

N24 CARRICK ROAD IMPROVEMENT SCHEME

PROJECT APPRAISAL PLAN (PAP)

AUGUST 2018

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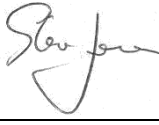


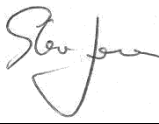
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1 INTRODUCTION

This Project Appraisal Plan (PAP) has been prepared in accordance with the TII Project Appraisal Guidelines (PAG) Unit 2.1 and Unit 12. The PAP functions as a scoping document for the appraisal, and the traffic modelling process, thereby allowing an understanding of the methodologies before any significant data collection, modelling or appraisal decisions take place. This PAP has been developed having regard to the confined and limited geographic area of the scheme and the problems and objectives identified therein.

The N24 is a National Primary Route located in County Waterford, County Kilkenny, County Tipperary and County Limerick, with an overall total length of approximately 116km. The cities and towns located on or adjacent to the N24 are Waterford (City), Carrick-on-Suir, Clonmel, Cahir, Tipperary and Limerick (City). There are also numerous villages located along the N24 route and it provides a vital link in the region to both the M9 and M8 Motorways in the counties of Waterford and Tipperary.

The section of N24 that is being considered within this PAP is rural in nature and located immediately North West of the village of Mooncoin in County Kilkenny. See Figure 1.1 below.

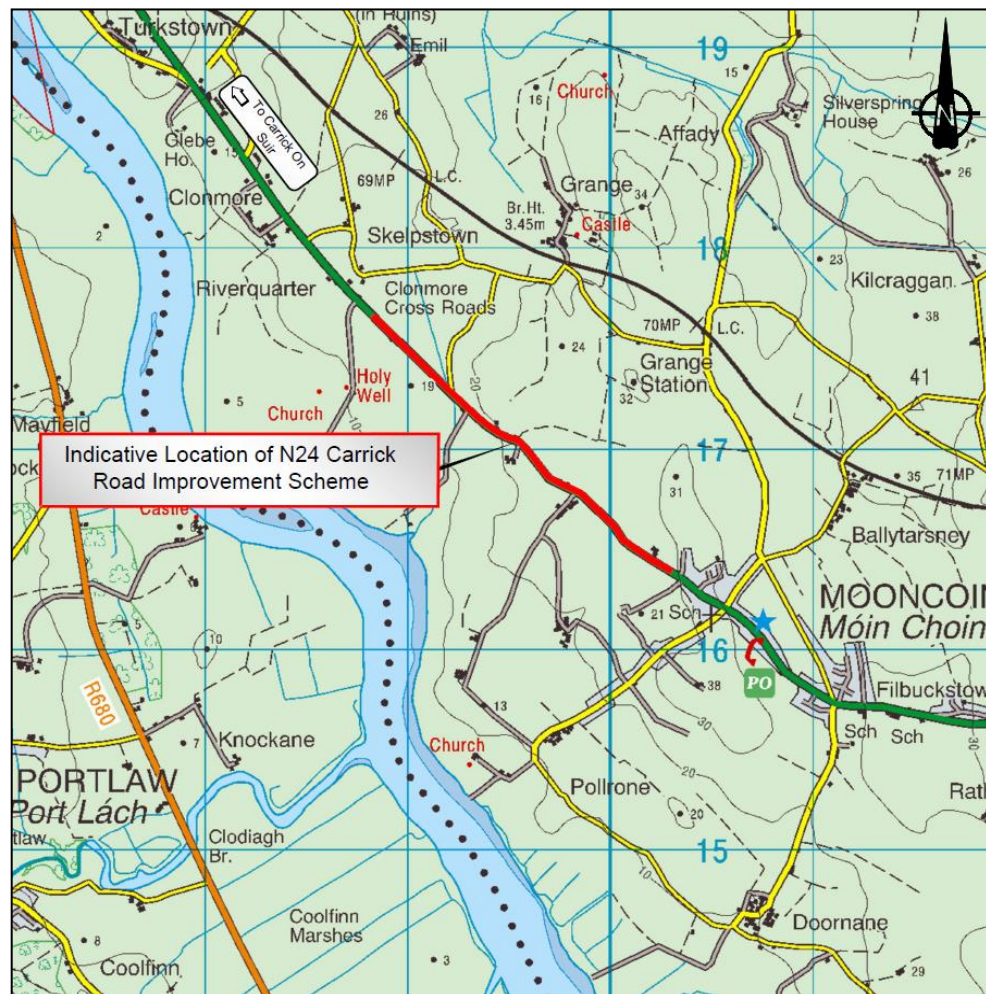


Figure 1.1: Project Extents

1.1 Project Appraisal

The Department of Transport, Tourism and Sport publication which is referred to as the Common Appraisal Framework for Transport Projects and Programmes 2016 (DTTaS CAF) provides specific guidelines for the appraisal of transport projects and programmes. The CAF provides guidance on how the rules and procedures of the Public Spending Code apply to projects in the transport sector. The document gives advice on defining projects for appraisal and on the generation of project options, describing an objectives-led framework that employs both multi-criteria and cost-benefit approaches.

The TII Project Appraisal Guidelines (TII PAG) translate the requirements of the CAF in relation to national road infrastructure projects and programmes.

The first step in the appraisal process as set out in the TII PAG is to prepare a Project Appraisal Plan (PAP). In line with the CAF, DTTaS should be consulted on appraisal assumptions and approach (see DTTaS CAF section 1.5.2), and this PAP provides the basis for this consultation. The PAP includes but is not limited to the following areas:

- Problem Definition i.e. Scheme Need;
- Consideration of Alternatives and Options;
- Methodology;
- Sensitivity Analysis; and
- Appraisal Scenarios

1.2 TII Classification of Project

In accordance with TII PAG Unit 2.0 (Project Appraisal Deliverables) National Road Capital Expenditure Projects* are classified into three main categories, each requiring a different and proportionate level of appraisal as follows:

- Major Projects – cost >€20m;
- Minor Projects – cost between €5m and €20m; and
- Minor Projects – cost between €0.5m and €5m.

(*NOTE: For categorisation of projects capital expenditure costs are inclusive of VAT.)

It is anticipated that any proposed minor scheme at this location will be between 1.9km and 2.3km in length and will involve online and / or offline improvements. Current estimates for the project indicate that the cost is likely to be in excess of €5m. Consequently the project has been classified as a Minor Project (€5m to €20m) in accordance with Unit 12.0 of the PAG.

1.3 Background, Project History & Context

In 2002, Kilkenny County Council completed a 9.3 kilometre improvement of the N24 between The Three Bridges (South Tipperary / Kilkenny County Boundary) and Clonmore Cross, immediately west of the N24 Carrick Road Improvement Scheme extents. This wide single carriageway improvement bypassed the villages of Piltown and Fiddown. In 2006, a two plus one carriageway retrofit (Type 3 Dual Carriageway) was carried out along the full extent of the by-pass, as a pilot project trialling this type of cross-section. The N24 Carrick Road Improvement Scheme will interface with the by-pass and two plus one carriageway.

The N24 Carrick Road Improvement Scheme is situated adjacent to the N24 Mooncoin Bypass Major Scheme. The identified route options for the Major Scheme as taken from the Final September 2003 Route Selection Report and the Published Preferred Route are provided in Appendix 1.

Within the past 10 years Kilkenny County Council has implemented 80kph speed limit zones and low cost safety measures on the N24 within the N24 Carrick Road Improvement Scheme extents (circa 2008 & 2012 respectively). See Figure A3.2 and A3.3 in Appendix 3. The author has been advised by Kilkenny County Council that these controls and measures came about primarily due to the recorded collision history at the location.

The National Development Plan published in February 2018 has identified the “N24 Waterford to Cahir” project as a section of the national road network that *“will be progressed through pre-appraisal and early planning during 2018 to prioritise projects which are proceeding to construction in the National Development Plan.”* Refer to section 3.2 of this PAP for further details regarding policy context.

2 STUDY AREA

A Study Area for the project has been defined and is shown on Figure 2.1 on the next page. The Study Area commences on the N24 from a location just west of Mooncoin village and terminates towards the end of the N24 Pilltown Fidown Bypass two plus one road.

In terms of the extent of the study area the author has reviewed the existing Constraints and Route Selection Report for the N24 Mooncoin Bypass Major Scheme. In this regard the identified constraints and routing potential for this scheme have been considered in terms of defining an appropriate and realistic Study Area for the development of sustainable options. See also Appendix 1.

From Ch650-Ch2000 the southwestern side of the Study Area is constrained by development and an existing area of land currently cultivated as Orchard. The nearby adjacent River Suir is also a known Special Area of Conservation (SAC). See Figure A2.1 in Appendix 2 for known constraints within and adjacent to the Study Area.

Two potential drainage outfall areas have been identified for further consideration within the Study Area. One is an open watercourse which crosses the existing N24 at circa Ch1600 and discharges directly into the River Suir. See also Figure A2.1 in Appendix 2. The second location is an existing Kilkenny County Council 450mm diam.surface water pipe at circa Ch400. The pipe is an existing road drain and runs in a southerly direction from a manhole just inside the roadside boundary.

The extent of the study area is considered at this stage to be sufficient to allow a robust appraisal to be carried out in the context of a Minor Scheme. It also encompasses the previously published route options and preferred route for the N24 Mooncoin Bypass Major Scheme at its western extents.

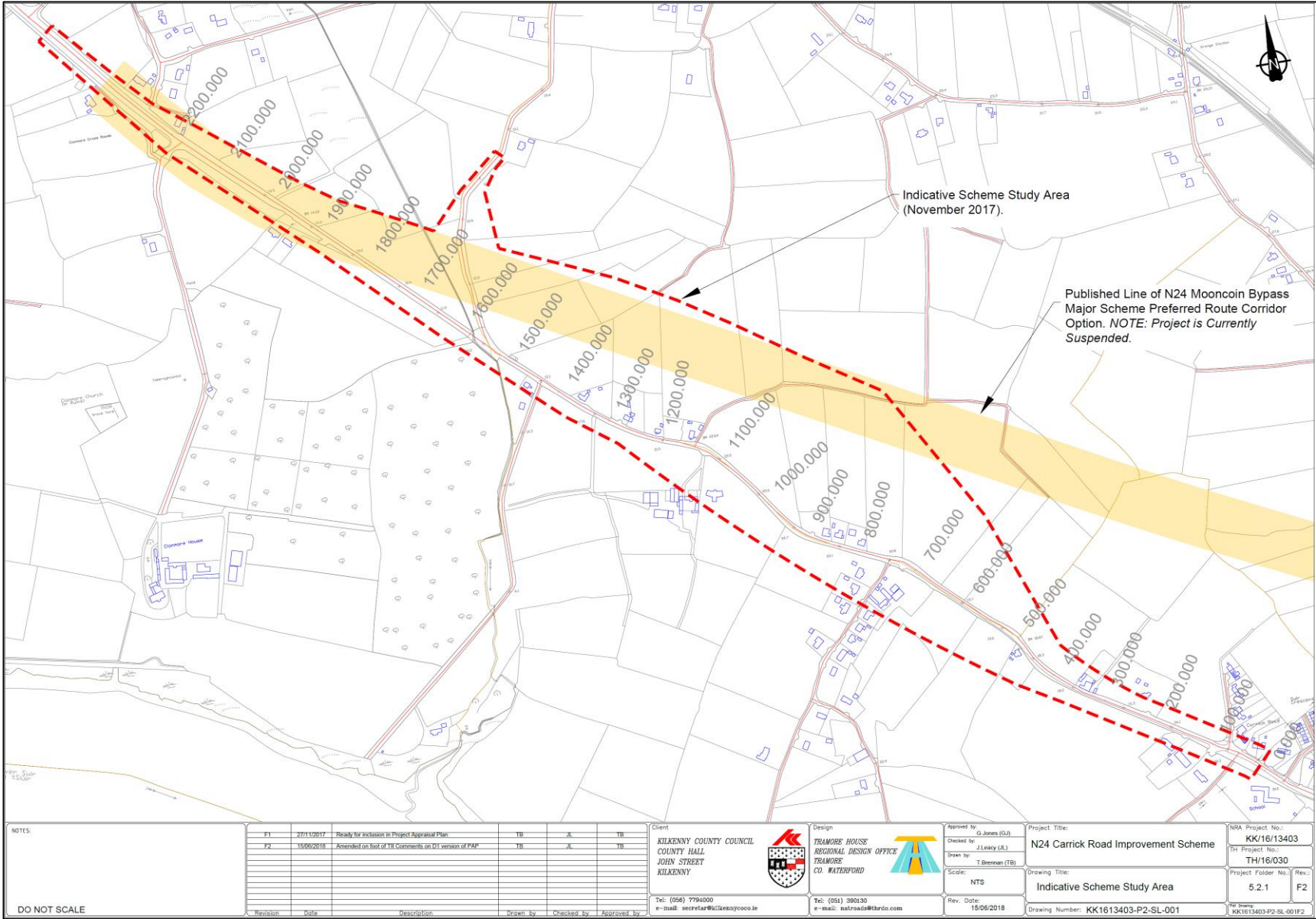


Figure 2.1: Proposed N24 Carrick Road Improvement Scheme Study Area

3 PROBLEM DEFINITION

3.1 Overview

This section of the Project Appraisal Plan outlines the deficiencies associated with the existing network within the project extents for the N24 Carrick Road Improvement Scheme. These deficiencies combined with National, Regional and local policies as discussed in section 3.2 of this PAP constitute the 'Need for the Scheme'.

The following are assessed in terms of network deficiencies:

- Journey Times & Speeds
- Existing Road Character
- Traffic Volumes
- Road Safety

3.1.1 Journey Times & Speeds

Within the project extents journey time data was collected on the N24 for both the eastbound and westbound directions using the Google maps distance matrix API. Figure 3.1 provides a summary of the average journey times in seconds, whilst Figure 3.2 provides a summary of the resultant average speeds on the N24. The am and pm peaks referred to in this section relate to traffic flow from 8 to 9am and 5 to 6pm.

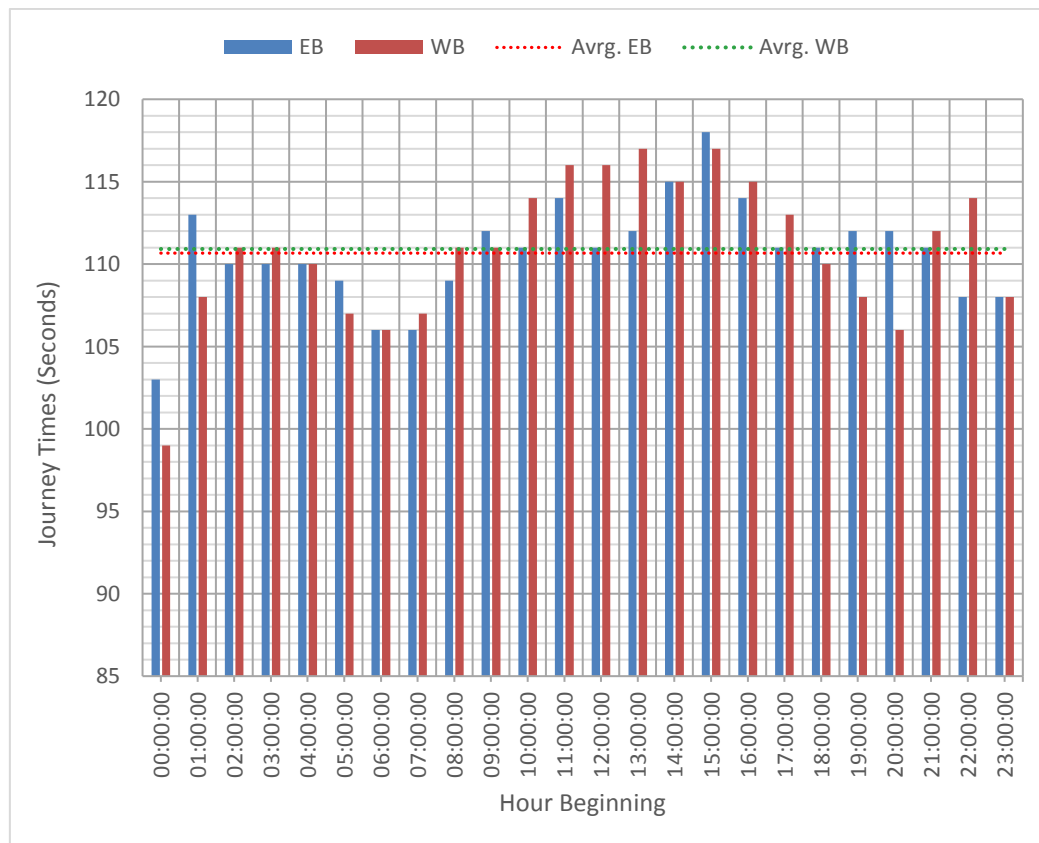


Figure 3.1: Journey Time N24 Carrick Road Project Extents – Eastbound & Westbound

For the eastbound direction, the average journey time is 109 seconds (1 minute 49 seconds) during the AM peak and 111 seconds (1 minute 51 seconds) during the PM Peak, which equates to an average speed in the order of 69kph and 68kph respectively. In the westbound direction the average journey time is 111 seconds (1 minute 51 seconds) during the AM peak and 113 seconds (1 minutes 53 seconds) during the PM Peak, which equates to an average speed in the order of 68kph and 67kph respectively.

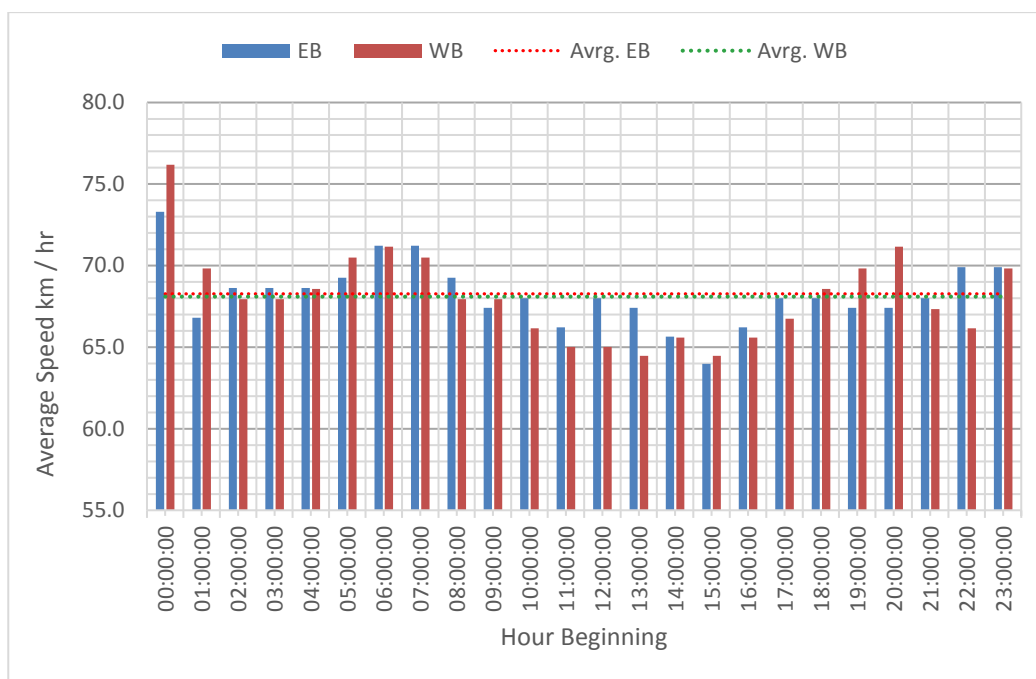


Figure 3.2: Speeds N24 Carrick Road Project Extents – Eastbound & Westbound

Overall the recorded daily speed range in the eastbound direction is in the order of 64kph to 73.3kph and 64.5kph to 76.2kph in the westbound direction.

3.1.2 Existing Road Character

The existing section of the N24 which is under consideration within this PAP is a narrow rural 80kph single carriageway road with average driving lane widths in the order of 3.2m and hard-strips typically ≤ 0.5 m. The existing verge widths vary but are again predominantly narrow and sub-standard and they allow little or no scope for widening within the existing roadbed and for the provision of forgiving roadsides. The narrow nature of the cross-section effectively means that Vulnerable Road Users are typically in close proximity to vehicular traffic, with cyclists using the vehicular driving lanes. However from Ch0 to Ch750 there is an existing footpath on the left hand side from Mooncoin village adjacent to the westbound carriageway.

There is considerable existing road frontage development including roadside boundary walls with approximately 43 no. private access points and 3 no. local road junctions. See Figure A3.1 in Appendix 3 for a drawing of the existing private access locations and junctions.

An indicative drawing of the existing N24 road alignment has been provided in Figure A3.2 of Appendix 3. As can be seen the horizontal alignment from Ch300 to Ch1500 contains sub-standard radii. There are also hidden dips in the vertical alignment from Ch1500 to Ch2200. These deficiencies coupled with the narrow cross-section and extent of development means that the forward visibility on the mainline is extremely poor with no safe overtaking opportunities. Visibility is also sub-standard from a considerable number of the existing private access points, in particular those located within the section from Ch300 to Ch1500.

3.1.3 Traffic Volumes

Traffic data on the N24 was collected from the existing TII Traffic Monitoring Unit adjacent to Pilltown village i.e. TMU N24 100.0 E, Site ID 000000001243.

A summary of the Average Annual Daily Traffic (AADT) and percentage Heavy Goods Vehicles (HGV) is provided on Table 3.1. This table indicates that traffic volumes have increased by 6% between 2014 and 2017.

	2017	2016	2015	2014
AADT	7177	7042	6726	6771
% HGV	7.8%	7.5%	7.6%	7.3%
Annual Coverage	99.7%	99.7%	99.70%	99.7%

Table 3.1: AADT (veh / day) on the N24 at the TII TMU (See Figure 3.1 for the location)

Further available N24 traffic data, including projected AADT is provided on Figure 3.1 on the next page. Traffic Growth as shown is based on the link-based demand projections for the South-East region contained within Unit 5.3 of the TII Project Appraisal Guidelines (PAG).

The TII Road Link Design standard DN-GEO-03031* indicates a capacity at Level of Service D of 5,000 AADT for Type 3 Single Carriageway road and 8,600 AADT for a Type 2 Single Carriageway road. Based on a review of the existing N24 cross-section it is reasonable to assume that the actual Level of Service D for the existing N24 is between this AADT range i.e. in the order of 6,800 AADT. Based on Table 3.1 and Figure 3.1 it is noted that the existing road has already exceeded 6,800 AADT. Further growth is also anticipated into the future, including growth beyond the Level of Service D of 8,600 AADT for a Type 2 Single Carriageway road.

(*NOTE: The TII Road Link Design standard DN-GEO-03031 states that "Capacity figures are indicative for general guidance. The appropriate cross section shall be selected with reference to the TII Project Appraisal Guidelines.")

The National Planning Framework (NPF) – Project Ireland 2040 published in February 2018 states the following strategy in relation to Ireland's cities "Supporting ambitious growth targets to enable the four cities of Cork, Limerick, Galway and Waterford to each grow by at least 50% to 2040 and to enhance their significant potential to become cities of scale." Given the proximity of the N24 Carrick Road Improvement Scheme to Waterford City, the above mentioned targeted growth if realised could result in a significant increase in traffic volumes on the N24, over the above mentioned PAG projections.

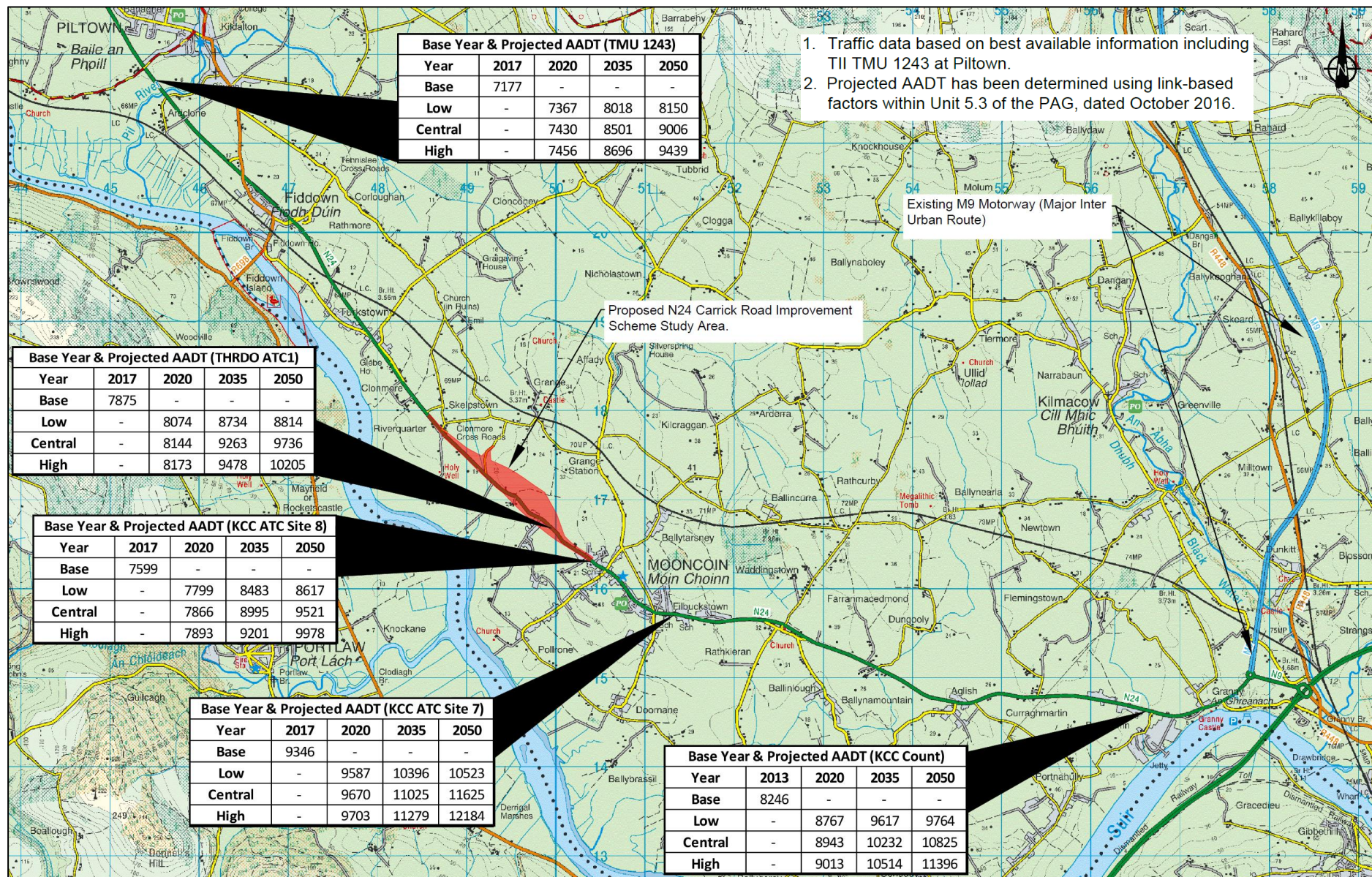


Figure 3.1: N24 Base Year & Projected AADT Summary

3.1.4 Road Safety

Available collision history on the N24 from 2004 to 2016 was reviewed during the preparation of this PAP. The relevant sources used are listed as follows:

- Kilkenny County Council Pre-2005 records;
- Collisions 2005 to 2014 inclusive from the Road Safety Authority (<http://www.rsa.ie/RSA/Road-Safety/Our-Research/Collision-Statistics/Ireland-Road-Collisions/>); and

Figure 3.2 provides a summary of collisions from 2004 to 2014 inclusive, within the minor project extents identified in Chapter 1 of this Project Appraisal Plan (PAP).

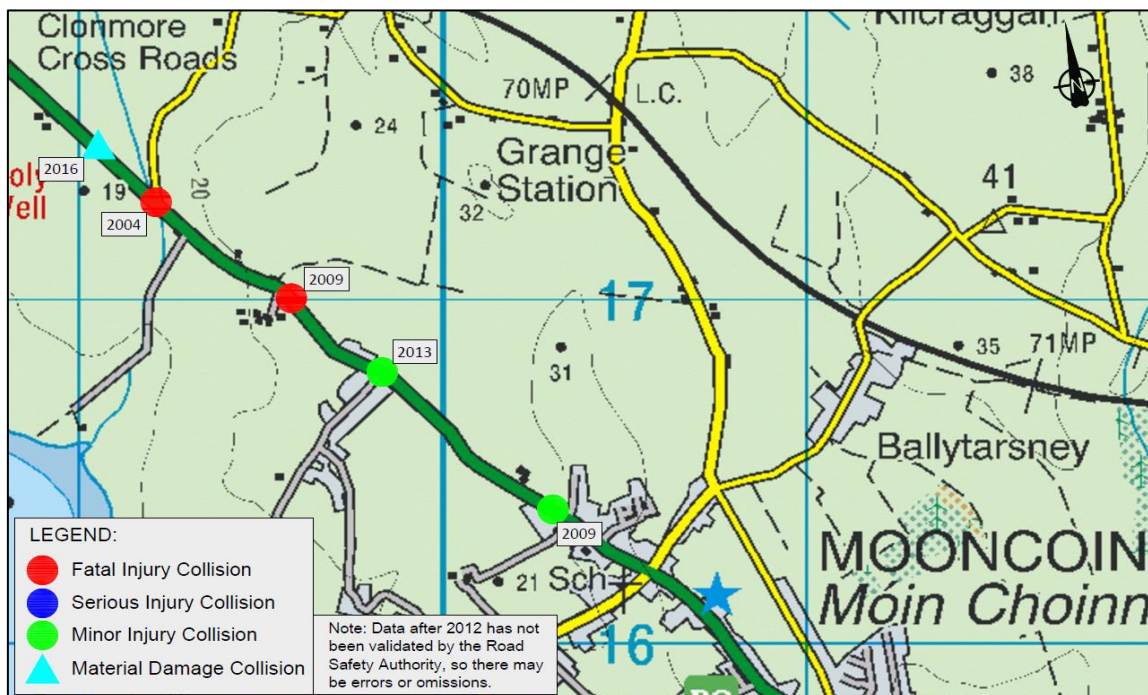


Figure 3.2: Collision History 2004 to 2014 inclusive

In addition Transport Infrastructure Ireland (TII) produce collision maps of the national road network that indicate the safety ranking of the network relative to the national average collisions for particular road types. Figure 3.3 on the next page illustrates the current available results for a 3 year period from 2014-2016 along the N24 and includes Material Damage Collisions. Information presented in relation to network safety ranking is based on data obtained from the following website:

<https://data.gov.ie/dataset/collision-rates-2014-to-2016>.

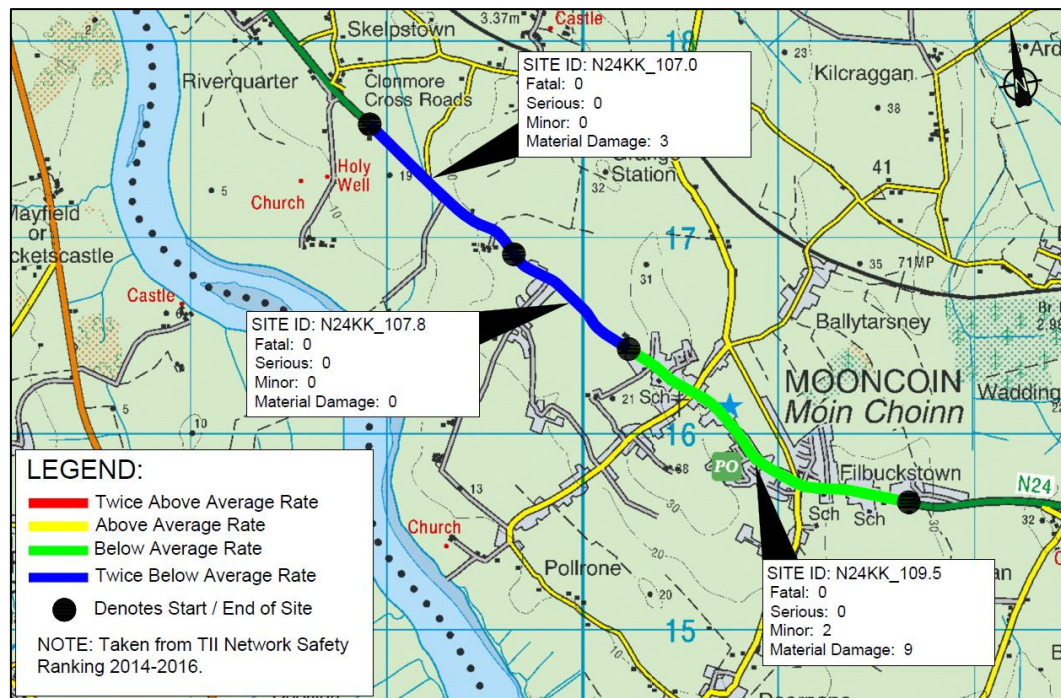


Figure 3.3: TII Network Safety Ranking 2014 to 2016 (Current Available Ranking)

Within the extents of N24 Carrick Road Improvement Scheme it is noted that Kilkenny County Council has an 80kph speed limit zone in force since around 2008. In addition Kilkenny County Council also implemented low cost safety measures in 2012. See Figure A3.2 and Figure A3.3 in Appendix 3.

Based on the review of collision history there were no specific road safety problems identified. The author also considers it reasonable to say that the speed limit and low cost measures implemented by Kilkenny County Council as outlined above has assisted in reducing the number of recorded collisions along the N24, albeit with reduced average journey times and speeds as indicated within section 3.1.1 of this PAP. Consequently the safety objective will be to maintain the existing collision rankings at below or twice below the national average rates, with an improvement in average mainline speeds within the project extents.

3.2 Policy Context

The Need for the N24 Carrick Road Improvement Scheme is consistent with or in line with the following National, Regional and Local policy documents.

National Policy Context:

- National Planning Framework – Project Ireland 2040;
- National Development Plan 2018-2027 – Project Ireland 2040;
- Strategic Framework for Investment in Land Transport;
- Smarter Travel: A Sustainable Transport Future 2009 - 2020; and
- Road Safety Authority Road Safety Strategy 2013 – 2020.

Regional Policy Context:

- Regional Planning Guidelines for the South-East Region 2010 – 2022.

Local Policy Context:

- Kilkenny County Development Plan 2014 – 2020.

3.2.1 National Development Framework – Project Ireland 2040

The National Planning Framework (NPF) – Project Ireland 2040 was published by the Government in February 2018. It sets out a new strategic planning and development context for Ireland and all of its regions up to 2040, setting a high-level framework for the co-ordination of a range of national, regional and local authority policies and activities, planning and investment, both public and private. The NPF is structured around a set of National Strategic Outcomes (NSOs) or goals. One of these NSOs which is directly related to the proposed road development is:

- Enhanced Regional Accessibility i.e. National Strategic Outcome 2

Under Enhanced Regional Accessibility the NPF states the following national strategic outcomes of the plan for *“Inter – Urban Roads*:

- *Maintaining the strategic capacity and safety of the national road network including planning for future capacity enhancements; and*
- *Improving average journey time targeting an average inter-urban speed of 90kph.”*

In relation to Ireland’s cities the following is the strategy as stated in the NPF:

- *“Supporting ambitious growth targets to enable the four cities of Cork, Limerick, Galway and Waterford to each grow by at least 50% to 2040 and to enhance their significant potential to become cities of scale.*
- *Enabling the four cities to be regional drivers and to lead in partnership with each other and as partners in regional/inter-regional networks as viable alternatives to Dublin.*
- *Focusing investment to improve the collective ‘offer’ within each of the four cities, i.e. infrastructure, quality of life and choice in terms of housing, employment and amenities.”*

Given the close proximity of the N24 Carrick Road Improvement project to Waterford City the above mentioned targeted growth if realised is likely to result in a significant increase in traffic volumes on the N24 by 2040.

The N24 Carrick Road Improvement project would support the goals and targets contained within the NPF in relation to enhanced accessibility and growth targets for Waterford City.

3.2.2 National Development Plan – Project Ireland 2040

The National Development Plan 2018 – 2027 was published with the National Planning Framework in February 2018. The National Development Plan (NDP) will drive Ireland's long term economic, environmental and social progress across all parts of the country over the next decade and will underpin the successful implementation of the new National Planning Framework (NPF).

The NDP provides €7.3 billion for investment in the national road network under National Strategic Outcome 2 – Enhanced Regional Accessibility as outlined in the previous section. In addition the NDP provides €14.5 billion for compact growth targets.

The NDP states that “A core priority under the NPF is the essential requirement to enhance and upgrade accessibility between urban centres of population and their regions, in parallel with the initiation of compact growth of urban centres. This has a crucial role to play in maximising the growth potential of the regional urban centres and the economy as a whole.”

The NDP has also specifically identified the “N24 Waterford to Cahir” project as a section of the national road network that *“will be progressed through pre-appraisal and early planning during 2018 to prioritise projects which are proceeding to construction in the National Development Plan.”*

3.2.3 Strategic Investment Framework for Land Transport (SIFLT)

The Strategic Investment Framework for Land Transport (SIFLT) 2015, which was published by the Department of Transport, Tourism and Sport (DTTaS) outlines the key principles against which national and regional, comprehensive and single mode based plans and programmes will be drawn up and assessed. The framework does not set out a list of projects to be prioritised however the following three priorities are noted in terms of investment:

- Priority 1 – Achieve steady state maintenance;
- Priority 2 – Address urban congestion; and
- Priority 3 – Maximise the value of the road network.

In terms of Priority 3, the report states that *“the value of the road network will be maximised through targeted investments that:*

- *Enhance the efficiency of our existing network, particularly through the increased use of ITS applications;*

- *Improve connections to key seaports and airports;*
- *Provide access for large-scale employment proposals; and*
- *Support identified national and regional spatial planning priorities”*

The proposed project will support the objectives of the SIFLT by improving the efficiency of part of the national road network.

3.2.4 Smarter Travel – A Sustainable Transport Future 2009 – 2020

Smarter Travel, A Sustainable Transport Future 2009 - 2020, presents a transport policy framework for Ireland covering the period up to 2020. The policy, launched by the Department of Transport in 2009, sets out a vision, goals and targets to be achieved, and outlines 49 actions that form the basis for achieving a more sustainable transport future. One of the key goals of the initiative is:

“Improve economic competitiveness through maximising the efficiency of the transport system and alleviating congestion and infrastructural bottlenecks.”

This key goal as defined within the policy document, in relation to maximising the efficiency of the transport system is consistent with the ambitions of the subject improvement scheme.

The policy recognises the need to focus population and employment in a way that will minimise the potential for excessive transport demand. This will be achieved through consolidation of future growth in residential, commercial and retail development within existing settlements. The N24 Carrick Road Improvement Scheme is located in a rural area some distance from Waterford City, with N24 access restricted to a strategic junction located away from the city. As such any proposed future N24 upgrades will support the future consolidated growth of Waterford City, but without unduly influencing the demand for travel, local development patterns or car use within urban centres.

Policies for improvements to public transport within Smarter Travel distinguish between Significant Urban Areas and Rural Areas. For public transport, the focus in urban areas is a transfer from car use to fast and frequent public transport services in order to reduce congestion and emissions in densely populated areas. For rural areas, public transport attracts less demand as a result of the dispersed population, and hence there is limited congestion or environmental benefit to be realised. Instead, rural services are focused more on filling a social need, providing for those who do not have access to private means of transport. The proposed scheme will maintain the existing rural public transport facilities, with the benefits of improvements to journey times and consistency of speeds for inter-urban bus users and operators.

3.2.5 RSA Road Safety Strategy 2013 – 2020

The Road Safety Authority (RSA) Road Safety Strategy 2013 – 2020, sets out targets to be achieved in terms of road safety in Ireland as well as policy to achieve these targets. The primary target of this strategy is:

“A reduction of road collision fatalities on Irish roads to 25 per million population or less by 2020 is required to close the gap between Ireland and the safest countries. This means reducing deaths from 162 in 2012 to 124 or fewer by 2020.

A provisional target for the reduction of serious injuries by 30% from 472 (2011) to 330 or fewer by 2020 or 61 per million population has also been set.”

The plan sets out strategies for engineering and infrastructure in terms of the benefits that they can have in terms of reducing collisions. The provision of an upgraded section of national roads proposed as part of this project would support and complement this RSA strategy.

3.2.6 South East Regional Planning Guidelines 2010-2022

The South East Regional Authority is one of the regional authorities established in Ireland and is responsible for implementing the National Spatial Strategy at regional level. The South-East Region covers Carlow, Kilkenny, South Tipperary, Waterford City, Waterford County and Wexford. The Authority operates with the assistance and cooperation of the local authorities and with input from a wide range of public and private sector organisations and individuals. In July 2010, it made the Regional Planning Guidelines for the South-East Region for the period 2010 to 2022, to replace those made in 2004.

These guidelines take account of the key issues affecting the development of the region, such as population and settlement; economic and employment trends; industrial and commercial development; transportation; water supply and waste water facilities; energy and communications; education, healthcare, retail and community facilities; environmental protection etc.

Under the heading “N24 PRIORITISATION STUDY” the South East Regional Planning Guidelines state *“The current N24 is of variable standard and is certainly not consistent with its status as a National Primary route. This results in a number of problems, principally arising from congestion and safety issues. The Study, published in 2008, sets out the case for upgrading the route on the grounds of safety, efficiency and strategic importance of the route for the economic performance of the region. It is an objective of the Regional Authority to prioritise upgrading of the N24.”*

Consequently the proposed N24 Carrick Road Improvement project is consistent with the objectives and visions for the N24 as set out in the South Eastern Regional Planning Guidelines.

3.2.7 Kilkenny County Development Plan 2014 – 2020

The Kilkenny County Development Plan 2014 – 2020 is the current development Plan for County Kilkenny. It is stated in section 11.7.6 of the Kilkenny County Council Development Plan 2014 – 2020 that the Council with the support of the NRA (now TII) is progressing / developing a number of schemes within County Kilkenny and specifically mentions the “N24 Mooncoin Bypass”. In terms of sustainable development for future needs it is anticipated subject to appraisal requirements in the context of scheme specific needs that the proposed N24 Carrick Road Improvement project will complement any future bypass scheme.

In terms of alternate modes of transport the plan also states that *“The Council will promote walking, cycling, public transport and other more sustainable forms of transport as an alternative to the private car, together with the development of the necessary infrastructure and promotion of the initiatives contained within Smarter Travel, A Sustainable Transport Future 2009 – 2020.”*

4 SCHEME OBJECTIVES

The framing of scheme specific objectives was undertaken in accordance with the guidance provided in the TII PAG and DTTaS CAF. These guidance documents include a recommendation that project objectives are established based on each of the following criteria:

- Economy;
- Safety;
- Environment;
- Accessibility & Social Inclusion;
- Integration; and
- Physical Activity (if applicable).

Based on characteristics of the existing road corridor, and responding to the aspirations of national and strategic policy documentation, a series of defined objectives were developed. The objectives which are presented in Table 4.1 are intended to allow a focused definition of options which can be examined both quantitatively and qualitatively against a series of required outcomes.

Criteria	Scheme Specific Objective
Economy	<ul style="list-style-type: none"> • To improve journey times and average mainline speeds; and • To improve capacity, drivability and efficiency of the N24 by providing a suitable and sustainable road type, plus road alignment to meet current and future needs.
Safety	<ul style="list-style-type: none"> • To maintain the existing collision rankings at below or twice below the national average rate, with improved average mainline speeds; • To improve mainline visibility and overtaking opportunities, thereby reducing the potential for driver frustration and unsafe manoeuvres; • To reduce the level of private access on the national road network and to provide a more forgiving roadside; and • To complement the Government's Road Safety Strategy.
Environment	<ul style="list-style-type: none"> • To maintain or reduce existing CO2 and particulate emissions through a reduction in fuel consumption in addition to other Government initiatives; • To develop designs and measures so as to manage or minimise any potential Environmental Impacts; and • To avoid any adverse affects on the integrity and qualifying interests of the Lower River Sure SAC (Site Code 002137).
Accessibility and Social Inclusion	<ul style="list-style-type: none"> • To improve road based public transport journey time and journey time reliability; and • To complement wider government policy related to improved accessibility from socially disadvantaged areas.
Integration	<ul style="list-style-type: none"> • To be compatible with adopted land use objectives; • To complement and be consistent with the objectives of National, Regional and Local Planning Policy; and • To complement any existing and / or proposed future major schemes for the N24 as indicated within the above mentioned planning policy.
Physical Activity	To improve facilities for vulnerable road users, including separation distances from vehicular traffic on the national road network.

Table 4.1: Scheme Specific Objectives

5 CONSIDERATION OF ALTERNATIVES & OPTIONS

5.1 Overview

This section provides a brief summary of the initial alternatives and options considered for the project. In accordance with the Unit 4.0 of the Project Appraisal Guidelines, Alternatives refer to a specific transport mode (road, rail, bus, air etc.) or demand management proposals (fiscal, control, ITS measures etc.), whilst options are typically road based.

In terms of the Preliminary Appraisal the options / alternatives identified for the project will be assessed such that a preferred option can be determined. Given the nature and localised extent of the project and the current objectives, it is proposed to carry out option appraisal by comparing the effective Multi Criteria Analysis / Project Appraisal Balance Sheets (PABS) for each option. The proposed PABS format for this project shall be a combination of Unit 14 and Unit 12 of the PAG, including the proposed template provided in Appendix 4. Refer also to section 6.5 of this PAP.

5.2 Public Transport - Rail

There is a parallel rail link / network alternative to the existing N24 road based route which serves Waterford, Carrick-On-Suir, Clonmel, Cahir, Limerick Junction and Limerick City. The nearest adjacent train stations are located in Waterford and Carrick-On-Suir.

Given the isolated rural nature and geographic extent of the minor scheme or improvement being considered (<3km), the development of rail alternatives will not address the project objectives, as identified in section 4. In this regard it should be noted that the objectives are predominantly relative to the existing road character and not specifically demand driven. However it is anticipated that any proposed improvements to address the objectives will also improve accessibility to the existing rail connection locations in Waterford and Carrick-On-Suir.

5.3 Public Transport - Bus

There are no existing defined formal Bus Stops located within the identified Scheme Study Area, with the location being rural in nature and limited in terms of its extent. There are a number of existing through bus services on the N24 between Waterford, Carrick-On-Suir and beyond. There are existing Bus Stops located at the Church on the N24 in Mooncoin village.

Given the limited geographic area of the project along the N24 (<3km), the development of bus alternatives will not satisfy or address the objectives of the scheme as identified in section 4. In this regard it should be noted that the objectives are predominantly relative to the existing road character and are not specifically demand driven. However it is anticipated that any proposed improvements to address the objectives will be of benefit to existing and future bus services using the route and travelling to connection points in Carrick-On-Suir, Mooncoin village, Waterford City and beyond.

5.4 Vulnerable Road Users (VRU) – Cyclists

An Automatic Traffic Counter (ATC) was installed on the N24 by Tramore House Regional Design Office at location THRDO ATC 1 in March 2017. Cycle trips recorded from the 13/03/2017 to 26/03/2017 inclusive are provided on the next page in Table 3.1. See also section 3.1.3 of this PAP for a map showing the location of the ATC.

Date	Day	THRDO ATC 1 N24 (13/03/17-26/03/17)		
		A>B East	B>A West	Total
13/03/2017	Mon	7	9	16
14/03/2017	Tue	7	8	15
15/03/2017	Wed	6	6	12
16/03/2017	Thu	3	12	15
17/03/2017	Fri	5	5	10
18/03/2017	Sat	8	8	16
19/03/2017	Sun	4	8	12
20/03/2017	Mon	5	4	9
21/03/2017	Tue	5	6	11
22/03/2017	Wed	1	5	6
23/03/2017	Thu	3	4	7
24/03/2017	Fri	5	9	14
25/03/2017	Sat	8	9	17
26/03/2017	Sun	13	7	20
Average >>		6	7	13

Table 3.1: Recorded Cycle Trips March 2017 at THRDO ATC 1

The results indicate that the level of cycle trips recorded during the count period is very low, with the average number of daily two-way trips at THRDO ATC1 being 13. This is consistent with traffic data gathered at adjacent locations on the N24 as shown in section 3.1.3, including the TII TMU on the N24 at Piltown (Site ID: 1243). The following is also noted:

- There are no specific local or regional planning policies or objectives currently in place for the provision of an online cycle route on the N24 at this location.
- The N24 between Mooncoin and Carrick-On-Suir has not been identified as being part of the proposed National Cycle Network, within the [National Cycle Network Scoping Study](#), dated August 2010.

There are existing hardshoulders / hardstrips available for cyclists on the N24 west of the Study Area for the N24 Carrick Road Improvement Scheme. However there is little or no hardshoulder available within the scheme extents.

Taking into account the objectives identified in section 4 of this PAP, the improvement of facilities for cyclists by way of the provision of an increased hardshoulder width would improve road safety and accessibility for Vulnerable Road Users, in addition to providing increased separation from vehicular traffic on the national road.

5.5 Vulnerable Road Users (VRU) – Pedestrians

Taking into account the initial objectives identified in section 4 of this report, the improvement of facilities for pedestrian by way of the provision of an increased hardshoulder width within the scheme extents, as identified within the previous section, would improve road safety and accessibility for Vulnerable Road Users. All existing pedestrian facilities adjacent to Mooncoin village will be maintained and / or improved.

5.6 Demand Management Proposals or Controls

Given that the defined objectives at this stage are primarily related to the existing road character and geometry, the provision of demand management proposals are not considered to be appropriate.

Within the last 10 years Kilkenny County Council has implemented 80kph speed limit zones (circa 2008) and low cost safety measures (circa 2012) on the N24 within the scheme Study Area. See Figure(s) A2.1, A2.2 in Appendix 2. These controls and measures in addition to the existing road character and geometry have resulted in reduced journey times and average speeds as outlined in section 3.1.1 of this PAP. An objective of this project will be to maintain the existing collision rankings at below or twice below the national average rate, with improved average mainline speeds.

5.7 Road Based Options

Having regard to Unit 4.0 of the PAG the initial consideration of road based options are broadly identified and discussed in the following sections. It is anticipated that road based options will address key objectives identified in section 4 i.e. objectives related to exiting road character, geometry, journey time and average speeds.

5.7.1 Do-Nothing & Do-Minimum Option

The Do-Nothing Option assumes that there will be no other investment in the transport network other than regular maintenance within the appraisal period. Therefore the Do-Nothing Option is the existing transport network plus regular maintenance. The Do-Nothing Option will not address the key objectives identified in section 4.

The Do-Minimum Option provides the baseline for establishing the economic, integration, safety, environmental and accessibility impacts of all options.

5.7.2 Do-Something Options

A number of Do-Something Options will be identified on an incremental basis as an intervention to address the objectives in section 4.

6 APPRAISAL METHODOLOGY

6.1 Cost Benefit Analysis

Owing to the localised and rural nature of the project and the fact that reassignment of traffic is unlikely, the use of the 'TII Simple Appraisal Tool' for Costs Benefit Analysis in accordance with Unit 12.0 of the TII Project Appraisal Guidelines (PAG) is considered to be appropriate. Having reviewed collision history at the location, it is anticipated that limited monetary collision benefits will be derived as a result of the proposed N24 Carrick Road Improvement Scheme. Refer to section 3.1.4 of this PAP. Consequently it has been determined that the use of COBALT collision analysis software will not be required.

The TII Simple Appraisal Tool will be obtained from the "Downloads" section of the TII Publications website under PE-PAG-02035_Unit-12 (<http://www.tiipublications.ie/downloads/>).

The proposed appraisal period for the Cost Benefit Analysis is 30 years. Refer to section 6.3 for further details related to the proposed appraisal years.

The appraisal parameters as set out in PAG Unit 6.11 National Parameters Values sheet will be used. Refer to PE-PAG-02030 within the Project Appraisal Guidelines section of the Publications website (<http://www.tiipublications.ie/advanced-search/>).

6.2 Data Requirements

Tramore House Regional Design Office (THRDO) installed 1 no. Automatic Traffic Counter (ATC) on the N24 within the Scheme Study Area for two weeks in March 2017. This ATC was installed on behalf of Kilkenny County Council to clarify and confirm the needs and objectives within the project extents. In addition to this traffic data was obtained from Kilkenny County Council from ATC's undertaken by Tracsis Plc on their behalf in January 2017. The AADT was determined for short period ATC's using the single TII TMU methodology in Unit 16.0 of the TII PAG. The TMU used is identified as follows:

- [TMU N24 100.0 E](#) N24 between Carrick-On-Suir and Waterford, Piltown, Co. Kilkenny

See section 3.1.3 of this PAP for further details on the above mentioned traffic count information with locations on the existing N24.

A traffic count was also under taken by THRDO on an existing local road from the 13/03/2017 to the 26/03/2017 inclusive i.e. THRDO ATC 3 on the L7416 Grange Road. This road is located towards the western end of the scheme Study Area as shown in Figure 6.1 on the next page. The average daily traffic (ADT) recorded during the count period was 116 vehicles per day.

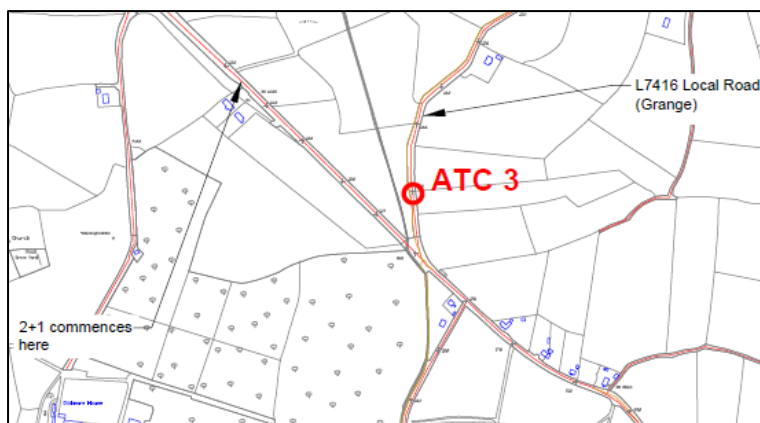


Figure 6.1: Location of THRDO ATC 3 on the Local Road L7416 to Grange

In order to inform this PAP existing journey times and speeds along the route have been measured using google Matrix API as outlined in section 3.1.1 of this PAP. Additional road-based journey time surveys will be used at a later date for any subsequent Appraisal.

Updated ordinance survey mapping has already been received from Kilkenny County Council and a detailed topographical survey has been completed within the scheme Study Area.

THRDO has also carried out a windshield survey along with a Land Registry search to identify all existing properties, access locations, rights of way and landowners. Service providers will be consulted and slit trenching carried out as part of a preliminary Ground Investigation, to identify and confirm existing overhead and underground services within the study area and at expected tie-in locations.

6.3 Transport Modelling Methodology

Given the project extents, a simple static traffic model is proposed. In this regard no change in the distribution of traffic is expected as a result of this project and there are no alternate parallel routes in close proximity to the Study Area. It is expected that all traffic will transfer to any proposed option or scheme within the Study Area. In this regard the do-nothing and do-something traffic will effectively be the same. Consequently the base model network for the static traffic model shall be limited to the existing roads contained within the Study Area.

The main objective of the traffic assessment is to inform the economic appraisal of the project. This will be achieved by ascertaining the current traffic levels in terms of AADT and Heavy Vehicle % and forecasting future traffic levels by the application of approved traffic growth rates. Short period Automatic Traffic Counts (ATC's) and a nearby TII Permanent Traffic Count site (TII TMU) shall be used to determine AADT and Heavy Vehicle Percentage. See previous section 6.2 for further details and guidance related to determining AADT from short period traffic counts and section 6.4 for details regarding growth rates.

The following initial forecast and / or model years are proposed for this project appraisal:

- Opening Year 2020
- Design Year 2035
- Forecast Year 2050

6.4 Travel Demand Projections

In order to forecast future traffic volumes for application in the project appraisal and given the location and limited size, scope and effective area of the project, it is proposed to use the Link-Based Growth Rates published on Table 5.3.2 in Unit 5.3 of the TII PAG. County Kilkenny is located in the 'South-East' region i.e. No. 7 on Table 5.3.2 shall be used in the Project Appraisal.

The relevant annual growth projections for light and heavy vehicles are provided in Table 6.1. Zero traffic growth is assumed beyond 2050.

	2013 – 2030		2030 – 2050	
	LV	HV	LV	HV
Annual Low Sensitivity Growth Rates (South-East, Kilkenny)	1.0076	1.0221	0.9996	1.0135
Annual Central Growth Rates (South-East, Kilkenny)	1.0106	1.0237	1.0022	1.0176
Annual High Sensitivity Growth Rates (South-East, Kilkenny)	1.0118	1.0242	1.0038	1.0195

Table 6.1: Link-Based Growth Rates from Table 5.3.2 of Unit 5.3 of the TII PAG

(NOTE: The Low and High Sensitivity Growth rates may be used for the purposes of Sensitivity Testing for Economic and Environmental Impacts.)

Refer to section 3.1.3 of this PAP for current AADT growth projections for N24 Traffic in the vicinity of the scheme Study Area and at adjacent locations.

6.5 Multi-Criteria Analysis (MCA)

The options identified for the N24 Carrick Road Improvement Scheme will be appraised in line with the guidance in the DTTaS CAF, which requires a Multi-Criterial Analysis (MCA) to be undertaken in order to assess both the quantitative and qualitative impacts of all feasible options.

The Multi-Criteria Analysis (MCA) / Project Appraisal Balance Sheet (PABS) shall be based on the proposed template provided in Appendix 4 of this PAP. It is also proposed to populate the following elements within the MCA or PABS in accordance with Unit 14 of the TII Project Appraisal Guidelines (PAG):

Environment:

- Air Quality;
- Noise & Vibration;
- Landscape & Visual;
- Cultural, Archaeological and Architectural Heritage;
- Land Use; and
- Water Resources.

Economy:

- Transport Efficiency & Effectiveness, excluding Journey Time & Vehicle Operating Cost Benefits;
- Wider Economic Impact; and
- Transport Reliability plus Quality.

Safety:

- Collision Reduction; and
- Security.

Accessibility & Social Inclusion:

- Vulnerable Groups; and
- Deprived Geographic Areas.

Integration:

- Transport Integration;
- Land Use Integration;
- Geographical Integration; and
- Integration with Other Government Policies (Integration with, National, Regional and Local Policy).

Physical Activity.

All remaining sub-criteria / elements required under the main headings to complete the MCA shall be considered under Unit 12 of the PAG and any other relevant PAG units or TII guidance documents referenced therein. These sub-criteria are identified as follows:

Economy:

- Transport Efficiency & Effectiveness in terms of *Journey Time & Vehicle Operating Cost Benefits; and
- Funding Impacts including * Present Value of Costs.

(*NOTE: Elements obtained from Cost Benefit Analysis. Refer to previous section 6.1 in this PAP.)

Environment:

- Biodiversity*

(*NOTE: Element to be considered fully through the commission of an Ecological Consultant.)

The proposed approach for the MCA of options as outlined above is considered to be commensurate with the complexity, size, geographic extent and associated rural nature of the proposed N24 Carrick Road Improvement Scheme.

6.6 Sensitivity Analysis

If the scheme should proceed to detailed appraisal (Phase 3 Design & Environmental Evaluation) then both Target Costs & Total Scheme Budget as per the Cost Management will be tested. In terms of demand all growth rates shall also be tested during detailed appraisal i.e. low Sensitivity Growth, Central Growth and High Sensitivity Growth. See section 6.4 for further details regarding growth projections to be used. It may also be prudent to undertake an analysis of the potential Project 2040 Targeted Growth and associated investment for Waterford City. Refer to section 3.2.1 and 3.2.2 of this PAP for further details. The sensitivity testing or analysis in terms of costings and demand for detailed appraisal as outlined above is consistent with Table 6.1.3 from Unit 6.1 of the PAG.

No sensitivity analysis will be required during the Preliminary Appraisal i.e. Phase 0 Scope & Pre-Appraisal, Phase 1 Concept & Feasibility and Phase 2 Option Selection. See also section 6.7 below.

It should be noted that a simple appraisal in accordance with Unit 12 of the PAG shall be carried out on this scheme for Cost Benefit Analysis throughout each project phase i.e. Phase 2 to Phase 6.

6.7 Appraisal Scenarios

As noted above a range of scenarios and sensitivity tests will be modelled and used as the basis for appraisal.

6.8 Appraisal Deliverables

All appraisal reporting deliverables required on Table 12.1.1 of Unit 12 of the PAG for each project phase shall be prepared for the scheme, unless agreed otherwise with Transport Infrastructure Ireland (TII). However, in order to maintain consistency during each project phase it is proposed to retain the Project Appraisal Balance Sheet template provided in Appendix 4 of this PAP.

APPENDICES

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Appendix 1 – N24 Mooncoin Bypass Major Scheme

Figure A1.1: N24 Mooncoin Bypass Major Scheme Study Area & Identified Route Options (Figure 2.1 Route Selection Report, 2003)

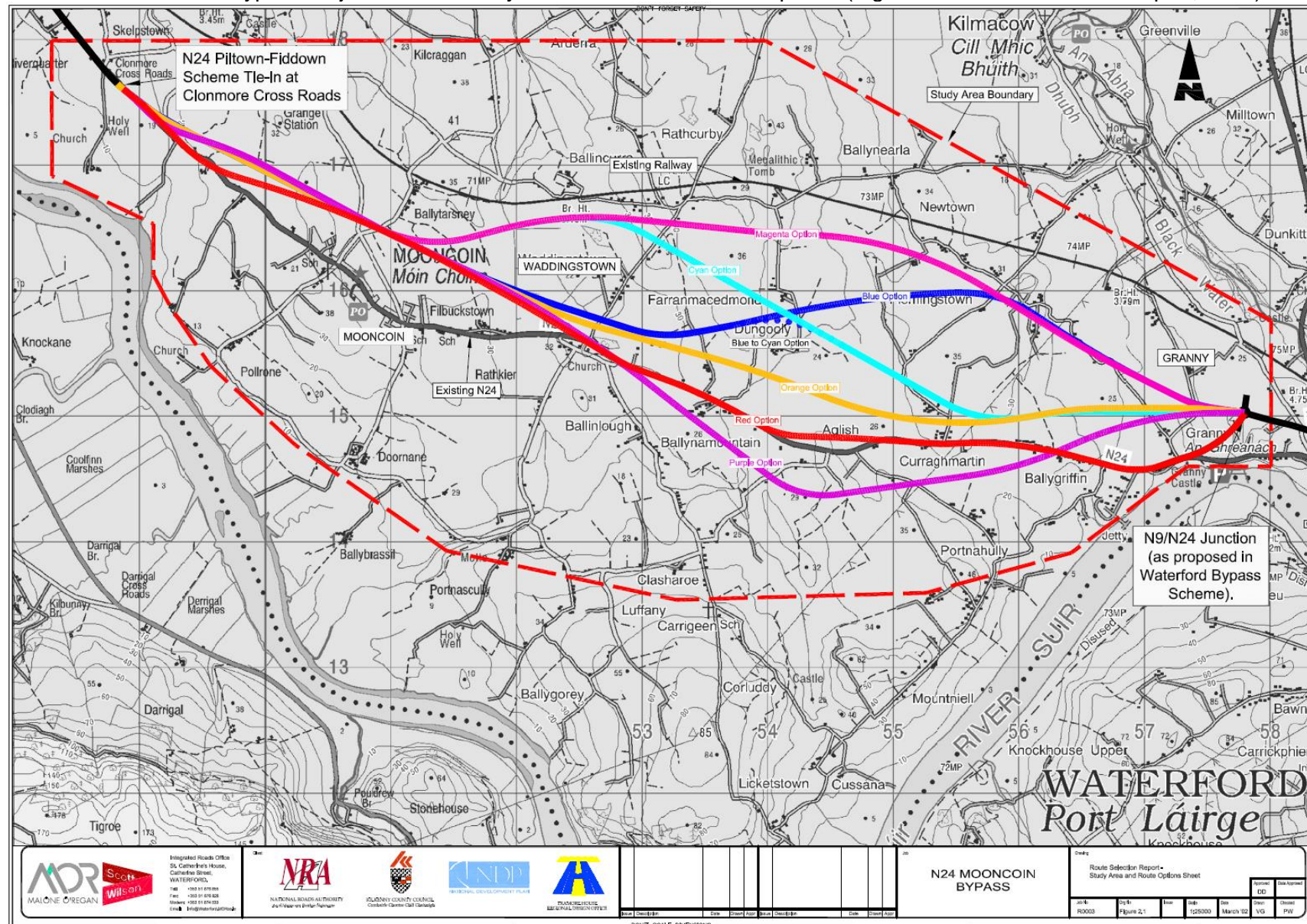
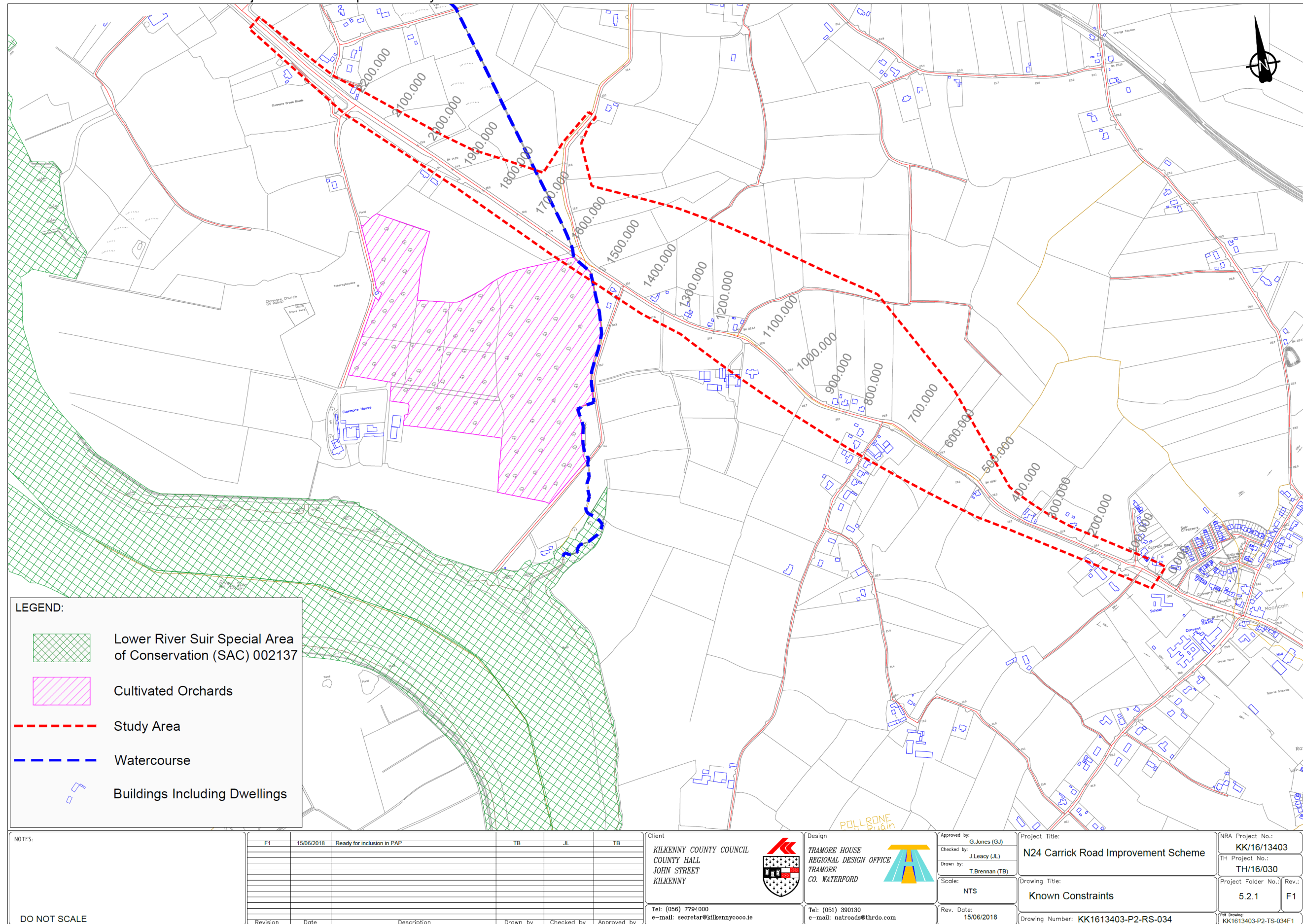


Figure A1.2: Published Preferred Route for the N24 Mooncoin Bypass (<https://www.kilkennycoco.ie/resources/eng/Services/mooncoinmap.gif>)

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Appendix 2 – Known Constraints within & Adjacent to the Study Area

Figure A2.1: Known Constraints Within & Adjacent to the Proposed Study Area



Appendix 3 – Drawings Related to Scheme Need & Objectives

Figure A3.1: Existing Access Location & Type

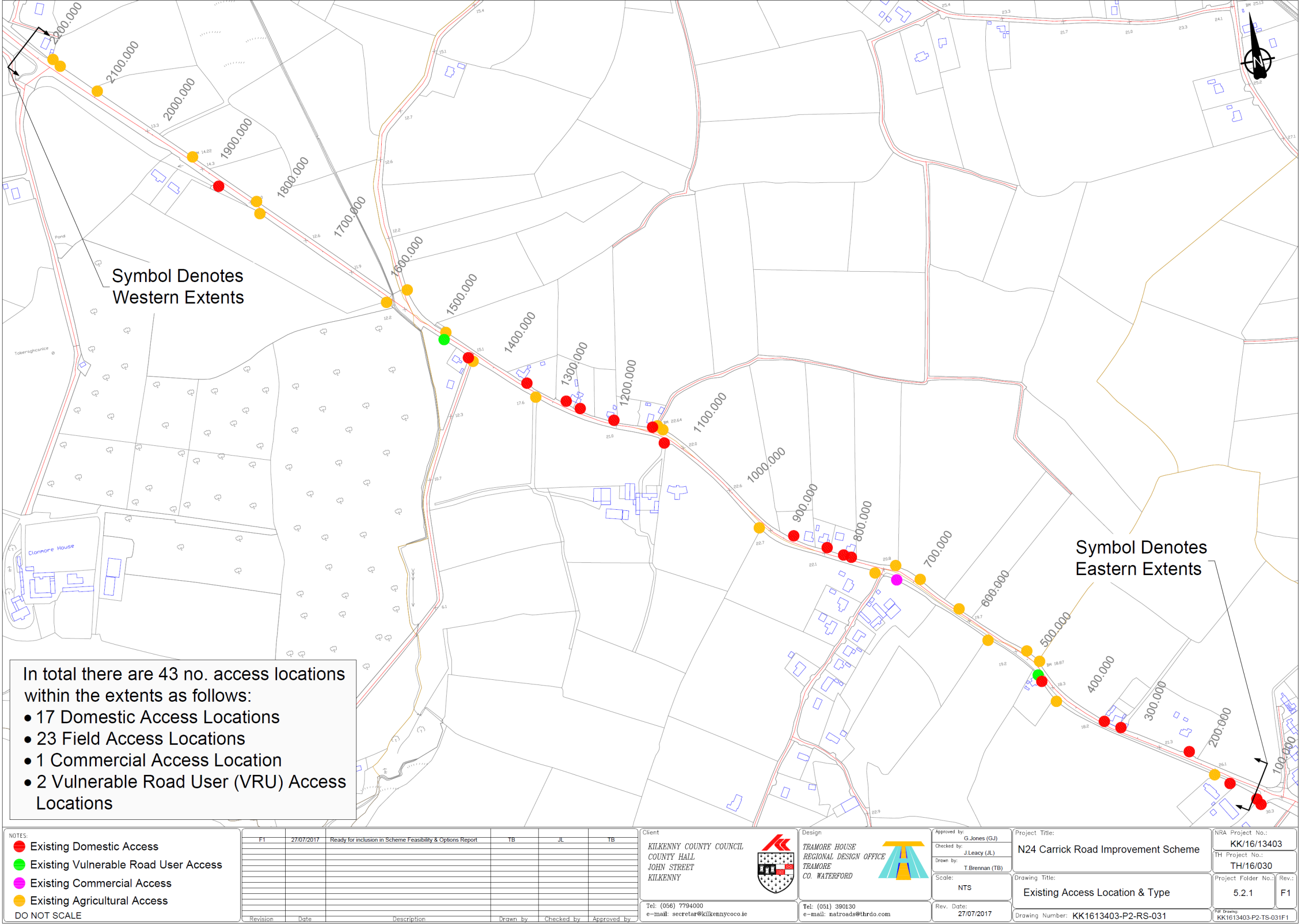


Figure A3.2: Existing N24 Road, with Horizontal & Vertical Alignment

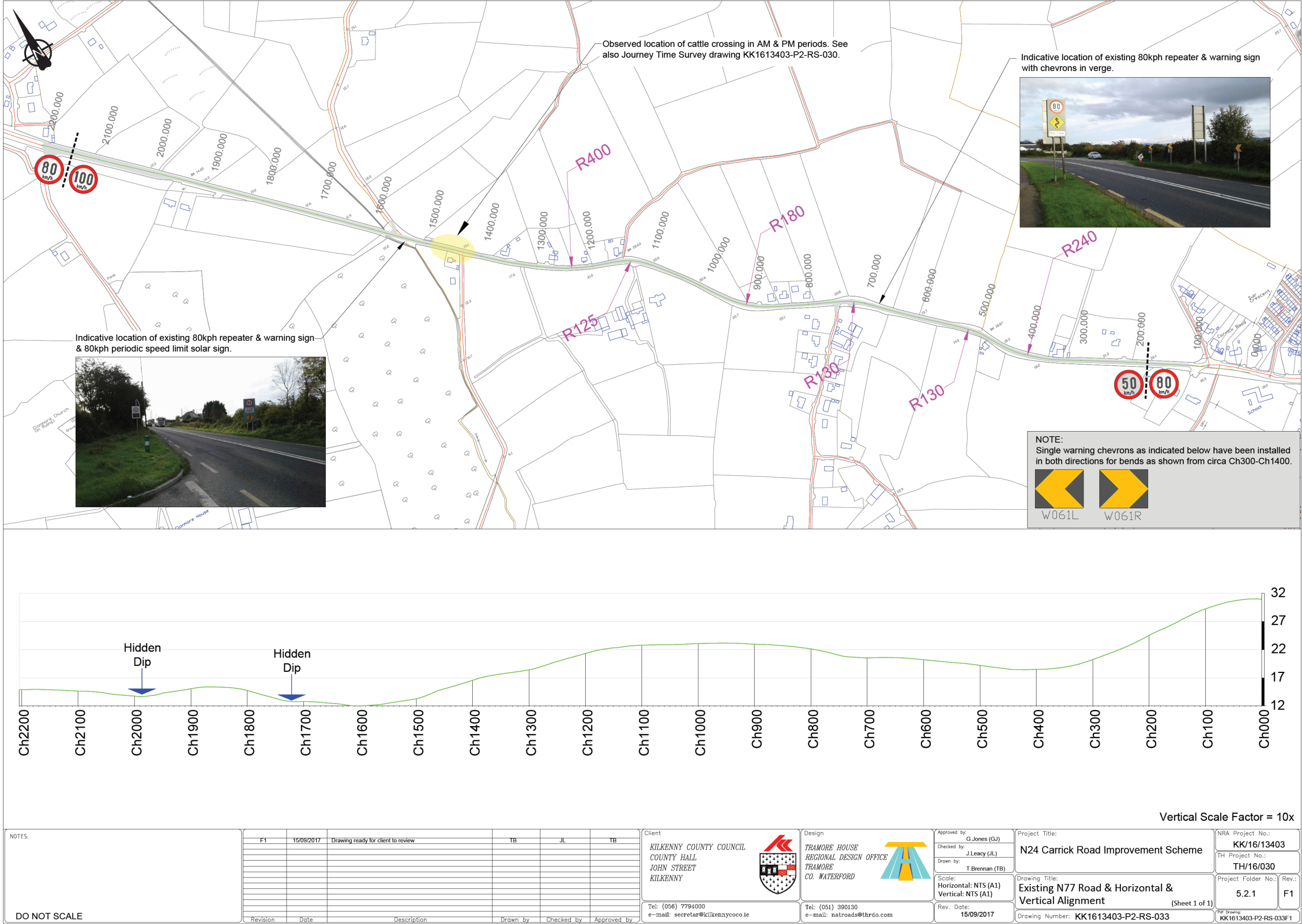
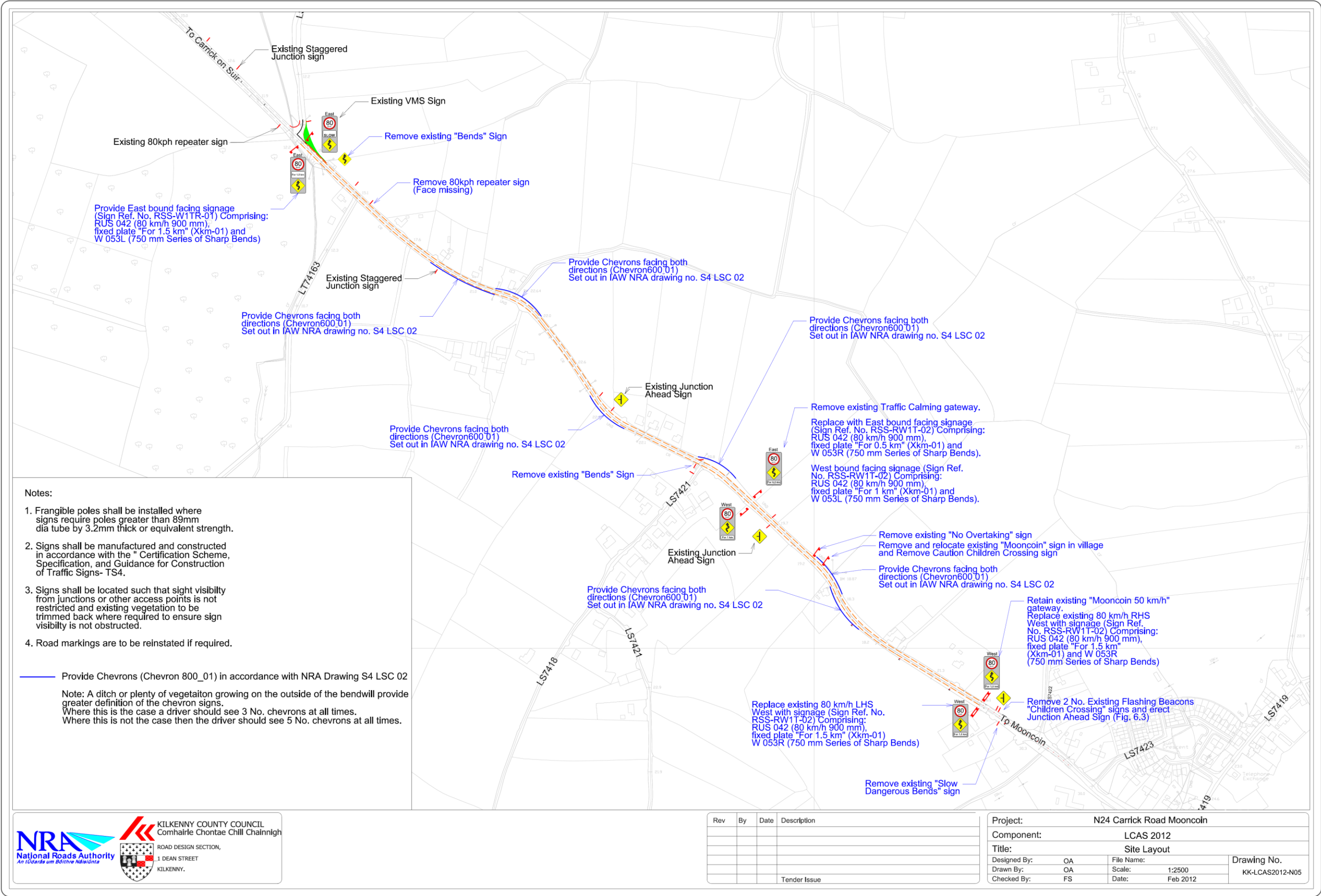


Figure A3.3: Existing Low Cost Safety Measures Implemented by Kilkenny County Council (circa 2012)



**Appendix 4 – Proposed Project Appraisal Balance Sheet (PABS)
Template**

PROJECT APPRAISAL BALANCE SHEET (PABS)															
SCHEME NAME:		Description:			Problems Identified:						Scheme Budget:				
N24 Carrick Road Improvement Scheme											€X.Xm				
Current Typical Carriageway Width:		Route No:			Speed Limit:		Proposed Carriageway Standard:								
		N24			80Kph		Type 1 Single Carriageway								
Appraisal Criteria	Appraisal Sub-Criteria	Qualitative Impacts / Objectives (Guidance available in PAG Unit 3.0)			Qualitative Statement / Quantitative Assessment				Monetised (€ million over 30 yrs.)		Sub-Criteria Performance Description	Score	Appraisal Criteria Score		
Environment	Air Quality										Not Significant or Neutral	4	Neutral		
	Noise & Vibration										Not Significant or Neutral	4			
	Landscape & Visual										Not Significant or Neutral	4			
	Biodiversity										Not Significant or Neutral	4			
	Cultural Heritage										Not Significant or Neutral	4			
	Land Use										Not Significant or Neutral	4			
	Water Resources										Not Significant or Neutral	4			
Safety	Collision Reduction						Current Rate:	X.XXX PIC / mvkm				Not Significant or Neutral	4	Neutral	
				Proposed Rate (see PAG 6.11):	2 Lane Single Carriageway > 60kph	0.080 PIC / mvkm		Not Significant or Neutral	4						
	Security											Not Significant or Neutral	4		
Economy	Transport Efficiency and Effectiveness						Existing Average Speed:	74kph	Current AADT:	7,875	Journey Time Benefits:	€X.X	Not Significant or Neutral	4	Neutral
				Proposed Average Speed:	XXkph	Forecast 2049 HG AADT:	10,154	Vehicle Operating Costs Benefits:	€X.X						
	Wider Economic Impacts										Not Significant or Neutral	4			
	Transport Reliability and Quality										Not Significant or Neutral	4			
	Funding				Zero non-exchequer funding identified to date.				Present Value of Costs (PVC):		€X.X	Not Significant or Neutral	4		
Accessibility and Social Inclusion	Vulnerable Groups										Not Significant or Neutral	4	Neutral		
	Deprived Areas										Not Significant or Neutral	4			
Integration	Transport Integration										Not Significant or Neutral	4	Neutral		
	Land-Use Integration										Not Significant or Neutral	4			
	Geographic Integration										Not Significant or Neutral	4			
	Integration with Other Government Policies										Not Significant or Neutral	4			
Physical Activity	Physical Activity										Not Significant or Neutral	4	Neutral		
Overall Description of Scheme / Option												4	Neutral		
									Present Value of Benefits (PVB)		€X.X				
									Benefit to Cost Ratio (BCR)		€X.X				

Multi Criteria Analysis Scale:		
Major or Highly Positive	7	Highly Positive
Moderately Positive	6	Moderately Positive
Minor or Slightly Positive	5	Slightly Positive
Not Significant or Neutral	4	Neutral
Minor or Slightly Negative	3	Slightly Negative
Moderately Negative	2	Moderately Negative
Major or Highly Negative	1	Highly Negative
Scaling Collision Benefits:		
Current Collision Rate:	0.151	PIC / mvkm
Proposed Collision Rate :	0.080	PIC / mvkm
Proposed difference in Rate / Current Collision Rate	0.5	PIC / mvkm
Reduce Current Rate by Half		>> Major or Highly Positive
Reduce Current Rate by less than Half		>> Moderately Positive
Limited Change to Current Rate		>> Not Significant or Neutral
Increase Current Rate by less then half		>> Moderately Negative
Increase Current rate by half		>> Major or Highly Negative

END OF REPORT