location of stockpiles will follow the guidelines outlined in the Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (IFI 2016). They will not be located under overhead lines or underground services and will maintain minimum separation distances, particularly to the outer conductors of overhead electricity lines. Topsoil and subsoil will be stored in separate stockpiles and managed in accordance with best practices and standards. See also Section 1.11.6.2 below.

The remaining vegetation within the construction footprint (i.e. the land within the CPO boundary required to be disturbed for construction purposes) will be removed as required by the appointed contractor and in such a way as to minimise the amount of exposed soil open to the elements. Where practicable, the removal of vegetation will be undertaken outside the bird breeding season and will follow the mitigation measures proposed in the EIAR in relation to protected habitats and species. An invasive plant species survey has been undertaken and will be provided to the appointed contractor(s). Any invasive plant species identified within the lands made available will also be dealt with prior to construction works by means of an advanced works contract.

1.11.2.3 Reinstatement

Where the Proposed Development includes for temporary land take, lands will be made good following the completion of the construction works. In places this will comprise of reinstating the land to a similar condition as what existed prior to the construction works (e.g. levelling, re-seeding, re-erection of a fence/ gate, provision of a suitable replacement boundary treatment, closure of a temporary entrance), or as may otherwise be agreed with the landowner. However, in places altered conditions may be considered more appropriate (e.g. alterative boundary treatment or finish to that removed to accommodate the construction works) and may be necessary in cases where it is not possible to replace features on a similar basis. For example, temporary works to an entrance at some properties will result in the entrance being in the same position, but at an altered gradient to tie in with the proposed new road level when completed.

For the permanent land take new boundary treatments will be constructed in accordance with TII standards or as may otherwise be agreed with the adjoining landowner.

Embedded Mitigation (i.e. mitigation by design) for those properties subject to land take is provided within Appendix C16.01 of Chapter 16: Material Assets: Non-Agricultural.

1.11.3 Demolition Works

Demolition works will be required for the following types of structures directly impacted by the Proposed Development:

- Domestic residential properties.
- Farm buildings
- Commercial buildings.
- Existing road infrastructure at tie-in locations.

These properties will be acquired as part of the CPO process due to their proximity within and beside the Proposed Development. 12 of the acquired properties can be retained and therefore will not be demolished. However, a total of 43 residential and commercial properties will be demolished for the Proposed Development, as summarised in Table 1.41. Further detail is provided in Section 1.12.2 (Section 1), Section 1.13.2 (Section 2), and Section 1.14.2 (Section 3).

While no hazardous materials have been identified, hydrocarbons (e.g. kerosene – home heating oil) and other hazardous materials may be present in existing buildings that require demolition and management of such hazardous material will be in accordance with the relevant legislation and guidance.

Table 1.41: Summary of Properties to be Demolished

Section	Residential*	Commercial	Other	Total
1	14	1	5	**20**
2	8	3	5**	**16**
3	8	0	3	**11**
Totals	**30**	**4**	**13**	**47**

* Includes outbuildings associated with dwellings and disused dwellings
** Includes disused buildings in DCC ownership (Plot 2900) and agricultural buildings (Plot 2114). Both plots also have residential demolition.

1.11.4 Earthworks Materials

There are three broad types of excavated material as set out in TII's *Specification for Road Works Series 600 – Earthworks*:

- **Compliant material:** Material excavated from within the Site or imported on to the Site which meets the requirements of a particular Class of material in Table 6/1 and meets the requirements of Appendix 6/1 for use in the Works. Imported material shall meet the requirements of all current legislation and may comprise the following:

    a) Products: Earthworks materials resulting from extraction, the primary aim of which was the production of that material;

    b) By-products: Earthworks materials resulting from a production process, the primary aim of which was not the production of that material; or

    c) Recycled aggregates: Earthworks materials resulting from the recovery of mineral waste. The aggregate shall be classified by hand-sorting the coarse aggregate particles in accordance with I.S. EN 933-11. The content of materials including wood, plastic, rubber, plaster and metal shall not exceed 1% by mass. Organic content shall not exceed 1% by mass, or other value stated in Appendix 6/1. The haulage and processing of this material shall be fully compliant with all current legislation and guidelines, and all permits obtained as required.

- **Non-compliant material:** Material excavated from within the Site, other than unacceptable material as defined below, which does not meet the requirements of a particular Class of material in Table 6/1 or does not meet the requirements of Appendix 6/1. If it is processed by physical, mechanical, chemical or other means to meet the requirements of a Class of material in Table 6/1 and the requirements of Appendix 6/1, it may become compliant and may be used; or

- **Unacceptable material:** Unacceptable material is 'hazardous waste' or 'bio-waste' as defined in the European Union (Waste Directive) Regulations 2011-2020. Material excavated from within the Site which shall not be used in the Works.

Compliant excavated material that is not surplus to requirements will be re-used in the works for engineering purposes including fill to embankments, landscaping, placed as non-structural fill in shallow slopes or used in backfilling operations at Material Extraction and/or Deposition (MED) areas.

Non-compliant material may be processed by mechanical, chemical or other means to render the material compliant for use in the works. Non-compliant material will also be used to backfill Material Extraction and/or Deposition areas. It is possible that some non-compliant material may become a waste if it is to be discarded.

Details on the earthworks for each section of the Proposed Development are provided in Section 1.12.3 (Section 1), Section 1.13.3 (Section 2), and Section 1.14.3 (Section 3).

Should any unacceptable material be encountered during construction, it will be removed to a suitably licensed waste management facility.

In terms of a road construction project, most naturally occurring materials excavated as part of the works will not be considered a waste as they can be re-used within the works. Waste is defined as any substance or object which the holder discards or intends or is required to discard. All excavated material from the site of the Proposed Development will be managed in accordance with best practice to ensure in so far as possible that there is minimal waste generated.

Any excavated contaminated material will fall under Unacceptable material and must be removed off-site for disposal at an authorised waste management facility. Currently, there is no indication of contaminated material being present within the footprint of the Proposed Development. This was determined by historical records and consideration of potential contamination sources such as industrial developments and landfills. Further details regarding the assessment of contaminated materials can be found in Chapter 10: Land, Soil & Hydrogeology.

MED areas have been identified within the Proposed Development boundary to provide a source for suitable material for use in the works as well as for the deposition of surplus material. MED locations are shown in the General Arrangement Drawings 1 (Section 1), 2 (Section 2), and 3 (Section 3). Further details of the locations of the MED areas are provided in Chapter 10: Land, Soils and Hydrogeology.

Estimates of the likely quantities of waste that will be generated from the works have been evaluated and assessed, as well as cut/fill balance estimates associated with each section. These are discussed in Chapter 16 Material Assets Non-Agriculture.

1.11.5 Compound locations and site access

For each section, construction compounds will be required during the construction phase to provide office and welfare facilities for site staff. The construction compounds will also provide facilities for material storage, laydown and maintenance of construction plant, and possibly material testing. Offices, stores, toilets and other accommodation spaces for the Employer’s Representative and assistant staff will also be located within the construction compound.

Construction compound locations have been proposed at locations where they can be easily accessed from the existing National or Regional Road networks. The location of the construction compounds has been determined after considering:

- Environmental impact.
- Access to road network.
- Suitability of location for construction operations.
- Transport routes for construction traffic.
- Availability of utility connections e.g. water, electricity, telecommunications and foul drainage.
- Landtake required and impact on landowner.

A total of six locations for construction compounds has been identified throughout the Project (two in Section 1, two in Section 2, and two in Section 3). Compounds will be established with utility connections provided to enable satisfactory operation of the compounds without the reliance upon power generators.

The locations of construction compounds are shown in Drawings 1, 2 and 3. For further details see Section 1.12.4 (Section 1), Section 1.13.4 (Section 2), and Section 1.14.4 (Section 3):

Most of the construction for the Proposed Development takes place offline from the existing road network. Accordingly, the majority of materials that are generated within the site (i.e., earthworks) will be transported along haul routes within the site and will not require transportation along the National, Regional and Local

Road networks. These internal site haul routes are generally located remotely from existing housing, so will avoid high volumes of HGVs transporting earthworks along the public road network, passing close to residential properties and other sensitive receptors. During construction, it will be necessary for haulage of materials to use the local road network to avoid watercourses that do not yet have suitable crossing points, e.g. river bridge or culverts.

Construction materials that need to be imported into the sites will generally use National and Regional Road networks, and will gain access to proposed compound locations, and the internal haul roads, from access points located on the National and Regional roads.

Where haul roads contained within the site cross existing roads within the public network, traffic movements will be managed to ensure safety for all road users. Similarly, access to site compounds will be designed to operate safely and traffic management measures will be deployed.

Access points to the site haul routes will be restricted to specific locations on the National and Regional Road network.

1.11.6 Drainage and Sediment Control

Erosion control prevents runoff flowing across exposed ground and becoming polluted with sediments. Sediment control is designed to slow runoff to allow any suspended solids to settle out in situ.

Eight principles of erosion and sediment control during the construction phase of a road infrastructure project are outlined within section 18 of the CIRIA C648 document Control of water pollution from linear road projects (CIRIA, 2006). This document lists the following principles which will be applied as required during construction:

- Erosion control (preventing runoff) is much more effective than sediment control in preventing water pollution. Erosion control is less subject to failure from high rainfall, requires less maintenance and is also less costly.
- Plan erosion and sediment controls early in the project and incorporate into the works programme.
- Install drainage and runoff controls before starting site clearance and earthworks.
- Minimise the area of exposed ground.
- Prevent runoff entering the site from adjacent ground, as this creates additional polluted water.
- Provide appropriate control and containment measures on site.
- Monitor and maintain erosion and sediment controls throughout the project.
- Establish vegetation as soon as practical on all areas where soil has been exposed.

1.11.6.1 Potential Sources of Runoff

Areas of potential runoff include:

Earthworks

The most significant areas of concern regarding the control of erosion and sediment on any road infrastructure project are those associated with the processes where the topsoil and subsoil surfaces have been exposed. These surfaces are most likely to have the potential for runoff and are typically exposed during the following work sequences:

- The initial site clearance and topsoil stripping along the proposed route corridor.
- Excavation works associated with steep slopes.

- Excavation works associated with road cuttings.
- Excavation works associated with Flood compensation areas.
- Works associated with the construction of the road embankments.
- The excavation and backfilling of any soft spots encountered along the road corridor.
- The construction of haul roads to provide for construction access for the works operations.
- The stockpiling of compliant earthworks material for reuse in the project.
- The stockpiling of unacceptable earthworks material prior to removal offsite.

The greatest source of sediment loaded runoff is likely to be from pluvial runoff on exposed earthworks slopes. Once earthworks slopes are exposed (cuts) or built up (embankments), rainfall falling on the slope and runoff from land sloping towards the top of a cut travel uncontrolled down the slope – potentially at high velocities – causing suspension and resuspension of soil particles from the surface of the slope. An additional impact of uncontrolled runoff on slope faces is that erosion channels (or gullies) may form in the cut slope due to the movement of water down the cut slope allowing water penetration into the slope face which may lead to slope stability issues.

Where topsoil and other soils are to be stored on site, stockpiles with significant side slopes can create another source of sediment laden runoff. As with the earthworks slopes above, once the slopes are built up, rainfall falling on the slope and runoff from the top of the stockpile travel uncontrolled down the slope – potentially at high velocities – causing suspension of soil particles from the surface of the slope.

When construction plant such as excavators, dumpers or trucks are travelling into and out of earthworks locations, soil may become attached to the wheels and then be tracked along haul routes. When rainfall lands on these roads the runoff resuspends the sediments and the polluted runoff may be directed to drains or watercourses without treatment.

Surface Water Crossings and Outfalls

An additional area of potential concern is the construction of structures such as over/under bridges, surface water outfalls and culverts. These works are likely to have potential for runoff and will typically carry a risk of generating runoff containing sediment and other pollutants.

Open drainage features constructed as part of the works such as interceptor drains, and attenuation ponds can also contribute to sediment runoff. Where water is introduced to these features prior to a full vegetation cover, the water can result in suspension of soil particles as the water is conveyed through the feature. It is important that any run-off falling into un-vegetated drains or attenuation pond does not have a pathway to a receiving water environment until such time as the features are vegetated and are functioning as designed.

Concrete and Grouting Activities

Concrete, bentonite, grout and other cement-based products are highly alkaline and corrosive and can have a devasting effect upon water quality. Cement-based products generate very fine, highly alkaline silt (11.5pH) that can physically damage fish by burning their skin and blocking their gills. This alkaline silt can also smother vegetation and the bed of watercourses and can mobilise pollutants, such as heavy metals, by changing the water's pH. Concrete and grout pollution is often highly visible.

Large volumes of cementitious materials are used within the construction industry and frequently involve the batching and placement of "wet" materials in situ. Particular risks are posed to water quality when construction is taking place over or near surface waters.

1.11.6.2 Erosion and Sediment Controls

The objectives for erosion and sediment control during the earthworks phase are to:

- Keep areas exposed to the elements to an absolute minimum.
- Minimise the quantity of surface water runoff within the site works area.
- Prevent runoff entering the site from adjacent ground, as this can create additional polluted water.
- Schedule the works operations appropriately to allow for works to commence at the low point and continue to the works towards the high point associated with the catchment area for each outfall.
- Plan the works in advance to allow for an efficient earthwork operation and ensure that any fill material is placed as soon as is practical after excavated material has been removed.
- Plan the bridge crossing works appropriately and in sufficient detail to allow operations to have a minimal impact on surface runoff.
- Ensure that all unacceptable / non-compliant material as encountered during excavation works is removed from the works area and placed in a dedicated, controlled location in as efficient a manner as possible.

The principal control measures that are prescribed for the construction phase to protect the water quality within the receiving catchment are as follows:

- All required construction compounds are located on dry land, and where feasible at a distance of 50 m from any river and stream channels and outside of all potential floodplain areas associated with the waterbodies. The construction compounds are also outside of SAC/SPA boundaries.
- Measures will be implemented to ensure that silt laden or contaminated surface water runoff from the compound does not discharge directly to the watercourse. These protection measures will comprise of the use of grassed buffer areas or timber fencing with silt curtains or earthen berms covered with a geotextile to prevent direct runoff of waters from the construction site to the adjacent watercourses.
- The storage of oils, fuel, chemicals, hydraulic fluids, etc. will be undertaken in accordance with current best practice for oil storage, e.g. CIRIA C736 Containment systems for the prevention of pollution (Walton, 2014) and Best Practice Guide BPGCS005 Oil Storage Guidelines (Enterprise Ireland, no date). All stored oils, fuel, chemicals, hydraulic fluids, etc. must be located in a secure, bunded and impermeable surfaced area and will be appropriately secured. As a minimum, storage must be bunded to a volume not less than 110% of the tank's maximum capacity. If more than one container is stored the system must be able to contain 110% of the largest tank or drum within the bunded area or 25% of the total tank capacity within the bund, whichever is greater.
- Protection measures will be put in place to ensure that all hydrocarbons used during the construction phase are appropriately handled, stored and disposed of in accordance with recognised standards, as laid out by the EPA. All chemical and fuel filling locations will be contained within bunded areas,
- Foul drainage from all site offices and construction facilities will be contained and disposed in an appropriate manner.
- Site clearance works, including the stripping of topsoil, will not be carried out over significantly large areas in advance of the earthworks to prevent areas from being exposed to the elements for unnecessarily long periods of time.
- Sediment ponds, silt traps and bunds will be constructed as part of the surface water management system during construction works. Temporary run-off collection systems will be channelled to the proposed attenuation pond, vortex control chambers and petrol interceptors for treatment prior to any discharge to receiving waters. Construction within watercourses will be minimised. Where pumping of water is to be carried out, sediment socks will be used at intake and discharge points.
- All control measures implemented are to be inspected daily, in particular, after rainfall or alluvial flood events. An inspection and maintenance checklist of the control measures shall be developed and

records kept of the inspections and maintenance activities, such as the removal of sediment accumulated in silt traps when they are half full.

- Surface water flowing onto the construction area from areas external to the site will be minimised by the provision of the proposed interceptor channels.

- Management of material stockpiles to prevent siltation of watercourses through runoff during rainfall events will be undertaken. This may involve allowing the establishment of vegetation on the exposed soil and surrounding stockpiles, with the provision of cut-off ditches or silt fences to the base of the stockpile to contain runoff. Any stockpiles must be kept at least 50 m from the nearest SAC boundary and at least 10m from any waterbody, river, stream or drain.

- Where construction works are carried out adjacent to a watercourse, protection of such waterbodies from silt laden runoff, as described above, will be carried out.

- The use and management of concrete close to watercourses will be carefully controlled to avoid spillage.

- Any surface water abstracted from a river for use during construction shall be through a pump fitted with a filter, to prevent the accidental intake of fish. Any surface water abstractions will conform with IFI/Loughs Agency guidelines. Proper biosecurity measures will be implemented at any water abstraction to ensure that any plant, footwear or other equipment is thoroughly disinfected prior to entering and after removal from the watercourse. There shall be no permitted water abstraction from the Swilly Burn in Section 3 due to the reported presence of the invasive species Asian clam within the watercourse.

1.11.7 Traffic Management

1.11.7.1 Construction Traffic

During the construction of the works, materials will be required to be imported including earthworks fill materials that cannot be sourced on-site, concrete products, steel materials, pavement materials (bituminous layers), pipes, ducts and pre-cast units, etc. Where feasible, materials excavated within the site will be hauled along the route of the Proposed Development within each individual section, without the need to use the public road network. However, where there are natural obstacles to this, e.g., rivers or major roads, then haulage on the public road network cannot be avoided.

Construction traffic, other than earthworks, will be generated by the need for other construction materials to be delivered and transported to/ from/ around the site. This will include:

- Concrete and concrete products.

- Steel reinforcement.

- Fence and barrier materials.

- Crushed stone for pavement construction that cannot be sourced from within the site.

- Pavement materials.

- Pipes, ducts, pre-cast units required for drainage and utility systems.

- Geotextiles and other membranes.

- Lighting, signage, road marking materials.

- Landscaping materials.

- Machinery, plant, fuel, supplies to the construction compound and other miscellaneous equipment and materials.

Workers, sub-contractors, site supervision staff and other staff and employees working on the Proposed Development will be accessing the sites at various locations on the road network.

The volume of traffic generated by the requirements above will vary in intensity from location to location, and from time to time during the 60-month construction period for the project. Construction activities will be limited to the permitted construction times in any consent granted for the Proposed Development.

Temporary crossing points will be required for each of the national, regional and local roads crossed by the Proposed Development. The crossings will require local traffic management, in accordance with a temporary TMP, traffic signs manual, and the Safety, Health & Welfare at Work (Construction) Regulation 2013, when required.

For each section, the additional construction traffic on the public road network has been estimated on the following basis:

- The entire Proposed Development will be constructed in one phase (60 months).
- The construction traffic is distributed over a construction period of 36 months for each Section of the Scheme.
- Works will typically be undertaken, save for emergency works or pumping out of excavations, on a six-day working week Monday to Friday between 07:00 and 19:00 and on Saturdays between 08:00 and 16:00.
- Construction traffic movements are based on one full load and one empty load (i.e. two movements for each load of materials).
- The transport of materials will be along proposed haul routes identified in the EIAR, and through the site via internal haul roads.
- The increase in traffic takes account of the additional trips required for the transportation of additional fill material, pavement and concrete materials.

1.11.7.2 Traffic Management, Road Closures and Temporary Diversions

Connectivity of the local road network will be maintained during construction by completing construction offline from the existing road networks and maintaining operation of the local road network, before final tie-in works are completed, or providing a temporary diversion of the local road network around the construction site where online construction is required.

Temporary road closures or partial closures will be required during construction to complete tie-in works, utility connections and accommodate other specific construction activities. In most cases, traffic management measures will enable partial closures to be implemented, rather than full closures. Where full road closures are required, diversion routes will be identified and signed.

Sufficient lands will be made available within the permanent or temporary Proposed Development Boundary to accommodate the provision of temporary road diversions.

Construction works that affect access points to businesses and residences will be scheduled in such a way as to minimise disruption. Where accesses are affected by construction activities, affected property owners/ occupiers will be notified in advance.

1.11.8 Utilities

Utility diversions necessitated by the Proposed Development are described in Chapter 16: Material Assets: Non-Agriculture.

Utility diversions will need to be completed prior to, or early during the construction phase to facilitate construction of the main works. Consultation has taken place with utility service providers to identify feasible utility diversions for the purpose of ensuring sufficient land is included within the Proposed Development Boundary to accommodate the diversions.

All utility diversions will require allowance for lead in times within the detailed design and construction programmes. Lead in times for electricity HV (EirGrid/ ESB), water supply (Uisce Eireann) and strategic fibre-optic communications (Project Kelvin) are particularly long and consultation with these providers will continue should approval be granted for the Proposed Development.

In addition to utility diversions required for the main works, utility connections and supplies will be required for the construction compounds proposed for each section.

Temporary lighting for other areas of construction remote from the construction compounds, such as structure locations, will be provided using mobile generators.

1.11.9 Environmental Operating Plan (EOP)

An Environmental Operating Plan (EOP), also referred to as a Construction Environmental Management Plan (CEMP), has been prepared and is included as Appendix C4.01 in Volume C: Technical Appendices to the EIAR. The EOP will be updated and finalised by the appointed contractor(s) and will include any additional commitments which may arise as part of the EIA / AA / statutory approval processes and also any mitigation measures / conditions required pursuant to any decision to grant approval by An Coimisiún Pleanála (the Commission). The contractor will also be required to provide a documented account of the implementation of the environmental commitments as set out in the EIAR and NIS and in the EOP itself if same is required by any approval as may be granted by the Commission for the Project.

1.12 Construction – Section 1 N15/ N13 Ballybofey/Stranorlar Urban Region

1.12.1 Land Use Requirements

The location of the Proposed Development is predominantly rural and passes close to the settlements of Ballybofey and Stranorlar.

1.12.1.1 Landtake

In total, approximately 218 hectares of land will be permanently required, and a further approximate 4 hectares of land temporarily required, to construct the Proposed Development and associated works.

1.12.2 Acquisitions / Demolition works

The acquisition of dwellings, commercial buildings and outbuildings required for the construction of the Proposed Development in Section 1 are presented in Table 1.42.

Table 1.42: Section 1 Structures to be Acquired

	Chainage (approx.)	Road Reference	Plot ID Ref	Type	Demolished / Retained
1	0+980 m	Mainline	1021	Commercial	Demolish
2	1+130 m	Mainline	1023	Dwelling and outbuildings	Demolish
3	1+030 m	Mainline	1024	Dwelling and outbuildings	Demolish
4	0+050 m	L-2794 (Cappry Road) tie-in	1028	Outbuilding	Demolish
5	0+690 m	Ballybofey Link Road	1030	Dwelling and outbuildings	Demolish
6	1+760 m	Mainline	1031	Dwelling and outbuildings	Demolish
7	1+750 m	Mainline	1032	Dwelling and outbuildings	Demolish

	Chainage (approx.)	Road Reference	Plot ID Ref	Type	Demolished / Retained
8	1+840 m	Mainline	1901	Dwelling and outbuildings	Demolish
9	1+950 m	Ballybofey Link Road	1043	Dwelling and outbuildings	Demolish
10	2+320 m	Mainline	1045	Dwelling and outbuildings	Demolish
11	2+300 m	Mainline	1177	Dwelling and outbuildings	Retain
12	3+870 m & 3+760 m	Mainline	1061	Dwelling and outbuildings	Demolish
13	3+850 m	Mainline	1062	Dwelling and outbuildings	Demolish
14	4+050 m	Mainline	1166	Dwelling and outbuildings	Retain
15	5+130 m	Mainline	1077	Dwelling and outbuildings	Demolish
16	6+900 m	Mainline	1107	Dwelling and outbuildings	Demolish
17	6+700m	Mainline	1085	Dwelling and outbuildings	Demolish
18	0+650 m	N15 Primary Road Connector	1090	Dwelling and outbuildings	Retain
19	0+150m	L-6674 Connector	1114	Dwelling and outbuildings	Retain
20	0+100m	Mainline	1013	Outbuilding	Demolish
21	0+050m	AR1.07	1016	Outbuilding	Demolish
22	4+820m	Mainline	1071	Pump House	Retain
23	4+350m	Mainline	1068	Dwelling	Demolish
24	0+640m	L-6564 Connector	1008	Outbuildings	Demolish
25	3+760 m	Mainline	1057	Outbuildings	Demolish

1.12.3 Earthworks Materials

This section outlines the existing ground conditions and earthwork quantities including details of the proposed Material Extraction and/or Deposition (MED) areas. These are based on site investigations and the design of the Proposed Development.

Excavation of approximately 2.7 million m^3 of earthworks is proposed, with approximately 2.06 million m^3 considered as suitable construction material. With regard to the re-usability of material sourced on-site, it has been determined that there is no requirement to import earthworks materials.

The earthworks types present along the proposed route of Section 1 are shown in Table 1.43.

Table 1.43: Section 1 Earthwork Locations

Sub-Section	Chainage	Earthworks Type	Soil or Rock Cut (if Applicable)	Method of Removal
S1.1	0-50	At Grade	N/A	N/A
	50-450	Fill	N/A	N/A
S1.2/1.3	0-150	Fill	N/A	N/A
	150-1,000	Cut	Rock Ch. 500 – Ch. 600	Cut/Blast
	1,000-1,100	At Grade	N/A	N/A
	1,100-1,600	Cut	Rock Ch. 1,300 – Ch. 1,600	Cut/Blast
	1,600-2,270	Fill	N/A	N/A
	2,680-2,990	Fill	N/A	N/A
	3,040-3,300	Fill	N/A	N/A
	3,300-4,000	Cut	Rock Ch. 3,400 – Ch. 3,700	Cut/Blast
	4,000-4,950	Fill	N/A	N/A
	4,950-6,000	Cut	Rock Ch. 5,400 – Ch. 5,900	Cut/Blast
	6,000-6,550	Fill	N/A	N/A
	6,550-7,450	Cut	Rock Ch. 6,700 – Ch. 6,900	Cut/Blast
	7,450-8,550	Fill	N/A	N/A
S1.4	0-300	Fill	N/A	N/A
	300-500	Cut	No Rock	Excavation
	500-600	At Grade	N/A	N/A
S1.N15 PRC	0-300	Cut	Rock Ch. 125 – Ch. 275	Cut/Blast
	300-1300	Fill	N/A	N/A
	1,300-2,250	Fill	N/A	N/A
	2,250-2,900	Cut	No Rock	Excavation
	2,900-3,085	Fill	N/A	N/A

A detailed assessment of materials within the Proposed Development project can be found in Chapter 10: Land, Soil & Hydrogeology.

Table 1.44 summarises the earthworks quantities assessed for Section 1 and demonstrates that there is an earthworks balance, and that all requirements to win and dispose of material can be met within the Proposed Development Boundary by the utilisation of MED areas that have been identified within the site. Accordingly, there will be no net import or export of earthworks material to / from Section 1.

Table 1.44: Section 1 Earthwork Quantities

Element	Intermediate Volumes (m^3)	Total Volumes (m^3)
Total Cut		2,700,000
Total Cut available for reuse		2,056,000
Over excavation for soft areas	172,000	
Unsuitable	473,000	
Cumulative volume of material requiring deposition		645,000
Additional material to fill soft areas	172,000	
Fill to meet alignment requirements	1,873,000	
(Import to site)	*74,000*	
Cumulative volume of Fill required		2,045,000
Excavation and backfill to MEDs		104,000
Material placed as non-structural fill		645,000

Notes
(1) All excavated rock assumed to be processed into compliant fill.
(2) Non-compliant material generally comprises soft glacial till, peat and alluvium.
(3) An allowance has been made for an import of sub - pavement fill material which is not included in cumulative fill volume

The Section 1 earthworks balance shows a surplus of topsoil and acceptable fill volumes. The surplus of topsoil can be accommodated within environmental bunds and landscape areas that form part of the permanent works. The surplus of compliant fill will also be re-used within environmental bunds and landscape areas. The remaining surplus will be placed within designated deposition areas. There are a total of 15 no. MED areas located within the Section 1 Proposed Development boundary and the location of these MED areas are in close proximity to the permanent works in areas with the least environmental/ ecological impact. The proposed MED areas provide sufficient capacity to cater for the surplus material.

The main material extraction area within the Section 1 route corridor is south of the River Finn at the proposed construction compound (MED01) at Cappry. This extraction of material from the MED01 area has been proposed to cater for the approach embankment leading up to the River Finn so as to avoid the need for haulage from north of the river, either through the Twin Towns or across the river, to construct the southern embankment. The MED01 area has an average depth of 8m and an estimated volume recovery of 104,000 m^3 to 120,000 m^3. Volumes have been estimated based on the proposed road level however, if additional material is required the contractor may advance deeper to win more suitable material for construction. It is proposed to fill any extraction areas with surplus and non-compliant material back to blend in with the surrounding post-construction ground levels.

1.12.4 Construction Compound Locations

Two locations have been identified and considered for the main Section 1 construction compounds as presented in Table 1.45.

Table 1.45: Section 1 Construction Compound Locations

Name	Location	Approximate Chainage	Approx. Site Area (ha)
Section 1	**Cappry**	Mainline 1.2 Ch. 1+450 – 1+930 m	5.37 ha
Section 1	**Treanamullin**	N15 Primary Road Connector Ch. 2+500 – 2+850 m	1.55

The locations of construction compounds are shown in Drawing 1 sheet 2 of 8 (Cappry) and sheet 8 of 8 (Treanamullin) in Appendix 2.

The construction compound location at Cappry consists of three areas located adjacent to each other at the proposed Ballybofey Link Road North/ South grade separated junction. Access/ egress to/ from the Cappry construction compound locations can be obtained from the L-2794 road until such time as the contractor has an alternative access road created, e.g. a corridor for the Ballybofey Link Road North from the R252 or a corridor from the R252 along the mainline, both within the Proposed Development boundary.

The Treanamullin compound can be accessed from the existing N15 within the Proposed Development boundary.

1.12.5 Drainage and Sediment Control

The lands associated with Section 1 are predominantly agricultural, within a semi urban landscape around Ballybofey/Stranorlar. The topography of the site is highly variable, with the lowest point within the project being the River Finn, and the highest point being the hilly terrain around Teevickmoy to the northern end of the project.

The key surface water features associated with the Proposed Development are as follows:

- River Finn (proposed crossing point).
- Burn Daunett (southern tie in).
- Cloghroe River (northern tie in).
- Various smaller watercourses that feed the above.

A detailed assessment of these waterbodies, and a summary of the proposed watercourse crossings, can be found in Chapter 9A: Biodiversity Terrestrial, Chapter 9B: Biodiversity Aquatic, and Chapter 11: Water.

1.12.6 Construction Traffic

The River Finn severs a linear haul route along the Proposed Development corridor connecting the south and the north portions of Section 1, effectively splitting the site into two:

- the southern portion between the southern tie-in and the River Finn, including the Ballybofey Link Road and
- the northern portion including the remainder of the mainline to the tie-in with the N13, and the N15 Primary Road Connector.

Bulk earthworks will be mostly completed within the first two years of construction; however, the proposed River Finn Bridge is not expected to be completed until the final year of construction. Section 1, north and south of the river, are each balanced in terms of earthworks to minimise the transportation of earthworks material through the Twin Towns across the existing River Finn bridge.

Analysis of the site investigation data collected shows an earthworks balance in the southern and northern portions of Section 1 is achievable, as well as achieving the overall balance throughout the entire Section 1. Within the lands acquired for Section 1 MED areas have been identified to win suitable material and dispose of unsuitable material. In total, there will be approximately 180,000 earth moving truck movements required to construct Section 1. Most of this trucking will take place along temporary haul roads within the Proposed Development corridor.

1.12.7 Permanent road closures

Road closures are shown on the General Arrangement drawings, Drawing 1 in Appendix 2.

1.12.8 Utilities

For Section 1 construction works will require works to the following utilities:

- ESB electricity: There are 31 interface points with the high voltage (38 kV and 110kV) network, and medium and LV (below 38 kV) network. The key diversion is the 110 kV transmission line between Cappry and Drumboe, including the crossing of the River Finn (Ch 1+150 to 3+100).

- Eir: There are 21 interface points with the EIR underground and overhead services affected by the Proposed Development.

- ENET: There are 2 interface points with ENET underground services affected by the Proposed Development

- Public Water and Wastewater Supply: There are 21 interface points between the Proposed Development and UÉ networks (including water supply and sewerage). This includes an Uisce Eireann water supply trunk main (375 mm diameter) between Cappry and Drumboe, including crossing of the River Finn (Ch 1+750 to 3+100).

1.12.9 River Finn Bridge Construction

The construction sequence for the River Finn Crossing is described below. In-stream works are not required or permitted for the construction of the River Finn Crossing. The bridge construction will take approximately 36 months to complete. Works on the south side of the river will use the proposed construction compound at the Ballybofey Link Road North/ South (approx. mainline Ch. 1600). Works from the northern side of the river will utilise the construction compound on the N15 Primary Road Connector (Ch. 2650).

1. Carry out additional ground investigation works prior to site mobilisation to confirm the expected ground conditions. There will be no ground disturbance within 8 m from the River Finn main channel and there are no discharges involved with such works.

2. Carry out archaeological trenching works, only within areas marked out for the bridge pier foundation sites. The areas at proposed Pier 3 and 4 (closest to the River Finn SAC and on the floodplain) will be surrounded in temporary silt fencing prior to these test trenches being excavated. Once again, there will be no ground disturbance within 8 m from the River Finn main channel for these works and there are no discharges involved.

3. Bridge construction site mobilisation.

4. Erect appropriate temporary fencing (e.g. mammal and silt) set-back from the SAC boundary to demarcate the limit of allowable working area which is outside the SAC only and to leave a width of riparian habitat undisturbed.

5. The extent of bankside and flood plain interference and vegetation removal shall be agreed by the Ecological Clerk of Works, identified, documented, and demarcated with appropriate fencing.

6. Construct temporary site access tracks from the mainline haulage route to the bridge construction works area on each side of the river.

7. Areas of hardstanding / work platform will be required throughout at each bridge support location to facilitate the piling process and will need to be maintained throughout the construction stage.

8. The Southern Abutment and Piers 1 and 2 are located outside the 1% AEP flood zone and the required hardstandings will be constructed from appropriate fill (clause 804 or similar and containment geotextile layers as required). These hardstand areas will be surrounded in silt fencing and temporary cut off drains around the work platform areas will have check dams installed and be directed towards the permanent attenuation pond (No. 10), which will have been installed as part of the advance works. This pond shall be utilised to treat run off during the construction phase and shall be cleaned of any excess silt during and at the end of the construction phase, as required.

9. Piers 3, 4, 5 and 6 and the Northern Abutment are located on the River Finn floodplain and within the 1% AEP flood zone. In order to prevent the hardstanding / work platform becoming sources of suspended solids to the SAC river over the approximate 36 month construction period, they will be comprised of layers of reno-mattress (or similar) (essentially flat gabions filled with clean stone) which avoids placing large areas of clause 804 which can become entrained to the SAC river during potential flooding. The platforms shall be of the minimum thickness required to provide stability for large machinery and plant.

10. To avoid generating sources of sediment loss, there will be no excavations undertaken to install the clean-stone reno-mattress work platforms. They will be laid directly onto the vegetated ground and will comprise layers of reno-mattress filled with washed clean rockfill placed on a basal separation geotextile. A geogrid will be placed between each layer. Locally, clean rockfill can be placed and sandwiched between and upper and lower mattresses to level out hollows and provide a suitably level platform surface for large plant.

11. The rockfill will have a typical particle size of 75 mm – 150mm with the smallest typical particle size greater than the mesh size. All stone fill will arrive to site clean and pre-washed to remove any soil and residual rock dust and other fines before being transported to site. The upper most reno mattress will use rock fill with a particle size weighted towards the smaller sizes but not <75 mm. This will reduce surface roughness of the platform and improve trafficking.

12. The rockfill will be confined by the cage of the reno-mattress. Each mattress will be tethered to the next with lacing wire. In this way water will be able to pass through the work platform in the event of a flood, without entraining fines to the River Finn SAC. Typical dimensions for the proposed mattresses are 6 m (length) x 2 m (breath) and 0.3 m (thickness). Similar to block laying, each new layer of mattress shall overlap the joints between individual mattresses present in the previous layer to provide stability.

13. Construction works to install pier foundations on the southern side of the river are above the 1% AEP flood zone and do not require additional flood protection during construction works. Robust silt fencing and surface water run-off management (as described above for work platforms) shall be employed.

14. Construction works to install pier foundations on the northern side of the river are on the floodplain and are below the 1% AEP flood level. For that reason temporary sheet pile cofferdams shall be constructed around each of the four foundation works areas for Piers 3, 4, 5 and 6. Even though these works are outside the SAC boundary, they are in close proximity to the SAC in a reach of the river where there is sensitive, highly utilised salmonid nursery habitat, hence very sensitive to sediment and pollutant washout.

15. The function of the cofferdams is to exclude soil and water from the excavations below the existing ground surface to facilitate the construction of bridge pier foundations. The cofferdam walls are made of impermeable, interlocking steel sheet piles. The sheet piles are to be installed using a hydraulic press method to form a continuous interlocking vertical wall. The top of the sheet piles will extend to a height above the ground surface which is above the peak 1% AEP (plus 20% climate change (CC) allowance + 200 mm freeboard). It is preferable that the sheet piles for the cofferdams are installed to intercept fair to good rock stratum to further limit the potential for groundwater ingress. Groundwater ingress to a cofferdam will either be through the floor of the cofferdam or from the interlock between piles, though properly constructed and maintained sheet piles will allow very little water ingress at the interlock. The majority of water ingress will be through the floor of the cofferdam. The water accumulating in the

cofferdams will be pumped from a sump formed in the cofferdam to a storage bowser positioned outside of the cofferdam. Uncontaminated water will be pumped out and removed to the nearest Attenuation Pond for settlement of suspended solids. Any sump water that is contaminated (e.g. from concrete and/or hydrocarbons) will be pumped out and removed off-site for disposal at a licenced waste management facility.

16. The top height of the temporary cofferdams will be set at 21.67 mOD Malin, which is the 1% AEP (+ 20% CC allowance + 200 mm freeboard). With the 20% CC allowance, such a top height allows sufficient freeboard for the construction period, whilst ensuring the cofferdam height is manageable to access during the construction. From existing ground levels, it is evident that the temporary cofferdams top height will extend broadly 1.5 m above existing ground (varies across the floodplain) and they can be accessed throughout the construction using ladders.

17. Implement additional measures to minimise and control the risk of siltation entering the river. This will include:
    a. Establish site, surface drainage and silt control measures including silt fencing;
    b. Building a diversion for water run-off from the construction areas to settlement pond No. 10 (on the southern side of the river). There shall be no temporary settlement ponds on the northern side of the river as they would be within the flood zone and become potential sources of sediment input to the SAC. The focus on the northern side of the river is to avoid and limit potential sources of sediment wash out by utilising reno-mattress hardstandings and temporary cofferdams around pier foundation constructions;
    c. Following steps a and b above, stripping of topsoil, and where necessary, surfacing of areas with granular material on the southern side of the river. There shall be no stripping of topsoil on the northern side of the river within the construction footprint within 50 m of the SAC boundary, instead employing the method described above in terms of laying of clean stone filled layers of reno-mattress; and
    d. Covering of any temporary stockpiles of stripped soil.

18. Oil storage tank(s) and the associated filling area and distribution pipe work will be at least 50m distant from the river banks or any connected land drain and 50 metres outside of any European Site and positioned so that no spillages can flow in the direction of the river.

19. Storage tanks will have secondary containment provided by means of an above ground bund to capture any oil leakage irrespective of whether it arises from leakage of the tank itself or from associated equipment such as filling and off-take points, sighting gauges, etc., all of which should be located within the bund.

20. Oil booms and oil soakage pad will be maintained on-site to enable a rapid and effective response to any accidental spillage or discharge.

21. Abstraction of water for dust control will be from dedicated watering points; these will be from an excavated site located outside the SAC and not closer than 20m from any SAC boundary, replenished by ground infiltration and not by stream infiltration. No abstraction will occur from watercourses.

22. The bridge will require bored pile foundations down to rock requiring a large piling rig and crawler crane to access each foundation locations. Prefabricated rebar and concrete deliveries required to all areas, material excavated during boring to be removed from site.

23. Excavate for pile caps. Implement de-watering measures as necessary. Dewatering will be required from the temporary cofferdam areas on the River Finn floodplain at Piers 3, 4, 5 and 6. This water will potentially be contaminated with silt and concrete washings and will be removed and treated. Dewatering protocols to protect water quality are set out in Chapter 11: Water.

24. Construct reinforced concrete pile caps at abutment and pier locations. Conventional construction of the reinforced concrete substructure will require plant such as concrete lorries and pumps to operate within the valley.

25. Construct remainder of reinforced concrete substructure; abutments including inspection gallery, pier columns and crossbeams on top of columns.

26. Waterproof pile caps and abutments.

27. Remove cofferdams and backfill around pile caps and behind abutments up to the abutment diaphragm construction joint level.

28. Install bridge bearings to abutments and pier crossheads.

29. The bridge deck comprises steel girders in composition with a reinforced concrete deck. The steel girders will be lifted into place in sections by crane. A very large crawler crane (Liebherr LR 1600/2 or similar) will be required to allow the main pier sections and central sections of the main span over the River Finn to be lifted into position. It is assumed that girders will be lifted in braced pairs. The crane will be located on the south side of the proposed alignment away from the high voltage cables to the north. Multiple crane set ups will be required to lift in the various sections. The hardstanding area will facilitate the crane set ups and girder assembly however additional temporary crane mats/timbers will be required to support the crane during the lifts. It is likely that some intermediate temporary supports will be required during the lifting operation, to support one end of the pier sections prior to lifting in the central sections. A smaller crane may be used to lift in some of the shorter back span sections which will be installed prior to the main pier and midspan sections.

30. Following delivery of the steelworks to site, the girders will be assembled in pairs, braced together and lifted into position and spliced together at the designated locations.

31. Install permanent formwork on the steelwork, fix reinforcement, pour deck sections and abutment/pier diaphragms.

32. Finish construction of in-situ reinforced concrete wing walls and backfilling behind abutments.

33. Complete structure finishes (expansion joints, deck waterproofing, road and verge surfacing, parapets etc.)

34. To avoid the requirement for large excavations within the SACs there will be no installation of concrete headwalls and concrete apron within the SAC or directly at the riverbank.

35. Outfalls will be set back from the channel, discharging over secured 'green' erosion protection mats, e.g., pipe to swale scenario (using vegetated armour such as Hanes ScourStop ® transition matting, or similar). The scour protection to the outfalls will run up to the riverbank edge but will comprise the geotextile, green paving type rubble mats which are pinned to the ground surface between the outfall and the riverbank, with the area revegetating over time.

36. De-mobilise from site and remove any temporary access roads and hardstanding areas.

37. Reinstate disturbed ground.

On the northern side of the river on the floodplain, as with the placement of the reno-mattresses, the last mattress put in place will be the first one lifted out so that machines are always working from the platform and not rutting the ground. Demobilisation is expected to take less than one month. The vegetation will have died off beneath the platform rendering the soil vulnerable to erosion from flooding and surface run-off. To reduce the potential for erosion, the platform will be removed in sections and will be timed to occur in spring to autumn. To reverse soil compaction the ground will be chisel ploughed to loosen soil and immediately reseeded with an appropriate grass mix. Silt fencing along the SAC boundary will remain in place until vegetation has established.

The bridge is considered to be readily constructible by a contractor suitably experienced in bridge construction of this scale and form.

1.13 Construction – Section 2 N56/ N13 Letterkenny to Manorcunningham

1.13.1 Land Use Requirements

The location of the Proposed Development is predominantly semi-urban and passes close to the east of Letterkenny.

1.13.1.1 Landtake

In total, approximately 165 hectares of land is permanently required, and a further approximate 3.5 hectares of land will be temporarily required to construct the Proposed Development and associated construction compounds.

The proposed haul routes include the national and regional road network, internal site haul routes, access points to the construction site and construction compound locations.

1.13.2 Acquisitions / Demolition works

The acquisition of dwellings, commercial buildings and outbuildings required for the construction of the Proposed Development in Section 2 are presented in Table 1.46.

Table 1.46: Section 2 Structures to be Acquired

	Chainage (approx.)	Road Ref.	Plot ID Ref.	Type	Demolished / Retained
1	0+090 m	Mainline 2.1	2010	Dwelling and outbuildings	Demolish
2	0+200 m	Mainline 2.1	2012	Dwelling and outbuildings	Demolish
3	2+325 m	Dromore Junction	2057	Dwelling and outbuildings	Demolish
4	2+325 m	Dromore Junction	2058	Dwelling and outbuildings	Demolish
5	2+325 m	Dromore Junction	2059	Dwelling and outbuildings	Demolish
6	1+220 m	L-5494 Connector	2112	Dwelling and outbuildings	Demolish
7	1+420 m	L-5494 Connector	2114	Dwelling and outbuilding	Demolish
8	0+100 m	Dry Arch roundabout	2900	Dwelling and outbuildings	Demolish
9	0+150	Mainline	2102	Dwelling and outbuildings	Retain
10	0+100 m	Bonagee Junction LX-2010	2079	Commercial	Demolish
11	0+050 m	Dry Arch roundabout	2900	Outbuilding	Demolish
12	1+000 m	Mainline	2081	Commercial	Demolish
13	0+150 m	Ballyraine Junction	2183	Commercial	Demolish
14	1+450 m	L-5494 Connector	2114	Outbuildings	Demolish
15	0+050 m	Listellian Junction	2801	Outbuildings	Demolish
16	0+970 m	Mainline 2.6	2039	Outbuildings	Demolish
17	2+090m	Mainline 2.2	2053	Outbuildings	Demolish

1.13.3 Earthworks Materials

This section outlines the existing ground conditions and earthwork quantities including details of the proposed Material Extraction and/or Deposition (MED) areas. These are based on site investigations and the design of the Proposed Development.

Excavation of approximately 1.91 million m^3 of earthworks is proposed, with approximately 1.53 million m^3 considered suitable construction material. With regard to the re-usability of material sourced on-site, it has been determined that there is no requirement to import earthworks materials.

The earthworks types present along the Proposed Development is shown in Table 1.47.

Table 1.47: Section 2 Earthwork Locations

Sub-Section	Chainage	Earthworks Type	Soil or Rock Cut (if Applicable)
S2.1	0-50	At Grade	N/A
	50-850	Cut	Rock Ch. 800 – Ch. 850
	850-1,350	Cut	Rock Ch. 850 – Ch. 1,350
	1,350-1,700	Cut	Rock Ch. 1,350 – Ch. 1,800
	1,700-2,340	Cut	Rock Ch. 2,100 – Ch. 2,290
	2,340-2,365	At Grade	N/A
S2.2	0-1,000	At Grade	N/A
	1,000-1,400	At Grade	N/A
	1,400-2,350	At Grade	N/A
	2,350-3,100	At Grade	N/A
	3,100-3,759	At Grade	N/A
S2.RSL	0-150	At Grade	N/A
	150-220	Fill	N/A
	220-350	Cut	No Rock
	350-450	Fill	N/A
	600-980	Fill	N/A
	980-1,450	Fill	N/A
	1,450-1,970	Fill	N/A
S2.BL	0-450	Fill	N/A
S2.DAL	0-350	At Grade	N/A
	350-670	Fill	N/A

A detailed assessment of materials within the Proposed Development project can be found in Chapter 10: Land, Soil & Hydrogeology.

Table 1.48 summarises the earthworks quantities assessed for Section 2 and demonstrates that there is an earthworks balance, and that all requirements to win and dispose of material can be met within the Proposed Development Boundary by utilisation of MED areas that have been identified within the site. Accordingly, there will be no net import or export of earthworks material to/ from Section 2.

Table 1.48: Section 2 Earthwork Quantities

Element	Intermediate Volumes (m³)	Total Volumes (m³)
Total Cut		1,913,000
Total Cut available for reuse		1,530,000
Over excavation for soft areas	56,000	
Unsuitable	328,000	
Cumulative volume of material requiring deposition		384,000
Additional material to fill soft areas	56,000	
Fill to meet alignment requirements	1,469,000	
(Import to site)	*69,000*	
Cumulative volume of Fill required		1,525,000
Excavation and backfill to MEDs		687,500
Material placed as non-structural fill		56,000

Notes
(1) All excavated rock assumed to be processed into compliant fill.
(2) Non-compliant material generally comprises soft glacial till, peat and alluvium.
(3) An allowance has been made for an import of sub - pavement fill material which is not included in cumulative fill volume

The Section 2 earthworks balance shows a surplus of topsoil volumes. The surplus of topsoil can be accommodated within environmental bunds and landscape areas that form part of the permanent works. There are a total of 21 no. material deposition areas within the Section 2 Proposed Development boundary and the location of these areas are in close proximity to the permanent works in areas with the least environmental/ecological impact. The proposed MED areas are intended to provide sufficient capacity to cater for surplus material.

The MED areas also allow for the extraction of material to cater for the deficit of suitable material within the earthworks balance. There are 16 material extraction areas located within the Section 2 CPO Boundary. The depth of extraction in the MED areas can range from 1 m to 8 m and will have a total estimated volume recovery of 687,500 m^3 to 790,000 m^3. Volumes have been estimated based on the proposed road level however, if additional material is required the contractor may advance deeper to win more suitable material for construction.

1.13.4 Construction Compound Locations

Two locations have been identified and considered for the main Section 2 construction compounds as presented in Table 1.49.

Table 1.49: Section 2 Construction Compound Locations

Section	Location	Approximate Chainage	Approx. Site Area (ha)
Section 2	**Lurgy**	L-1064 Connector Ch. 0+250 – 0+650 m	4.6
Section 2	**South of Proposed Bonagee Junction between LX-2009 and LX-2011**	Bonagee Link Ch. 0+300 – 0+350 m	0.5

Access/ egress to/from the Lurgy construction compound can be obtained from the L-1064 which is a short-distance from the existing N13. After sufficient progress has been made on the proposed new L-1064 connector road to the existing N13, construction compound traffic will be able to use this new road for access/ egress.

The Bonagee Junction construction compound can be accessed from the Dry Arch Business Park.

The locations of construction compounds are shown in Drawing 2 sheet 1 of 5 (Lurgy) and 2 sheet 2 of 5 (South of Proposed Bonagee Junction between LX-2009 and LX-2011) in Appendix 2.

1.13.5 Drainage and Sediment Control

The lands associated with Section 2 are a predominantly urban landscape through Letterkenny and east toward Manorcunningham. There is a portion of agricultural landscape along the southern tie in of the route at Listellian. The topography of the site is highly variable between the distinct road corridors, with the lowest point within the project being the low-lying valley of the River Swilly, and the highest point being the hilly terrain around Listellian to the south of Section 2.

The key surface water features associated with the Proposed Development design are as follows:

- River Swilly (at proposed road bridge crossing point – Mainline Section 2.6).
- Isle Burn / Leslie Hill (Stream) (at proposed active travel crossing point – Mainline Section 2.4) close to eastern tie in.
- Various smaller watercourses that feed the above.

A detailed assessment of these waterbodies, and a summary of the proposed watercourse crossings can be found in Chapter 9A: Biodiversity Terrestrial, Chapter 9B: Biodiversity Aquatic, and Chapter 11: Water.

1.13.6 Construction Traffic

The existing N13 dual carriageway severs the linear haul route connecting earthworks cuts between Dromore and Listellian with the earthworks fills between Dromore and the River Swilly. These truck movements must therefore cross the existing N13 dual carriageway interacting with other traffic.

The shortest crossing of the existing N13 dual carriageway would be a direct crossing at Dromore. However, because N13 dual carriageway lanes eastbound and westbound are at different vertical levels the truck movements will use this portion of the N13 dual carriageway accessing the site at the Dry Arch Roundabout.

These trucking movements will take place during off-peak hours. It is further likely that the detailed design will require the embankment fills approaching the River Swilly to be completed in a few stages to facilitate settlement and consolidation.

Works between the Ballyraine Junction and River Swilly crossing will access from the existing N56/ R245 junction (existing Creamery Roundabout) at Ballyraine until the proposed River Swilly crossing is completed. Because finish road levels in this section are similar to existing ground levels trucking movements will be minimal.

In total, there will be approximately 110,000 earth moving truck movements required to construct Section 2. Most of this trucking will take place along haul roads within the Proposed Development corridor.

1.13.7 Permanent Road Closures

Road closures are shown on the General Arrangement drawings, Drawing 2.

1.13.8 Utilities

For Section 2 construction works will require works to the following utilities:

- ESB electricity: There are 25 interface points with the high voltage (38 kV and 110kV) network, and medium and LV (below 38 kV) network.
- Eir: There are 10 interface points with the EIR underground and overhead services affected by the Proposed Development.
- ENET: There are 4 interface points with ENET underground services affected by the Proposed Development
- Project Kelvin: There are 7 interface points between the Proposed Development and the fibreoptic network. This includes a strategic fibreoptic communication (two lines) along the existing N13 dual carriageway between Dry Arch Roundabout and Pluck Roundabout (Ch 0+000 to Ch 3+750).
- Public Water and Wastewater Supply: There are 13 interface points between the Proposed Development and UÉ networks (including water supply and sewerage). This includes an Uisce Eireann water supply trunk main (1,200 mm diameter) at Bonagee on the northern side of the River Swilly (Ch 0+450).

1.13.9 River Swilly Bridge Construction

The construction sequence for the River Swilly Crossing is described below. In-stream works are not required or permitted for the construction of the River Swilly Crossing. This bridge construction will take approximately 36 months to complete. Works on the western (Ballyraine) side of the river will use the proposed construction compound at Bonagee (approx. Ch. +400 on LX2011 between the Bonagee Link and Mainline 2.5). Works from the eastern side of the river will utilise the same construction compound.

1. Carry out additional ground investigation works prior to site mobilisation. There will be no ground disturbance within 15 m from the River Swilly main channel and there are no discharges involved with such works.
2. Carry out archaeological trenching works, only within areas marked out for the bridge pier foundation sites. The area at the proposed western pier (Ballyraine side), closest to the Lough Swilly SAC and on the floodplain will be surrounded in temporary silt fencing prior to the test trench being excavated. Once again, there will be no ground disturbance within 15 m from the River Swilly main channel for these works and there are no discharges involved.
3. Bridge construction site mobilisation.
4. Construct temporary site access tracks from the mainline haulage route to the bridge construction works area on each side of the river.

5. Install sheet piles/temporary works outside the SAC boundary on eastern and western sides of the River Swilly.

6. Erect appropriate temporary fencing (e.g. mammal and silt) set-back from the SAC boundary to demarcate the limit of allowable working area which is outside the SAC only and to leave a width of riparian habitat undisturbed.

7. The extent of bankside and flood plain interference and vegetation removal shall be agreed by the Ecological Clerk of Works, identified, documented, and demarcated with appropriate fencing.

8. Areas of hardstanding / work platform will be required throughout at each bridge support location to facilitate the piling process and will need to be maintained throughout the construction stage. The area on the eastern (Milk Isle) side of the river is protected from flooding in the construction phase by the OPW Swilly Embankments which protect above the 0.5% AEP coastal flood level. The hardstanding on the eastern (Milk Isle) side shall therefore be constructed from appropriate fill (clause 804 or similar and containment geotextile layers as required) as the risk of suspended solids washout during construction is low. These hardstand areas will be surrounded in silt fencing and temporary cut off drains around the work platform areas will have check dams installed and be directed back towards the permanent attenuation pond, which will have been installed as part of the advance works or at the commencement of construction in that area. This pond shall be utilised to treat run off during the construction phase and shall be cleaned of any excess silt during and at the end of the construction phase, as required.

9. The proposed western pier on the Ballyraine side is located on the Swilly floodplain and within the 0.5% AEP coastal flood zone. In order to prevent the hardstanding / work platform becoming sources of suspended solids to the SAC over the approximate 36 month construction period, the first 30 m back from the SAC boundary (i.e., until it is above the flood level of 3.84 mOD Malin) will be comprised of layers of reno-mattress (or similar) (essentially flat gabions filled with clean stone) which avoids placing large areas of clause 804 which can become entrained to Lough Swilly SAC during potential flooding. The platforms shall be of the minimum thickness required to provide stability for large machinery and plant.

10. To avoid generating sources of sediment loss, there will be no excavations undertaken to install the clean-stone reno-mattress work platforms. They will be laid directly onto the vegetated ground and will comprise layers of reno-mattress filled with washed clean rockfill placed on a basal separation geotextile. A geogrid will be placed between each layer. Locally, clean rockfill can be placed and sandwiched between and upper and lower mattresses to level out hollows and provide a suitably level platform surface for large plant.

11. The rockfill will have a typical particle size of 75 mm – 150mm with the smallest typical particle size greater than the mesh size. All stone fill will arrive to site clean and pre-washed to remove any soil and residual rock dust and other fines before being transported to site. The upper most reno mattress will use rock fill with a particle size weighted towards the smaller sizes but not <75 mm. This will reduce surface roughness of the platform and improve trafficking.

12. The rockfill will be confined by the cage of the reno-mattress. Each mattress will be tethered to the next with lacing wire. In this way water will be able to pass through the work platform in the event of a flood, without entraining fines to the River Swilly SAC. Typical dimensions for the proposed mattresses are 6 m (length) x 2 m (breath) and 0.3 m (thickness). Similar to block laying, each new layer of mattress shall overlap the joints between individual mattresses present in the previous layer to provide stability.

13. Construction works to install pier foundations on the eastern (Milk Isle) side of the river are above the 0.5% AEP coastal flood zone (3.84 mOD) and do not require additional flood protection during construction works. Robust silt fencing and surface water run-off management (as described above for work platforms) shall be employed.

14. Construction works to install pier foundations on the western (Ballyraine) side of the river are on the floodplain and are below the 0.5% AEP coastal flood zone. For that reason temporary sheet pile cofferdams shall be constructed around the western pier. Even though the works are outside the SAC boundary, they are in close proximity to the SAC and QI habitat Estuaries 1130.

15. The function of the cofferdams is to exclude soil and water from the excavations below the existing ground surface to facilitate the construction of bridge pier foundations. The cofferdam walls are made of impermeable, interlocking steel sheet piles. The sheet piles are to be installed using a hydraulic press method to form a continuous interlocking vertical wall. The top of the sheet piles will extend to a height above the ground surface which is above the peak 0.5% AEP coastal (+ 200 mm freeboard). It is preferable that the sheet piles for the cofferdams are installed to intercept fair to good rock stratum to further limit the potential for groundwater ingress. Groundwater ingress to a cofferdam will either be through the floor of the cofferdam or from the interlock between piles, though properly constructed and maintained sheet piles will allow very little water ingress at the interlock. The majority of water ingress will be through the floor of the cofferdam. The water accumulating in the cofferdams will be pumped from a sump formed in the cofferdam to a storage bowser positioned outside of the cofferdam. Uncontaminated water will be pumped out and removed to the nearest Attenuation Pond for settlement of suspended solids. Any sump water that is contaminated (e.g. from concrete and/or hydrocarbons) will be pumped out and removed off-site for disposal at a licenced waste management facility.

16. The top height of the temporary cofferdam will be set at 4.04 mOD Malin. This ensures the cofferdam height is manageable to access during the construction. From existing ground levels, it is evident that the temporary cofferdam top height will extend broadly 1.0 m above existing ground (varies on the inland margin) and it can be accessed throughout the construction using ladders. The western abutment is well outside the flood zone and does not require temporary cofferdam, but will have robust silt fencing and run off controls directing flow towards the permanent attenuation pond on that side of the river.

17. Implement additional measures to minimise and control the risk of siltation of entering the river. This will include:
    a. Establish site, surface drainage and silt control measures including silt fencing;
    b. Building a diversion for water run-off from the construction areas to settlement ponds or silt traps with over-flows directed to land rather than to a watercourse;
    c. Stripping of topsoil, and where necessary, surfacing of areas with granular material; and
    d. Covering of temporary stockpiles.

18. Oil storage tank(s) and the associated filling area and distribution pipe work will be at least 50 m distant from the river banks and SAC boundary positioned so that no spillages can flow in the direction of the river.

19. Storage tanks will have secondary containment provided by means of an above ground bund to capture any oil leakage irrespective of whether it arises from leakage of the tank itself or from associated equipment such as filling and off-take points, sighting gauges, etc., all of which will be located within the bund.

20. Oil booms and oil soakage pads will be maintained on-site to enable a rapid and effective response to any accidental spillage or discharge.

21. Abstraction of water for dust control will be from dedicated watering points; these will preferably be from an excavated site located outside the SAC and not closer than 20 m from any SAC boundary, replenished by ground infiltration and not by stream infiltration. No abstraction will occur from watercourses.

22. The bridge will require bored pile foundations down to rock requiring a large piling rig and crawler crane to access each foundation locations. Prefabricated rebar and concrete deliveries required to all areas, material excavated during boring to be removed from site.

23. Excavate for pile caps. Implement de-watering measures as necessary.

24. Construct reinforced concrete pile caps at abutment and pier locations. Conventional construction of the reinforced concrete substructure will require plant such as concrete lorries and pumps to operate within the valley.

25. Construct remainder of reinforced concrete substructure; abutments including inspection gallery, and piers,

26. Waterproof pile caps and abutments,

27. Remove cofferdams and backfill around pile caps and behind abutments up to the abutment diaphragm construction joint level,

28. Install bridge bearings to abutments and piers.

29. The bridge superstructure comprises a post-tensioned concrete box and cantilevers. The main box (phase 1) will be constructed by the balanced cantilever method over the River Swilly. The back span to abutment sections can be constructed by conventional methods using scaffold falsework supported on the ground (this work can be done at the same time as balanced cantilever construction or in advance). The section from the piers to middle of the back spans can be constructed either by balanced cantilever or conventional methods depending on the contractor's preference. The cantilevers (phase 2) will be constructed by travelling formwork supported from the phase 1 main box.

30. Firstly, temporary supports/falsework will be installed at the piers on both sides of the river. Formwork and reinforcement will be installed and the initial box section will be cast over the piers.

31. Following the stripping of the formwork, the travelling formwork system will be erected to begin the balanced cantilever process which will involve: fixing reinforcement, pouring concrete, applying post-tensioning once the concrete is up to strength, stripping formwork, before moving the formwork system on for next section and repeating the process.

32. Finally the closing segments between balanced cantilever and conventional sections will be cast to complete the phase 1 box. Once up to strength the formwork can be stripped and the travelling formwork and falsework removed and replaced by the travelling formwork system to construct the cantilever sections from on top of the phase 1 box deck.

33. The superstructure construction will involve concrete trucks, concrete pumps and crawler cranes operating within the hardstanding area.

34. Finish construction of reinforced concrete wing walls and backfilling behind abutments.

35. Complete structure finishes (expansion joints, deck waterproofing, road and verge surfacing, parapets etc.)

36. To avoid the requirement for large excavations within the SACs there will be no installation of concrete headwalls and concrete apron within the SAC or directly at the riverbank

37. Outfalls will be set back from the channel, discharging over secured 'green' erosion protection mats, e.g., pipe to swale scenario (using vegetated armour such as Hanes ScourStop ® transition matting, or similar). The scour protection to the outfalls will run up to the riverbank edge but will comprise the geotextile, green paving type rubble mats which are pinned to the ground surface between the outfall and the riverbank, with the area revegetating over time.

38. De-mobilise from site and remove any temporary access roads and hardstanding areas.

39. Reinstate disturbed ground.

For temporary hardstanding areas, the last mattress put in place will be the first one lifted out so that machines are always working from the platform and not rutting the ground. Demobilisation is expected to take less than one month. The vegetation beneath the platform will have died off rendering the soil vulnerable to erosion from flooding and surface run-off. To reduce the potential for erosion, the platform will be removed in sections and will be timed to occur in spring to autumn. The newly exposed area will be chisel ploughed to reverse soil compaction and will be immediately reseeded with an appropriate native grass mix. Silt fencing along the SAC boundary will remain in place until vegetation has established.

The bridge type is considered to be readily constructible by a contractor suitably experienced in bridge construction of this scale and form.

1.13.10 Active Travel River Bridge Over Isle Burn Construction

1.13.10.1 Special Area of Conservation

The Lough Swilly SAC extends downstream from the northern side of the existing dual carriageway to Lough Swilly. The Isle Burn is also an important fisheries migration channel and the riverbanks are otter habitat.

The Active Travel river bridge crosses over the Isle Burn on the southern side of the existing dual carriageway and therefore will not directly impact on the SAC.

The proposed Active Travel river bridge design will clear span the Isle Burn to ensure there is no barrier to the passage of fish. There will also be no in-stream works at this location. Substructures will be set back at least 10 m from the edge of the river channel and construction works will minimise modification to the riverbanks. Surface water run-off sediment control measures will be in place during construction.

1.13.10.2 Expected Construction Sequence

The likely construction sequence is as follows:

1. Site mobilisation.
2. Erect appropriate temporary fencing at 5m set-back from the river channel to demarcate the limit of allowable working.
3. The extent of bankside and flood plain interference and vegetation removal shall be agreed, identified, documented, and demarcated with appropriate fencing.
4. Implement measures to minimise and control the risk of siltation entering the river. This may include such measures as:
    a. Establish site, surface drainage and silt control measures;
    b. Building a diversion for water run-off from the construction areas to settlement ponds or silt traps with over-flows directed to land rather than to a watercourse;
    c. Stripping of topsoil, and where necessary, surfacing of areas with granular material; and
    d. Covering of temporary stockpiles.
5. Oil storage tank(s) and the associated filling area and distribution pipe work will be at least 10m distant from the riverbanks and positioned so that no spillages can flow in the direction of the river.
6. Storage tanks will have secondary containment provided by means of an above ground bund to capture any oil leakage irrespective of whether it arises from leakage of the tank itself or from associated equipment such as filling and off-take points, sighting gauges, etc., all of which will be located within the bund.
7. Oil booms and oil soakage pads will be maintained on-site to enable a rapid and effective response to any accidental spillage or discharge.
8. Abstraction of water for dust control will be from dedicated watering points; these will preferably be from silt lagoons located on site or from an excavated site, replenished by ground infiltration and not by stream infiltration. No abstraction should occur from watercourses.
9. Construct temporary access roads on each side of the river.
10. Excavate for foundations. Implement de-watering measures as necessary.
11. Place upfill and construct RC spread foundations.

12. Construct abutments and wingwalls. Build up approach path embankments and backfill abutments. Install bearings.

13. Set-up temporary crane pad adjacent to the crossing.

14. Deliver steelwork to site. Assemble and connect sections to form the bridge. Crane into position.

15. Remove temporary crane pad.

16. Complete backfilling of abutments.

17. Complete finishes (parapets, expansion joints, approach path surfacing & fencing etc.)

18. De-mobilise from site and remove any temporary access roads and hardstanding areas.

1.14 Construction – Section 3 N14 Manorcunningham to Lifford/ Strabane/ A5 Link

1.14.1 Land Use Requirements

The location of the Proposed Development is predominantly rural and passes to the south of the urban area of Lifford.

1.14.1.1 Landtake

In total, approximately 305 hectares of land are permanently required, and approximately a further 1 hectare of land temporarily required to construct the Proposed Development and associated construction compounds.

1.14.2 Acquisitions / Demolition works

The acquisition of dwellings, commercial buildings and outbuildings required for the construction of the Proposed Development in Section 3 are presented in Table 1.50.

Table 1.50: Section 3 Structures to be Acquired

	Mainline Chainage approx.	Road Reference	Plot ID Ref	Type	Demolished / Retained
1	0+300	L1294 Manorcunningham Local Road (Ch 0+150 m)	3042	Outbuildings	Demolished
2	2+120 m	Drumoghill	3159	Dwelling and outbuildings	Retained
3	2+500 m	Drumoghill	3009	Dwelling and outbuildings	Demolished
4	7+700 m	Adjacent to Access Road AR3.32	3130	Dwelling and outbuildings	Retained
5	9+150 m	LX3014 Tullyrap (Ch 0+040 m)	3045	Disused house	Demolished
6	9+370 m	Mainline	3052	Disused House	Demolished
7	9+380 m	Mainline	3053	Disused House	Demolished
8	13+400 m	Ballindrait Side Road (Ch 0+030 m)	3088	Small Open Shed	Demolished
9	13+700 m	Ballindrait Side Road (Ch 0+250 m)	3086	Dwelling and outbuildings	Demolished
10	13+700 m	Ballindrait Side Road (Ch 0+250 m)	3087	Dwelling and outbuildings	Demolished
11	14+100 m	Ballindrait Side Road (Ch 0+840 m)	3091	Disused dwelling and Outbuildings	Demolished
12	14+100 m	Ballindrait Side Road (Ch 0+850 m)	3092	Outbuildings	Demolished
13	14+100 m	Ballindrait Side Road (Ch 1+000 m)	3093	Dwelling and outbuildings	Demolished
14	14+100 m	Ballindrait Side Road (Ch 1+200 m)	3162	Dwelling and outbuildings	Retained
15	14+600 m	R264 Murlog	3101	Dwelling and outbuildings	Retained
16	17+300 m	Access to the pond / adjacent to realigned N15 Lifford Tie-In West	3115	Dwelling and outbuildings	Retained
17	17+300 m	Access to the pond / adjacent to realigned N15 Lifford Tie-In West	3116	Dwelling and outbuildings	Retained

1.14.3 Earthworks Materials

This section outlines the existing ground conditions and earthwork quantities. These are based on site investigations and the design of the Proposed Development.

Excavation of approximately 3.35 million m^3 of earthworks is proposed, with approximately 2.83 million m^3 considered suitable construction material. There will be a deficit of approximately 0.59 million m^3 of earthworks materials which will be sourced from Material Extraction and/or Deposition (MED) areas to be opened within the Proposed Development Boundary of Section 3. With regard to the re-usability of material sourced on-site, it has been determined that there is no requirement to import earthworks materials.

The earthwork types present along the Proposed Development is shown in Table 1.51.

Table 1.51: Section 3 Earthwork Locations

Sub Section	Chainage	Earthworks Type	Soil or Rock Cut (if Applicable)
S03.01	0 - 410	Cut	No rock
	410 – 1,330	Fill	N/A
S03.02	1,330 – 1,750	Cut	No rock
	1,750 – 3,530	Fill	N/A
S03.03	3,530 – 4,070	Cut	No rock
	4,070 – 4,610	Fill	N/A
S03.04	4,610 – 5,250	Cut	No rock
	5,250 – 5,830	Fill	N/A
S03.05	5,830 – 6,450	Cut	No rock
	6,450 – 7,110	Fill	N/A
S03.06	7,110 – 7,310	Cut	Rock Ch. 7,160 - Ch. 7,260
	7,310 – 7,690	Fill	N/A
S03.07	7,690 – 8,070	Cut	No rock
	8,070 – 8,590	Fill	N/A
S03.08	8,590 – 8,930	Cut	Rock Ch. 8,580 - Ch. 8,920
	8,930 – 10,170	Fill	N/A
S03.09	10,170 – 11,010	Cut	Rock Ch. 10,540 - Ch. 10,720
	11,010 – 12,470	Fill	N/A
S03.10	12,470 – 13,950	Cut	Rock Ch. 12,860 - Ch. 13,920
	13,950 – 14,970	Fill	N/A
S03.11	14,970 – 16,610	Cut	Rock Ch. 15,360 - Ch. 15,420 Rock Ch. 16,040 - Ch. 16,440
	16,610 – 17,540	Fill	N/A

A detailed assessment of materials within the Proposed Development can be found in Chapter 10: Land, Soil & Hydrogeology.

Table 1.52 summarises the earthworks quantities assessed for Section 3 and demonstrates that there is an earthworks balance, and that all requirements to win and dispose of material can be met within the Proposed Development Boundary by the utilisation of MED areas that have been identified within the site. Accordingly, there will be no net import of earthworks material to/from Section 3.

Table 1.52: Section 3 Earthwork Quantities

Element	Intermediate Volumes (m^3)	Total Volumes (m^3)
Total Cut		3,347,200
Total Cut available for reuse		2,831,750
Over excavation for soft areas	449,300	
Unsuitable	66,150	
Cumulative volume of material requiring deposition		515,450
Additional material to fill soft areas	515,450	
Fill to meet alignment requirements	2,908,000	
(Import to site)	*75,800*	
Cumulative volume of Fill required		3,423,450
Excavation and backfill to MEDs		515,900
Material placed as non-structural fill		315,350*

*This material may alternatively be accommodated within the site boundary in shallow slopes or landscaped areas

Notes
(1) All excavated rock assumed to be processed into compliant fill.
(2) Non-compliant material generally comprises soft glacial till, peat and alluvium.
(3) An allowance has been made for an import of sub - pavement fill material which is not included in cumulative fill volume

There are a total of nine MED areas located within the Section 3 Proposed Development boundary. The location of these MED areas are in close proximity to the permanent works in areas with the least environmental/ ecological impact. The proposed MED areas provide sufficient capacity to cater for surplus material and the extraction of material where required.

1.14.4 Construction Compound Locations

Two locations have been identified and considered for the main Section 3 construction compounds as presented in Table 4-46.

Table 1.53: Section 3 Construction Compound Locations

Section	Location	Approximate Chainage	Approx. Site Area (ha)
Section 3	**Pluck**	Mainline 0+000m – 0+300 m	2.7
Section 3	**R236**	Mainline 7+900 m	1.6

The locations of construction compounds are shown in Drawing 3 sheet 1 of 10 (Pluck) and sheet 5 of 10 (R236) in Appendix 2.

1.14.5 Drainage and Sediment Control

The lands associated with Section 3 are predominantly agricultural, within a semi urban landscape around Lifford. The topography of the site is highly variable, from high points around Mongorry Hill (284 m OD) to the southwest, Dooish Mountain (266 m OD) to the northeast, and Croaghan Hill (217 m OD) near Lifford, to the undulating areas of the Laggan Valley including those associated with the Swilly Burn and Deele River. The key surface water features associated with the Proposed Development design are as follows:

- River Finn (proposed crossing point of N14/N15 to A5 Link).
- Swilly Burn.
- River Deele (near Ballindrait Junction).
- Various smaller watercourses that feed the above.

A detailed assessment of these waterbodies, and a summary of the proposed watercourse crossings, can be found in Chapter 9A: Biodiversity Terrestrial, Chapter 9B: Biodiversity Aquatic, and Chapter 11: Water.

1.14.6 Construction Traffic

For Section 3, most of the earthworks will be moved inside of the Proposed Development boundary, with other construction elements and required materials to be brought into the site. Most of the traffic will be expected from either the Lifford or Letterkenny areas, using the N13, N15 and N14 as the main haulage routes and minor traffic on the Regional and Local Roads.

In total, there will be approximately 236,000 earth moving trucks required. The majority of these movements will take place along haul roads within the Proposed Development corridor.

1.14.7 Permanent Road Closures

Road closures are shown on the General Arrangement drawings, Drawing 3.

1.14.8 Utilities

For Section 3 construction works will require works to the following utilities:

- ESB electricity: There are 27 interface points with the ESB high voltage (38 kV and 110 kV) network, and medium and LV (below 38 kV) network.
- Eir: There are 28 interface points with the EIR underground and overhead services affected by the Proposed Development.
- Project Kelvin: There are 12 interface points between the Proposed Development and the fibreoptic network. This includes a strategic fibreoptic communication (two lines) along the existing N14 between Pluck Roundabout and Lifford (multiple locations between Ch 0+000 and Ch 14+300).
- Public Water and Wastewater Supply: There are 20 interface points between the Proposed Development and UÉ networks (including water supply and sewerage).

1.14.9 River Finn Crossing (N14/N15 to A5 Link) Construction

The expected construction sequence for the River Finn Crossing is described below. In-stream works are not required or permitted for the construction of the River Finn Crossing. This bridge construction will take approximately 18 months to complete. Works on the northern (Co. Donegal) side of the river will use the proposed construction compound at the R236 (Ch. +7900).

The river is tidal in the proposed crossing reach. The predicted designed flood level at the bridge crossing site is 6.73 mOD Malin based on combined 100 year fluvial and tide event and includes 20% climate change allowance. Existing floodplain ground level on the northern (Co. Donegal) side of the river is broadly 2.1 to 2.6 mOD Malin and 3.7 mOD on the southern (Co. Tyrone) side. It would not be feasible to build temporary cofferdams around the full extent of the proposed structure or temporary work platforms to be above the combined tidal and fluvial flood level of 6.73 mOD. For that reason, the focus of the proposed construction works is on limiting potential sources of sediment washout to the SAC river. It is therefore proposed that layers of reno-mattress (or similar) will be used to construct the temporary access and work platforms across the flood plain on the Co. Donegal side of the river (which is more susceptible to flooding as it is low-lying). See description of reno-mattress work platform construction and decommissioning above as for Section 1.

Materials delivered to site such as the prefabricated steel girders will be stored on hard standing or lay down areas. It is in these areas that the steel girders will be braced together prior to erection. The hard standings will be of similar construction to the floating road and therefore, will protect the underlying flood plain and will be easily removed following completion of the works.

It is envisaged that the superstructure will be erected using cranes. The cranes will be supported on platforms of similar construction to the floating road, however, piled pads will be provided at crane outrigger locations to ensure the loads associated can be supported. These platforms will be removed once the structure has been erected.

The proposed bridge will be constructed following the outline construction process detailed below:

1. Carry out additional ground investigation works prior to site mobilisation. There will be no ground disturbance within 7.9 m from the River Finn main channel and there are no discharges involved with such works.

2. Carry out archaeological trenching works, only within areas marked out for the bridge pier foundation sites. The areas under the 2 no. piers closest to the Finn main channel will be surrounded in temporary silt fencing prior to the test trenches being excavated. Once again, there will be no ground disturbance within 7.9 m from the River Finn main channel for these works and there are no discharges involved.

3. Erect appropriate temporary fencing at 5m set-back from the river channel to demarcate the limit of allowable working and to leave a 5m width of riparian habitat undisturbed.

4. Provide required access including construction of floating road.

5. The existing land drains on the Co. Donegal side, south of the proposed N14/N15 to A5 Link, will require temporary diversion before interacting with the works area. A new interceptor drain will be constructed parallel to the proposed N14/N15 to A5 Link to intercept the existing land drains with falls toward the River Finn. This new interceptor drain will then run between the two piers closest to the River Finn to connect to the existing land drain that is north of the proposed N14/N15 to A5 Link. This existing land drain then discharges to the River Finn, removing the need to construct any new outfall to the river. The new interceptor drain will be constructed at the outset of the works and allowed to establish vegetation before connecting to the existing drains. A series of two check dams will be installed in the land drains before the river outfall. This is work within the SAC but will be minor.

6. Attenuation pond 16 and Outfall 18 (Drawing 3 sheet 10 of 10) will be constructed and operational prior to commencing excavations to facilitate the treatment of water run-off from the works area and the settlement of suspended solids prior to discharge.

7. Prepare work platforms on both sides of the river for craneage (including ground improvement if required – subject to the above mentioned detailed geotechnical analysis).

8. Construction works to install pier foundations on the Donegal side of the River Finn are on the floodplain and are below the flood zone. For that reason temporary sheet pile cofferdams shall be constructed around the piers to be constructed within the flood zone.

9. The function of the cofferdams is to exclude soil and water from the excavations below the existing ground surface to facilitate the construction of bridge pier foundations. The cofferdam walls are made of impermeable, interlocking steel sheet piles. The sheet piles are to be installed using a hydraulic press method to form a continuous interlocking vertical wall. As noted above, the cofferdams cannot be constructed above the predicted tidal and fluvial flood level of 6.73 mOD. However, they will be constructed to a level that provides some flood protection, limits the potential sources of sediment washout to the SAC and which also allows the Contractor to undertake the works safely. It is preferable that the sheet piles for the cofferdams are installed to intercept fair to good rock stratum to further limit the potential for groundwater ingress. Groundwater ingress to a cofferdam will either be through the floor of the cofferdam or from the interlock between piles, though properly constructed and maintained sheet piles will allow very little water ingress at the interlock. The majority of water ingress will be through the floor of the cofferdam. The water accumulating in the cofferdams will be pumped from a sump formed in the cofferdam to a storage bowser positioned outside of the cofferdam. Water will be pumped out and removed to the nearest Attenuation Pond 16 for settlement of suspended solids before discharging from Outfall 18 (Drawing 3 sheet 10 of 10). Any sump water that is contaminated (e.g. from concrete and/or hydrocarbons) will be pumped out and removed off-site for disposal at a licenced waste management facility.

10. Implement additional measures to minimise and control the risk of siltation of the river. This will include measures such as:
    a. Establish site, surface drainage and silt control measures;
    b. Building a diversion of water run-off from the construction areas to a temporary settlement pond (Attenuation Pond 16) with silt traps with over-flows directed to land rather than to a watercourse;
    c. Outside of the areas to be excavated for the bridge pier foundations there will be no stripping of topsoil instead employing the method described above in terms of laying of clean stone filled layers of reno-mattress;

11. Oil storage tank(s) and the associated filling area and distribution pipe work will be at least 50 m distant from the SAC boundary and positioned so that no spillages can flow in the direction of the river.

12. Storage tanks will have secondary containment provided by means of an above ground bund to capture any oil leakage irrespective of whether it arises from leakage of the tank itself or from associated equipment such as filling and off-take points, sighting gauges, etc., all of which will be located within the bund.

13. Oil booms and oil soakage pads will be maintained on-site to enable a rapid and effective response to any accidental spillage or discharge.

14. Abstraction of water for dust control will be from dedicated watering points; these will preferably be from an excavated site located outside the SAC and not closer than 20 m from the SAC boundary, replenished by ground infiltration and not by stream infiltration. No abstraction will occur from watercourses.

15. Excavation, pile testing and installation of piles.

16. Construction of pile caps and intermediate piers, ground anchors and backfilling of abutments.

17. Off-site fabrication and protection of structural steel.

18. Construction of bankseats.

19. Delivery of prefabricated steel plate girders to site.

20. Backfilling behind abutment bankseats;

21. Prepare plate girders and brace together for erection.

22. Install temporary bearings at intermediate piers and end support.

23. Mobilise and erect crane south side.
24. Mobilise crane and erect structural steelwork including cantilevers for southern approach span.
25. Erect east span steelwork.
26. Mobilise and erect crane north side.
27. Erect structural steelwork for Span 6 including cantilevers for Main Span and Span 5.
28. Erect structural steelwork for Main Span.
29. Mobilise and relocate crane on north side.
30. Erect structural steelwork for west approach spans.
31. Install precast participating formwork including cantilevers.
32. Pour pier diaphragms and deck slab.
33. Finishes, including: waterproofing; parapets; drainage and ducting; footways; road pavement; lighting; road markings and signage.
34. Take down craneage;
35. To avoid the requirement for large excavations within the SACs there will be no installation of concrete headwalls directly at the river bank.
36. Outfalls will be set back from the channel, discharging over secured ‘green’ erosion protection mats, e.g., pipe to swale scenario (using vegetated armour such as Hanes ScourStop ® transition matting, or similar). The scour protection to the outfalls will run up to the riverbank edge but will comprise the geotextile, green paving type rubble mats which are pinned to the ground surface between the outfall and the riverbank, with the area revegetating over time.
37. Extract haul roads, reno mattresses, and craneage platforms.
38. Reinstate disturbed ground.

On the northern (Co. Donegal) side of the river - as with the placement of the reno-mattresses, the last mattress put in place will be the first one lifted out so that machines are always working from the platform and not rutting the ground. Demobilisation is expected to take less than one month. The vegetation beneath the platform will have died off rendering the soil vulnerable to erosion from flooding and surface run-off. To reduce the potential for erosion, the platform will be removed in sections and will be timed to occur in spring to autumn. The newly exposed area will be chisel ploughed to reverse any soil compaction and will be immediately reseeded with an appropriate native grass mix. Silt fencing along the river margin (5 m exclusion zone) will remain in place until vegetation has established.

The bridge is considered to be readily constructible by a contractor suitably experienced in bridge construction of this scale and form.

1.14.10 Scenario Where the N14/N15 to A5 Link is Not Constructed

In the scenario where the N14/N15 to A5 Link does not proceed at the time of construction of Section 3, the remainder of Section 3 will be constructed as described above. The roundabout at the N14/N15 Lifford Junction including the active travel elements and the part of the N14/N15 to A5 Link up to approximately chainage 0+080 will be constructed. This small section of road will be blocked-off from the roundabout to prevent traffic from entering. This small section of the N14/N15 to A5 Link is necessary to facilitate the construction of the active travel infrastructure and for any potential future construction of the remainder of the N14/N15 to A5 Link to Northern Ireland.

Similarly, in this scenario Attenuation Pond 16 and Outfall 18 (Drawing 3 sheet 10 of 10) will be constructed and operational prior to commencing excavations and/or earthworks to facilitate the treatment of water from the works area and the settlement of suspended solids prior to discharge. Some minor realignment of the existing land drain closest to the N14/N15 Lifford Junction roundabout may be required to facilitate the embankment for the active travel. The realigned land drain will be reconnected to the existing land drains and a series of two check dams will be installed in the existing land drains before the river outfall. This is work within the SAC but will be minor.

1.15 Operation

1.15.1 Permanent Maintenance Facilities

1.15.1.1 Inspection and Maintenance of River Bridges

The use of weathering steel for the fabrication of the steel plate girders will ensure that maintenance painting will not be required over the lifetime of the structures. The deck surfacing will need maintenance and replacement after 20 years. Bridge bearing and movement joints will need to be inspected and maintained regularly and replaced after 50 and 20 years respectively.

The configuration of the structures has been designed to afford good access for inspection and maintenance. Inspection of the bridge superstructures can be undertaken safely from the bridge itself, from the ground below the bridges and from the rivers using boat access when required. Sufficient space and headroom clearance are provided under the bridge decks at each abutment to facilitate future inspections. Shallow side slopes no steeper than 1V:2H are provided at the structures meaning access steps to the abutments are not required. Inspection galleries at the abutments allow for access, maintenance and replacement of the bridge bearings.

Temporary mats will be used to allow vehicular access to the intermediate piers to facilitate scaffold erection for bearing inspection, maintenance and replacement.

The structures will be inspected every six years or as required under the TII Eirspan Bridge Management System.

1.15.1.2 Inspection and Maintenance of Overbridges

Due to integral nature of the overbridge structures, maintenance requirements are minimised for the design life of the structures. The configuration of the structures has been undertaken to afford good access for inspection and maintenance. Inspection of all components of the structures can be done visually from the proposed ground level.

Sufficient space and headroom clearance are provided under the bridge deck at each abutment to facilitate future inspections. Shallow side slopes no steeper than 1V:2H are provided at each of the structures meaning access steps to the abutment are not required. Access for inspections and maintenance will be from the mainline, with temporary traffic management arrangement in place as necessary or from the bridge deck as required.

The structures will be inspected every six years or as required by the TII Eirspan Bridge Management System.

1.15.1.3 Inspection and Maintenance of Active Travel Bridges

The steel elements of the structure will be painted and require nominal maintenance over the first 20 years after which maintenance painting of the steel work will be required. It is expected that full repainting will be required after 25-30 years.

The deck surfacing will consist of an epoxy resin based, tar derived resin slurry and will need maintenance and replacement after 20 years. The movement joints and bearings will need maintenance and replacing after 35-40 years.

The configuration of the structure has been designed to afford good access for inspection and maintenance. Inspection of all components of the structure can be done visually from proposed ground level. Sufficient space and headroom clearance are provided under the bridge deck at each abutment to facilitate future inspections.

Shallow side slopes no steeper than 1V:2H are provided at the structure meaning access steps to the abutments are not required. Access for maintenance will be provided via the proposed pedestrian/cyclist route from the mainline.

1.15.1.4 Inspection and Maintenance Drainage

Grassed surface water channels

Grassed channels shall be maintained as described in section 9 of TII-DN-DNG-03073-02 *'Grassed surface Water Channels'.*

To ensure optimum hydraulic performance, the mowing schedule will be developed to ensure that the grass blades are no longer than 75 mm.

The grassed surface water channel will be capable of being mowed using the same equipment that is used to maintain the verge. The maintenance regime will also include the removal of litter and other debris, as well as weed control and the repair of any damage to the channels caused by vehicles.

Access to the grassed channels will be provided from the mainline and shall include traffic management as may be necessary to carry out maintenance works.

Filter drains

Maintenance requirements for filter drains include monthly inspections, monthly weed control, annual sediment removal and replacement of clogged filter material as required (typically ten years or more).

Attenuation and retention ponds

Ponds shall be maintained as described in section 6 of TII DN-DNG-03063-02 '*Vegetated Drainage Systems for Road Runoff*'.

The ponds will need regular inspection as the growth of vegetation will need to be inspected and controlled to ensure the system continues to operate as designed. A maximum six-month inspection interval will be required at the start and end of the growing season. Additional inspections will be carried out after any significant storm events (greater than a one-in-fifty year event) to check for signs of erosion or flooding, which will indicate whether the system has been affected by the storm.

The maintenance regime will ensure that the hydraulic and treatment performance of the ponds is operating as designed.

Any sediment which is not collected upstream of the ponds is likely to settle in the base of the retention pond. This sediment, along with any plant waste, will be removed with care to avoid damage to the pond liner (if part of the pond design) and any vegetation. Information will be provided to operatives on the presence and depth of liners and on the existence of any depth markers. Consideration will be given to the impact that disturbance of the sediment will have on the short-term migration of fines and contaminants from the system and maintenance operations planned accordingly.

Sediment removal will take place as and when required, generally at least every ten-years, but this will vary by location and shall be determined by inspection during operation. The removal may need to be phased to protect the existing vegetation.

As the ponds are designed to collect and treat contaminants associated with runoff, the area in and around the pond will be considered contaminated and the maintenance regime should take account of this during the disposal of any sediment or plant waste from the ponds, as well as the de-contamination of the pond when it has reached the end of its useful life.

The inspection and maintenance of ponds will be undertaken in accordance with Table 6.1 of TII DN-DNG-03063-02 ‘Vegetated Drainage Systems for Road Runoff’.

Vortex grit removal chambers

The Vortex grit removal chambers are standalone units, and their maintenance will be carried out in accordance with the manufacturer’s recommendations.

This would normally include inspection of the unit regularly after installation, and every six months after the first year of installation. This ensures that the system is operating as intended and helps to highlight any issues.

Sediment and oil removal will be carried out, generally at least once per year and following any accidental spill in the area draining to the unit. This will vary depending on the nature and size of the catchment in question.

Vortex grit removal structures are provided at each outfall to the attenuation ponds.

Petrol / oil interceptors

The petrol/oil interceptor’s maintenance will be carried out in accordance with the manufacturer’s recommendations and BS EN 858-2:2003 Separator systems for light liquids (e.g. oil and petrol) – Part 2.

Cleaning of the interceptor will be carried out, generally every three to six months, but this may vary depending on location and catchment area. Additional cleaning and maintenance should be undertaken after any major events that may have caused additional debris to collect in the system.

The regular maintenance schedule should include, but not be limited to:

- Check the integrity of the interceptor and all its mechanical parts.
- Inspect the filters and repair or replace, where required.
- Assess the volume of contaminants collected in the tank.
- Service all electrical systems, interceptor management systems and alarms etc.
- Have all silt and contaminants removed and disposed in accordance with environmental regulations.
- Keep logs of any inspections, maintenance, incidents, services and contaminant removal activities.
- Ensure any contaminants are removed and transported in accordance with relevant legislation.

Petrol/oil interceptors are provided at each outfall to the attenuation ponds.

Pavement

The mainline pavement will require ongoing inspection, testing and maintenance. This will be carried out in accordance with TII pavement management requirements. Temporary traffic management will be provided where required to facilitate inspection, testing and maintenance.

1.15.1.5 Inspection and Maintenance Landscape and Biodiversity

Inspection and maintenance of the landscape design measures and the biodiversity habitat creation measures is required. This is to ensure that the landscape planting provides the minimum level of screening as set out in the EIAR and that the post-construction habitats meet the requirements to achieve no net loss of biodiversity. The maintenance regime will include regular landscaping, cutting of grassed areas, pruning of trees and hedgerows and other landscaping measures as set out in the Biodiversity Management Plan that accompanies the EIAR (Appendix C4.03 in Volume C: Technical Appendices) as part of the application for approval submitted to the Commission.

1.16 List of TII Design Standards

- DN-DNG-03022 Drainage Systems for National Roads.
- DN-DNG-03061 Design of Outlets for Surface Water Channels (including Amendment No. 1 dated June 2015).
- DN-DNG-03062 Edge of Pavement Details (including Amendment No. 1 dated June 2015).
- DN-DNG-03063 Vegetated Drainage Systems for Road Runoff (including Amendment No. 1 dated June 2015).
- DN-DNG-03064 Drainage of Runoff from Natural Catchments (including Amendment No. 1 dated June 2015).
- DN-DNG-03065 Road Drainage and the Water Environment (including Amendment No. 1 dated June 2015).
- DN-DNG-03066 Design of Earthworks Drainage, Network Drainage, Attenuation & Pollution Control.
- DN-DNG-03067 Spacing of Road Gullies (including Amendment No. 1 dated June 2015).
- DN-DNG-03068 - Hydraulic Design of Road-Edge Surface Water Channels (including Amendment No. 1 dated June 2015).
- DN-DNG-03071 Design of Outfall and Culvert Details (including Amendment No. 1 dated June 2015.
- DN-DNG-03072 Design of Soakaways (including Amendment No. 1 dated June 2015).
- DN-DNG-03073 Grassed Surface Water Channels for Road Runoff (including Amendment No. 1 dated June 2015).
- DN-ERW-03083 Managing Geotechnical Risk.
- DN-GEO-03028 The location and layout of service areas.
- DN-GEO-03031 Road Link Design.
- DN-GEO-03036 Cross-sections and headroom.
- DN-GEO-03047 Rural Cycleway Design (Offline and Greenways).
- DN-GEO-03060 Geometric Design of Junctions (priority junctions, direct accesses, roundabouts, grade separated, and compact grade separated junctions).
- DN-GEO-03084 The Treatment of Transition Zones to Towns and Villages on National Roads.
- DN-ITS-03029 Traffic Control and Communications Infrastructure Design
- DN-LHT-03038 Design of Road Lighting for the National Road Network.
- DN-PAV-03021 Analytic Pavement & Foundation Design.
- DN-PAV-03026 Footway Design.
- DN-REQ-03034 The Design of Road Restraint Systems (Vehicle and Pedestrian) for Roads and Bridges.
- DN-STR-03001 Technical Acceptance of Road Structures on Motorways and Other National Roads.
- DN-STR-03002 Weathering Steel for Highway Structures.
- DN-STR-03005 Design Criteria for Footbridges.
- DN-STR-03006 Expansion Joints for Use in Highway Bridge Decks.
- DN-STR-03010 Portal and Cantilever Sign/Signal Gantries
- DN-STR-03020 The Structural Design of Road Structures.
- GE-ENV-01104 - The Management of Invasive Alien Plant Species on National Roads – Standard

1.17 References

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CIRIA (2006) C648 Control of water pollution from linear construction projects; London.

Department of Transport (2021) Traffic Signs Manual; Updated 2025; Available: https://www.roadguidelines.ie/traffic-signs/tsm/ ; Accessed: November 2025.

Department of Transport (2013) Design Manual for Urban Roads and Streets (DMURS); Updated 2025; Available: https://www.gov.ie/en/department-of-transport/publications/design-manual-for-urban-roads-and-streets/; Accessed: November 2025.

Enterprise Ireland (no date) Best Practice Guidelines BPGCS005 Oil Storage Guidelines; Available: https://www.leanbusinessireland.ie/includes/documents/OilStorageBPG.pdf; Accessed: November 2025.

Invasive Species Ireland (2008), Water Users Code of Practice; Available: https://invasives.ie/app/uploads/2021/09/Water_Users_CoP.pdf; Accessed: November 2025.

TII (2016) PE-PAG-02031 Project Appraisal Guidelines for National Roads Unit 7.0 – Multi Criteria Analysis (withdrawn in 2024).

TII (2017) PE-PMG-02001 - Road Safety Impact Assessment (withdrawn 2025).

Walton, I.L.W., (2014) CIRIA C736 Containment systems for the prevention of pollution: Secondary, tertiary and other measures for industrial and commercial premises, London.