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Transport Infrastructure Ireland

Comhairle Contae Dhún na nGall
Donegal County Council

RPS

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Donegal National Roads Design Office

Phase 1: Scheme Feasibility Report

TEN-T Priority Route Improvement Project, Donegal





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1 Introduction

This document presents the Scheme Feasibility Report for the Trans-European Transport Network (TEN-T) Priority Route Improvement Project, Donegal.

The purpose of the Scheme Feasibility Report is to further verify the need for this Project in addition to the Project Brief. This is to allow for a better understanding of the issues at hand and to assist in the planning direction of further studies.

This document is developed in accordance with the requirements of Transport Infrastructure Ireland (TII) Project Management Guidelines.

1.1 Overview of the proposed Scheme

County Donegal is one of the most peripheral counties in Ireland, situated at the north west of the island with vast shoreline on the Atlantic coast. Approximately 90% of Donegal's border is with counties in Northern Ireland (Derry, Tyrone and Fermanagh) with the remaining 10% bordering with Leitrim in the Republic of Ireland. This positioning isolates Donegal, and particularly North Donegal from the rest of the Republic of Ireland. County Donegal has a population of 158,755 (2016 Census). Donegal has enjoyed a long-term, positive relationship with its neighbouring counties in Northern Ireland, particularly Derry and Tyrone. This relationship has strengthened since the onset of the Good Friday Agreement/Belfast Agreement in 1998, and has culminated in a strong connection between communities on both sides of the border in the North-West region, creating a population of approximately 350,000 in the North-West.

The largest town in County Donegal is Letterkenny (population 19,588 in 2011 census), which is connected to Derry, Lifford (the County Town) and Ballybofey/Stranorlar via the N13, N14 and N15 links respectively. The N56/N13 is a strategic route connecting Letterkenny and North Donegal to the rest of the National Primary network in County Donegal. The N13 and N14 are linked at Manorcunningham, joining Letterkenny to Lifford (the County Town) and onto the A5 at Strabane in County Tyrone, Northern Ireland. The A5 is the key route linking the North-West of Ireland through County Tyrone to the N2 in Monaghan and onto Dublin. The N15 runs from the border with Northern Ireland at Lifford through Ballybofey and Stranorlar to Leitrim and Sligo, forming the key route to Galway. It is the only National Primary route connecting Donegal directly to the rest of the Republic of Ireland and is also a key route linking south Donegal to Derry and Belfast.

Due to the lack of freight infrastructure in Donegal, these National Routes are particularly important for both tourism and industries such as Killybegs harbour, Ireland's largest fishing port, to provide connectivity between County Donegal and the rest of the island of Ireland. This significance is supported by the fact that these routes form part of the TEN-T; 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. EU Regulation Number

1315/2013 sets the requirements for the TEN-T transport corridors. The overarching aim of the TEN-T is that all EU citizens should be no further than 30 minutes away from the comprehensive network, thereby being connected nationally and internationally.

The TEN-T corridor in Donegal connects to the rest of the TEN-T in Northern and Republic of Ireland as shown in Figure 1-1, and are supplemented by other routes on the road network. The functionality, and the success, of the TEN-T corridor depends on the effective operation of its component parts. While there are other alternative routes across Donegal, due to the Derryveagh Mountain range running north – south through the centre of Donegal, these alternative east – west connections across Donegal are limited.

Accordingly, this project focuses on three component sections of the TEN-T in Donegal, which are dealt with as three related sections. These are:

1. The N15 Ballybofey/Stranorlar Urban Region
2. The N56/N13 Letterkenny to Manorcunningham
3. The N14 Manorcunningham to Lifford/Strabane/A5 Link

The sections are described in further detail in the following paragraphs.

1.2 Existing Conditions on the National Route

This section of the report discusses the existing condition of the TEN-T network in Donegal on the following routes:

1.2.1 N15 Ballybofey – Stranorlar Urban Region

Ballybofey/Stranorlar, are adjoined towns either side of the River Finn in Donegal. Currently the N15 that links Donegal to the rest of the Republic of Ireland via Sligo and Leitrim aligns through the town centres of Ballybofey/Stranorlar, and is the key link on the Atlantic Corridor in Donegal. The current condition of the N15 at this location is inadequate and inappropriate for strategic traffic, having a varying cross-section width of 6-7m, numerous retail frontages, on-street car parking, junctions with side-roads, a bus stop and traffic lights. These factors all contribute to congestion, and reduce the average speed of traffic, as commercial and private vehicles drive through the Ballybofey and Stranorlar in both directions. The need for improvements to this section of road network goes back to the 1998 National Road Needs Study which recommended a bypass of Ballybofey / Stranorlar as a Phase 1 Need. Donegal County Council have attempted to address the issue, with a previous Constraints Study (2000), Route Selection Study (2001) and Environmental Impact Statement (2007) and Compulsory Purchase Order being produced, along with the scheme being zoned in the County Development Plan (2012 – 2018) to accommodate the proposed solution – a bypass of the Ballybofey / Stranorlar, which are often referred to as the Twin Towns. A Cost Benefit Analysis Appraisal Report was conducted in 2007. This analysis resulted in positive Benefit Cost Ratio (BCR) of 1.283 – 1.495. The scheme was published in December 2007 but was refused planning by An Bord Pleanála in October 2009 citing concerns over the junction design and environmental issues. To date, no changes have been made to this part of the network to improve journey time reliability or improve safety.

The Twin Towns of Ballybofey and Stranorlar have long been renowned for their traffic congestion issues as people navigate along the N15 strategic route through the town centres. The route is easily distinguishable in two sections as outlined in the following paragraphs.

<u>N15 Cappry to N15/N13 Junction in Stranorlar</u>

This 4.4km section from southwest Ballybofey through both Twin Towns consists of a single carriageway with a road width of approximately 6-7m incorporating a 1-1.5m footway. On the

approach to the Twin Towns, the cross-section widens to accommodate right turn lanes and footways on both sides. A 50km/h speed limit exists within the towns, with retail frontages, junctions and on-street parking all present on the route. Ballybofey and Stranorlar are joined by the N15 which crosses over a small multi-arch bridge over the River Finn that currently accommodates traffic and pedestrians, however, a new footbridge that will accommodate pedestrians and cyclists is currently in the planning process.

Figure 1-2 Congestion in Ballybofey showing bus-stops, retail frontages, side roads and on-street parking

N15/N13 Junction to N13/R236 Junction

This 3.6km section consists of single carriageway with a road width of approximately 6.5-7m and 0-0.5m hard strips with no verges. A footway exists for approximately 300m beyond Stranorlar town. There is no provision for right turning vehicles. This section includes 50km/h, 60km/h and 100km/h speed limits. The junction with the R236 is a simple priority T-junction with priority given to the N13-R236 route. This results in vehicles that are travelling on the N13 from Letterkenny to Stranorlar, Sligo, Galway etc. being required to stop at this junction and take a right turn to remain on the National Route as shown in Figure 1-9.

Figure 1-3 Queueing on the N13 approach to the R236 junction towards Stranorlar, Sligo etc.

1.2.2 N56/N13 Letterkenny to Manorcunningham

The N56 between the Dry Arch roundabout to the Polestar roundabout is the only link into Letterkenny from Inishowen, Derry, Lifford, Ballybofey/Stranorlar and subsequently Belfast, Dublin and Sligo. This poor network resilience results in long diversions and delays in emergency situations when road closure is necessary. In an attempt to address the issue, Donegal County Council have previously conducted feasibility and Route Selection studies. This determined that a new relief road is required. Cost benefit analysis outlined in a Preliminary Business case developed for the scheme in 2010 identified extremely positive economic benefits with Benefit Cost Ratios of 5.2-6.3[1]. Although these figures require updating, they indicate a strong economic incentive for the scheme. However, the project was suspended along with several other projects in the state due

[1] N56 Letterkenny Relief Road Project Appraisal Project Business Case (2010)

to the lack of available government funding. This scheme has been accommodated for in the County Development Plan (2012-2018). No work has commenced on this relief road while the traffic congestion and network resilience issues on the network continue to increase. The existing N13 that connects Letterkenny to Manorcunningham, a dual carriageway link, has an all-movement at-grade Junction, something which would not be acceptable in current design standards. Intervention is required along this link to safely connect Letterkenny to Manorcunningham and onto the N14/A5 and Dublin.

Figure 1-4 The N56 4 lane road approach to Pole Star roundabout from Dry Arch roundabout, crossing over the River Swilly

Figure 1-5 Trimnagh at-grade junction on the N13 dual carriageway

1.2.3 N14 Manorcunningham to Lifford/Strabane/A5 Link

The N14 links the N13 (Letterkenny to Derry road) at Pluck roundabout to Lifford, Donegal's County Town on the border with Tyrone. This link forms the key route for traffic from Letterkenny and Donegal to Dublin, via the A5 in Tyrone, and the N2 in the Republic of Ireland. The existing link is characterised by its alignment, with sharp horizontal bends, and poor vertical alignment, which reduces opportunities for safe overtaking. This is exacerbated by the poor cross-sectional width, numerous roadside hazards, lack of hard-strip/hard shoulder along much of its length, and numerous accesses and junctions. These issues have culminated in a transport corridor that has a poor safety record and unreliable journey times. Donegal County Council have previously attempted to address the issue and commissioned a Constraints and Route Selection Report (2001). Subsequently, a corridor was reserved in the County Development Plan (2012-2018) to accommodate the preferred route. A Preliminary Design was undertaken on the scheme resulting in a Preliminary Design Report being finalised in October 2009. A draft EIS was also completed in July 2009. The project performed well economically, with an assessment in 2013 showing Benefit Cost Ratios ranging from 1.81 to 2.54[2] across different criteria. Although this assessment would need updating, this confirms the economic viability of the scheme. Despite this, the project was suspended along with several other projects in the state due to the lack of available government funding.

Figure 1-6 Irregular alignment and congestion on N14 between Manorcunningham and Lifford

Splitting the link into 3 sections, the primary characteristics are as follows:

N13/ N14 Pluck Road Roundabout to R236 Junction (7.6km)

This 7.6km section has a varying single carriageway cross section. At the Manorcunningham end the cross-section consists of approximately a 7m carriageway, with 2.5m hard shoulders and 0.5m verges. This reduces to a carriageway of approximately 6.0 to 6.5m with 0-0.5m hard strips and no verges until the N14 reaches the junction with the R236, where it widens out temporarily. The horizontal alignment has many sharp bends and the existing ground is undulating which leads to poor vertical alignment and reduced visibility.

R236 Junction to the R265 Junction (7.9km)

As the road approaches the junction with R236, the cross-section widens to accommodate right turning lanes at the staggered junction. This is the only junction/access on this section with a right turn lane. On departure from the junction travelling from west to east, the cross-section width reduces to a 6m wide carriageway with no hard shoulders or hard strips. Overall the horizontal alignment along this section is poor and has a high frequency of sharp bends with poor visibility at the beginning of the section.

[2] Business Case N14 Letterkenny to Lifford (2013)

Junction with R265 to N14/N15 Lifford Roundabout (2.2km)

The alignment continues with many junctions on approach to Lifford with right turning lanes provided. Nearer to Lifford town, a 50km/h speed limit is introduced and the cross-section widens to a 13m carriageway with a central hatched road marking and a 2m footway on both sides. The N14 approach to the N14/N15/A38 roundabout at Lifford is 2 lanes wide for a short length.

The cross-section details as observed on site are summarised in
Table 1-1.

Table 1-1 Summary of cross-sections along the existing N14 corridor

Section of N14 Manorcunningham to Lifford	Cross-section
N13/N14 Pluck Roundabout to R236 Junction (7.6km)	6.5m-7.0m c/w with varied hard shoulder width for 1.5km and then hard strip
R236 Junction to R265 Junction (7.9km)	6.0m c/w with 0m to 0.5m hard strip
Junction with R265 to N14/N15 Lifford Roundabout (2.2km)	6.0m c/w with 0m to 0.5m hard strip 13m c/w with 2.0m footpath either side (within 50km/h boundary)

The existing cross-section along N14 should only permit a recommended speed limit of 80km/h or less in accordance with the primary criteria set out in Guidelines for Setting and Managing Speed Limits. However, the existing road is subject to a 100km/h limit. The N14 cross section is required to be enhanced to TII Standards to be suitable for the 100km/h statutory speed limit.

An assessment of the Full Overtaking Sight Distance for this link was measured resulting in approximately a 20% Overtaking Value as calculated using TII Design standard DN-GEO-03031 (formally TD9/12) This simple assessment has been undertaken at a basic level on aerial plan view, and does not consider the numerous simple junctions or accesses along the route. Therefore, the actual opportunities for safe overtaking on this link are much less than this measurement can represent.

1.3 Summary of Road Development Policy.

The TEN-T Priority Route Improvement Project, Donegal has been identified as contributing to the objectives set out in various in local, regional national and international policy documentation, which are highlighted below. .

European Policy Context

- Trans-European Transport Network Regulation No 1315/2013

National Policy Context

- National Planning Framework – Ireland 2040 Our Plan Issues and Choices Paper (2017)
- Building on Recovery: Infrastructure and Capital Investment Plan 2016-2021
- National Spatial Strategy 2002-2020
- National Development Plan 2007-2013
- Investing in our future – Strategic Infrastructure Framework for Land Transport 2015 by DTTAS
- Sharing our Future: Ireland 2025 Strategic Policy Requirements for Enterprise Development by Forfas
- A Sustainable Transport Future: A New Transport Policy for Ireland 2009-2020
- Realising our Rural Potential: Action Plan for Rural Development
- Action Plan for Jobs
- Enterprise 2025

- Road Safety Authority Road Safety Strategy 2013-2020

Regional Policy Context

- Border Regional Authority Planning Guidelines 2010-2022
- Regional Development Strategy for Northern Ireland 2015
- Initial Analysis of the Challenges and Opportunities of Brexit for the Derry City and Strabane and Donegal County Council Areas – North West City Region

Local Policy Context

- County Donegal Development Plan 2012-2018
- Lifford Local Area Plan 2007-2013
- Letterkenny and Environs Development Plan 2009-2015
- Donegal Local Economic and Community Plan 2016-2022
- Donegal County Council 3-year Capital Budget 2016-2018

Research and Information Notes

- Connected: A Prosperous Island of 10 million People (July 2016)
- Infrastructure 2020: Building Beyond the Bailout (2013
- Headline figures/Key Statistics regarding Regions – Dr Juan Martinez-Covarrubias from the 3 Regional Assemblies in Ireland
- Gateways Hubs Development Index 2012 – Review of Scio-Economic Performance
- Transport Infrastructure Ireland – Impact of Improvement in the Road Network on the Accessibility & Economic Potential of Counties, Urban Areas, Gateways and Hubs, March 2012
- International Centre for Local and Regional Development – Applying the Function Territories Concept: Planning Beyond Boundaries, June 2016.

1.3.1 Policy Summary

Key European, National and Local policy, guidance and research documents have been referenced in this section to demonstrate how these three corridor improvements will align with various objectives set out. A summary of the key points highlighted in this section is set out as follows:

- Donegal is a peripheral county on the Island of Ireland, and has been described as "*geographically remote*" (from most of the republic of Ireland) in **TII research** documents. Its only direct connection with the Republic of Ireland is via the N15 which runs along the eastern side of the County through south Donegal and onto Sligo;
- Despite its isolation, Donegal has had a long, positive relationship with its bordering counties in Northern Ireland particularly Derry and Tyrone, forming an acknowledged, collaborative North West region, which has been identified as a '*hotspot'* in the **National Planning Framework** documentation. The region has countless national and regional roads of varying standards creating cross-border connections between the two jurisdictions;
- The TEN-T Priority Route Improvement project proposes prioritised improvements on three sections of the TEN-T in Donegal**. EU TEN-T Regulation 1315/2013** sets out the requirements and objectives of the TEN-T, which is largely based on "*ensuring the accessibility" "of all regions in the union, including the remote, insular and outermost regions*" and "*strengthening social cohesion between them*". Article 10 of this Regulation encourages further consideration to be given to *"isolated networks and sparsely populated, remote and outermost regions".* Additionally, it states that priority should be given to measures necessary for *"bridging missing links and removing bottlenecks, particularly in cross-border sections".* In the face of Brexit, improvements to the Donegal TEN-T corridors will meet regulation requirements by ensuring "*continuity of a project of common interest*" "*on both sides of the border of two Member States or between a Member State and a*

neighbouring country". This TEN-T Priority Route Improvement Project aims to improve connectivity and cohesion within the region, and between the North West and the rest of Ireland.

- **A Sustainable Transport Future: A new Transport Policy for Ireland 2009-2020** emphasises that "*in the border area it is highly desirable that we align local sustainable transport strategies*" while a key goal of the document is improvement of "*accessibility to transport for all*" and "*those who may experience isolation due to lack of transport*".
- The **Action Plan for Jobs** and **Realising our Rural Potential** documents recognise that there has been a lack of Foreign Direct Investment in the border region, and that the an "*Atlantic Economic Corridor*" is required to drive "*jobs and investment along the Western seaboard*";
- Similarly, the Capital Investment Plan 2016-2021, **Building on Recovery**, recognises that quality infrastructure "*strengthens economic growth*" and subsequently endorses improved connectivity to/from the North West by confirming its commitment to co-fund the A5 project. These observations are mirrored in the Joint Business Council report, **Connected: A prosperous island of 10 million people,** which explains its proposal to connect all the island's urban centres would help in "*spreading economic and population growth*" and support "*attraction and growth of FDI (Foreign Direct Investment) and indigenous investment*".
- Equally, **Enterprise 2025** sets out long-term aspirations for job creation and enterprise growth, emphasising "*improved connectedness*" as a key objective, which includes "*improving access between main urban centres" "and providing access to poorly served regions*". Again, this is supported by the **Strategic Investment Framework for Land Transport** which defines Priority Three as providing "*access to poorly served regions, for large-scale employment proposals, to complete missing links and to address critical safety issues*".
- An IBEC report **Infrastructure 2020: Building Beyond the Bailout,** stresses the long-term effects of lack of infrastructure investment, highlighting that existing construction sector employment levels *"below the equilibrium*" and identifies that there is a "*strong case for employment impact to be taken into account in project evaluation*".
- The **Road Safety Authority Safety Strategy 2013-2020** sets out the objective for the "*reduction of collision fatalities on Irish roads to 25 per million population or less by 2020*". The 2016 statistics are currently at almost 40 per million (4.7 million population and 188[3] fatalities). This target can only be achieved by a combination of engineering and non-engineering measures, and improvements to the TEN-T transport corridor in Donegal will work towards improving these regional statistics.
- These vital TEN-T links provide the means to introduce a "*better balance of social, economic, physical development and population growth"* in the North-West in comparison to other regions, in a methodology that aligns with key concepts of the **National Spatial Strategy** including "*potential, critical mass, gateways, hubs, complementary roles and linkages*".
- The **Donegal Development Plan** admits that there are "*existing infrastructural* deficiencies *throughout the County*", and economic analyses conducted for the **Donegal Local Economic and Community Plan** emphasises that a key weakness in the county is "*Access to service barriers: primarily transport, broadband and language*". These plans align with the **Donegal County Council 3-year Capital Budget 2016-2018** which recognises infrastructure deficiencies in the region and expects a programme of interventions to be developed.
- Comparative **research conducted by the Regional Assemblies** looking at economic statistics of the three regional assembly areas in Ireland, further emphasise that the North

[3] An Garda Síochána website: http://www.garda.ie/Controller.aspx?Page=16418&Lang=1

and Western Regional Assembly performs the poorest across most criteria including consistent poverty and extent of unemployment, while the Border area of that Assembly performs the worst.

- Nevertheless, research conducted by **TII** demonstrates that "*economic productivity gains can be realised through transport system improvements that raise effective density*".
- Similarly, **Forfás document Sharing our Future** emphasises this by stating that "*There will need to be sufficient good quality transport networks between regions and within regions to create proximity and economic critical mass*."
- As Donegal does not have a railway network, the only way to improve connectivity and effective density is through road improvements. Despite this, "*inter-urban routes" "between Gateways, such as the Atlantic Corridor,"* (N15) have had minimal improvements undertaken despite what was set out in the **National Development Plan (2007-2013)**.
- Improvements to the prioritised three TEN-T corridors as part of the Donegal Priority Route Improvements can create "*intra and inter regional connectivity and mobility throughout the Region*" (**Border Regional Authority Planning Guidelines**) not only connecting the towns (Letterkenny, Ballybofey/Stranorlar, Lifford etc.) to the greater National network, but also providing improved internal connectivity between these settlements to assist in developing internal investment and improving effective density.
- In the long-term, improving these corridors will help to "*safeguard the carrying capacity and safety of National roads*" and help to *"enhance the role of Letterkenny" while strengthening infrastructure" "linkages within the County and in a Cross Border context, with other Gateways, hubs, and towns in the Border Region, Dublin and elsewhere in the Country and further afield"* in accordance with the **County Donegal Development Plan.**

The Project Brief Report outlines the above policies in greater detail.

1.4 TII Requirement to prepare the Scheme Feasibility Report

The Scheme Feasibility Report has been prepared, following discussion with TII, to further validate the need of the scheme as set out in the Project Management Guidelines 2010. The Report will support the decision making process throughout the various project phases will inform on the benefits and worth of the project for investment.

2 Journey Time Assessments

The three sections are considered of sufficient scale to be categorised as Major Options (Cost >€20m) and therefore warrant detailed modelling. Due to the potential scale of the options, and the potential for local re-routing, an assignment model will be developed for use in the appraisal.

It is envisaged that the transport modelling will serve several functions; it can help determine what the most appropriate option for a scheme is, aid the design of a scheme, and it can provide the necessary outputs for the economic, financial, safety and environmental appraisal of a scheme.

Traffic assessments will be undertaken for the individual Sections to assist in the selection of a Preferred Route for each Section, after which a traffic assessment will be undertaken for the entire project to include the Preferred Routes for each of the 3 Sections.

The transport modelling methodology that will be applied to the TEN-T Priority Route Improvement Project, Donegal, has been developed in line with the 'Project Appraisal Guidelines (PAG) for National Roads Unit 5.1 – Construction of Transport Models' document (TII, October 2016). The Appraisal Methodology, including details of the transport modelling methodology, is outlined in more detail in the scheme Project Appraisal Plan (PAP).

2.1 Traffic Counts & Surveys

A summary and review of existing data is provided in this section, followed by a schedule of proposed additional data to be collected. To reduce the costs associated with data collection, use will be made of existing data sources wherever appropriate.

2.1.1 Data Requirements

Data will be required to feed into all elements of the appraisal, this includes:

- Development and sifting of options
- Traffic Modelling
- Economic Assessment
- Safety Assessment
- Environmental Assessment

2.1.2 Existing Data

The PAP sets out the existing data/sources and data required to be collected to inform the development of the transport model.

PAG Unit 5.2 – Data Collection states that the age of survey data at the time of use of the traffic model must be considered. In addition to the current age of data, when assessing its suitability, it is also important to consider the life cycle of the project. Regarding the TEN-T Priority Route Improvement Project, events such as a value for money workshop and potential inquiry dates are currently scheduled for late 2019 onwards. This date must be borne in mind when considering the potential suitability of any data to be used in the model development process.

Survey Data from Existing Models

As detailed in Section 4 of the Project Appraisal Plan, there are existing models in the study area. Available data is indicated in Table 2-1.

Table 2-1: Survey Data Used in Existing Local Area Models

Model	Letterkenny Transport Model	A5 Western Transport Corridor Model	N14 Letterkenny to Lifford Model
Survey Data	• ANPR • ATC • JTC MCC • Journey Times	• RSI • ATC • JTC MCC • Journey Times	• RSI • ATC • JTC MCC • Journey Times
Survey Year	2008	2013	2010
Survey Location	Letterkenny, this is part of the simulation area proposed for the new Donegal TEN-T model and is directly relevant to the schemes area of influence.	A5 Corridor: This is at the edge of the simulation area of the new Donegal TEN-T model. The survey data therefore covers a small proportion of the network coverage of the new model.	The majority of survey locations are on or within the extents of the N13/N14/N15. This is the proposed core simulation area of the new Donegal TEN-T model.
Age of Data in 2019	11 years	6 years	9 years
Data Suitable for Use in New Model Construction?	No – Network Coverage is relevant but data is not recent enough	Yes – Data for the A5 through Strabane would be relevant for the Donegal model	No – Network Coverage is relevant but data is not recent enough

The information provided in Table 2.1 indicates that survey data collected for the A5 Western Transport Corridor may be suitable for use in the development of the Donegal TEN-T model. It should be noted however, that this survey data would be located at a periphery of the area of influence of the scheme to be considered in this study. Therefore, significant further data collection would be required.

The survey data collected for input to the other traffic models is considered to be too old for further use. Due to its age, the use of this data could undermine confidence in the preparation of the business case for the scheme.

TII Traffic Monitoring Units (TMUs)

There are seven TII TMUs within the study area, these are located on the N13, N14, N15 and N56 as shown in Figure 2-1. The TMUs in the study area provide traffic data from March 2013 up to early 2017. The flow data from the TMUs will form part of the validation dataset for the Donegal TEN-T model.

Figure 2-1 TII TMU Locations

The TMUs provide all day traffic counts throughout the year. The TMUs will therefore form the basis for identifying expansion factors to convert the single hour modelled periods to AADT and 18hr and 24hr flows for the air quality and noise assessments that will be undertaken as part of the appraisal.

Existing Survey Data on the *N14*

Traffic survey data was collected in March 2016 for the four lane section of the N14 between and including the Dry Arch and Pole Star Roundabouts. The following data was collected:

- MCC turn counts at each junction between the roundabouts
- MCC turn counts at the Dry Arch and Pole Start roundabouts
- Queue length surveys at the Dry Arch and Pole Star roundabouts
- An ATC on the N14 between the Dry Arch and Pole Star roundabouts

The proposed scheme to be assessed as part of this study include an option to upgrade the four lane section of the N14 to dual carriageway. This could include removing the ability to make right turns to and from the N14. Therefore, the March 2016 survey data will form a useful input to the study by providing recent detailed information on the current operation of the network.

Traffic Signal Data

In order to inform the network coding of the SATURN model, controller specifications for each signal junction in the study area will be obtained from Donegal County Council. The information in the controller specifications will be validated through observations made during site visits and through engagement with Donegal County Council. This will ensure that the operation of traffic signal junctions is coded accurately within the SATURN model.

Collision Data

Collision data for the road network covering the most recent five-year period is required to inform an assessment of the potential safety benefits of the scheme. In the absence of up-to-date data, the assessment will be based on the default parameter values inherent within the program to be used for the collision assessment.

2.1.3 Proposed Additional Data

Recent traffic survey data will be required for the development of the Donegal TEN-T model in order that it is fit for purpose for use in the appraisal and preparation of a business case for the scheme.

As noted above, there is insufficient recent data upon which to develop the traffic model in line with best practice. Therefore, it is proposed that additional traffic surveys be undertaken. It is envisaged that the traffic survey data outlined below would be collected during the Route Selection phase.

Origin-Destination Data

Origin-destination (O-D) trip data will be collected through Road Side Interview (RSI) surveys. RSIs provide a rich dataset and have advantages over other forms of O-D information in that they collect the true origins and destinations of trips. This is unlike other forms of O-D data collection, such as Automatic Number Plate Recognition (ANPR) and Bluetooth that are only able to identify the entry and exit points to the study area. RSIs also provide data on trip purpose segmentation and vehicle types.

The processing of O-D data is time consuming and costly, however, established methods exist to clean RSI data and to expand it to an average weekday. The existence of these established methods mean that a lower level of resource is required to process RSI data than would be required for Bluetooth or mobile phone data. ATC data will be collected for 2 weeks at each RSI location in order to provide expansion factors.

Roadside interview surveys will be collected at the following locations, as indicated by Figure 2-2.

- RSI 1: N15 Southwest of Ballybofey
- RSI 2: N15 East of Stranorlar
- RSI 3: N56 East of Letterkenny
- RSI 4: N14 North of Lifford
- RSI 5: N13 Northeast of Newton Cunningham
- RSI 6: R236 Northeast of St Johnston
- RSI 7: A5 North of Strabane

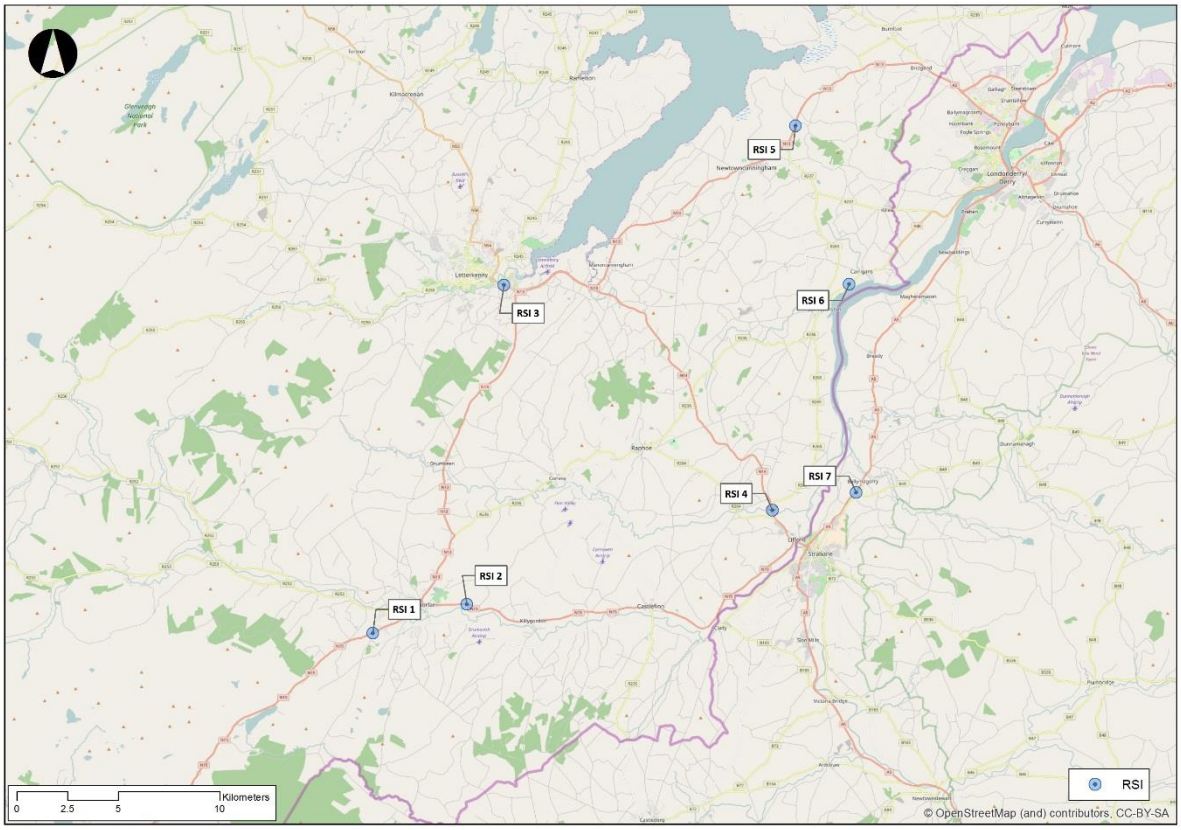

Figure 2-2: RSI Locations

Temporary Automatic Traffic Counts (ATCs)

Twenty-six temporary ATCs will be undertaken over a two week period on the main links within the modelled area. The ATCs would be located to form screenlines, picking up the main movements across the modelled area. Cordons would also be formed on the main routes in/out of Letterkenny, Ballybofey/Stranorlar and Lifford/Strabane, this would enable the level of traffic entering and exiting the main settlements in the study area to be understood. The proposed ATC locations are as indicated in Figure 2-3.

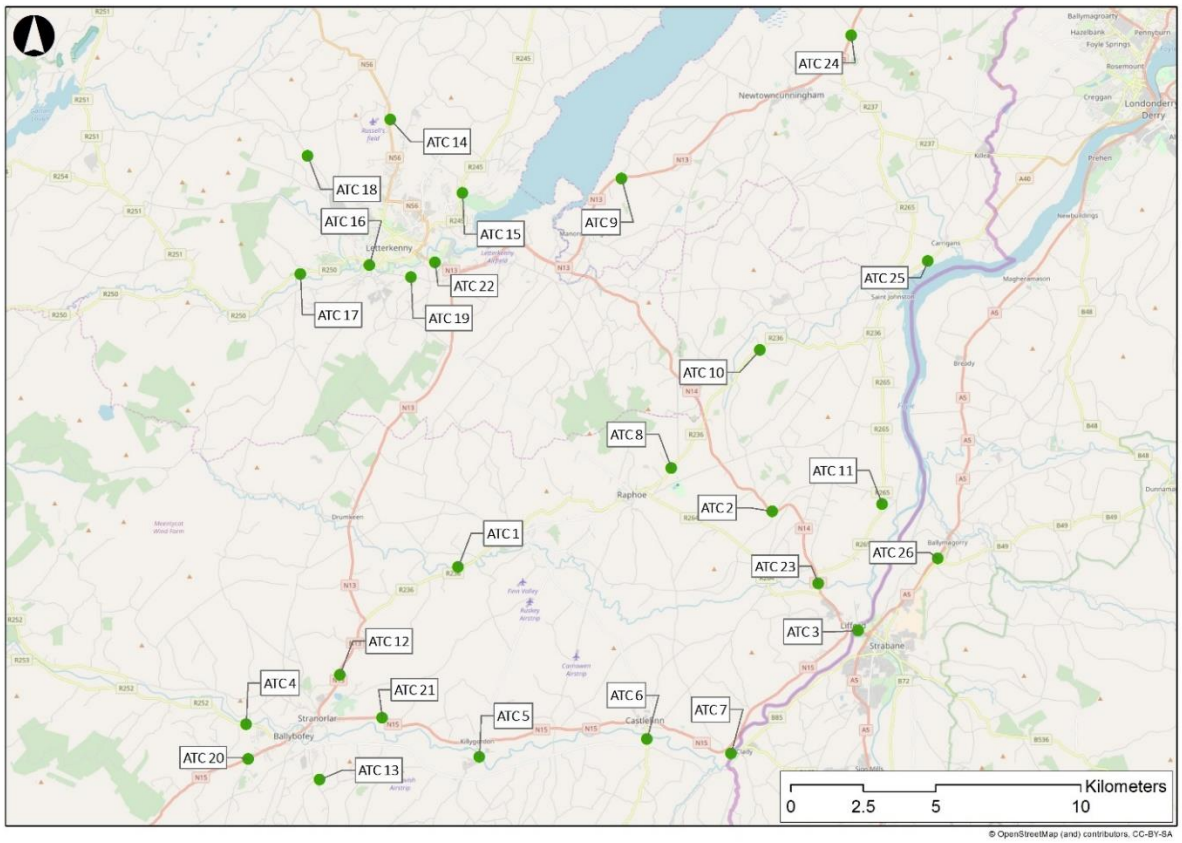

Figure 2-3: ATC Locations

Junction Turn Counts (JTC)

JTC's are necessary to provide information on vehicle types at key points on the network. It is recommended that twenty-seven MCC junctions are carried out at the locations indicated by Figure 2-4.

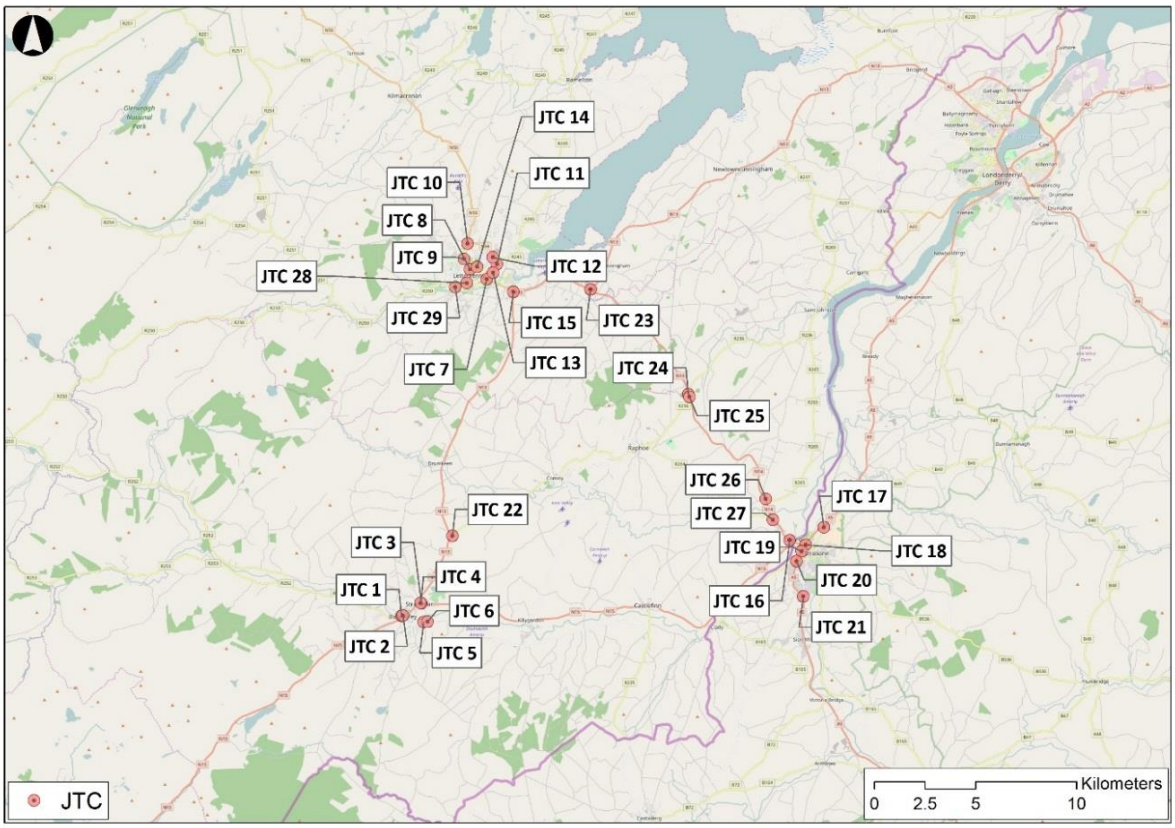

Figure 2-4: Proposed JTC Survey Locations

Journey Time Information

Journey times would be recorded for each of the major routes within the modelled area. This includes coverage of the main alternative routes through the study area that could be influenced by the proposed scheme that will be appraised during the study.

Comprehensive coverage of the modelled network will help to ensure that each of the main routes in the study area can be calibrated to observed data. This will ensure that assignment responses in the model during scheme testing are based on a consistent and accurate representation of delay.

It will be necessary to obtain a sufficient number of journey time observations to understand the reliability on the routes. Therefore, it is proposed that the journey time surveys will be undertaken via Automatic Number Plate Recognition and Bluetooth rather than the Moving Car Observer (MCO) method.

Journey time survey data will be collected for the six routes detailed below and indicated by Figure 2-5.

- Journey Time Route 1: N15 south of Ballybofey of N13 south of Letterkenny
- Journey Time Route 2: R249 north of Letterkenny to N14 north of Lifford
- Journey Time Route 2a: R249 north of Letterkenny to N14 north of Lifford (via town centre)
- Journey Time Route 3: N15 from Stranorlar to Lifford
- Journey Time Route 4: R236 from N15 to Derry
- Journey Time Route 5: N13 from N14 to Bridge End
- Journey Time Route 6: A5 from Derry to south of Sion Mills

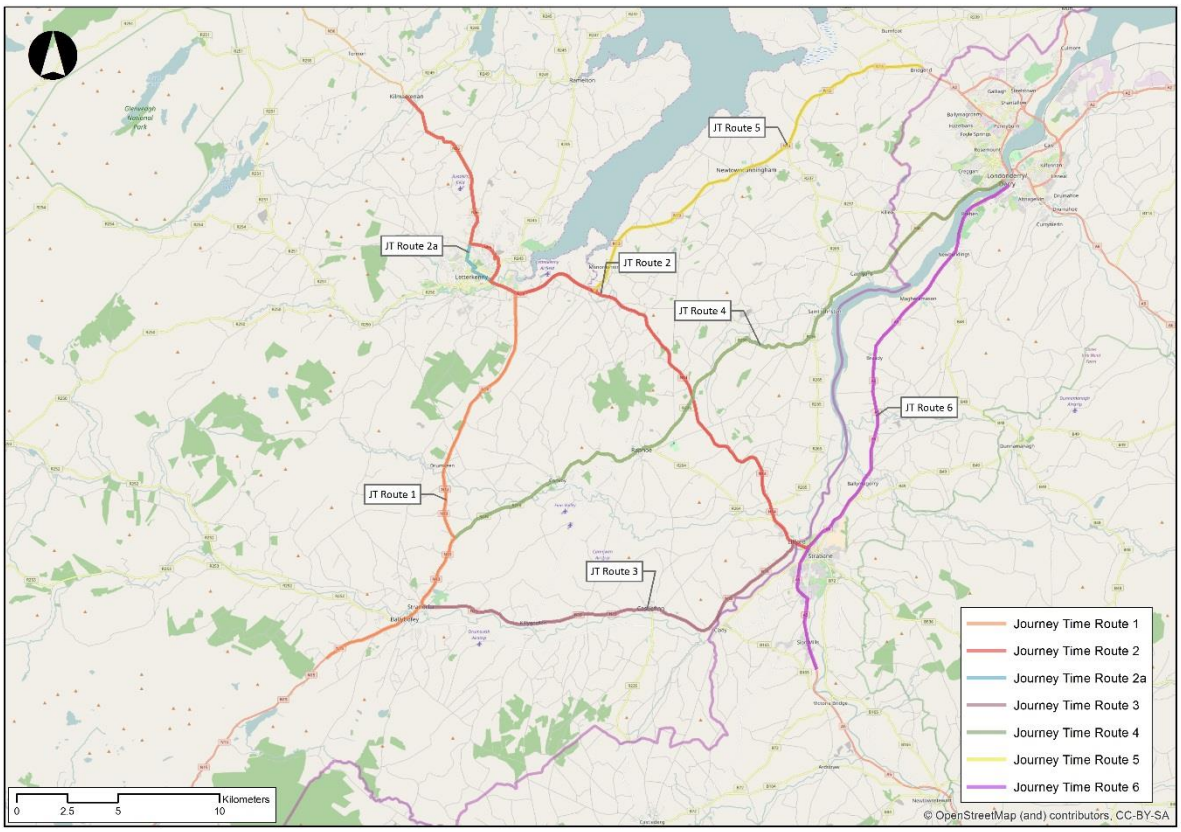

Figure 2-5: Journey Time Survey Routes

2.2 Summary of Journey Time Assessments along the route

Journey time surveys were carried out by CH2MBarry in September 2015 to inform the TEN-T Corridor Needs Study undertaken. The summary results of these surveys are presented below.

2.2.1 N15 Ballybofey – Stranorlar Urban Region

The average speeds are shown in **Table 2-2**. The route is split into two sections; the N15 from Cappry (southwest of Ballybofey) to N13/N15 junction in Stranorlar and the N13 from N13/N15 junction to the R236/N13 junction (northeast of Stranorlar).

Table 2-2: Average Journey Speeds on N15/N13 through Ballybofey/Stranorlar

Time Period	N15 Cappry to N15/N13 junction Average Speed (km/h)	N15/N13 junction to R236 Junction Average Speed (km/h)
AM Peak	41	79
Inter-Peak	38	62
PM Peak	45	68
Average	48	57

2.2.2 N56/N13 Letterkenny to Manorcunningham

The average speeds recorded on the N56 are shown in

Table 2-3. The 2015 journey time survey did not include the N13 from the Dry Arch Roundabout to Manorcunningham.

Table 2-3: Average Journey Speeds on N56 from Letterkenny to the Dry Arch Roundabout

Time Period	N56 Pole Star Roundabout to Dry Arch Roundabout Average Speed (km/h)
AM Peak	34
Inter-Peak	40
PM Peak	50
Average	41

2.2.3 N14 Manorcunningham to Lifford/Strabane/A5 Link

The average speeds recorded on the N14 are shown in Table 2-4.

Table 2-4: Average Journey Speeds on N14 from the Pluck Roundabout to Lifford.

Time Period	N14 Pluck Roundabout to Lifford Average Speed (km/h)
AM Peak	69
Inter-Peak	67
PM Peak	70
Average	69

2.3 Confirmation of average journey time in both directions

Confirmation of journey times will be provided in the detailed traffic modelling report.

3 Traffic Volumes

3.1 Results of Automatic Traffic Counts

At this stage, due to the early progress of the appraisal results of automatic traffic counts have not been undertaken as proposed in Section 2. This situation will remain under review with the results to be updated when undertaken.

3.2 Comparison with TII National Roads & Traffic Flow Figures

A comparison of the results cannot be undertaken at this stage. This section will remain under review. Information on the existing traffic conditions is available on TII Traffic Data website as is described below

3.2.1 Existing Traffic Conditions

The traffic flows recorded by Traffic Measurement Units (TMUs) in 2015 on sections of the road network within the study area are presented below for the purpose of providing the current magnitude of traffic flows to set the context of the project feasibility.

The 2015 data is more representative of typical conditions than the 2016 data, due to the presence of roadworks which took some detector loops offline for several weeks within 2016. The data presented includes:

- Annual Average Daily Traffic[4] (AADT) flows;
- Average hourly traffic profiles for weekdays and a full week; and
- Monthly AADTs.

N15 Ballybofey – Stranorlar Urban Region

The nearest TMUs to this section are located on the N13 to the North and on the N15 to the South of Ballybofey/Stranorlar as shown Figure 3-1 below. These recorded a 2-way AADT of 9,600 and 6,700 vehicles respectively in 2015.

[4] AADT is the average number of vehicles that use a section of road over a full 24hr period across a calendar year. It is calculated by dividing the total traffic over a full calendar year by the number of days in the year.

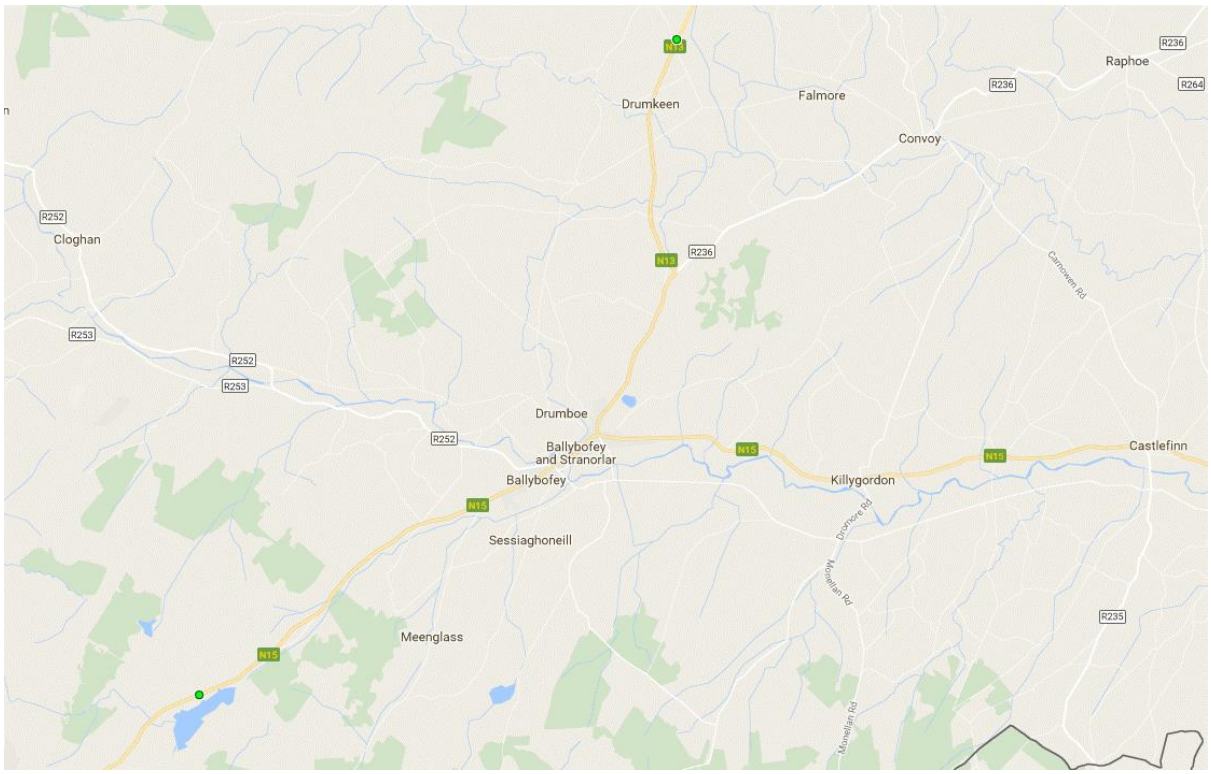

Figure 3-1 Location of TMUs on N13 and N15 on the North and South of Ballybofey/Stranorlar

Figure 3-2 shows the average hourly traffic profiles for weekdays and a full week. In both cases, the PM peak volume is higher than the AM peak. The AM peak is more pronounced during the working week.

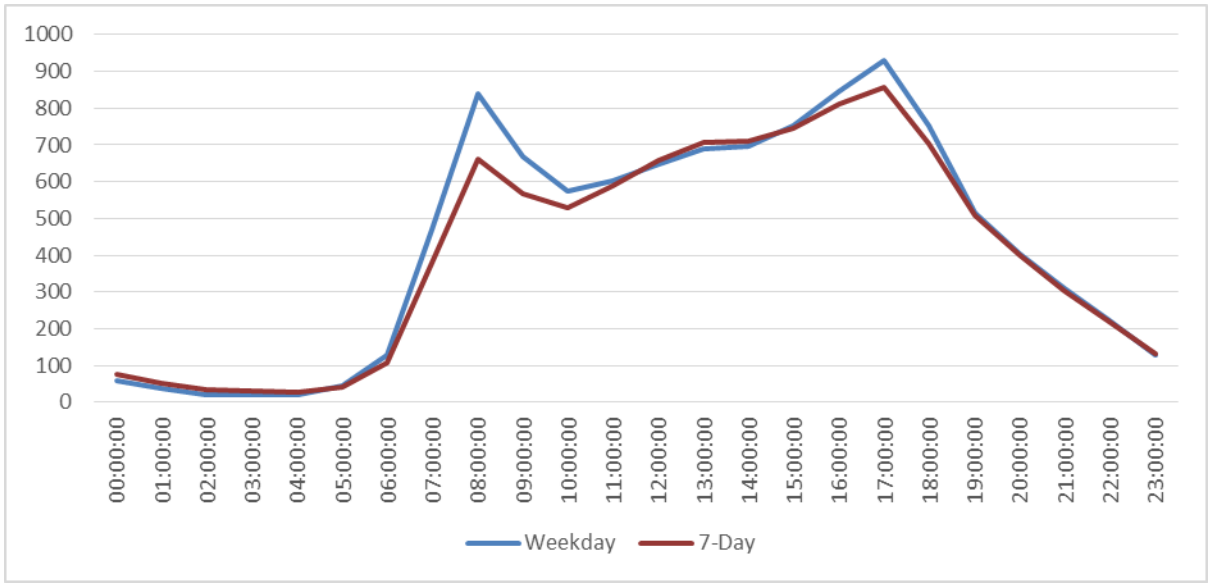

Figure 3-2: Average Hourly Traffic Profile for the N13 north of Ballybofey/Stranorlar

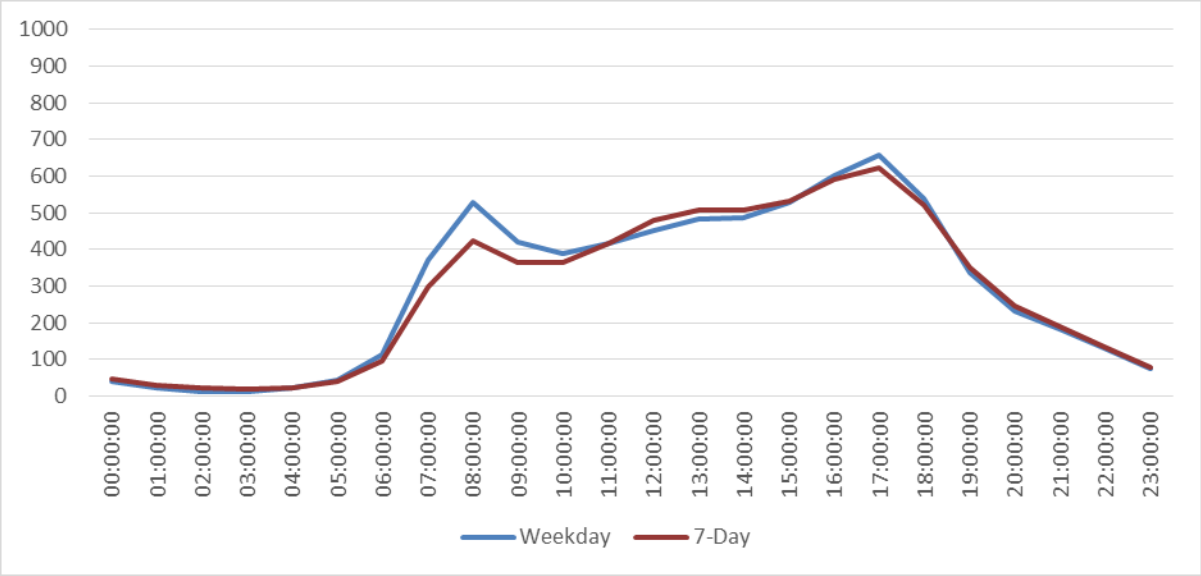

Figure 3-3 Average Hourly Traffic Profile for the N15 south of Ballybofey/Stranorlar

Figure 3-4 shows the average monthly traffic flows for 2015. Peak flows of approximately 10,000 vehicles / day occurred in July and August, which is the main holiday season.

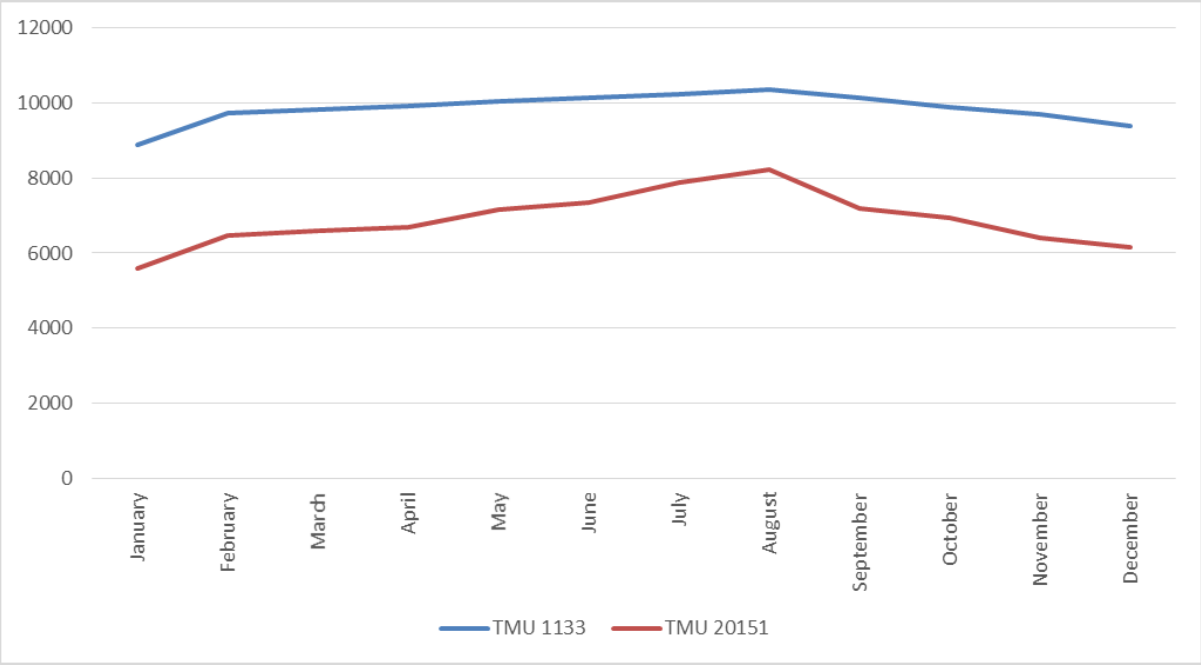

Figure 3-4: Monthly Traffic Profiles for each TMU

N56/N13 Letterkenny to Manorcunningham

A TMU is located on the N13 approximately 700 metres west of the Pluck roundabout and on the N56 to the north of Letterkenny, as shown in Figure 3-5 below.

Figure 3-5: TMU Locations near Letterkenny

Figure 3-6 and Figure 3-7 shows average daily traffic profiles for both weekdays and a full week. In both cases, the PM peak volume is higher than the AM peak. The AM peak is more pronounced during the working week. It should be noted that 2016 data for the counter to the east of Letterkenny is unavailable, as the counter was offline for significant periods during roadworks

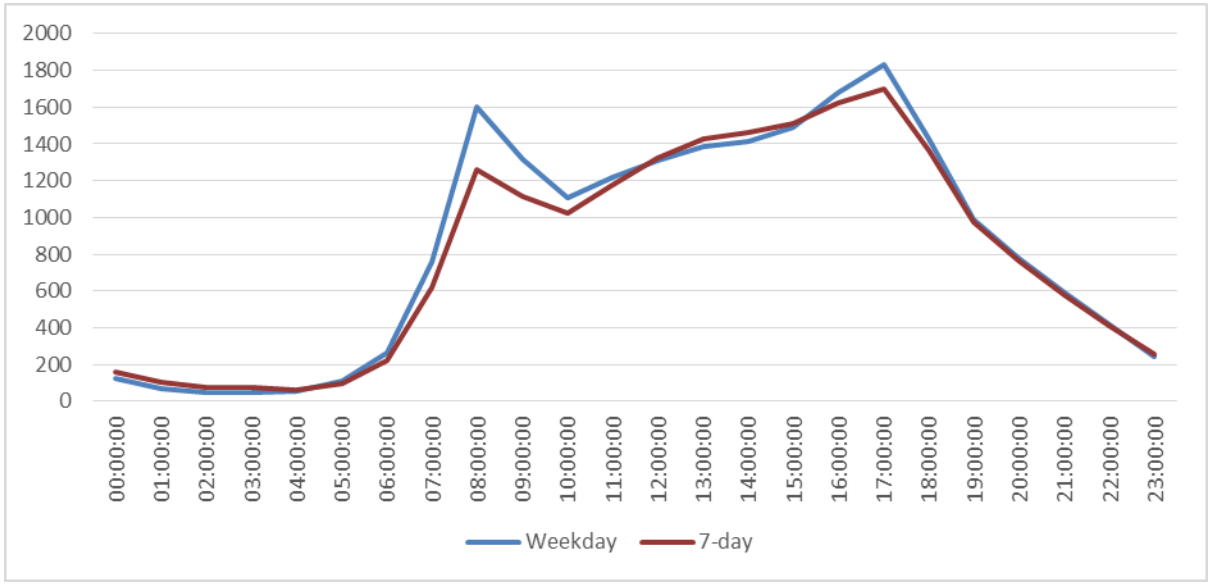

Figure 3-6: Daily Traffic Profile for the N13 east of Letterkenny

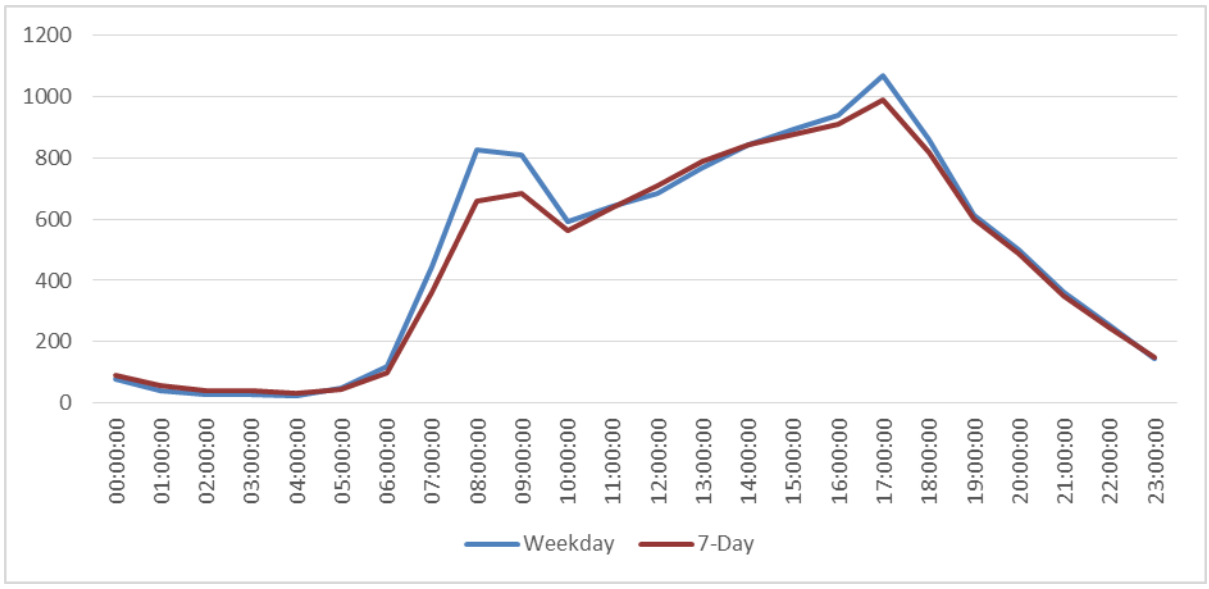

Figure 3-7 Average Hourly Traffic Profile for the N56 north of Letterkenny

The available information suggests that, to the east of Letterkenny, 2-way AADT traffic volumes were in the order of 19,400 in 2015. This compares with a 2-way AADT to the north of approximately 11,000 in 2016.

Figure 3-8 shows the average monthly traffic flows for 2015. Peak flows of approximately 21,000 vehicles / day occurred in July and August, which is the main holiday season.

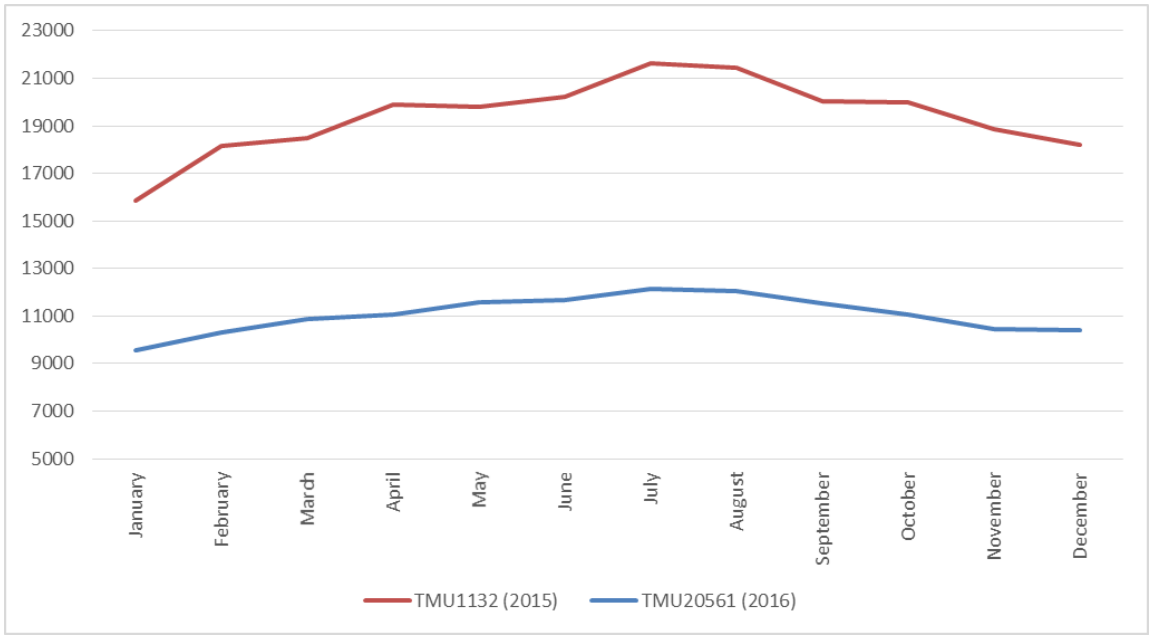

Figure 3-8: Monthly Traffic Profiles east and north of Letterkenny

While no TMU are located on the 4-lane section of the N56 between the Pole Star roundabout and the Dry Arch roundabout, a temporary automatic traffic counter was installed on this section for the period of 1 week in March 2016, indicating significant traffic volumes on this link that require consideration in future surveys.

N14 Manorcunningham to Lifford/Strabane/A5 Link

A TMU is located on the N14 approximately 1km north of Lifford, as shown in Figure 3-9. This recorded a 2-way AADT of 11,400 vehicles in 2015.

Figure 3-9: TMU location on the N14 north of Lifford

Figure 3-10 shows average daily traffic profiles for both weekdays and a full week. In both cases, the PM peak volume is significantly higher than the AM peak. There is no clear AM peak for the full weekly average.

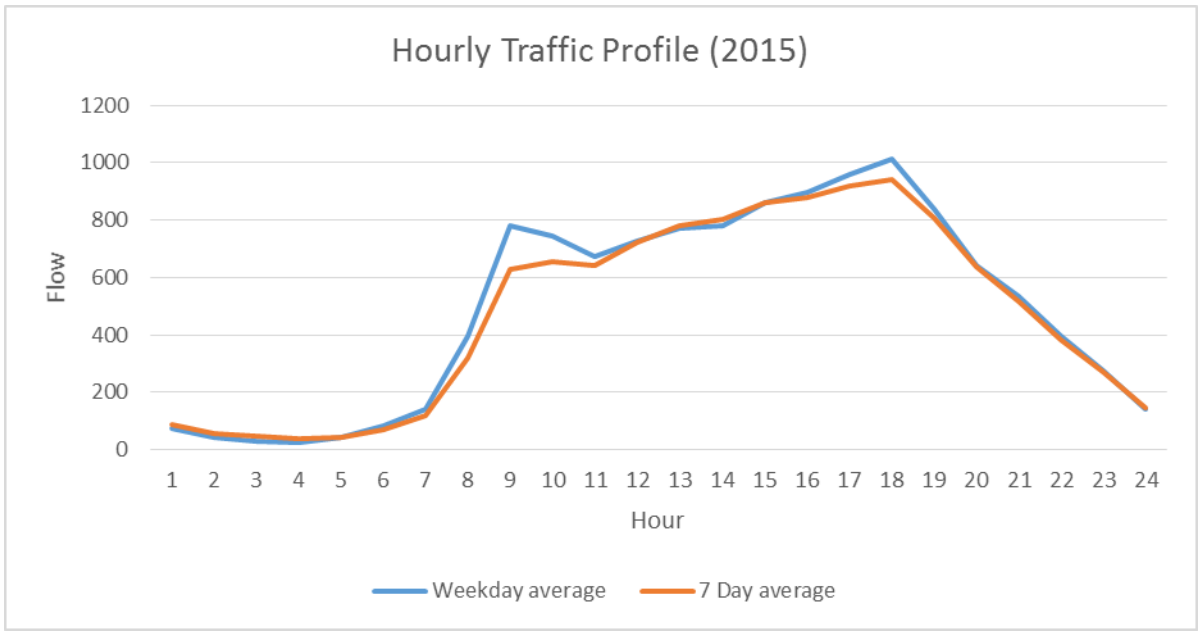

Figure 3-10: Daily Traffic Profile for the N14 north of Lifford

Figure 3-11 shows the average monthly traffic flows for 2015. The flows from February to November show less variation than for the other counter sites presented. Peak flows approaching 12,000 vehicles / day occurred in June, July and September.

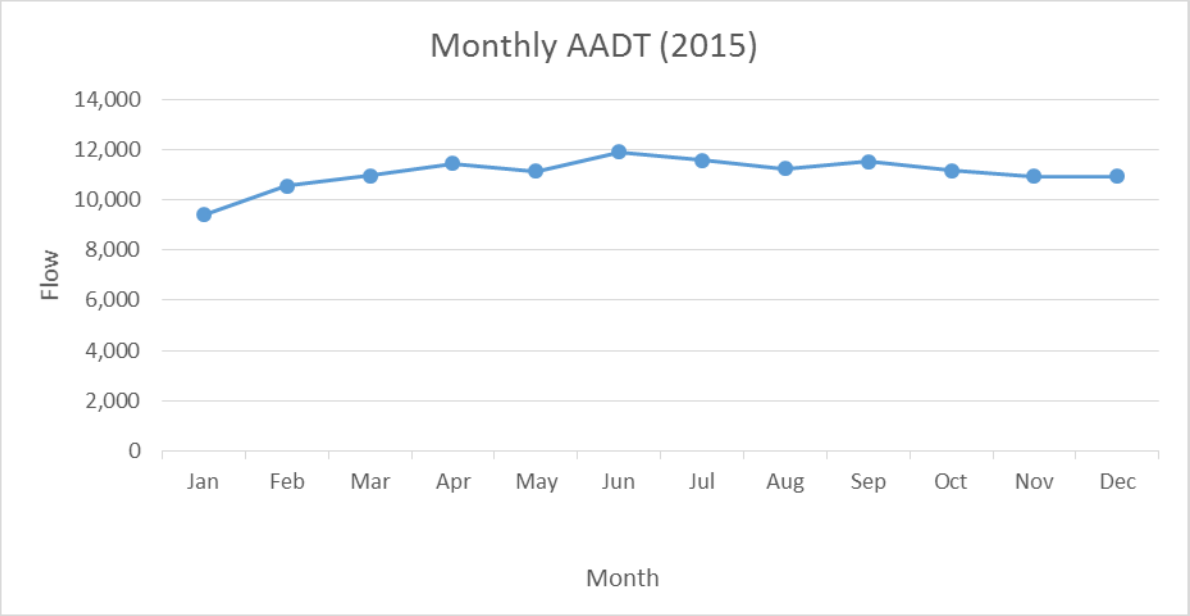

Figure 3-11: Monthly Traffic Profile for the N14 north of Lifford

3.3 Existing Journey Times

Journey time surveys were carried out by CH2MBarry in September 2015 to inform the TEN-T Corridor Needs Study undertaken. The summary results of these surveys are presented below.

N15 Ballybofey – Stranorlar Urban Region

The average speeds are shown in **Table 3-1**. The route is split into two sections; the N15 from Cappry (southwest of Ballybofey) to the N15/N13 junction in Stranorlar and the N13 from the N15/N13 junction to the junction with the R236 (northeast of Stranorlar).

Table 3-1: Average Journey Speeds on N15/N13 through Ballybofey/Stranorlar

Time Period	N15 Cappry to McClays Corner Average Speed (km/h)	N13 McClays Corner to R236 Junction Average Speed (km/h)
AM Peak	41	79
Inter-Peak	38	62
PM Peak	45	68
Average	48	57

N56/N13 Letterkenny to Manorcunningham

The average speeds recorded on the N56 are shown in Table 3-2. The 2015 journey time survey did not include the N13 from the Dry Arch Roundabout to Manorcunningham.

Table 3-2: Average Journey Speeds on N56 from Letterkenny to the Dry Arch Roundabout

Time Period	N56 Pole Star Roundabout to Dry Arch Roundabout Average Speed (km/h)
AM Peak	34
Inter-Peak	40
PM Peak	50
Average	41

N14 Manorcunningham to Lifford/Strabane/A5 Link

The average speeds recorded on the N14 are shown in Table 3-3.

Table 3-3: Average Journey Speeds on N14 from the Pluck Roundabout to Lifford.

Time Period	N14 Pluck Roundabout to Lifford Average Speed (km/h)
AM Peak	69
Inter-Peak	67
PM Peak	70
Average	69

3.3.1 Level of Service

The minimum acceptable Level of Service is 'D', where a Level of Service 'A' describes free-flow operation and a Level of Service 'E' describes operating at design capacity. The LOS "D" is a parameter set out in TII standard DN-GEO-03031 (formally TD9/12) Table 6.1. The capacity in terms of AADT for LOS "D" for each type of road considered in this report are set out in Table 3-4.

Table 3-4: Type of Road and Capacity at a Level of Service "D"

Type of Road	Capacity (AADT) - Level of Service D
Type 3 Single Carriageway (6.0m)	5,000
Type 2 Single Carriageway (7.0m)	8,600
Type 1 Single Carriageway (7.3m)	11,600
Type 3 Dual (7.0m x 2)	14,000
Type 2 Dual (7.0m x 2)	20,000
Type 1 Dual (7.0m x 2 + 2.5m HS)	42,000

Table 3-5 below compares the existing AADT against the level of Service D AADT based on the existing road cross section.

Table 3-5 Comparison of current AADT against Level of Service "D"

	N15 Ballybofey/ Stranorlar	N56/N13 Letterkenny to Manorcunningham	N14 Manorcunningham to Lifford
AADT Required for LOS D based on existing Cross Section	8,600	15,000/42,000**	5,000-8,600
Existing AADT*	9,868	30,000/17,476***	11,319

*Traffic Figures are for 2016 and are taken from TII Traffic counters accessible at: nratrafficdata.ie

** 15,000 assumed as LOS D N56 4-lane road, which is likely to have a higher LOS than Type 1 single carriageway, but less than a segregated Type 2 dual carriageway. 42,000 is LOS D for Type 1 dual carriageway on N13 section of the route.

***30,000 recorded in March 2016 with a temporary traffic counter on N56 4-lane road, as there is no TII traffic counter present on this section. 17,476 is recorded from a TII Traffic counter on the N13 dual carriageway.

The results show that all of the corridors in the TEN-T Priority Route Improvement Project, except the N13 Dry Arch Roundabout to Pluck Roundabout section which is a dual carriageway, are currently operating worse than a Level of Service D at existing traffic volumes. The above figures are considered conservative as, for example, road widths for the N15 Ballybofey and N14 Manorcunningham to Lifford are less than 7m in sections with no hard strips of verges. This highlights the inadequacy of the existing road network which will be exacerbated due to future traffic growth.

3.4 Projected Traffic Figures to the Design Year

At this stage, due to the early progress of the appraisal projected traffic flows have not been validated. This situation will remain under review with the results to be detailed in a Traffic Modelling Report.

In line with guidance in PAG Unit 5.3 and in order to maintain consistency with the appraisal of national road projects, forecast demand for transport will be derived from the TII National Transport Model (NTpM). Demand forecasts will be obtained from a cordon of the NTpM that corresponds to the network coverage of the Donegal TEN-T model.

Travel demand projections from the NTpM are available for two forecast years, 2030 and 2050. NTpM includes a central growth scenario and two sensitivity scenarios. The two sensitivity scenarios are based on adjusted demographic and economic projections and represent low and high growth scenarios. The central growth scenario in NTpM will be used to provide the demand forecasts for the core scenario in the TEN-T Priority Route Improvement, Donegal Project. Demand forecasts for the Low and High growth scenarios will also be obtained for use in sensitivity testing.

Growth rates from NTpM will be applied as increases in trip ends at a zonal level. The base year matrices from the Donegal TEN-T model will then be furnessed to produce the future year demands.

The zoning system within the NTpM is based on aggregations of Electoral Divisions. The Donegal TEN-T model will have a finer zoning system than the NTpM. It will therefore be necessary to disaggregate the NTpM forecast data for application to the Donegal TEN-T model. The disaggregation of demand will be based upon the distribution of households and employment locations as revealed within POWSCAR data. The disaggregation of forecast demand would be constrained to the overall growth in the coverage of the NTpM zone.

Development planning data will also be reviewed to understand the potential distribution of future household and employment locations. Where necessary the demand forecast from NTpM will be adjusted to match the distribution of development. The redistribution of forecast demand would be applied to the zoning system with the Donegal TEN-T model and would be constrained by the growth forecast in the overall NTpM zone.

In line with the guidance in PAG Unit 5.1, model scenarios would be prepared for the following years:

- Base Year: 2016
- Opening Year: 2025
- Design Year (Opening year plus 15 years): 2040
- Forecast Year (Opening year plus 30 years): 2055

As these forecast years do not coincide with the data available from the (NTpM), linear interpolation will be applied to calculate the demand at the years required for this study.

Consultation will be undertaken with stakeholders in order to understand if there are any significant infrastructure schemes that could have an impact on travel patterns in the study area. Schemes that could potentially have a significant impact on the study area include the A5 Western Transport Corridor and the proposed N14 to A5 link. The level of commitment and opening years of these and any other relevant schemes will be confirmed to determine if any additional forecast years or demand forecasts may be required as part of the core scenario or sensitivity testing.

3.5 Results of Origin-Destination Surveys

To date no Origin-Destination Surveys have been undertaken, however this is information is programmed to be collated via Road Side Interview surveys. This situation will remain under review with the results of the O-D survey to be updated.

3.6 Previous Traffic Reports and Assessments

The following reports have been previously carried out along these corridors:

- N14/N13 Junction (Manorcunningham) to Lifford Constraints Study, 2000; Mott MacDonald
  This report reviews the area near the N14 improvement scheme and ranks in order the constraints to consider in order of importance.

- N15 Ballybofey/Stranorlar Bypass Constraints Study, 2000; McCarthy Hyder

- N15 Ballybofey/Stranorlar Bypass Route Selection Report, 2001; McCarthy Hyder
  This concludes that the proposal to develop a bypass to Ballybofey and Stranorlar are economically viable.

- N14/N13 Junction (Manorcunningham) to Lifford Route Selection Report, 2001; Mott MacDonald
  This report describes the process undertaken for the selection of a route for an upgraded link. The preferred route option resulted in a review of various options against environmental, economic and engineering constraints as well as comments received at consultation. The subsequent preferred route was a single carriageway with a combination of online and offline elements with offline elements primarily being at the Lifford end of the scheme, culminating in a roundabout junction between the new N14 the existing N15 and the new A5 Link across the River Finn to the proposed A5 Western Transport Corridor.

- Environmental Impact Statement N14 Letterkenny to Lifford/Strabane Road Improvement Scheme, Draft Rev 04, 2009; Mott MacDonald / RPS
  Report produced with final proposals of a Type 2 dual carriageway route as amended at local consultation in May 2006 and sets out mitigation measures to alleviate any negative effects of the scheme.

- N14 4 Lane Road at Letterkenny Feasibility Report, 2005; Michael Punch and Partners.

- N14 Letterkenny to Lifford/Strabane Preliminary Design Report, 2009; Mott MacDonald / RPS
  This Report was developed to assist in establishing land take requirements in Phase 4 (PMG) of the delivery.

- N56 Letterkenny Relief Road Route Selection Report, 2010; Donegal County Council
  Sets out the rationale for route selection and defines the Blue Route as the preferred route for the N56 Letterkenny Relief Road.

- N13/N14/N15 Traffic Model Study Local Model Validation Report, 2010; Jacobs

This study set out to validate a previous report conducted into the base year (2010) traffic effects for various improvement schemes in Donegal, including the N14 improvement. This was developed with the A5 Western Transport Corridor (WTC) forming part of the Do-Minimum scenario. The model includes the area bounded by the towns of Letterkenny, Ballybofey, Strabane and the city of Derry. The study concluded that the previous traffic modelling work calibrated well against 2010 observed data and exceed acceptability criteria set out in the NRA Project Appraisal Guidelines.

- N13/N14/N15 Traffic Model Study Future Year Scenario Report (all schemes) 2010; Jacobs
  Principal purpose of this report was to provide traffic data extracted from the future year models with the aim of informing the design, environment and economic assessments for several National Road schemes in Donegal.

- N13/N14/N15 Traffic Model Study Future Year Scenario Report N14/N15 to A5 WTC Link Road 2010; Jacobs
  Traffic modelling indicates that in future years, traffic will decrease on the existing N14 as vehicles switch to using the new N14 alignment and relieve traffic on the N14/A38 River crossing.

- N14 Letterkenny to Lifford Traffic Model Review (2013) RPS;
  This review assessed the suitability of the 2010/2011 Saturn traffic model for compliance with NRA Project Appraisal Requirements and made recommendations for generating traffic figures for future project development and appraisal. The report concluded that work completed on the Saturn model was at this point, current and acceptable and in accordance with industry and practice, but recommended some additional work to align the future models to a more realistic economic outlook.

- N14 Letterkenny to Lifford Traffic Model Revalidation Report (2013); RPS
  This report describes the traffic modelling work that was undertaken by RPS in June/July 2013 to update, improve and re-validate the traffic model that was assessed in a previous Model Review.

- National Road Safety Inspection Programme N14 Road Safety Inspection Review (2013); Donegal National Roads Office
  This report conducted a review of the route to identify road safety issues and hazards. The findings in the report highlight detailed areas for improvement such as specific lengths of vehicle restraint system etc. Additionally, there were several strategic problems with the route identified as hazardous, including the road width, road layout, accesses and sight lines, as well as street furniture, walls and boundaries within the clear zone of the road. The report admits that minimal improvement on many issues with the road can be achieved *"until such time as they can be upgraded or replaced with alternative alignments."*

- N14 4-Lane Road at Letterkenny (2015);
  This report highlights the poor existing operational and safety performance of the N14 between the Pole Star and Dry Arch roundabouts, indicating that when road traffic collisions occur on the link, the main route to/from the hospital and fire station is affected causing delays and forcing traffic onto the local road network. The report makes recommendations on how to alleviate the issue.

- Trans-European Transport Network (TEN-T) Corridor Needs Study, Donegal (2015/16); HalcrowBarry (now CH2MBarry) Ltd
  This study reviewed the TEN-T in Donegal, assessing the corridors against various technical, non-technical, economic, operational and safety criteria to evaluate if the links complied to the relevant standards required for a National Primary Road. For the study, TEN-T corridors were divided into seven separate sections. Each section was ranked in order of priority requiring intervention. While six sections were identified as requiring

intervention, three were selected as requiring imminent intervention, all of which form part of this scheme feasibility report.

- A5 Western Transport Corridor Wider Economic Benefits (2016); Volterra
  This report sets out economic benefits likely to be experienced by the North West region as a result of the A5 WTC, which is 85km of dual carriageway from south of Derry to the border with the Republic of Ireland at Aughnacloy, greatly improving connectivity of the North West to Dublin. The benefits assessed were Agglomeration benefits, which is an increase in output as a result of a higher effective density or access to economic mass. The report gives a concluding benefit of £112.2 million over 60-year appraisal period with the greatest benefit experienced in the Republic of Ireland (58%), with 50% of this benefit accruing in Donegal.

- N14/N15 to A5 Link EIS
  This An Bord Pleanála approved Environmental Impact Statement (EIS) / Environmental Statement (ES) is for the N14 / N15 to A5 Link. The N14/N15 to A5 Link Scheme involves the design of a road linking the A5 Western Transport Corridor (WTC) in Co. Tyrone, Northern Ireland to the existing N15 in County Donegal and allows for a future tie in to the proposed N14 Manorcunningham to Lifford/Strabane scheme in Co. Donegal. The distance between the junction on the A5 WTC and the proposed N15 junction is approximately 500m. The Scheme includes a significant structure crossing the River Finn and floodplain.

3.7 Proposed Traffic and Economic Assessments

The traffic and economic assessments that will be completed for the individual road sections and overall project will include consideration of:

1. The implementation of each section on its own as a stand-alone project for the purposes of identifying the Preferred Route,
2. The implementation of the three sections of road together (Preferred Routes) within the overall project.

The economic viability of the overall project will be demonstrated by the second part of the appraisal listed about. While the results of this economic assessment will not be known until later in the project, it can be concluded with confidence at this feasibility stage that there will be a strong economic return for the project given the high economic performance of the individual schemes as demonstrated in previous studies.

4 Safety Review

4.1 Safety Assessment of existing National Route

The three sections of the TEN-T in Donegal have a poor safety record, which is likely resulting from the substandard alignment and cross-section of the routes which are not sufficient to accommodate current traffic volumes. Additionally, much of the TEN-T in Donegal has numerous agricultural and residential accesses directly onto the national road network, increasing the variety of vehicles and speeds using the network. These along with at-grade junctions on the N15 dual carriageway and on the N56 4 lane single carriageway result in a significant number of conflict points along the TEN-T route.

The key project objectives with respect to Safety include:

- Reduce the frequency and severity of collisions on the road network to improve the overall safety of the national road network in Donegal. This achieved can be met by;
- Reducing junction numbers and conflict points;
- Providing improved alignments and cross-section widths to accommodate safe overtaking sections on the road network;
- To improve safety for vulnerable users by separating strategic traffic from local traffic through towns and villages;
- To support the Governments Road Safety Strategy 2013-2020.

The Road Safety Authority (RSA) Personal Injury Collision (PIC) database has been used to gather information regarding collisions along the TEN-T Priority Route Improvement Project, Donegal corridors. The number of fatal, serious and minor collisions across each of the corridors is summarised in Table 4-1.

Table 4-1: Summary of collisions across the corridors of the TEN-T Priority Route Improvement Project, Donegal from 2005-2013

	N15 Ballybofey/ Stranorlar	N56/N13 Letterkenny to Manorcunningham	N14 Manorcunningham to Lifford	Total across Network
Fatal	3	2	1	6
Serious	7	4	5	16
Minor	30	39	73	148
Totals	**40**	**40**	**79**	**159**

From these figures and traffic flow information, the PIC rate for each road was calculated. This rate assists in representing the road safety performance of a link, based on collision numbers, traffic data, link length and road type/cross-section. As TII traffic counters are in discrete locations which do not cover each section of the scheme, traffic data collected in 2013 for previous reports was utilised to conduct the PIC analysis, providing a more comprehensive breakdown of collision rates per section. The traffic figures used from 2013 data correspond well with the figures obtained from the TII Traffic Counters, where available. Across each section of the scheme, the existing PIC rates are higher than set out as expected rates in the Project Appraisal Guidelines (PAG) Unit 6.11 National Parameters Values Sheet. The N56/N13 and N14 links perform particularly poorly with respect to safety, with one section of the N14 having a PIC rate almost four times what should be expected. Table 4-2 summarises the findings:

Table 4-2: Summary of PIC rates across the TEN-T Priority Route Improvement Project, Donegal

	Existing PIC rate per mvkm	Expected PIC rate per mvkm (PAG Unit 6.11)	Notes
N15 Ballybofey/Stranorlar			
N15 Cappry to N15/N13 junction	0.188	0.080 0.213	This section is subject to speed limits less than and greater than 60 km/h
N15 N15/N13 junction to N13/R236 junction	0.093	0.213 0.080	This section is subject to speed limits less than and greater than 60 km/h
N56/N13 Letterkenny to Manorcunningham			
N56 Pole Star roundabout to Dry Arch roundabout	0.148	0.080	Assumed expected rate of 0.080 based on 2+1 without central reserve barrier
N13 Dry Arch roundabout to N13/N14 Pluck Roundabout	0.034	0.033	Assumed expected rate for Type 1 dual carriageway
N14 Manorcunningham to Lifford			
N14 Pluck Roundabout to the R236 junction	0.155	0.080	Expected rate is that for single carriageway with a speed limit over 60 km/h
N14 from R236 junction to the R265 junction	0.305	0.080	Expected rate is that for single carriageway with a speed limit over 60 km/h
N14 from R265 junction to Lifford (N14/N15 roundabout)	0.249	0.080	Expected rate is that for single carriageway with a speed limit over 60 km/h

The Network Safety Ranking for the three corridors for 2012-2014 are represented diagrammatically in Figure 4-1 below. The colours identify areas as follows:

- Red – Collision rate is twice above the expected rate for that type of road;
- Yellow- Collision rate is above the expected rate for that type of road;
- Green – Collision rate is below the expected rate for that type of road;
- Blue – Collision rate is twice below the expected rate for that type of road;

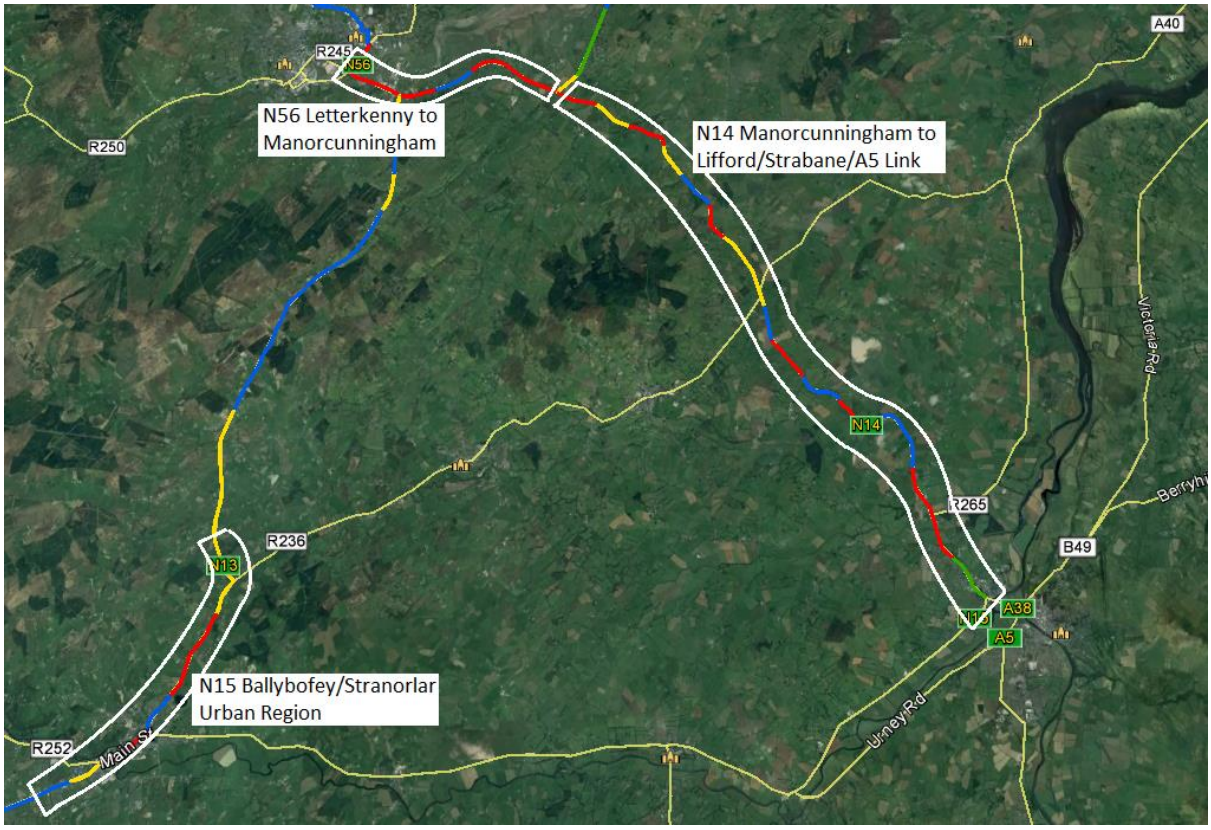

Figure 4-1 showing Collision Rates for the N15, N56/N13 and N14 TEN-T Corridors for 2012-2014. Source: https://data.gov.ie/dataset/collision-rates-2012-to-2014

Based on the Personal Injury Collision rates, the TEN-T Priority Route Improvement Project, Donegal is required to address the ongoing, long-term safety issues experienced across the National Road network in the region.

In consultation with TII and DCC, it was agreed that it was not necessary for a formal Road Safety Impact Assessment to be undertaken at this stage of the project.

4.2 Recommendations for improvement to safety conditions

The geometric design of the alignment will be in accordance with TII Standards and Publications. The road cross-section, junction types and design speeds across each section of the scheme forming part of the TEN-T Priority Route Improvement Project, Donegal is yet to be confirmed.

4.2.1 Performance Targets

For the project to provide good value for money and meet the TII requirements for a new upgraded National route, the project must address the scheme needs, satisfy the scheme objectives and meet the following targets:

- The roads shall be designed to TII Design standards and have the geometric properties to accommodate a single carriageway or a dual carriageway with designed speed limits in accordance with DN-GEO-03031 (formally TD9/12), and set speed limits in accordance with Guidelines for Setting and Managing Speed Limits in Ireland;
- Result in a reduction in collisions compared to the three existing corridors;
- Improved environmental performance of the TEN-T corridor as a whole, with reduced noise and air pollution effects on sensitive receptors and vulnerable road users and the provision of facilities for the treatment of surface water run-off;

- Provide a Level of Service of at least “D” on each link in accordance with Table 6/1 of DN-GEO-03031;
- Provide for safe overtaking opportunities with overtaking sections to, as a minimum, meet the requirements of the TII publications and standards;
- The roads should aim to limit or remove all direct accesses other than at junctions with other roads. The current considerable number of direct accesses on the existing roads does not align with the characteristics of a TEN-T corridor;

5 Cost Estimate

A summary of the preliminary Feasibility Working Cost/Cost Estimate for each section of the scheme is presented below. As no route options have been developed, the Feasibility Working Cost has been estimated based on assumed potential solutions. The assumptions are subject to change during the development of the project Route Selection and Preliminary Design, when more detailed information such as traffic modelling and appraisal are developed. These are:

- N15 Ballybofey/Stranorlar: Type 2 dual carriageway bypass of Ballybofey/Stranorlar;
- N56/N13 Letterkenny to Manorcunningham: Implementing safety improvements on the N56 4-lane road, constructing a 2.4km long inner relief road connecting Dry Arch roundabout with the N56, which includes a 120m span bridge, and online improvements and construction of a compact grade separated junction and link roads on the N13 dual carriageway; and
- N14 Manorcunningham to Lifford/Strabane/A5 Link: based on a Type 2 dual carriageway off-line realignment

Refer to Appendix A for further details on calculations, which have been conducted in accordance with the TII Cost Management Manual 2010. It should be noted, however, that the current Cost Estimates for each section currently exclude programme risk;

Table 5.1 Feasibility Working Cost N15 Ballybofey/Stranorlar Urban Region

Summary of Section 1 Finance (in millions of Euros):	
Main Contract Construction	73.304
Main Contract Supervision	5.498
Archaeology	2.717
Advance Works & Other Contracts	0.000
Residual Network	0.733
Land & Property	37.868
Planning & Design	5.498
Length in KM	13
Sub Total	***125.617***
Construction Inflation (2%)	1.466
Land and Property Inflation (2%)	0.757
Section 1 Cost Estimate	**127.841**
Cost/km	**9.83**

Table 5.2 Feasibility Working Cost N56/N13 Letterkenny to Manorcunningham

Summary of Section 2 Finance (in millions of Euros):				
	Element 1	**Element 2**	**Element 3**	**Total**
Main Contract Construction	5.082	26.367	14.783	46.232
Main Contract Supervision	0.381	1.978	1.109	3.467
Archaeology	0.000	0.455	0.362	0.817
Advance Works & Other Contracts	0.000	0.000	0.000	0.000
Residual Network	0.051	0.264	0.148	0.462
Land & Property	0.000	10.560	1.951	12.511
Planning & Design	0.381	3.955	1.109	5.445
Length in KM	1.4	2.4	4.3	8.1
Sub Total	***5.895***	***43.579***	***19.460***	***68.934***
Construction Inflation (2%)	0.102	0.527	0.296	0.925
Land and Property Inflation (2%)	0.000	0.211	0.039	0.250
Section 2 Cost Estimate	**5.997**	**44.317**	**19.795**	**70.109**
Cost/km	4.284	18.465	4.603	8.655

Table 5.3 Feasibility Working Cost N14 Manorcunningham to Lifford/Strabane A5 Link

Summary of Section 3 Finance (in millions of Euros):	
Main Contract Construction	100.826
Main Contract Supervision	7.562
Archaeology	3.762
Advance Works & Other Contracts	0.000
Residual Network	1.008
Land & Property	29.561
Planning & Design	7.562
Length in KM	18
Sub Total	**150.281**
Construction Inflation (2%)	2.017
Land and Property Inflation (2%)	0.591
Section 3 Cost Estimate	**152.889**
Cost/km	8.49

Table 5.4 Combined Feasibility Working Cost of TENT-T Priority Route Improvement Project, Donegal

Summary of Scheme Finance (in millions of Euros):				
	N15 Ballybofey/Stranorlar Urban Region	**N56/N13 Letterkenny to Manorcunningham**	**N14 Manorcunningham to Lifford/Strabane A5 Link**	**Total Project**
Main Contract Construction	73.304	46.232	100.826	220.362
Main Contract Supervision	5.498	3.467	7.562	16.527
Archaeology	2.717	0.817	3.762	7.296
Advance Works & Other Contracts	0.000	0.000	0.000	0.000
Residual Network	0.733	0.462	1.008	2.204
Land & Property	37.868	12.511	29.561	79.939
Planning & Design	5.498	5.445	7.562	18.505
Length in KM	13	8.1	18	39.10
Cost/km	9.663	8.510	8.349	8.819
Inflation Allowance	2.223	1.175	2.608	6.075
Scheme Cost Estimate	**127.841**	**70.109**	**152.889**	**350.839**

6 Conclusions and Recommendations

The TEN-T Priority Route Improvement Project in Donegal has materialised through the necessity for a high-quality transport corridor to Donegal and the North West, while improving connectivity and safety within the region itself. These three sections of TEN-T have been prioritised for improvement because they currently operate over capacity and have collision rates in excess of the average when compared to similar national roads.

This Scheme Feasibility Report, accompanied by the Project Brief, highlights the need for this scheme, which can be summarised as follows:

- Improvement in connectivity to peripheral parts of the EU is covered in policy at European Union level and are expressed in the TEN-T requirements. These requirements are supplemented by long-standing policies at National, Regional and County level (Section 1.3) which have identified an objective for a high quality comprehensive road network and to thus underpin the economic development of the North West region through improved land connectivity to and around this remote region. The potential for economic growth resulting from improved infrastructure and connectivity is demonstrated widely in Forfás, IBEC and TII research documents aforementioned, an advantage which Donegal could benefit from having a falling overall population from 2011-2016 and having suffered immensely during the economic downturn.

- As there is no rail network in Donegal, improvements in road infrastructure is the sole method by which connectivity can be improved, and therefore make the region more attractive for investment. Because the TEN-T corridor in the County does not currently align with EU Regulation 1315/2013 requirements, the TEN-T requires prioritisation for investment to provide the North West with infrastructure to accommodate future economic stability and growth;

- Numerous previous reports and studies on each part of TEN-T have highlighted the extent of the existing technical, operational and safety issues including inadequate cross-sectional width, horizontal and vertical alignments, numerous mainline accesses and junctions, poor average speed and a higher than expected Personal Injury Collision rate on this network. These existing issues reduce the overall quality of the transport network in Donegal, affecting the accessibility of the region and conflicting with requirements set out for comprehensive corridors in the EU Regulation 1315/2013 for a TEN-T route;

- Due to the existing condition of the TEN-T corridor in Donegal, there are no appropriate standard cross-border links that connect to the TEN-T in Northern Ireland, particularly connecting to the new A5 Western Transport Corridor, which is likely to start construction in 2018. This results in vehicles using countless border crossings on various roads to reach each jurisdiction which could be avoided if there were a discrete number of attractive, efficient road links across the border.

- While the individual implementation of each of the three Sections of the scheme included within the TEN-T Project would provide benefits to the local population of Donegal, their combined implementation will be required in order to successfully meet the connectivity objectives of the TEN-T Priority Route Improvement Project, Donegal. Accordingly, it is strongly recommended that this project is advanced as one integrated project comprising 3 sections, rather than implementing the three individual sections independently.

Route options and solutions have not yet been derived, however, to identify an approximate scheme budget, estimated costs for potential solutions have been developed as per Section 5. These are based on previous proposals at these locations, resulting in a total estimated cost of

€350.839 million (Section 1: €127.841 million, Section 2: €70.109 million, Section 3: €152.889 million).

No economic appraisal has been undertaken on this scheme as part of this commission. Historical economic assessments have shown benefits of each section ranging from 1.283 to 6.3 for each individual section, demonstrating that the sections are financially feasible. An up to date economic appraisal will be conducted on the solutions and route options as the project progresses. Further data collection is required as part of the Project Appraisal, which is outlined in Section 2.1.3.

It is recommended that this scheme progresses to Phase 2, Route Selection, to identify potential solutions to the existing problems on this network.

Appendix A

Feasibility Working Costs





Feasibility Working Cost

Scheme Name	TEN-T Priority Route Improvement Project, Donegal
Road Authority	Donegal County Council
TII Reference No.	
Phase	1
Cross-Section	Variable - Refer to Indivudal Sections

Possible Mid-Construction Date	2029
Current Year	2017
Inflation - Construction	2%
Inflation Land & Property	2%
% Programme Risk	

Scheme Preliminary Scope

Mainline Length in km	Refer to Indivudal Sections
Grade Separated Junctions	Refer to Indivudal Sections
No. of Bridges (Ordinary)	Refer to Indivudal Sections
No. Viaducts/Signature Structures	Refer to Indivudal Sections

All Costs in € Millions	**Basic Cost Inc VAT**	**Project Specific Contingency**	**Total Project Cost (Excl Programme Risk)**
Main Contract Construction	€200.329	€20.033	€220.362
Main Conract Supervision	€15.025	€1.502	€16.527
Archaeology	€6.633	€0.663	€7.296
Advance Works & Other Contracts	€0.000	€0.000	€0.000
Residual Network	€2.003	€0.200	€2.204
Land & Property	€72.672	€7.267	€79.939
Planning & Design	€16.822	€1.682	€18.505
Subtotal (from above)			€344.833
	Total Inflation Allowance		€6.01
	TII Programme Risk		€0.000
Feasibility Working Cost		**€**	**€350.839** **million**

Notes (Major Assumptions/Risks/Exclusions)

Refer to FWC estimate for each section for major assumptions / risks.

Signatures

Regional Manager _____

Head of Major Projects _____

Feasibility Working Cost Section 1 (Phase 1 or 2)

Scheme Name	TEN-T Priority Route Improvement Project, Donegal
Section	N15 Ballybofey/Stranorlar Urban Region
Road Authority	Donegal County Council
TII Reference No.	
Phase	1
Cross-Section	Type 2 Dual Carriageway

Possible Mid-Construction Date	2029
Current Year	2017
Inflation - Construction	2%
Inflation Land & Property	2%
% Programme Risk	

Scheme Preliminary Scope

Mainline Length in km	13
Grade Separated Junctions	3
No. of Bridges (Ordinary)	0
No. Viaducts/Signature Structures	1

All Costs in € Millions	**Basic Cost Inc VAT**	**Project Specific Contingency**	**Total Project Cost (Excl Programme Risk)**
Main Contract Construction	€66.640	€6.664	€73.304
Main Conract Supervision	€4.998	€0.500	€5.498
Archaeology	€2.470	€0.247	€2.717
Advance Works & Other Contracts	€0.000	€0.000	€0.000
Residual Network	€0.666	€0.067	€0.733
Land & Property	€34.425	€3.443	€37.868
Planning & Design	€4.998	€0.500	€5.498
Subtotal (from above)			€125.617
	Total Inflation Allowance		€2.22
	TII Programme Risk		€0.000
Feasibility Working Cost	**€**		**€127.841** **million**

Notes (Major Assumptions/Risks/Exclusions)

This Cost Estimate is assumed on developing a 13km long Type 2 dual carriageway bypass of Ballybofey/Stranorlar. This is based on previous studies and route selection reports concluding this solution. This assumption will be re-evaluated at the route selection stage when more information is available to determine an alignment and road cross-section. Assumptions on each part of the cost estimation are as follows:

1. Main Construction Contract: This is a Type 1 Single Carriageway cost from the National Secondary Roads Need Study (NSRNS) factored up by 35% to €4m/km
2. Main Contract Supervision: Assumed as 7.5% of the base construction cost estimate
3. Archaeology: Based on cost of Type 1 single carriageway archaeology from the NSRNS factored up by 50% to 0.19m/km
4. Advance Works & Other Contracts: no work assumed to be included at this stage
5. Residual Network: Assumed as 1% of the base construction cost estimate
6. Land and Property: Assumed cost of €1.35m/km, including severence, injurious affection etc. This was assumed for 17km, to include side roads, link roads, accesses etc. This is factored up by 50% to €2.025m to take account of urban nature of the area with numerous properties etc.
7. Planning and Design: Assumed as 7.5% of the base construction cost estimate

Signatures

Regional Manager _____

Head of Major Projects _____

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Section 1: Level 1 Estimate Summary Template

Section Title:	N15 Ballybofey/Stranorlar Urban Region	Date of Estimate:	May 2017
Current Scheme Phase:	Phase 1	Insert Base Date for Rates:	2017
Name of Consultant:	RPS CH2M Barry	Name of Estimator:	
Mainline Section Type:	Type 2 Dual Carriageway	Mainline Length km:	13
Link Roads Section Type:		Link Roads Length:	0

			Quantity	Unit	Rate €m	Total €m
1	**Main Construction Contract**					
	a	Carriageway - Main Line	13	km	€4.000	€52.000
	b	Carriageway - Link Roads	2	km	€0.820	€1.640
	c	Carriageway - Side Roads	0	km	€0.000	€0.000
	d	Over/Underbridges	0	No.	€0.000	€0.000
	e	River Crossings	1	No.	€10.000	€10.000
	f	Railway Crossings	0	No.	€0.000	€0.000
	g	Grade Separated Junctions	3	No.	€1.000	€3.000
	h	Freeflow Interchanges	0	No.	€0.000	€0.000
	i	Signature Structures	0	Item	€0.000	€0.000
	j	Tunnels	0	km	€0.000	€0.000
	Total Base Cost for Main Construction Contract					€66.640
	Add Project Specific Contingency			10.00%	%	€6.664
	Total MCC Base Cost plus Project Specific Risk Contingency					**€73.304**

			Quantity	Unit	Rate €m	Total €m
2	**Land and Property - All-in Costs**					
	a	Mainline and Link Roads - Agricultural	17	km	€2.025	€34.425
	b	Mainline and Link Roads - Zoned/Other	0	Ha.	€0.000	€0.000
	c	Junction/Interchanges - Agricultural	0	Ha.	€0.000	€0.000
	d	Junction/Interchanges - Zoned	0	Ha.	€0.000	€0.000
	e	Properties	0	Item	€0.000	€0.000
	Total Base Cost for Land and Property					€34.425
	Add Project Specific Risk Contingency			10.00%		€3.443
	Total L&P Base Cost plus Project Specific Risk Contingency					**€37.868**

			Total €m
3	**Planning and Design**		
	Provision based on percentage of Main Construction Contract Base Cost		€4.998
	Add Project Specific Contingency	10.00%	€0.500
	Total P&D Base Cost plus Project Specific Risk Contingency		**€5.498**

			Total €m
4	**Archaeology**		
	Provision based on percentage of Main Construction Contract Base Cost		€2.470
	Add Project Specific Contingency	10.00%	€0.247
	Total Archaeology Base Cost plus Project Specific Risk Contingency		**€2.717**

			Total €m
5	**Advance Works and Other Contracts**		
	Provision based on percentage of Main Construction Contract Base Cost		€0.000
	Add Project Specific Contingency	0.00%	€0.000
	Total Advance Works Base Cost plus Project Specific Risk Contingency		**€0.000**

			Total €m
6	**Main Contract Supervision (Employer's Costs)**		
	Provision based on percentage of Main Construction Contract Base Cost		€4.998
	Add Project Specific Contingency	10.00%	€0.500
	Total MC Supervision Base Cost plus Project Specific Risk Contingency		**€5.498**

			Total €m
7	**Residual Network (Provision to be subject to the approval of the NRA Regional Manager)**		
	Provision based on percentage of Main Construction Contract Base Cost		€0.666
	Add Project Specific Contingency	10.00%	€0.067
	Total Residual Network Base Cost plus Project Specific Risk Contingency		**€0.733**

TOTAL LEVEL 1 ESTIMATE INCLUSIVE OF VAT IN MILLIONS	**€125.617**

Mainline Length:	13	km	Rate per km	€9.663

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Feasibility Working Cost Section 2 (Phase 1)

Scheme Name	TEN-T Priority Route Improvement Project, Donegal
Section	N56/N13 Letterkenny to Manorcunningham
Road Authority	Donegal County Council
TII Reference No.	
Phase	1
Cross-Section	Numerous

Possible Mid-Construction Date	2029
Current Year	2017
Inflation - Construction	2%
Inflation Land & Property	2%
% Programme Risk	

Scheme Preliminary Scope

Mainline Length in km	8.1
Grade Separated Junctions	1
No. of Bridges (Ordinary)	0
No. Viaducts/Signature Structures	1

All Costs in € Millions	**Basic Cost Inc VAT**	**Project Specific Contingency**	**Total Project Cost (Excl Programme Risk)**
Main Contract Construction	€42.029	€4.203	€46.232
Main Conract Supervision	€3.152	€0.315	€3.467
Archaeology	€0.743	€0.074	€0.817
Advance Works & Other Contracts	€0.000	€0.000	€0.000
Residual Network	€0.420	€0.042	€0.462
Land & Property	€11.373	€1.137	€12.511
Planning & Design	€4.950	€0.495	€5.445
Subtotal (from above)			€68.934
	Total Inflation Allowance		€1.175
	TII Programme Risk		€0.000
Feasibility Working Cost	**€**		**€70.109** **million**

Notes (Major Assumptions/Risks/Exclusions)

This Cost Estimate has been assumed on implementing online improvements to existing N56 4-Lane road (1.4km), constructing a 2.4km long inner relief road which includes a 120m span bridge and online improvements and construction of a CGSJ and link roads (4.6km) on the N13 Dual Carriageway. Key cost assumptions are as follows:

1. Main Construction Contract: Costs based on the National Secondary Roads Needs Study (NRNS) rates per km and key item estimation
2. Main Contract Supervision: Assumed as 7.5% of the base construction cost estimate
3. Archaeology: Based on costs set out in the NSRNS (rates per km)
4. Advance Works & Other Contracts: no work assumed to be included at this stage
5. Residual Network: Assumed as 1% of the base construction cost estimate
6. Land and Property: Based on rates per km and rates per acre from the NSRNS, factored up where necessary for zoning.
7. Planning and Design: Assumed as 7.5% of the base construction cost estimate

Signatures

Regional Manager _____

Head of Major Projects _____

Section 2: Level 1 Estimate Summary - Element 1 N56 4-Lane road Upgrade

Section Title:	N56/N13 Letterkenny to Manorcunningham: Element 1	Date of Estimate:	Sept 2017
Current Scheme Phase:	Phase 1	Insert Base Date for Rates:	2017
Name of Consultant:	RPS CH2M Barry	Name of Estimator:	
Mainline Section Type:	4 Lane Single Carriageway	Mainline Length km:	1.4
Link Roads Section Type:		Link Roads Length:	

			Quantity	Unit	Rate €m	Total €m
1	**Main Construction Contract**					
	a	Carriageway - 4 lane carriageway	1.4	km	€3.300	€4.620
	b	Carriageway - Link Roads	0	km	€0.000	€0.000
	c	Carriageway - Side Roads	0	km	€0.000	€0.000
	d	Over/Underbridges	0	No.	€0.000	€0.000
	e	River Crossings	0	No.	€0.000	€0.000
	f	Railway Crossings	0	No.	€0.000	€0.000
	g	Grade Separated Junctions	0	No.	€0.000	€0.000
	h	Freeflow Interchanges	0	No.	€0.000	€0.000
	i	Signature Structures	0	Item	€0.000	€0.000
	j	Tunnels	0	km	€0.000	€0.000
	Total Base Cost for Main Construction Contract					€4.620
	Add Project Specific Contingency			10.00%	%	€0.462
	Total MCC Base Cost plus Project Specific Risk Contingency					**€5.082**

			Quantity	Unit	Rate €m	Total €m
2	**Land and Property - All-in Costs**					
	a	Mainline and Link Roads - Agricultural	0	km	€0.000	€0.000
	b	Mainline and Link Roads - Zoned/Other	0	Ha.	€0.000	€0.000
	c	Junction/Interchanges - Agricultural	0	Ha.	€0.000	€0.000
	d	Junction/Interchanges - Zoned	0	Ha.	€0.000	€0.000
	e	Properties	0	Item	€0.000	€0.000
	Total Base Cost for Land and Property					€0.000
	Add Project Specific Risk Contingency			0.00%		€0.000
	Total L&P Base Cost plus Project Specific Risk Contingency					**€0.000**

			Total €m
3	**Planning and Design**		
	Provision based on percentage of Main Construction Contract Base Cost		€0.347
	Add Project Specific Contingency	10.00%	€0.035
	Total P&D Base Cost plus Project Specific Risk Contingency		**€0.381**

			Total €m
4	**Archaeology**		
	Provision based on percentage of Main Construction Contract Base Cost		€0.000
	Add Project Specific Contingency	0.00%	€0.000
	Total Archaeology Base Cost plus Project Specific Risk Contingency		**€0.000**

			Total €m
5	**Advance Works and Other Contracts**		
	Provision based on percentage of Main Construction Contract Base Cost		€0.000
	Add Project Specific Contingency	0.00%	€0.000
	Total Advance Works Base Cost plus Project Specific Risk Contingency		**€0.000**

			Total €m
6	**Main Contract Supervision (Employer's Costs)**		
	Provision based on percentage of Main Construction Contract Base Cost		€0.347
	Add Project Specific Contingency	10.00%	€0.035
	Total MC Supervision Base Cost plus Project Specific Risk Contingency		**€0.381**

			Total €m
7	**Residual Network (Provision to be subject to the approval of the NRA Regional Manager)**		
	Provision based on percentage of Main Construction Contract Base Cost		€0.046
	Add Project Specific Contingency	10.00%	€0.005
	Total Residual Network Base Cost plus Project Specific Risk Contingency		**€0.051**

TOTAL LEVEL 1 ESTIMATE INCLUSIVE OF VAT IN MILLIONS	**€5.895**

Mainline Length:	1.4	km	Rate per km	€4.211

Section 2: Level 1 Estimate Summary: -Element 2 Inner Relief Road

Section Title:	N56/N13 Letterkenny to Manorcunningham: Element 2	Date of Estimate:	Sept 2017
Current Scheme Phase:	Phase 1	Insert Base Date for Rates:	2017
Name of Consultant:	RPS CH2MBarry	Name of Estimator:	
Mainline Section Type:	Dual and Single C'Way	Mainline Length km:	2.4
Link Roads Section Type:		Link Roads Length:	

			Quantity	Unit	Rate €m	Total €m
1	**Main Construction Contract**					
	a	Carriageway -Dual Carriageway	1.7	km	€4.000	€6.800
	b	Carriageway -Single Carriageway	0.7	km	€3.100	€2.170
	c	Carriageway - Side Roads	0	km	€0.000	€0.000
	d	Over/Underbridges	0	No.	€0.000	€0.000
	e	River Crossings	1	No.	€15.000	€15.000
	f	Railway Crossings	0	No.	€0.000	€0.000
	g	Grade Separated Junctions	0	No.	€0.000	€0.000
	h	Freeflow Interchanges	0	No.	€0.000	€0.000
	i	Signature Structures	0	Item	€0.000	€0.000
	j	Tunnels	0	km	€0.000	€0.000
	Total Base Cost for Main Construction Contract					€23.970
	Add Project Specific Contingency			10.00%	%	€2.397
	Total MCC Base Cost plus Project Specific Risk Contingency					**€26.367**

			Quantity	Unit	Rate €m	Total €m
2	**Land and Property - All-in Costs**					
	a	Mainline Dual Carriageway - Zoned	1.7	km	€4.000	€6.800
	b	Mainline Single Carriageway - Zoned	0.7	km	€4.000	€2.800
	c	Junction/Interchanges - Agricultural	0.0	Ha.	€0.000	€0.000
	d	Junction/Interchanges - Zoned	0.0	Ha.	€0.000	€0.000
	e	Properties	0.0	Item	€0.000	€0.000
	Total Base Cost for Land and Property					€9.600
	Add Project Specific Risk Contingency			10.00%		€0.960
	Total L&P Base Cost plus Project Specific Risk Contingency					**€10.560**

			Total €m
3	**Planning and Design**		
	Provision based on percentage of Main Construction Contract Base Cost		€3.596
	Add Project Specific Contingency	10.00%	€0.360
	Total P&D Base Cost plus Project Specific Risk Contingency		**€3.96**

			Total €m
4	**Archaeology**		
	Provision based on percentage of Main Construction Contract Base Cost		€0.414
	Add Project Specific Contingency	10.00%	€0.041
	Total Archaeology Base Cost plus Project Specific Risk Contingency		**€0.455**

			Total €m
5	**Advance Works and Other Contracts**		
	Provision based on percentage of Main Construction Contract Base Cost		€0.000
	Add Project Specific Contingency	0.00%	€0.000
	Total Advance Works Base Cost plus Project Specific Risk Contingency		**€0.000**

			Total €m
6	**Main Contract Supervision (Employer's Costs)**		
	Provision based on percentage of Main Construction Contract Base Cost		€1.798
	Add Project Specific Contingency	10.00%	€0.180
	Total MC Supervision Base Cost plus Project Specific Risk Contingency		**€1.978**

			Total €m
7	**Residual Network (Provision to be subject to the approval of the NRA Regional Manager)**		
	Provision based on percentage of Main Construction Contract Base Cost		€0.240
	Add Project Specific Contingency	10.00%	€0.024
	Total Residual Network Base Cost plus Project Specific Risk Contingency		**€0.264**

TOTAL LEVEL 1 ESTIMATE INCLUSIVE OF VAT IN MILLIONS	**€43.579**

Mainline Length:	2.4 km	Rate per km	€18.158

Section 2: Level 1 Estimate Summary - Element 3 N13 Improvements and CGSJ

Section Title:	N56/N13 Letterkenny to Manorcunningham: Element 3	Date of Estimate:	Sept 2017
Current Scheme Phase:	Phase 1	Insert Base Date for Rates:	2017
Name of Consultant:	RPS CH2MBarry	Name of Estimator:	
Mainline Section Type:	Type 1 Dual Carriageway	Mainline Length km:	4.3
Link Roads Section Type:		Link Roads Length:	

		Quantity	Unit	Rate €m	Total €m
1	**Main Construction Contract**				
a	Carriageway - Main Line Pavement Improvement	4.3	km	€0.878	€3.773
b	Carriageway - Link Roads	0.0	km	€0.000	€0.000
c	Carriageway - Side Roads	0.0	km	€0.000	€0.000
d	Over/Underbridges	0.0	No.	€0.000	€0.000
e	River Crossings	0.0	No.	€0.000	€0.000
f	Railway Crossings	0.0	No.	€0.000	€0.000
g	Grade Separated Junctions	1.0	No.	€9.666	€9.666
h	Freeflow Interchanges	0.0	No.	€0.000	€0.000
i	Signature Structures	0.0	Item	€0.000	€0.000
j	Tunnels	0.0	km	€0.000	€0.000
	Total Base Cost for Main Construction Contract				€13.439
	Add Project Specific Contingency		10.00%	%	€1.344
	Total MCC Base Cost plus Project Specific Risk Contingency				**€14.783**

		Quantity	Unit	Rate €m	Total €m
2	**Land and Property - All-in Costs**				
a	Connector Roads - Area required	5.0	Acre	€0.100	€0.500
b	Compact GSJ- Agricultural	11.1	Acre	€0.100	€1.112
	Subtotal of L&P Costs				€1.612
c	Properties - Rerouting Accesses/Compensation		10.00%		€0.161
	Total Base Cost for Land and Property				€1.773
	Add Project Specific Risk Contingency		10.00%		€0.177
	Total L&P Base Cost plus Project Specific Risk Contingency				**€1.951**

		Total €m
3	**Planning and Design**	
	Provision based on percentage of Main Construction Contract Base Cost	€1.008
	Add Project Specific Contingency 10.00%	€0.101
	Total P&D Base Cost plus Project Specific Risk Contingency	**€1.109**

		Total €m
4	**Archaeology**	
	Provision based on percentage of Main Construction Contract Base Cost	€0.329
	Add Project Specific Contingency 10.00%	€0.033
	Total Archaeology Base Cost plus Project Specific Risk Contingency	**€0.362**

		Total €m
5	**Advance Works and Other Contracts**	
	Provision based on percentage of Main Construction Contract Base Cost	€0.000
	Add Project Specific Contingency 0.00%	€0.000
	Total Advance Works Base Cost plus Project Specific Risk Contingency	**€0.000**

		Total €m
6	**Main Contract Supervision (Employer's Costs)**	
	Provision based on percentage of Main Construction Contract Base Cost	€1.008
	Add Project Specific Contingency 10.00%	€0.101
	Total MC Supervision Base Cost plus Project Specific Risk Contingency	**€1.109**

		Total €m
7	**Residual Network (Provision to be subject to the approval of the NRA Regional Manager)**	
	Provision based on percentage of Main Construction Contract Base Cost	€0.134
	Add Project Specific Contingency 10.00%	€0.013
	Total Residual Network Base Cost plus Project Specific Risk Contingency	**€0.148**

TOTAL LEVEL 1 ESTIMATE INCLUSIVE OF VAT IN MILLIONS	**€19.460**

Mainline Length:	4.3 km	Rate per km	€4.526

Feasibility Working Cost Scheme 3 (Phase 1 or 2)

Scheme Name	TEN-T Priority Route Improvement Project, Donegal
Section Name	N14 Manorcunningham to Lifford/Strabane/A5 Link
Road Authority	Donegal County Council
TII Reference No.	
Phase	1
Cross-Section	Type 2 Dual Carriageway

Possible Mid-Construction Date	2029
Current Year	2017
Inflation - Construction	2%
Inflation Land & Property	2%
% Programme Risk	

Scheme Preliminary Scope

Mainline Length in km	18
Grade Separated Junctions	3
No. of Bridges (Ordinary)	6
No. Viaducts/Signature Structures	0

All Costs in € Millions	**Basic Cost Inc VAT**	**Project Specific Contingency**	**Total Project Cost (Excl Inflation & Programme Risk)**
Main Contract Construction	€91.660	€9.166	€100.826
Main Conract Supervision	€6.875	€0.687	€7.562
Archaeology	€3.420	€0.342	€3.762
Advance Works & Other Contracts	€0.000	€0.000	€0.000
Residual Network	€0.917	€0.092	€1.008
Land & Property	€26.874	€2.687	€29.561
Planning & Design	€6.875	€0.687	€7.562
Subtotal (from above)			€150.281
	Total Inflation Allowance		€2.608
	TII Programme Risk		€0.000
Feasibility Working Cost		**€**	**€152.889** **million**

Notes (Major Assumptions/Risks/Exclusions)

This Cost Estimate has been developed based on an 18km Type 2 Dual carriageway, a possible outcome solution for the scheme, based on previous studies. Assumptions on each section are as follows:

1. Main Construction Contract: €4m/km based on factored up rate taken from the National Secondary Roads Needs Study (NSRNS) to produce a Type 2 Dual Carrriageway rate
2. Main Contract Supervision: Assumed as 7.5% of the base construction cost estimate
3. Archaeology: Based on factored up rate taken from the NSRNS to produce a Type 2 Dual Carrriageway rate
4. Advance Works & Other Contracts: no work assumed to be included at this stage
5. Residual Network: Assumed as 1% of the base construction cost estimate
6. Land and Property: Assumed cost of €100,000/acre, including severence, injurious affection etc. from the National Secondary Roads Needs Study. Includes for potential impacts on sites, one off houses etc
7. Planning and Design: Assumed as 7.5% of the base construction cost estimate
8. Risk of 10% included for Feasibility Stage

Signatures

Regional Manager _____

Head of Major Projects _____

Section: 3 Level 1 Estimate Summary Template

Section Title:	N14 Manorcunningham to Lifford/Strabane A5 Link	Date of Estimate:	Sept 2017
Current Scheme Phase:	Phase 1	Insert Base Date for Rates:	2017
Name of Consultant:	RPS CH2M Barry	Name of Estimator:	
Mainline Section Type:	Type 2 Dual C'Way	Mainline Length km:	18
Link Roads Section Type:		Link Roads Length:	13

			Quantity	Unit	Rate €m	Total €m
1	**Main Construction Contract**					
	a	Carriageway - Main Line	18	km	€4.000	€72.000
	b	Carriageway - Link Roads	13	km	€0.820	€10.660
	c	Carriageway - Side Roads	0	km	€1.000	€0.000
	d	Over/Underbridges	0	No.	€1.000	€0.000
	e	River Crossings	6	No.	€1.000	€6.000
	f	Railway Crossings	0	No.	€1.000	€0.000
	g	Grade Separated Junctions	3	No.	€1.000	€3.000
	h	Freeflow Interchanges	0	No.	€1.000	€0.000
	i	Signature Structures	0	Item	€1.000	€0.000
	j	Tunnels	0	km	€1.000	€0.000
	Total Base Cost for Main Construction Contract					€91.660
	Add Project Specific Contingency			10.00%	%	€9.166
	Total MCC Base Cost plus Project Specific Risk Contingency					**€100.826**

			Quantity	Unit	Rate €m	Total €m
2	**Land and Property - All-in Costs**					
	a	Mainline and Link Roads - Agricultural	109	Ha.	€0.247	€26.874
	b	Mainline and Link Roads - Zoned/Other	0	Ha.	€0.000	€0.000
	c	Junction/Interchanges - Agricultural	0	Ha.	€0.000	€0.000
	d	Junction/Interchanges - Zoned	0	Ha.	€0.000	€0.000
	e	Properties	0	Item	€0.000	€0.000
	Total Base Cost for Land and Property					€26.874
	Add Project Specific Risk Contingency			10.00%		€2.687
	Total L&P Base Cost plus Project Specific Risk Contingency					**€29.561**

3	**Planning and Design**			Total €m
	Provision based on percentage of Main Construction Contract Base Cost			€6.875
	Add Project Specific Contingency	10.00%		€0.687
	Total P&D Base Cost plus Project Specific Risk Contingency			**€7.562**

4	**Archaeology**			Total €m
	Provision based on percentage of Main Construction Contract Base Cost			€3.420
	Add Project Specific Contingency	10.00%		€0.342
	Total Archaeology Base Cost plus Project Specific Risk Contingency			**€3.762**

5	**Advance Works and Other Contracts**			Total €m
	Provision based on percentage of Main Construction Contract Base Cost			€0.000
	Add Project Specific Contingency	0.00%		€0.000
	Total Advance Works Base Cost plus Project Specific Risk Contingency			**€0.000**

6	**Main Contract Supervision (Employer's Costs)**			Total €m
	Provision based on percentage of Main Construction Contract Base Cost			€6.875
	Add Project Specific Contingency	10.00%		€0.687
	Total MC Supervision Base Cost plus Project Specific Risk Contingency			**€7.562**

7	**Residual Network (Provision to be subject to the approval of the NRA Regional Manager)**			Total €m
	Provision based on percentage of Main Construction Contract Base Cost			€0.917
	Add Project Specific Contingency	10.00%		€0.092
	Total Residual Network Base Cost plus Project Specific Risk Contingency			**€1.008**

TOTAL LEVEL 1 ESTIMATE INCLUSIVE OF VAT IN MILLIONS	**€150.281**

Mainline Length:	18	km	Rate per km	€8.349