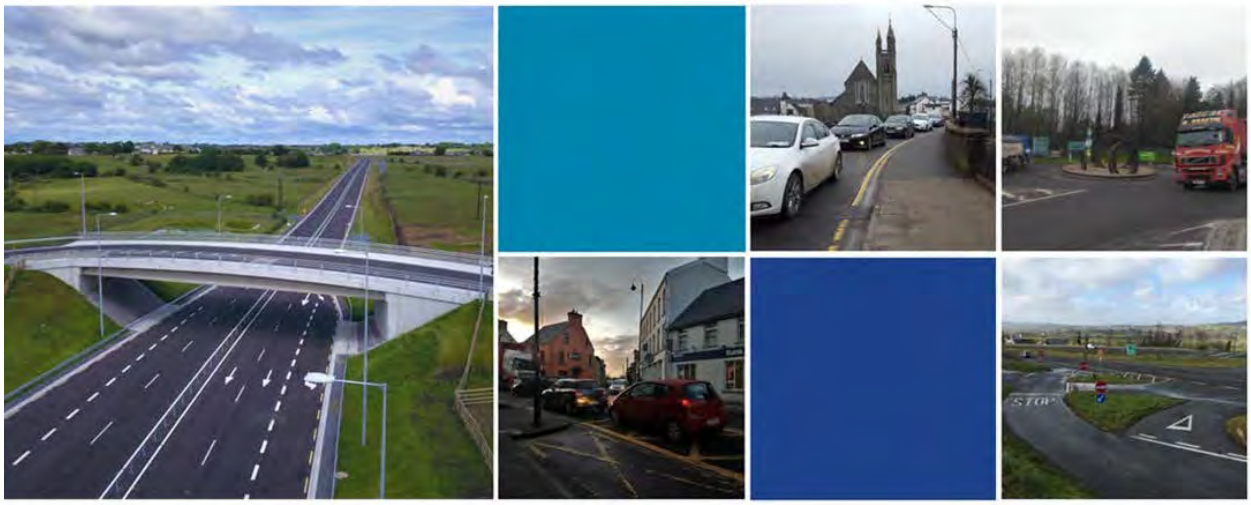
Bonneagar Iompair Éireann
Transport Infrastructure Ireland

Comhairle Contae Dhún na nGall
Donegal County Council

TEN-T Priority Route Improvement Project, Donegal

Phase 2, Option Selection Report
Volume C1-Section 1 Non-Environmental Appendices



RPS BARRY TRANSPORTATION

Rialtas na hÉireann
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1 INTRODUCTION

This report examines the Safety impacts as part of the Project Appraisal (Multi-Criteria Analysis) for Section 1: N15 / N13 Ballybofey Stranorlar and will form part of a Route Corridor Selection Report to be issued by the National Roads Design Office, Donegal County Council.

The Project Appraisal Guidelines (PAG) for National Roads Unit 7.0 - Multi Criteria Analysis (TII 2016). guidance document identifies two principal road safety impacts to be considered with respect to safety. These are:

- Collision reduction and
- Security of road users.

This Report also summaries the impacts arising from the following two safety reports:

1. Road Safety Audit (RSA) Stage F Part 1 Report; completed as a comparative assessment of the options from a road safety perspective, in accordance with the requirements of GE-STY-01024. This Report is included in **Appendix A** of this Report.

2. Road Safety Impact Assessment (RSIA); undertaken in accordance with PE-PMG-02001, to compare the options in terms of potential road safety implications of each option, while considering the safety benefits and dis-benefits arising from each option. This Report is included in **Appendix B** of this Report.

The objectives of the report are to establish and compare the relative impacts of the options in terms of safety and provide an impact score in accordance with the PAGs for National Roads. Each impact is score is based on the seven point scale as below and an integer will be assigned according to the impact level.

Table 1-1 : Impact Scoring Key (TII, 2016)

7	Major or Highly Positive
6	Moderately Positive
5	Minor or Slightly Positive
4	Not Significant/Neutral
3	Minor or Minor or slightly negative
2	Moderately negative
1	Major or Highly negative

1.1 Methodology

The methodology adopted for this appraisal includes a review of all available qualitative and quantitative information available relating to collision reduction and safety and security of road as well as the potential road safety effects of each option.

1.2 Existing Environment

The existing N15 / N13 Ballybofey Stranorlar road is characterised by its urban nature as it passes through the towns of Ballybofey and Stranorlar. Traffic flow is impeded by congested road conditions, poor alignment, narrow cross section and side friction with on street parking. This is exacerbated by the poor

capacity of key junctions such as the R252 / N15 priority junction and the N15/ N13 traffic signal junction, both of which are located within the towns. These issues have culminated in a transport corridor that has a poor safety record and unreliable journey times.

Further details of the conditions of the existing road network is provided within the Option Selection Report main text, Volume A.

2 COLLISION REDUCTION

2.1 Recent Collision History

The Road Safety Authority make an interactive online mapping tool, seen in Figure 2-1, available to review collision locations and classifications across the road network. The mapping tool currently records a total of 51 collisions from 2005 – 2014 as shown in Table 2-1 below.

Table 2-1 Current RSA collision data from 2005 – 2014

Severity	Number of Collisions
Fatal	3
Serious	9
Minor	39
Total	51

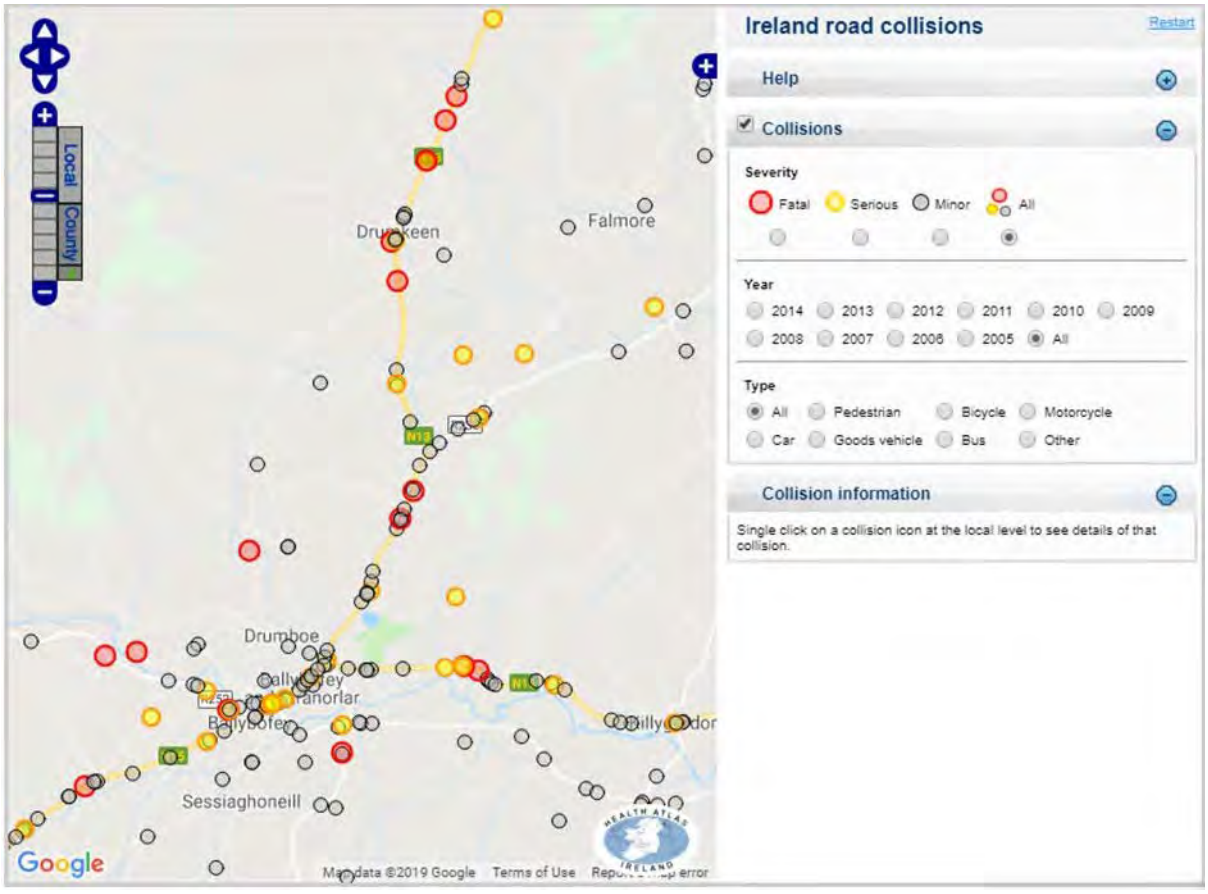

Figure 2-1 Irish Road Collisions

The significance of the quantity of collisions is difficult to interpret based on the number of collisions only. As such, a collision rating can be a more appropriate means to determine the road safety performance of a link. A Collision Rate is the ratio between the frequency of collisions over a length of road and an exposure measure, typically in the form of vehicle kilometres of travel over the same section. The Average

Collision Rate (Rrp) is the collision rate for a Reference Population (e.g. rural type 2 dual carriageway), while the site Collision Rate (Rj) is the collision rate for a specific site (GE-STY-01022). TII have provided national road HD15 collision rate data for the project, which is shown in **Figure 2-2 below.**

The colours identify areas as follows:

- Red – Collision rate is twice above the expected rate for that type of road;
- Orange- 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 2-2: HD15 Collision Rates (2014 – 2016)

This illustrates that the N15 / N13 currently suffers from a very poor road safety record which needs to be addressed.

2.2 Predicted Safety Improvements

2.2.1 Qualitative Assessment

All route options provide a significant improvement in infrastructure provision in comparison to the existing N15 / N13 route as any of the new route options and junctions are designed to current design standards providing consistent cross-sectional width and sufficient capacity for current and future traffic volumes. Furthermore, all route options propose to limit access to the mainline carriageway to up to four points – roundabout at south western tie in Dooish, a compact grade separated junction at Cappry with link road to existing N15 or R252, a compact grade separated junction at Teevickmoy with a link road to the existing N13 and N15 and a roundabout at the north eastern tie in with the existing N15 at Callan Bridge. This reduces the number of conflict points along the N15 / N13 providing an improvement in safety.

From a strategic level, provision of a new N15 / N13 will accommodate the segregation of strategic and local traffic by means of grade separation. This will further reduce the conflicting requirements of these road users.

Furthermore, all route options propose to include a segregated cycle track within the road cross-section. This assists in separating vulnerable road users from traffic and will have a net positive effect on road safety. Consideration will be required during later design stages to ensure appropriate provision for cyclists at junctions and where accessing and egressing the mainline route.

2.2.2 Quantitative Assessment

The road safety benefits of each route option were quantitatively assessed using COBALT (Cost and Benefit to Accidents – Light Touch), which quantifies the change in the number of collisions and casualties as a direct result of a road project.

Collision rates for specified road types set out in PAG Unit 6.11 were utilised in COBALT. **Table 2-2** outlines the present value of benefits established for each route option in terms of collision savings.

Table 2-2 Collision Reduction Summary

	1A	1B	1C	1D	1E	1F
Collision reduction benefits (000's €)	€ 3,367	€ 2,547	€ 3,403	€ 1,795	€ 2,251	€ 1,970
Impact Description	Moderately Positive	Moderately Positive	Moderately Positive	Slight Positive	Slight Positive	Slight Positive
Impact Score	6	6	6	5	5	5
Preference	Preferred	Preferred	Preferred	Intermediate	Intermediate	Intermediate

	1A1	1B1	1C1	1D1	1E1	1F1	1G
Collision reduction benefits (000's €)	€ 3,367	€ 2,547	€ 3,403	€ 1,795	€ 2,251	€ 1,970	€ 3,445
Impact Description	Moderately Positive	Moderately Positive	Moderately Positive	Slight Positive	Slight Positive	Slight Positive	Moderately Positive
Impact Score	6	6	6	5	5	5	6
Preference	Preferred	Preferred	Preferred	Intermediate	Intermediate	Intermediate	Preferred

All route options have a positive impact in terms of collision reduction.

3 SECURITY OF ROAD USERS

The existing N15 / N13 is currently a sub-standard single carriageway route that has numerous roadside hazards. There are no separated pedestrian or cycle facilities, and no hard shoulder for most of the length of the route. There are also poor opportunities for overtaking.

All new route options propose a segregated cycle track within the mainline cross-section. This will provide an improvement in safety and security of cyclists.

Furthermore, all new mainline routes will cater for strategic traffic and goods vehicles, which is likely to reduce the traffic volumes on the local road network. It is anticipated that the existing N15 / N13 will be re-classified and the speed limit reduced from 100km/h to 80km/h and 60km/h. Cumulatively, this will have a positive effect on the safety of the residual existing road network.

Therefore, all route options perform positively with respect to safety and security of road users. The impact score of each route option with respect to collision reduction is outlined in **Table 3-1.**

Table 3-1 Safety and Security Assessment Section 1

	1A	1B	1C	1D	1E	1F
Impact Description	Moderately Positive	Moderately Positive	Moderately Positive	Moderately Positive	Moderately Positive	Moderately Positive
Impact Score	6	6	6	6	6	6
Preference	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate

	1A1	1B1	1C1	1D1	1E1	1F1	1G
Impact Description	Moderately Positive	Moderately Positive	Moderately Positive	Moderately Positive	Moderately Positive	Moderately Positive	Moderately Positive
Impact Score	6	6	6	6	6	6	6
Preference	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate

4 ROAD SAFETY AUDIT

A Stage F Part 1 Road Safety Audit was undertaken which examined the route options in respect to road safety and the impacts on all road users. The Road Safety Audit provides an impact score shown in the table below. The Road Safety Audit Report notes that all route options represent a significant improvement to the existing arrangement in terms of safety. The Stage F Road Safety Audit Report Part 1 and Part 2 reports are presented in **Appendix A**.

All routes options scored as having a good effect on the existing traffic flows, reduced congestion, traffic patterns, and impact on non-motorised users. All routes had a neutral or positive effect on reducing existing collision levels by reducing the number of junctions and having them better located; and having improved geometry compared to the existing roads.

	1A	1B	1C	1D	1E	1F
Rank	8	10	8	5	5	13
Impact Description	Moderately Positive	Moderately Positive	Moderately Positive	Moderately Positive	Moderately Positive	Slight Positive
Impact Score	6	6	6	6	6	5
Preference	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate

	1A1	1B1	1C1	1D1	1E1	1F1	1G
Rank	12	2	10	2	2	5	1
Impact Description	Slight Positive	Moderately Positive	Slight Positive	Moderately Positive	Moderately Positive	Slight Positive	Major Positive
Impact Score	5	6	5	6	6	5	7
Preference	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate	Preferred

Table 4-1 Stage F Road Safety Audit Section 1

5 ROAD SAFETY IMPACT ASSESSMENT

As part of the RSIA, an understanding of the overall impact that each option would have on the proposed and existing road network was determined by reviewing the Option selection alignment designs and comparing qualitative and quantitative data. The Road Safety Impact Assessment report is presented in **Appendix B.**

The data reviewed to complete the RSIA includes, but is not limited to:

- Collision history, frequency and location
- Geometric design of options
- Location, frequency and design of junctions
- Indicative future traffic flows and AADT data
- Potential impact on local traffic patterns
- Potential impact on vulnerable road users and provision for these users
- COBALT assessment data

All options considered for Section 1 as part of this Phase 2 are beneficial in terms of road safety in comparison to the existing road network. This is demonstrated through provision of positive quantitative COBALT figures provided for each Option.

It should be highlighted that ranking is based on marginal differences between the options and as such, there is not a significant benefit of one option over another in terms of road safety, considering the items reviewed. Options 1B1, 1C1 and 1G are preferred over all other Options in terms of road safety impact due to a highly positive COBALT collision benefits, engineering design and positive effects in terms of the transfer of traffic from the existing urban road network to the proposed scheme.

Considering the overall benefits of each option in terms of road safety impact and the ranking of options as part of the RSIA, an impact score has been applied to each option in accordance with the TII PAG 1 - 7 scale.

Table 5-5-1 Road Safety Impact Assessment Section 1

	1A	1B	1C	1D	1E	1F
Ranking	3	3	3	5	5	3
Impact Description	Moderately Positive	Moderately Positive	Moderately Positive	Moderately Positive	Moderately Positive	Moderately Positive
Impact Score	6	6	6	6	6	6
Preference	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate

	1A1	1B1	1C1	1D1	1E1	1F1	1G
Ranking	4	1	1	4	3	3	2
Impact Description	Moderately Positive	Major Positive	Major Positive	Moderately Positive	Moderately Positive	Moderately Positive	Major Positive
Impact Score	6	7	7	6	6	6	7
Preference	Intermediate	Preferred	Preferred	Intermediate	Intermediate	Intermediate	Intermediate

Appendix A

RPS Barry Transportation

TEN-T Priority Route Improvement, Donegal

Section 1 – N15/N13 Ballybofey/Stranorlar Urban Region

Stage F (Part 1) Road Safety Audit

P·M·C·E

October 2019

RPS Barry Transportation

TEN-T Priority Route Improvement, Donegal

Section 1 – N15/N13
Ballybofey/Stranorlar Urban Region

Stage F (Part 1) Road Safety Audit

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1 Introduction

1.1 General

This report results from the Part 1 of a Stage F Road Safety Audit carried out on Section 1 (N15/N13 Ballybofey/Stranorlar Urban Region) of the proposed TEN-T Priority Route Improvement, Donegal. The audit was carried out at the request of Ms Emma Coyle of Barry Transportation, on behalf of RPS Barry Transportation.

1.2 Audit Team

The members of the Road Safety Audit Team are independent of the design team, and include:

Mr. Peter Monahan
(PMCE Ltd.)
(BE MSc CEng FIEI RSACert)
Road Safety Audit Team Leader

Mr. Gerard Claffey
(Barry Transportation)
(BA BAI MAI MIEI)
Road Safety Audit Team Member

Mr. Peter Morehan
(Barry Transportation)
(BE CEng MIEI)
Road Safety Audit Team Member

Ms. Laura Woodbyrne
(Barry Transportation)
(BA BAI (Hons) PGCert CEng MIEI)
Trainee/Observer

1.3 Audit Information

The Road Safety Audit took place during the period August 2018 to January 2019 and comprised an examination of the documents provided by RPS Barry Transportation (see Appendix B). In addition to examining the documents supplied the Road Safety Audit Team visited the site of the proposed measures on the 15th August 2018. Weather conditions during the site visit were mainly dry & overcast with some rain showers, the road surface was dry and traffic volumes were moderate to heavy.

This Stage F (Part 1) Road Safety Audit has been carried out in accordance with the requirements of GE-STY-01024 - Road Safety Audit, dated December 2017, contained on the Transport Infrastructure Ireland (TII) Publications website.

The proposed options have been examined and this report compiled in respect of the consideration of those matters that may have an adverse effect on road safety and considers the perspective of all road users. It has not been examined or verified for compliance with any other standards or criteria.

The Audit Team understands that option alignments have been developed within a 300m wide corridor for the purposes of option assessment and selection. The alignment design itself is subject to change as the project progresses and further information becomes available, surveys are undertaken and consultation takes place.

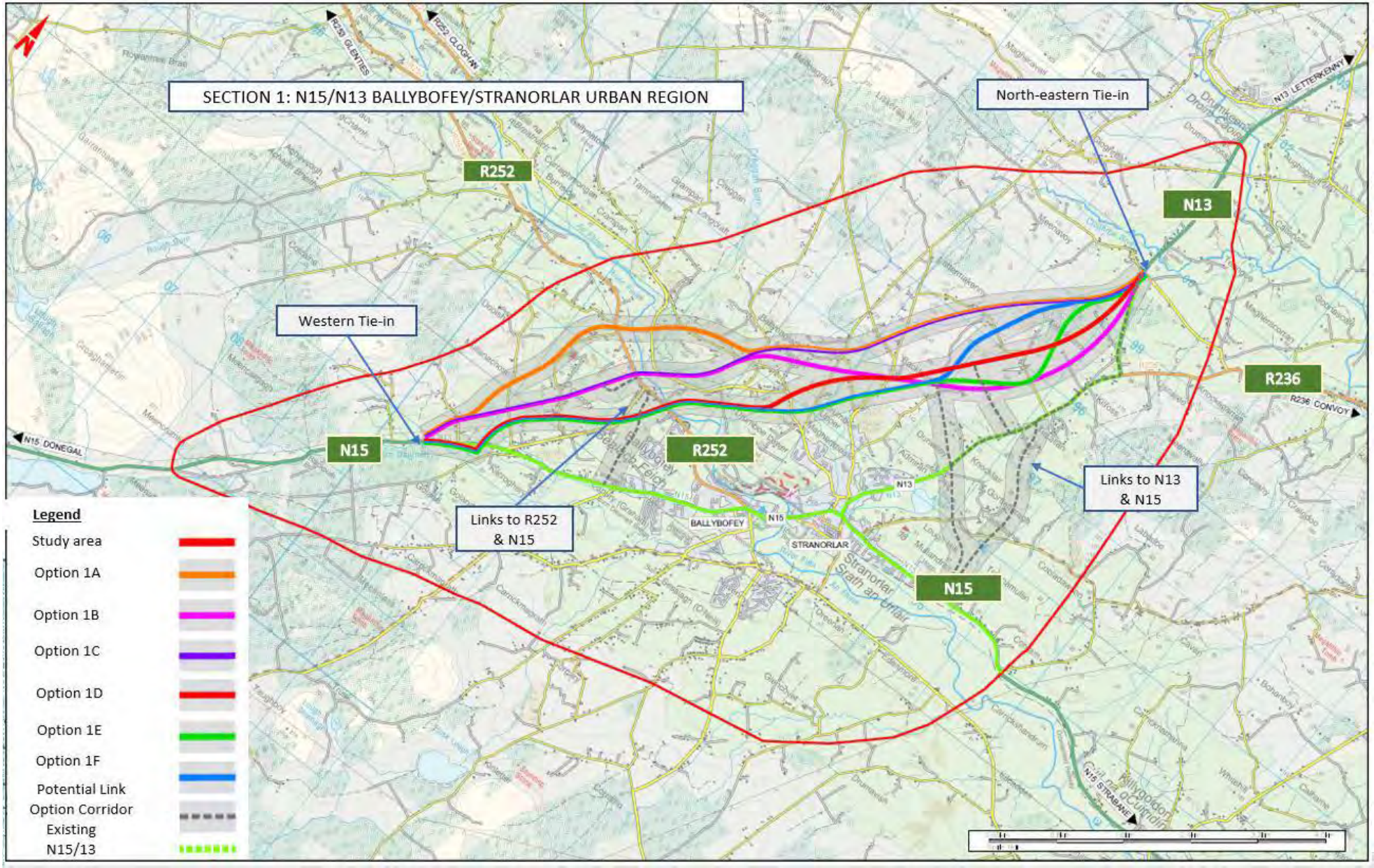


FIGURE 1.1: SECTION 1 STUDY AREA

1.4 Scheme Description

1.4.1 Overall Scheme

The overall project comprises three sections of the National Primary road network in Donegal, which also form part of the Trans-European Transport (TEN-T) road network. These sections have been prioritised for improvement to address existing safety and operational issues. The TEN-T is a selection of strategic transport corridors that have been identified to play a key role in the mobility of goods and passengers through the European Union. The TEN-T Network in Donegal consists of three National Primary Roads (N13, N14 and N15). The three sections of the TEN-T in Donegal that have been prioritised for improvement are: -

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

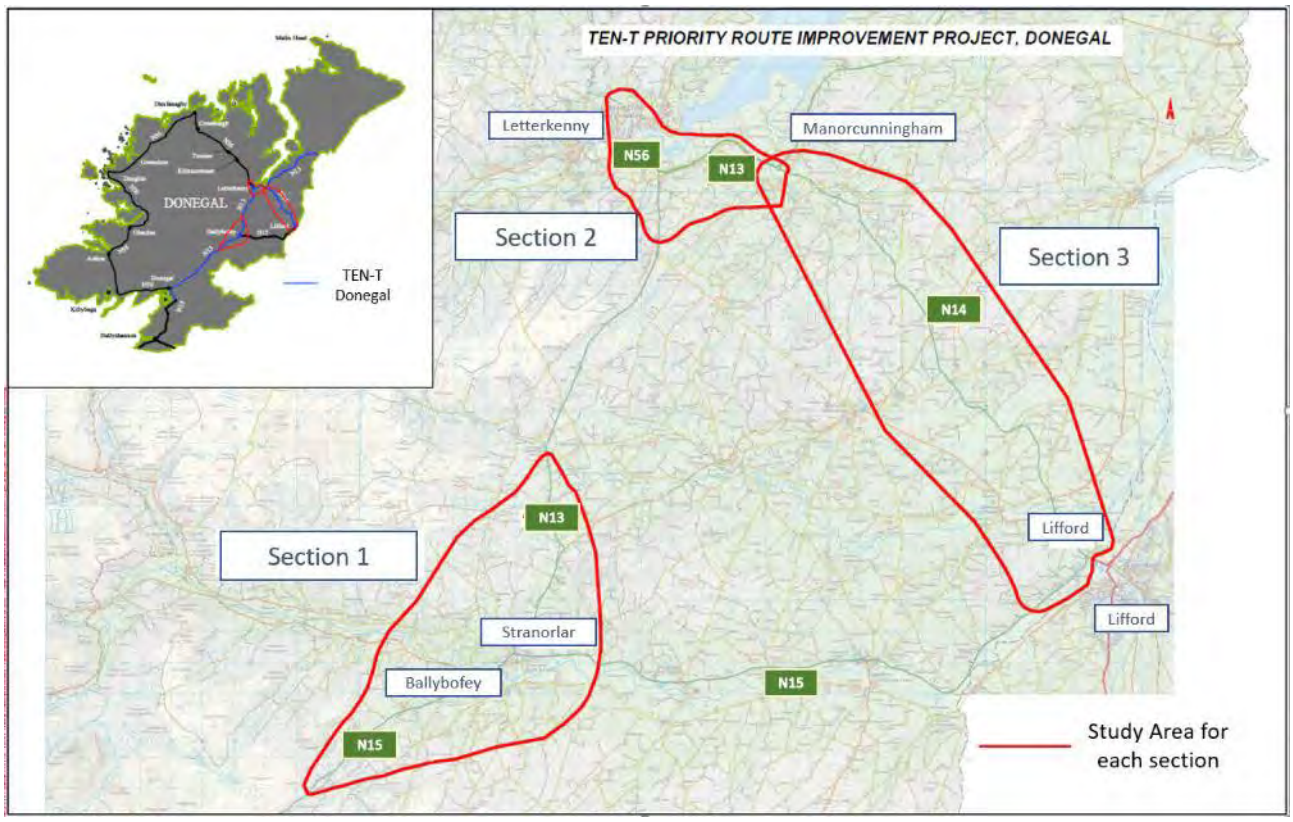


FIGURE 1.2: STUDY AREAS FOR EACH SECTION OF OVERALL SCHEME

This audit is for Section 1, N15/N13 Ballybofey/Stranorlar Urban Region, which is described in the following section of this report. Figure 1.2 shows the Study Areas for each of the three sections and Figure 1.1 shows the corridor options assessed in this Stage F (Part 1) Audit.

1.4.2 Section 1

The N15 is Donegal's only national road link to the rest of the Republic of Ireland. The N15 currently passes through Ballybofey and Stranorlar, with strategic, local, business and leisure traffic travelling on the national road through the town centre resulting in congestion and safety issues.

The existing N13 and N15 in the vicinity of the proposed improvement consist of narrow single carriageway roads with no hard shoulder over much of their length. Where they run through the urban environment of Ballybofey and Stranorlar they feature numerous direct accesses and have historical collisions rates above, and twice above, the national average for a similar type of national road for much of their length.

The proposed road improvement is to consist of a realignment of the N15 & N13 to bypass Ballybofey & Stranorlar. The cross-section for the road improvement will be confirmed in subsequent design phases, however for the purposes option selection and this audit, the new road is assumed to consist of a Type 2 Dual Carriageway (Ref: DN-GEO-03036) including a cycle track of 2.5m in width offset from the carriageway edge by 2.5m.

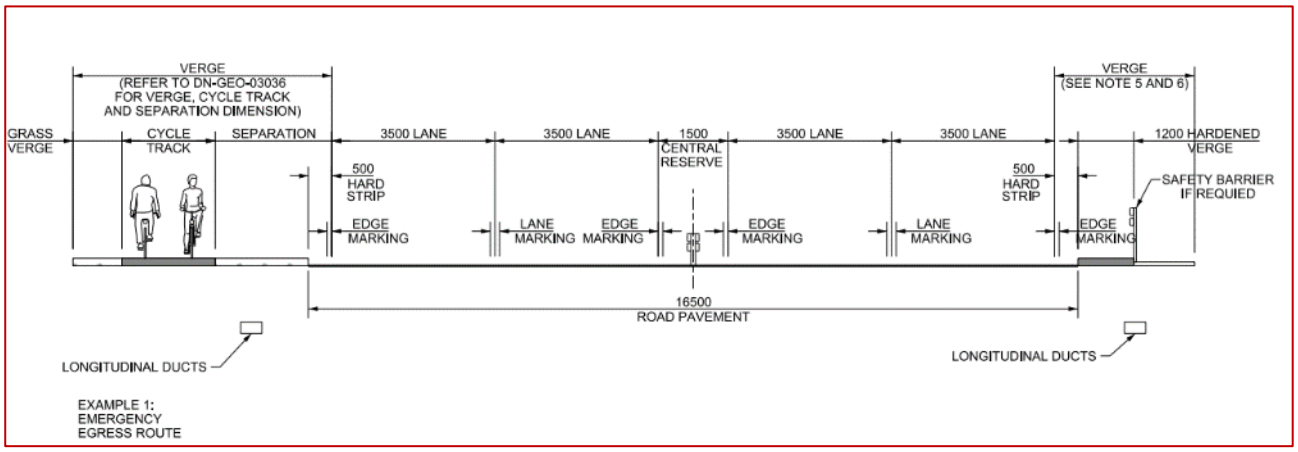


FIGURE 1.3: TYPE 2 DUAL CARRIAGEWAY

Thirteen options have been audited: -

- Option 1A (Orange),
- Option 1B (Pink),
- Option 1C (Purple),
- Option 1D (Red),
- Option 1E (Green),
- Option 1F (Blue),
- Option 1G (Yellow),
- Option 1A1 (Orange),
- Option 1B1 (Pink),
- Option 1C1 (Purple),
- Option 1D1 (Red),
- Option 1E1 (Green), and
- Option 1F1 (Blue).

all of which are located to the northwest of Ballybofey & Stranorlar. All of the routes have similar lengths (ranging between 8.2km and 8.75km) and similar start/end points on the N15 southwest of Ballybofey near Blackburn Bridge and on the N13 north of the N13/R236 junction.

All of the options provide grade-separated crossings of the existing road network, with the exception of the tie-in points. No direct access from private lands is proposed onto the mainline.

All of the options include a Compact Grade Separated Junction to the west of the Finn River, connecting either to the existing R252 Regional Road and/or to the old N15 immediately west of Ballybofey.

Each option differs in terms of its horizontal alignment, vertical alignment and arrangements at tie-ins. Some of the options include a Compact Grade Separated Junction, east of the River Finn & north of Stranorlar, with links to the existing N13 and/or the N15 east of Stranorlar.

A terminal roundabout is proposed at the north-eastern tie-in for Options 1G, 1A1, 1B1, 1C1, 1D1, 1E1 & 1F1 at the location of an existing crossroads between the N13 and the L6674 local road. The proposed roundabout will provide connectivity to/from the existing N13 to the north-east, the proposed bypass and the L6674 local road. No connection is proposed to the existing N13 to the south of this proposed terminal roundabout.

FIGURE 1.4: NORTH-EASTERN TIE-IN ROUNDABOUT FOR ROUTE OPTIONS 1G, 1A1, 1B1, 1C1, 1D1, 1E1 & 1F1

1.4.3 Information Provided to Audit Team

Drawings detailing the proposed route options were provided, details of which are listed in Appendix A.

National road HD15 collision rates for the Period 2014 to 2016 were obtained from the Open Data Portal (data.gov.ie) which are shown in Figure 1.5.

The sections shown in red are those sections of road with collision rates twice (or more) above the average, sections shown in orange are those sections of road with collision rates above the average, sections shown in blue are those sections of road with collision rates below the average & sections shown in green are those sections of road with collision rates twice (or more) below the average.

FIGURE 1.5: HD15 COLLISION RATES (2014 TO 2016)

2 Items Arising from the Audit

2.1 Overview

This audit is concerned with the safety issues that differentiate the options in order to permit a comparative safety ranking of the route options. All of the route options presented would provide significant improvement to safety on the sections of the N15 and N13 which are being bypassed.

The overall number and severity of identified hazards, as well as the overall safety considerations of each option, has advised the comparative safety ranking of the options in this report.

2.2 Option 1A (Orange)

The overall length of Option 1A is 8.75km, excluding the realignments of the N13 or N15 at the tie-in points, all of which is off-line to the north-west of Ballybofey & Stranorlar. Terminal roundabouts are proposed at the eastern & western tie-ins with associated realignment of the N15 & N13 respectively into the proposed roundabouts.

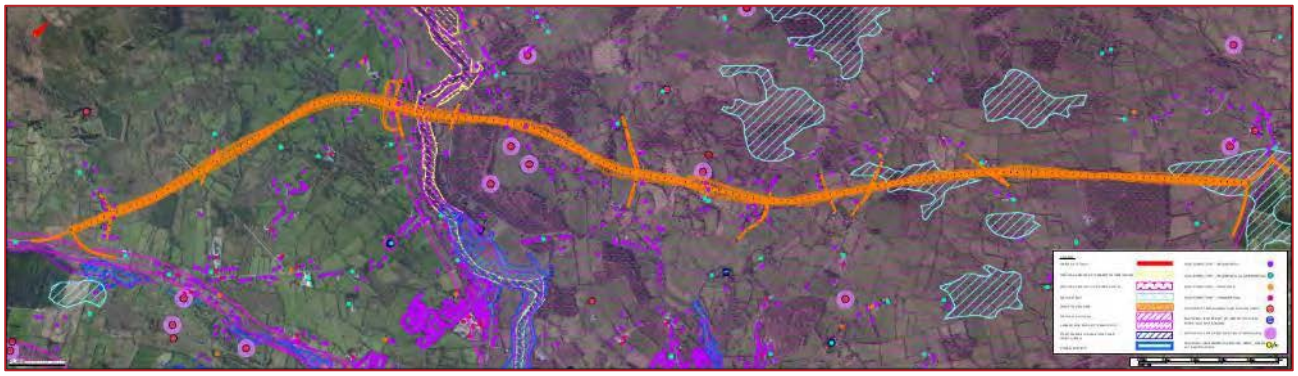


FIGURE 2.1: OPTION 1A (ORANGE)

One river bridge and nine grade-separated road crossings are required including at the R252 Regional Road where a compact grade-separated junction is proposed. It is also proposed to amend the existing crossroads junction north of the north-eastern tie-in point to be a staggered t-junction.

Option 1A also includes a new link between the existing N15 and N13 north-east of Stranorlar.

2.2.1 R252 Compact Grade Separated Junction

FIGURE 2.2: COMPACT GRADE SEPARATED JUNCTION WITH R252

Problem

The proposed compact grade separated junction at the intersection with the R252 Regional Road will result in two new at-grade junctions, in close proximity, on the regional road.

Hazard

Junctions in close proximity on the existing regional road will result in additional turning movements with increased likelihood of side-on collisions associated with right-turning manoeuvres into/out of the loop connectors.

2.2.2 R252 Compact Grade Separated Junction

Problem

The proposed compact grade separated junction at the intersection with the R252 Regional Road is located on a bend in the horizontal alignment of the regional road, with the loop junctions indicated either side of the existing bend.

No improvement to the horizontal alignment of the regional road has been indicated as part of the junction provision. The arrangement as shown may result in insufficient sightlines for drivers approaching on the regional road, and insufficient visibility for drivers on the loop connectors exiting onto the regional road.

Hazard

Insufficient forward visibility or junction visibility can lead to unsafe exiting/turning manoeuvres and side-on collisions.

2.2.3 Traffic to/from N15 East of Ballybofey & Stranorlar

Problem

Traffic travelling to/from the N15 west of Ballybofey & Stranorlar to/from the N15 east of the town are more likely to continue to travel through the town centre on this option compared with other options, reducing the potential safety benefits from the proposed road improvement.

The historical collision data provided to the Audit Team indicates that there are safety issues on the existing national road through the town, in particular for non-motorised road users.

Hazard

When compared with other options, this option is likely to provide fewer safety improvements for users due to the increased potential for N15 traffic to continue travelling through town.

2.2.4 North-eastbound Approach to North-eastern tie-in

Problem

The gradient on the north-eastbound approach to the north-eastern tie-in roundabout is in excess of 4%.

Hazard

Excessive speeds on approach to roundabout due to the approach gradient will result in some drivers failing to adequately moderate their speeds on the approach leading to overshoot into the junction and side-on or run off road collisions.

2.2.5 Existing N13 North-east of Stranorlar

Problem

While it is proposed to provide a new link between the existing N13 & N15 to the east of Stranorlar, traffic travelling to/from the north-east and the south-east will continue to use the existing N13, including the t-junction with the R236, which has limited sightlines and requires the national road traffic to give way to regional road traffic.

Hazard

When compared with other options, this option is likely to provide a lesser safety benefit as a result of traffic continuing to use existing road network, including the t-junction with the R236.

2.3 Option 1B (Pink)

The overall length of Option 1B is 8.7km, excluding the realignments of the N13 or N15 at the tie-in points, all of which is off-line to the north-west of Ballybofey & Stranorlar. A terminal roundabout is proposed at the western tie-in with associated realignment of the N15 into the roundabout. A dual roundabout arrangement is proposed at the north-eastern tie-in along with a realignment of the N13 to the north, providing connectivity onto the existing N13 at this location.

One river bridge and thirteen grade-separated road crossings are required including at the R252 Regional Road where a compact grade-separated junction is proposed. A second compact grade separated junction is proposed to the north-east of Stranorlar connecting the bypass with the existing N13. A new link is proposed between the existing N13 and the N15 to the east of Stranorlar.

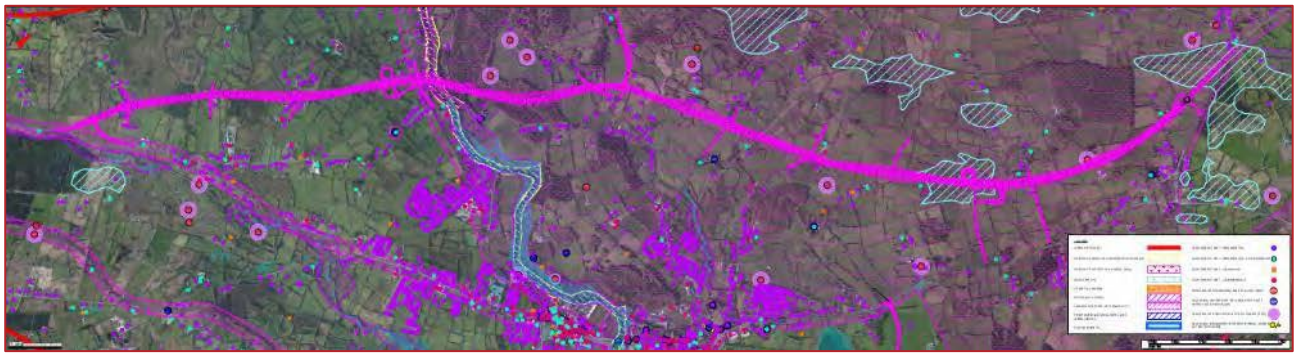


FIGURE 2.3: OPTION 1B (PINK)

2.3.1 R252 Regional Road

Problem

The provision of a compact grade separated junction between the bypass and the R252 Regional Road may result in increased traffic along the regional road between the bypass and Ballybofey, and an increase in traffic turning into/out of the regional road at its junction with the existing N15.

The existing R252 within the town is relatively narrow and the existing R252/N15 junction is uncontrolled and has visibility issues for drivers exiting from the R252.

Additional traffic using the R252/N15 junction to access the bypass will increase the number of turning manoeuvres at the existing junction and increase the potential for conflicts.

Hazard

Increased turning movements at existing uncontrolled junction may lead to increase in collisions.

2.3.2 Approaches to North-eastern tie-in Roundabout

Problem

The horizontal alignment of the N13 on both approaches to the north-eastern tie-in roundabout could result in a sight-through issue for drivers travelling in either direction on the N13 approaching the roundabout, where drivers may sight onto the section of road downstream of the junction reducing their awareness of the upcoming junction.

Hazard

Sight-through effect reducing approaching driver's awareness of the upcoming junction, and of the need to moderate their speeds in order to navigate the roundabout, leading to inappropriate approach speeds and overshoot incidents resulting in side-on or run off road collisions.

2.3.3 Crossroads on N13 North of North-eastern tie-in

Problem

An existing crossroads is located on the N13 north of the north-eastern tie-in. Crossroad junctions present particular hazards to road users as a result of sight-through effects which can reduce a side-road driver's awareness of an upcoming junction. This has the potential to lead to overshoot into the main road carriageway and side-on collisions.

Hazard

Sight-through at existing crossroads junction resulting in overshoot into the N13 carriageway and side-on collisions.

2.3.4 Traffic to/from N15 East of Ballybofey & Stranorlar

Problem

The proposed layout of the link between the proposed bypass and the N15 may result in some traffic travelling to/from the N15 west of Ballybofey & Stranorlar to/from the N15 east of the town continuing to travel through the town centre. This reduces the potential safety benefits of this option compared with other options.

The historical collision data provided to the Audit Team indicates that there are safety issues on the existing national road through the town, in particular for non-motorised road users.

Hazard

When compared with other options, this option is likely to provide fewer safety improvements for users due to the increased potential for N15 traffic to continue travelling through town.

2.3.5 Existing N13 North of Stranorlar

Problem

It is proposed to provide a new link between the existing N13 and the existing N15 east of Stranorlar, and to provide a link from the bypass onto the existing N13 north-east of the new N13/N15 link. The proposed arrangement introduces two new junctions onto the existing N13, which will increase the number of turning manoeuvres as traffic wishing to travel from the N15 to the bypass travels along the existing section of road between the new junctions.

Hazard

Additional turning movements with increased likelihood of collisions associated with manoeuvres into/out of the new link roads when compared with the other options.

2.3.6 Dual Roundabouts at North-eastern Tie-in

Problem

Two roundabouts are proposed at the north-eastern tie-in in order to connect the proposed bypass with the N13 to the north of the scheme and with the section of existing N13 to the south of the tie-in location. The provision of two roundabouts in close proximity increases the road layout complexity and the number of turning manoeuvres which will need to be undertaken by drivers depending on their intended destination.

Hazard

When compared with the other option s, Option 1B has greater road layout complexity resulting in an increased number of turning manoeuvres with the dual roundabout terminal arrangement leading to an increased likelihood of collisions.

2.4 Option 1C (Purple)

The overall length of Option 1C is 8.6km, excluding the realignments of the N13 or N15 at the tie-in points, all of which is off-line to the north-west of Ballybofey & Stranorlar. Terminal roundabouts are proposed at the eastern & western tie-ins with associated realignment of the N15 & N13 respectively into the proposed roundabouts.

One river bridge and twelve grade-separated road crossings are required including at the R252 Regional Road where a compact grade-separated junction is proposed. Option 1C also includes a new link between the existing N15 and N13 north-east of Stranorlar.

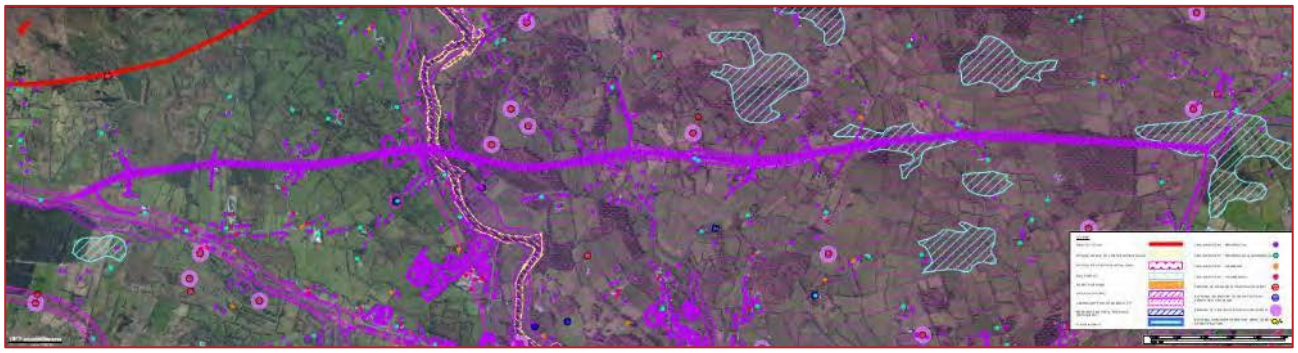


FIGURE 2.4: OPTION 1C (PURPLE)

2.4.1 Traffic to/from N15 East of Ballybofey & Stranorlar

Problem

Traffic travelling to/from the N15 west of Ballybofey & Stranorlar to/from the N15 east of the town are more likely to continue to travel through the town centre on this option compared with other options, reducing the potential safety benefits from the proposed road improvement.

The historical collision data provided to the Audit Team indicates that there are safety issues on the existing national road through the town, in particular for non-motorised road users.

Hazard

When compared with other options, this option is likely to provide fewer safety improvements for users due to the increased potential for N15 traffic to continue travelling through town.

2.4.2 North-eastbound Approach to North-eastern tie-in

Problem

The gradient on the north-eastbound approach to the north-eastern tie-in roundabout is in excess of 5% to a point within 250m of the roundabout.

Hazard

Excessive speeds on approach to roundabout due to the approach gradient will result in some drivers failing to adequately moderate their speeds on the approach leading to overshoot into the junction and side-on or run off road collisions.

2.4.3 Crossroads on N13 North of North-eastern tie-in

Problem

An existing crossroads is located on the N13 north of the north-eastern tie-in. Crossroad junctions present particular hazards to road users as a result of sight-through effects which can reduce a side-road driver's awareness of an upcoming junction, leading to overshoot into the main road carriageway and side-on collisions.

Hazard

Sight-through at existing crossroads junction resulting in overshoot into the N13 carriageway and side-on collisions.

2.4.4 Existing N13 North-east of Stranorlar

Problem

While it is proposed to provide a new link between the existing N13 & N15 to the east of Stranorlar, traffic travelling to/from the north-east and the south-east will continue to use the existing N13, including the t-junction with the R236, which has limited sightlines and requires the national road traffic to give way to regional road traffic.

Hazard

Reduced benefit from the road improvement when compared with other options as a result of the increased potential for traffic travelling to/from the north-east and the south-east to continue using the existing poor-quality sections of the existing road network, including the t-junction with the R236.

2.5 Option 1D (Red)

The overall length of Option 1D is 8.44km, excluding the realignments of the N13 or N15 at the tie-in points, all of which is off-line to the north-west of Ballybofey & Stranorlar. Terminal roundabouts are proposed at the eastern & western tie-ins with associated realignment of the N15 & N13 respectively into the proposed roundabouts.

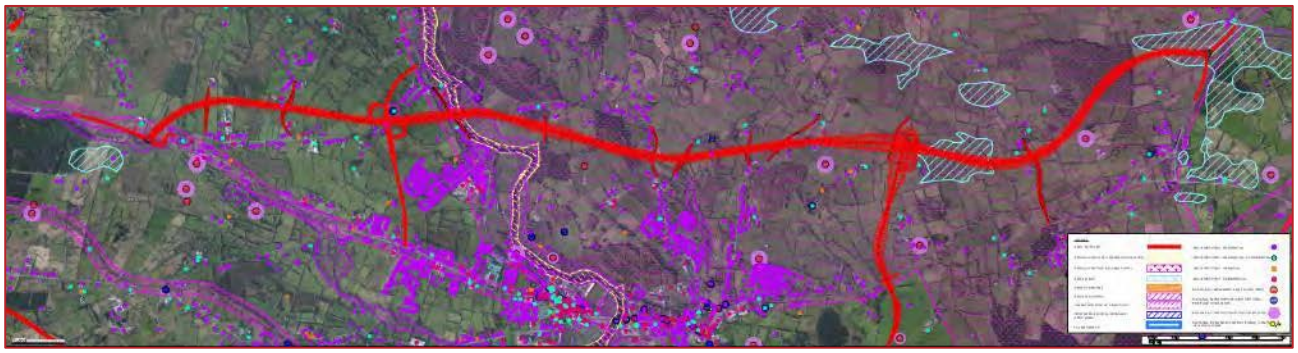


FIGURE 2.5: OPTION 1D (RED)

One river bridge and fourteen grade-separated road crossings are required including at the R252 Regional Road where a compact grade-separated junction is proposed. A second compact grade separated junction is proposed to the north-east of Stranorlar connecting the bypass with the existing N13 and the existing N15 to the east of Stranorlar.

2.5.1 Western Tie-in Roundabout

Problem

The horizontal alignment of the proposed bypass on the westbound approach to the western tie-in roundabout consists of a horizontal curve which connects directly to the roundabout. The proposed road layout may result in reduced awareness by westbound drivers of the upcoming roundabout, leading to a failure to adequately moderate speeds on the approach.

Hazard

Horizontal alignment on the westbound approach to tie-in roundabout may lead to drivers failing to adequately moderate their speeds on approach, resulting in overshoot incidents into the circulating carriageway leading to side-on collisions.

2.5.2 Western Tie-in Roundabout

Problem

The proposed horizontal alignment on the eastern arm of the western tie-in roundabout, connecting to the existing N15 towards Ballybofey, includes back-to-back low-radius curves which drivers may fail to successfully negotiate resulting in run-off-road incidents.

Hazard

Run-off-road collisions due to high-demand alignment on approach to western terminal roundabout.

2.5.3 North-eastbound Approach to North-eastern tie-in

Problem

The gradient on the north-eastbound approach to the north-eastern tie-in roundabout is approximately 4%.

Hazard

Excessive speeds on approach to roundabout due to the approach gradient will result in some drivers failing to adequately moderate their speeds on the approach leading to overshoot into the junction and side-on or run off road collisions.

2.5.4 Crossroads on N13 North of North-eastern tie-in

Problem

An existing crossroads is located on the N13 north of the north-eastern tie-in. Crossroad junctions present particular hazards to road users as a result of sight-through effects which can reduce a side-road driver's awareness of an upcoming junction, leading to overshoot into the main road carriageway and side-on collisions.

Hazard

Sight-through at existing crossroads junction resulting in overshoot into the N13 carriageway and side-on collisions.

2.6 Option 1E (Green)

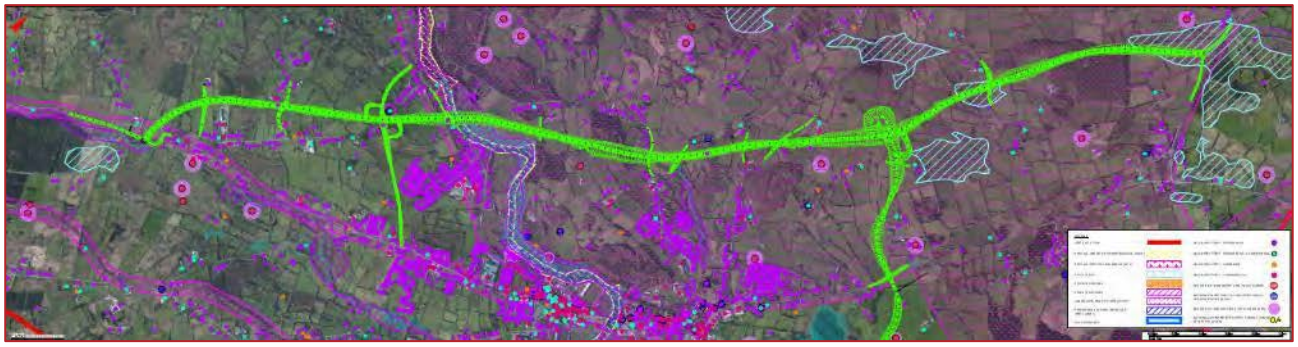


FIGURE 2.6: OPTION 1E (GREEN)

The overall length of Option 1E is 8.2km, excluding the realignments of the N13 or N15 at the tie-in points, all of which is off-line to the north-west of Ballybofey & Stranorlar.

Terminal roundabouts are proposed at the eastern & western tie-ins with associated realignment of the N15 & N13 respectively into the proposed roundabouts.

One river bridge and thirteen grade-separated road crossings are required including at the R252 Regional Road where a compact grade-separated junction is proposed. A second compact grade separated junction is proposed to the north-east of Stranorlar connecting the bypass with the existing N13 and the existing N15 to the east of Stranorlar.

2.6.1 Western Tie-in Roundabout

Problem

The horizontal alignment of the proposed bypass on the westbound approach to the western tie-in roundabout consists of a horizontal curve which connects directly to the roundabout. The proposed road layout may result in reduced awareness by westbound drivers of the upcoming roundabout, leading to a failure to adequately moderate speeds on the approach.

Hazard

Horizontal alignment on the westbound approach to tie-in roundabout may lead to drivers failing to adequately moderate their speeds on approach, resulting in overshoot incidents into the circulating carriageway leading to side-on collisions.

2.6.2 Western Tie-in Roundabout

Problem

The proposed horizontal alignment on the eastern arm of the western tie-in roundabout, connecting to the existing N15 towards Ballybofey, includes back-to-back low-radius curves which drivers may fail to successfully negotiate resulting in run off road incidents.

Hazard

Run off road collisions due to high-demand alignment on approach to western terminal roundabout.

2.6.3 North-eastbound Approach to North-eastern tie-in

Problem

The gradient on the north-eastbound approach to the north-eastern tie-in roundabout is approximately 4%.

Hazard

Excessive speeds on approach to roundabout due to the approach gradient will result in some drivers failing to adequately moderate their speeds on the approach leading to overshoot into the junction and side-on or run off road collisions.

2.6.4 Crossroads on N13 North of North-eastern tie-in

Problem

An existing crossroads is located on the N13 north of the north-eastern tie-in. Crossroad junctions present particular hazards to road users as a result of sight-through effects which can reduce a side-road driver's awareness of an upcoming junction, leading to overshoot into the main road carriageway and side-on collisions.

Hazard

Sight-through at existing crossroads junction resulting in overshoot into the N13 carriageway and side-on collisions.

2.7 Option 1F (Blue)

The overall length of Option 1F is 8km, excluding the realignments of the N13 or N15 at the tie-in points, all of which is off-line to the north-west of Ballybofey & Stranorlar. A terminal roundabout is proposed at the western tie-in with associated realignment of the N15 into the roundabout. A dual roundabout arrangement is proposed at the north-eastern tie-in along with a realignment of the N13 to the north, providing connectivity onto the existing N13 at this location.

FIGURE 2.7: OPTION 1F (BLUE)

One river bridge and thirteen grade-separated road crossings are required including at the R252 Regional Road where a compact grade-separated junction is proposed. A second compact grade separated junction is proposed to the north-east of Stranorlar connecting the bypass with the existing N13. A new link is proposed between the existing N13 and the N15 to the east of Stranorlar.

2.7.1 Western Tie-in Roundabout

Problem

The horizontal alignment of the proposed bypass on the westbound approach to the western tie-in roundabout consists of a horizontal curve which connects directly to the roundabout. The proposed road layout may result in reduced awareness by westbound drivers of the upcoming roundabout, leading to a failure to adequately moderate speeds on the approach.

Hazard

Horizontal alignment on the westbound approach to tie-in roundabout may lead to drivers failing to adequately moderate their speeds on approach, resulting in overshoot incidents into the circulating carriageway leading to side-on collisions.

2.7.2 Western Tie-in Roundabout

Problem

The proposed horizontal alignment on the eastern arm of the western tie-in roundabout, connecting to the existing N15 towards Ballybofey, includes back-to-back low-radius curves which drivers may fail to successfully negotiate resulting in run off road incidents.

Hazard

Run off road collisions due to high-demands alignment on approach to western terminal roundabout.

2.7.3 Crossroads on N13 North of North-eastern tie-in

Problem

An existing crossroads is located on the N13 north of the north-eastern tie-in. Crossroad junctions present particular hazards to road users as a result of sight-through effects which can reduce a side-road driver's awareness of an upcoming junction, leading to overshoot into the main road carriageway and side-on collisions.

Hazard

Sight-through at existing crossroads junction resulting in overshoot into the N13 carriageway and side-on collisions.

2.7.4 Existing N13 North of Stranorlar

Problem

It is proposed to provide a new link between the existing N13 and the existing N15 east of Stranorlar, and to provide a link from the bypass onto the existing N13 north-east of the new N13/N15 link. The proposed arrangement introduces two new junctions onto the existing N13, which will increase the number of turning manoeuvres, when compared with other options, as traffic wishing to travel from the N15 to the bypass travels along the existing section of road between the new junctions.

Hazard

Additional turning movements, when compared with other options, with increased likelihood of collisions associated with manoeuvres into/out of the new link roads.

2.7.5 Traffic to/from N15 East of Ballybofey & Stranorlar

Problem

The proposed layout of the link between the proposed bypass and the N15 may result in some traffic continuing to travel through the town centre to travel east/west or west/east on the N15, reducing the potential safety benefits of this option when compared to other options.

The historical collision data provided to the Audit Team indicates that there are safety issues on the existing national road through the town, in particular for non-motorised road users.

Hazard

When compared with other options, this option is likely to provide fewer safety improvements for users due to the increased potential for N15 traffic to continue travelling through the town.

2.7.6 Approaches to North-eastern Tie-in Roundabout

Problem

The horizontal alignment of the N13 on both approaches to the north-eastern tie-in roundabout could result in a sight-through issue for drivers travelling in either direction on the N13 approaching the roundabout, where drivers may sight onto the section of road downstream of the junction reducing their awareness of the upcoming junction.

Hazard

Sight-through effect reducing approaching driver's awareness of the upcoming junction, and of the need to moderate their speeds in order to navigate the roundabout, leading to inappropriate approach speeds and overshoot incidents resulting in side-on or run off road collisions.

2.7.7 Dual Roundabouts at North-eastern Tie-in

Problem

Two roundabouts are proposed at the north-eastern tie-in in order to connect the proposed bypass with the N13 to the north of the scheme and with the section of existing N13 to the south of the tie-in location. The provision of two roundabouts in close proximity increases the road layout complexity, when compared with other options, and the number of turning manoeuvres which will need to be undertaken by drivers depending on their intended destination.

Hazard

When compared with the other options, Route 1F1 has greater road layout complexity, and increased number of turning manoeuvres required with dual roundabout terminal arrangement, leading to an increased likelihood of collisions.

2.8 Option 1G (Yellow)

The overall length of Option 1G is 8.2km, excluding the realignments of the N13 or N15 at the tie-in points, all of which is off-line to the north-west of Ballybofey & Stranorlar. A terminal roundabout is proposed at the western tie-in with associated realignment of the N15 into the roundabout.

A terminal roundabout is also proposed at the north-eastern tie-in at the location of an existing crossroads at this location. The proposed roundabout will provide connectivity to/from the existing N13 to the north-east, the proposed bypass and the L6674 local road. No connection is proposed to the existing N13 to the south of the proposed terminal roundabout.

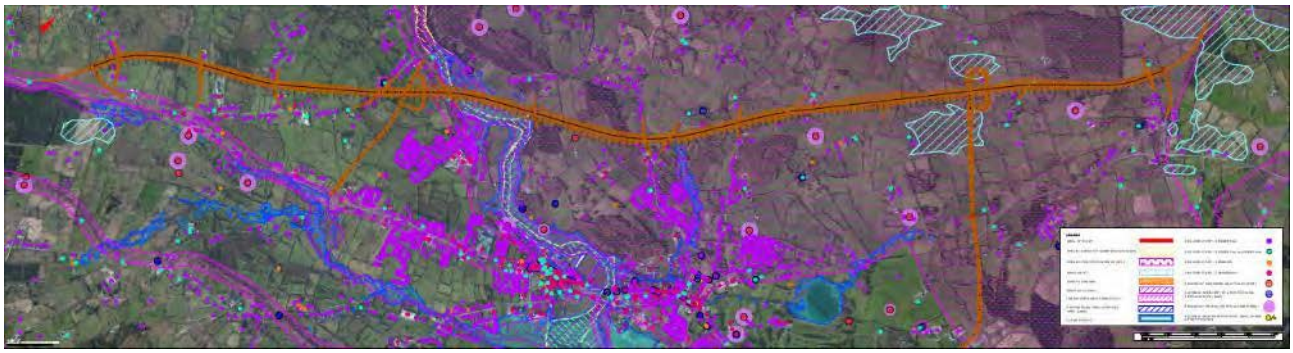


FIGURE 2.8: OPTION 1G (YELLOW)

One river bridge and fifteen grade-separated road crossings are required including at the R252 Regional Road where a compact grade-separated junction is proposed. A link is proposed from this junction to the existing N15 to the north west of Ballybofey. A second compact grade separated junction is proposed to the north-east of Stranorlar connecting the bypass with the existing N13 and the N15 to the east of Stranorlar.

2.8.1 Tie-in with Existing R252

Problem

The proposed junction on the R252 between the new link road, connecting the existing R252 with the proposed bypass and the existing N15, is located in close proximity to existing, non-standard, local road junction on the regional road. The proximity of the two junctions will result in a concentration of turning movements along a relatively short length of regional road with a resulting increased likelihood of collisions associated with turning manoeuvres.

Hazard

Junctions in close proximity on the existing regional road could lead to driver confusion resulting in late-braking or late manoeuvres and shunt collisions and will also result in additional turning movements with increased likelihood of side-on collisions associated with right-turning manoeuvres into/out of the junctions.

2.8.2 Existing R252

Problem

The proposed junction arrangement on the R252 between the new link road, connecting the existing R252 with the proposed bypass and the existing N15, will result in priority being retained for the existing R252. This arrangement is likely to result in traffic continuing to travel along the existing regional road into the town rather than use the new link road.

During the site visit it was noted that the existing R252 within the town is relatively narrow and the existing R252/N15 junction is uncontrolled and has visibility issues for drivers exiting from the R252.

Hazard

Continued or increased use of existing R252, and in particular its junction with the existing N15, may lead to increase in collisions, when compared with other route options.

2.9 Option 1A1 (Orange)

The overall length of Option 1A1 is 8.75km, excluding the realignments of the N13 or N15 at the tie-in points, all of which is off-line to the north-west of Ballybofey & Stranorlar. A terminal roundabout is proposed at the western tie-in with associated realignment of the N15 into the roundabout.

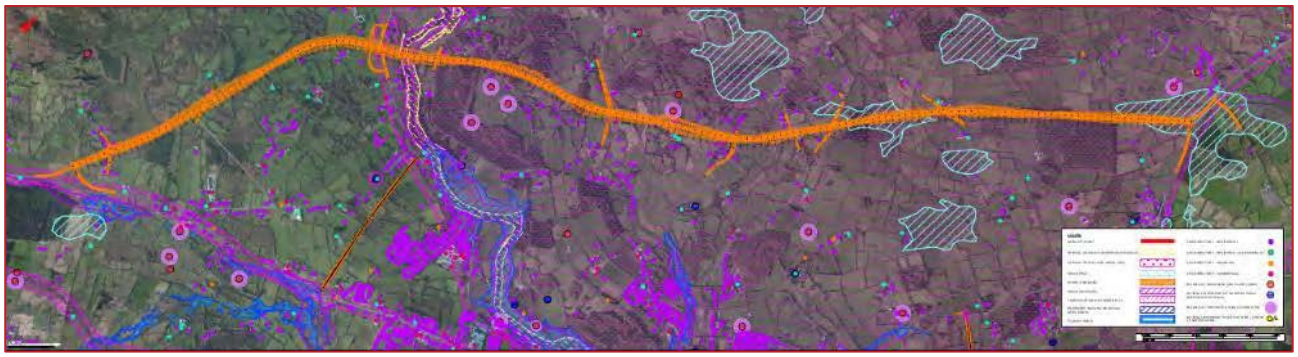


FIGURE 2.9: OPTION 1A1 (ORANGE)

A terminal roundabout is also proposed at the north-eastern tie-in at the location of an existing crossroads at this location. The proposed roundabout will provide connectivity to/from the existing N13 to the north-east, the proposed bypass and the L6674 local road. No connection is proposed to the existing N13 to the south of the proposed terminal roundabout.

One river bridge and nine grade-separated road crossings are required including at the R252 Regional Road where a compact grade-separated junction is proposed. It is also proposed to amend the existing crossroads junction north of the north-eastern tie-in point to be a staggered t-junction.

Option 1A1 also includes a new link between the existing N15 and R252 to the west of Ballybofey. A new link is also proposed between the existing N13 and the N15 to the east of Stranorlar.

2.9.1 R252 Compact Grade Separated Junction

Problem

The proposed compact grade separated junction at the intersection with the R252 Regional Road will result in two new at-grade junctions, in close proximity, on the regional road.

Hazard

Junctions in close proximity on the existing regional road will result in additional turning movements with increased likelihood of side-on collisions associated with right-turning manoeuvres into/out of the loop connectors.

2.9.2 R252 Compact Grade Separated Junction

Problem

The proposed compact grade separated junction at the intersection with the R252 Regional Road is located on a bend in the horizontal alignment of the regional road, with the loop junctions indicated either side of the existing bend.

The arrangement as shown may result in insufficient sightlines for drivers approaching the compact grade separated junction on the existing, unaltered, regional road and insufficient visibility for drivers on the loop connectors exiting onto the regional road.

Hazard

Potential for insufficient forward visibility or junction visibility can lead to unsafe exiting/turning manoeuvres and side-on collisions.

2.9.3 Link Road between Existing N15 and R252

Problem

It is proposed to provide a new link road between the existing N15 and the R252 to the west of Ballybofey. The proposed location of the junction between the link road and the R252 is in close proximity to an existing non-standard junction on the R252 with a local road.

The proximity of these at-grade junctions could lead to driver confusion and late manoeuvres resulting in shunt collisions, and will increase the concentration of turning manoeuvres along this section of the regional road resulting in a potential increased number of collisions at this location.

Hazard

Junctions in close proximity on the existing regional road could lead to driver confusion resulting in late-braking or late manoeuvres and shunt collisions and will also result in additional turning movements with increased likelihood of side-on collisions associated with right-turning manoeuvres into/out of the junctions.

FIGURE 2.10: N15 TO R252 LINK WEST OF BALLYBOFEY/STRANORLAR

2.9.4 Traffic to/from N15 East of Ballybofey & Stranorlar

Problem

Traffic travelling to/from the N15 west of Ballybofey & Stranorlar to/from the N15 east of the town are more likely to continue travelling through the town centre on this option compared to other options, reducing the potential safety benefits from the proposed road improvement.

The historical collision data provided to the Audit Team indicates that there are safety issues on the existing national road through the town, in particular for non-motorised road users.

Hazard

When compared with other options, this option is likely to provide fewer safety improvements for users due to the increased potential for N15 traffic to continue travelling through town.

2.9.5 North-eastbound Approach to North-eastern tie-in

Problem

The gradient on the north-eastbound approach to the north-eastern tie-in roundabout is 3.7% over a distance of 1.35km until within 50m of the roundabout.

Hazard

Excessive speeds on approach to roundabout due to the approach gradient will result in some drivers failing to adequately moderate their speeds on the approach leading to overshoot into the junction and side-on or run off road collisions.

2.9.6 Traffic to/from N13 North-East of Route

Problem

The existing N13 south of the north-eastern terminal roundabout is to be severed and no link is proposed between the bypass and the existing N13 or the N15 east of the River Finn.

Traffic travelling to/from the N13 to the north-east and the N15 to the south-east will travel through the town in order to access the bypass either via the new N15/R252 link road or the existing R252, including the R252/N15 t-junction which has limited sightlines.

Alternatively, drivers may choose to use the local road network. Increased traffic on the local road network is likely to result in increased collisions.

Hazard

In comparison to other options, Option 1A1 is likely to provide a lesser safety benefit as traffic to/from the N13 to the north-east and the N15 to the south-east will continue to use the existing road network through Ballybofey and Stranorlar or the local road network.

2.10 Option 1B1 (Pink)

The overall length of Option 1B1 is 8.7km, excluding the realignments of the N13 or N15 at the tie-in points, all of which is off-line to the north-west of Ballybofey & Stranorlar. A terminal roundabout is proposed at the western tie-in with associated realignment of the N15 into the roundabout.

A terminal roundabout is also proposed at the north-eastern tie-in at the location of an existing crossroads at this location. The proposed roundabout will provide connectivity to/from the existing N13 to the north-east, the proposed bypass and the L6674 local road. No connection is proposed to the existing N13 to the south of the proposed terminal roundabout.

One river bridge and twelve grade-separated road crossings are required including at the R252 Regional Road where a compact grade-separated junction is proposed.

A second compact grade separated junction is proposed to the north-east of Stranorlar connecting the bypass with the existing N13 and the N15 to the east of Stranorlar. Option 1B1 also includes a new link between the existing N15 and R252 to the west of Ballybofey.

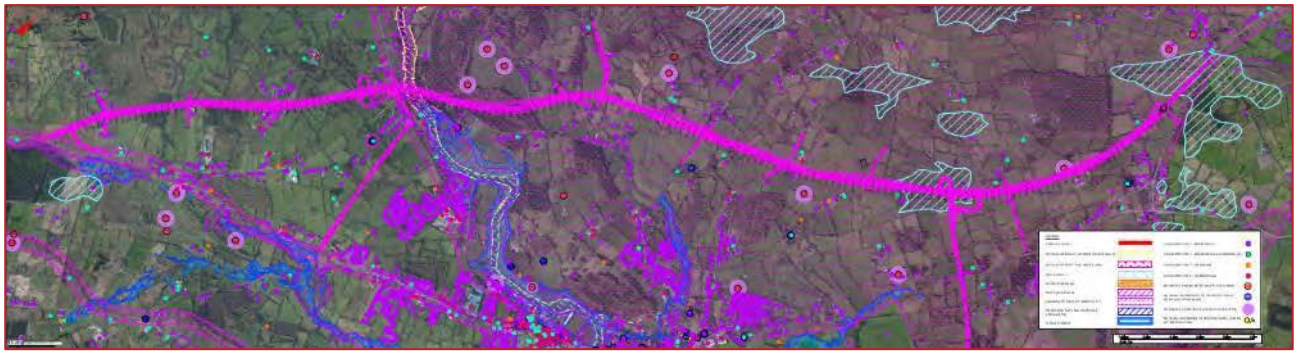


FIGURE 2.11: OPTION 1B1 (PINK)

2.10.1 Link Road between Existing N15 and R252

Problem

It is proposed to provide a new link road between the existing N15 and the R252 to the west of Ballybofey. The proposed location of the junction between the link road and the R252 is in close proximity to and existing non-standard junction on the R252 with a local road.

The proximity of these at-grade junctions could lead to driver confusion and late manoeuvres resulting in shunt collisions, and will increase the concentration of turning manoeuvres along this section of the regional road resulting in a potential increased number of collisions at this location.

Hazard

Junctions in close proximity on the existing regional road could lead to driver confusion resulting in late-braking or late manoeuvres and shunt collisions and will also result in additional turning movements with increased likelihood of side-on collisions associated with right-turning manoeuvres into/out of the junctions.

2.10.2 R252 Regional Road

Problem

The provision of a compact grade separated junction between the bypass and the R252 Regional Road will result in increased traffic along the regional road between the bypass and Ballybofey, and an increase in traffic turning into/out of the regional road at its junction with the existing N15.

The proposed link road between the N15 and the R252 is unlikely to attract a significant proportion of this traffic in the absence of measures to discourage use of the existing R252 into the town.

Hazard

Continued or increased use of existing R252, and in particular its junction with the existing N15, may lead to increase in collisions, when compared with other options.

2.11 Option 1C1 (Purple)

The overall length of Option 1C1 is 8.6km, excluding the realignments of the N13 or N15 at the tie-in points, all of which is off-line to the north-west of Ballybofey & Stranorlar. A terminal roundabout is proposed at the western tie-in with associated realignment of the N15 into the roundabout.

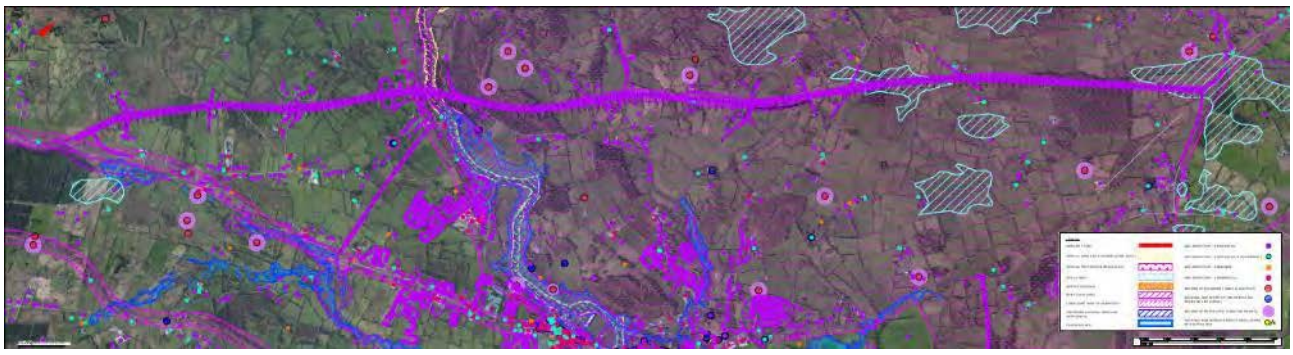


FIGURE 2.12: OPTION 1C1 (PURPLE)

A terminal roundabout is also proposed at the north-eastern tie-in at the location of an existing crossroads at this location. The proposed roundabout will provide connectivity to/from the existing N13 to the north-east, the proposed bypass and the L6674 local road. No connection is proposed to the existing N13 to the south of the proposed terminal roundabout.

One river bridge and twelve grade-separated road crossings are required including at the R252 Regional Road where a compact grade-separated junction is proposed. Option 1C1 also includes a new link between the existing N15 and R252 to the west of Ballybofey. A new link is also proposed between the existing N13 and the N15 to the east of Stranorlar.

2.11.1 Link Road between Existing N15 and R252

Problem

It is proposed to provide a new link road between the existing N15 and the R252 to the west of Ballybofey. The proposed location of the junction between the link road and the R252 is in close proximity to and existing non-standard junction on the R252 with a local road.

The proximity of these at-grade junctions could lead to driver confusion and late manoeuvres resulting in shunt collisions, and will increase the concentration of turning manoeuvres along this section of the regional road resulting in a potential increased number of collisions at this location.

Hazard

Junctions in close proximity on the existing regional road could lead to driver confusion resulting in late-braking or late manoeuvres and shunt collisions and will also result in additional turning movements with increased likelihood of side-on collisions associated with right-turning manoeuvres into/out of the junctions.

2.11.2 Traffic to/from N15 East of Ballybofey & Stranorlar

Problem

Traffic travelling to/from the N15 west of Ballybofey & Stranorlar to/from the N15 east of the town are likely to continue to travel through the town centre, and consequently these road users do not benefit from the same safety improvements provided by other options.

The historical collision data provided to the Audit Team indicates that there are safety issues on the existing national road through the town, in particular for non-motorised road users.

Hazard

When compared with other options, this option is likely to provide fewer safety improvements for users due to the increased potential for N15 traffic to continue travelling through town.

2.11.3 North-eastbound Approach to North-eastern tie-in

Problem

The gradient on the north-eastbound approach to the north-eastern tie-in roundabout is 4.7% to a point within 300m of the roundabout.

Hazard

Excessive speeds on approach to roundabout due to the approach gradient will result in some drivers failing to adequately moderate their speeds on the approach leading to overshoot into the junction and side-on or run off road collisions.

2.11.4 Traffic to/from N13 North-East of Route

Problem

The existing N13 south of the north-eastern terminal roundabout is to be severed and no link is proposed between the bypass and the existing N13 or the N15 east of the River Finn.

Traffic travelling to/from the N13 to the north-east and the N15 to the south-east will travel through the town in order to access the bypass either via the new N15/R252 link road or the existing R252, including the R252/N15 t-junction which has limited sightlines.

Alternatively, drivers may choose to use the local road network. Increased traffic on the local road network is likely to result in increased collisions.

Hazard

It is likely that a higher volume of traffic will continue to use the existing network when compared to other options, making the journey less safe in comparison to other options.

2.12 Option 1D1 (Red)

The overall length of Option 1D1 is 8.44km, excluding the realignments of the N13 or N15 at the tie-in points, all of which is off-line to the north-west of Ballybofey & Stranorlar. A terminal roundabout is proposed at the western tie-in with associated realignment of the N15 into the roundabout.

A terminal roundabout is also proposed at the north-eastern tie-in at the location of an existing crossroads at this location. The proposed roundabout will provide connectivity to/from the existing N13 to the north-east, the proposed bypass and the L6674 local road. No connection is proposed to the existing N13 to the south of the proposed terminal roundabout.

One river bridge and twelve grade-separated road crossings are required including at the R252 Regional Road. A compact grade separated junction is proposed to link to the R252 Regional Road and to the existing N15. A second compact grade separated junction is proposed to the north-east of Stranorlar connecting the bypass with the existing N13 and the existing N15 to the east of Stranorlar.

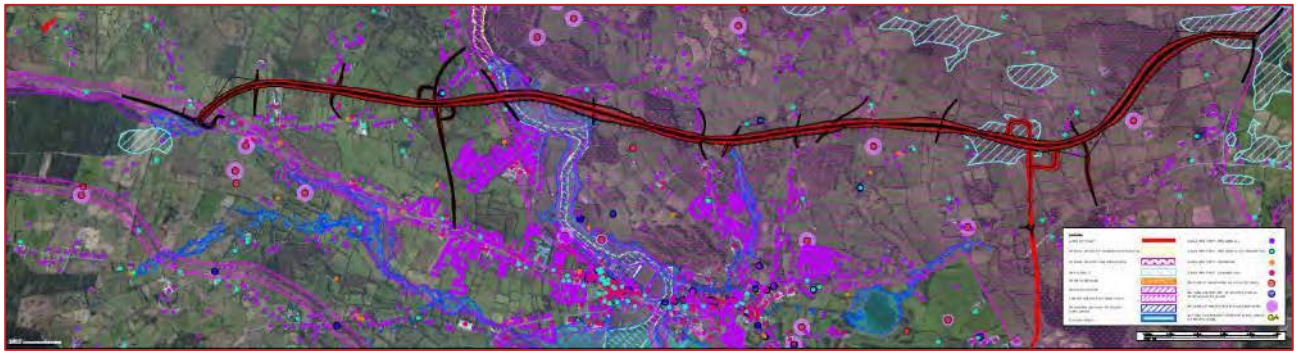


FIGURE 2.13: OPTION 1D1 (RED)

2.12.1 Western Tie-in Roundabout

Problem

The horizontal alignment of the proposed bypass on the westbound approach to the western tie-in roundabout consists of a horizontal curve which connects directly to the roundabout. The proposed road layout may result in reduced awareness by westbound drivers of the upcoming roundabout, leading to a failure to adequately moderate speeds on the approach.

Hazard

Horizontal alignment on the westbound approach to tie-in roundabout may lead to drivers failing to adequately moderate their speeds on approach, resulting in overshoot incidents into the circulating carriageway leading to side-on collisions.

2.12.2 Western Tie-in Roundabout

Problem

The proposed horizontal alignment on the eastern arm of the western tie-in roundabout, connecting to the existing N15 towards Ballybofey, includes back-to-back low-radius curves which drivers may fail to successfully negotiate resulting in run-off-road incidents.

Hazard

Increased potential for run-off-road or loss of control collisions due to alignment on approach to western terminal roundabout.

2.12.3 Tie-in with Existing R252

Problem

The proposed junction on the R252 between the new link road, connecting the existing R252 with the proposed bypass and the existing N15, is located in close proximity to an existing, non-standard, local road junction on the regional road. The proximity of the two junctions will result in a concentration of turning movements along a relatively short length of regional road with a resulting increased likelihood of collisions associated with turning manoeuvres.

Hazard

Junctions in close proximity on the existing regional road could lead to driver confusion resulting in late-braking or late manoeuvres and shunt collisions and will also result in additional turning movements with increased likelihood of side-on collisions associated with right-turning manoeuvres into/out of the junctions.

2.12.4 Existing R252

Problem

The proposed junction arrangement on the R252 between the new link road, connecting the existing R252 with the proposed bypass and the existing N15, will result in priority being retained for the existing R252. This arrangement is likely to result in traffic continuing to travel along the existing regional road into the town rather than use the new link road.

During the site visit it was noted that the existing R252 within the town is relatively narrow and the existing R252/N15 junction is uncontrolled and has visibility issues for drivers exiting from the R252.

Hazard

Continued or increased use of existing R252, and in particular its junction with the existing N15, may lead to increased collisions when compared with other options.

2.13 Option 1E1 (Green)

The overall length of Option 1E1 is 8.2km, excluding the realignments of the N13 or N15 at the tie-in points, all of which is off-line to the north-west of Ballybofey & Stranorlar. A terminal roundabout is proposed at the western tie-in with associated realignment of the N15 into the roundabout.

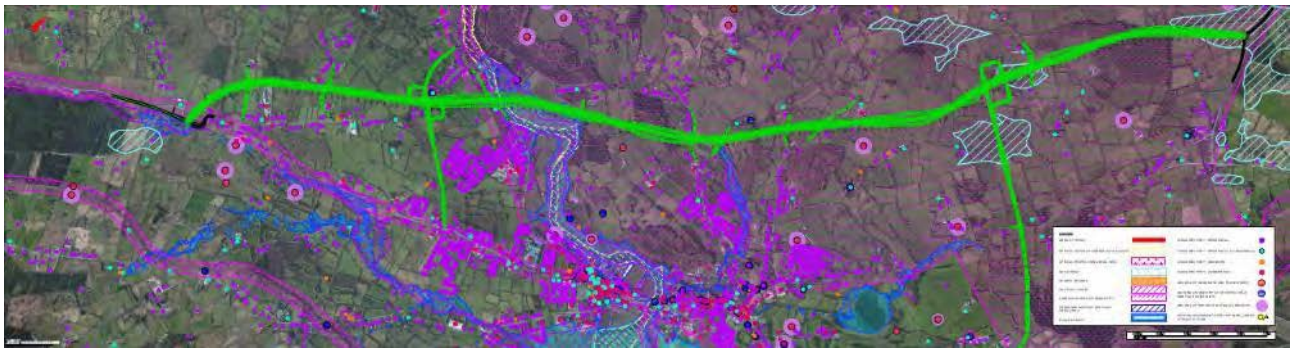


FIGURE 2.14: OPTION 1E1 (GREEN)

A terminal roundabout is also proposed at the north-eastern tie-in at the location of an existing crossroads at this location. The proposed roundabout will provide connectivity to/from the existing N13 to the north-east, the proposed bypass and the L6674 local road. No connection is proposed to the existing N13 to the south of the proposed terminal roundabout.

One river bridge and eleven grade-separated road crossings are required including at the R252 Regional Road. A compact grade separated junction is proposed to link to the R252 Regional Road and to the existing N15. A second compact grade separated junction is proposed to the north-east of Stranorlar connecting the bypass with the existing N13 and the existing N15 to the east of Stranorlar.

2.13.1 Western Tie-in Roundabout

Problem

The horizontal alignment of the proposed bypass on the westbound approach to the western tie-in roundabout consists of a horizontal curve which connects directly to the roundabout. The proposed road layout may result in reduced awareness by westbound drivers of the upcoming roundabout, leading to a failure to adequately moderate speeds on the approach.

Hazard

Horizontal alignment on the westbound approach to tie-in roundabout may lead to drivers failing to adequately moderate their speeds on approach, resulting in overshoot incidents into the circulating carriageway leading to side-on collisions.

2.13.2 Western Tie-in Roundabout

Problem

The proposed horizontal alignment on the eastern arm of the western tie-in roundabout, connecting to the existing N15 towards Ballybofey, includes back-to-back low-radius curves which drivers may fail to successfully negotiate resulting in run off road incidents.

Hazard

Run off road collisions due to high-demands alignment on approach to western terminal roundabout.

2.13.3 North-eastbound Approach to North-eastern tie-in

Problem

The gradient on the north-eastbound approach to the north-eastern tie-in roundabout is approximately 4%.

Hazard

Excessive speeds on approach to roundabout due to the approach gradient will result in some drivers failing to adequately moderate their speeds on the approach leading to overshoot into the junction and side-on or run off road collisions.

2.13.4 Tie-in with Existing R252

Problem

The proposed junction on the R252 between the new link road, connecting the existing R252 with the proposed bypass and the existing N15, is located in close proximity to existing, non-standard, local road junction on the regional road. The proximity of the two junctions will result in a concentration of turning movements along a relatively short length of regional road with a resulting increased likelihood of collisions associated with turning manoeuvres.

Hazard

Junctions in close proximity on the existing regional road could lead to driver confusion resulting in late-braking or late manoeuvres and shunt collisions and will also result in additional turning movements with increased likelihood of side-on collisions associated with right-turning manoeuvres into/out of the junctions.

2.13.5 Existing R252

Problem

The proposed junction arrangement on the R252 between the new link road, connecting the existing R252 with the proposed bypass and the existing N15, will result in priority being retained for the existing R252. This arrangement is likely to result in traffic continuing to travel along the existing regional road into the town rather than use the new link road.

During the site visit it was noted that the existing R252 within the town is relatively narrow and the existing R252/N15 junction is uncontrolled and has visibility issues for drivers exiting from the R252.

Hazard

Continued or increased use of existing R252, and in particular its junction with the existing N15, may lead to increased collisions when compared with other options.

2.14 Option 1F1 (Blue)

The overall length of Option 1F1 is 8km, excluding the realignments of the N13 or N15 at the tie-in points, all of which is off-line to the north-west of Ballybofey & Stranorlar A terminal roundabout is proposed at the western tie-in with associated realignment of the N15 into the roundabout.

A terminal roundabout is also proposed at the north-eastern tie-in at the location of an existing crossroads at this location. The proposed roundabout will provide connectivity to/from the existing N13 to the north-east, the proposed bypass and the L6674 local road. No connection is proposed to the existing N13 to the south of the proposed terminal roundabout.

FIGURE 2.15: OPTION 1F1 (BLUE)

One river bridge and eleven grade-separated road crossings are required including a compact grade separated junction to the north-east of Stranorlar connecting the bypass with the existing N13 and the existing N15 to the east of Stranorlar. A new link is proposed from the proposed compact grade separated junction between the bypass and the existing N13 and N15 to the east of Stranorlar. An at-grade roundabout junction is proposed to the north-west of Stranorlar connecting the bypass with the existing N15.

2.14.1 Western Tie-in Roundabout

Problem

The horizontal alignment of the proposed bypass on the westbound approach to the western tie-in roundabout consists of a horizontal curve which connects directly to the roundabout. The proposed road layout may result in reduced awareness by westbound drivers of the upcoming roundabout, leading to a failure to adequately moderate speeds on the approach.

Hazard

Horizontal alignment on the westbound approach to tie-in roundabout may lead to drivers failing to adequately moderate their speeds on approach, resulting in overshoot incidents into the circulating carriageway leading to side-on collisions.

2.14.2 Western Tie-in Roundabout

Problem

The proposed horizontal alignment on the eastern arm of the roundabout, connecting to the existing N15 towards Ballybofey, includes back-to-back low-radius curves which drivers may fail to successfully negotiate resulting in run-off-road incidents.

Hazard

Run-off-road collisions due to high-demand alignment on approach to western terminal roundabout.

FIGURE 2.16: OPTION 1F1 WESTERN TIE-IN ROUNDABOUT

2.14.3 Approaches to North-eastern Tie-in Roundabout

Problem

The horizontal alignment of the N13 on both approaches to the north-eastern tie-in roundabout could result in a sight-through issue for drivers travelling in either direction on the N13 approaching the roundabout, where drivers may sight onto the section of road downstream of the junction reducing their awareness of the upcoming junction.

Hazard

Sight-through effect reducing approaching driver's awareness of the upcoming junction, and of the need to moderate their speeds in order to navigate the roundabout, leading to inappropriate approach speeds and overshoot incidents resulting in side-on or run off road collisions.

2.14.4 Dual Roundabouts at North-eastern Tie-in

Problem

Two roundabouts are proposed at the north-eastern tie-in in order to connect the proposed bypass with the N13 to the north of the scheme and with the section of existing N13 to the south of the tie-in location. The provision of two roundabouts in close proximity increases the road layout complexity, when compared with other options, and the number of turning manoeuvres which will need to be undertaken by drivers depending on their intended destination.

Hazard

When compared with the other options, Route 1F1 has greater road layout complexity, and increased number of turning manoeuvres required with dual roundabout terminal arrangement, leading to an increased likelihood of collisions.

2.14.5 Tie-in with Existing R252

Problem

The proposed junction on the R252 between the new link road, connecting the existing R252 with the proposed bypass and the existing N15, is located in close proximity to existing, non-standard, local road junction on the regional road. The proximity of the two junctions will result in a concentration of turning movements along a relatively short length of regional road with a resulting increased likelihood of collisions associated with turning manoeuvres.

Hazard

Junctions in close proximity on the existing regional road could lead to driver confusion resulting in late-braking or late manoeuvres and shunt collisions and will also result in additional turning movements with increased likelihood of side-on collisions associated with right-turning manoeuvres into/out of the junctions.

2.14.6 Existing R252

Problem

The proposed junction arrangement on the R252 between the new link road, connecting the existing R252 with the proposed bypass and the existing N15, will result in priority being retained for the existing R252. This arrangement is likely to result in traffic continuing to travel along the existing regional road into the town rather than use the new link road.

During the site visit it was noted that the existing R252 within the town is relatively narrow and the existing R252/N15 junction is uncontrolled and has visibility issues for drivers exiting from the R252.

Hazard

Continued or increased use of existing R252, and in particular its junction with the existing N15, may lead to increased collisions when compared to other options.

3 Preference of Design Options

Following on from the safety concerns outlined in the previous section, this is a summary of the main points/issues identified for each option.

3.1 Option 1A (Orange)

Two at-grade junctions are proposed on the R252 to cater for connections to the bypass, at a location on the regional road where sightline/visibility issues could arise.

Traffic from the west wishing to travel towards the N15 east of Stranorlar will continue to travel through the town, some of which may use the R252 and its junction with the existing N15.

Traffic travelling from the north to/from the N15 will have to travel along the existing N13 and through the existing t-junction with the R236.

Option 1A connects onto the existing R252 Regional Road and may result in increased traffic volumes on this road and through the existing R252/N15 junction in Ballybofey.

3.2 Option 1B (Pink)

Option 1B connects onto the existing R252 Regional Road and will result in increased traffic volumes on this road and through the existing R252/N15 junction in Ballybofey.

There is no proposal to address the existing crossroads on the N13 north of the north-eastern tie-in.

Traffic travelling to/from the N15 will have to navigate two junctions and a section of the existing N13 east of Stranorlar, to access the bypass.

Traffic from the west wishing to travel towards the N15 east of Stranorlar will continue to travel through the town, some of which may use the R252 and its junction with the existing N15.

The horizontal alignment on the approach to the north-eastern tie-in location could give rise to sight-through issues at the roundabout, and the provision of two new roundabouts at this location will result in increased road layout complexity and increased turning manoeuvres.

3.3 Option 1C (Purple)

Traffic from the west wishing to travel towards the N15 east of Stranorlar will continue to travel through the town, some of which may use the R252 further exacerbating issues at its junction with the existing N15.

There is no proposal to address the existing crossroads on the N13 north of the north-eastern tie-in.

Traffic travelling from the north to/from the N15 will have to travel along the existing N13 towards the north and east, navigating the existing t-junction with the R236.

Option 1C connects onto the existing R252 Regional Road and will result in increased traffic volumes on this road and through the existing R252/N15 junction in Ballybofey when compared to other options.

The horizontal alignment on the approach to the north-eastern tie-in location could give rise to sight-through issues at the roundabout, and the provision of two new roundabouts at this location will result in increased road layout complexity and increased turning manoeuvres.

3.4 Option 1D (Red)

Option 1D provides a new link road from a proposed compact grade separated junction on the bypass and connecting onto the existing N15 to the south and to the existing R252 Regional Road. This will provide an improved route for traffic travelling to/from the Bypass and Ballybofey or Glenties.

Traffic from the west wishing to travel towards the N15 east of Stranorlar are catered for by means of a new link and the Bypass to both the existing N13 and N15 east of Stranorlar, reducing the volumes of traffic through the town.

The proposal to provide the western tie-in roundabout to the south of the existing N15 results in a less desirable horizontal alignment on the Bypass, and a problematic horizontal alignment on the connection onto the old N15 towards Ballybofey, approaching the roundabout.

There is no proposal to address the existing crossroads on the N13 north of the north-eastern tie-in.

3.5 Option 1E (Green)

Option 1E provides a new link road from a proposed compact grade separated junction on the bypass and connecting onto the existing N15 to the south and to the existing R252 Regional Road. This will provide an improved route for traffic travelling to/from the Bypass and Ballybofey or Glenties.

Traffic from the west wishing to travel towards the N15 east of Stranorlar are catered for by means of a new link and the Bypass to both the existing N13 and N15 east of Stranorlar, reducing the volumes of traffic through the town.

The proposal to provide the western tie-in roundabout to the south of the existing N15 results in a less desirable horizontal alignment on the Bypass, and a problematic horizontal alignment on the connection onto the old N15 towards Ballybofey, approaching the roundabout.

There is no proposal to address the existing crossroads on the N13 north of the north-eastern tie-in.

3.6 Option 1F (Blue)

Option 1F provides a new link road from a proposed compact grade separated junction on the bypass and connecting onto the existing N15 to the south and to the existing R252 Regional Road. This will provide an improved route for traffic travelling to/from the Bypass and Ballybofey or Glenties.

Traffic travelling to/from the N15 will have to navigate two junctions and a section of the existing N13 east of Stranorlar, to access the bypass.

Traffic from the west wishing to travel towards the N15 east of Stranorlar will continue to travel through the town.

The proposal to provide the western tie-in roundabout to the south of the existing N15 results in a less desirable horizontal alignment on the Bypass, and a problematic horizontal alignment on the connection onto the old N15 towards Ballybofey, approaching the roundabout.

There is no proposal to address the existing crossroads on the N13 north of the north-eastern tie-in.

3.7 Option 1G (Yellow)

Option 1G provides a new link road from the bypass and connecting onto the existing N15 to the south and to the existing R252 Regional Road. This will provide an improved route for traffic travelling to/from the Bypass and Ballybofey.

Traffic from the west wishing to travel towards the N15 east of Stranorlar are catered for by means of a new link between the Bypass to both the existing N13 and N15 east of Stranorlar, reducing the volumes of traffic through the town.

A new at-grade junction is proposed on the R252, to cater for the new link road connecting with the bypass and the existing N15 west of Ballybofey, in close proximity to an existing non-standard junction, increasing turning manoeuvres along a relatively short section of the regional road.

3.8 Option 1A1 (Orange)

Option 1A1 connects onto the existing R252 Regional Road and will result in increased traffic volumes on this road and through the existing R252/N15 junction in Ballybofey.

Traffic from the west wishing to travel towards the N15 east of Stranorlar will continue to travel through the town, some of which may use the R252 and its junction with the existing N15.

Traffic travelling from the north to/from the N15 (south-east) will have to travel through the town, some of which may use the R252 and its junction with the existing N15, or along the local road network.

Two at-grade junctions are proposed on the R252 to cater for connections to the bypass, at a location on the regional road where sightline/visibility issues could arise.

A new junction is proposed on the R252 for the new link road connecting with the existing N15 west of Ballybofey in close proximity to an existing non-standard junction, increasing turning manoeuvres along a relatively short section of the regional road.

3.9 Option 1B1 (Pink)

Option 1B1 connects onto the existing R252 Regional Road and will result in increased traffic volumes on this road and through the existing R252/N15 junction in Ballybofey.

Traffic from the west wishing to travel towards the N15 east of Stranorlar are catered for by means of a new link between the Bypass to both the existing N13 and N15 east of Stranorlar, reducing the volumes of traffic through the town.

A new at-grade junction is proposed on the R252 to cater for connections to the bypass and a new junction is proposed on the R252 for the new link road connecting with the existing N15 west of Ballybofey in close proximity to an existing non-standard junction, increasing turning manoeuvres along a relatively short section of the regional road.

3.10 Option 1C1 (Purple)

Option 1C1 connects onto the existing R252 Regional Road and will result in increased traffic volumes on this road and through the existing R252/N15 junction in Ballybofey.

Some traffic from the west wishing to travel towards the N15 east of Stranorlar will continue to travel through the town, some of which may use the R252 and its junction with the existing N15.

A new at-grade junction is proposed on the R252 to cater for connections to the bypass and a new junction is proposed on the R252 for the new link road connecting with the existing N15 west of Ballybofey in close proximity to an existing non-standard junction, increasing turning manoeuvres along a relatively short section of the regional road.

Traffic travelling from the north to/from the N15 (south-east) will have to travel through the town, some of which may use the R252 and its junction with the existing N15, or along the local road network.

3.11 Option 1D1 (Red)

Option 1D1 provides a new link road from a proposed compact grade separated junction on the bypass and connecting onto the existing N15 to the south and to the existing R252 Regional Road. This will provide an improved route for traffic travelling to/from the Bypass and Ballybofey or Glenties.

A new at-grade junction is proposed on the R252, to cater for the new link road connecting with the bypass and the existing N15 west of Ballybofey, in close proximity to an existing non-standard junction, increasing turning manoeuvres along a relatively short section of the regional road.

Traffic from the west wishing to travel towards the N15 east of Stranorlar are catered for by means of a new link between the Bypass to both the existing N13 and N15 east of Stranorlar, reducing the volumes of traffic through the town.

The proposal to provide the western tie-in roundabout to the south of the existing N15 results in a less desirable horizontal alignment on the Bypass, and a problematic horizontal alignment on the connection onto the old N15 towards Ballybofey, approaching the roundabout.

3.12 Option 1E1 (Green)

Option 1E1 provides a new link road from a proposed compact grade separated junction on the bypass and connecting onto the existing N15 to the south and to the existing R252 Regional Road. This will provide an improved route for traffic travelling to/from the Bypass and Ballybofey or Glenties.

A new at-grade junction is proposed on the R252, to cater for the new link road connecting with the bypass and the existing N15 west of Ballybofey, in close proximity to an existing non-standard junction, increasing turning manoeuvres along a relatively short section of the regional road.

Traffic from the west wishing to travel towards the N15 east of Stranorlar are catered for by means of a new link between the Bypass to both the existing N13 and N15 east of Stranorlar, reducing the volumes of traffic through the town.

The proposal to provide the western tie-in roundabout to the south of the existing N15 results in a less desirable horizontal alignment on the Bypass, and a problematic horizontal alignment on the connection onto the old N15 towards Ballybofey, approaching the roundabout.

3.13 Option 1F1 (Blue)

Option 1F1 provides a new link road from the bypass and connecting onto the existing N15 to the south and to the existing R252 Regional Road. This will provide an improved route for traffic travelling to/from the Bypass and Ballybofey.

A new at-grade junction is proposed on the R252, to cater for the new link road connecting with the bypass and the existing N15 west of Ballybofey, in close proximity to an existing non-standard junction, increasing turning manoeuvres along a relatively short section of the regional road.

Traffic from the west wishing to travel towards the N15 east of Stranorlar are catered for by means of a new link between the Bypass to both the existing N13 and N15 east of Stranorlar, reducing the volumes of traffic through the town.

The proposal to provide the western tie-in roundabout to the south of the existing N15 results in a less desirable horizontal alignment on the Bypass, and a problematic horizontal alignment on the connection onto the old N15 towards Ballybofey, approaching the roundabout.

3.14 Ranking of Options

The Audit Team carried out a full review of all relevant drawings and documents in relation to the proposed options and visited the site. The main safety considerations in comparing the routes at this stage included: -

- Impact, interface and effect of the on existing road network, in particular within Ballybofey & Stranorlar;
- Type and arrangement of junctions;
- Potential design issues; and
- Potential residual risks.

A summary of some of the comparative items reviewed is given in Table 3.1. The Audit Team consider, from a road safety perspective, that: -

1. New Junctions - options which result in fewer new junctions, and in particular fewer new at-grade junctions, are preferred;
2. Traffic in Urban Area - options which result in reduced traffic through Ballybofey and Stranorlar, along the existing R252 and at the R252/N15 junction, are preferred (Ranking is 'High', 'Moderate', Neutral' and 'Negative' – with 'High' the most preferred);
3. Improved vulnerable road user environment - options which result in reduced traffic through Ballybofey and Stranorlar are preferred (Ranking is 'High', 'Moderate', 'Low' – with 'High' the most preferred);
4. Connectivity to/from Bypass and the N15 (East) - options which include connectivity between the bypass and the N15 east of Stranorlar are preferred (Ranking is 'High', 'Moderate', Low' and 'None' – with 'High' the most preferred);
5. Western Terminal - the western terminal roundabout arrangement shown on Routes 1A, 1B, 1C, 1G, 1A1, 1B1 & 1C1 is preferred (Ranking is 'High', 'Moderate', Low' and 'None' – with 'High' the most preferred);
6. North-Eastern Terminal - a north-eastern terminal roundabout arrangement with a single roundabout is preferred (Ranking is 'High', 'Moderate', Low' and 'None' – with 'High' the most preferred); and
7. Crossroad Junction at Northern Tie-in - Routes which address the existing crossroad junction to the north, are preferred subject to the approach gradient being reduced for some of the routes.

Route Option	Mainline Length [km]	Link Road Length [km]	New Junctions		Effect on Traffic through Urban Area	Improvement to VRU Environment	Connectivity to/from Bypass and the N15 (East)	Western Terminal	North-Eastern Terminal	Crossroad Junction Improved
			At-Grade	Grade-Separated						
1A (Orange)	8.745	2.293	6	1	Neutral	Moderate	Low	High	High	Yes
1B (Pink)	8.700	2.582	6	2	Neutral	Moderate	Moderate	High	Moderate	No
1C (Purple)	8.577	2.293	5	1	Neutral	Moderate	Low	High	High	No
1D (Red)	8.440	4.506	6	2	High	High	High	Moderate	High	No
1E (Green)	8.192	4.744	6	2	High	High	High	Moderate	High	No
1F (Blue)	7.976	4.408	7	2	Moderate	Moderate	Moderate	Moderate	Moderate	No
1G (Yellow)	8.218	4.848	6	2	High	High	High	High	High	Yes
1A1 (Orange)	8.745	3.521	6	1	Negative	Low	None	High	High	Yes
1B1 (Pink)	8.700	4.385	6	2	Moderate	Moderate	High	High	High	Yes
1C1 (Purple)	8.577	3.521	5	1	Negative	Low	None	High	High	Yes
1D1 (Red)	8.440	4.803	6	2	High	High	High	Moderate	High	Yes
1E1 (Green)	8.192	5.239	6	2	High	High	High	Moderate	High	Yes
1F1 (Blue)	7.976	4.962	7	2	High	High	High	Moderate	High	Yes

TABLE 3.1: COMPARISONS ADVANTAGES/DISADVANTAGES (NON-EXHAUSTIVE/SELECTED)

The Audit Team have concluded that the Options, as provided, rank as shown in Table 3.2 in terms of road safety. The ranking is purely a relative grading of the options with respect to each other.

All of the proposed Options represent a significant improvement to the existing arrangement where the N13 and N15 travel through the urban area of Ballybofey and Stranorlar, however the Audit Team consider that many, or all, of the elements of the proposed routes which are preferred from a road safety perspective can be incorporated into the final selected route.

Option	Rank
1A (Orange)	8
1B (Pink)	10
1C (Purple)	8
1D (Red)	5
1E (Green)	5
1F (Blue)	13
1G (Yellow)	1
1A1 (Orange)	12
1B1 (Pink)	2
1C1 (Purple)	10
1D1 (Red)	2
1E1 (Green)	2
1F1 (Blue)	5

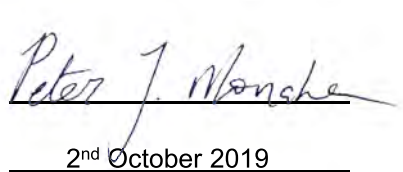
TABLE 3.2: OPTION RANKING

4 Road Safety Audit Team Statement

We certify that we have examined the drawings and other information referred to in this report and listed in Appendix B, and that the site during daytime on the 15th August 2018. We product certify that we are independent from the design team for the scheme. The examination has been carried out with the sole purpose of identifying any features of the design that could be removed or modified in order to improve the safety of the scheme.

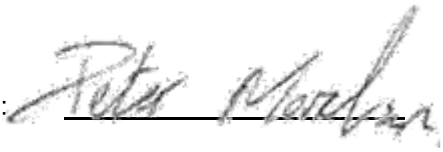
The problems identified have been noted in this report, together with suggestions for a preferred option.

ROAD SAFETY AUDIT TEAM LEADER

Peter Monahan Signed: 

Dated: 2nd October 2019

ROAD SAFETY AUDIT TEAM MEMBER

Peter Morehan Signed: 

Dated: 2nd October 2019

ROAD SAFETY AUDIT TEAM MEMBER

Gerard Claffey Signed: 

Dated: 2nd October 2019

OTHERS INVOLVED

Ms. Laura Woodbyrne, Trainee/Observer

Appendix A – Documents Submitted to the Road Safety Audit Team

DOCUMENT/DRAWING TITLE	DOCUMENT/DRAWING NO.	REVISION
	Collision Rate Data (Jan2014 to Sep 2016)	-
TT_MGT0337-RPS-00-ZZ-DR-D-DG0011-01	SECTION 1 - STAGE 2 ROUTE CORRIDORS	P01
TT_MGT0337-RPS-00-ZZ-DR-D-GE0001	LONGPLOT PLAN & PROFILE SECTION 1 - ORANGE ROUTE CORRIDOR	P03
TT_MGT0337-RPS-00-ZZ-DR-D-GE0002	PLAN & PROFILE SECTION 1 - PINK ROUTE CORRIDOR	P03
TT_MGT0337-RPS-00-ZZ-DR-D-GE0003	PLAN & PROFILE SECTION 1 - PURPLE ROUTE CORRIDOR	P03
TT_MGT0337-RPS-00-ZZ-DR-D-GE0004	LONGPLOT PLAN & PROFILE SECTION 1 - RED ROUTE CORRIDOR	P03
TT_MGT0337-RPS-00-ZZ-DR-D-GE0005	LONGPLOT PLAN & PROFILE SECTION 1 - GREEN ROUTE CORRIDOR	P03
TT_MGT0337-RPS-00-ZZ-DR-D-GE0006	LONGPLOT PLAN & PROFILE SECTION 1 - BLUE ROUTE CORRIDOR	P04
TT_MGT0337-RPS-00-ZZ-DR-D-GE0027-01	LONGPLOT PLAN & PROFILE SECTION 1 – ORANGE ROUTE CORRIDOR 1A1	P01
TT_MGT0337-RPS-00-ZZ-DR-D-GE0027-02	LONGPLOT PLAN & PROFILE SECTION 1 – PINK ROUTE CORRIDOR 1B1	P01
TT_MGT0337-RPS-00-ZZ-DR-D-GE0027-03	LONGPLOT PLAN & PROFILE SECTION 1 – PURPLE ROUTE CORRIDOR 1C1	P01
TT_MGT0337-RPS-00-ZZ-DR-D-GE0027-04	LONGPLOT PLAN & PROFILE SECTION 1 – RED ROUTE CORRIDOR 1D1	P01
TT_MGT0337-RPS-00-ZZ-DR-D-GE0027-05	LONGPLOT PLAN & PROFILE SECTION 1 – GREEN ROUTE CORRIDOR 1E1	P01
TT_MGT0337-RPS-00-ZZ-DR-D-GE0027-06	LONGPLOT PLAN & PROFILE SECTION 1 – BLUE ROUTE CORRIDOR 1F1	P01
TT_MGT0337-RPS-00-ZZ-DR-D-GE0027-07	LONGPLOT PLAN & PROFILE SECTION 1 – COMPOSITE ROUTE CORRIDOR 1G	P01
Section 1_Northern Tie-In_Option B	Section 1_Northern Tie-In_Option B.pdf	-
TT_MGT0337-RPS-00-ZZ-DR-D-SK0008-01	SECTION 1 - LINK ROUTE DIRECT NORTH (IN ASSOCIATION WITH ORANGE ROUTE CORRIDOR 1A1)	P01.01
TT_MGT0337-RPS-00-ZZ-DR-D-SK0008-02	SECTION 1 - LINK ROUTE DIRECT NORTH (IN ASSOCIATION WITH PINK ROUTE CORRIDOR 1B1)	P01.01
TT_MGT0337-RPS-00-ZZ-DR-D-SK0008-03	SECTION 1 - LINK ROUTE DIRECT NORTH (IN ASSOCIATION WITH PURPLE ROUTE CORRIDOR 1C1)	P01.01
TT_MGT0337-RPS-00-ZZ-DR-D-SK0008-04	SECTION 1 - LINK ROUTE DIRECT NORTH (IN ASSOCIATION WITH RED ROUTE CORRIDOR 1D1)	P01.01
TT_MGT0337-RPS-00-ZZ-DR-D-SK0008-05	SECTION 1 - LINK ROUTE DIRECT NORTH (IN ASSOCIATION WITH GREEN ROUTE CORRIDOR 1E1)	P01.01
TT_MGT0337-RPS-00-ZZ-DR-D-SK0008-06	SECTION 1 - LINK ROUTE DIRECT NORTH (IN ASSOCIATION WITH BLUE ROUTE CORRIDOR 1F1)	P01.01
TT_MGT0337-RPS-00-ZZ-DR-D-SK0008-07	SECTION 1 - LINK ROUTE DIRECT NORTH (IN ASSOCIATION WITH COMPOSITE ROUTE CORRIDOR 1G)	P01.01

Appendix B – Audit Team Approval

Emma Coyle
Classon House
Dundrum Business Park
Dublin 14

Date: 13/08/2018

Our Ref: 1311544/5336/Stage F

re: N15 N15/N13 Ballybofey/Stranorlar Urban Region TEN-T

APPROVAL OF ROAD SAFETY AUDIT TEAM, Stage F

Dear Emma Coyle,

The following members of the proposed road safety audit team are approved to carry out the Stage F road safety audit of N15 N15/N13 Ballybofey/Stranorlar Urban Region TEN-T.

1. Peter Monahan - PMCE Ltd. - Leader
2. Peter Morehan - J.B. Barry & Partners Ltd. (Dublin) - Leader
3. Gerard Claffey - J.B. Barry & Partners Ltd. (Dublin) - Member

A copy of all audit reports, design team response and exception reports must be uploaded through RSAAS. Successful upload of these reports and completion of the audit approval process is necessary for any further audit approval on this scheme.

Yours sincerely,

Lucy Curtis

Regional Road Safety Engineer
roadsafetyaudits@nra.ie

Appendix B

Comhairle Contae Dhún na nGall
Donegal County Council

TEN-T Priority Route Improvement Project, Donegal

Section 1: N15/N13 Ballybofey to Stranorlar

Phase 2 - Road Safety Impact Assessment

December 2019

RPS BARRY TRANSPORTATION

Document Control Sheet

Client:	Donegal County Council
Project Title:	TEN-T Priority Route Improvement Project, Donegal – Section 1: N15/N13 Ballybofey to Stranorlar
Document Title:	Road Safety Impact Assessment
Document No. :	TT_Y16112-BT-RS-GEN-S3 -RP-C-00001

Rev. No.	Suitability	Effective Date	Revision Description	Checked	Approved
P01	S4	December 2019	Issue for publication	TD/GD	ED

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1 SECTION 1 PHASE 2 IMPACT ASSESSMENT REPORT

1.1 Introduction

This report is for a Phase 2 Road Safety Impact Assessment and considers the "Do Something" options only for Section 1 of the TEN-T Priority Route Improvement Project, Donegal.

An assessment of the "Do Nothing" option concluded that the "Do Nothing" option will not achieve the desired road safety objectives. A Do-minimum option was explored at the beginning of the option selection process but was discounted prior to Stage 1 assessment as the solution would not provide adequate level of service, nor bring infrastructure to current standards and would not meet the scheme objectives.

The objective of this assessment is to consider the proposed project from a road safety point of view by carrying out a comparative analysis of the road safety implications of each alternative option identified during Phase 2. Consequently, a determination of which scheme would give the best road safety outcome can be made.

The assessment has been carried out on the shortlisted options that are being assessed during Stage 2 of the Option Selection Process. To assist in drawing comparisons between options, the assessment reviews the alignment designs prepared at the time of writing, which are Option selection designs only, and are not developed to preliminary design level.

1.2 Problem definition

1.2.1 The Project

The scope of the project is to provide a high-quality road network on three prioritised sections of the Trans-European Transport Network (TEN-T) in Donegal. The scope of the improvement aligns with the National Development Plan, the National Planning Framework (Ireland 2040) and the County Donegal Development Plan.

The project has emerged from a recent study, the Trans-European Transport Network Corridor Needs Study, conducted by CH2M Barry in 2015, which reviewed the existing condition of the whole TEN-T network in the county. For the purposes of the study, the TEN-T network was split into 7 sections as shown in Figure 1-1.

This report assesses the current condition of each section through a site visit, journey time surveys and a desktop study for all sections. The only section omitted from the study was the N15 from south of Ballybofey to the county boundary (Section 1), as numerous upgrades of this section have been completed in recent times. The investigation assessed each section with respect to:

- Cross-section characteristics
- Full Overtaking Sight Distance
- Accesses
- Drainage
- Pavement Condition
- Traffic/Level of Service
- Travel Speed
- Collision Rates

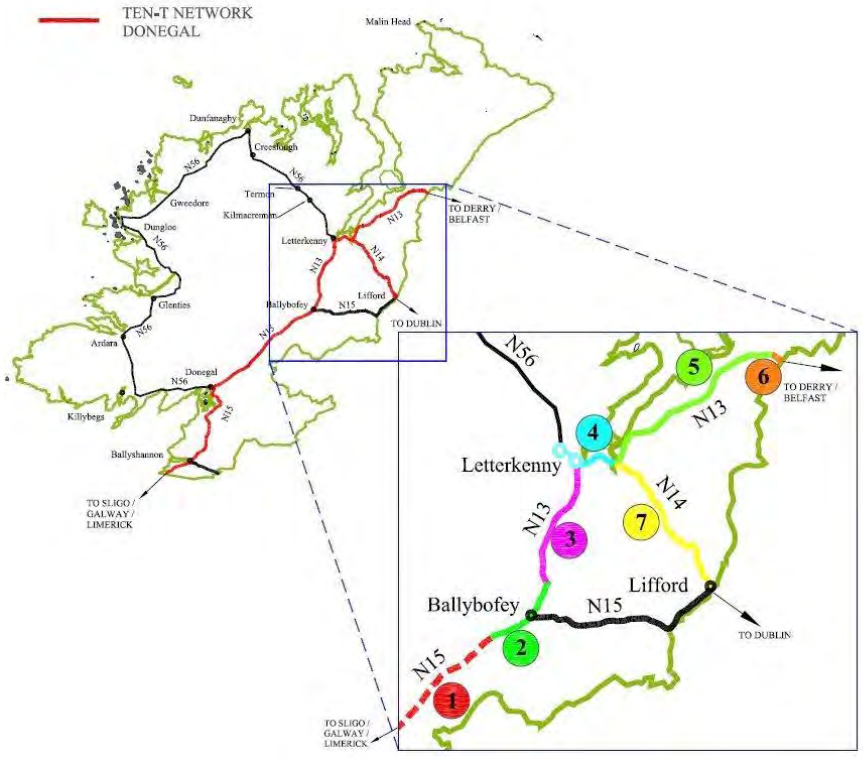

Figure 1-1 Sections of the TEN-T Network in County Donegal

Each section was scored in a consistent manner, which highlighted that much of the TEN-T network in the county falls below the standard expected, with all sections performing poorly on collision rates, future estimated capacity and number of accesses. The overall scores provided a means to prioritise the sections that require imminent intervention, to begin the phased development of the full TEN-T network. These prioritised sections, which performed worst overall, were each of the three sections making up the TEN-T Priority Route Improvement Project, Donegal as follows:

1. The N15/N13 Ballybofey/Stranorlar Urban Region (Section 2)
2. The N56/N13 Letterkenny to Manorcunningham (Section 4)
3. The N14 Manorcunningham to Lifford/Strabane/A5 Link (Section 7)

The above three sections of the TEN-T network form part of the TEN-T Priority Route Improvement Project, Donegal.

The EU Regulation No. 1315 (2013) of the European Parliament and of the Council on Union guidelines for the development of the TEN-T network aims to tackle key issues on the network. The development of the TEN-T network in County Donegal will require a phased approach in order to meet the objectives set out in the TEN-T Regulations.

The first section, the N13/N15 route, is the subject of this report and it links Donegal town to Letterkenny in County Donegal, providing a strategic route linking these towns to Belfast via Derry and the rest of the National Primary network in County Donegal. The N13 starts/terminates in Ballybofey/Stranorlar where is connects to the N15. The N15 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.

1.2.2 Project Objectives

The objectives of this project are to address current road infrastructure deficits and improve the Level of Service (LOS) provided. In so doing, traffic congestion in urban areas will be relieved and road safety

improved (current collision rates are above that anticipated for the nature of the road). A key objective for this scheme is the improvement in journey times for strategic traffic on the N15, by re-assignment from the urban areas of Ballybofey and Stranorlar onto a higher standard, national primary route.

1.3 List of existing road safety problems

The existing problems fall into three key categories:

- Infrastructure deficits: existing infrastructure is currently below the current design standards with respect to alignment, overtaking distances and cross-sectional width;
- Higher Personal Injury Collision (PIC) rates than expected as set out in Project Appraisal Guideline (PAG) Unit 6.11;
- Inadequate LOS: the AADT required for the minimum LOS of D has been exceeded.

Each of the above items are largely interdependent, with LOS being influenced by cross-section, and collision numbers being influenced by alignment. The breakdown of collision statistics for each link within Section 2 is available in Appendix A.

Table 1-1 Collision Statistics from 2005 to 2014 from the rsa.ie collision database

Location	Fatal	Serious	Minor	Total
N15 near Cappry	1	0	5	6
N13 Tyrcallen – near R236 Junction	2	0	4	6
N15 Ballybofey – near junction with R252	0	4	0	4
N15 Ballybofey/Stranorlar speed limit area	0	5	24	29
All other locations	0	0	6	6
Total	**3**	**9**	**39**	**51**

The collision statistics show a cluster of collisions within the Ballybofey/Stranorlar town centres and fatal collisions occurring out of town. Town centre collisions have more pedestrians involved, with all 7 of the serious collisions involving pedestrians occurring in the town centres. Furthermore, a fatal collision at Tyrcallen involved a pedestrian.

Of all 29 collision, 18 involved a pedestrian, 4 of which involve a goods vehicle. Of all collisions, 6 involved goods vehicles. One serious collision involved a bicycle.

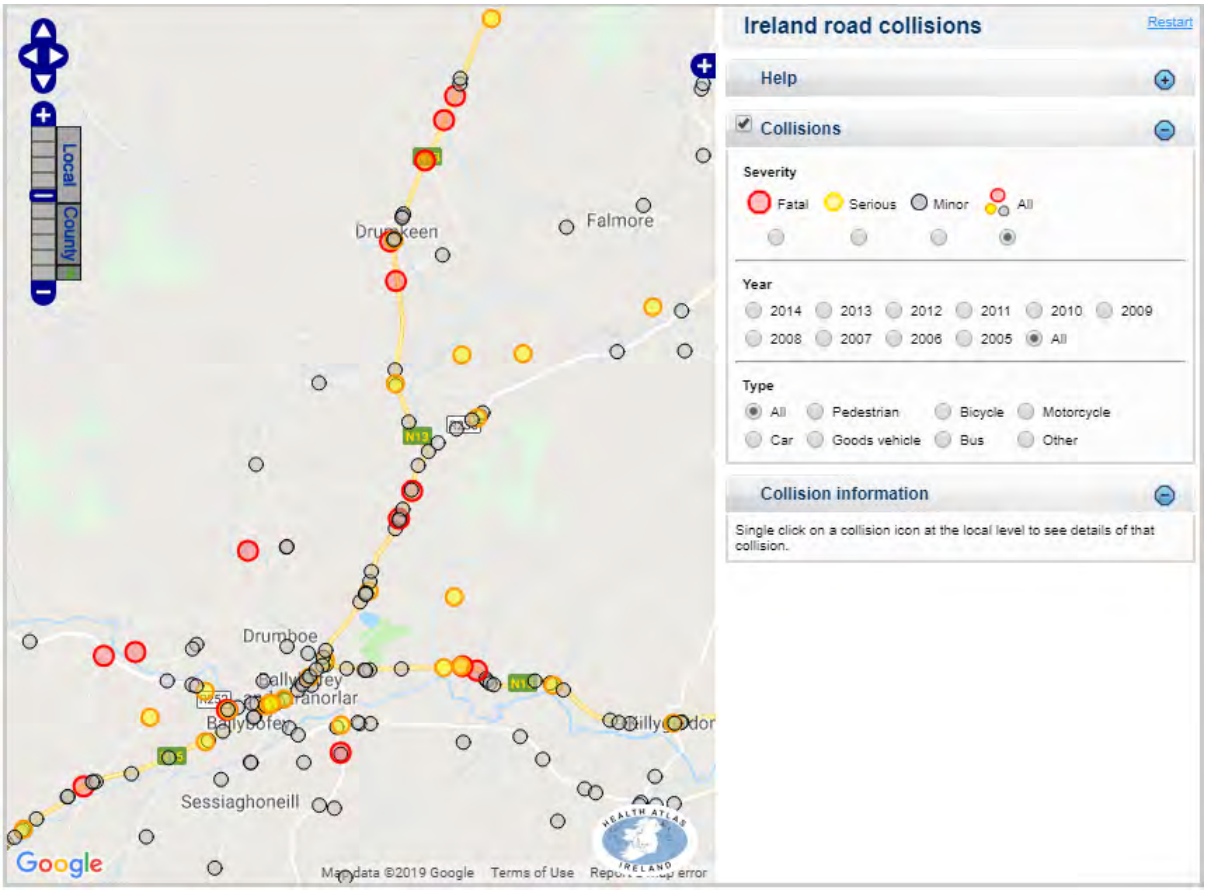

Figure 1-2 RSA.ie collision database information for the Section 1 locality

1.4 The area of influence

In terms of dealing with traffic between the N13 and the N15 (west), all options are similar in that traffic will bypass the towns of Ballybofey/Stranorlar to the north. In general, minor road crossings are proposed to be bridged, minimising impact on local traffic route choice, mode of travel or travel time on local journeys.

The link road proposed between the N13 to the N15 Stranorlar to Lifford link permits north-south traffic to bypass Stranorlar. This link has the potential to redistribute local traffic on the west side of Stranorlar and further reduce traffic volumes on existing roads within Stranorlar.

All options, except Option 1A (Orange) and 1C (Purple) provide a junction on the proposed mainline, which connects to the N13 and N15 east of Ballybofey/Stranorlar. This will benefit trips from the west to east side of Ballybofey/Stranorlar for these options.

1.5 Road safety objectives

The 2016 national fatality statistics are at 40 per million (4.7 million population and 187 fatalities), almost twice the target set in the Road Safety Authority aim of "*25 per million population or less by 2020"*. Correspondingly, the existing safety record for TEN-T comprehensive network in Donegal is poorer than should be expected from that of National Primary Routes.

These poor records are likely to be correlated to the substandard alignment and cross-section of the routes which are insufficient to accommodate current traffic volumes. Additionally, much of the TEN-

T network in Donegal has numerous direct accesses onto the national road network, increasing the variety of vehicles and speeds using the network.

An objective of the project is to reduce the frequency and severity of collisions that occur on the three sections of the TEN-T network, and subsequently making the infrastructure more attractive for vehicular and non-vehicular traffic.

The road safety objectives of this scheme are to:

- Decrease collision frequency on the N15 and N13 within the Ballybofey/Stranorlar area. This can be achieved by:
    - Reducing junction numbers, direct accesses and conflict points;
    - Providing improved infrastructure, alignments and cross-section widths to accommodate existing and future traffic flows;
- Provide a standardised road layout with no substandard features;
- Reduce collision severity on the N15 and N13 within the Ballybofey/Stranorlar area;
- Improve safety for vulnerable road users;

Together these targets will help achieve the overall objective of supporting the Government's Road Safety Strategy 2013-2020.

2 OPTION COMPARISON

Each option has been reviewed in terms of horizontal and vertical alignment of the mainline as prepared for the option selection phase. At this phase the design is not finalised but is indicative of the typical characteristics that could be expected of a route. For example, the extent of areas in cut or fill, the positioning of junctions, proximity to local road networks etc.

The RSIA aims to consider the wider road safety impact of each option on the residual network, as well as the route itself. As such, consideration was given to local trip attractors and traffic generators. A non-exhaustive list of these is provided in Appendix B. The list shows that there is a high demand for local trips in the Section 1 study area, and a significant amount of recreational activities.

During Phase 2 Option Selection, various options for the link road design/layout were developed and investigated on the west side of Ballybofey/Stranorlar. All the options investigated form a compact grade separated junction with the mainline at the same location and link to the N15 western side of Ballybofey. These options underwent public consultation and option assessment to determine which link layout would be best suited for the preferred mainline option. A separate assessment across the relevant RSIA criteria was undertaken on these link roads, and is available in Appendix C.

2.1 Analysis of Impacts on Road Safety

Each option will influence various aspects of the operation of the road network in the locality which in turn have an impact on road safety. The road safety impacts of each option have been reviewed with cognisance of the requirements and criteria set out in PE-PMG-02001. These are outlined in Table 2-1.

Review under the elements set out in Table 2-1 showed that all options provide a significant improvement to the existing road safety conditions as all routes have similar characteristics in terms of cross-section, junction strategy, length etc. Therefore, a review of the engineering designs was undertaken in further understanding of the differences between options and assist in deriving a route ranking. This is summarised in section 2.2.

Table 2-1 Comparative impacts of each option

	Option 1A (Orange)	Option 1A1	Option 1B (Pink)	Option 1B1	Option 1C (Purple)	Option 1C1
Effect on Traffic Flow	According to predicted traffic figures, all options result in transfer of traffic to the new route, reducing town-centre traffic figures by 35%-55% to AADTs of approximately 5200 to 7500. Reduced congestion and lower strategic traffic volumes create a better environment for vulnerable road users.					
	Reduced congestion and lower strategic traffic volumes create a better environment for vulnerable road users. Modal split may result from more favourable conditions for walking and cycling local trips. This is likely to have an overall positive safety benefit.					
		Additional link connecting the R252 to the proposed N15 mainline may alter traffic flows on the regional and local road in the area. This link also results in two additional junctions, creating more conflict points than Option 1A.		Additional link connecting the R252 to the proposed N15 mainline may alter traffic flows on the regional and local roads in these areas. The additional junctions created by these links also introduces more conflict points than Option 1B.		Additional link connecting the R252 to the proposed N15 mainline may alter traffic flows on the regional and local roads in these areas. The additional junctions created by these links also introduces more conflict points than Option 1C.
Effect on Traffic Patterns	A design principal of the scheme is the retention of side roads by means of an underbridge or overbridge of the new national route. Therefore, no significant effects on traffic patterns are anticipated. Local traffic will have access to the existing N13/N15, for local trips.					
	Access to the national route is facilitated by roundabout junctions on each of the route and one intermediate grade separated junction.		Access to the national route is facilitated by roundabout junctions on each of the route and two intermediate grade separated junctions.		Access to the national route is facilitated by roundabout junctions on each of the route and one intermediate grade separated junction.	
	Local through-road severance at Ch 3+100 (Trooper's Hill) will have a minor effect on traffic patterns as feasible alternate routes are available.				Retains the local road network at Trooper's Hill.	
		Additional link connecting the R252 to the proposed N15 mainline may alter traffic patterns.	Closure of through-traffic on a rural road near Troopers Hill will create a detour route that will put through-traffic on a narrow rural road with one-way traffic only in some places and with sharp bends. To reduce road safety impact, this road would need to be upgraded (2km length).			
Impact on Non-Motorised User Travel	The existing local road network will be retained, largely in its current form, by the provision of underbridges and overbridges. Where there is severance of any route, an alternative local road connection will be provided. Therefore, it is not anticipated that any significant negative impact on pedestrian and cyclist safety will occur as a result of the any option. Furthermore, the reassignment of national route traffic onto the new mainline will reduce the number of higher speed vehicles on the local road network (i.e. rat-running), potentially improving conditions for pedestrians and cyclists. The currently proposed Type 2 Dual Carriageway includes a segregated cycle track within the mainline corridor. This will accommodate strategic cyclist journeys. Further clarity is required on the treatment of these road users at the junction interfaces to ensure their safety.					
Seasonal Conditions	There is the potential for increased traffic volumes during the summer tourist period, or at other times due to sports events. However, it is not anticipated that the option will influence road safety in terms of seasonal conditions.					
Climatic Conditions	The option has a high elevation along the western side of Ballybofey/Stranorlar. This slightly increases the risk of snow and ice accumulation for this route		All options have at a high elevation (although lower than Option 1A) on the western side of Ballybofey/Stranorlar. This slightly increases the risk of snow and ice accumulation. However, the shallow gradients applied to the design will not exacerbate this problem.			

	Option 1A (Orange)	Option 1A1	Option 1B (Pink)	Option 1B1	Option 1C (Purple)	Option 1C1
	more than all other routes. However, the shallow gradients applied to the design will not exacerbate this problem.					
Safe Parking Areas	As the option is approximately 9km in length, parking areas are not deemed necessary.					
Effect on existing Collision Clusters	The removal of through-traffic from the urban areas of Ballybofey/Stranorlar will reduce the number of serious and minor collisions that will occur here. Additionally, the downgrading of the existing national route to a regional road with reduced speed and traffic volumes, should address most of the likely contributory factors that lead to the fatal collisions that occurred outside of Ballybofey/Stranorlar.					
Road Geometry	Significant improvement on the road cross-section and alignment design in comparison to the existing N15/N13.					
	Alignment elements that may benefit from further design refinement in later stages: 1. Superelevated carriageway on an almost flat gradient at Ch 0+600 R1020m may give rise to standing water on the carriageway. Consequently, this may create spray/poor visibility during rain, possibility of aquaplaning and ice. 2. There is a long radius with superelevated horizontal curves at Ch 2+700, 3+400, 4+650 and 5+300 with momentary areas of flat pavement at transitions. 3. Potential for a hidden dip in the roadway at Ch 4+300. Vertical sag curvature K-value at Ch 2+700 providing an inconsistent LOS.		Alignment elements that may benefit from further design refinement in later stages: 1. Superelevated carriageway on an almost flat gradient at Ch 0+600 R1020m may give rise to standing water on the carriageway. Consequently, this may create spray/poor visibility during rain, possibility of aquaplaning and ice. 2. There is a long radius with superelevated horizontal curve at Ch 5+800 with momentary area of flat pavement at transitions.		Alignment elements that may benefit from further design refinement in later stages: 1. Superelevated carriageway on an almost flat gradient at Ch 0+600 R1020m may give rise to standing water on the carriageway. Consequently, this may create spray/poor visibility during rain, possibility of aquaplaning and ice. 2. There is a long radius with superelevated horizontal curve at Ch 5+800 with momentary area of flat pavement at transitions. 3. Vertical sag curvature K-value at Ch 2+800 providing an inconsistent LOS.	
Junction Frequency	The existing N15/N13 across the study area has in excess of 40 junctions/accesses. The new mainline proposes one grade separated junction in addition to tie-in junctions at either end. This reduces the number of conflict points on the route, improves the efficiency of traffic flow and can therefore has a positive impact on road safety.					
Junction Locations	Use of desirable minimum (720m) curve on mainline approach to junction. This may have a slight impact on desirable visibility and providing a smooth eastbound diverge to the junction.					
Tie-ins	The mainline approaches to both roundabout junctions at the tie-ins are on down-gradients, providing good forward visibility of the road layout ahead.					
Forgiving Roadsides	Approximately 50% of the route length is on embankments which would require safety barrier.		Approximately 40% of the route length is on embankments which would require safety barrier.		Approximately 41% of the route length is on embankments which would require safety barrier	

Table 2-2 Comparative impacts of each option (continued)

	Option 1D (Red)	Option 1D1	Option 1E (Green)	Option 1E1	Option 1F (Blue)	Option 1F1	Option 1G
Effect on Traffic Flow	According to predicted traffic figures, all options result in transfer of traffic to the new route, reducing town-centre traffic figures by 35%-55% to AADTs of approximately 5200 to 7500. Reduced congestion and lower strategic traffic volumes create a better environment for vulnerable road users.						
Effect on Traffic Patterns	A design principal of the scheme is the retention of side roads by means of an underbridge or overbridge of the new national route. Therefore, no significant effects on traffic patterns are anticipated. Local traffic will have access to the existing N13/N15, for local trips. Reduced congestion and lower strategic traffic volumes create a better environment for vulnerable road users. Modal split may result from more favourable conditions for walking and cycling local trips. This is likely to have an overall positive safety benefit.						
	Access to the national route is facilitated by 2 tie-in junctions and 2 intermediate junctions on the route.		Access to the national route is facilitated by 2 tie-in junctions and 2 intermediate junctions on the route.		Access to the national route is facilitated by 2 tie-in junctions and 2 intermediate junctions on the route.		Access to the national route is facilitated by 2 tie-in junctions and 2 intermediate junctions on the route.
Impact on Non-Motorised User Travel	The existing local road network will be retained, largely in its current form, by the provision of underbridges and overbridges. Where there is severance of any route, an alternative local road connection will be provided. Therefore, it is not anticipated that any significant negative impact on pedestrian and cyclist safety will occur as a result of the any option. Furthermore, the displacement of national route traffic onto the new mainline will reduce the number of higher speed vehicles on the local road network, potentially improving conditions for pedestrians and cyclists. The current proposed Type 2 Dual Carriageway includes a segregated cycle track within the mainline corridor. This will accommodate strategic cyclist journeys. Further clarity is required on the treatment of these road users at the junction interfaces to ensure their safety.						
Seasonal Conditions	There is the potential for increased traffic volumes during the summer tourist period, or at other times due to sports events. However, it is not anticipated that the option will influence road safety in terms of seasonal conditions.						
Climatic Conditions	All options have at a high elevation along the western side of Ballybofey/Stranorlar. This slightly increases the risk of snow and ice accumulation. However, the shallow gradients applied to the design will not exacerbate this problem.						
Safe Parking Areas	As the route is approximately 9km in length, parking areas are not deemed necessary.						
Effect on existing Collision Clusters	The removal of through-traffic from the urban areas of Ballybofey/Stranorlar will reduce the number of serious and minor collisions that will occur here. Additionally, the downgrading of the existing national route to a regional road with reduced speed and traffic volumes, should address most of the likely contributory factors that lead to the fatal collisions that occurred outside of Ballybofey/Stranorlar.						
Road Geometry	Significant improvement on the road cross-section and alignment design in comparison to the existing N15/N13 with all geometric alignments in accordance with TII design publications.						
Junction Frequency	The existing N15/N13 across the study area has in excess of 40 junctions/accesses. The new mainline proposes one grade separated junction in addition to tie-in junctions at either end. This reduces the number of conflict points on the route, improves the efficiency of traffic flow and can therefore has a positive impact on road safety.						
Junction Locations	Approach locations to grade separated junction are unlikely to have any negative impact on road safety performance.						
Tie-ins	The mainline approaches to both roundabout junctions at the tie-ins are on down-gradients, providing good forward visibility of the road layout ahead.						
Forgiving Roadsides	Approximately 47% of the route length is on embankments which would require safety barrier.		Approximately 37% of the route length is on embankments which would require safety barrier.		Approximately 36% of the route length is on embankments which would require safety barrier.		Approximately 51% of the route length is on embankments which would require safety barrier.

2.2 Engineering Design Review

To further understand the differences between the options proposed, the Phase 2 mainline alignment designs were reviewed. Although all options fall within the permissible design criteria set out in DN-GEO-03031, there are elements of the design which are close to the limiting value of the design standards. This results in a lesser degree of comfort for road users over the minimum standard and limits the future flexibility to amend the design.

The assessment considered horizontal radii, vertical crest and sag curves and gradients. Limiting criteria for a design speed of 100kph are:

Table 2-3 Criteria reviewed to determine designs approaching limiting values

	Desirable Minimum	Desirable Maximum
Horizontal Radii	720m	
Vertical Crest	100	
Vertical Sag	37	
Vertical Gradient		4%

Table 2-4 Review of Mainline Engineering Designs with respect to limiting values

	Option 1A/1A1 (Orange)	Option 1B/1B1 (Pink)	Option 1C/1C1 (Purple)	Option 1D/1D1 (Red)	Option 1E/1E1 (Green)	Option 1F/1F1 (Blue)	Option 1G
Use of limiting horizontal radius (no. of instances)	1	3	2	4	4	3	3
Length of use of limiting radius (m)	437	1,133	224	2,166	1,081	1,279	441
Large changes in horizontal bearing (no. of instances)	0	0	0	3	1	1	0
Length of use of 4% gradient or greater (m)	940	709	1,935	2,009	4,476	1,359	2,644
Use of limiting vertical crest curvature (no. of instances)	1	1	1	0	1	2	2

In terms of limiting geometry, Option 1D/1D1 has the most instances where the option selection alignment design is on limiting values. Similarly, Options 1E/1E1 have less desirable horizontal alignment and has the most instances of gradients of 4% or greater. Therefore, Options 1D/1D1 and 1E/1E1 are less preferred than other options. Option 1A/1A1 has the least instances of the use of limiting geometry of all options and therefore would be preferred over all other options in terms of geometric design, followed by Options 1B/1B1 and 1C/1C1.

	Option 1A/1A1 (Orange)	Option 1B/1B1 (Pink)	Option 1C/1C1 (Purple)	Option 1D/1D1 (Red)	Option 1E/1E1 (Green)	Option 1F/1F1 (Blue)	Option 1G
Preference Rank	1	2	2	4	4	3	3

All options provide improved geometric design in comparison to the existing infrastructure, and therefore from an Engineering perspective all options are deemed to have positive effects.

2.3 Comparison of the alternatives

This section compares options by considering information outlined to date in a qualitative and quantitative manner.

2.3.1 Qualitative Comparison

Table 2-5 Qualitative Comparison of Options

Option	Advantages	Disadvantages
Option 1A (Orange)	One intermediate junction. Good re-distribution of traffic on the west side of Ballybofey/Stranorlar with provision of links to the N15.	Maximum elevation of 139m OD: issues with snow/ice may be more severe. Route is more undulating than other options. Sharp sag at river crossing. Local through-road severance at Trooper's Hill. East-west movement along the N15 involves a more circuitous route due to the lack of eastern links. With approximately 51% of the route on large embankments requiring safety barrier, this route rates poorly (on a comparative basis) in minimising barrier provision and provision of forgiving roadsides. Less traffic transfer onto the new mainline in comparison to other options, except Option 1C/1C1
Option 1A1 (Orange)	One intermediate junction. Good re-distribution of traffic on the west side of Ballybofey/Stranorlar with provision of links to the N15.	Maximum elevation of 139m OD: issues with snow/ice may be more severe. Route is more undulating than other options. Sharp sag at river crossing. Local through-road severance at Trooper's Hill. East-west movement along the N15 involves a more circuitous route due to the lack of eastern links. With approximately 51% of the route on large embankments requiring safety barrier, this route rates poorly (on a comparative basis) in minimising barrier provision and provision of forgiving roadsides. Additional link on the western side of Ballybofey introduces additional conflict points. Less traffic transfer onto the new mainline in comparison to all other options, except Option 1C/1C1
Option 1B (Pink)	Smooth vertical geometry. Good re-distribution of traffic on the east and west sides of Ballybofey/Stranorlar with provision of links to the N15.	Two intermediate junctions. Local through-road severance at Trooper's Hill.
Option 1B1 (Pink)	Smooth vertical geometry. Good re-distribution of traffic on the east and west sides of Ballybofey/Stranorlar with provision of more direct links between the new mainline and the existing N15 Lifford road. Prediction of 1800 less vehicles/day utilising the R252 on this option compared to 1B, reducing the traffic volumes aligning through the R252/N15 junction.	Two intermediate junctions. Local through-road severance at Trooper's Hill. Additional link on the western side of Ballybofey introduces additional conflict points.

Option	Advantages	Disadvantages
Option 1C (Purple)	One intermediate junction. Reasonably straight – good visibility. Good re-distribution of traffic on the east west side of Ballybofey/Stranorlar with provision of links to the N15.	Maximum elevation of 139m OD: issues with snow/ice may be more severe. East-west movement along the N15 involves a more circuitous route due to the location of the mainline alignment and the lack of eastern links from the mainline to N13/N15 east of Ballybofey/Stranorlar. Less traffic transfer onto the new mainline in comparison to other options, except Option 1C/1C1
Option 1C1 (Purple)	One intermediate junction. Reasonably straight – good visibility. Good re-distribution of traffic on the west side of Ballybofey/Stranorlar with provision of links to the N15. Prediction of 1000 less vehicles/day utilising the R252 on this option compared to 1C, reducing the traffic volumes aligning through the R252/N15 junction.	Maximum elevation of 139m OD: issues with snow/ice may be more severe. East-west movement along the N15 involves a more circuitous route due to the location of the mainline alignment and the lack of eastern links from the mainline to N13/N15 east of Ballybofey/Stranorlar. Additional link on the western side of Ballybofey introduces additional conflict points.
Option 1D (Red	Facilitation of east-south traffic movement along the N15: inclusion of new link from N15 south to new junction on dual carriageway. Good re-distribution of traffic on the east and west sides of Ballybofey/Stranorlar with provision of links to the N15.	Two intermediate junctions. Two links from mainline to existing road network increases conflict points.
Option 1D1 (Red)	Facilitation of east-south traffic movement along the N15: inclusion of new link from N15 south to new junction on dual carriageway. Good re-distribution of traffic on the east and west sides of Ballybofey/Stranorlar with provision of links to the N15. These links have an improved horizontal alignment compared to Option 1D.	Two intermediate junctions. Two links from mainline to existing road network increases conflict points.
Option 1E (Green)	Facilitation of east-south traffic movement along the N15: inclusion of new link from N15 south to new junction on dual carriageway. Good re-distribution of traffic on the east and west sides of Ballybofey/Stranorlar with provision of links to the N15.	Two intermediate junctions. Two links from mainline to existing road network increases conflict points.
Option 1E1 (Green)	Facilitation of east-south traffic movement along the N15: inclusion of new link from N15 south to new junction on dual carriageway. Good re-distribution of traffic on the east and west sides of Ballybofey/Stranorlar with provision of links to the N15. These links have an improved horizontal alignment compared to Option 1E.	Two intermediate junctions. Two links from mainline to existing road network increases conflict points. Slightly increased traffic volumes in future years aligning through R252/N15 junction and on N13 Tyrcallen compared with Option 1E.

Option	Advantages	Disadvantages
Option 1F (Blue)	Facilitation of east-south traffic movement along the N15: inclusion of new link from N15 south to new junction on dual carriageway. Good re-distribution of traffic on the east and west sides of Ballybofey/Stranorlar with provision of links to the N15.	Two intermediate junctions. Two links from mainline to existing road network increases conflict points.
Option 1F1 (Blue)	Facilitation of east-south traffic movement along the N15: inclusion of new link from N15 south to new junction on dual carriageway. Good re-distribution of traffic on the east and west sides of Ballybofey/Stranorlar with provision of links to the N15. These links have an improved horizontal alignment compared to Option 1F	Two intermediate junctions. Two links from mainline to existing road network increases conflict points.
Option 1G	More re-distribution of traffic onto new, higher standard links with lesser impact on local road network at Troopers Hill.	Two intermediate junctions and links similar to all other options Two links from mainline to existing road network increases conflict points.

On a qualitative basis, all options have a similar advantages and disadvantages with all options providing improved safety in comparison to the existing road infrastructure. Taking all the advantages and disadvantages above into consideration, the ranking of options considering the qualitative information is outlined below:

Table 2-6 Ranking of Options from the Qualitative comparison

	Option 1A	Option 1B	Option 1C	Option 1D	Option 1E	Option 1F
Preference Rank	3	2	3	2	2	2

	Option 1A1	Option 1B1	Option 1C1	Option 1D1	Option 1E1	Option 1F1	Option 1G
Preference Rank	4	1	2	1	1	1	1

2.3.2 Quantitative cost benefit analysis of the road safety aspects

The economic assessment of options also estimated predicted benefits as a result of collision reduction on each option. This was derived using COBALT (Cost and Benefits to Accidents – Light Touch), which showed all options provide a road safety benefit in terms of collision reduction.

Table 2-7 Ranking of Options from the Quantitative Comparison

	Option 1A	Option 1B	Option 1C	Option 1D	Option 1E	Option 1F
Monetary Value of Collision Reduction Savings in €m for 60-years discounted to 2011	€ 3,350,000	€ 3,315,000	€ 3,427,000	€ 3,243,000	€ 3,261,000	€ 3,088,000
Preference Rank	2	3	2	4	3	2

	Option 1A1	Option 1B1	Option 1C1	Option 1D1	Option 1E1	Option 1F1	Option 1G
Monetary Value of Collision Reduction Savings in €m for 60-years discounted to 2011	€ 3,367,000	€2,547,000	€ 3,403,000	€ 1,795,000	€ 1,792,000	€ 1,970,000	€ 2,465,000
Preference Rank	1	2	1	3	2	3	2

3 CONCLUSION

An understanding of the overall impact that each option would have on the proposed and existing road network was determined by reviewing the option selection alignment designs and comparing qualitative and quantitative data. All options considered as part of this RSIA Phase 2 report are beneficial in terms of road safety in comparison to the existing road network. This is demonstrated through provision of positive quantitative COBALT figures provided for each route.

All options will improve traffic segregation, providing separate infrastructure for strategic and local journeys. This will assist in reducing conflict between pedestrians and vehicles at existing collision cluster sites, particularly in the town centres of Ballybofey/Stranorlar. Furthermore, all proposed improvements are off-line and are designed within the current design alignment criteria, giving a significant improvement in infrastructure provision in comparison to the narrow single carriageway alignment that currently exists on the N15/N13.

Based on the information available at the time of ranking, and the status of the drawings at this point, Table 3-1 sets out the ranking of options. It should be highlighted that ranking is based on marginal differences between the options and as such, there is not a significant benefit of one option over another in terms of road safety, considering the items reviewed.

Table 3-1 Ranking of options in terms of road safety impact

Option	Ranking
Option 1B1	1
Option 1C1	1
Option 1G	2
Option 1A	3
Option 1B	3
Option 1C	3
Option 1F	3
Option 1F1	3
Option 1E1	3
Option 1A1	4
Option 1D1	4
Option 1E	5
Option 1D	5

Appendix A Collision Statistics

Collision No.	Severity	Year	Location	Vehicle	Circumstances	Day	Time	Casualties
1	Fatal	2007	N15 Cappry	Car	Single Vehicle only	Saturday	0300-0700	1
2	Fatal	2006	N13 Tyrcallen	Car	Pedestrian	Tuesday	1600-1900	1
3	Fatal	2008	N13 Tyrcallen	Car	Head-on-Conflict	Monday	1600-1900	2
4	Serious	2008	N15 near R252 junction Ballybofey	Goods Vehicle	Pedestrian	Thursday	0700-1000	1
5	Serious	2011	N15 near R252 junction Ballybofey	Goods Vehicle	Pedestrian	Monday	1000-1600	1
6	Serious	2011	N15 near R252 junction Ballybofey	Car	Pedestrian	Thursday	1600-1900	1
7	Serious	2007	N15 near R252 junction Ballybofey	Car	Pedestrian	Thursday	1000-1600	1
8	Serious	2006	N15 Ballybofey	Goods Vehicle	Pedestrian	Monday	1000-1600	1
9	Serious	2007	N15 Stranorlar	Car	Pedestrian	Saturday	1900-2300	1
10	Serious	2011	N15/N13 Junction Stranorlar	Car	Head-on-Conflict	Tuesday	0700-1000	3
11	Serious	2014	N15 Ballybofey	Car	Pedestrian	Sunday	2300-0300	1
12	Serious	2013	N13 Meenavoy Lower	Bicycle	Other	Wednesday	1000-1600	1
13	Minor	2012	N15 Cappry	Car	Single Vehicle only	Wednesday	2300-0300	1
14	Minor	2008	N15 Cappry	Car	Rear end, straight	Tuesday	1000-1600	1
15	Minor	2007	N15 Cappry	Car	Single Vehicle only	Sunday	1000-1600	1
16	Minor	2006	N15 near Ard Mac Carron	Goods Vehicle	Single Vehicle only	Sunday	0300-0700	2
17	Minor	2005	N15 Ballybofey	Motorcycle	Angle, right turn	Sunday	1600-1900	1
18	Minor	2010	N15 near Blackrock Drive	Car	Other	Friday	0700-1000	1
19	Minor	2008	N15/R252 junction Ballybofey	Car	Pedestrian	Wednesday	1900-2300	1
20	Minor	2011	N15/Chestnut Road junction	Car	Single Vehicle only	Sunday	2300-0300	1
21	Minor	2011	N13 Meenavoy Lower	Car	Pedestrian	Tuesday	1000-1600	1

Collision No.	Severity	Year	Location	Vehicle	Circumstances	Day	Time	Casualties
22	Minor	2008	N15 River Finn Bridge	Car	Head-on right turn	Wednesday	0700-1000	1
23	Minor	2011	N15 Stranorlar	Bus	Pedestrian	Thursday	1000-1600	1
24	Minor	2009	N15 Stranorlar	Car	Pedestrian	Tuesday	1600-1900	1
25	Minor	2009	N15 Stranorlar	Car	Pedestrian	Saturday	2300-0300	1
26	Minor	2007	N15 Stranorlar	Car	Head-on-Conflict	Monday	0700-1000	2
27	Minor	2006	N15 Stranorlar	Car	Pedestrian	Friday	0700-1000	1
28	Minor	2008	N15 Stranorlar	Car	Rear end, straight	Friday	0700-1000	1
29	Minor	2008	N15 Stranorlar	Car	Pedestrian	Friday	1000-1600	1
30	Minor	2013	N15 Stranorlar	Goods Vehicle	Pedestrian	Tuesday	1000-1600	1
31	Minor	2008	N15/N13 Junction Stranorlar	Car	Angle, both straight	Tuesday	1900-2300	1
32	Minor	2012	N13 Stranorlar	Car	Rear end, straight	Wednesday	1600-1900	1
33	Minor	2008	N13/local road junction	Car	Rear end, straight	Monday	1000-1600	1
34	Minor	2011	N13/local road junction	Goods Vehicle	Other	Friday	1000-1600	2
35	Minor	2010	N13 North Stranorlar	Car	Head-on-Conflict	Wednesday	0700-1000	3
36	Minor	2013	N13/local road junction	Car	Head-on-Conflict	Saturday	1600-1900	2
37	Minor	2012	N13 Tyrcallen	Car	Single Vehicle only	Sunday	1000-1600	2
38	Minor	2006	N13 North Stranorlar	Car	Rear end, straight	Monday	1000-1600	
39	Minor	2006	N13 Tyrcallen	Car	Rear end, straight	Wednesday	0700-1000	1
40	Minor	2006	N13 Tyrcallen	Car	Single Vehicle only	Saturday	1600-1900	1
41	Minor	2012	N13 North of R236 Junction	Car	Rear end, straight	Sunday	2300-0300	1
42	Minor	2006	N13 Tivockmoy	Car	Single Vehicle only	Friday	1000-1600	1
43	Minor	2010	N13 Tivockmoy	Car	Rear end, straight	Friday	1600-1900	2
44	Minor	2012	N13/R236 Junction	Car	Rear end, straight	Friday	0300-0700	2

Collision No.	Severity	Year	Location	Vehicle	Circumstances	Day	Time	Casualties
45	Minor	2014	N15 Cappry	Car	Single Vehicle only	Wednesday	1000-1600	1
46	Minor	2014	N15 Cappry	Car	Rear end, straight	Tuesday	1600-1900	2
47	Minor	2014	N15/R252 Junction	Car	Pedestrian	Saturday	2300-0300	1
48	Minor	2014	N15 Ballybofey and Stranorlar	Undefined	Pedestrian	Thursday	1900-2300	1
49	Minor	2014	N15 Ballybofey and Stranorlar	Undefined	Rear end, straight	Tuesday	2300-0300	1
50	Minor	2014	N13 North Stranorlar	Motorcycle	Other	Thursday	1000-16000	1
51	Minor	2014	N13 Tyrcallen	Car	Rear end, straight	Friday	0700-1000	2

Appendix B Trip Generators

Table 3-1 Key trip generators within the Section 1 study area

Type	Name
Primary School	St. Mary's National School, Stranorlar. Welchtown National School, Welchtown. Dooish National School, Dooish. Sessiagh O'Neill National School, Sessiagh O'Neill. Glencovitt National School, Glencovitt.
Secondary School	St. Columba College Secondary School, Drumboe Avenue, Stranorlar – *Causes traffic issues at mornings, lunch and evenings.* Finn Valley College Secondary School, Drumboe Lower, Stranorlar
Other Education/Childcare	St. Columba College Secondary School, Drumboe Avenue, Stranorlar – Causes traffic issues at mornings, lunch and evenings. Finn Valley College Secondary School, Drumboe Lower, Stranorlar
Sporting Grounds	MacCumhaill Park, Ballybofey – *Cause traffic issues when games are played (Sunday afternoon/evening) as it is the home ground of Donegal GAA.* Finn Park, Ballybofey – *Home ground of League of Ireland team Finn Harps. Can cause some traffic disruptions during Friday evening/night. New pitch being made behind the BASE Enterprise Centre.* Finn Valley Centre, Millbrae, Stranorlar – *Sports and Leisure Centre, including running track (Finn Valley AC), swimming pool and playing pitches (Ballybofey United – new pitch being made beside the Tennis Club). Gym and exercise classes would also draw traffic.* Cappry Rovers FC, Cappry – *May generate levels of traffic on existing local road network*
Other Recreation	Drumboe Woods, Stranorlar – Coillte owned and managed woodland used for recreation, parking available on site.
Retail	McElhinneys, Main Street, Ballybofey – Two large car parks are present just after the crossing of the Finn from Stranorlar to Ballybofey. The entry and exit of these vehicles can often lead to the disruption of the regular flow of traffic through the town. Other retail/services in town, particularly along existing main road. Foys/AIB/Ulster Bank/Social Welfare/Aldi/Lidl/Local Pubs and Restaurants/Coffee Shops etc. Top Station, McClay's Corner, Stranorlar – The location of the filling station and shop causes a disruption to the flow of traffic and regular dangerous turning manoeuvres.
Hotels	Hotels in the area can cause some disruption to the flow of traffic, particularly with weddings, concerts or other functions. Jackson's Hotel, Main Street, Ballybofey Villa Rose Hotel, Main Street, Ballybofey Kee's Hotel, Main Street, Stranorlar
Religious Grounds	St. Mary's R.C Church, Main St. Stranorlar – During church times, traffic entering and exiting the church grounds can cause a disruption to the flow of traffic. This problem is exacerbated during Weddings/Funerals/Communions/Confirmations etc.

Appendix C – RSIA of Section 1 Link Road Options

Introduction

The TEN-T Priority Route Improvement Project, Donegal is part of the National Development Plan 2018-2027 and aims to develop a sustainable high-quality network to connect the North West Region to the rest of Ireland and Northern Ireland.

The Project consists of three sections and further detail can be found in the main Option Selection Report. This appendix provides Road Safety Impact Assessment (RSIA) for the link road options to the west of Ballybofey within Section 1: N15/N13 Ballybofey / Stranorlar. These link roads connect the proposed preferred option for Section 1 (Option 1G) to the N15 National Road, south of the River Finn.

Option Comparison

Options considered for this stage are shown below. All options form a compact grade separated junction with the overall preferred mainline option (Option 1G) at a similar location to the west of the River Finn. The proposed cross-section for the options is a type 3 single carriageway. This includes 3m lanes within a 7m carriageway with grass verge and cycle track on one side.

Figure A – Link Road Option A

Figure B – Link Road Option B

Figure C – Link Road Option C

Figure D – Link Road Option D

Figure E – Link Road Option E

Analysis of Impact on Road Safety

Each option will influence various aspects of the operation of the road network in the locality which in turn have an impact on road safety. The road safety impacts of each option have been reviewed with cognisance of the requirements and criteria set out in PE-PMG-02001. These are outlined in the table below.

Table A1 – Analysis of Impact on Road Safety

<table>
<tr><th></th><th>A</th><th>B</th><th>C</th><th>D</th><th>E</th></tr>
<tr><td rowspan="2">Effect on Traffic Flow</td><td>Estimated traffic volumes through Ballybofey is the highest of all options in 2043.</td><td colspan="3">All options perform similarly in terms of reducing traffic through Ballybofey town centre to an approximate AADT of 4900 in 2043.</td><td>Higher future traffic volumes through Ballybofey town centre than Options B, C and D.</td></tr>
<tr><td>Estimated AADT on the R252 in 2043 is the highest of all options at approximately 2700</td><td colspan="2">Estimated AADT on the R252 in future years are the lowest of all options at approximately 1700.</td><td>Estimated AADT on the R252 in 2043 is higher than Options B and C at approximately 2100.</td><td>Estimated AADT on the R252 in future years are the lowest of all options at approximately 1700.</td></tr>
<tr><td>Effect on Traffic Patterns</td><td>Desire-lines for traffic travelling between existing N15 and R252 satisfied with further connectivity to Cappry.</td><td>Desire-lines likely to be satisfied with full connectivity between the link, the N15 and R252 which is accommodated by roundabout junctions.</td><td>Connectivity provided but with a more complicated trip required for movements between existing N15/R252.</td><td>Connectivity provided but in a more dis-jointed fashion than other options, with provision of two separate links.</td><td>Connectivity provided but with a more complicated trip required for movements between existing N15/R252.</td></tr>
<tr><td rowspan="3">Impact on Non-Motorised User Travel</td><td colspan="5">All options currently propose a type 3 single carriageway which includes a segregated cycle track on one side of the roadway. This is will have a positive impact on the safety of NMUs, but interface with the existing road network, and the proposed mainline will need careful consideration in subsequent design stages.</td></tr>
<tr><td rowspan="2">The link is further out of town centre and may not capture the same NMU use as other options. With poor traffic transfer onto the link, conditions for NMUs on the existing R252/N15 are unlikely to improve.</td><td colspan="3">Options B, C and D will have reduction of traffic on the existing network, improving the environment in the residual network for NMUs.</td><td rowspan="2">The R252 connection further out of town centre and may not capture the same NMU use as other options. However, reduced traffic volumes on the existing R252 will improve conditions for NMUs.</td></tr>
<tr><td colspan="3"></td></tr>
<tr><td>Seasonal Conditions</td><td colspan="5">There is the potential for increased traffic volumes during the summer tourist period, or at other times due to sports events. However, it is not anticipated that the option will influence road safety in terms of seasonal conditions.</td></tr>
<tr><td>Climatic Conditions</td><td colspan="5">All link road options are in a same confined area with little variation in topography and climatic conditions.</td></tr>
<tr><td>Safe Parking Areas</td><td colspan="5">Reviewed as part of the mainline assessment only.</td></tr>
</table>

<table>
<tr><th></th><th>A</th><th>B</th><th>C</th><th>D</th><th>E</th></tr>
<tr><td>Effect on existing Collision Clusters (relative to the link roads only)</td><td>Option A is likely to have a somewhat positive impact on the cluster at the horizontal bend (R252) with some reduction in traffic expected. No improvement to the network at the collision cluster location is proposed.</td><td colspan="2">Options B, and C are likely to provide some benefit to the collision cluster at the horizontal bend on the existing R252 within Ballybofey. This is due to the new link replacing the existing alignment and anticipated reduction in future traffic volumes.</td><td>Option D proposes no upgrades or amendments to the existing R252 and adds an additional junction and conflict point. Similarly, this option is estimated to have a lesser impact in terms of traffic reduction. Therefore, it has no anticipated positive effect on collision clusters.</td><td>Option E proposes no upgrades or amendments to the existing R252. However, a somewhat positive impact is expected due to a reduction of traffic on the R252.</td></tr>
<tr><td rowspan="3">Road Geometry (link roads only)</td><td colspan="2">Relatively direct, straighter alignments on the new link.</td><td colspan="3">Significant horizontal curvature on the new link</td></tr>
<tr><td colspan="4">Conventional/simple GSJ link layouts between the new link road and proposed mainline.</td><td>Complicated GSJ link layout.</td></tr>
<tr><td>Continuous, new infrastructure provision. Relatively straight link providing direct connection between R252 and the existing N15. R252 retains priority over the new link at priority junctions.</td><td>Continuous, new infrastructure provision with the link provided in two parts: one connecting to the existing R252 and the other to existing N15. All junctions are roundabouts providing consistency.</td><td>Continuous, new infrastructure provision. New link takes priority over existing R252 with new staggered junction proposed.</td><td>Discontinuity in infrastructure provision. Additional junction proposed at Mulrines near the collision cluster on the R252.</td><td>Continuous, new infrastructure provision but with most complicated access to the new N15 mainline and the existing R252.</td></tr>
<tr><td>Junction Frequency/ Junction Locations</td><td>New junctions with existing network occur at <u>two</u> locations: outside town centre with existing N15 and Cappry road.</td><td>New junctions with existing network occur at <u>two</u> locations: on N15 within a residential area of Ballybofey town and on the R252.</td><td>New junctions with existing network occur at <u>two</u> locations: on R252 and the existing N15.</td><td>New junctions with existing network occur at <u>three</u> locations: on the existing R252, the existing N15 on the edge of town centre, further west of town.</td><td>New junctions with existing network occur at two locations: on the existing N15 on the edge of town centre and on the R252 west of the Cappry road.</td></tr>
<tr><td>Tie-ins</td><td>Priority junctions at link road N15 and R252 tie-ins creates additional conflict points</td><td>Tie-in to existing N252 by new roundabout and local realignment</td><td>Tie-in to existing N252 by new a priority junction and roundabout with local realignment</td><td>Tie-in of Mulrines link to existing R252 and N15 currently shown as priority junctions.</td><td>Priority junctions proposed on Cappry road and the R252</td></tr>
<tr><td></td><td></td><td colspan="3">Tie-in of link to existing N15 with roundabout</td></tr>
<tr><td>Forgiving Roadsides</td><td colspan="5">Reviewed as part of the mainline assessment only.</td></tr>
</table>

Engineering Design Review

Vertical alignment designs are not reviewed as part of this assessment. All links are anticipated to have similar geometric parameters in terms of gradients as all links are proposed within a relatively small area. All options are designed to meet current TII design guidance.

In reviewing other Engineering parameters in Table A1 above, Option E has the least conventional approach in terms of engineering design, with the proposed unusual GSJ layout.

Options B, C and D provide similarities in terms of alignment of the main link and the GSJ with the proposed mainline. However, Options C and D introduce a new junction close to Ballybofey town centre (Mulrines). Furthermore, Option D adds a second new junction on the existing N15 (proposed roundabout) and gives priority to the new link at the junction with the existing R252. This adds complexity to the network in this area.

Option B provides linkages between the existing N15, proposed N15 and R252 by means of new roundabout junctions. This removes some significant curves which are present in Options C, D and E.

Option A has the most direct link between the proposed mainline and the existing N15 and R252. This option connects to the N15 furthest out of Ballybofey town centre, but also has the most priority junctions proposed.

Qualitative Comparison

This assessment compares the relative advantages and disadvantages of each option.

Table A2 – Qualitative Comparison of Options

Option	Advantages	Disadvantages
A	▪ Most direct link from existing R252 and N15 to proposed mainline. ▪ Utilises existing Cappry road junction on R252. ▪ Junction with existing N15 occurs outside 60kph zone, with less interface with NMUs and urban traffic. ▪ Conventional GSJ layout and relatively straight link alignment ▪ Likely to satisfy desire-lines of traffic travelling from northwest suburbs of Ballybofey and Glenties road to/from proposed mainline	▪ Priority junctions proposed for all junctions on the link, including tie-ins. ▪ May not attract the same amount of NMUs as other options due to location and therefore is unlikely to provide benefit to these users. ▪ Does not improve existing R252 at collision cluster location. ▪ Does not satisfy desire-lines for town-centre traffic due to proximity of Cappry junction
B	▪ Creates a single link from existing R252 and N15 to proposed mainline. ▪ Improves R252 at current collision cluster location. ▪ Likely to satisfy desire lines of town centre traffic due to proximity of junction to town centre. ▪ Anticipated use by NMUs which may utilise a circular route for leisure walking/cycling.	▪ Poorer connectivity to the northwest of Ballybofey and wider area, meaning this traffic is more likely to utilise the terminal junction on the proposed mainline (south of Cappry). ▪ Creates conflict points closer to Ballybofey town centre. ▪ Potential for conflict between strategic traffic/HGVs and residential traffic and pedestrians at the roundabout junction with existing N15, which occurs in residential area.
C	▪ Creates a single link from existing R252 and N15 to proposed mainline. ▪ Realigns R252 at current collision cluster location. ▪ Likely to satisfy desire lines of town centre traffic due to proximity of link to town centre.	▪ Poorer connectivity to the northwest of Ballybofey and wider area, meaning this traffic is more likely to utilise the terminal junction on the proposed mainline (south of Cappry). ▪ Creates conflict points closer to Ballybofey town centre.

Option	Advantages	Disadvantages
		▪ Likely "funnelling" effect of directing all traffic and NMUs through much of the existing N15/R252 close to the town centre.
D	▪ Likely to satisfy desire lines of town centre traffic due to proximity of link to town centre.	▪ Two links proposed to make connectivity between the existing N15, R252 and the proposed mainline. ▪ Does not improve the R252 at collision cluster location. ▪ Traffic is required to utilise much of the existing, unimproved road infrastructure to navigate from the proposed mainline to the R252 ▪ Poorer connectivity to the northwest of Ballybofey and wider area, meaning this traffic is more likely to utilise the terminal junction on the proposed mainline (south of Cappry). ▪ Creates conflict points closer to Ballybofey town centre.
E	▪ Creates a single link from existing R252 and N15 to proposed mainline. ▪ Likely to satisfy desire lines of town centre traffic due to proximity of link to town centre ▪ Likely to remove strategic N13/R252 traffic from town centre. ▪ Potential for use by NMUs which may utilise a circular route for leisure walking/cycling. ▪ Anticipated to capture much of the traffic that would utilise the existing R252 with the potential for increased safety.	▪ Creates conflict points close to Ballybofey town centre. ▪ Unusual GSJ layout.

Quantitative Comparison

A quantitative COBALT assessment was not undertaken as part of the options assessment for the link roads.

Link Road RSIA Conclusion

This report reviewed the Road Safety Impact of 5 different link road options that connect the Section 1 of the TEN-T Priority Route Improvement Project, Donegal to the existing N15 and R252 in Ballybofey.

All options propose a type 3 single carriageway cross-section with segregated cycle track/NMU facility. All options meet current TII geometric design guidance, and all options limit the number of accesses onto the new link.

As such, all options are deemed to provide a significant safety benefit to the scheme. The preference ranking provided in this appendix is based on minor differences between the options.

Option	Ranking
A	3
B	1
C	4
D	5
E	1

Donegal County Council

TEN-T Priority Route Improvement Project, Donegal

Section 1: N15/N13 Ballybofey/Stranorlar Urban Region

Option Selection Report

Appendix C1.2 – Physical Activity

December 2019

Document Control Sheet

Client:	Donegal County Council
Project Title:	TEN-T Priority Route Improvement Project, Donegal – Section 1: N15/N13 Ballybofey/Stranorlar Urban Region
Document Title:	Option Selection Report –Appendix C1.2 – Physical Activity
Document No.:	TT_MGT0337-RPS-00-01-RP-Z-RP-2002

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1 INTRODUCTION

This report is concerned with assessing each shortlisted option with respect to impact on physical activity within Section 1. The Physical Activity appraisal has been conducted in accordance with the Project Appraisal Guidelines Unit 7: Multi-Criteria Analysis, with guidance taken from Unit 13.0: Pedestrian and Cyclist Facilities. The basis of the appraisal covers the nature of physical activity impacts of the proposed scheme, including the provision of new cyclist facilities or enhancement to existing pedestrian and / or cyclist facilities.

1.1 Methodology

For the purposes of Option Selection, each option will be appraised based on any new pedestrian / cyclist facilities being provided as part of the project, or any new linkages to existing facilities as part of the scheme. PAG Unit 13.0 outlines sub-criteria to be considered as part of the Physical Activity which are:

- Health Benefits
- Absenteeism Benefits
- Journey Ambience Benefits
- Changes in the number of incidents or journey times
- Other possible impacts

At the time of writing there was no available information on the number of cyclists currently using the N13 / N15, therefore a prediction of use could not be established, nor could the associated benefits (relating to health or absenteeism) be quantitatively assessed. Therefore, the physical activity appraisal is based solely on qualitative information.

Therefore, the physical activity appraisal is based solely on qualitative information across:

- Health Benefits
- Journey Ambience Benefits

2 EXISTING FACILITIES

2.1 Walking / Cycling Facilities

The Donegal Cycle Route is the primary cycle infrastructure available in Donegal, and mapping is available for two accessible sources including:

- Donegal County Council Opendata portal
- A dedicated website at www.donegalcycleroute.ie

The Donegal Cycle Route does not intersect the Section 1 study area, therefore the proposed road has no impact upon it.

Figure 2-1 The Donegal Cycle Route

There are several walking routes within the study area for Section 1, with some very close to the centre of the twin towns and others in more remote rural locations, including:

Drumboe Woods – A popular walking route close to Stranorlar. Drumboe has a diverse range of tree species (both broadleaf and conifer) and has a number of paths throughout the woodland. The woodland is split by the local road (L2754) and walking trails are present on either side of woodland. There are three walking trails in place within the woodland, “The Natura Trail”, “The Multi Access Trail” and “The Drumboe Loop Trail”. The site is managed by Coillte and is listed as a “Forest Recreation Area” and parking facilities are available on two locations within the woodland. The site of Drumboe Woods also has an important historic and cultural aspect, as it is the site of the 17th century Drumboe Castle and also of the execution of the Drumboe Martyrs. (Signposted Walk)

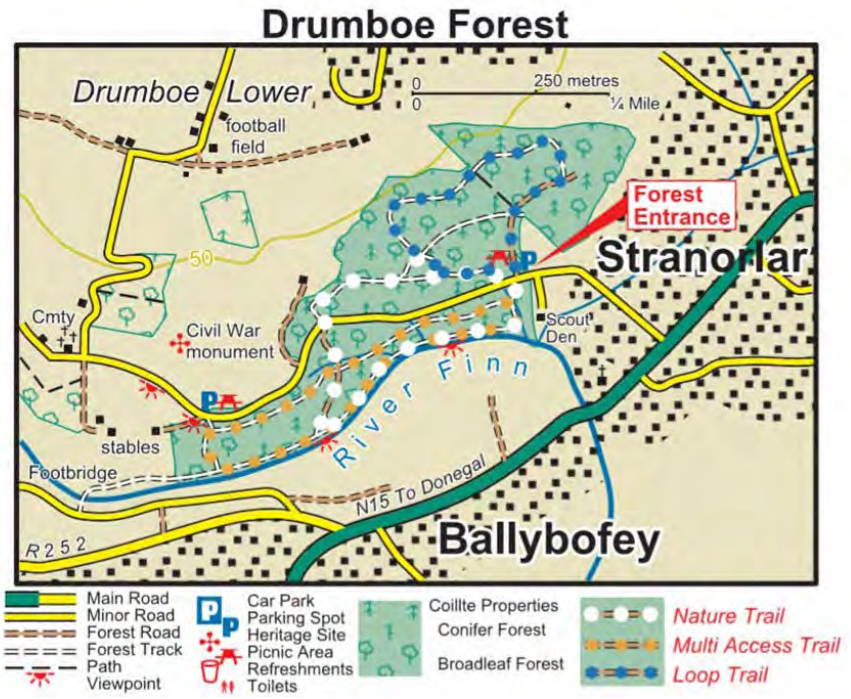

Figure 2-2 Drumboe Forest Trails

The Steeple (Mullaghagarry Woods) – This is an active woodland, having paths and tracks present throughout, seems to be used for both amenity and extraction of timber. The area is a mix of tree species (both broadleaf and conifer) and there are benches and picnic tables located at some locations near the summit of the hill. Extraction (in the form of log piles) and replanting (in the form of native Ash trees) is also taking place. The Steeple Tower itself appears to have been built c.1810 as an observational tower and affords views over the surrounding Finn Valley Area. Parking is available both at the entrance to the woodland but also just along the local road (L66743). (Signposted Walk)

Figure 2-3 The Steeple (Mullaghgarry Woods)

Drumboe Avenue (Loop) – This route carries on from Drumboe Woods along the local road (L2754) and allows for access to the more northern areas outside of Ballybofey and Stranorlar. Drumboe Avenue appears to stop near one of the eastern entrances to the Creggan Forest Walk, around Troopers Hill. The Avenue is also access for completing a full loop around the surrounding area, heading west at the end of the avenue, along the bottom of Creggan Forest Walk and south past Kee's Mill and crossing the River Finn at Logue's Bridge. Heading east along the regional road (R252) there is access to a small road which leads into town and also to a footbridge across the River Finn that leads back into Drumboe Woods.

Figure 2-4 Drumboe Anvenur Loop

Gortletteragh – This area now appears to be marked as private but had an area for parking and picnic tables. Woodland paths, along with a waterfall, mass rock and other features (souterrain and ringfort). The local road in this location is also listed as part of the National Cycle Network. (Signage is in place).

Figure 2-5 Gortletteragh

Creggan Forest Park – Woodland surrounding Trooper's Hill, mixed broadleaf and conifer tree species are present throughout the site. A number of paths are set through the woodland and there are parking areas at both sides of the

woodland, both with entrances to the woodland. The paths throughout the woodland appear to be recent and this provides connectivity for walks coming from Drumboe, Holy Well Wood and the Creggan area in general.

Figure 2-6 Creggan Forest Park

Holy Well Wood – Holy Wood Well is located on the Northern side of the River Finn. The area is open to the public and appears to be managed by Coillte. The site has routes/tracks throughout the woodland, the main route leading to the "Holy Well" (which has been recently improved/upgraded). The area appears to be relatively well accessed and visited, with a number of "offerings" left at the location. A (memorial) bench is also located at the site. The woodland is accessed through a gate with a small amount of off-road parking. (Sign outside woodland).

Figure 2-7 Holy Well Woods

Stranorlar to Donegal – This route follows the old disused road from Stranorlar to Donegal. The route leaves the Finn Valley Centre on Millbrae Road, crosses the River Finn, heads right on Navenny Road a short distance and follows the unmarked trail which is the Old disused road in a south westerly direction. The trail ends and reconnects to the N15 east of Lough Eske onto the town of Donegal.

Figure 2-8 Stranorlar to Donegal Walking Route

Miscellaneous Routes – The routes as shown in the image below are routes developed from public consultations with residents in the town. These must be considered as they have been impacted by the Ten – T options. These are shown in detail in Section 1.4.

Figure 2-9 Various Routes through Town

2.2 Other Facilities

There are several organisations within the towns that promote physical activity and sports. The facilities for these organisations are shown below:

Figure 2-10 Finn Valley Athletic Club

An Athletic Club is based at the Finn Valley Centre, in Stranorlar as shown in **Figure 2-10**.

Figure 2-11 Cappry Rover FC – Local Football club

Cappry Rovers Football Club is located north of the existing N15 at Cappry, to the west of Ballybofey as shown in **Figure 2-11.**

Figure 2-12 Scouts (Den) (6th Donegal Stranorlar Scout Group)

The Scouts Den, located near Drumboe Woods, is also used by local community organisations for various activities, including the Twin Towns Walking Festival, as shown in **Figure 2-12**.

Go for Life – This is a programme administered by an organisation call Age and Opportunity which promotes physical activity in those over 50. Funding is sought from various different organisations as well as Sport Ireland for equipment and access to these activities. The programme is overseen by Sport Ireland, Age and Opportunity, Federation of Active Retirement Associations, Irish Senior Citizens Parliament and the National Council on Ageing and Older People.

Other sporting organisations include:

- Finn Wheelers Cycling Club – Cycling Club
- Power Walking Group
- Donegal Sports Partnership – Across Donegal
- Ballybofey United – Local Football Club
- Operation Transformation Walk Day 2018 – Locations Nationally and four within Donegal (one in Stranorlar)
- Twin Towns Walking Festival – The festival takes place in October at various locations including Drumboe Woods, The Steeple, Trusk Lough, Other areas of Ballybofey and Stranorlar; and raises awareness of walking trails and natural areas located close to the Twin Towns.

3 PROPOSED INFRASTRUCTURE

All options propose a type 2 dual carriageway to replace the existing sections of the N13 / N15 routes between Cappry and Kilross. All options currently propose a roundabout at each end of the option, and one or two compact grade separated junctions between the two terminal roundabouts.

All options propose a segregated cycle facility along the full length of the alignment that is separated from the carriageway by the provision of a grass verge, as shown in **Figure 3-1.** This facility, however, will be modified during the design stage to be a shared cycleway / pedestrian footway.

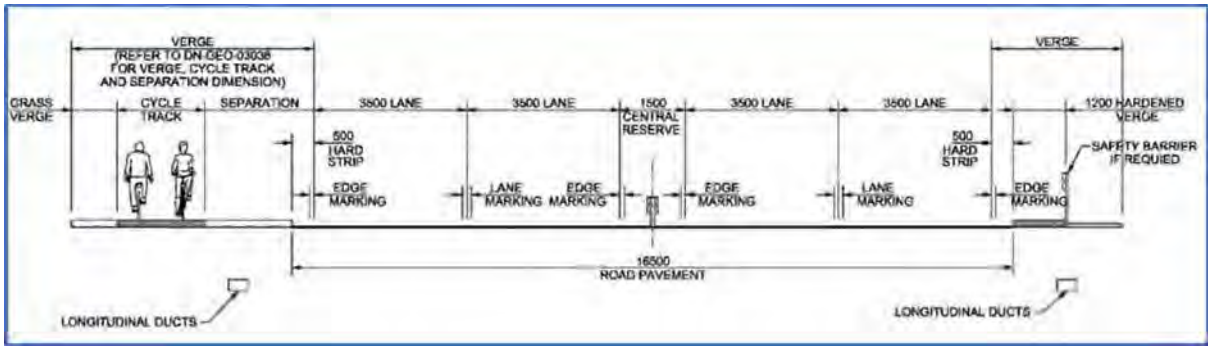

Figure 3-1 Typical Cross Section showing a Type 2 Dual Carriageway

The proposed National Cycle Network seeks to use existing cycleways and Greenways to achieve a country wide cycle network, as shown below in **Figure 3-2**:

Figure 3-2 National Cycle Routes

Ballybofey / Stranorlar lies on the proposed Sligo to Letterkenny section of the National Cycle Network and the inclusion of a shared cycleway / pedestrian footway adjacent to the proposed road will help to achieve the establishment of the National Cycle Network, therefore having a significant positive impact on the establishment of this infrastructure.

No dedicated pedestrian facilities are proposed adjacent to the proposed road, however existing pedestrian links crossing the proposed road by way of the existing local road network will be maintained in most cases. In circumstances where they will be severed, there will be a nearby alternative route.

4 PHYSICAL ACTIVITY IMPACTS

4.1.1 Health Benefits

Health benefits and impacts associated with the scheme are defined by the impact that the scheme has on existing walking / running / cycling routes contained within the local road network and amenity areas (such as public parks and woodland), and new facilities that are introduced with the scheme (such as the dedicated cycleway).

Figure 4-1 below shows the impact of the routes on the known walking trails. Most of these trails are also found with the forest areas. The impacts of the different options on the existing walking trains is discussed in Section 5 below.

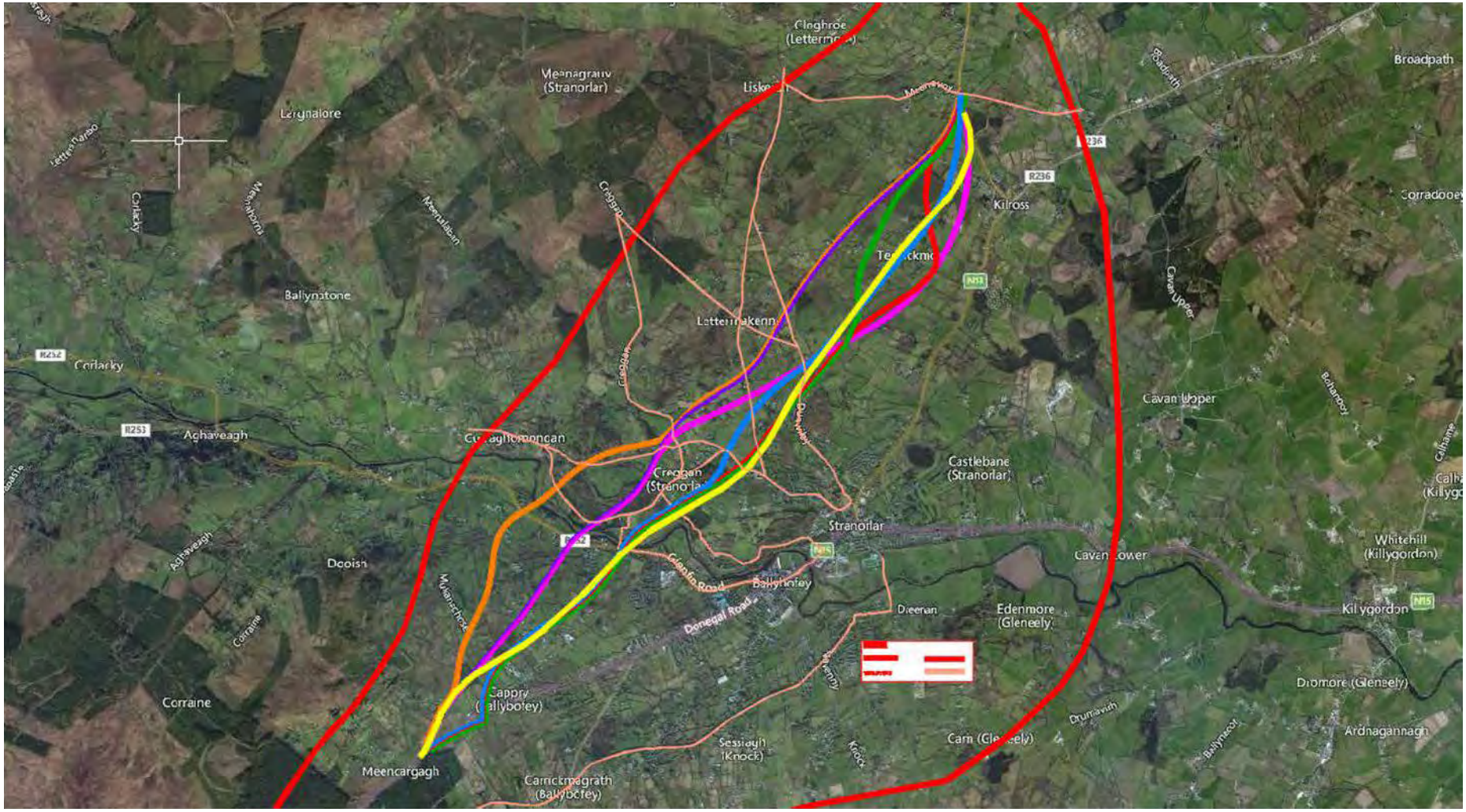

Figure 4-1 Extent of Options showing impact on existing walking routes

All options have the same material impact on the local cycle network provision for Section 1, with none of the options traversing the Donegal Cycle Network, and all options provide a shared cycleway / pedestrian footway contributing to the establishment of the National Cycle Network. For all options, the proposed cycle track will provide an expansion of the existing informal cycle network. The new facility will be over 8km in length and will provides a safe cycling facility, currently not available in the towns.

Any increase in cycling trips is likely to result in increased health benefits, and the new cycleway is likely to entice people to cycle, further improving the health benefits. Further, the removal of significant volumes of traffic from the existing local road network will encourage greater cycling and walking, leading to additional health benefits.

In terms of health benefits, it is considered all options will have a moderately positive impact score with the same preference across each option.

4.1.2 Journey Ambience Benefits

Provision of a segregated cycle track with each option reduces conflict points between cyclists and vehicles utilising the N13 / N15. This improved segregation can improve safety and subsequently increase the attractiveness of the option for cycling. This will be modified at the design stage to include for both pedestrians and cyclists.

For all options, the construction of a new mainline will re-distribute traffic and reduce traffic volumes on the existing N13 / N15. The existing N13 / N15 speed limit will also be reduced, further improving conditions for residual cyclists and pedestrians on the local road network. This has the potential to make the existing residual road network more attractive for cyclists and pedestrians, contributing positively to journey ambience for non-motorised road users.

There will also be a negative impact at locations where the proposed road will cross the existing local road network (within a quiet area) that is used as a walking route.

Overall, in terms of journey ambience benefits, it is considered all options will have a moderately positive impact score with the same preference across each option.

5 OPTION COMPARISON

None of the options have a direct impact on any dedicated sporting facility / ground, so have neutral impact in this regard.

All options include a shared cycleway / pedestrian footway along the mainline.

Regarding local amenities that facilitate physical activity, Options 1A, 1A1, 1B, 1B1, 1C and 1C1 pass through Cregan Forest Park and will therefore have a high negative impact on the physical activity associated with this forest.

Options 1D, 1D1, 1E, 1E1, 1F and 1F1 have a similar high negative impact on Holywell Woods. Option 1G has a slight impact on Holywell Woods and is therefore considered to be the most preferable option in relation to direct impact on amenities that encourage physical activity. Options 1D, 1D1, 1E, 1E1, 1F, 1F1 and 1G have a moderate negative impact on the Drumboe Avenue Loop route, with the proposed road crossing this loop twice for all of these options.

All options result in reduced traffic volumes on the existing road network and proposals also include lowering the speed limits of the existing N13 / N15. This will make the residual road network more attractive and safer for walking and cycling. Although this is likely to have a positive effect in terms of journey ambience and

health benefits, the net effect of this is not regarded as a differentiating factor between options in terms of the physical activity assessment.

None of the options have a direct impact on existing sports facilities (such as football grounds).

The assessment for Physical Activity is summarised in **Table 5-1** below, with the impact scoring key shown in **Table 5-2**.

In summary, all options will have a positive impact on physical activity. Option 1G, however, will have a slightly higher positive impact than the other options, since it is the only option that does not have a significant impact on any woodland amenity. All options have a moderate positive impact – score 6, while Option 1G is preferred above the other options.

Table 5-1 Option Scoring Matrix

	1A	1B	1C	1D	1E	1F
Impact Description	Moderately Positive	Moderately Positive	Moderately Positive	Moderately Positive	Moderately Positive	Moderately Positive
Impact Score	6	6	6	6	6	6
Preference	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate

	1A1	1B1	1C1	1D1	1E1	1F1	1G
Impact Description	Moderately Positive	Moderately Positive	Moderately Positive	Moderately Positive	Moderately Positive	Moderately Positive	Moderately Positive
Impact Score	6	6	6	6	6	6	6
Preference	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate	Preferred

Table 5-2 Impact Scoring Key (TII, 2016)

7	Major or Highly Positive
6	Moderately Positive
5	Minor or Slightly Positive
4	Not Significant/Neutral
3	Minor or Slightly Negative
2	Moderately Negative
1	Major or Highly Negative

Donegal County Council

TEN-T Priority Route Improvement Project, Donegal

Section 1: N15/N13 Ballybofey/Stranorlar Urban Region

Option Selection Report

Appendix C1.3 – Accessibility & Social Inclusion Appraisal

December 2019

Document Control Sheet

Client:	Donegal County Council
Project Title:	TEN-T Priority Route Improvement Project, Donegal – Section 1: N15/N13 Ballybofey/Stranorlar Urban Region
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1 INTRODUCTION

The Accessibility and Social Inclusion appraisal has been conducted in accordance with the Project Appraisal Guidelines Unit 7: Multi-Criteria Analysis. The basis of the appraisal covers two key areas:

- Deprived Geographical Areas
- Vulnerable Groups

County Donegal is a coastal county with approximately 10% of its land boundary connecting to rest of the Republic of Ireland. It is an isolated county geographically from many of the urban centres and key services throughout the Republic of Ireland. As such, Donegal has developed a positive relationship with its neighbouring counties in Northern Ireland, particularly Derry and Tyrone which provides an element of service provision for the population of Donegal.

Section 1 of the TEN-T Priority Route Improvement Project includes the existing N15 and N13 national roads. The N15 and N13 connect Ballybofey and Starnorlar to Letterkenny and northwest Donegal with Derry to the north, Dublin to the east, and Donegal, Sligo and Galway to the south.

In comparison to the existing N13 and N15 roads, all of the proposed options provide for an improvement in infrastructure. There will be short term employment opportunities due to the construction of the road and also longer-term benefits due to improved accessibility to Letterkenny. However, this improvement is deemed to be marginal with respect to impact/influence on Accessibility and Social Inclusion. Furthermore, all options are deemed to contribute equally to the objectives of national and regional policies including the Project Ireland 2040 National Planning Framework, Building on Recovery: Infrastructure and Capital Investment Plan, the Border Regional Authority Regional Planning Guidelines 2010 – 2022 and the Donegal Local and Economic and Community Plan 2016-2022.

2 DEPRIVED GEOGRAPHICAL AREAS

The 2016 Pobal HP Deprivation Index shows the level of overall affluence and deprivation across the country using identical measurements and scales using data from the 2016 Census of Population. All of the Section 1 study area is marginally below average or disadvantaged according to this index.

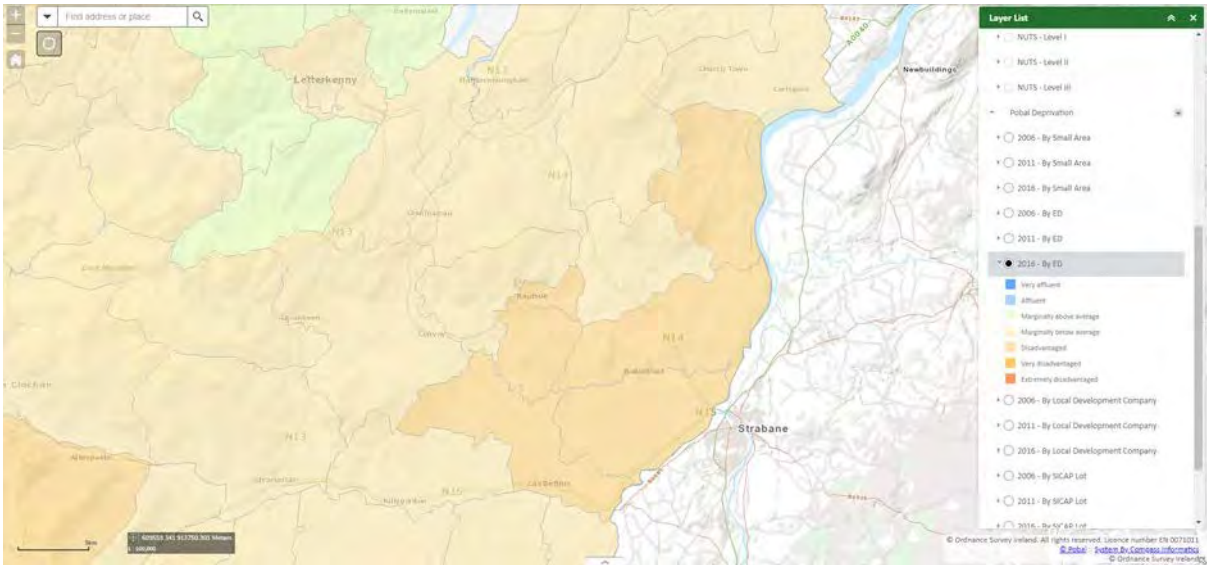

Figure 2-1 Deprivation Index for Section 1 Study Area.

(Source: https://maps.pobal.ie/WebApps/DeprivationIndices/index.html)

The government has various schemes to help address the issues that are prevalent in these deprived areas.

The Rural Social Scheme is an income support programme aimed at low-income farmers and fishermen/women who receive specified Social Welfare payments. It supports these individuals who are unable to earn a sufficient living from their farm holding by providing an additional social welfare payment in return for services that benefit rural communities for a set number of hours per week.

In County Donegal, the percentage of total employment in the agriculture, forestry and fishing sector is 6.8%, much higher than the state average of 4.4% (**Reference: western development commission**). The Section 1 study area comprises mostly of agricultural businesses and farmland. As the area is identified as being disadvantaged to various extents and visibly has a significant proportion of its industry within farming, it is likely that participants in the Rural Social Scheme reside within the study area. The proposed N15 / N13 scheme is likely will improve accessibility from the rural area to Donegal, Letterkenny and Lifford and also improve access between Ballybofey / Stranorlar and the main centres of Donegal, Letterkenny and Lifford. The construction of the project will also provide short term employment opportunities. However, it is not anticipated that the improvements will have any significant impact. All routes will have a similar impact and are all scored neutral.

The option assessment for Deprived Geographical Areas, with the Impact Scores and Preferences, is summarised in **Table 2-1** below.

Table 2-1 Deprived Geographical Areas Scoring Matrix

	1A	1B	1C	1D	1E	1F
Impact Description	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
Impact Score	4	4	4	4	4	4
Preference	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate

	1A1	1B1	1C1	1D1	1E1	1F1	1G
Impact Description	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
Impact Score	4	4	4	4	4	4	4
Preference	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate

3 VULNERABLE GROUPS

Currently the national primary road network, which includes the N13 and N15 within Section 1, is the only transport connection between County Donegal and other counties in the Republic and Northern Ireland, as there is no live rail network. This means that buses are the only public transport mode available to travel to/from Donegal for many individuals. Bus Eireann services from Ballybofey / Stranorlar include Letterkenny, Sligo, Galway, Derry and Lifford. There are no direct services from Ballybofey / Stranorlar to Dublin.

As the N15 / N13 forms part of the route between Donegal and Letterkenny / Lifford and then onto Dublin, any proposed improvement to the N15 / N13 will improve the journey time and journey time reliability between these centres. This improvement in accessibility between Ballybofey / Stranorlar and these centres will improve the access from residents in Section 1 to jobs, key facilities and social opportunities in Letterkenny, Lifford and further to Dublin.

It is not anticipated that the improved N15 / N13 will have any beneficial impact on mobility or sensory impairment.

Options have been assessed taking into consideration their connectivity to local communities and start/end points in in the context of accessibility and social inclusion. In summary, it is concluded that options that have greater accessibility to the town will perform slightly better than the options with lower accessibility.

Options 1D1, 1E1, 1F1 and 1G all have junctions closest to the town with its associated services, and have the most direct link between the scheme and St Joseph's Hospital making them the best performing options. Option 1B1 has the same advantages but has one junction slightly further remote than Options 1D1, 1E1, 1F1 and 1G making it slightly less preferred. Option 1C1 has only one intermediate junction providing access to the towns and Option 1A1 has only one intermediate junction serving the towns; and is also located most remotely of all the proposed intermediate junctions.

The option assessment for Vulnerable Groups, with the Impact Scores and Preferences, is summarised in **Table 3-1** below.

Table 3-1 Vulnerable Groups Scoring Matrix

	1A	1B	1C	1D	1E	1F
Impact Description	Neutral	Slight Positive	Neutral	Slight Positive	Slight Positive	Slight Positive
Impact Score	4	5	4	5	5	5
Preference	Least Preferred	Intermediate	Least Preferred	Preferred	Preferred	Preferred

	1A1	1B1	1C1	1D1	1E1	1F1	1G
Impact Description	Neutral	Slight Positive	Neutral	Slight Positive	Slight Positive	Slight Positive	Slight Positive
Impact Score	4	5	4	5	5	5	5
Preference	Least Preferred	Intermediate	Least Preferred	Preferred	Preferred	Preferred	Preferred

Donegal County Council

TEN-T Priority Route Improvement Project, Donegal

Section 1: N15/N13 Ballybofey/Stranorlar Urban Region

Option Selection Report

Appendix C1.4 – Integration Appraisal

December 2019

Document Control Sheet

Client:	Donegal County Council
Project Title:	TEN-T Priority Route Improvement Project, Donegal – Section 1: N15/N13 Ballybofey/Stranorlar Urban Region
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1 INTRODUCTION

The Integration appraisal has been conducted in accordance with the Project Appraisal Guidelines Unit 7: Multi-Criteria Analysis. The basis of the appraisal covers the following key areas:

- Transport Integration
- Land Use Integration
- Geographical Integration
- Other Government Policy Integration: Regional Balance

The aim of this section is to compare the impact of each option on achieving objectives of EU and Government Policy.

1.1 Context

County Donegal is a coastal county with approximately 10% of its land boundary with the rest of the Republic of Ireland. It is isolated geographically from many of the urban centres and key services throughout the Republic of Ireland. As Donegal has no live railway network, road travel is the only transport mode available.

Section 1 of the TEN-T Priority Route Improvement Project, Donegal comprises sections of the N15 and N13 routes in the vicinity of Ballybofey and Stranorlar. Sections of the existing road network suffer from congestion, a saturation of junctions and direct accesses, poor geometry (such as poor vertical alignment) and high collision rates.

2 TRANSPORT INTEGRATION

This section of the appraisal focuses on gaps in the existing network and potential for opportunities for changing mode of transport. The performance of each option with respect to four sub-criteria is considered for this section.

2.1 Connectivity of the strategic road network

A new N15 / N13 alignment avoiding the town centres of Ballybofey and Stranorlar would improve linkages to the existing road network to the north and to the east. Furthermore, with the existing N15 to the west that has been improved during recent years, a new N15 / N13 alignment would address a gap in the quality of the existing infrastructure at Ballybofey / Stranorlar, bringing it in line with the transport network to which it joins. All options are identified as being highly positive in this respect.

2.2 Connectivity between transport modes

There is no live railway network in Donegal or therefore any new N15 / N13 road would not have an impact on modal change from road to rail. Improving the road infrastructure may make public transport by bus more desirable by improving journey times and journey time reliability.

Therefore, all route options are deemed to have a neutral impact with respect to this criterion.

2.3 Support for sustainable transport modes

The desirable cross-section to be applied on the preferred option is a Type 2 Dual Carriageway. This cross-section includes a cycle track within the corridor which is separated from the paved road surface. While this mainline cycle track will have no link to the existing Donegal Cycle Route, it will represent the addition of a new cycle track approximately 8km long, fully segregated from traffic making it a valuable local amenity for the towns. It would have a significantly positive impact on the extent of cycle provision in the area. All options would accommodate a similar provision/ improvement in cycle infrastructure, which has the potential to lengthen the cycle route and encourage more use. In addition, the existing N15 / N13 will also be more desirable for cyclists due to reduced traffic volumes. Therefore, all options are deemed to be perform moderately positive in this regard.

2.4 Access to other transport infrastructure

The N15 / N13, leading to the N14 and A5, is the primary route utilised for residents in Donegal to access Dublin and subsequently, Dublin Airport and Port. Although the existing N15 / N13 provides the road connection to the N14 and then onto the A5 and onto Dublin, an upgraded N15 / N13 would accommodate increased capacity, especially in the vicinity of Ballybofey / Stranorlar with the potential for improved journey times and journey time reliability. The improvement of the N15 / N13 will also improve access to Belfast Airport and Port. All options perform similarly in this way, and therefore are deemed to score moderately positive in this regard.

3 LAND USE INTEGRATION

This criterion compares the performance of each option with respect to compatibility with adopted land use objectives and are appraised across three sub-criteria.

3.1 Support for local development plan

The County Donegal Development Plan, 2018 – 2024 has strategic objectives including, but not limited to, planning for population growth, prioritising "key infrastructural investment required throughout the County", and to provide the "strategic spatial framework to guide collaboration, investment, community development and sustainable growth". The Transportation Strategy states that the "need for investment in new roads access and improvements to existing roads infrastructure within the county is a priority intervention to be sought through the life of the plan". It continues to state how the Core Strategy Map (**Figure 3-1**) shows the "importance of the onward and external connections through the A5 Western Transport Corridor and the A6 road projects, the TEN-T Network and in particular the Letterkenny Relief Road and the N14 Letterkenny/Lifford road".

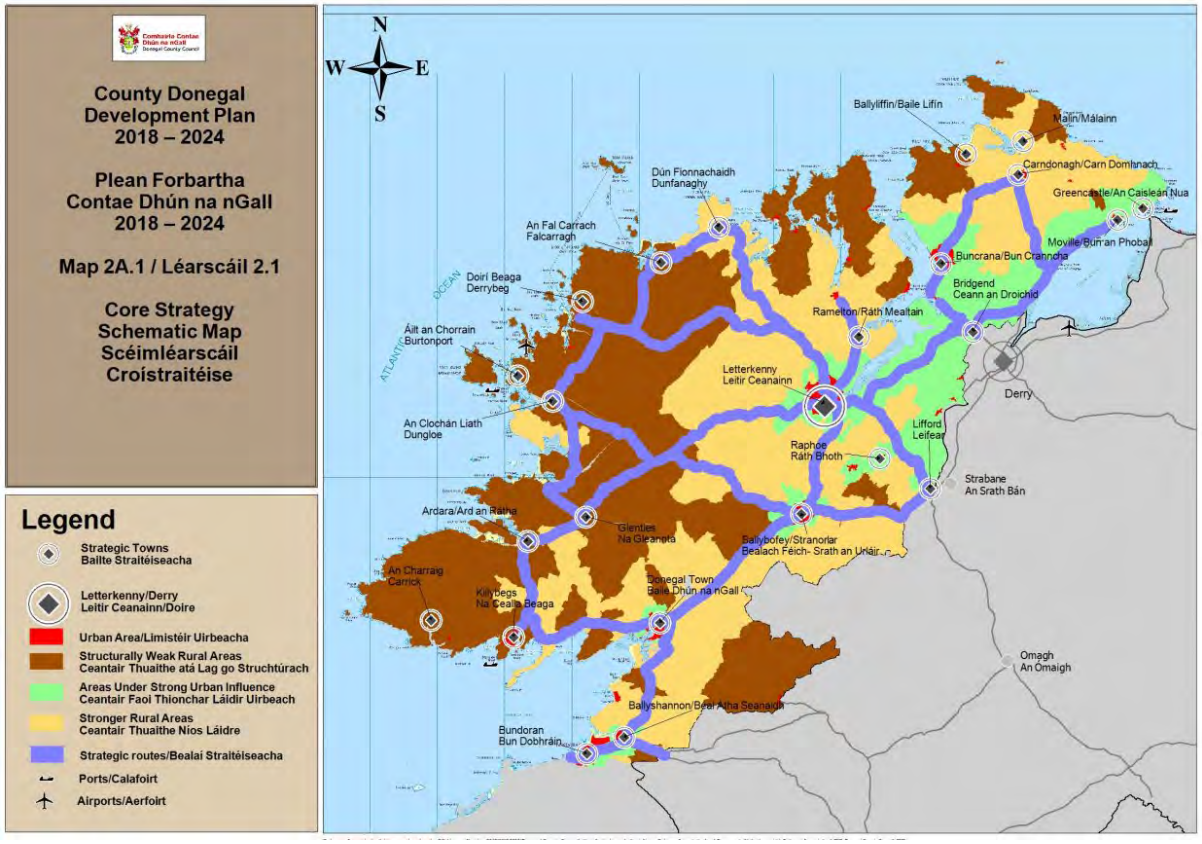

Figure 3-1 Core Strategy Schematic Map

Core Strategy Objective (CS-O-9) states:

"To coordinate and promote the delivery of key roads and access infrastructure (including the A5 Western Transport Corridor and A6 road projects, the Ten- T Network, Letterkenny Relief Road and the N14 Letterkenny/ Lifford road) with the other relevant authorities including partners in the North West Strategic Growth Partnership and within the Northern and Western Regional Assembly so as to result in effective strategic connections to and throughout the County".

Similarly, Transportation Objective (T-O-1) states:

"To deliver the Trans-European Transport Network (TEN-T), (as required by EU Regulation (EU) No 315/2013 "Guidelines for the development of the Trans European Transport Network (Ten-T)") as part of the core and comprehensive transport network of Ireland".

These objectives are supported by Map 5.1.2 (**Figure 3-2**) which outlines the Strategic Transport Network in Donegal. The development plan includes a reserved corridor for the N15 / N13 Ballybofey / Stranorlar Bypass improvement which is based on a previous route selection process.

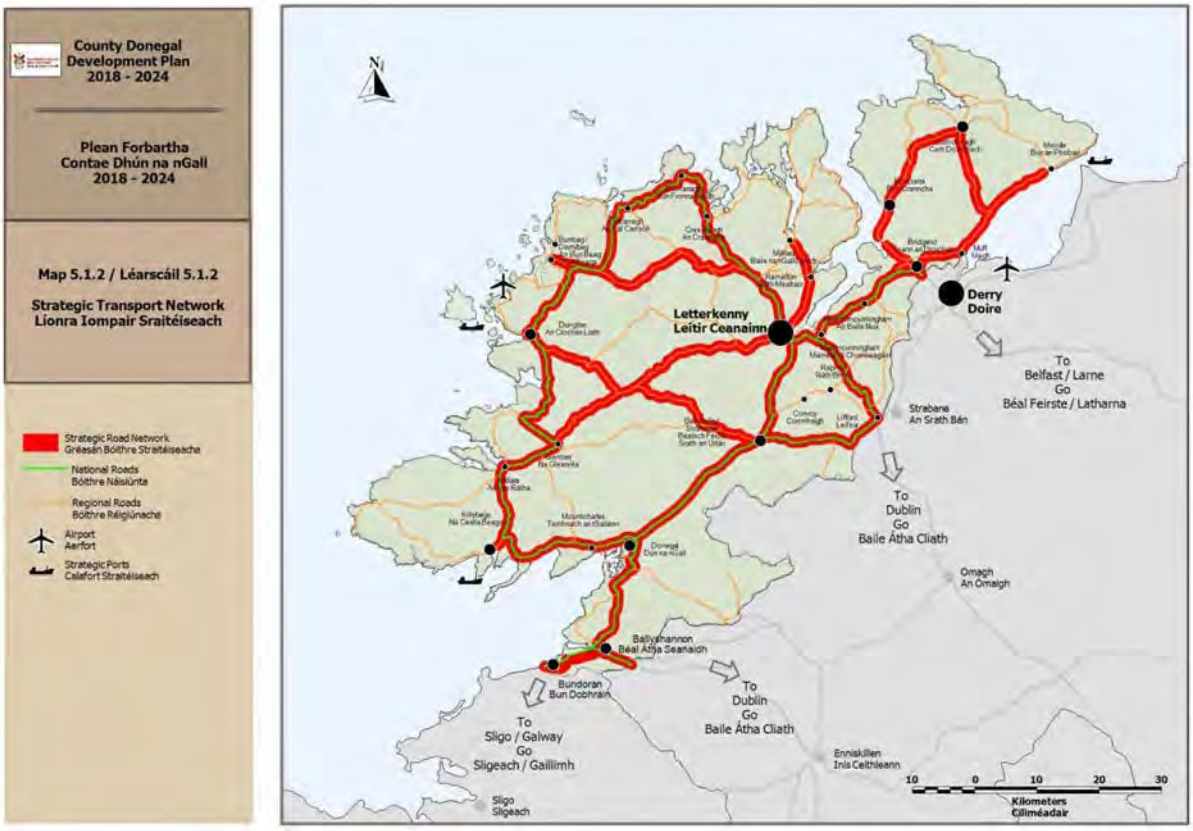

Figure 3-2 Strategic Transport Network, Donegal

The importance of the N15 / N13 is repeated in mapping and text within the County Development Plan. As such, all options perform positively with respect to correlation with the plan.

There is a reserved corridor within the previous 2012-2018 plan which has been retained in the new County Donegal Development Plan, 2018 – 2024. This previous option (Option V in Stage 1 of Phase 2 of this project) was included as one of the Stage 1 options but was not shortlisted to progress to Stage 2 since it did not perform as well as the shortlisted options for environmental and economic reasons.

Although this corridor is reserved in the current CDP, the plan is developed such as to accommodate an amendment pending the outcome of the current Option Selection process, and as such, an amendment to the CDP would be expected. Given that all other options would still be addressing key objectives in the CDP, all options have a major positive impact in their support for local development plans.

3.2 Strategic connectivity for long distance trips

The N15 / N13 is identified as a Comprehensive Corridor on the Trans-European Transport Network, meaning it has regional significance. All options aim to replace a section of the existing N13 and N15 with

an improved alignment with a wider cross-section, which will subsequently improve the capacity, operation and safety of the N15 / N13 routes. In addition, the project provides for an offline improvement of the road network with limited connectivity to national and regional roads. The N15 / N13 will therefore be a protected road regarding future access. In this respect, all options will have a positive impact. The options that are closest to the towns (Options 1D, 1D1, 1E, 1E1, 1F, 1F1 and 1G) , however, provide a slight comparative advantage of having greater accessibility to the urban centres and therefore perform better than options located further from the town with more remote access between the scheme and the town centre (Options 1A, 1A1, 1B, 1B1, 1C and 1C1).

3.3 Mitigate risks of urban sprawl

All options are located on the north-western side of Ballybofey / Stranorlar and include specified junctions that will connect to the existing road network leading to the town centres, with a link provided to the east of Stranorlar to connect to the existing N15 Lifford Road. All options have uninterrupted flow between junctions with limited local access points to protect the network.

Options located closer to the existing town centre and more heavily populated areas will, by their physical presence, provide a boundary for future development and a restraint for potential urban sprawl. The closer the option to the town centre, the greater the restraint on the risk of urban sprawl. Accordingly, Options 1B, 1B1, 1D, 1D1, 1E, 1E1, 1F, 1F1 and 1G will perform better in mitigating risks for urban sprawl than Options 1A, 1A1, 1C and 1C1 which are located further away from the town centre.

4 GEOGRAPHICAL INTEGRATION

Project Ireland 2040, the National Planning Framework (NPF), addresses where to plan population growth, and outlines objectives with respect to regions. A prevalent theme throughout the NPF is the need for improved "access from the north-west to Dublin and the east and to Cork, Limerick, Galway and Waterford", as outlined in the "Overview" section of the strategy. Within the text, it states that "enhanced connectivity is a priority for this regional area [Donegal]" and to support the "strong links that exist between Letterkenny and Northern Ireland".

The ambition of the NPF is to create a single vision and shared goals nationally. These goals are expressed as National Strategic Outcomes (NSOs). NSO 2 deals with Enhanced Regional Accessibility, and explicitly states that better accessibility to the "Northern and Western region will enable unrealised potential to be activated". It also highlights "upgrading access to the North-West border area, utilising existing routes (N2/N14/A5)" as being necessary for improving regional accessibility to the North-West.

All options perform equally in satisfying the goals of the NPF. They also follow through with themes from the National Spatial Strategy, by improving connectivity between Hubs and Gateways. Additionally, the N15 / N13 is also part of the Trans European Transport Network (TEN-T), meaning it has National and European significance and provides cross-border, international connectivity. As such, all options score an equal score of highly positive with respect to geographical integration.

5 OTHER GOVERNMENT POLICY INTEGRATION: REGIONAL BALANCE

In addition to improved accessibility, another theme of the NPF is promotion of regional parity, with National Policy Objective 1a stating that "The projected level of population and employment growth in the Eastern and Midland Regional Assembly area will be at least matched by that of the Northern and Western and Southern Regional Assembly areas combined".

As such, the TII Project Appraisal Guidelines Unit 7 advise that transport projects should be scored positively for regional balance if investment is:

- Within or to urban centres from peripheral regions
- On links between urban centres
- On routes which improve access to international ports and airports

All options for the N15 / N13 meet these criteria to varying extents, by improving connectivity from County Donegal, one of the most peripheral counties in the country, to the rest of the TEN-T network and subsequently to Dublin, while also improving connectivity to the international transport network in Northern Ireland. This in turn improves access to international ports and airports in Dublin.

In addition, the N15 / N13 Ballybofey / Stranorlar improvement is also consistent with the objectives of the National Development Plan, 2018-2027 (NDP), of which one objective is to invest in the Border Region to fully realise the potential of the North-West. The NDP provides for investment to support the ambition for development of the border region by upgrading road networks including the N15 / N13 Ballybofey / Stranorlar section.

As such, all options score equally under this sub-criterion, which is highly positive.

6 ROUTE COMPARISON

In comparison to the existing N15 / N13, all of the proposed options provide for an improvement in infrastructure which in turn is likely to have a positive impact with respect to integration.

For strategic connectivity for longer trips, and mitigation of urban sprawl, the options closest to the towns perform best.

Table 6-1 Outlines the scoring and preferences of each option with respect to Integration.

Table 6-1 Integration Scoring Matrix

Option	Criteria	Sub-criteria	Sub-criteria Impact Score	Impact Score	Preference
1A & 1A1	Transport Integration	Connectivity of the strategic road network	7	6	Intermediate
		Connectivity between transport modes	4		
		Support for sustainable transport modes	6		
		Access to other transport infrastructure	6		
	Land Use Integration	Support for Local Development Plan	7	5	Intermediate
		Strategic connectivity for long distance trips	5		
		Mitigate risks of urban sprawl	3		
	Geographical Integration	-	7	7	Preferred
	Other Government Policy	-	7	7	Preferred
1B & 1B1	Transport Integration	Connectivity of the strategic road network	7	6	Intermediate
		Connectivity between transport modes	4		
		Support for sustainable transport modes	6		
		Access to other transport infrastructure	6		
	Land Use Integration	Support for Local Development Plan	7	5	Intermediate
		Strategic connectivity for long distance trips	6		
		Mitigate risks of urban sprawl	4		
	Geographical Integration	-	7	7	Preferred

	Other Government Policy	-	7	7	Preferred
1C & 1C1	Transport Integration	Connectivity of the strategic road network	7	6	Intermediate
		Connectivity between transport modes	4		
		Support for sustainable transport modes	6		
		Access to other transport infrastructure	6		
	Land Use Integration	Support for Local Development Plan	7	5	Intermediate
		Strategic connectivity for long distance trips	5		
		Mitigate risks of urban sprawl	3		
	Geographical Integration	-	7	7	Preferred
	Other Government Policy	-	7	7	Preferred
1D & 1D1	Transport Integration	Connectivity of the strategic road network	7	6	Preferred
		Connectivity between transport modes	4		
		Support for sustainable transport modes	6		
		Access to other transport infrastructure	6		
	Land Use Integration	Support for Local Development Plan	7	6	Preferred
		Strategic connectivity for long distance trips	7		
		Mitigate risks of urban sprawl	4		
	Geographical Integration	-	7	7	Preferred

	Other Government Policy	-	7	7	Preferred
1E & 1E1	Transport Integration	Connectivity of the strategic road network	7	6	Preferred
		Connectivity between transport modes	4		
		Support for sustainable transport modes	6		
		Access to other transport infrastructure	6		
	Land Use Integration	Support for Local Development Plan	7	6	Preferred
		Strategic connectivity for long distance trips	7		
		Mitigate risks of urban sprawl	4		
	Geographical Integration	-	7	7	Preferred
	Other Government Policy	-	7	7	Preferred
1F & 1F1	Transport Integration	Connectivity of the strategic road network	7	6	Preferred
		Connectivity between transport modes	4		
		Support for sustainable transport modes	6		
		Access to other transport infrastructure	6		
	Land Use Integration	Support for Local Development Plan	7	6	Preferred
		Strategic connectivity for long distance trips	7		
		Mitigate risks of urban sprawl	4		
	Geographical Integration	-	7	7	Preferred

	Other Government Policy	-	7	7	Preferred
1G	Transport Integration	Connectivity of the strategic road network	7	6	Preferred
		Connectivity between transport modes	4		
		Support for sustainable transport modes	6		
		Access to other transport infrastructure	6		
	Land Use Integration	Support for Local Development Plan	7	6	Preferred
		Strategic connectivity for long distance trips	7		
		Mitigate risks of urban sprawl	4		
	Geographical Integration	-	7	7	Preferred
	Other Government Policy	-	7	7	Preferred

TEN-T Priority Route Improvement Project, Donegal

Section 1: N15/N13 Ballybofey/Stranorlar Urban Region

Option Selection Report

Appendix C1.5: Ballybofey Link Road Assessment (Non Environment)

December 2019

Document Control Sheet

Client:	Donegal County Council
Project Title:	TEN-T Priority Route Improvement Project, Donegal – Section 1: N15/N13 Ballybofey/Stranorlar Urban Region
Document Title:	Option Selection Report- Appendix C1.7: Option 1G Ballybofey Link Road Assessment
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1 INTRODUCTION

The TEN-T Priority Route Improvement Project, Donegal is part of the National Development Plan 2018-2027 and aims to develop a sustainable high-quality network to connect the North West Region to the rest of Ireland and Northern Ireland.

The Project consists of three sections and further detail can be found in the main Option Selection Report. This report deals with part of Section 1: N15/N13 Ballybofey / Stranorlar and is primarily focussed on Ballybofey and the National Road N15, south of the River Finn.

This report presents the Route Selection Assessment (Stages 1 and 2) of the associated Link Roads at Ballybofey in County Donegal developed for the Mainline Option 1G. Option 1G is the Preferred Option of the Mainline within Section 1. The Link Roads form an important connection between the Proposed Scheme and Ballybofey.

1.1 Background

1.1.1 Ballybofey Link Roads

Stage 1 Assessment

This report presents the conclusions from the Stage 1 assessment of 19 Link road Options at Ballybofey (Appendix A), that connected the preferred mainline Option 1G to the local road network. These options were assessed in accordance with the Project Appraisal Guidelines for National Roads Unit 7.0 -Multi Criteria Analysis. The assessment followed the Phase 2, Stage 1 – Preliminary Option Assessment, criteria for Stage 1 consisted of Engineering, Environmental and Economic Impacts.

The criteria used in the engineering, environmental and economic Stage 1 assessments matched those used in the Stage 1 assessment for the mainline options for the project, with two additional criteria introduced to give specific consideration for the need for the link roads to provide strong connectivity to the local road network and town centre, and the compliance with the Seven Strategic Towns Local Area Plan (Ballybofey - Stranorlar) 2018 – 2024.

The Economic Assessment was based on the general construction cost of options including land and property costs. River crossings and related structures were included in the costs for each option.

The Stage 1 assessment concluded with the shortlisting of five options to be taken forward to the Stage 2 assessment. These shortlisted options had scores and preferences that were significantly better than all other 14 options. The options that were not shortlisted were not considered further.

The Figure below shows an overview of the initial options which were assessed as part of the Stage 1 Assessment. Drawings showing details of each individual option are presented in Appendix A.

Figure 1-1 Ballybofey Stage 1 Link Road Options Overview

Stage 2 Assessment

Five Options were taken forward for Stage 2 consideration. These 5 options were designed to provide a link between Emerging Preferred Option 1G for Section 1 and the local road network including R252 and existing N15.

The assessment followed the guidelines set out in the Project Appraisal Guidelines for National Roads Unit 7.0 -Multi Criteria Analysis to produce the Phase 2, Stage 2 – Project Appraisal Matrix based on assessment of the quantitative and qualitative impacts of options. The criteria used were Economy, Safety, Environment, Accessibility and Social Inclusion, Integration and Physical Activity. All of these criteria also contain sub-criteria and the contents of this report presents the analysis of these. The environmental assessment was carried out separately and can be found in Appendix D of the main Options Selection Report, while this report presents the assessments for non-environmental assessments.

The application of the assessment criteria took into consideration the local nature, rather than the strategic nature, of the Ballybofey Link Roads. This included consideration to the policies of the **Seven Strategic Towns Local Area Plan (Ballybofey - Stranorlar) 2018 – 2024**, and of the impact of the link road options on the local road network. Within the Local Area Plan, Map No. 3 shows the Land Use Zoning for Ballybofey and Stranorlar. On the map, Potential Access Points are shown linking the R252, existing N15 in the area east of Cappry. These Potential Access Points could be achieved by the provision of new roads that would provide access to the zoned lands, in order to open it up for development. Map 3 from the Local Area Plan is shown below in Error! Reference source not found., followed by the 5 Stage 2 options illustrated in Error! Reference source not found. to Error! Reference source not found. below.

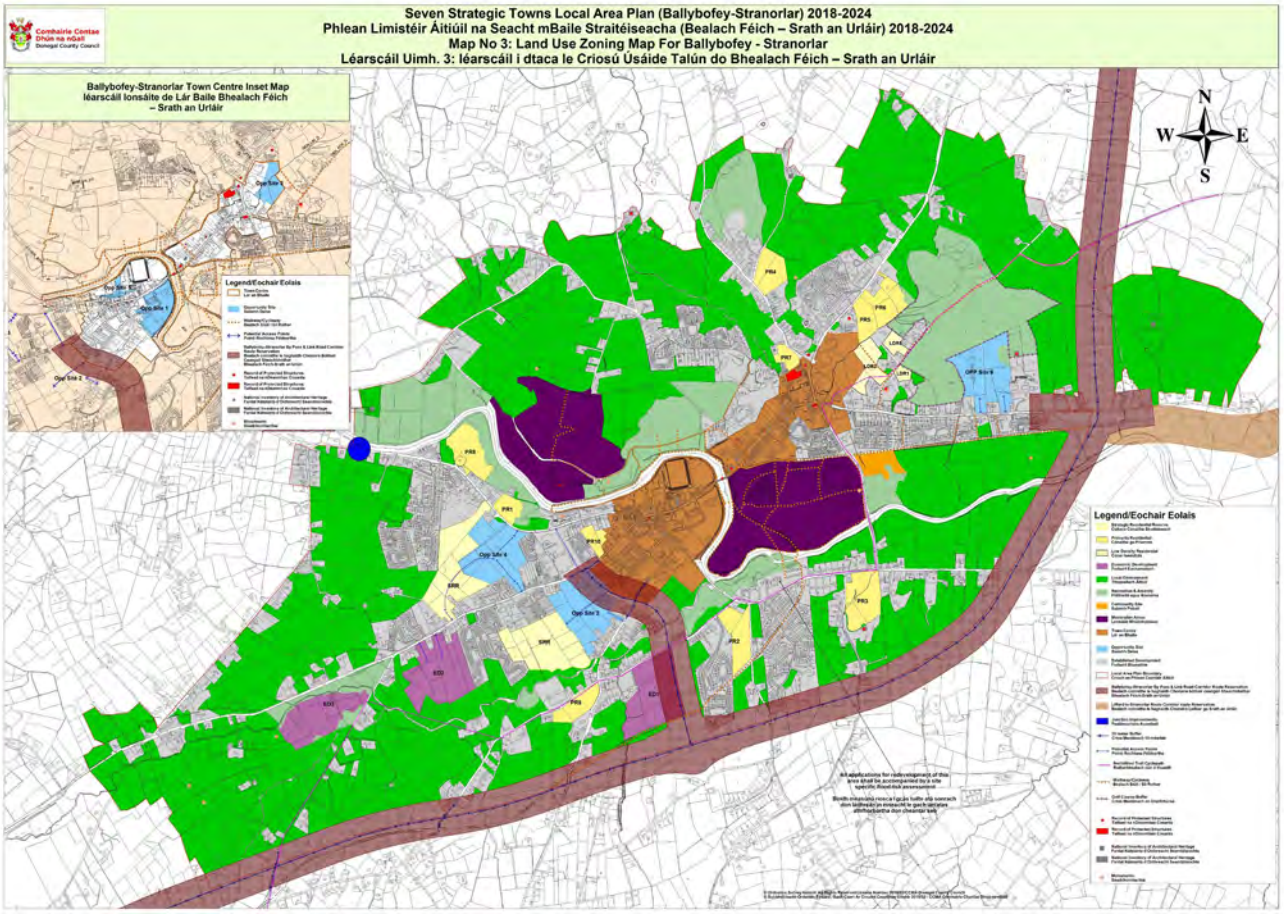

Figure 1-2 Extract of Map 3 from the Seven Strategic Towns Local Area Plan (A3)

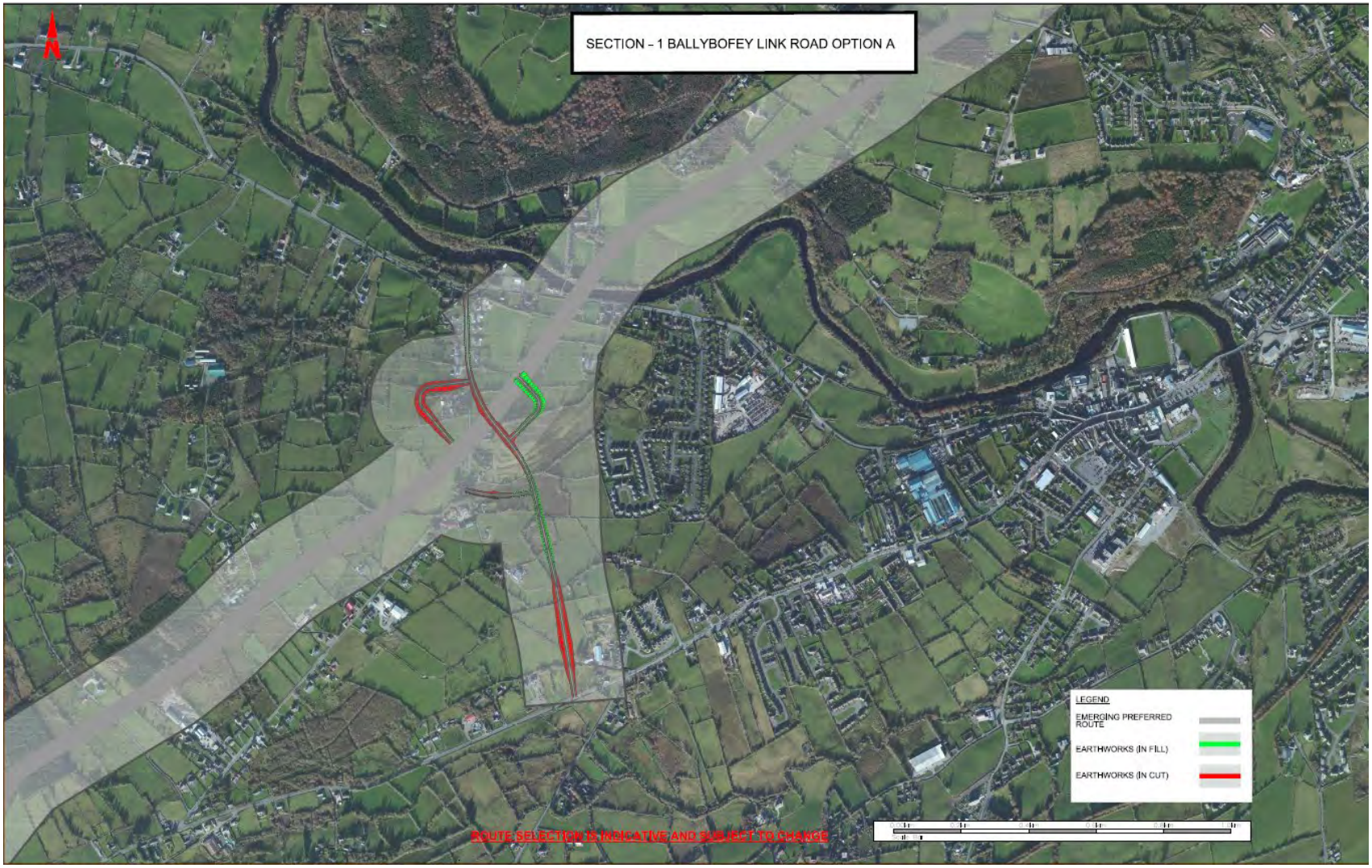

Figure 1-3 Ballybofey Link Road Option A

Figure 1-4 Ballybofey Link Road Option B

Figure 1-5 Ballybofey Link Road Option C

Figure 1-6 Ballybofey Link Road Option D

Figure 1-7 Ballybofey Link Road Option E

1.2 Methodology for Stage 2 Assessments

The Stage 2 assessments of the 1G Link Road Options forms part of the Phase 2 – Option Selection Report for the TEN-T Priority Route Improvement Project, Donegal. (See Section 1.2 of the Option Selection Report for a description of the project.)

This report includes the assessment for the non-environmental criteria for the Ballybofey Link Road options in accordance with guidance documents: TII PMG (2019) and Project Appraisal Guidelines for National Roads Unit 7.0 – Multi-Criteria Analysis, PE PAG 02031, (2016). The Common Appraisal Framework (CAF) criteria are presented in this report along with the sub-criteria as shown below.

- Economy, including
  - Transport efficiency and effectiveness
  - Wider economic impacts
  - Transport quality and reliability
  - Funding impacts
- Safety, including
  - Collision reduction
  - Security
  - Road Safety Audit
  - Road Safety Impact Assessment
- Accessibility & Social Inclusion, including:
  - Deprived geographical areas
  - Vulnerable groups
- Integration, including:
  - Transport integration
  - Land use integration
  - Geographical integration
  - Other government policy integration
- Physical Activity, including:
  - Ambience
  - Absenteeism
  - Reduced health risk
- Environment*

*The assessment on criteria 'Environment' was conducted separately and can be found in Appendix D1 of the main Option Selection Report.

The detailed assessment was completed on each option using a qualitative and quantitative assessment process.

Sub-criteria were scored according to the table shown below with overall scores for each criterion shown in the Overall Project Appraisal Matrix.

Table 1-1 below shows the negative or positive impacts on a scale of 1 to 7, 1 being major or highly negative and 7 being major or highly positive.

Table 1-1 Impact Scoring Key (TII, 2016)

7	Major or Highly Positive
6	Moderately Positive
5	Minor or Slightly Positive
4	Not Significant/Neutral
3	Minor or Minor or slightly negative
2	Moderately negative
1	Major or Highly negative

Following the completion of the individual appraisal of each sub-criterion within this assessment, an overall impact score was obtained for the combined assessment. This allowed each option to be ranked and a preference to be determined. Preferences are grouped into one of three types:

- **Preferred** – the option(s) which have the least impact taking into account the project objectives.
- **Intermediate** – the option(s) where the impacts are considered to be reasonable in terms of the anticipated impacts and overall project objectives. Impacts are considered to be greater than those of the Preferred Option(s) but considerably better than those of the Least Preferred Option(s); and
- **Least Preferred** - the option(s) which does least to achieve the project objectives.

For some options there may be very little between their impact scores and some may even have the same impact scores. In such circumstances, each technical expert will apply expert judgement and evaluate each option comparatively against the other options, considering the quantitative and qualitative assessments. This will facilitate the determination of a preference for each option. In some instances, similar options may have the same preference. Following this process, the sum of all sub-criteria scores was determined and shown in the Project Appraisal Matrix.

2 SECTION A: STAGE 2 PROJECT APPRAISAL MATRIX – BALLYBOFEY LINK ROADS

2.1 Shortlisted Options

As mentioned in Section 1, there were originally 19 options for the Ballybofey Link roads. Following the Stage 1 appraisal process, 5 options were shortlisted for consideration for this Stage 2 assessment. The summary of all shortlisted options that were considered for assessment as part of Stage 2 Assessment can be seen in the **Table 2-1**:

Table 2-1 Options for Stage 2 Assessment – Ballybofey Link Roads

Stage 2 Options	
Ballybofey Link Road Options	A
	B
	C
	D
	E

These 5 options were assessed under each of the six project appraisal criteria, and their associated sub-criteria.

2.2 Economy

2.2.1 Introduction

The Economic assessment of the options aims to determine and compare the relative economic benefits of each option, drawing conclusions from qualitative and quantitative assessments.

2.2.2 Transport Efficiency and Effectiveness

Cost estimates were completed for the options considered during Stage 2 in accordance with the TII Cost Management Manual (CMM), using rates calculated to reflect market conditions in 2018. The cost estimates were based on alignment designs for Section 1 option 1G Link Road Options prepared during the Stage 2 assessment, using 2018 prices. Refer to the **Table 2-2** for Stage 2 cost estimates for each of the 4 Link Road options.

Table 2-2 Cost Estimates

Ballybofey Link Road Option	A	B	C	D	E
Options Comparison Estimate (in millions of euros)	€141.652	€145.816	€146.288	€145.553	€148.314

Table 2-3 below sets out the Present Value of Costs (PVC), Present Value of Benefits (PVB) and Benefit Cost Ratio (BCR). These have been calculated using TUBA and COBALT.

While there were variations in the BCR values for the different options, all BCR values are well in excess of 1.0 indicating a strong positive economic performance, and accordingly all options have equally been given the highest impact scores of 7. The variations in the BCR values, however, show that Option E has a better economic performance than the other options and so has a higher preference.

Table 2-3 Transport Efficiency and Effectiveness Impact Scores

Ballybofey Link Road Option	A	B	C	D	E
PVC (millions €)	77.11	79.29	79.56	79.15	79.86
PVB (millions €)	171.37	170.83	172.29	170.12	182.03
BCR	2.22	2.15	2.17	2.15	2.28
Impact Description	Major Positive	Major Positive	Major Positive	Major Positive	Major Positive
Impact Score	7	7	7	7	7
Preference	Intermediate	Intermediate	Intermediate	Intermediate	Preferred

2.2.3 Wider Economic Impacts

Competition in the Market

All Link Road options for the N15 Ballybofey Section 1 connects the mainline Option 1G with the National Road N15 and the R252, to provide access to the towns of Ballybofey and Stranorlar.

These Link Roads form vital connections within the TEN-T network with the purpose of connecting towns, and in turn connect commercial hubs.

Options B and C offer closer access to the town centre as well as alternative routes to the R252 to the east. Option A offers a tie in to the R252 to the north but has the furthest tie in onto the N15 from the town centre. Option D only offers one tie in to the N15 with an indirect link provided between N15 and R252 through Mulrines link road and further from the town centre than Options B and C. Option E provides the benefit of having direct links to both the R252 and the existing N15 and having the N15 tie in location located close to the town centre.

While the difference in journey times between the junction on the proposed mainline and a common point within the town (the junction of the existing N15 and R252 roads) is less than 1 minute between all options, Options B, C, D and E avoid the need for traffic travelling from the proposed road using the existing N15 within the Cappry area which is residential in nature, and are preferable to Option A. Since Option E provides a direct link to both the R252 and existing N15 from the proposed mainline Option 1G, Option E is preferable to all other options.

Agglomeration

All Link Road options will provide access to Ballybofey and Stranorlar from the new mainline Option 1G. Whilst the TEN-T mainline will reduce congestion and improve travel times and efficiency of the road network through the town, the Link Roads provide an important access route into the town which is a positive for the economy of the town. All routes perform similarly in this regard.

Inward Investment

The project has not been established at the request of inward investors, but the improved infrastructure and connectivity between economic centres, such as Donegal, Ballybofey and Letterkenny, is likely to improve the attractiveness of the region and assist in securing inward investment. All route options score positively in this regard. However, taking into consideration the local context of the Link Roads, Options B, C, D and E all provide greater benefit than Option A because they are in compliance with the policies and Potential Access Points identified in the Local Area Plan, and provide the facility to access land zoned for commercial and residential development. Accordingly, Option A provides a slightly positive impact, whereas Options B, C, D and E all provide a major positive impact.

Labour Supply

The existing N15/13 between Donegal, Ballybofey/Stranorlar and Letterkenny currently provides a link between existing labour markets. Journey time would likely be improved with the mainline and any of the link roads creating a more efficient trip between towns. It is not anticipated that a significant change in labour supply will occur as a result of the Link Road options, however it is anticipated that a residual positive effect in terms of labour markets and attractiveness will remain. Therefore, all options score slightly positive in terms of Labour Supply.

Urban Regeneration

Taking into consideration the local context of the Link Roads, Options B, C, D and E all provide greater benefit than Option A because they are in compliance with the policies and Potential Access Points identified in the Seven Strategic Towns Local Area Plan and encourage urban development by providing access to land zoned land. Option A provides no such access. Accordingly, Option A provides a neutral impact, whereas Options B, C, D and E all provide a moderate positive impact.

Wider Economic Impacts Summary

Taking account of the five factors above that contribute to the overall scores for Wider Economic Impact, all options are considered to provide a positive impact. Option A provides a slight positive impact, Options B, C and D provide a moderate positive impact, while Option E provides a major positive impact and is preferred of all the options. An overall summary of the wider economic impact's criterion is provided in **Table 2-4** below.

Table 2-4 Impact Scores for Wider Economic Benefits

Ballybofey Link Road Option	A	B	C	D	E
Impact Description	Slightly Positive	Moderately Positive	Moderately Positive	Moderately Positive	Major Positive
Impact Score	**5**	**6**	**6**	**6**	**7**
Preference	**Least Preferred**	**Intermediate**	**Intermediate**	**Intermediate**	**Preferred**

2.2.4 Funding Impacts

The project aims to improve the strategic transport network in County Donegal.

As the project will assist in improving connectivity to a peripheral region in Europe (which may become more isolated as a result of Brexit), then there is the potential opportunity to secure non-exchequer funding through the European Union.

Additionally, there is an opportunity to secure non-exchequer funding through the contract type, by employing a Public Private Partnership (PPP) type contract.

All options have the same opportunity to avail of the above funding streams and therefore score slightly positive. **Table 2-5** shows the impact scores and preferences for Funding Impacts.

Table 2-5 Impact Scores for Funding Impacts

Ballybofey Link Road Option	A	B	C	D	E
Impact Description	Slightly Positive	Slightly Positive	Slightly Positive	Slightly Positive	Slightly Positive
Impact Score	**5**	**5**	**5**	**5**	**5**
Preference	**Intermediate**	**Intermediate**	**Intermediate**	**Intermediate**	**Intermediate**

2.3 Safety

2.3.1 Introduction

This section involves a comparative analysis of each option with regards to their Road Safety impacts on the scheme. The assessment follows the TII Project Appraisal Guidelines document as well as the TII Project Management Guidelines document. The safety considerations of these are shown below:

- Safety and Security of Road Users
- Collision Reduction
- Road Safety Audit Stage F
- Road Safety Impact Assessment

2.3.2 Collision Reduction

The Road Safety Authority make an interactive online mapping tool available to review collision locations and classifications across the road network. The mapping tool currently records collisions from 2005 – 2015. The tool identifies accidents by location and severity i.e. Fatal, Serious or Minor. Accidents can also be filtered by year, type of vehicle or pedestrian. **Figure 2-1** shows collision data for the area identified for the Link Road Options.

As seen on **Figure 2-1** there are serious to fatal accidents recorded on a curve on the existing R252. Two of these Options B and C tie into the existing road at this very point and propose improvements to the alignments. This would improve safety in this area and in turn reduce collisions.

Option A also utilises some sections of existing road, with property frontages, compared to Options B, C and D which mainly utilise new sections of road with little or no exposure to existing frontage.

Option E provides the combined benefit of avoiding traffic using significant sections of existing road, and therefore avoids potential conflicts with property accesses / frontages (particularly compared to Option A), and also provides a fewer number of junctions from the proposed road to the town centre, then Options B, C and D

For this reason, Option A scores neutral. Options B, C and D score slightly positive and Option E scores moderately positive, as shown in **Table 2-6**.

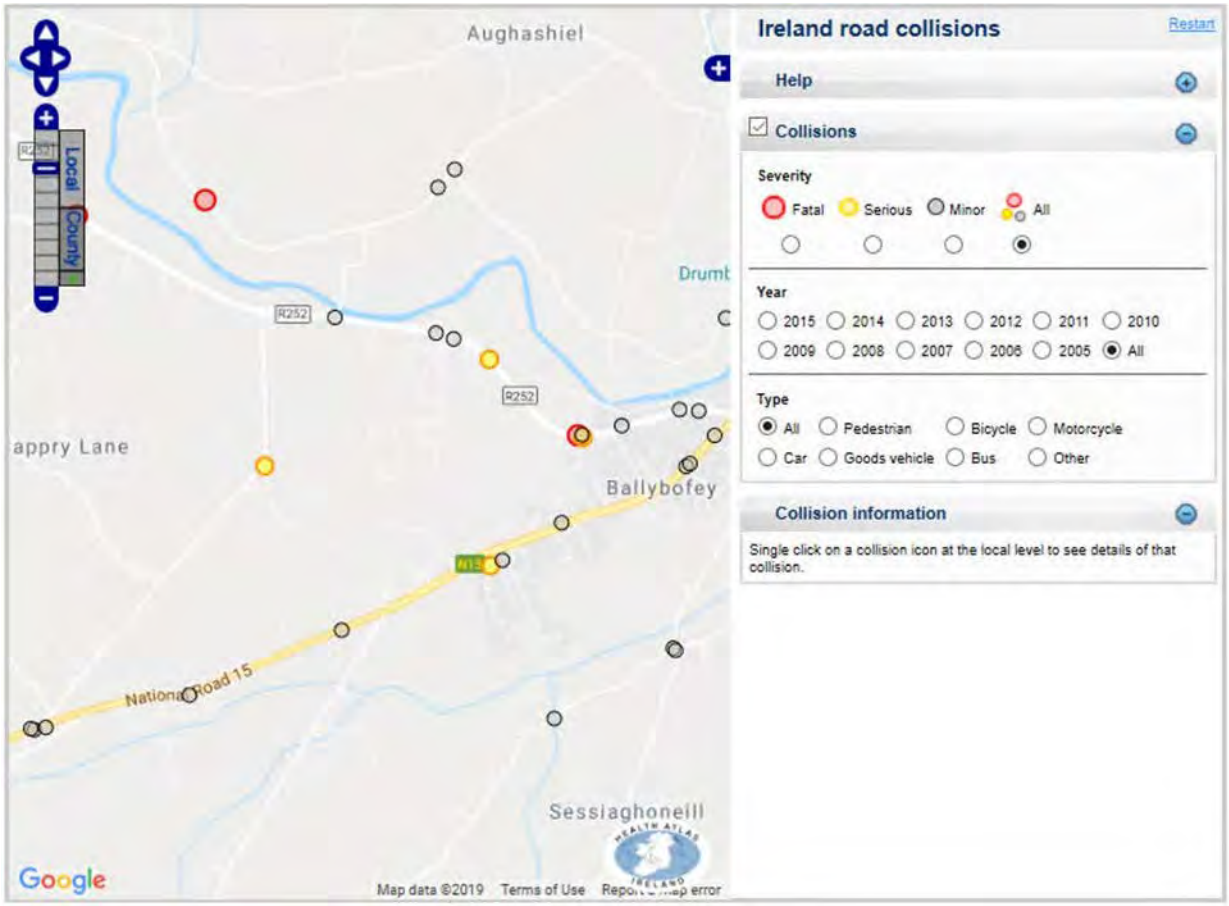

Figure 2-1 RSA Collision Statistics

Table 2-6 Collision Reduction Assessment

Ballybofey Link Road Option	A	B	C	D	E
Impact Description	Neutral	Slightly Positive	Slightly Positive	Slightly Positive	Moderately Positive
Impact Score	4	5	5	5	6
Preference	**Least Preferred**	**Intermediate**	**Intermediate**	**Intermediate**	**Preferred**

2.3.3 Security

The R252 is currently substandard in terms of horizontal and vertical geometry and the options which offer alternatives onto the R252 do propose localised improvements in this regard. It can be seen from **Figure 2-1** that there have been recorded collisions on this road, some even serious to fatal. The new link road options have been designed to the recommended geometric standards in an effort to reduce accidents and improve safety. Link Road options vary between 60km/hr to 85km/hr depending on allowable geometry. All new options propose a segregated cycle track within the cross-section. This will provide an improvement in safety and security of cyclists.

Therefore, all options perform moderately positively with respect to safety and security of road users, as shown in **Table 2-7**.

Table 2-7 Security Appraisal

Ballybofey Link Road Option	A	B	C	D	E
Impact Description	Moderately Positive	Moderately Positive	Moderately Positive	Moderately Positive	Moderately Positive
Impact Score	6	6	6	6	6
Preference	**Intermediate**	**Intermediate**	**Intermediate**	**Intermediate**	**Intermediate**

2.3.4 Road Safety Audit and Road Safety Impact Assessment

A Stage F Road Safety Audit Part 1 was undertaken which examined the options to consider all matters that may have an adverse effect on road safety and the perspective of all road users. The Road Safety Audit Report notes that all options represent a significant improvement to the existing arrangement in terms of safety.

As part of the RSIA, an understanding of the overall impact that each option would have on the proposed and existing road network was determined by reviewing the Option selection alignment designs and comparing qualitative and quantitative data. Overall, all options in combination with the remaining scheme represent a significant improvement to the existing road network.

The data reviewed to complete the Stage F Road Safety Audit Part 1 and the RSIA includes, but is not limited to:

- Collision history, frequency and location
- Geometric design of options
- Location, frequency and design of junctions
- Indicative future traffic flows and AADT data
- Potential impact on local traffic patterns
- Potential impact on vulnerable road users and provision for these users

Geometric Design: Options B, C and E have reasonable geometric parameters and are scored neutral. Option D has a 2-step relaxation curves including one on approach to a junction that will be a departure, so Option D is scored lower. Option A has a steeper than desirable gradient where it connects to the R252 which will be a departure and options for reducing it are limited due to the properties adjacent to the road and so is scored lower.

Location, frequency and design of junctions: Option A has 8, the most, junctions in total (2 left in / left outs, 5 roundabouts and 1 T junction) and one of the left in / left out junctions is on the inside of a bend. Option D has the lowest number of junctions (4 roundabouts, 2 left in / left outs).

Indicative future traffic flows: Options B, C, D and E have higher traffic flows over a greater length than Option A, although all options have flows well within their operational capacity.

Potential impact on local traffic patterns: The options are broadly similar and have far lower traffic flows than the do-minimum, with the majority of the traffic on the existing N15 transferring to the proposed scheme. Option A, however, results in higher flows continuing to use the existing N15 and R252 leading to the town centre, than the other options. For this reason, Options B, C, D and E are all considered to provide better solutions in terms of the potential impact on local traffic patterns, than Option A. Option E, however, provides the option with the least number of potential conflict points with existing junctions and accesses, and is therefore the preferred option in terms of the potential impact on traffic patterns.

Potential impact on vulnerable road users and provision for these users: Separate NMU facilities are proposed in conjunction with each option and, as such, all options are scored positively.

Cobalt Assessment Data: Given the short nature of the links and the relatively small differences between them, the scoring under this heading is equally positive for all options.

Taking the above factors into account, the combined summary of the scoring for Road Safety Audit and the Road Safety Impact Assessment is provided in **Tables 2-8** and **Table 2-9**, respectively, below.

Table 2-8 Road Safety Audit

Ballybofey Link Road Option	A	B	C	D	**E**
Impact Description	Slightly Positive	Moderately Positive	Moderately Positive	Moderately Positive	Moderately Positive
Impact Score	5	6	6	6	6
Preference	**Least Preferred**	**Intermediate**	**Intermediate**	**Intermediate**	**Preferred**

Table 2-9 Road Safety Impact Assessment

Ballybofey Link Road Option	A	B	C	D	**E**
Rank	3	1	4	5	1
Impact Description	Slight Positive	Moderately Positive	Slight Positive	Slight Positive	Moderately Positive
Impact Score	5	6	5	5	6
Preference	**Intermediate**	**Preferred**	**Intermediate**	Intermediate	**Preferred**

2.4 Accessibility and Social Inclusion

This assessment has been conducted in accordance with the Project Appraisal Guidelines Unit 7: Multi-Criteria Analysis. The basis of the appraisal covers two key areas:

2.4.1 Deprived geographical areas

The 2016 Pobal HP Deprivation Index shows the level of overall affluence and deprivation across the country using identical measurements and scales using data from the 2016 Census of Population. The study area containing all options is marginally below average or disadvantaged according to this index.

Figure 2-2 below, taken from Pobal Maps

https://maps.pobal.ie/WebApps/DeprivationIndices/index.html

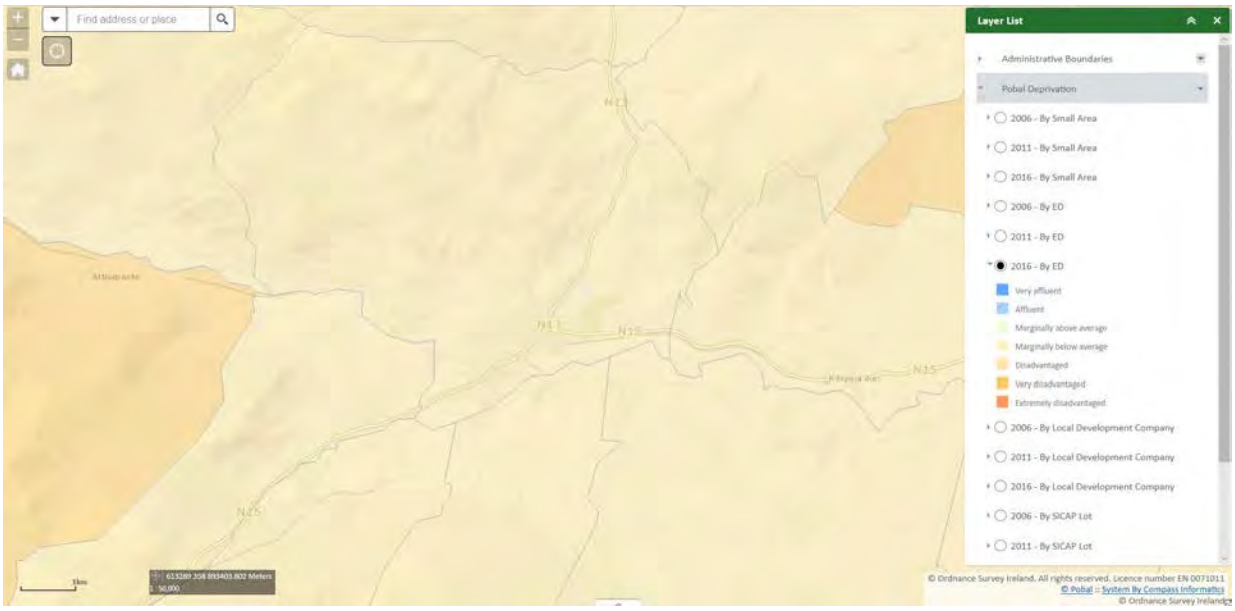

Figure 2-2 Deprivation Index for the Study Area

The government has various schemes to help address the issues that are prevalent in these deprived areas.

2.4.1.1 Rural Social Scheme

This scheme is an income support programme aimed at low-income farmers and fishermen/women who receive specified Social Welfare payments. It supports these individuals who are unable to earn a sufficient living from their farm holding by providing an additional social welfare payment in return for services that benefit rural communities for a set number of hours per week.

In County Donegal, the percentage of total employment in the agriculture, forestry and fishing sector is 6.8%, much higher than the state average of 4.4% (**Reference: western development commission**). The study area comprises mostly of agricultural businesses and farmland. As the area is identified as being disadvantaged to various extents and visibly has a significant proportion of its industry within farming, it is likely that participants in the Rural Social Scheme reside within the study area. The construction of the project will also provide short term employment opportunities. However, it is not anticipated that the improvements will have any significant impact. All routes will have a similar impact and are all scored neutral, as shown in **Table 2-10**.

Table 2-10 Summary of Deprived Geographical Areas Assessment

Ballybofey Link Road Option	A	B	C	D	E
Impact description	Neutral	Neutral	Neutral	Neutral	Neutral
Score	4	4	4	4	4
Preference	**Intermediate**	**Intermediate**	**Intermediate**	**Intermediate**	**Intermediate**

2.4.2 Vulnerable groups.

The current road network is limited with regards to transport availability to the general commuting public. The mode of transport currently available are busses between the towns. Commuters are solely dependent on this or private transport as there is no live train network serving these towns.

The construction of these Link Roads will form a vital connection between the new scheme and these towns. These will improve overall travel times and safety between these employment centres.

Overall, all options will generally have a similar impact in terms of Vulnerable Groups. It is not anticipated that the improvements will have any significant impact, however options with better accessibility to the towns will perform better than options with lower levels of accessibility.

In comparison to the existing road network, all of the proposed options provide for an improvement in infrastructure. There will be short term employment opportunities due to the construction of the road and also longer-term benefits due to improved accessibility between the Mainline and the town centre. However, this improvement is deemed to be marginal with respect to impact/influence on Accessibility and Social Inclusion.

The Phase 2, Stage 2 shortlisted options have been assessed taking into consideration their connectivity to local communities and start/end points in in the context of local accessibility and social inclusion. In summary, it is concluded that options that have greater accessibility to the town will perform slightly better than the options with lower accessibility.

Options B, C, D and E provide the closer links to the town centre, so are favourable over Option A. Options A, B and E provide a direct link between the R252 and the existing N15 so are favourable to Options C and D. On balance, all options provide a moderately positive impact, but Option E is preferred over the other options since it has both direct access to the R252 and a tie in with the N15 close to the town centre. The following **Table 2-11** shows the scores and preferences for Vulnerable Groups.

Table 2-11 Summary of Vulnerable Groups Assessment

Ballybofey Link Road Option	A	B	C	D	E
Impact description	Slightly Positive	Slightly Positive	Slightly Positive	Slightly Positive	Slightly Positive
Score	5	5	5	5	5
Preference	**Intermediate**	**Intermediate**	**Intermediate**	**Intermediate**	**Preferred**

2.5 Integration

This assessment was conducted in accordance with the Project Appraisal Guidelines Unit 7: Multi-Criteria Analysis. The basis of the appraisal covers the following key areas:

- Transport integration,
- Land use integration,
- Geographical integration,
- Other government policy integration: Regional balance.

2.5.1 Transport Integration

This section of the appraisal focuses on gaps in the existing network and potential for opportunities for changing mode of transport. The performance of each option with respect to the following sub-criteria is considered for this section.

Connectivity of the strategic road network

The Link Road Options provide a link from the Mainline to the town of Ballybofey. This in turn improves connectivity between towns on the TEN-T network. This new links would address the gaps in the quality of infrastructure at Ballybofey bringing it in line with the overall transport network which it supports. Connectivity between transport modes

There is no live railway network in Donegal or therefore any new road would not have an impact on modal change from road to rail. Improving the road infrastructure may make public transport by bus more desirable by improving journey times and journey time reliability.

Support for sustainable transport modes

Since the Mainline Option 1G will contain a dedicated cycle lane, the desirable cross-section to be applied on the Link Road is a Type 3 single Carriageway. This cross-section includes a cycle track within the corridor which is separated from the paved road surface. While this cycle track will have no link to the existing Donegal Cycle Route, it will represent the addition of a new cycle track fully segregated from traffic making it a valuable local amenity for the towns. The cycle track would enable seamless transition from the mainline into the town of Ballybofey. It would have a significantly positive impact on the extent of cycle provision in the area. All Link Road options would accommodate a similar provision in cycle infrastructure, which has the potential to lengthen the cycle route and encourage more use. In addition, the existing N13 / N15 will also be more desirable for cyclists due to reduced traffic volumes.

Access to other transport infrastructure

The Link Roads are not directly involved with connections to Ports or Airports as this is the purpose of the Mainline. They do however form a link to the Mainline to these ports and airports from the town of Ballybofey.

All options would score a slightly positive in terms of the Transport Integration Assessment, with equal preference, as shown in **Table 2-12**.

Table 2-12 Summary of Transport Integration Assessment

Ballybofey Link Road Option	A	B	C	D	E
Impact description	Slightly Positive	Slightly Positive	Slightly Positive	Slightly Positive	Slightly Positive
Score	5	5	5	5	5
Preference	**Intermediate**	**Intermediate**	**Intermediate**	**Intermediate**	**Intermediate**

2.5.2 Land Use Integration

This criterion compares the performance of each option with respect to compatibility with adopted land use objectives and are appraised across three sub-criteria.

- Support for local development plan (in this case, the Seven Strategic Towns Local Area Plan)
- Strategic connectivity for long distance trips
- Mitigate Urban Sprawl

Support for local development plan

The Mainline Option 1G, as with the entire TEN-T network within Donegal, is in line with County Donegal Development Plan 2018-2024. These Link Roads complement the Mainline in this regard and form part of the CDP. Options B, C, D and E, however, are preferable to Option A since Options B, C, D and E are compliant with the Seven Strategic Towns Local Area Plan (Ballybofey and Stranorlar) 2018 – 2024, **in** meeting its policies and providing the Potential Access Points identified in the plan. Option A, however, is not compliant with the Local Area Plan in meeting its policies since it does not provide one of the Potential Access Points identified in the plan, and in so doing, does not fully meet the objectives for the Link Road.

Strategic connectivity for long distance trips

The Emerging Preferred Option 1G is identified as a Comprehensive Corridor on the Trans-European Transport Network, meaning it has regional significance. As mentioned in the previous section the Link

Roads are not directly strategic routes to promote long distance trips but provide strategic links to economic hubs. The differences between the options have no impact on the ability of the scheme to provide strategic connectivity for long distance trips and are therefore considered to be equally positive.

Mitigate Urban Sprawl

Since Options B, C, D and E provide access to lands zoned for development within the Seven Strategic Towns Local Area Plan, they will facilitate urban development closer to the town and, thus, have the greater effect of mitigating urban sprawl. As such, Options B, C, D and E will all score moderately positively, and Option A will score neutrally in terms of mitigation against urban sprawl.

In summary, the overall scores for Land Use Integration are provided below in **Table 2-13.**

Table 2-13 Summary of Land Use Integration Assessment

Ballybofey Link Road Option	A	B	C	D	E
Impact description	Neutral Impact	Moderately Positive	Moderately Positive	Moderately Positive	Moderately Positive
Score	4	6	6	6	6
Preference	**Least Preferred**	**Preferred**	**Preferred**	**Preferred**	**Preferred**

2.5.3 Geographical Integration

The National Planning Framework (NPF) aims to provide enhanced connectivity from Republic of Ireland to Northern Ireland as well as easy access to links to the rest of Europe and the world. The Trans-European Transport Network (TEN-T) would also connect cities and towns nationally. The Link Roads form an important part of the greater network by provided access to the respective towns. It for this reason the Link Roads score moderately positive. The geographic location of Links in comparison to each other would have minimal difference in terms of integration as shown in **Table 2-14**.

Table 2-14 Summary of Geographical Integration Assessment

Ballybofey Link Road Option	A	B	C	D	E
Impact description	Moderately Positive	Moderately Positive	Moderately Positive	Moderately Positive	Moderately Positive
Score	6	6	6	6	6
Preference	**Intermediate**	**Intermediate**	**Intermediate**	**Intermediate**	**Intermediate**

2.5.4 Other Government Policy Integration: Regional Balance

The TII Project Appraisal Guidelines Unit 7 advise that transport projects should be scored positively for regional balance if investment is:

- Transport investment within or to urban centres from peripheral regions
- Transport investment on links between urban centres
- Transport investment on routes which improve access to international ports and airports

Whilst the Link roads might only meet these criteria locally, they do form part of the greater scheme which meets all the criteria.

As such, all options score equally under this sub-criterion, which is moderately positive.

In comparison to the existing road network, all of the proposed options provide for an improvement in infrastructure which in turn is likely to have a positive impact with respect to Other Government Policy Integration as shown in **Table 2-15**.

Table 2-15 Summary of Other Government Policy Assessment

Ballybofey Link Road Option	A	B	C	D	E
Impact description	Moderately Positive	Moderately Positive	Moderately Positive	Moderately Positive	Moderately Positive
Score	6	6	6	6	6
Preference	**Intermediate**	**Intermediate**	**Intermediate**	**Intermediate**	**Intermediate**

2.6 Physical Activity

This assessment has been conducted in accordance with the Project Appraisal Guidelines Unit 13: Walking and Cycling Facilities. The appraisal is based on any new pedestrian/cyclist facilities or linkages to existing facilities being provided as part of the scheme. The appraisal considers the following sub-criteria:

- Health benefits,
- Absenteeism benefits,
- Journey ambience benefits,
- Changes in the number of incidents or journey times,
- Other possible impacts.

At the time of writing there was no available information on the number of cyclists currently using the N13 / N15, therefore a prediction of use could not be established, nor could the associated benefits (relating to health or absenteeism) be quantitatively assessed. Therefore, the physical activity appraisal is based solely on qualitative information.

Cycling/Walking is currently a common practise in the Town of Ballybofey. There are a number of existing walking routes within the town. Many are informal routes, but the new developments promote the Department of Transports' policy on smart travel by introducing segregated cycle lanes and walkways. By promoting safety these also attract more users to these facilities.

2.6.1 Proposed Infrastructure

All route options propose a Type 3 single carriageway to link the TEN-T mainline to the town of Ballybofey. Options vary in length, with geometry, junctions as well as the number of roundabouts. The Type 3 carriageway contains a dedicated cycle way separated from the carriageway by means of a verge. Below is the typical cross section.

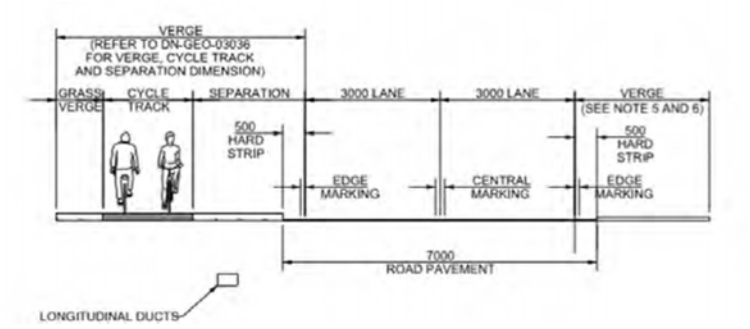

Figure 2-3 Type 3 single carriageway

The addition of a dedicated cycle way aims to promote physical activity with safety in mind.

2.6.2 Health Benefits

All Link Road Options propose a dedicated cycle track varying from 1.33km to 2.20km which tie into the 8km of cycle way on the Mainline Option 1G.

An increase in physical activity has been shown by the World Health Organisation (WHO) to have a positive effect on health and reduce mortality. Those who are new to the concept would benefit the most from introducing some form of physical activity into their daily routine. It must be noted that those who have been cycling or doing some sort of exercise regularly might not benefit from the new facilities, but it does promote maintenance of healthy lifestyles and possibly an alternative activity.

All the options would score equally high on this.

2.6.3 Absenteeism Benefits

As mentioned above there are health benefits to increased physical activities. This is turn has been shown to decrease illness in individuals by keeping them healthier than they normally would be. Again, the people who would find this most beneficial are those new to these activities or any activity.

The health benefits will in turn reduce sick leave and benefit work productivity. As much as this benefits the individual it does also benefit the employer.

2.6.4 Journey Ambience Benefits

The proposed link roads, together with the wider scheme, will significantly reduce traffic on the existing road network. This, together with free-flowing traffic and dedicated cycle tracks, will significantly improve the attractiveness of the local road network, that will lead to an increase in more sustainable travel methods improving health and wellbeing. Since all options will contribute equally to achieving this, all options score equally positively.

2.6.5 Other Possible Impacts

Dedicated pedestrian facilities will be provided within the link road design, and thus all link options will contribute positively to pedestrian safety. All options will result in the creation of new walking loops, with pedestrian provision, that do not exist within the current road network. Therefore, all schemes are deemed to have similar slightly positive impacts in terms of new opportunities for physical activity, as shown in **Table 2-16**.

None of the links directly impact other physical activity routes negatively but will tie into the existing informal networks.

Table 2-16 Summary of Physical Activity Assessment

Ballybofey Link Road Option	A	B	C	D	E
Impact description	Slightly Positive	Slightly Positive	Slightly Positive	Slightly Positive	Slightly Positive
Score	5	5	5	5	5
Preference	**Intermediate**	**Intermediate**	**Intermediate**	**Intermediate**	**Intermediate**

2.7 Project Appraisal Matrix (Multi-criteria Analysis) for Non-Environmental Assessments.

An overall appraisal matrix combines the above assessments. This provides an indication of the option with the least impact and is used in the selection of the preferred option.

The summary of the impact scores for the Non-Environmental Assessments are shown below in **Table 2-17,** while the summary of the preferences is shown in **Table 2-18.**

Table 2-17 Stage 2 Multi-Criteria Analysis Impact Scoring Summary (Non-Environmental) – Ballybofey Link Road Options

Safety	**A**	**B**	**C**	**D**	**E**
Safety and Security of Road Users	6	6	6	6	6
Collision Reduction	4	5	5	5	6
Road Safety Audit (Stage F)	5	6	6	6	6
Road Safety Impact Assessment	5	6	5	5	6
Safety Sub-Total	**20**	**23**	**22**	**22**	**25**

Physical Activity	**A**	**B**	**C**	**D**	**E**
Physical Activity	5	5	5	5	5
Physical Activity Sub-Total	**5**	**5**	**5**	**5**	**5**

Economy	**A**	**B**	**C**	**D**	**E**
Transport Efficiency and Effectiveness	7	7	7	7	7
Wider Economic Impacts	5	6	6	6	7
Funding Impacts	5	5	5	5	5
Economy Sub-Total	**17**	**18**	**18**	**18**	**19**

Accessibility and Social Inclusion	**A**	**B**	**C**	**D**	**E**
Deprived Geographical Areas	4	4	4	4	4
Vulnerable Groups	5	5	5	5	5
Accessibility and Social Inclusion Sub-Total	**9**	**9**	**9**	**9**	**9**

Integration	**A**	**B**	**C**	**D**	**E**
Transport Integration	5	5	5	5	5
Land use Integration	4	6	6	6	6
Geographical Integration	6	6	6	6	6
Other Government Policy Integration	6	6	6	6	6
Integration Sub-Total	**21**	**23**	**23**	**23**	**23**
Total Impact Scores	**72**	**78**	**77**	**77**	**80**

Table 2-18 Stage 2 Multi-Criteria Analysis Preferences Summary (Non-Environmental) – Ballybofey Link Road Options

Safety	A	B	C	D	E
Safety and Security of Road Users	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate
Collision Reduction	Least Preferred	Intermediate	Intermediate	Intermediate	Preferred
Road Safety Audit (Stage F)	Least Preferred	Intermediate	Intermediate	Intermediate	Preferred
Road Safety Impact Assessment	Intermediate	Preferred	Intermediate	Intermediate	Preferred
Physical Activity	**A**	**B**	**C**	**D**	
Physical Activity	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate

Economy	A	B	C	D	
Transport Efficiency and Effectiveness	Intermediate	Intermediate	Intermediate	Intermediate	Preferred
Wider Economic Impacts	Least Preferred	Intermediate	Intermediate	Intermediate	Preferred
Funding Impacts	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate

Accessibility and Social Inclusion	A	B	C	D	
Deprived Geographical Areas	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate
Vulnerable Groups	Intermediate	Intermediate	Intermediate	Intermediate	Preferred

Integration	A	B	C	D	
Transport Integration	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate
Land use Integration	Least Preferred	Preferred	Preferred	Preferred	Preferred
Geographical Integration	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate
Other Government Policy Integration	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate

2.8 Recommendation

Table 2-17 indicates Option E is the highest scoring options, with Options B, C and D having similar scores and Option A having the lowest from non-environmental assessments. **Table 2-18** indicates that Option E has the highest preference, with Options B, C and D having similar lower preference and Option A having the lowest preference.

From a non-environmental view point, Option E is the preferred option, with Option A being the least preferred option. The remaining Options B, C and D having broadly similar preference.

These scores will be considered with the scores within the multi-criteria analysis derived from the environmental assessments, and from then a preferred option will be selected.

APPENDIX A

Section 1-Stage 1 Assessment of Ballybofey Link Road Options LR01 to LR19

SECTION 1 BALLYBOFEY STRANORLAR

STAGE 1 ASSESSMENT SCORING - Ballybofey Link Route

	Indicates values / inputs taken from segment sheet		LR01	LR02	LR03	LR04	LR05	LR06	LR07
	Naming conventions for Public Consultation		Option A				Option B		
Engineering	Link road length to be built (km)		1.25	1.07	2.28	1.50	2.22	2.16	1.68
	Accessibilty to town. Distance (km) / time (mins) from bypass junction to McElhinney's. (Note: assumed speed of 60km/h on new link roads, 40 kph on existing N15 is considered)		2.84 (3.79)	2.14 (2.64)	3.16 (3.66)	2.35 (2.85)	2.38 (3.08)	2.60 (2.92)	2.47 (2.80)
	Vertical alignment (gradients)		Within standard guidelines : Maximum gradient being less than 6 % (which is acceptable for Type 3 Single carriageway) Note: 6% gradient to be used on proposed minor road connection to Cappry Road requires significant earthworks locally.	Within standard guidelines : Maximum gradient being less than 6 % (which is acceptable for Type 3 Single carriageway)	Within standard guidelines : Maximum gradient being less than 6 % (which is acceptable for Type 3 Single carriageway)	Not within the standard guidelines : Due to high embankments near the R252 possibly due to maximum gradient being >6% (not acceptable within standards)	Within standard guidelines : Maximum gradient being less than 6 % (which is acceptable for Type 3 Single carriageway)	Within standard guidelines : Maximum gradient being less than 6 % (which is acceptable for Type 3 Single carriageway)	Within standard guidelines : Maximum gradient being less than 6 % (which is acceptable for Type 3 Single carriageway)
	Horizontal alignment		Within standard guidelines. Note: Route taken along R252 would result in traffic passing infront of existing properties through residential area.	Within standard guidelines : This link route has 100km/h design speed. (Desirable minimum value of horizontal curvature with 5 % superelevation for a design speed of 100km/h should be 720m. Not more than 7% superelevation is to be considered for rural link roads. This link route option meets the design standards)	Within standard guidelines : This link route has 100km/h design speed. (Desirable minimum value of horizontal curvature with 5 % superelevation for a design speed of 100km/h should be 720m. Not more than 7% superelevation is to be considered for rural link roads. This link route option meets the design standards)	Within the standard guidelines: Low design speed of 60km/h due to the horizontal geometry.	Within standard guidelines : This link route has 70km/h design speed. (Desirable minimum value of horizontal curvature with 5 % superelevation for a design speed of 70km/h should be 360m. Not more than 7% superelevation is to be considered for rural link roads. This link route option meets the design standards)	Within standard guidelines : This link route has 60km/h design speed. Note: The existing road has poor alignment. Some section of the link prone to flooding. To avoid flooding to existing properties and the road, retaining wall construction could be advised as the properties in some section have been built on raised land.	Within the standard guidelines: Low design speed of 60km/h due to the horizontal geometry. Though the link from the interchange to R252 is a short distance and a design speed of 60km/h acceptable. Note: Route taken along R252 would result in high traffic flows through residential area.
	Road length within flood plain (km) 1:100 Year		0.000	**0.333** The Interchange lies completely within the flooding area, potentially restricting the flood path.	0.057	0.046	0.000	**0.578** Existing road within flood plain.	**0.342** Additionally, existing R252 covers 0.175km within flood plain.
	Safety		Direct route lowers the risk of accidents at junctions. This is offset, however, by increased traffic through residential areas.	Direct route lowers the risk of accidents. Better option than Option B and Option C	This option is less safe when compared with Option A - due to higher number of roundabouts	Lowest preferred amongst the alternatives - due to poor horizontal alignment	Direct route lowers the risk of accidents. Emerging preferred option amongst the alternatives	Poor safety amongst the alternatives - due to poor horizontal alignment	Direct route lowers the risk of accidents at junctions. This is offset, however, by increased traffic through residential areas.
	New River Finn Crossing (No.)		0	1	0	0	0	0	0
	Width of river crossing(m)		0.00	30.00	0	0	0	0.00	0.00
	Earthworks - Cut / Fill balance (m3)		6,752	110,416	99,578	227,408	-11,636	-32,812	-72,770
	Number of Junctions		1	1	1	1	1	1	1
	Number of Roundabouts		2	2	6	3	4	4	4
	Number of services crossed (All Services))		13	5	12	9	9	17	17
	Summary of Engineering Scores	Green	7.000	8.000	6.000	8.000	10.000	6.000	7.000
		Orange	4.000	3.000	6.000	2.000	2.000	6.000	4.000
		Red	1.000	1.000	0.000	2.000	0.000	0.000	1.000
	Engineering Summary	Average Score	2.500	2.583	2.500	2.500	2.833	2.500	2.500
Environmental	Planning - Road length within zoned land (m)		1250	1065	2279	1502	2218	2160	1684
	Compliance with Seven Strategic Towns Local Area Plan (Ballybofey - Stranorlar) 2018 - 2024, including provision of Local Access Points to facilitate development of lands identified in the Plan.		Not compliant with Local Area Plan in terms of providing Potential Access Points as defined on Map 3.	Partially compliant with Local Area Plan in terms of providing Potential Access Points as defined on Map 3. Conflicts with Masterplan area on northern side of river.	Compliant with Local Area Plan in terms of providing Potential Access Points as defined on Map 3. Facilitates access for land identified for Residential Development and Opportunity Site.	Compliant with Local Area Plan in terms of providing Potential Access Points as defined on Map 3. Facilitates access for land identified for Residential Development and Opportunity Site.	Compliant with Local Area Plan in terms of providing Potential Access Points as defined on Map 3. Facilitates access for land identified for Residential Development and Opportunity Site.	Partially compliant with Local Area Plan in terms of providing Potential Access Points as defined on Map 3.	Partially compliant with Local Area Plan in terms of providing Potential Access Points as defined on Map 3.
	Geology - poor ground (m)		0	361	0	0	0	404	162
	Ecology - length of road within SACs & SPA's (m)		0	47	0	0	0	249	**125** Exisiting R252 just besides the River Finn (SAC). However , there will be not direct impact to SAC.
	Ecology - length of road within NHA's & pNHA's (m)		0	0	0	0	0	0	0
	Ecology - length of road within mature woodland (m)		0	0	0	0	0	0	0
	Ecology - other ecological sites.			Potential impact to SAC's, further assessment to be done at later stages if shortlisted.			Hedgerows/Treelines are present throughout, some areas being quite extensive or established.Some of the areas may be of interest when it comes to the breeding bird surveying in Section 1, due to the network of hedgerows etc.		Low risk potential impacts to SAC's, further assessment to be done at later stages.
	Visual Impact - length of road within high landscape sensitivity (m)		147	795	**114** Proposed roundabout (where the proposed route meets existing road R252) needs to be raised by at least 5m to achieve appropriate vertical graidents	**110** Proposed roundabout (where the proposed route meets existing road R252) needs to be raised approximately 10m to achieve appropriate vertical graidents	494	**1550** Link from route mainline to R252 is not feasible due to the elevation difference of approximately 10m. Also, high impacts to surrounding properties through Mulrines link.	**512** Similar to existing R252, therefore minimal visual impact.
	Archaeology and Cultural Heritage - number of RHM / RMPs direct hits		0	0	0	0	0	**1** Impact to Ringed Fort	**0**

	Indicates values / inputs taken from segment sheet		LR08	LR09	LR10	LR11	LR12	LR13
	Naming conventions for Public Consultation							
Engineering	Link road length to be built (km)		1.50	1.47	1.43	1.81	1.10	1.05
	Accessibilty to town. Distance (km) / time (mins) from bypass junction to McElhinney's. (Note: assumed speed of 60km/h on new link roads, 40 kph on existing N15 is considered)		1.72 (1.97)	1.83 (2.16)	1.97 (2.35)	2.32 (2.69)	2.30 (2.90)	2.05 (2.55)
	Vertical alignment (gradients)		Tie-in from the proposed link to the route mainline does not meet standard requirements (Gradient >7%), Remaining link road within standard guidelines : Maximum gradient being less than 6 % (which is acceptable for Type 3 Single carriageway)	Within standard guidelines : Maximum gradient being less than 6 % (which is acceptable for Type 3 Single carriageway)	Within standard guidelines : Maximum gradient being less than 6 % (which is acceptable for Type 3 Single carriageway), however high amount of earthworks (cutting required >20meters) required to design the proposed link.	Within standard guidelines : Maximum gradient being less than 6 % (which is acceptable for Type 3 Single carriageway), however high amount of earthworks (cutting required >20meters) required to design the proposed link.	Within standard guidelines : Maximum gradient being less than 6 % (which is acceptable for Type 3 Single carriageway) Note: High amount of earthworks (High embankments required >18meters) required to design the proposed link	Within standard guidelines : Maximum gradient being less than 6 % (which is acceptable for Type 3 Single carriageway) Note: High amount of earthworks (High embankments required >18meters) required to design the proposed link. Additionally, it has a relaxation on the vertical geometry as perr TII guidelines (upto 7%)
	Horizontal alignment		Within standard guidelines : This link route has 70km/h design speed. (Desirable minimum value of horizontal curvature with 5 % superelevation for a design speed of 70km/h should be 360m. Not more than 7% superelevation is to be considered for rural link roads. This link route option meets the design standards)	Within standard guidelines : This link route has 70km/h design speed. (Desirable minimum value of horizontal curvature with 5 % superelevation for a design speed of 70km/h should be 360m. Not more than 7% superelevation is to be considered for rural link roads. This link route option meets the design standards)	Within standard guidelines : This link route has 70km/h design speed. (Desirable minimum value of horizontal curvature with 5 % superelevation for a design speed of 70km/h should be 360m. Not more than 7% superelevation is to be considered for rural link roads. This link route option meets the design standards)	Within standard guidelines : This link route has 70km/h design speed. (Desirable minimum value of horizontal curvature with 5 % superelevation for a design speed of 70km/h should be 360m. Not more than 7% superelevation is to be considered for rural link roads. This link route option meets the design standards)	Within standard guidelines : This link route has 70km/h design speed. (Desirable minimum value of horizontal curvature with 5 % superelevation for a design speed of 70km/h should be 360m. Not more than 7% superelevation is to be considered for rural link roads. This link route option meets the design standards)	Within standard guidelines : This link route has 70km/h design speed. (Desirable minimum value of horizontal curvature with 5 % superelevation for a design speed of 70km/h should be 360m. Not more than 7% superelevation is to be considered for rural link roads. This link route option meets the design standards)
	Road length within flood plain (km) 1:100 Year		0.167	**0.688** The Interchange lies completely within the flooding area, potentially restricting the flood path.	0.030	0.030	0.271	0.271
	Safety		Direct route lowers the risk of accidents.	Direct route lowers the risk of accidents.	Direct route lowers the risk of accidents.	Direct route lowers the risk of accidents.	Direct route lowers the risk of accidents.	Direct route lowers the risk of accidents.
	New River Finn Crossing (No.)		1	1	0	0	0	0
	Width of river crossing(m)		52.00	60.00	0.00	0.00	0.00	0.00
	Earthworks - Cut / Fill balance (m3)		68,618	-84,897	910,528	869,531	-417,867	-420,211
	Number of Junctions		1	1	1	1	1	1
	Number of Roundabouts		2	3	1	1	1	1
	Number of services crossed (All Services))		3	5	5	9	9	7
	Summary of Engineering Scores	Green	9.000	8.000	10.000	9.000	9.000	9.000
		Orange	2.000	3.000	1.000	2.000	1.000	1.000
		Red	1.000	1.000	1.000	1.000	2.000	2.000
	Engineering Summary	Average Score	2.667	2.583	2.750	2.667	2.583	2.583
Environmental	Planning - Road length within zoned land (m)		1500	1472	1432	1811	1353	1308
	Compliance with Seven Strategic Towns Local Area Plan (Ballybofey - Stranorlar) 2018 - 2024, including provision of Local Access Points to facilitate development of lands identified in the Plan.		Not compliant with Local Area Plan in terms of providing Potential Access Points as defined on Map 3.	Partially compliant with Local Area Plan in terms of providing Potential Access Points as defined on Map 3. Conflicts with Masterplan area on northern side of river.	Not compliant with Local Area Plan in terms of providing Potential Access Points as defined on Map 3. Conflict with Recreation and Amenity Areas north of the river.	Not compliant with Local Area Plan in terms of providing Potential Access Points as defined on Map 3. Conflict with Recreation and Amenity Areas north of the river.	Not compliant with Local Area Plan in terms of providing Potential Access Points as defined on Map 3. Conflict with Local Environment and Town Centre areas north of the river.	Not compliant with Local Area Plan in terms of providing Potential Access Points as defined on Map 3. Conflict with Local Environment and Town Centre areas north of the river.
	Geology - poor ground (m)		106	216	0	0	175	175
	Ecology - length of road within SACs & SPA's (m)		55	60	0	0	0	0
	Ecology - length of road within NHA's & pNHA's (m)		0	0	0	0	0	0
	Ecology - length of road within mature woodland (m)		**229** Considerate impacts to Holywell woods & Drumboe woods	0	458	383	0	0
	Ecology - other ecological sites.		Potential impact to SAC's, further assessment to be done at later stages if shortlisted.	Potential impact to SAC's, further assessment to be done at later stages if shortlisted.	Impacts to nearby woodlands	Impacts to nearby woodlands		
	Visual Impact - length of road within high landscape sensitivity (m)		**1333** Existing R252 is at low point and to accommodate proposed link route as an overhead bridge structure, high values of fill required. Also, it meets the minimum headroom distance to have an overbridge structure. To have an roundabout arrangement at the same location high impacts on existing properties and SAC.	**1290** Proposed roundabout (where the proposed route meets existing road R252) needs to be moved westwards to accommodate an appropriate angle of tie in to roundabout. Also, the link has an impact to SAC (River Finn) and suitable measures to be carried out to eliminate this impact.	**1432** High impacts to properties and Archaeology due to roundabout. Additionally, substantial amount of earthworks required to accommodate the design.	**1811** High impacts to properties and Archaeology due to roundabout. Additionally, substantial amount of earthworks required to accommodate the design.	**1353** Proposed roundabout (where the proposed link meets existing N13) would have high impact to properties. Also,large earthworks required to accommodate this design.	**1308** Proposed roundabout (where the proposed link meets existing Chapel street) would have high impact to properties. Also,large earthworks required to accommodate this design.
	Archaeology and Cultural Heritage - number of RHM / RMPs direct hits		**1** Impact to Drumboe memorial	**1** Impact to Ringed Fort	**2** Impact to a semi-detached 3 bay two-storey house (built in c. 1830)	**2** Impact to a semi-detached 3 bay two-storey house (built in c. 1830)	**3** **Major impact include : Stranorlar Presbyterian Church (NIAH)**	**3** **Major impact include : Stranorlar Catholic Graveyard (NIAH)**

	Indicates values / inputs taken from segment sheet		LR14	LR15	LR16	LR17	LR18	LR19
	Naming conventions for Public Consultation		Option C	Option D				Option E
Engineering	Link road length to be built (km)		1.83	1.33	2.63	2.65	3.20	3.18
	Accessibilty to town. Distance (km) / time (mins) from bypass junction to McElhinney's. (Note: assumed speed of 60km/h on new link roads, 40 kph on existing N15 is considered)		2.48 (2.80)	2.33 (2.83)	2.70 (3.60)	2.12 (2.72)	3.03 (4.12)	2.16 (2.56)
	Vertical alignment (gradients)		Within standard guidelines : Maximum gradient being less than 6 % (which is acceptable for Type 3 Single carriageway)	Within standard guidelines : Maximum gradient being less than 6 % (which is acceptable for Type 3 Single carriageway)	Within standard guidelines : Maximum gradient being less than 6 % (which is acceptable for Type 3 Single carriageway)	Within standard guidelines : Maximum gradient being less than 6 % (which is acceptable for Type 3 Single carriageway)	Within standard guidelines : Maximum gradient being less than 6 % (which is acceptable for Type 3 Single carriageway)	Within standard guidelines : Maximum gradient being less than 6 % (which is acceptable for Type 3 Single carriageway)
	Horizontal alignment		Within standard guidelines : This link route has 70km/h design speed. (Desirable minimum value of horizontal curvature with 5 % superelevation for a design speed of 70km/h should be 360m. Not more than 7% superelevation is to be considered for rural link roads. This link route option meets the design standards)	Within the standard guidelines: Low design speed of 60km/h due to the horizontal geometry.	Within the standard guidelines: Low design speed of 60km/h due to the horizontal geometry.	Within the standard guidelines: Low design speed of 60km/h due to the horizontal geometry.	Within standard guidelines : This link route has 60km/h design speed. Note: The existing road has poor alignment. Some section of the link prone to flooding. To avoid flooding to existing properties and the road, retaining wall construction could be advised as the properties in some section have been built on raised land.	Within the standard guidelines: Low design speed of 60km/h due to the horizontal geometry.
	Road length within flood plain (km) 1:100 Year		0.000	0.000	0.000	0.000	0.000	0.000
	Safety		Direct route lowers the risk of accidents.	Direct route lowers the risk of accidents.	Direct route lowers the risk of accidents at junctions. This is offset, however, by increased traffic through residential areas.	Direct route lowers the risk of accidents at junctions. This is offset, however, by increased traffic through residential areas.	Poor safety amongst the alternatives - due to poor horizontal alignment	Direct route lowers the risk of accidents. Emerging preferred option amongst the alternatives
	New River Finn Crossing (No.)		0	0	0	0	0	0
	Width of river crossing(m)		0.00	0.00	0.00	0.00	0.00	0.00
	Earthworks - Cut / Fill balance (m3)		-78,844	-119,526	226,032	309,227	342,630	321,780
	Number of Junctions		1	1	1	1	1	1
	Number of Roundabouts		2	2	3	3	4	2
	Number of services crossed (All Services))		10	5	7	7	6	7
	Summary of Engineering Scores	Green	10.000	10.000	7.000	8.000	6.000	9.000
		Orange	2.000	2.000	3.000	2.000	5.000	2.000
		Red	0.000	0.000	2.000	2.000	1.000	1.000
	Engineering Summary	Average Score	2.833	2.833	2.417	2.500	2.417	2.667
Environmental	Planning - Road length within zoned land (m)		1826	1331	940	959	449	1394
	Compliance with Seven Strategic Towns Local Area Plan (Ballybofey - Stranorlar) 2018 - 2024, including provision of Local Access Points to facilitate development of lands identified in the Plan.		Compliant with Local Area Plan in terms of providing Potential Access Points as defined on Map 3. Facilitates access for land identified for Residential Development and Opportunity Site.	Compliant with Local Area Plan in terms of providing Potential Access Points as defined on Map 3. Facilitates access for land identified for Residential Development and Opportunity Site.	Not compliant with Local Area Plan in terms of providing Potential Access Points as defined on Map 3.	Not compliant with Local Area Plan in terms of providing Potential Access Points as defined on Map 3.	Partially compliant with Local Area Plan in terms of providing Potential Access Points as defined on Map 3.	Compliant with Local Area Plan in terms of providing Potential Access Points as defined on Map 3. Facilitates access for land identified for Residential Development and Opportunity Site.
	Geology - poor ground (m)		0	0	25	0	0	0
	Ecology - length of road within SACs & SPA's (m)		0	0	0	0	0	0
	Ecology - length of road within NHA's & pNHA's (m)		0	0	0	0	0	0
	Ecology - length of road within mature woodland (m)		0	0	0	0	0	0
	Ecology - other ecological sites.							
	Visual Impact - length of road within high landscape sensitivity (m)		**459** Impact to few properties due to roundabout arrangement at Mulrines link	90	97	97	193	272
	Archaeology and Cultural Heritage - number of RHM / RMPs direct hits		0	0	0	0	0	0

	Archaeology and Cultural Heritage - number of RHM / RMPs within 300m		0	0	0	1	0	1	1	6	1	6	7	4	4	1	0	1	1	1	1
	Residential property demolitions		2	5	5	5	5	5	0	14	5	13	13	5	11	5	3	2	6	6	5
	Commercial Property demolitions		0	1	1	1	0	1	0	1	1	1	1	1	0	0	1	0	0	1	0
	Air quality / noise / vibration - properties within 300m		30	85	174	159	130	145	114	87	78	102	80	82	87	164	146	20	54	60	131
	Community impacts (schools, sports grounds, churches etc)		0	0	0	0	0	0	0	0	0	Direct impact 2 schools, 1 church.	Direct impact 2 schools, 1 church.	0	0	0	0	0	0	0	0
	Communities severed (Considering different community if distance greater than 500m between the two communities)		0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	1	1	1
	Summary of Environmental Scores	Green	14.000	7.000	10.000	10.000	12.000	5.000	10.000	4.000	5.000	5.000	4.000	8.000	9.000	11.000	12.000	11.000	10.000	9.000	11.000
		Orange	0.000	6.000	3.000	3.000	3.000	6.000	5.000	4.000	6.000	3.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	6.000	4.000
		Red	1.000	2.000	2.000	2.000	0.000	4.000	0.000	7.000	4.000	7.000	7.000	3.000	3.000	1.000	0.000	1.000	1.000	0.000	0.000
	Environmental Summary	Average Score	2.867	2.333	2.533	2.533	2.800	2.067	2.667	1.800	2.067	1.867	1.800	2.333	2.400	2.667	2.800	2.667	2.600	2.600	2.733
Cost	Total Scheme Cost (Land + Construction)		3,943,888	11,612,515	8,197,576	7,008,350	7,467,431	7,454,280	4,851,402	15,396,015	12,504,029	13,866,633	14,585,550	7,195,935	9,044,171	6,885,083	5,212,520	8,959,808	10,844,776	12,502,298	11,992,370
	Summary of Cost Scores: (Although costs vary between options, neutral scoring has been adopted to avoid unreasonable skewing of results)	Green																			
		Orange	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
		Red																			
		Average Score	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
	Total Average Score		7.367	6.917	7.033	7.033	7.633	6.567	7.167	6.467	6.650	6.617	6.467	6.917	6.983	7.500	7.633	7.083	7.100	7.017	7.400
	Conclusions		Take Forward	New river crossing, blocks the flood plains, potential impact to SAC's and hence rejected	Proposed roundabout needs to be raised atleast 5m to achieve gradients and hence rejected	Vertical alignment not within the standard guidelines, large amount of earthworks required, proposed roundabout needs to be raised 10m to achieve gradients and hecne rejected	Take Forward	Poor option across multiple criteria, hence rejected.	While this option is feasible, it is less safe than other options. Not taken forward	Poor option across multiple criteria, hence rejected.	Poor option across multiple criteria, hence rejected.	Poor option across multiple criteria, hence rejected.	Poor option across multiple criteria, hence rejected.	Vertical alignment requires large amount of earthworks, direct impacts to Archaelogy and hence rejected	Vertical alignment requires large amount of earthworks, direct impacts to Archaelogy and hence rejected	Take Forward	Take Forward	While this option is feasible, it is less safe than other options and is not in compliance with Local Area Plan. Not taken forward	While this option is feasible, it is less safe than other options and is not in compliance with Local Area Plan. Not taken forward	Low score and hence rejected	Take Forward


SECTION - 1 - STAGE 1 BALLYBOFEY LINK ROAD OPTION LR 01
LEGEND
EMERGING PREFERRED OPTION
300m CORRIDOR


SECTION - 1 - STAGE 1 BALLYBOFEY LINK ROAD OPTION LR 02
LEGEND
EMERGING PREFERRED OPTION
300m CORRIDOR


SECTION - 1 - STAGE 1 BALLYBOFEY LINK ROAD OPTION LR 03
LEGEND
EMERGING PREFERRED OPTION
300m CORRIDOR


SECTION - 1 - STAGE 1 BALLYBOFEY LINK ROAD OPTION LR 04
LEGEND
EMERGING PREFERRED OPTION
300m CORRIDOR


SECTION - 1 - STAGE 1 BALLYBOFEY LINK ROAD OPTION LR 05
LEGEND
EMERGING PREFERRED OPTION
300m CORRIDOR


SECTION - 1 - STAGE 1 BALLYBOFEY LINK ROAD OPTION LR 06
LEGEND
EMERGING PREFERRED OPTION
300m CORRIDOR


SECTION - 1 - STAGE 1 BALLYBOFEY LINK ROAD OPTION LR 07
LEGEND
EMERGING PREFERRED OPTION
300m CORRIDOR


N
SECTION - 1 - STAGE 1 BALLYBOFEY LINK ROAD OPTION LR 08
LEGEND
EMERGING PREFERRED OPTION
300m CORRIDOR


SECTION - 1 - STAGE 1 BALLYBOFEY LINK ROAD OPTION LR 09
N
LEGEND
EMERGING PREFERRED OPTION
300m CORRIDOR


SECTION - 1 - STAGE 1 BALLYBOFEY LINK ROAD OPTION LR 10-11
N
LEGEND
EMERGING PREFERRED OPTION
300m CORRIDOR


SECTION - 1 - STAGE 1 BALLYBOFEY LINK ROAD OPTION LR 12-13
N
LEGEND
EMERGING PREFERRED OPTION
300m CORRIDOR


SECTION - 1 - STAGE 1 BALLYBOFEY LINK ROAD OPTION LR 14
LEGEND
EMERGING PREFERRED OPTION
300m CORRIDOR


SECTION - 1 - STAGE 1 BALLYBOFEY LINK ROAD OPTION LR 15
LEGEND
EMERGING PREFERRED OPTION
300m CORRIDOR


SECTION - 1 - STAGE 1 BALLYBOFEY LINK ROAD OPTION LR16
LEGEND
EMERGING PREFERRED OPTION
300m CORRIDOR
Scale Bar


SECTION - 1 - STAGE 1 BALLYBOFEY LINK ROAD OPTION LR17
LEGEND
EMERGING PREFERRED OPTION
300m CORRIDOR


SECTION - 1 - STAGE 1 BALLYBOFEY LINK ROAD OPTION LR18
LEGEND
EMERGING PREFERRED OPTION
300m CORRIDOR


SECTION - 1 - STAGE 1 BALLYBOFEY LINK ROAD OPTION LR 19
LEGEND
EMERGING PREFERRED OPTION
300m CORRIDOR

APPENDIX B

Section 1-Stage 2 Assessment of Ballybofey Link Road Options A to E


SECTION - 1 BALLYBOFEY LINK ROAD OPTION A
LEGEND
EMERGING PREFERRED ROUTE
EARTHWORKS (IN FILL)
EARTHWORKS (IN CUT)
ROUTE SELECTION IS INDICATIVE AND SUBJECT TO CHANGE


SECTION - 1 BALLYBOFEY LINK ROAD OPTION B
LEGEND
EMERGING PREFERRED ROUTE
EARTHWORKS (IN FILL)
EARTHWORKS (IN CUT)
ROUTE SELECTION IS INDICATIVE AND SUBJECT TO CHANGE


SECTION - 1 BALLYBOFEY LINK ROAD OPTION C
LEGEND
EMERGING PREFERRED ROUTE
EARTHWORKS (IN FILL)
EARTHWORKS (IN CUT)
ROUTE SELECTION IS INDICATIVE AND SUBJECT TO CHANGE


SECTION - 1 BALLYBOFEY LINK ROAD OPTION D
LEGEND
EMERGING PREFERRED ROUTE
EARTHWORKS (IN FILL)
EARTHWORKS (IN CUT)
ROUTE SELECTION IS INDICATIVE AND SUBJECT TO CHANGE


SECTION - 1 BALLYBOFEY LINK ROAD OPTION E
LEGEND
EMERGING PREFERRED ROUTE
EARTHWORKS (IN FILL)
EARTHWORKS (IN CUT)
ROUTE SELECTION IS INDICATIVE AND SUBJECT TO CHANGE

TEN-T Priority Route Improvement Project, Donegal

Section 1: N15/N13 Ballybofey/Stranorlar Urban Region

Option Selection Report

Appendix B – Road Safety Audit Stage F – Part 2

December 2019

Document Control Sheet

Client:	Donegal County Council
Project Title:	TEN-T Priority Route Improvement Project, Donegal – Section 1: N15/N13 Ballybofey/Stranorlar Urban Region
Document Title:	Option Selection Report –Appendix C1.6 – Road Safety Audit Stage F – Part 2
Document No.:	TT-MGT0337-RPS-00-01-RP-Z-RP-2006

Rev. No.	Suitability	Effective Date	Revision Description	Checked	Approved
P01	S4	December 2019	Approval	PM	PJM

RPS Barry Transportation

TEN-T Priority Route Improvement, Donegal

Section 1 – N15/N13 Ballybofey/Stranorlar Urban Region

Stage F (Part 2) Road Safety Audit

P·M·C·E

October 2019

RPS Barry Transportation

TEN-T Priority Route Improvement, Donegal

Section 1 – N15/N13
Ballybofey/Stranorlar Urban Region

Stage F (Part 2) Road Safety Audit

Document Ref:	TT_Y16112-SC-RS-HGN-S1-RP-Z-00112

Rev	Prepared By	Reviewed By	Approved By	Issue Date	Suitability
P01	PJM	PM	PJM	2nd Oct. 2019	S4

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1 Introduction

1.1 General

This report results from the Part 2 of a Stage F Road Safety Audit carried out on the emerging preferred option for Section 1 (N15/N13 Ballybofey/Stranorlar Urban Region) of the proposed TEN-T Priority Route Improvement, Donegal. The audit was carried out at the request of Ms Emma Coyle of Barry Transportation, on behalf of RPS Barry Transportation.

1.2 Audit Team

The members of the Road Safety Audit Team are independent of the design team, and include:

Mr. Peter Monahan
(PMCE Ltd.)
(BE MSc CEng FIEI RSACert)
Road Safety Audit Team Leader

Ms. Laura Woodbyrne
(Barry Transportation)
(BA BAI (Hons) PGCert CEng MIEI)
Trainee/Observer

Mr. Peter Morehan
(Barry Transportation)
(BE CEng MIEI)
Road Safety Audit Team Member

1.3 Audit Information

The Road Safety Audit took place during the period March to July 2019 and comprised an examination of the documents provided by RPS Barry Transportation (see Appendix A). In addition to examining the documents supplied the Road Safety Audit Team visited the site of the proposed measures on the 15th August 2018. Weather conditions during the site visit were mainly dry & overcast with some rain showers, the road surface was dry and traffic volumes were moderate to heavy.

This Stage F (Part 2) Road Safety Audit has been carried out in accordance with the requirements of GE-STY-01024 - Road Safety Audit, dated December 2017, contained on the Transport Infrastructure Ireland (TII) Publications website.

The scheme has been examined and this report compiled in respect of the consideration of those matters that have an adverse effect on road safety and considers the perspective of all road users for the emerging preferred option. It has not been examined or verified for compliance with any other standards or criteria. The problems identified in this report are considered to require action in order to improve the safety of the scheme and minimise collision occurrence.

If any of the recommendations within this road safety audit report are not accepted, a written response is required, stating reasons for non-acceptance. Comments made within the report under the heading of Observations are intended to be for information only. Written responses to Observations are not required.

1.4 Scheme Description

1.4.1 Overall Scheme

The overall project comprises three sections of the TEN-T Network in Donegal that have been prioritised for improvement to address existing safety and operational issues. The Trans-European Transport Network (TEN-T) is a selection of strategic transport corridors that have been identified to play a key role in the mobility of goods and passengers through the European Union. The TEN-T Network in Donegal consists of three National Primary Roads (N13, N14 and N15). The three sections of the TEN-T in Donegal that have been prioritised for improvement are: -

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

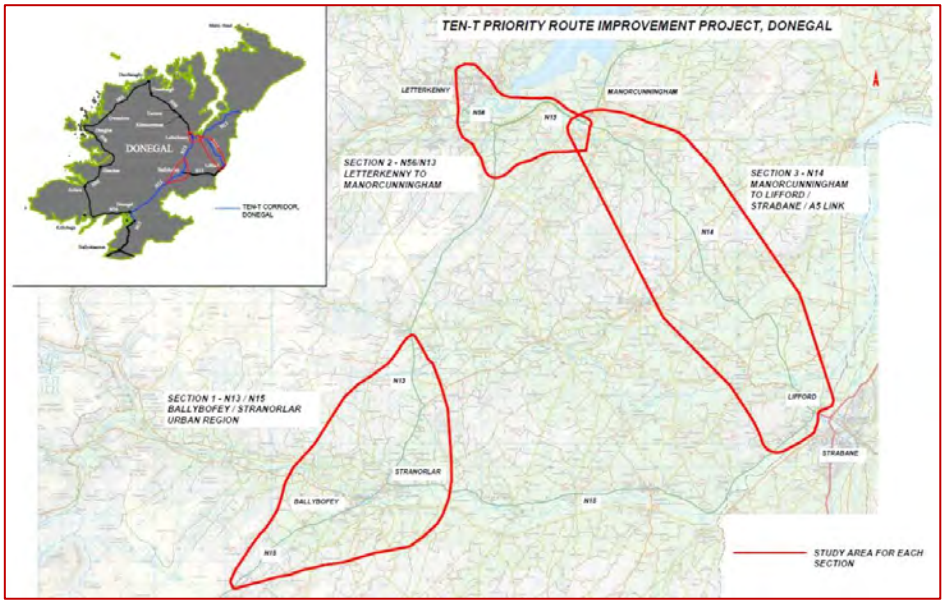


FIGURE 1.1: STUDY AREAS FOR EACH SECTION OF OVERALL SCHEME

This audit is for Section 1, which is described in the following section of this report.

1.4.2 Section 1

The N15 is Donegal's only national road link to the rest of the Republic of Ireland. The N15 currently passes through Ballybofey and Stranorlar, with strategic, local, business and leisure traffic travelling on the national road through the town centre resulting in congestion and safety issues.

The existing N13 and N15 in the vicinity of the proposed improvement consist of narrow single carriageway roads with no hard shoulder over much of their length. Where they run through the urban environment of Ballybofey and Stranorlar they feature numerous direct accesses and have historical collisions rates above, and twice above, the national average for a similar type of national road for much of their length.

The proposed road improvement is to consist of a realignment of the N15 & N13 to bypass Ballybofey & Stranorlar. The cross-section for the road improvement will be confirmed in subsequent design phases, however for the purposes of this audit the new road is assumed to consist of a Type 2 Dual Carriageway (Ref: DN-GEO-03036) including a cycle track of 2.5m in width offset from the carriageway edge by 2.5m.

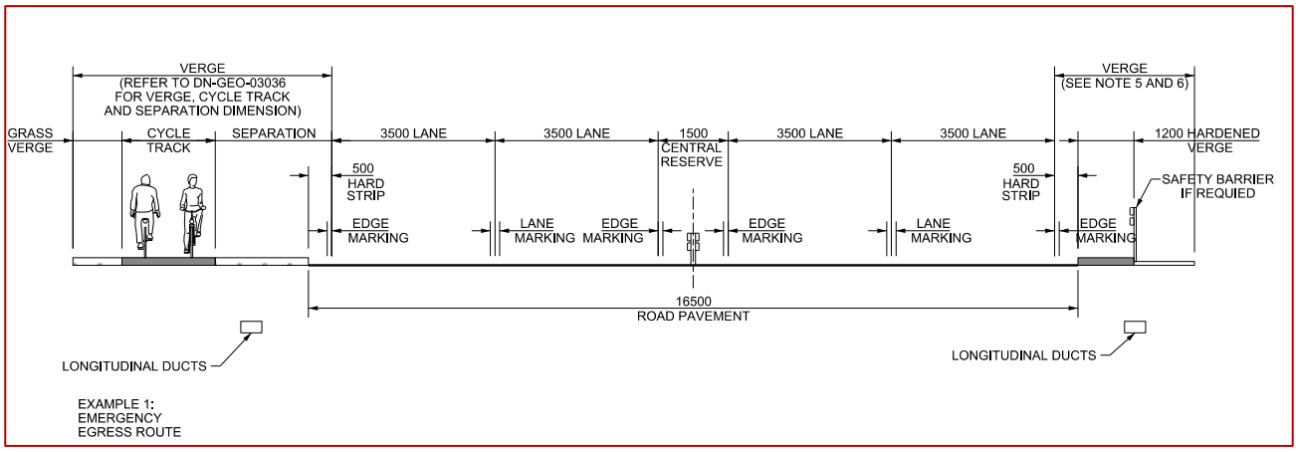


FIGURE 1.2: TYPE 2 DUAL CARRIAGEWAY

The overall length of the emerging preferred option is 8.2km, excluding link roads and the realignments of the N13 or N15 at the tie-in points, all of which is off-line to the north-west of Ballybofey & Stranorlar. Terminal roundabouts are proposed at the western and north-eastern tie-ins.

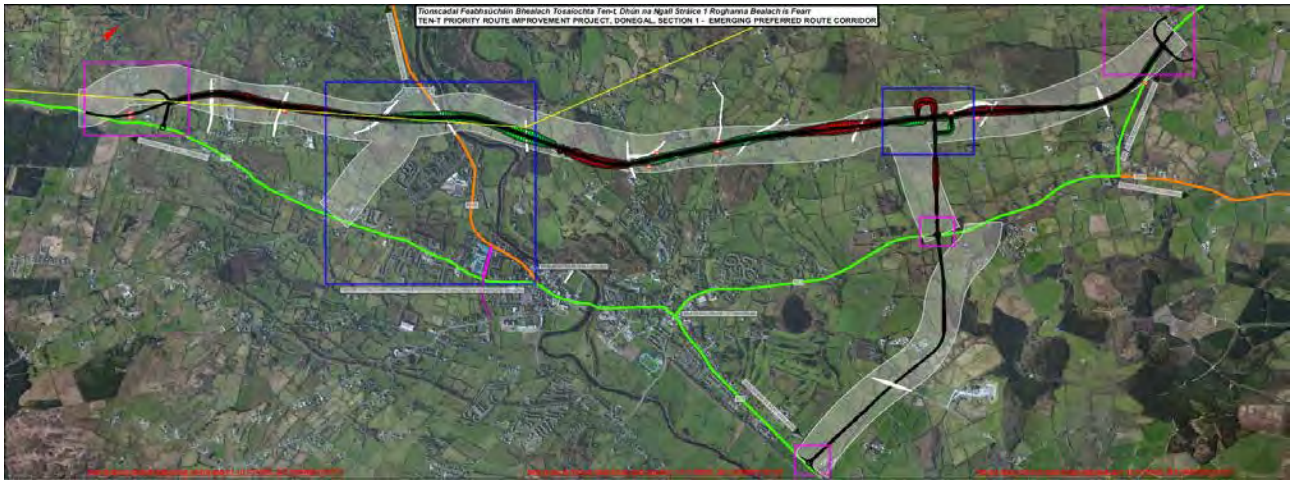


FIGURE 1.3: EMERGING PREFERRED OPTION

One river bridge and fifteen grade-separated road crossings are required including at the R253 Regional Road where a compact grade-separated junction is proposed.

A link is proposed from this junction to the existing N15 to the north west of Ballybofey. The route of this link has yet to be selected, with five options (A to E) under consideration and reviewed as part of this Audit.

A second compact grade separated junction is proposed to the north-east of Stranorlar connecting the bypass with the existing N13 and the N15 to the east of Stranorlar.

1.4.3 Information Provided to Audit Team

Drawings detailing the emerging preferred option were provided, details of which and are listed in Appendix A.

Collision records for the period 2005 to 2015 on the Road Safety Authority's website (**www.rsa.ie**) was also reviewed as part of the audit.

FIGURE 1.4: COLLISION RECORDS FROM ROAD SAFETY AUTHORITY WEBSITE

In addition, national road HD15 collision rates for the Period 2014 to 2016 were obtained from the Open Data Portal (data.gov.ie) which are shown in Figure 1.5. The sections shown in red are those sections of road with collision rates twice (or more) above the average, sections shown in orange are those sections of road with collision rates above the average, sections shown in blue are those sections of road with collision rates below the average & sections shown in green are those sections of road with collision rates twice (or more) below the average.

FIGURE 1.5: HD15 COLLISION RATES (2014 TO 2016)

1.5 Stage F (Part 1) Road Safety Audit

A Stage F (Part 1) Road Safety Audit was previously undertaken on this project, which identified possible safety issues for each option considered, which were compared to differentiate between the options in order to identify an emerging preferred option.

The Stage F (Part 1) report ranked this option as first (most preferred) out of the 13 options considered.

2 Main Report

The audit has been undertaken on preliminary designs developed for the option selection (Phase 2) stage of the project. It is noted that these are indicative designs developed within a 300m corridor and that they are subject to change and development as the project progresses into Design and Environmental Evaluation (Phase 3) stage.

2.1 Problem

Location: *Throughout the Scheme - Mainline*

Summary: *The absence of a hardshoulder may expose occupants of broken-down vehicles to the risk of being struck by through-traffic*

The proposed mainline cross-section does not include a hardshoulder. It was observed, during the site visit, that the existing sections of N13 & N15 beyond the tie-in points have hardshoulder provisions.

The absence of a hardshoulder may expose occupants of broken-down vehicles to the risk of being struck by through-traffic and increase the likelihood of high-speed shunt collisions between through-traffic and stationary vehicles on the mainline carriageway.

Recommendation

During the development of the scheme design include measures to reduce the risk, for example: -

- Provide a hard-shoulder or lay-bys to accommodate broken-down vehicles; or
- Ensure that the verge and hardstrip are capable of accommodating a broken-down vehicle without encroachment within the traffic lanes or the cycletrack, and that any vehicle restraint systems provided do not impede this arrangement.

2.2 Problem

Location: *Throughout the Scheme - Mainline*

Summary: *Lack of provisions for pedestrians on mainline and unclear how cyclists on mainline will interface with junctions.*

It is not proposed to include any provisions for pedestrians along the bypass. The proximity of the route to the urban area of Ballybofey & Stranorlar could lead to pedestrian traffic along the bypass as part of a leisure walking route.

Pedestrians using the bypass route in the absence of dedicated facilities will potentially walk along the cyclist provision, which may not be wide enough to cater for both pedestrians and cyclists, leading to collisions between these non-motorised road user groups. Alternatively, pedestrians may choose to walk within the carriageway with a resulting risk of being struck by a passing high-speed vehicle.

At-grade non-motorised user crossings at junctions, or crossings away from likely desire lines, will lead to pedestrians or cyclists interacting with high-speed traffic leading to collisions between non-motorised road user groups and vehicles.

Recommendation

During the design development assess likely pedestrian walking routes and desire lines and include safe routes and crossings where a need is identified.

2.3 Problem

Location: *Approaches to Proposed Roundabouts*

Summary: *Unexpected junction type (roundabout) on rural section of national route could lead to overshoot incidents or run-off-road incidents.*

The proposal to include terminal roundabouts where the Type 2 Dual Carriageway cross-section ends is considered an appropriate transition arrangement between a single carriageway road network and the dual carriageway bypass.

However, the introduction of roundabouts onto rural sections of national road is likely to result in an increase in collisions at the roundabout locations where drivers fail to anticipate this type of junction on a rural section of national road.

Unexpected junction type (roundabout) on rural section of national route(s) could lead to drivers failing to adequately moderate their speeds on approach to the roundabouts resulting in overshoot incidents or run off road incidents.

Recommendation

During the design development ensure that adequate forward visibility to, and advance warning of, the roundabouts are provided for approaching drivers.

2.4 Problem

Location: *Approaches to Terminal Roundabouts*

Summary: *Possible inappropriate approach speeds leading to a failure to stop and overshoot into the circulating carriageway resulting in side-on collisions or run-off-road collisions*

The scheme includes terminal roundabouts at the end of the bypass. The proposed scheme is a type 2 dual carriageway with two lanes approaching the roundabouts. This could lead to inappropriate approach speeds, a failure to stop and overshoot into the circulating carriageway resulting in side-on collisions or to run off road collisions, particularly for vehicles approaching on the outside lane.

Recommendation

During the development of the design ensure that adequate signage is provided for both nearside and offside drivers on the mainline approaches to the terminal roundabouts, and that where required median widening is provided to accommodate any necessary signage on these approaches.

2.5 Problem

Location: *Throughout the Scheme - Mainline*

Summary: *Insufficient forward visibility could result in drivers failing to observe a hazard in the upcoming carriageway in sufficient time, leading to a failure to stop and collisions.*

The proposed Type 2 Dual Carriageway cross-section may require verge and/or median widening on some horizontal curves in order to ensure adequate forward visibility.

Insufficient forward visibility could result in drivers failing to observe a hazard in the upcoming carriageway in sufficient time, leading to a failure to stop and collisions.

Recommendation

During the design development ensure that the required forward visibility is available at all locations along the roads within the scheme, and that adequate lands are acquired to provide any verge/median widening required to achieve this.

2.6 Problem

Location: *Ballybofey & Stranorlar*

Summary: *Increased speeds along bypassed section of road could lead to increase in injury severity when collisions occur.*

The existing road through Ballybofey & Stranorlar includes a number of high collision sections of road, with non-motorised user collisions representing a significant proportion of these.

The proposed route will lead to a reduction in traffic along the old N13 & N15 through Ballybofey & Stranorlar. This reduction in traffic volumes and associated congestion could give rise to increased vehicle speeds with a consequent increase in injury severity when collisions occur.

Recommendation

During the development of the design include measures along the existing road through Ballybofey & Stranorlar which would reduce speeds or deter traffic travelling to/from the west and the N15 from continuing through the urban area.

2.7 Problem

Location: *Mainline*

Summary: *Lack of provisions for pedestrians on mainline and unclear how cyclists on mainline will interface with junctions.*

It is proposed to include a cycle track along the bypass, but no footpath, and details are unclear relating to the pedestrian and cyclist provisions in the vicinity of junctions and tie-ins.

Pedestrians using the bypass route in the absence of dedicated facilities will potentially walk within the carriageway, leading to collisions between non-motorised road users and vehicles. At-grade non-motorised user crossings at junctions, or crossings away from likely desire lines, will lead to pedestrians or cyclists interacting with high-speed traffic leading to collisions between non-motorised road user groups and vehicles.

Recommendation

During the design development assess likely pedestrian walking routes and desire lines and include safe routes and crossings where a need is identified.

2.8 Problem

Location: *R253 Compact Grade Separated Junction*

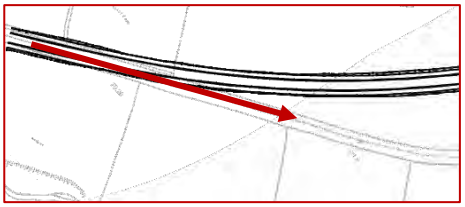
Summary: *Relatively steep mainline gradient at junction may lead to difficulties for merging/diverging traffic in completing the manoeuvre safely.*

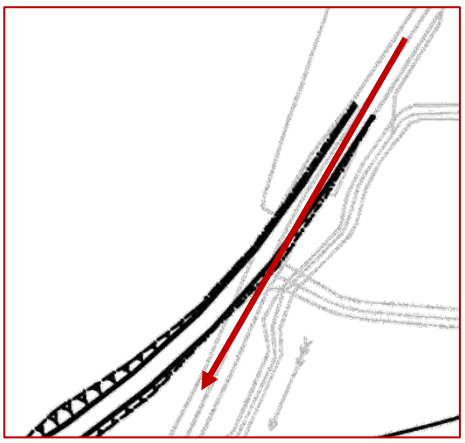
The proposed compact grade separated junction at the intersection with the R253 Regional Road is located on a section of route with, while to standard, a relatively steep mainline gradient. This can present difficulties for drivers in adequately moderating their speed on the mainline approach to the junction, leading to overshoot incidents. In addition, vehicles joining the mainline, in particular heavy vehicles, may have difficulty in accelerating sufficiently quickly to match speeds on the through-traffic lanes in order to merge safely.

Recommendation

During the development of the design include measures to improve this junction safety such as provision of auxiliary acceleration/deceleration lanes, of sufficient length, to permit safe merging & diverging manoeuvres.

2.9 Problem





Location: *Tie-ins with Existing Roads*

Summary: *Potential sight-through onto old sections of road.*

At a number of tie-in locations, for the mainline and side-roads, there is a risk of drivers sighting onto the section of old road and misunderstanding the upcoming road layout leading to run-off-road incidents.

Recommendation

During the design development include measures at these locations to prevent drivers sighting onto the old section of road.

2.10 Problem

Location: *Junction of Realigned Local Road (SR13) and Existing Local Road*

Summary: *Additional junction on local road increases the number of potential conflicting manoeuvres and hence risk of collisions*

It is proposed to realign an existing local road (SR13) and to create a new junction between it and the local road to the south. This will increase the number of junctions along this section of local road, increasing the number of potential conflicting manoeuvres and consequently increasing the risk of collisions.

Recommendation

During the design development examine the feasibility of realigning the diverted side road back onto existing local road south of proposed bypass.

2.11 Problem

Location: *Northern Tie-in*

Summary: *Retention of existing crossroad junction.*

It is unclear from the information provided if it is intended to close the existing crossroads on the N13 immediately north of the northern terminal roundabout.

Crossroad junctions have a poor safety record, arising primarily from the sight-through across the junction on the minor arm approaches.

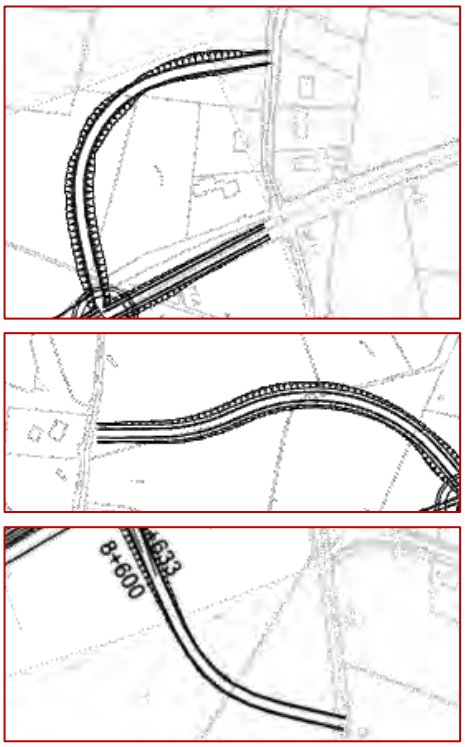
Recommendation

During the design development provide for a safe connection to the existing road network and where possible close the existing crossroad junction as part of the scheme.

2.12 Problem

Location: *Tie-ins with Existing Local Roads*

Summary: *Alignment at local road tie-ins.*



A number of the tie-ins between realigned and existing local roads throughout the scheme are indicated as occurring at 90°. The proposed arrangement is likely to result in the predominient traffic flow at the tie-in having to turn through 90°, resulting in increased potential conflicts.

Similarly, as drivers become familiar with the new road layout, and in particular the low likelihood of meeting traffic on one of the junction arms, they may be unprepared when a vehicle emerges from this arm which may have priority due to the junction layout.

Recommendation

During the design development tie-in realigned roads with a smooth horizontal alignment to the existing road network with clear priority to the expected main traffic flow and provide a suitable junction with the remaining (often severed) section of road.

2.13 Problem

Location: *Link Road Option A (Drawing TT_MGT0337-RPS-00-ZZ-DR-D-DG0022-01 P05)*

Summary: *Junctions in close proximity giving rise to increased potential for collisions.*

The proposed junction on the R253 between the Link Road Option A, connecting the existing R253 with the proposed bypass and the existing N15, is located in close proximity to an existing, non-standard, local road junction on the regional road. The proximity of the two junctions will result in a concentration of turning movements along a relatively short length of regional road with a resulting increased likelihood of collisions associated with turning manoeuvres.

Junctions in close proximity on the existing regional road could lead to driver confusion resulting in late-braking or late manoeuvres and shunt collisions and will also result in additional turning movements with increased likelihood of side-on collisions associated with right-turning manoeuvres into/out of the junctions.

Recommendation

During the design development, develop a safe junction arrangement for this location (e.g. the provision of a roundabout junction at this location).

2.14 Problem

Location: *Link Road Options B, C & D*

Summary: *Existing N15/R253 Junction*

The proposed Link Road arrangements (Options B, C & D) will result in the existing R253 traffic continuing to use the existing N15/R253 junction. During the site visit it was noted that the existing R253 within the town is relatively narrow and the existing R253/N15 junction is uncontrolled and has visibility issues for drivers exiting from the R253.

Continued use of the existing R253, and in particular its junction with the existing N15, will result in collisions continuing to occur at this location.

Recommendation

Link road options which result in a decrease in traffic along the R253 within the town, and in particular in a decrease in traffic turning at the existing N15/R253 junction, are preferred.

2.15 Problem

Location: *Link Road Option E*

Summary: *Junctions in close proximity giving rise to increased potential for collisions.*

The proposed junction on the R253 between the Link Road Option E, connecting the existing R253 with the proposed bypass and the existing N15, is located in close proximity to an existing, non-standard, local road junction on the regional road.

The road served by the existing junction, to the east of the link road junction, will be severed as part of the Link Road Option E proposals significantly reducing traffic volumes into/out of it.

Nevertheless, the proximity of the two junctions could result in driver confusion and an increased likelihood of collisions associated with driver hesitation.

Recommendation

During the design development examine the safety implications that may arise from the proximity of the two junctions, and if necessary amend the existing junction layout to reflect the reduced volumes of traffic into/out of it.

Include appropriate signs and markings to clearly convey to drivers the location of the link road junction and that the existing junction is for local traffic/access only.

2.16 Problem

Location: *Link Road Option E*

Summary: *Junctions in close proximity to proposed roundabout.*

There are a number of existing domestic accesses and residential access roads located on the existing N15 close to the proposed roundabout for the Link Road Option E.

There is a risk that drivers accelerating upon exiting the roundabout may not anticipate a vehicle slowing in front of them to turn into these existing accesses/local roads, leading to shunt collisions.

Recommendation

During the design development incorporate measures to ensure safe access to the existing properties/roads in the vicinity of the proposed roundabout.

2.17 Problem

Location: *Link Road Option A (Drawing TT_MGT0337-RPS-00-ZZ-DR-D-DG0021-01 P07)*

Summary: *Increased traffic through existing non-standard junction resulting in an increased potential for collisions.*

The proposed junction on the R253 between the Link Road Option A, connecting the existing R253 with the proposed bypass and the existing N15, is located at an existing, non-standard, local road junction with the regional road.

Increased traffic flows and associated turning movements at this existing junction are likely to result in an increased likelihood of collisions.

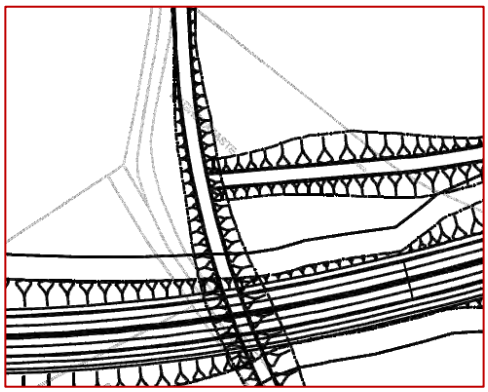
Recommendation

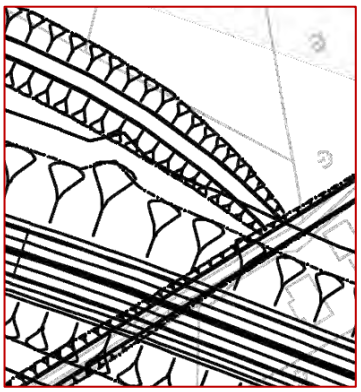
During the design development, develop a safe junction arrangement for this location (e.g. the provision of a roundabout junction at this location).

3 Observations

3.1 In a number of locations junctions/accesses on realigned side roads are indicated adjacent to proposed overbridges.

During the design development ensure that the visibility splays for drivers exiting from the minor arm of these junctions is not obstructed by the nearby structure or associated parapets.



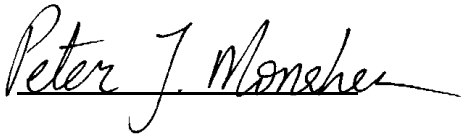


4 Road Safety Audit Team Statement

We certify that we have examined the drawings and other information referred to in this report and listed in Appendix B, and visited the site during daytime on the 15th August 2018. We certify that we are independent from the design team for the scheme. The examination has been carried out with the sole purpose of identifying any features of the design that could be removed or modified in order to improve the safety of the scheme.

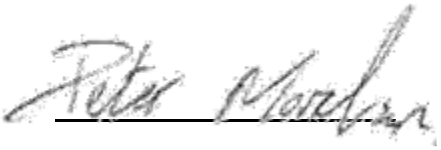
The problems identified have been noted in this report together with associated safety improvement suggestions, which we would recommend should be studied for implementation.

ROAD SAFETY AUDIT TEAM LEADER

Peter Monahan Signed: 

Dated: 2nd October 2019

ROAD SAFETY AUDIT TEAM MEMBER

Peter Morehan Signed: 

Dated: 2nd October 2019

OTHERS INVOLVED

Ms. Laura Woodbyrne, Trainee/Observer

Appendix A – Documents Submitted to the Road Safety Audit Team

DOCUMENT/DRAWING TITLE	DOCUMENT/DRAWING NO.	REVISION
Route 1G Plan & Profile Figure 1G Sheet 1 of 5	TT_MGT0337-RPS-00-ZZ-DR-D-GE0028-01	P02
Route 1G Plan & Profile Figure 1G Sheet 2 of 5	TT_MGT0337-RPS-00-ZZ-DR-D-GE0028-02	P02
Route 1G Plan & Profile Figure 1G Sheet 3 of 5	TT_MGT0337-RPS-00-ZZ-DR-D-GE0028-03	P02
Route 1G Plan & Profile Figure 1G Sheet 4 of 5	TT_MGT0337-RPS-00-ZZ-DR-D-GE0028-04	P02
Route 1G Plan & Profile Figure 1G Sheet 5 of 5	TT_MGT0337-RPS-00-ZZ-DR-D-GE0028-05	P02
Section 1 Ballybofey Link Road Option A	TT_MGT0337-RPS-00-ZZ-DR-D-GE0022-01	P05
Section 1 Ballybofey Link Road Option A	TT_MGT0337-RPS-00-ZZ-DR-D-GE0021-01	P07
Section 1 Ballybofey Link Road Option B	TT_MGT0337-RPS-00-ZZ-DR-D-GE0022-02	P05
Section 1 Ballybofey Link Road Option C	TT_MGT0337-RPS-00-ZZ-DR-D-GE0022-03	P05
Section 1 Ballybofey Link Road Option D	TT_MGT0337-RPS-00-ZZ-DR-D-GE0022-04	P05
Section 1 Ballybofey Link Road Option E	TT_MGT0337-RPS-00-ZZ-DR-D-GE0021-05	P02
Emerging Preferred route Section 1	TT_MGT0337-RPS-00-ZZ-DR-D-GE0027-07	P06
Calculated Traffic Flows based on ATC Surveys	-	-
Collision Data from rsa.ie Interactive Mapping (2005 – 2014)	-	-

Appendix B – Audit Team Approval

Emma Coyle
Classon House
Dundrum Business Park
Dublin 14

Date: 13/08/2018

Our Ref: 1311544/5336/Stage F

re: N15 N15/N13 Ballybofey/Stranorlar Urban Region TEN-T

APPROVAL OF ROAD SAFETY AUDIT TEAM, Stage F

Dear Emma Coyle,

The following members of the proposed road safety audit team are approved to carry out the Stage F road safety audit of N15 N15/N13 Ballybofey/Stranorlar Urban Region TEN-T.

1. Peter Monahan - PMCE Ltd. - Leader
2. Peter Morehan - J.B. Barry & Partners Ltd. (Dublin) - Leader
3. Gerard Claffey - J.B. Barry & Partners Ltd. (Dublin) - Member

A copy of all audit reports, design team response and exception reports must be uploaded through RSAAS. Successful upload of these reports and completion of the audit approval process is necessary for any further audit approval on this scheme.

Yours sincerely,

Lucy Curtis

Regional Road Safety Engineer
roadsafetyaudits@nra.ie

Appendix C – Feedback Form

Road Safety Audit Feedback Form

Scheme: TEN-T Priority Route Improvement, Donegal

N15/N13 Ballybofey/Stranorlar Urban Region

Route No.: N13 & N15

Audit Stage: Stage F (Part 2) **Date Audit Completed:** 2nd Oct. 2019

	To Be Completed By Designer			**To Be Completed By Audit Team Leader**
Paragraph No. in Safety Audit Report	**Problem Accepted (Yes/No)**	**Recommended Measure(s) Accepted (Yes/No)**	**Describe Alternative Measure(s). Give reasons for not accepting recommended measure**	**Alternative Measures or Reasons Accepted by Auditors (Yes/No)**
2.1	Yes	Yes		
2.2	Yes	Yes		
2.3	Yes	Yes		
2.4	Yes	Yes		
2.5	Yes	Yes		
2.6	Yes	Yes		
2.7	Yes	Yes		
2.8	Yes	Yes		
2.9	Yes	Yes		
2.10	Yes	No	During the design stage, the siting of the proposed junction for the SR13 will be selected and designed to avoid conflict with the existing junction. An offline solution, instead of the suggested RSA solution to utilise the existing SR13 road, is preferred since it will result in less impact.	Yes
2.11	Yes	Yes		
2.12	Yes	Yes		

Road Safety Audit Feedback Form

Scheme: TEN-T Priority Route Improvement, Donegal

N15/N13 Ballybofey/Stranorlar Urban Region

Route No.: N13 & N15

Audit Stage: Stage F (Part 2) **Date Audit Completed:** 2nd Oct. 2019

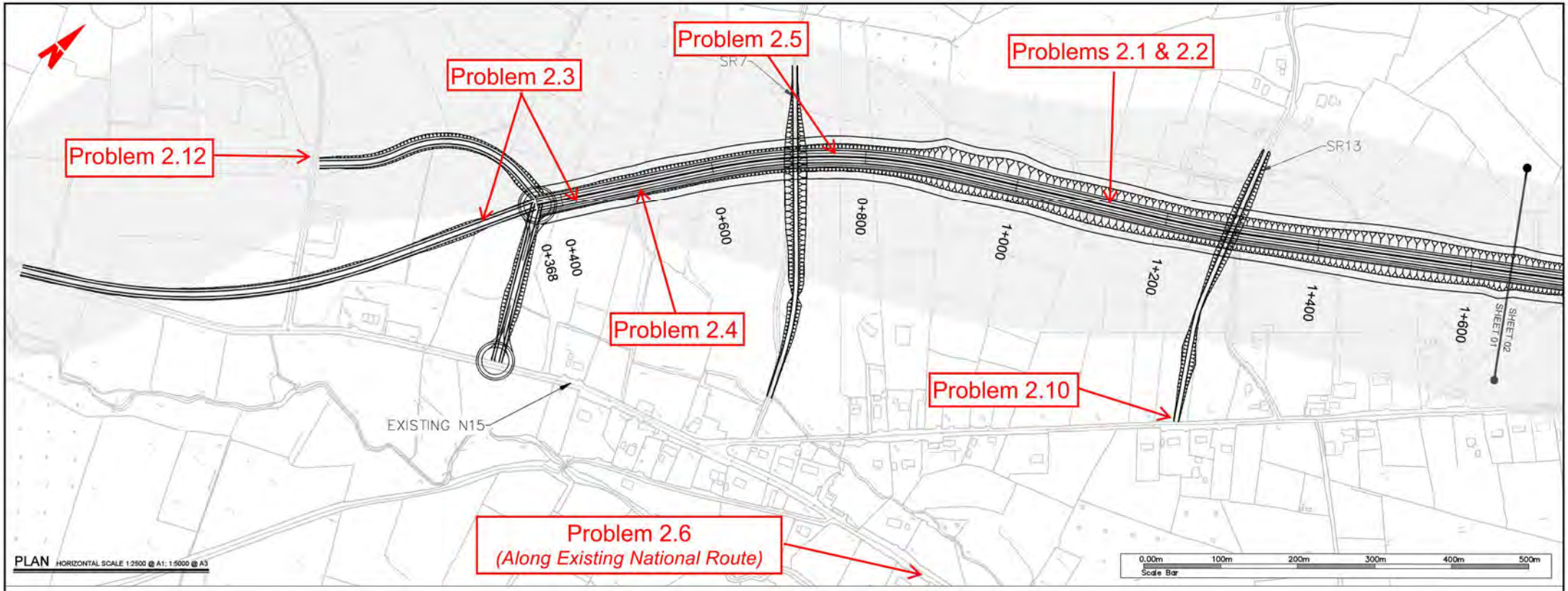
	To Be Completed By Designer			To Be Completed By Audit Team Leader
Paragraph No. in Safety Audit Report	**Problem Accepted (Yes/No)**	**Recommended Measure(s) Accepted (Yes/No)**	**Describe Alternative Measure(s). Give reasons for not accepting recommended measure**	**Alternative Measures or Reasons Accepted by Auditors (Yes/No)**
2.13	Yes	Yes		
2.14	Yes	Yes		
2.15	Yes	Yes		
2.16	Yes	Yes		
2.17	Yes	Yes		

Signed: Tim Cotter Designer **Date** 2/10/2019

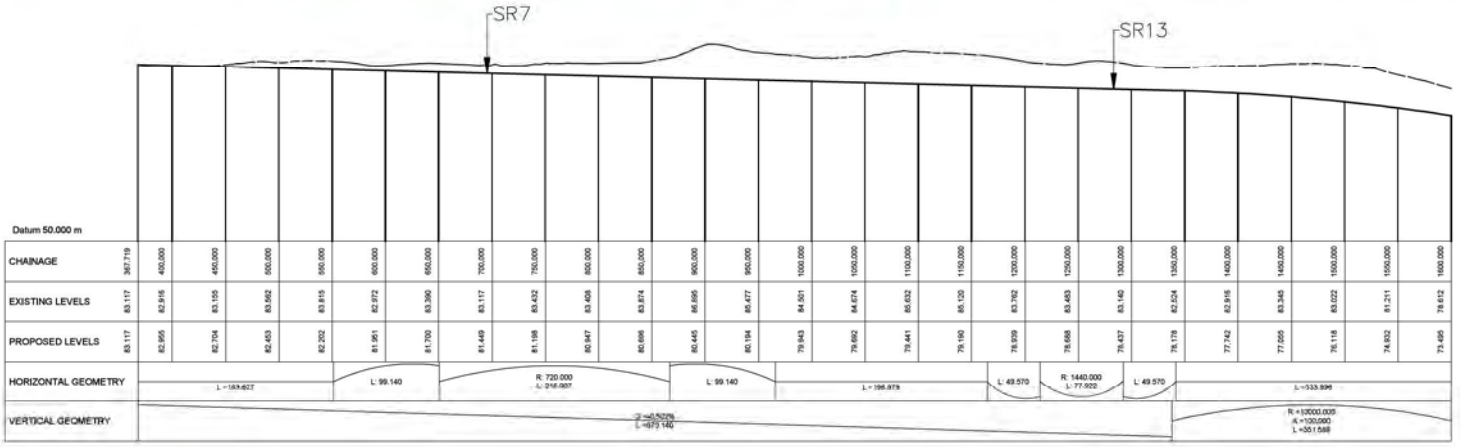
Signed: Peter J. Monaghan Audit Team Leader **Date** 2nd Oct. 2019

Signed: Áine McHugh Employer **Date** 4/10/2019

Appendix D – Problem Locations



PLAN HORIZONTAL SCALE 1:2500 @ A1; 1:5000 @ A3



PROFILE VERTICAL SCALE 1:500 @ A1; 1:1000 @ A3
HORIZONTAL SCALE 1:2500 @ A1; 1:5000 @ A3

Bonneagar Iompair Éireann

Comhairle Contae Dhún na nGall
Donegal County Council

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E: ireland@rpsgroup.com

BARRY TRANSPORTATION
Unit 14C, NS Business Park, Clarkston, Co Meath, Ireland
Phone: +353 94 906 8950
Email: info@jpbarry.ie

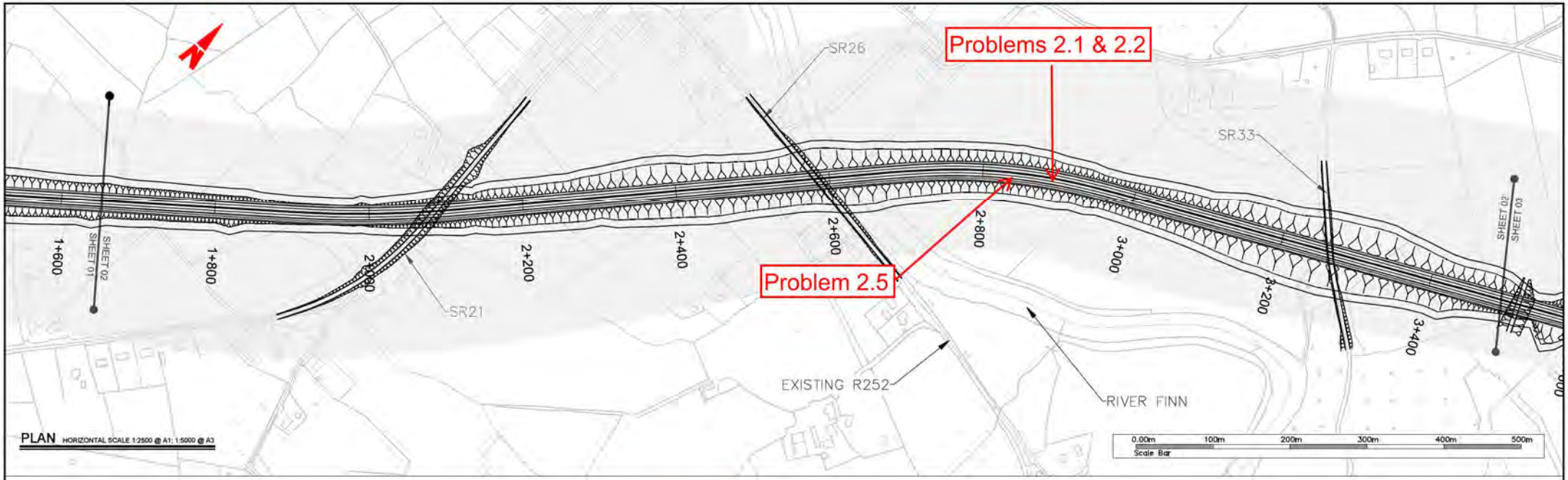
NOTES
DO NOT SCALE, use figured dimensions only.
All levels are referred to Ordnance Survey Datum, Malin Head.

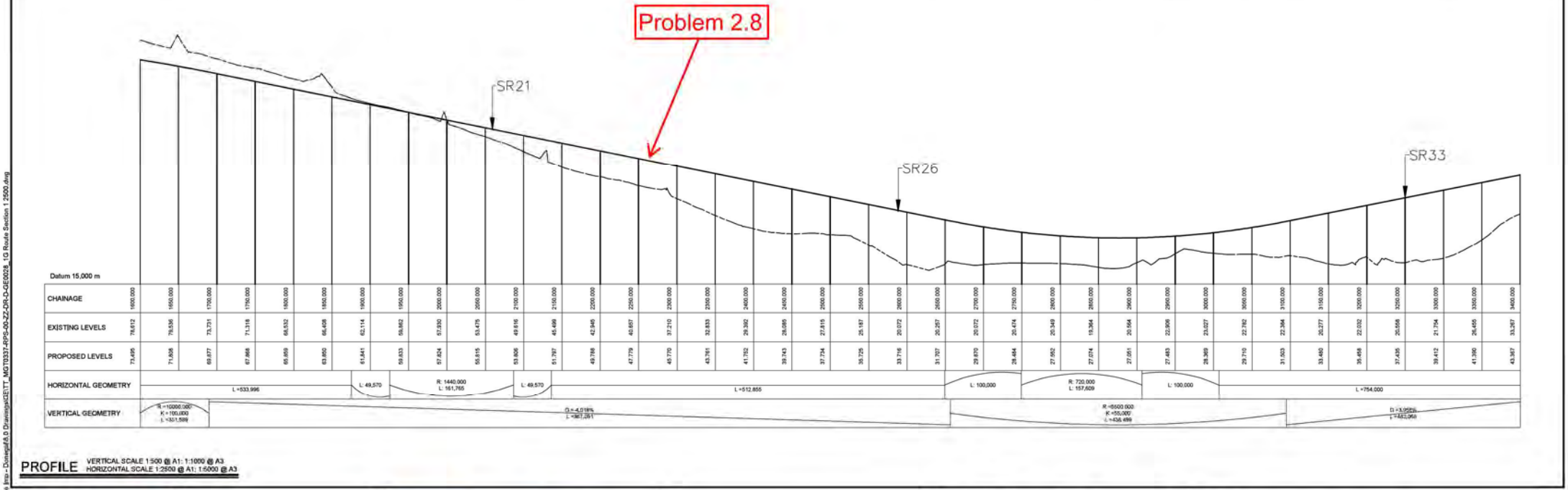
Information including topographical survey, geotechnical investigation and utility detail used in the design have been provided by others.

Rev.	Date:	Drawn	Description	Chk'd	Appr.
P02	13.03.19	DC	FOR REVIEW & COMMENT	EC	TP
P01.01	30.08.18	MN	WORK IN PROGRESS	LH	TP

Project Title: TEN-T Priority Route Improvement Project, Donegal
Drawing Title: ROUTE 1G PLAN & PROFILE
FIGURE 1G SHEET 1 OF 5
Status: S0
Designed: DC | Date: AUG 18 | Model File Identifier: N/A
Drawn: MN | Scale @ A1: AS SHOWN | Rev: P02
Approved: TP | @ A3: AS SHOWN | File Identifier: TT_MGT0337-RPS-00-ZZ-DR-D-GE0028-01
Checked: EC | Sheet: 01 of 05

R:\MGT0337 - Ten-T Priority Route Imp - Donegal\8.0 Drawings\GE\TT_MGT0337-RPS-00-ZZ-DR-D-GE0028_1G Route Section 1 2500.dwg





Tii Bonneagar Iompair Éireann

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NOTES:
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Rev.	Date:	Drawn	Description	Chkd	Appr.
P02	13.03.19	DC	FOR REVIEW & COMMENT	EC	TP
P01.01	30.08.18	MN	WORK IN PROGRESS	LH	TP

Project Title: TEN-T Priority Route Improvement Project, Donegal

Drawing Title: ROUTE 1G PLAN & PROFILE
FIGURE 1G SHEET 2 OF 5

Status: S0

Designed: DC	Date: AUG 18	Model File Identifier: N/A	Rev: P02
Drawn: MN	Scale @ A1: AS SHOWN		
Approved: TP	@ A3: AS SHOWN	File Identifier: TT_MGT0337-RPS-00-ZZ-DR-D-GE0028-02	
Checked: EC	Sheet: 02 of 05		

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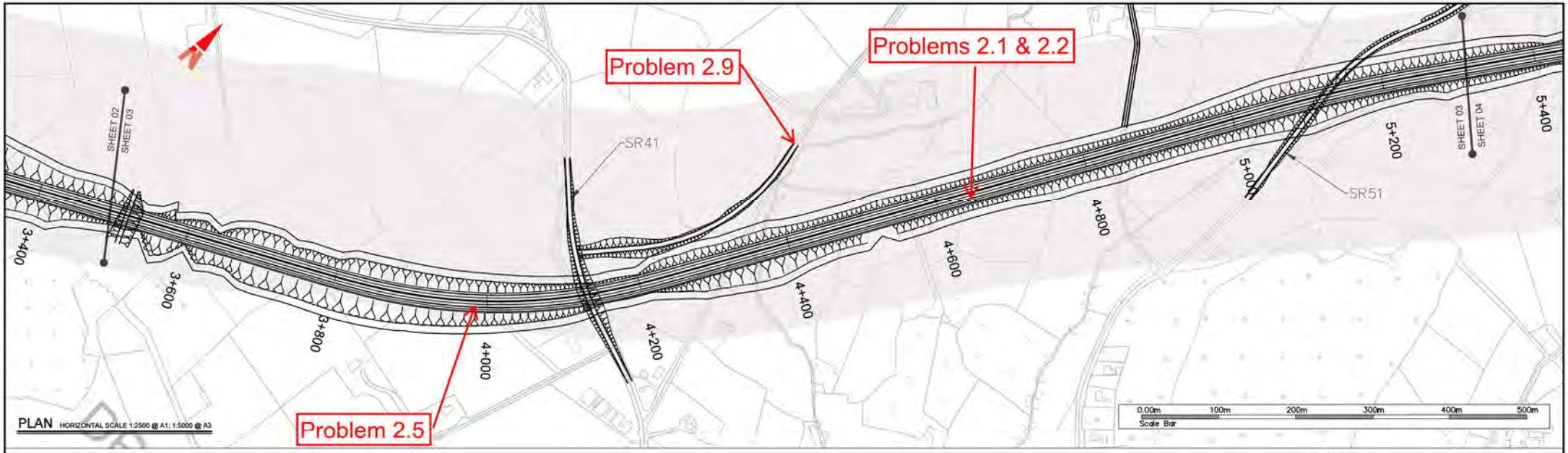
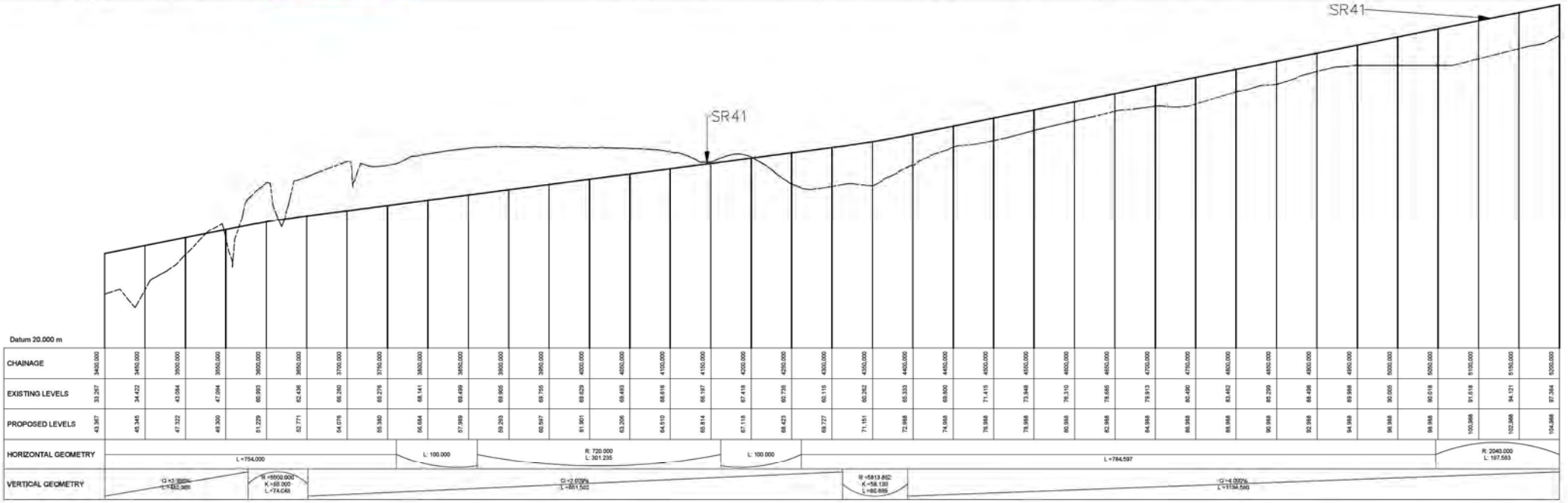


PLAN HORIZONTAL SCALE 1:2500 @ A1; 1:5000 @ A3



PROFILE VERTICAL SCALE 1:500 @ A1; 1:1000 @ A3
HORIZONTAL SCALE 1:2500 @ A1; 1:5000 @ A3

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P02	13.03.19	DC	FOR REVIEW & COMMENT	EC	TP
P01.01	30.08.18	MN	WORK IN PROGRESS	LH	TP

Project Title: TEN-T Priority Route Improvement Project, Donegal

Drawing Title: ROUTE 1G PLAN & PROFILE
FIGURE 1G SHEET 3 OF 5

Status: S0

Designed: DC	Date: AUG 18	Model File Identifier: N/A	Rev: P02
Drawn: MN	Scale @ A1: AS SHOWN		
Approved: TP	@ A3: AS SHOWN	File Identifier: TT_MGT0337-RPS-00-ZZ-DR-D-GE0028-03	
Checked: EC	Sheet: 03 of 05		

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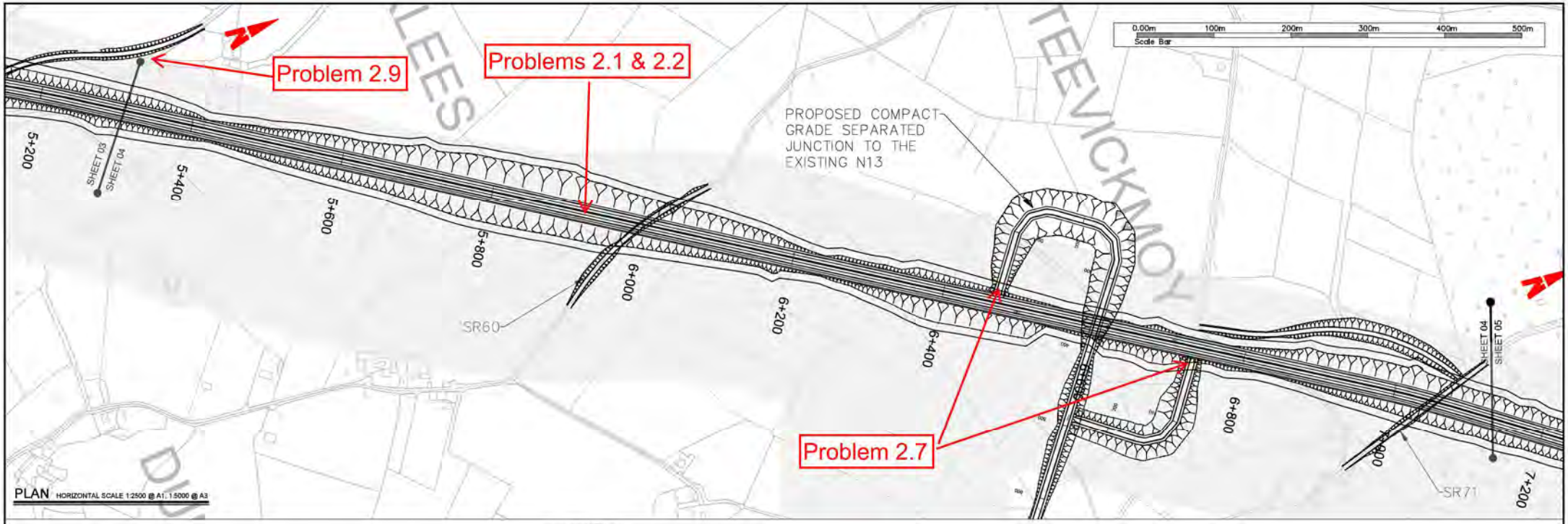

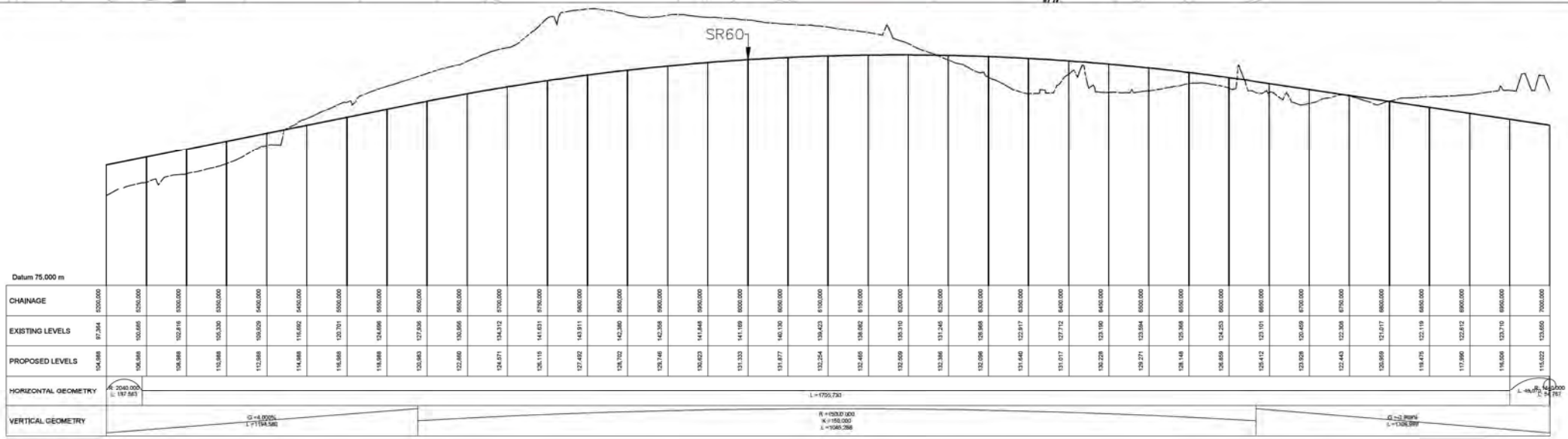

PROFILE VERTICAL SCALE 1:500 @ A1; 1:1000 @ A3
HORIZONTAL SCALE 1:2500 @ A1; 1:5000 @ A3

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P02	13.03.19	DC	FOR REVIEW & COMMENT	EC	TP
P01.01	30.08.18	MN	WORK IN PROGRESS	LH	TP

Project Title:
TEN-T Priority Route Improvement Project, Donegal

Drawing Title:
ROUTE 1G PLAN & PROFILE
FIGURE 1G SHEET 4 OF 5

Status: S0

Designed: DC	Date: AUG 18	Model File Identifier: N/A	Rev: P02
Drawn: MN	Scale @ A1: AS SHOWN		
Approved: TP	@ A3: AS SHOWN	File Identifier: TT_MGT0337-RPS-00-ZZ-DR-D-GE0028-04	
Checked: EC	Sheet: 04 of 05		

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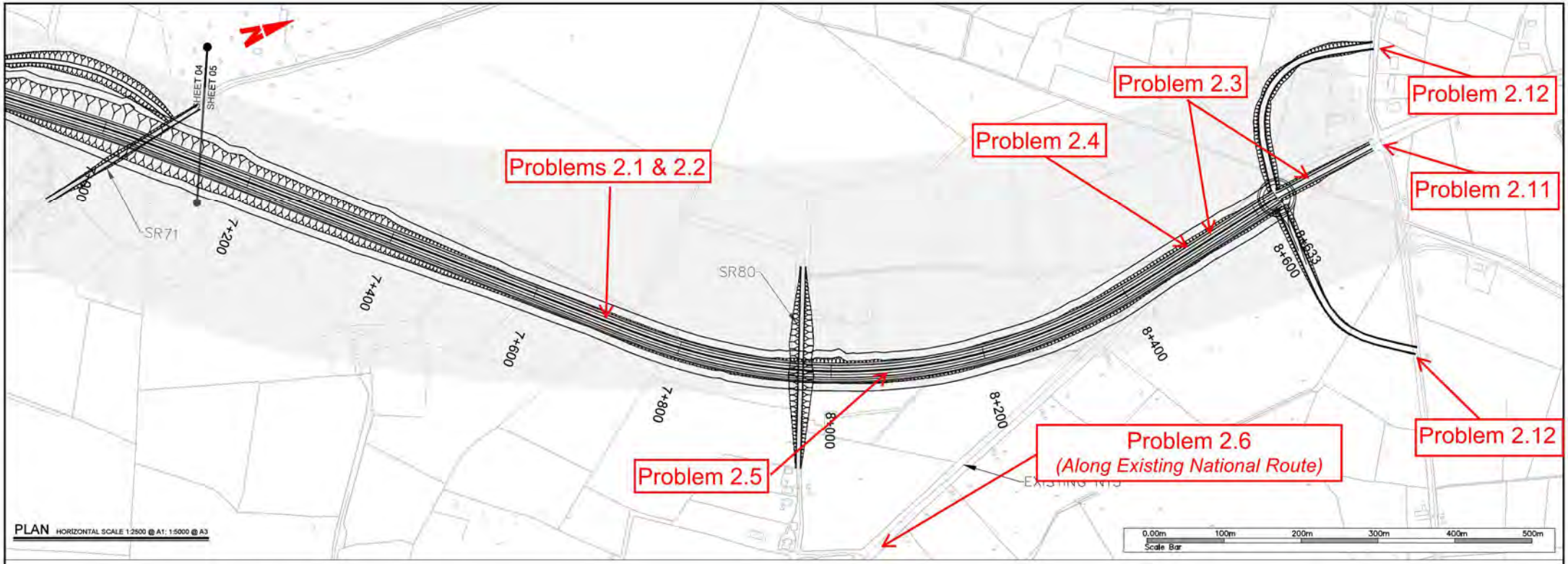
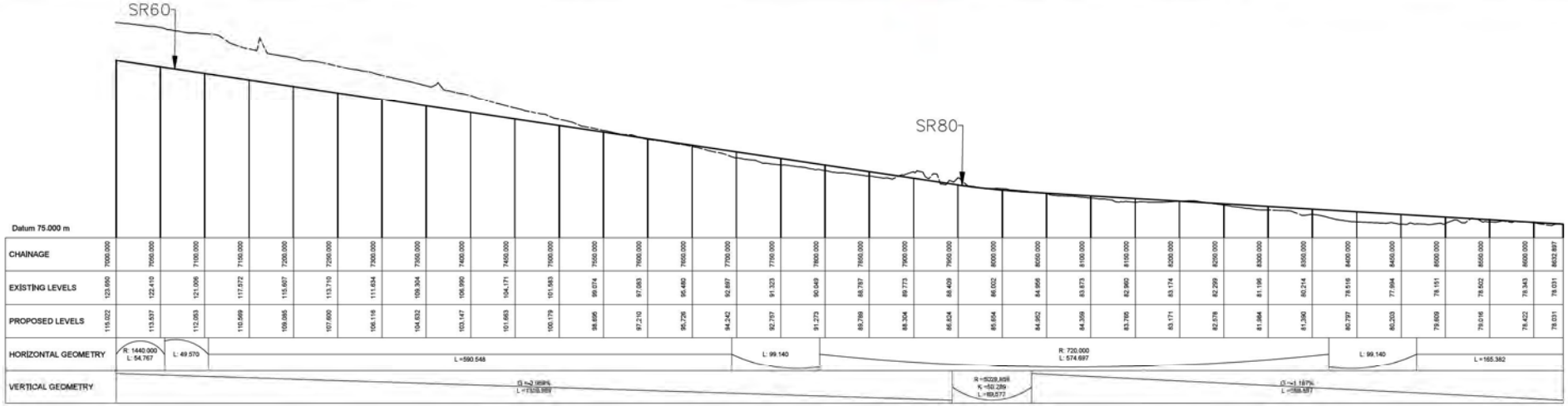


PLAN HORIZONTAL SCALE 1:2500 @ A1; 1:5000 @ A3



PROFILE VERTICAL SCALE 1:500 @ A1; 1:1000 @ A3
HORIZONTAL SCALE 1:2500 @ A1; 1:5000 @ A3

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P02	13.03.19	DC	FOR REVIEW & COMMENT	EC	TP
P01.01	30.08.18	MN	WORK IN PROGRESS	LH	TP

Project Title: TEN-T Priority Route Improvement Project, Donegal

Drawing Title: ROUTE 1G PLAN & PROFILE
FIGURE 1G SHEET 5 OF 5

Status: S0

Designed: DC	Date: AUG 18	Model File Identifier: N/A	Rev: P02
Drawn: MN	Scale @ A1: AS SHOWN		
Approved: TP	@ A3: AS SHOWN	File Identifier: TT_MGT0337-RPS-00-ZZ-DR-D-GE0028-05	
Checked: EC	Sheet: 05 of 05		

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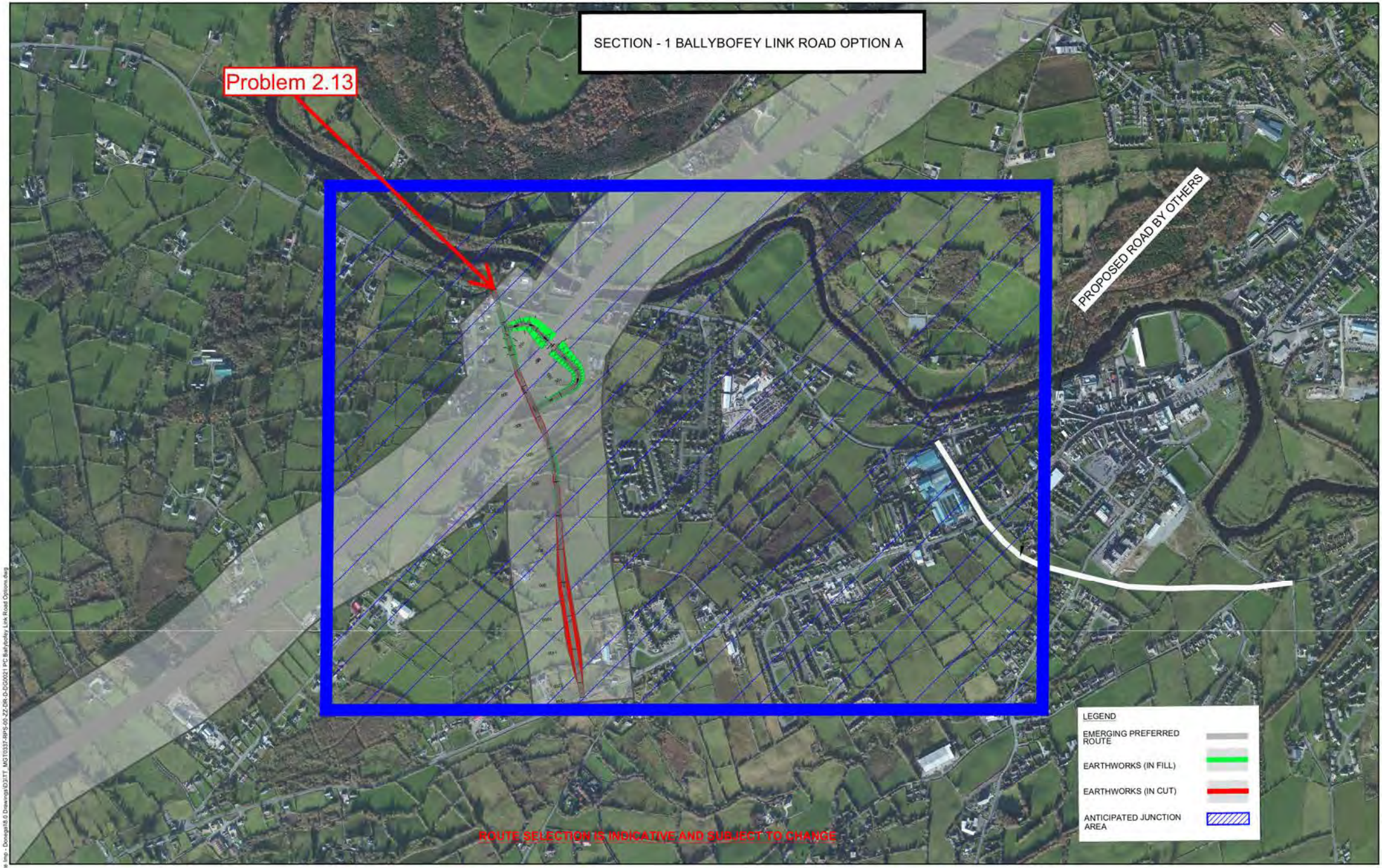

RJMGT0337 - Ten-T Priority Route Imp - Donegal\8.0 Drawings\DG\TT_MGT0337-RPS-00-ZZ-DR-D-DG0021 PC Ballybofey Link Road Options.dwg

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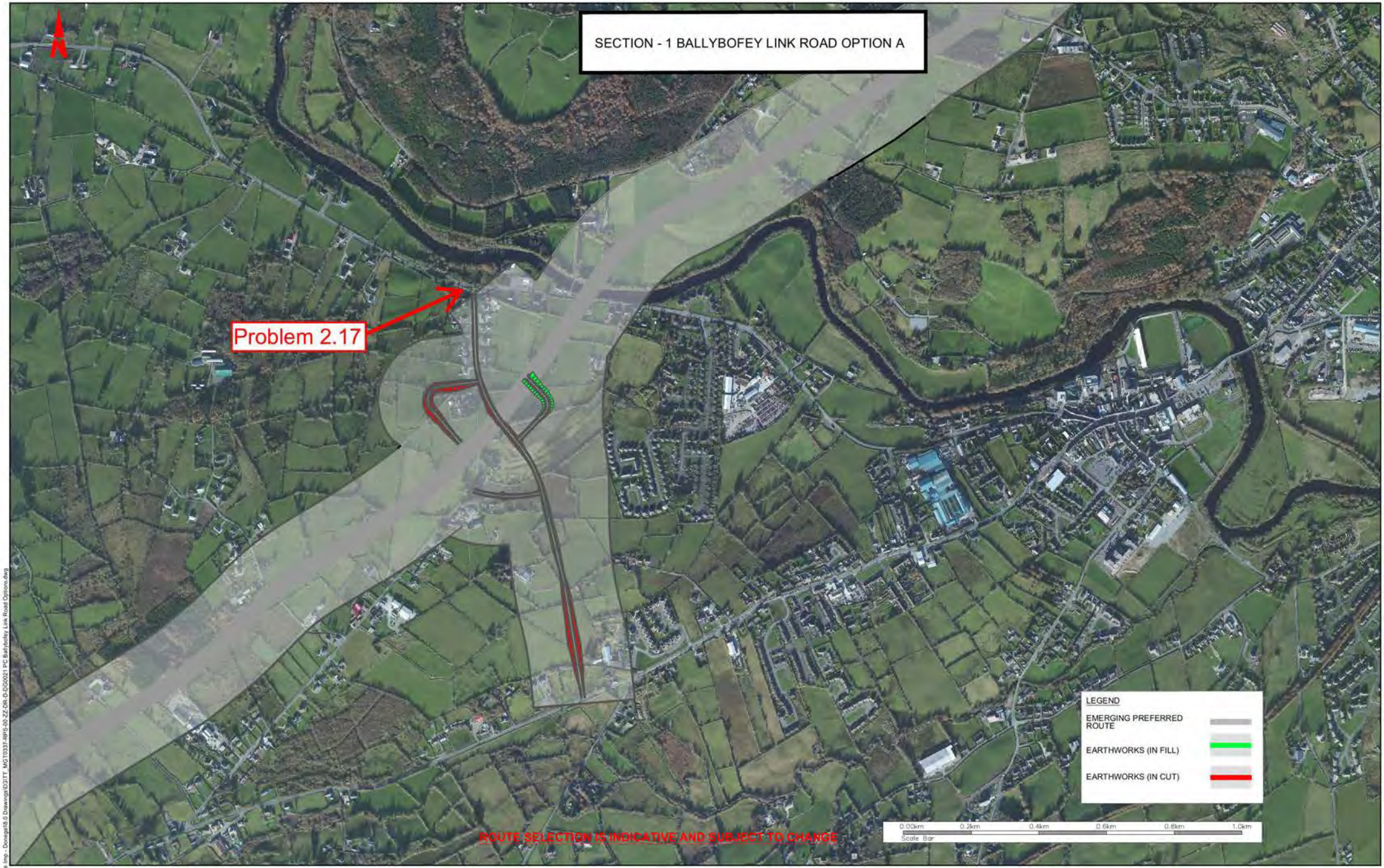
P05	13/03/19	SS	FOR REVIEW & COMMENT	TP	TP
P04	12/03/19	SS	FOR REVIEW & COMMENT	TP	TP
P03	06/03/19	SS	FOR REVIEW & COMMENT	TP	TP
P02	26/02/19	DC	FOR REVIEW & COMMENT	EC	TP
P01	15/02/19	DC	FOR REVIEW & COMMENT	EC	TP

Project Title: TEN-T Priority Route Improvement Project, Donegal
Drawing Title: SECTION 1 BALLYBOFEY LINK ROAD OPTION A
Status: S3
Designed: D. Curley | Date: Feb.2019 | Model File Identifier:
Drawn: S.Sinha | Scale @ A1: 1:20 000
Approved: T. Patterson | @ A3: 1:40 000 | Rev: P05
Checked: E. Cox | Sheet: 01 of 04 | File Identifier: TT_MGT0337-RPS-00-ZZ-DR-D-DG0022-01



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P07	04/09/19	SS	FOR REVIEW & COMMENT	EC	TP
P06	24/05/19	SS	FOR REVIEW & COMMENT	EC	TP
P05	13/03/19	SS	FOR REVIEW & COMMENT	TP	TP
P04	12/03/19	SS	FOR REVIEW & COMMENT	TP	TP
P03	06/03/19	SS	FOR REVIEW & COMMENT	TP	TP
P02	26/02/19	DC	FOR REVIEW & COMMENT	EC	TP
P01	15/02/19	DC	FOR REVIEW & COMMENT	EC	TP

Project Title: TEN-T Priority Route Improvement Project, Donegal
Drawing Title: SECTION 1 BALLYBOFEY LINK ROAD OPTION A
Status: S3
Designed: D. Curley | Date: Feb.2019 | Model File Identifier:
Drawn: S.Sinha | Scale @ A1: 1:20 000
Approved: T. Patterson | @ A3: 1:40 000 | Rev: P07
Checked: E. Cox | Sheet: 01 of 04 | File Identifier: TT_MGT0337-RPS-00-ZZ-DR-D-DG0021-01

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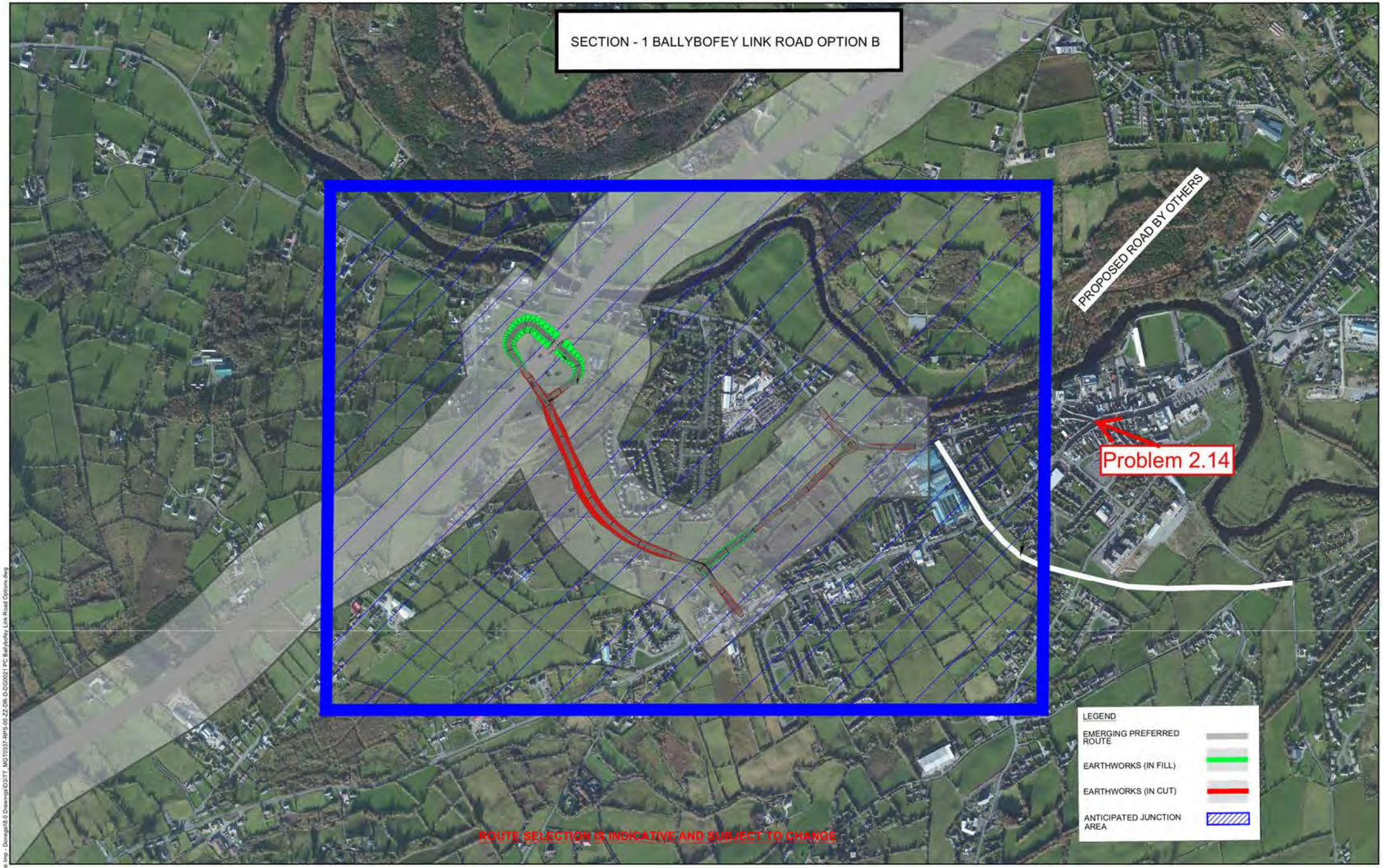

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P05	13/03/19	SS	FOR REVIEW & COMMENT	TP	TP
P04	12/03/19	SS	FOR REVIEW & COMMENT	TP	TP
P03	06/03/19	SS	FOR REVIEW & COMMENT	TP	TP
P02	26/02/19	DC	FOR REVIEW & COMMENT	EC	TP
P01	15/02/19	DC	FOR REVIEW & COMMENT	EC	TP

Project Title: TEN-T Priority Route Improvement Project, Donegal

Drawing Title: SECTION 1 BALLYBOFEY LINK ROAD OPTION B

Status: S3

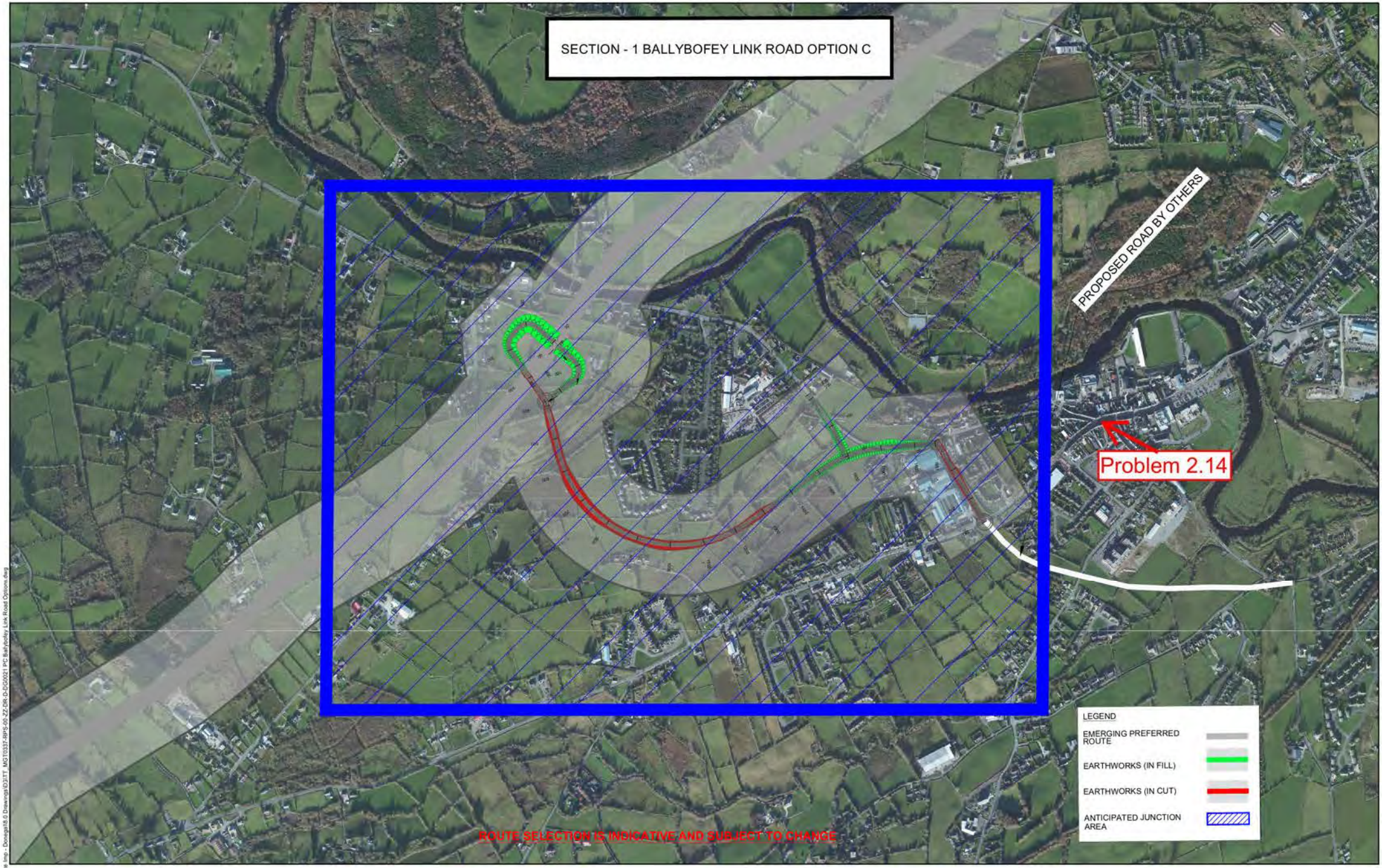
Designed: D. Curley | Date: Feb.2019 | Model File Identifier:

Drawn: S.Sinha | Scale @ A1: 1:20 000

Approved: T. Patterson | @ A3: 1:40 000 | File Identifier: TT_MGT0337-RPS-00-ZZ-DR-D-DG0022-02

Checked: E. Cox | Sheet: 02 of 04

Rev: P05



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P05	13/03/19	SS	FOR REVIEW & COMMENT	TP	TP
P04	12/03/19	SS	FOR REVIEW & COMMENT	TP	TP
P03	06/03/19	SS	FOR REVIEW & COMMENT	TP	TP
P02	26/02/19	DC	FOR REVIEW & COMMENT	EC	TP
P01	15/02/19	DC	FOR REVIEW & COMMENT	EC	TP

Project Title: TEN-T Priority Route Improvement Project, Donegal

Drawing Title: SECTION 1 BALLYBOFEY LINK ROAD OPTION C

Status: S3

Designed: D. Curley	Date: Feb.2019	Model File Identifier:	Rev:
Drawn: S.Sinha	Scale @ A1: 1:20 000		
Approved: T. Patterson	@ A3: 1:40 000	File Identifier:	P05
Checked: E. Cox	Sheet: 03 of 04	TT_MGT0337-RPS-00-ZZ-DR-D-DG0022-03	

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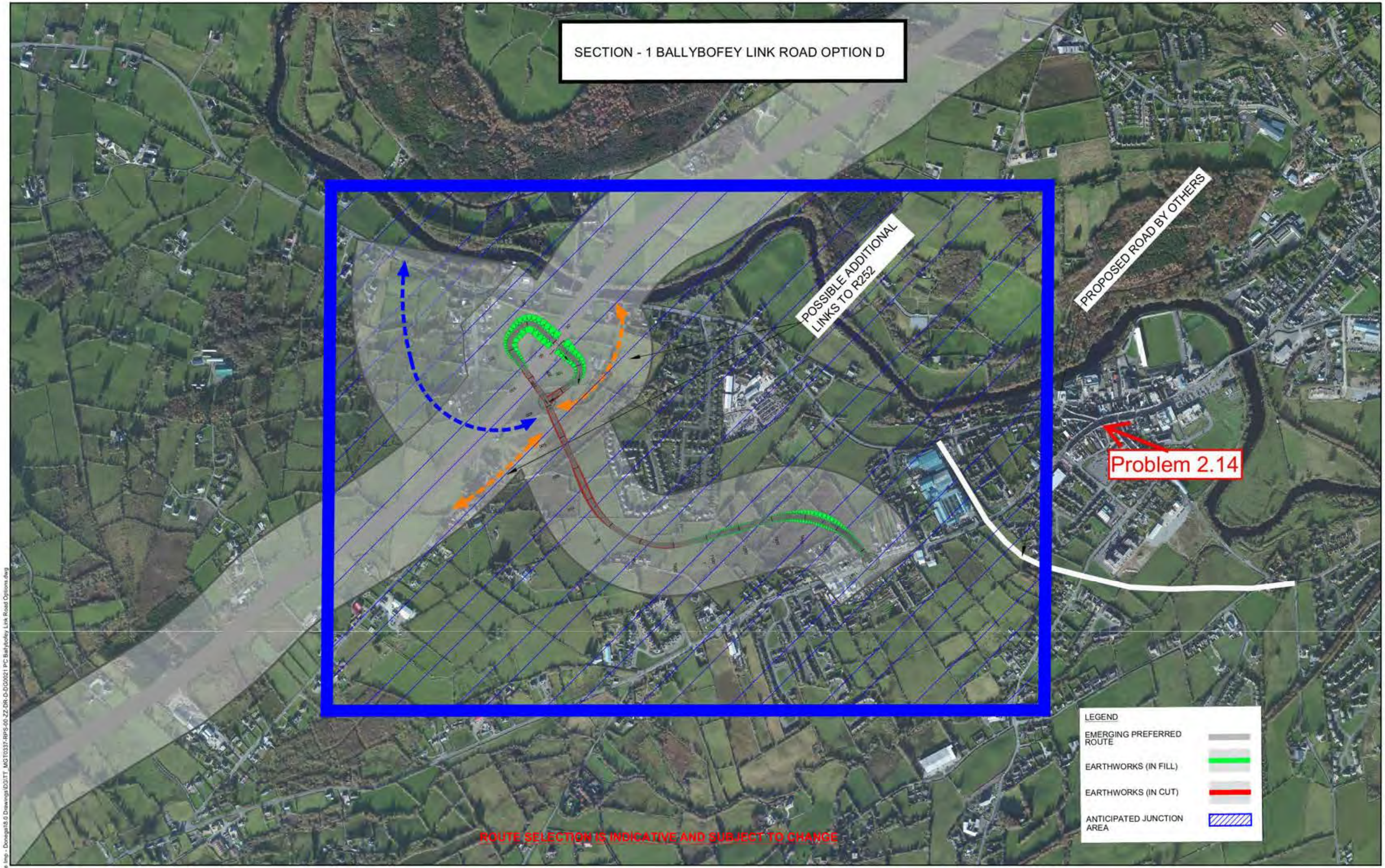

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P05	13/03/19	SS	FOR REVIEW & COMMENT	TP	TP
P04	12/03/19	SS	FOR REVIEW & COMMENT	TP	TP
P03	06/03/19	SS	FOR REVIEW & COMMENT	TP	TP
P02	26/02/19	DC	FOR REVIEW & COMMENT	EC	TP
P01	15/02/19	DC	FOR REVIEW & COMMENT	EC	TP

Project Title: TEN-T Priority Route Improvement Project, Donegal

Drawing Title: SECTION 1 BALLYBOFEY LINK ROAD OPTION D

Status: S3

Designed: D. Curley	Date: Feb.2019	Model File Identifier:	Rev:
Drawn: S.Sinha	Scale @ A1: 1:20 000		
Approved: T. Patterson	@ A3: 1:40 000	File Identifier:	P05
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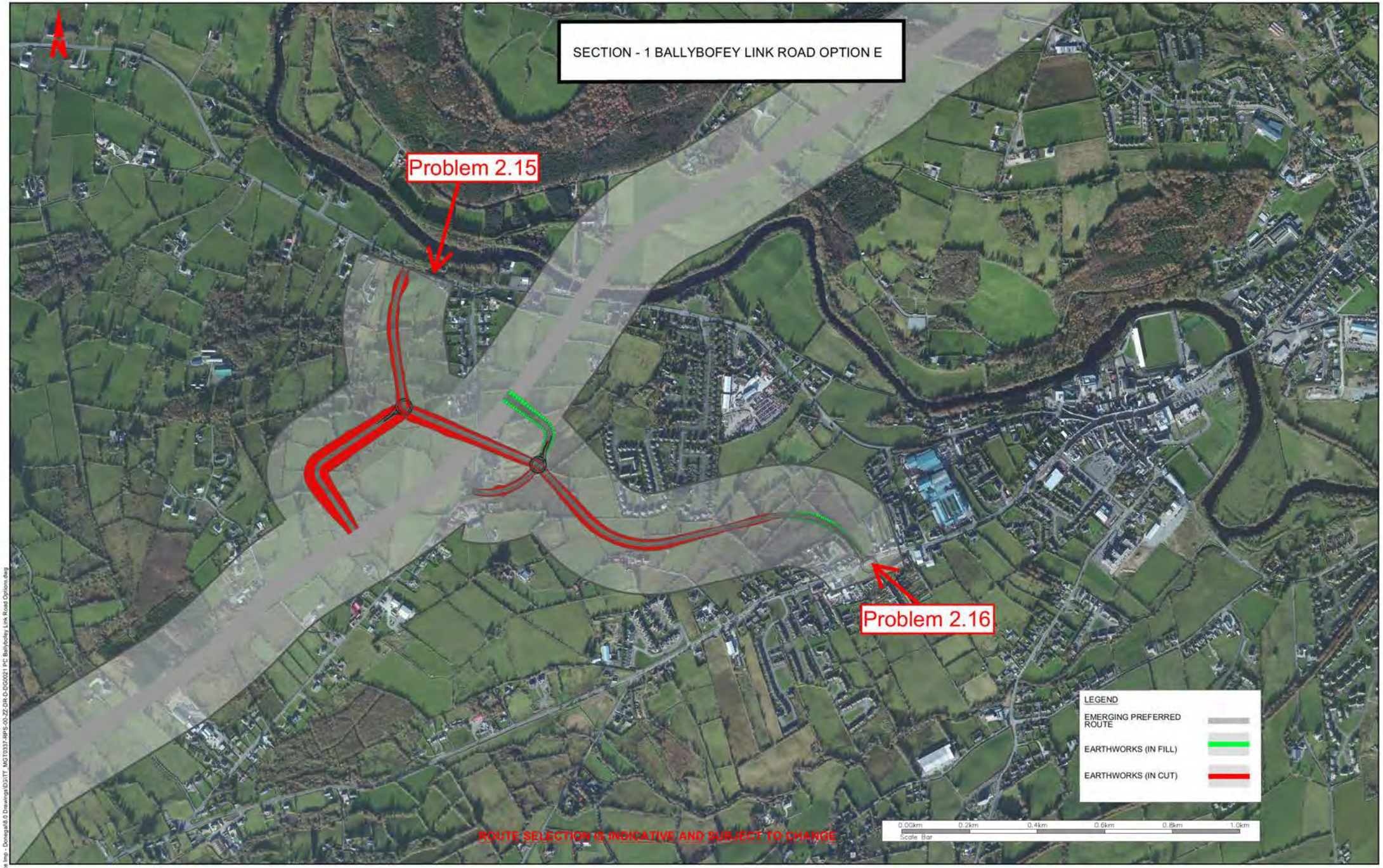

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P02	22/08/19	SS	FOR REVIEW & COMMENT	EC	TP
P01	12/08/19	SS	FOR REVIEW & COMMENT	EC	TP

Project Title: TEN-T Priority Route Improvement Project, Donegal
Drawing Title: SECTION 1 BALLYBOFEY LINK ROAD OPTION E
Status: S3
Designed: D. Curley | Date: Feb.2019 | Model File Identifier:
Drawn: S.Sinha | Scale @ A1: 1:20 000
Approved: T. Patterson | @ A3: 1:40 000 | Rev: P02
Checked: E. Cox | Sheet: 05 of 05 | File Identifier: TT_MGT0337-RPS-00-ZZ-DR-D-DG0021-05

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