

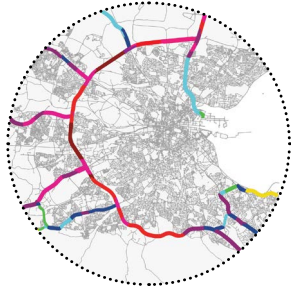
TRANSPORT INFRASTRUCTURE IRELAND

NATIONAL ROAD NETWORK INDICATORS 2016

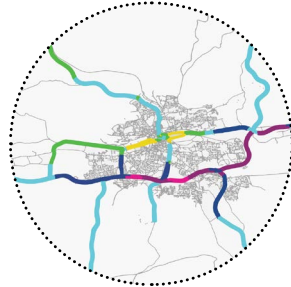
A: KEY TREND SUMMARY

TRAVEL HOTSPOTS:

M50 Dublin area:
140,000 vehicles per day
Hotspot: ■



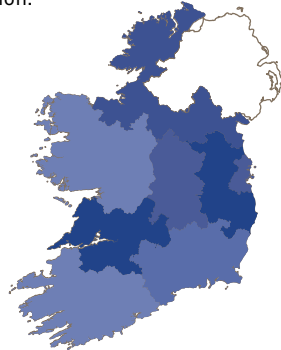
N40 Cork area:
80,000+ vehicles per day
Hotspot: ■



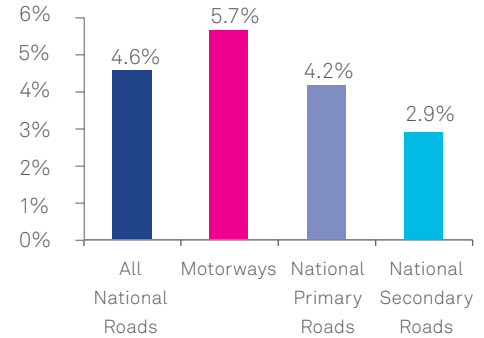
TRAFFIC GROWTH:

Traffic Growth by Region:

Mid-East	5.2%
Mid-West	5.4%
Dublin	4.6%
Midlands	4.8%
Border	5.0%
South East	5.7%
West	3.5%
South West	3.1%

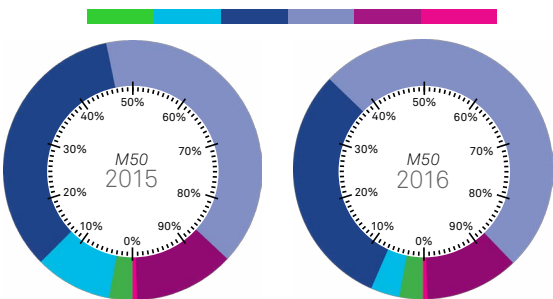


+4.6%
Traffic Growth across the network in 2016 was 4.6%.



M50 LEVEL OF SERVICE:

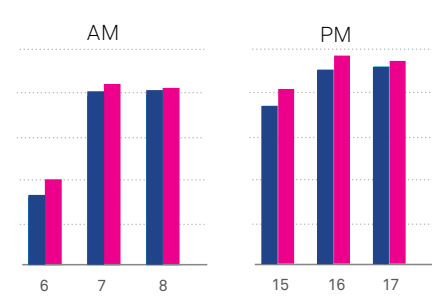
Morning rush hour: Free flow to → forced or breakdown flow



CHANGES IN PEAK HOUR SPREAD M50:

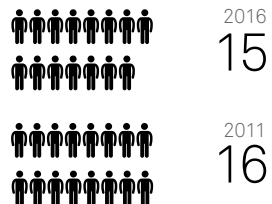
The peak hours remain the same as 2015: 6.30 - 9.30 and 15.30 - 18.30, but there was an increase in trips between 6.00 and 7.00 of 1% from 2015. This was a result of continued growth on the National Road network and traffic demand reaching previously unreachable levels especially on the M50.

TOTAL TRAFFIC M50 TMUs



FATAL COLLISIONS ON THE NATIONAL ROAD:

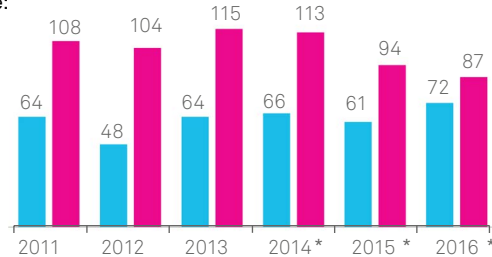
Pedestrians:



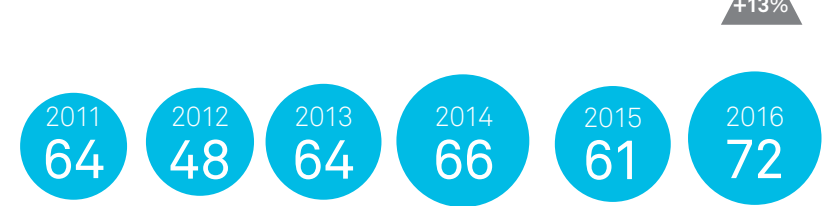
-6%

Fatal collisions by road type:

■ National Roads
■ Local & Regional Roads



Total fatal collisions on the National Roads (2011-2016):



*Fatal collisions 2014: Garda Pulse data (not verified by RSA) & fatal collisions 2015 & 2016: AGS data (not verified by RSA)

B: NEWS + UPDATES

Establishment of TII
In August 2015, the National Roads Authority (NRA) and the Railway Procurement Agency (RPA) were merged to become Transport Infrastructure Ireland (TII).

To find out more about TII visit www.tii.ie

National Transport Model (NTpM)

Since its release in 2013 the NTpM is updated annually using data from the Traffic Monitoring Units. Documentation regarding the National Transport Model can be located on the TII website at www.tii.ie/tii-library/strategic-planning/

Traffic Monitoring Units

TII now has over 370 Traffic Monitoring Units around the country which will be used to monitor traffic patterns and to plan future interventions.

See website: www.nratrafficdata.ie

Motorway Service Helpline

A Motorway Service Helpline has been set-up to assist roads users in difficulty on a Motorway. All calls are directed through the Motorway Traffic Control Centre (MTCC) and the number is:



0818-715-100 or;
operator@nraits.ie

Further information and live traffic updates are available on www.tiittraffic.ie

CONTENTS

INTRODUCTION	P5
1. ROAD NETWORK	P6
2. ECONOMIC	P19
3. ROAD CONDITION	P21
4. SAFETY	P25
5. ACCESSIBILITY + ENVIRONMENT	P27

INTRODUCTION

Transport Infrastructure Ireland's mission is to deliver transport infrastructure and services that contribute to the quality of life of the people of Ireland and support the country's economic growth

For this purpose, TII has overall responsibility not only for the planning and supervision of the construction and maintenance works on these roads, but also for ensuring the efficient use and safe operation of the National Road network.

Efficient use of the National Road network provides benefits to road passenger and road freight users in the form of shorter journey times, reduced congestion and

reductions in the cost of operating vehicles. Society as a whole benefits from increased economic productivity, reduced energy consumption and a better environment.

If the National Road network is operated to a high standard, then road users will enjoy safe journeys with predictable journey times.

Transport Infrastructure Ireland considers it important to monitor the performance and use of the National Road network and to share this information with the public.

This publication sets out some key indicators of performance and usage of the National Roads network.

ONE: ROAD NETWORK



A: LENGTH OF NATIONAL ROAD NETWORK

Length of National Road network by road type 2016

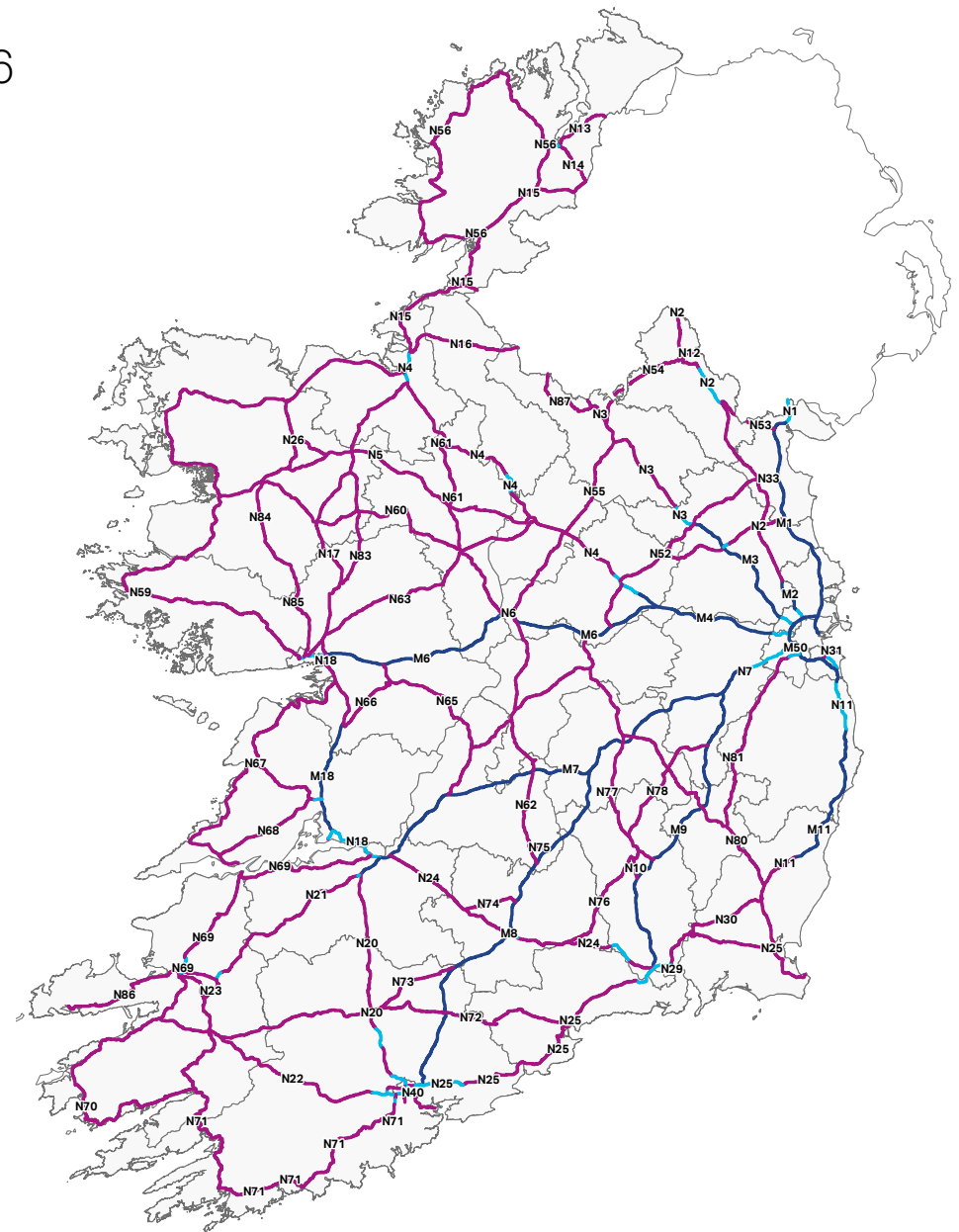
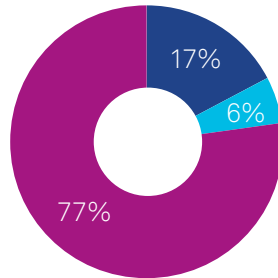
There are in excess of 5,300 kilometres of National Road network in Ireland.

The National Road network is comprised of 916 kilometres of motorway, 293km of dual carriageway, and 4,097km of single carriageway.

The actual length of the National Road network fluctuates year on year due to road reclassification, realignments to existing National Roads, new roads, opening and analysis/updating of data in the TII Roads Database.

Road type:

Motorway		916km
Dual carriageway		293km
Single carriageway		4,097km



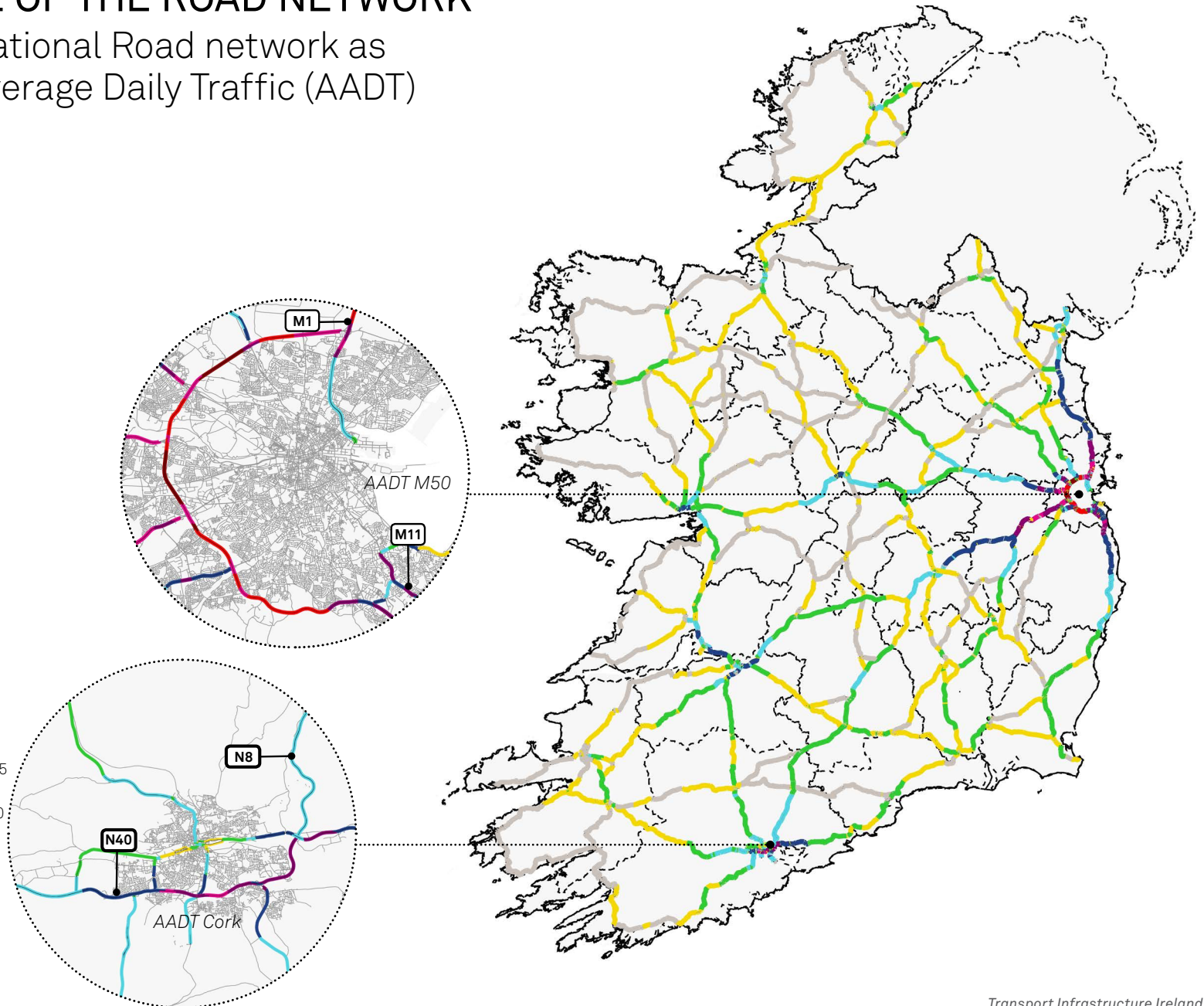
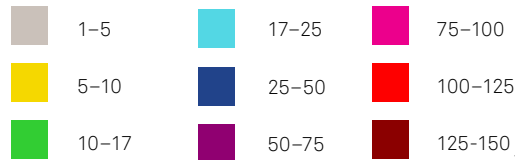
B1: LEVEL OF USAGE OF THE ROAD NETWORK

Level of usage of the National Road network as measured by Annual Average Daily Traffic (AADT)

The continued growth in the Irish economy is reflected by the growth in traffic on the National Road network.

In Dublin, the M50 continues to experience growth in levels of usage as measured by Annual Average Daily Traffic (AADT) flows, with the section between Junction 7 (N4) and Junction 9 (N7) recording the highest AADT levels on the National Road network. Increased economic activity outside of the Dublin region is also apparent with further AADT growth being experienced on the N40 (Cork South Ring Road) in 2016.

AADT (thousands per day)

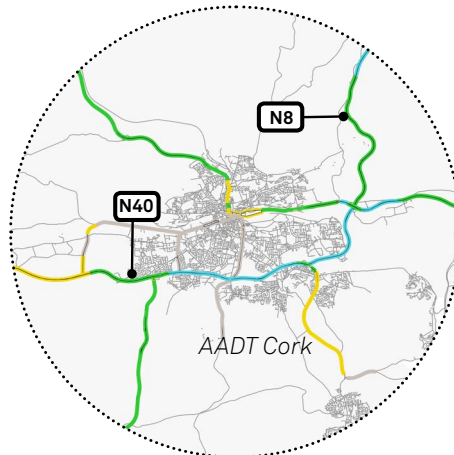
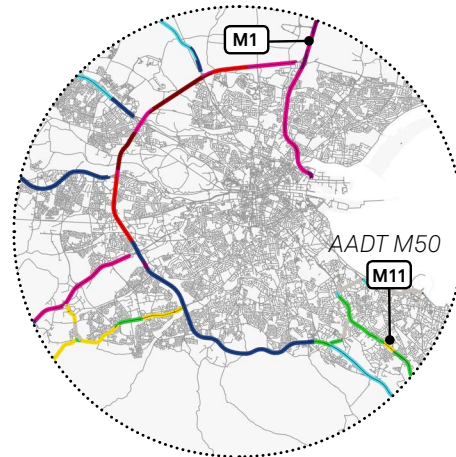


Source: TII National Transport Model, 2016

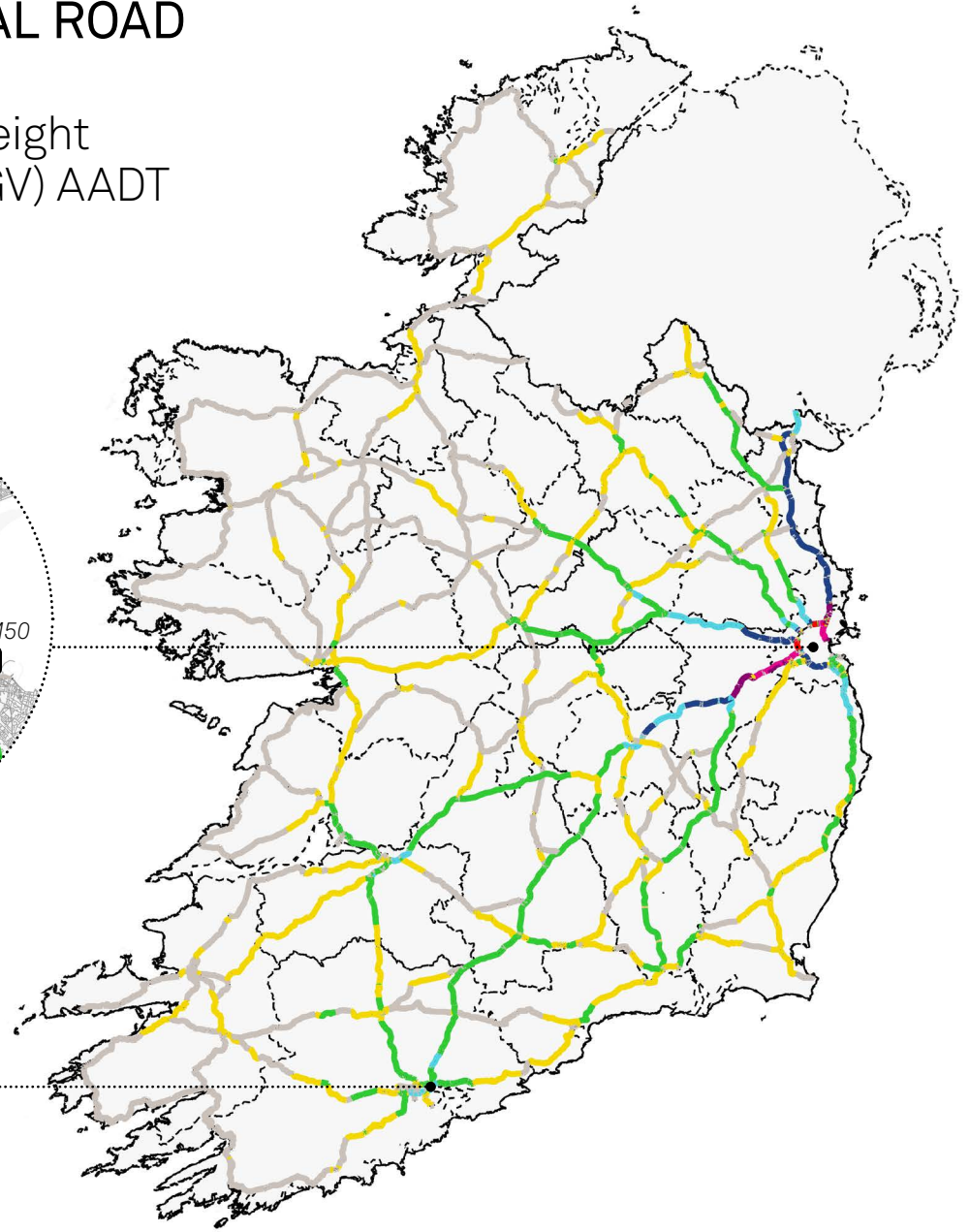
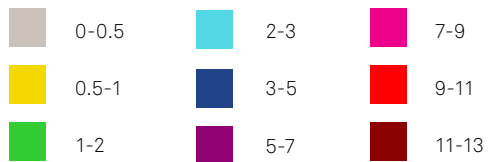
B2: FREIGHT MOVEMENTS ON THE NATIONAL ROAD NETWORK

Level of usage of the National Road network by freight vehicles as measured by Heavy Goods Vehicle (HGV) AADT

The level of usage of the National Road network by freight vehicles, as measured by Heavy Goods Vehicles (HGV) AADT, continues to experience growth particularly in economic centres near major ports.



HGV AADT (thousands per day)



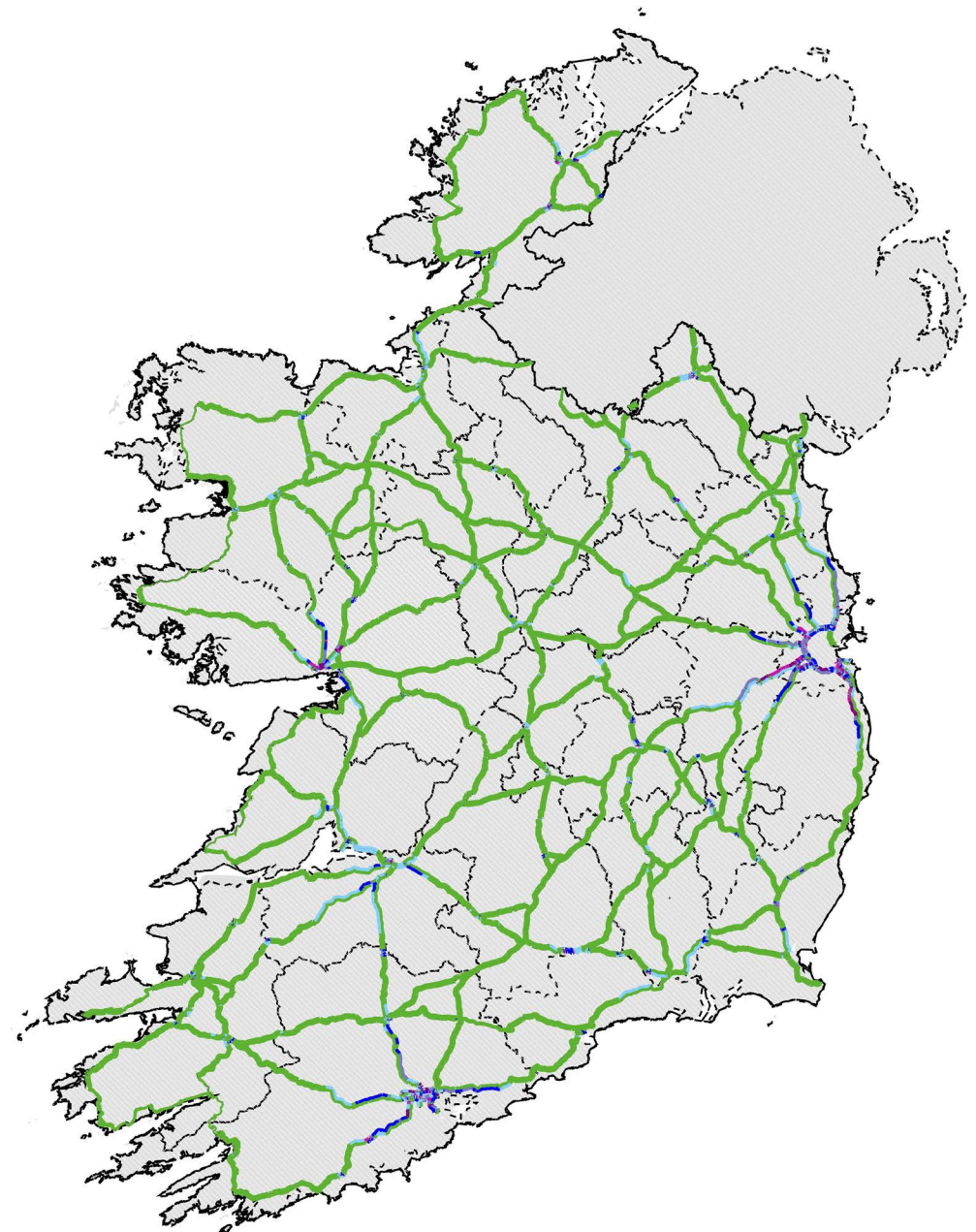
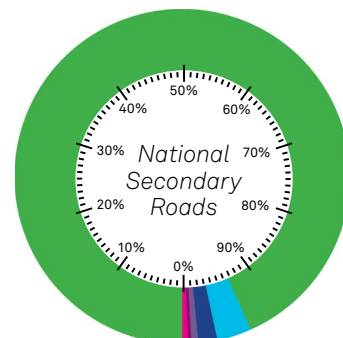
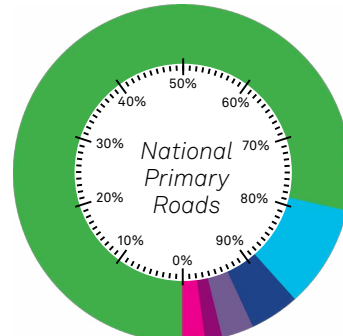
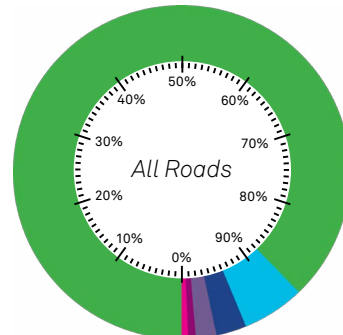
C1: LEVEL OF SERVICE: MORNING RUSH-HOUR, NATIONAL ROADS

Proportion of the National Roads network operating under each level of service condition

The level of service (LOS) provided by roads may be assessed using recognised international standards. LOS is a quality measure describing operational conditions within a traffic stream. Following the substantial investment in National Roads over the last decade, most route sections are operating to the highest standard of service. However, for certain roads such as the M50, further interventions such as demand management are required to ensure that higher levels of service are achieved.

For further information see: Transport Research and Information Note: A Study of Lane Capacity, online at www.tii.ie/tii-library/strategic-planning

- A. Free flow
- B. Reasonably free flow
- C. Stable flow
- D. Approaching unstable flow
- E. Unstable flow
- F. Forced or breakdown flow



C2: LEVEL OF SERVICE

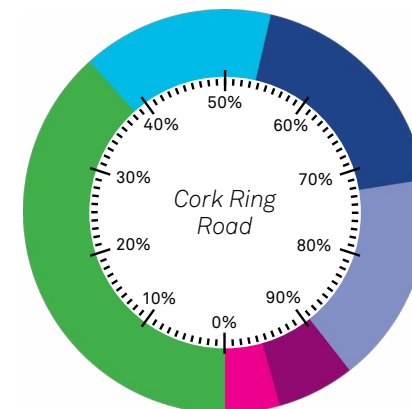
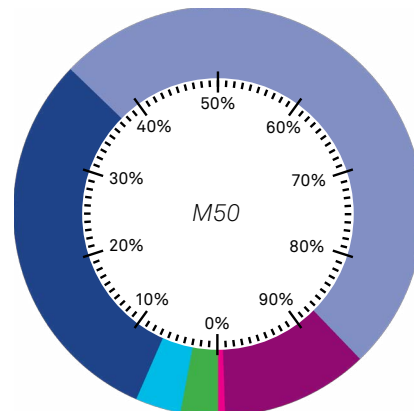
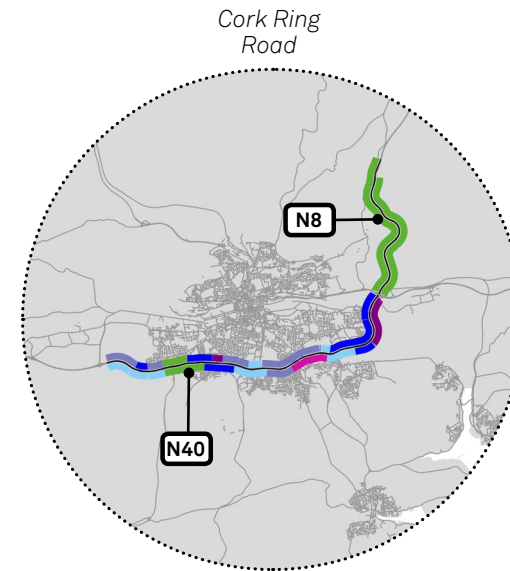
M50 AND N40

Proportion of the M50 and Cork Ring Road operating under each level of service condition

The level of service on the M50 in Dublin and Cork Ring Road is presented opposite.

The proportion of the M50 and Cork Ring Road operating at free or stable flow decreased by 10 percentage points and 5 percentage points respectively between 2015 and 2016.

- A. Free flow
- B. Reasonably free flow
- C. Stable flow
- D. Approaching unstable flow
- E. Unstable flow
- F. Forced or breakdown flow



Source: TII National Transport Model, 2016

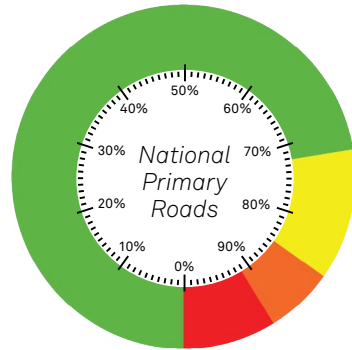
C3: VOLUME TO CAPACITY RATIO: NATIONAL PRIMARY ROADS

Proportion of the National Primary Roads network operating at each level of capacity

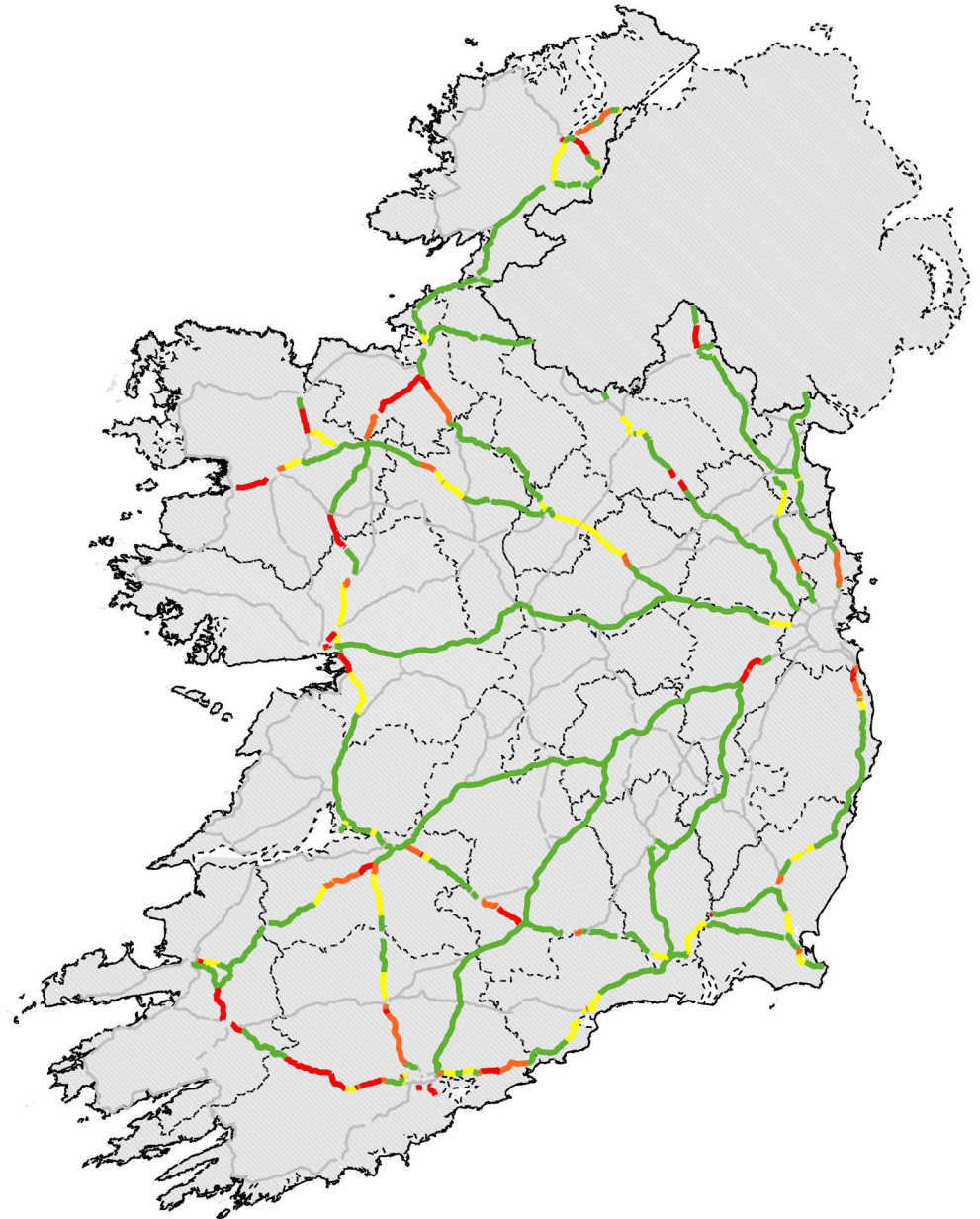
The Volume to Capacity (V/C) Ratio relates the AADT volume carried on a section of road to its daily operational capacity.

The V/C Ratio for the National Primary Road network indicates that over 70% of the network is operating at or below 80% of its daily capacity. This reflects the significant investment made in the National Primary Road network in recent times.

*Capacity Based on NRA TD 9 Road Link Design Table 6



- Operating Below 80% Capacity
- Operating between 80% - 100% Capacity
- Operating between 100% - 120% Capacity
- Operating above 120% Capacity



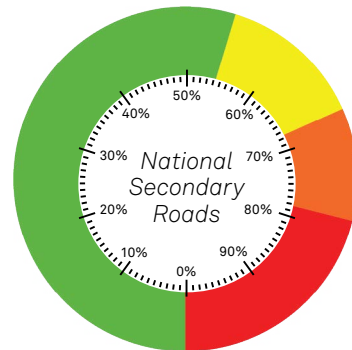
C4: VOLUME TO CAPACITY RATIO: NATIONAL SECONDARY ROADS

Proportion of the National Secondary Roads network operating at each level of capacity

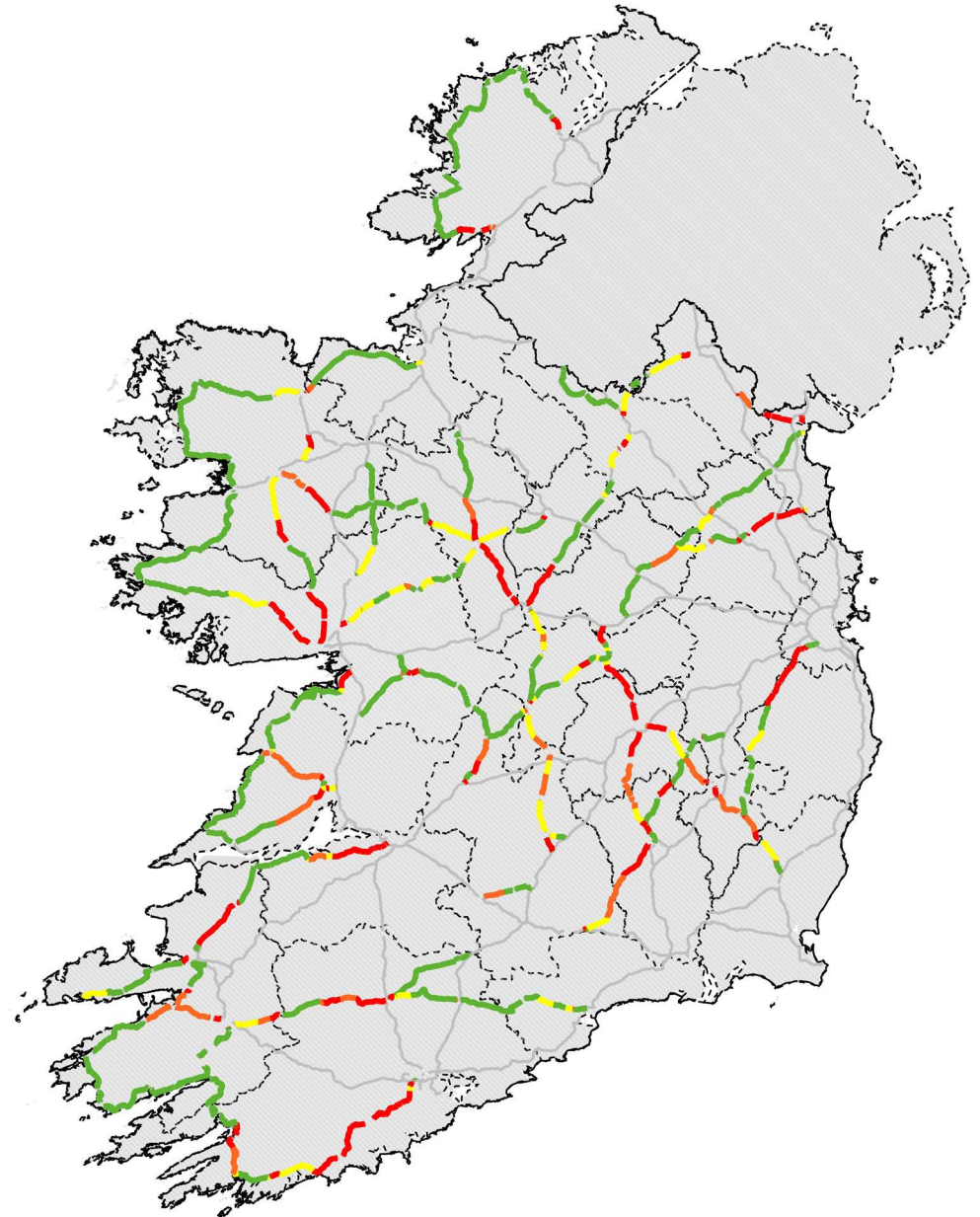
The Volume to Capacity (V/C) Ratio relates the AADT volume carried on a section of road to its daily operational capacity.

The V/C Ratio for the National Secondary Road network indicates that over 45% of the network is operating at or above 80% of its daily capacity. This indicates that investment is required in the National Secondary Road network to match the performance of the National Primary Road network.

*Capacity Based on NRA TD 9 Road Link Design Table 6



- Operating Below 80% Capacity
- Operating between 80% - 100% Capacity
- Operating between 100% - 120% Capacity
- Operating above 120% Capacity



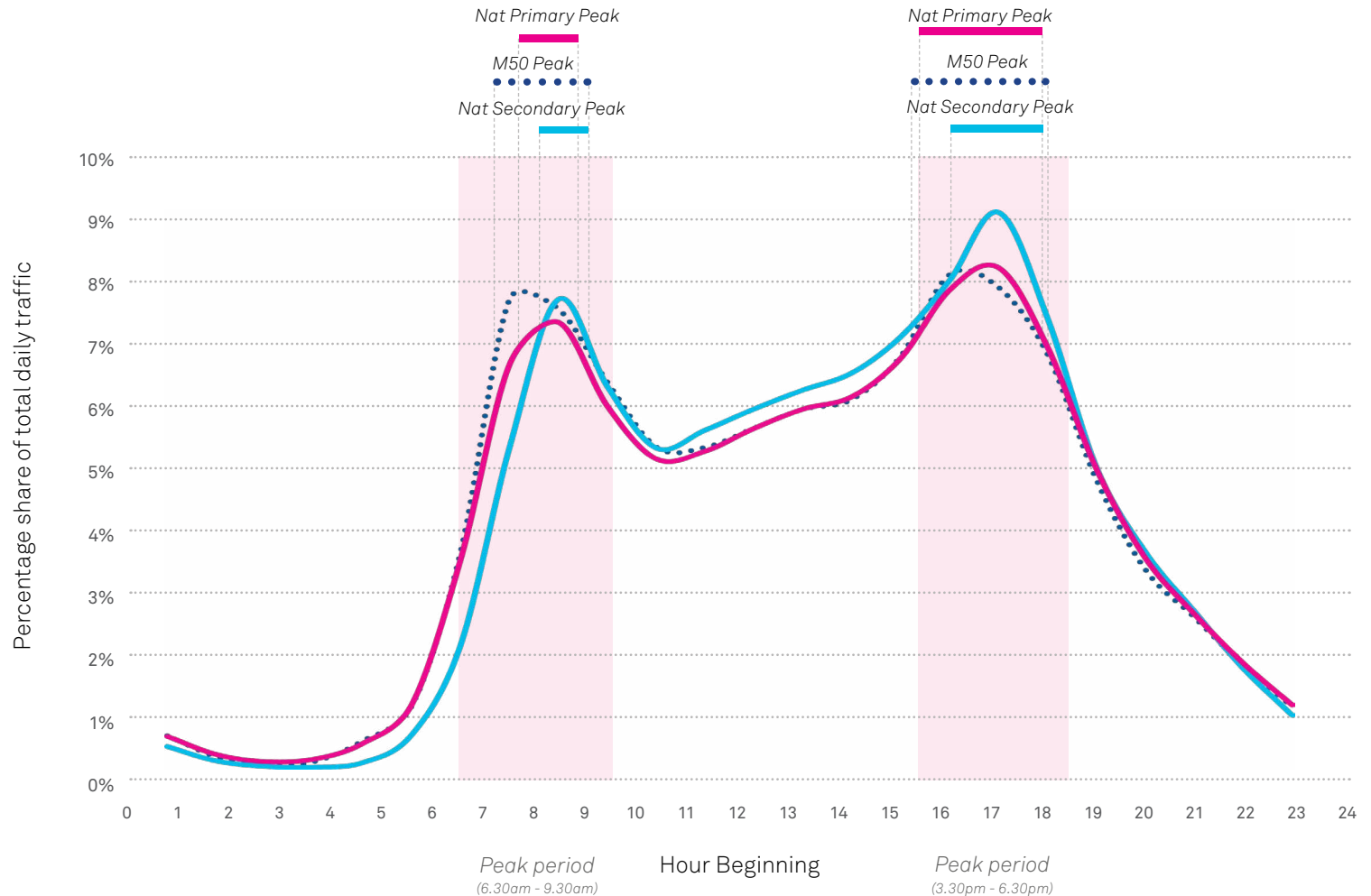
D: ROADS USAGE OVER THE DAY

Profile of the usage of the National Road network by time of day

The peak periods on our National Roads are extending outwards due to increased demand and congestion.

In the morning, the peak period lasts between 6.30am and 9.30am whilst in the evening, the peak covers the period between 3:30pm and 6:30pm. Peak traffic hours have a level of traffic some 30% to 50% above off-peak levels. The M50 is the most used road in the country with daily weekday traffic of up to 140,000 along its busiest sections. The peaks on the M50 are more prolonged than other roads with significant traffic flows being maintained during off-peak periods. The trend of 'peak hour spreading' continued in 2016, with the peak period share of total daily M50 traffic reducing by 0.2% point compared to the previous year.

- M50 Motorway
- National Primary
- National Secondary
- Peak period



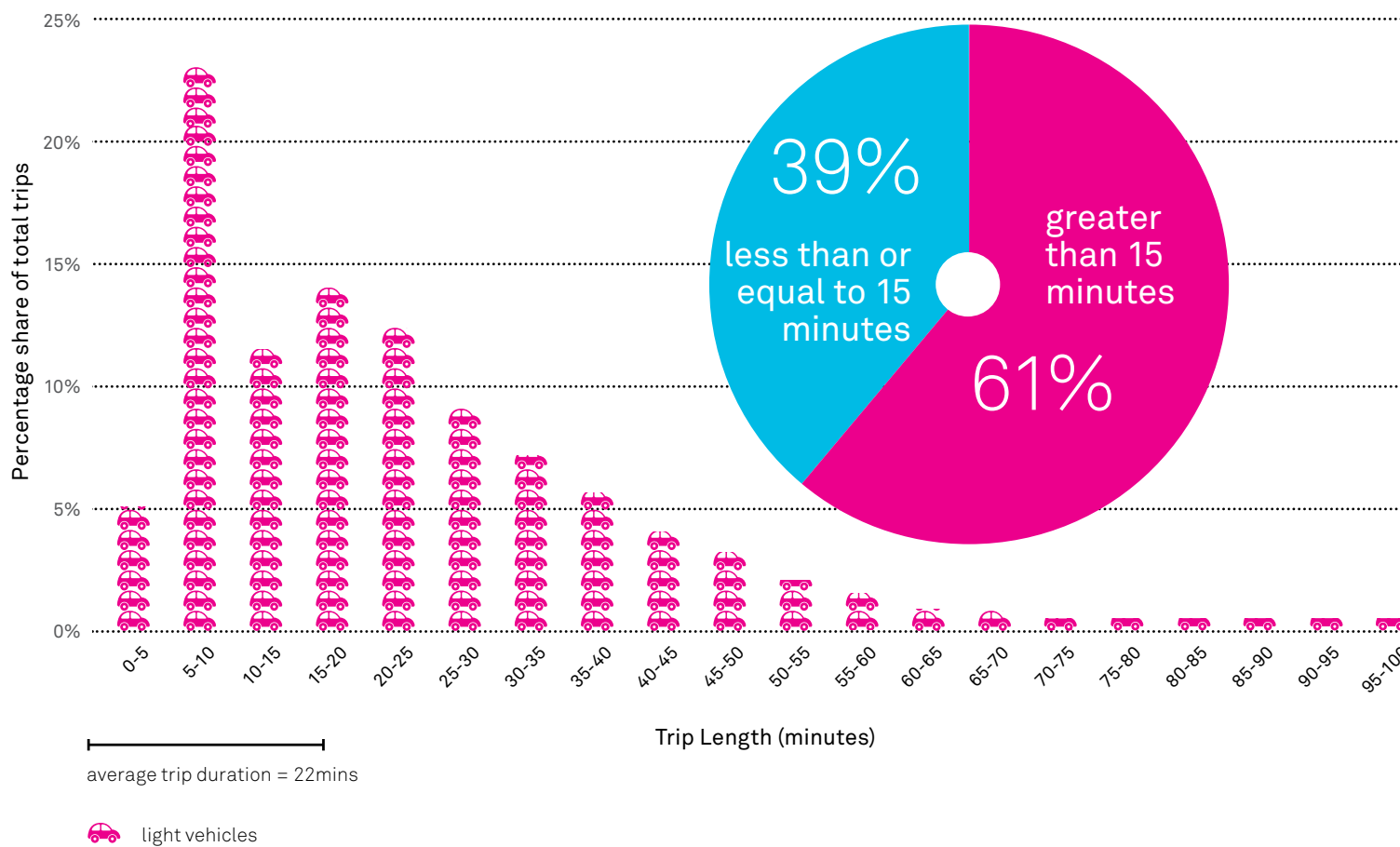
Source: TII National Transport Model, 2016

E: TRIP DURATION

NATIONAL ROADS AND REGIONAL ROADS - AM PEAK

Profile of the trips made on the National and Regional Roads network by their duration

Across the road network, a significant portion of trips that people make are of short duration. In total, 39% of trips are of 15 minutes duration or less.



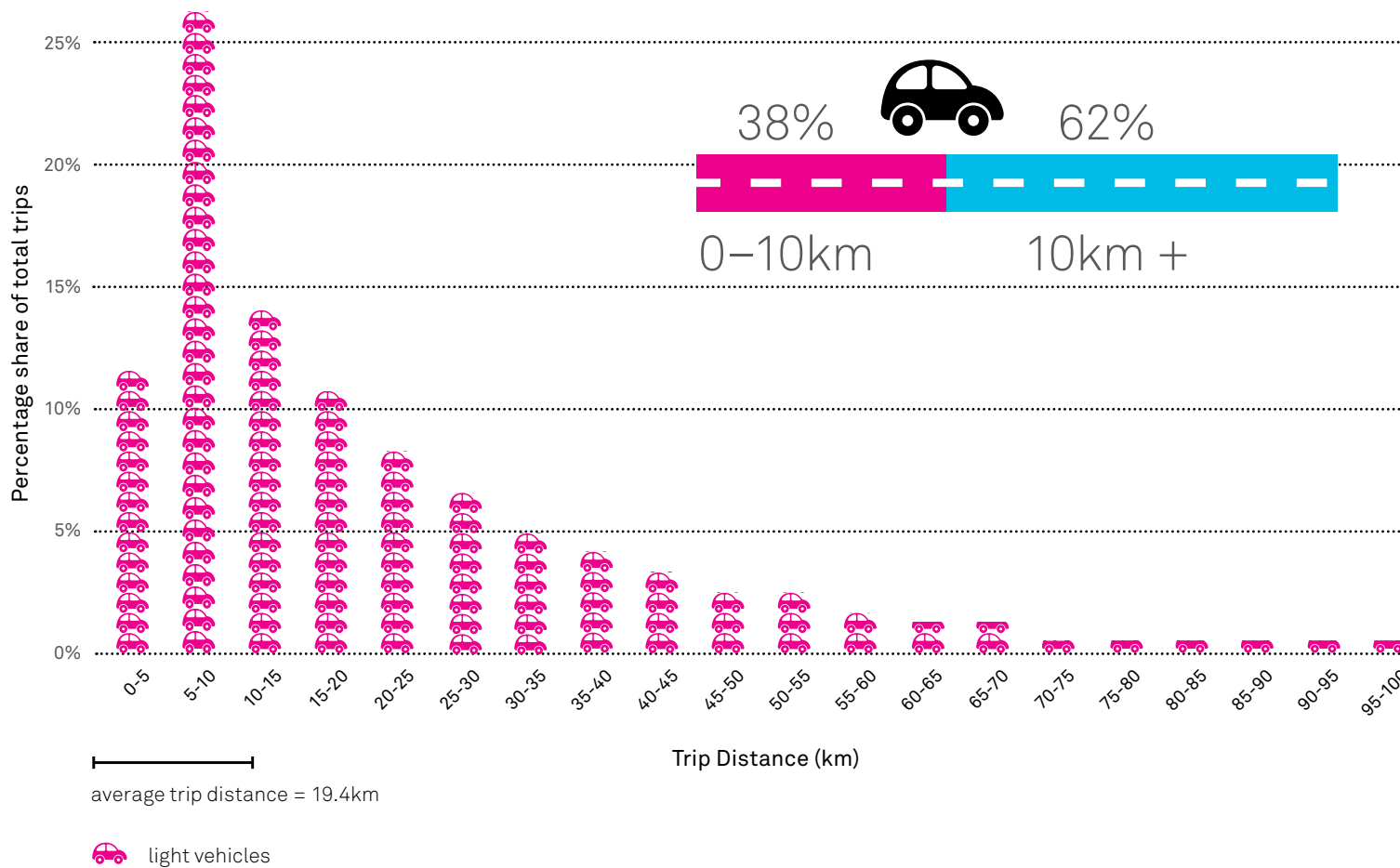
Source: TII National Transport Model, 2016

F: TRIP DISTANCE

NATIONAL AND REGIONAL ROADS - AM PEAK

Profile of the trips made on the National and Regional Roads network by their distance

Across the road network, a significant portion of trips that people make are short distance. In total, just over 50% of trips on the National and Regional road network are 15 kilometres or less.



Source: TII National Transport Model, 2016

G: ANNUAL TRAFFIC GROWTH RATES

Annual Traffic Growth 2015-2016

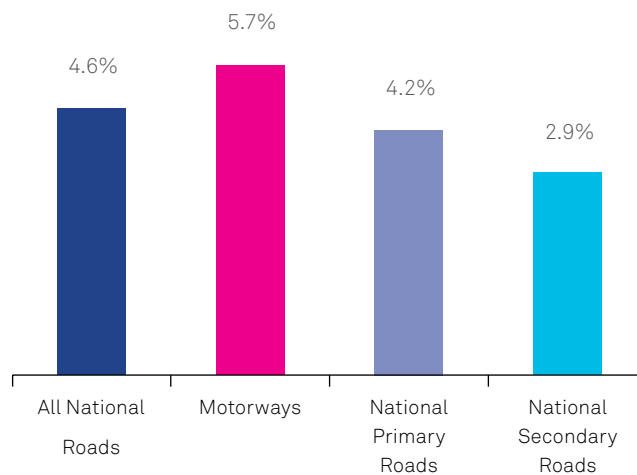
Traffic growth was 4.6% across the network in 2016.

The highest regional growth recorded in 2016 was in the South-East with 5.7% for the year. The Mid-West and Mid-East also experienced significant growth at 5.4% and 5.2% respectively. The South West and West had the lowest year on year growth at 3.1% and 3.5% respectively.

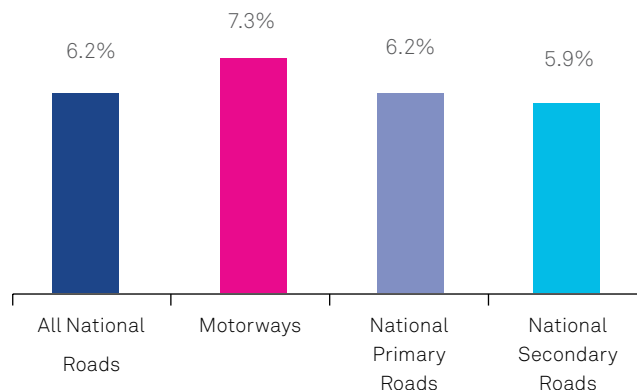
For HGVs the Mid-East and South-West recorded the highest regional growth with 7.4% and 7.2% respectively. The West and Midlands had the lowest year on year growth at 5.5% and 4.4% respectively.

The greatest year on year traffic growth by road type was recorded on motorways; where traffic has increased 5.7% for all vehicles and 7.3% for HGVs .

Growth by Road Type (All Vehicles)

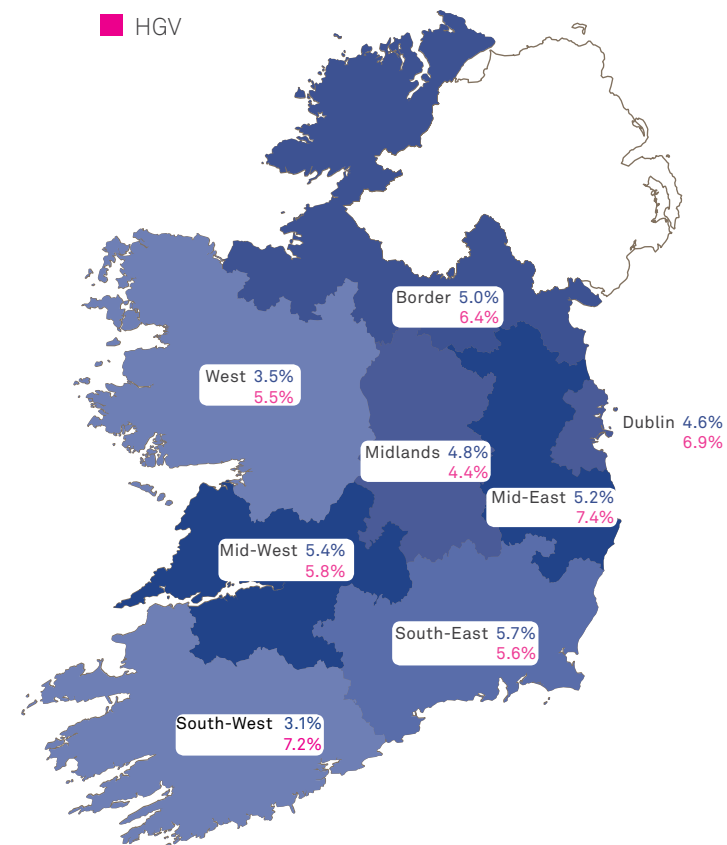


Growth by Road Type (HGVs)



Growth by Region

- All Vehicles
- HGV






Source: TII Traffic Monitoring Units

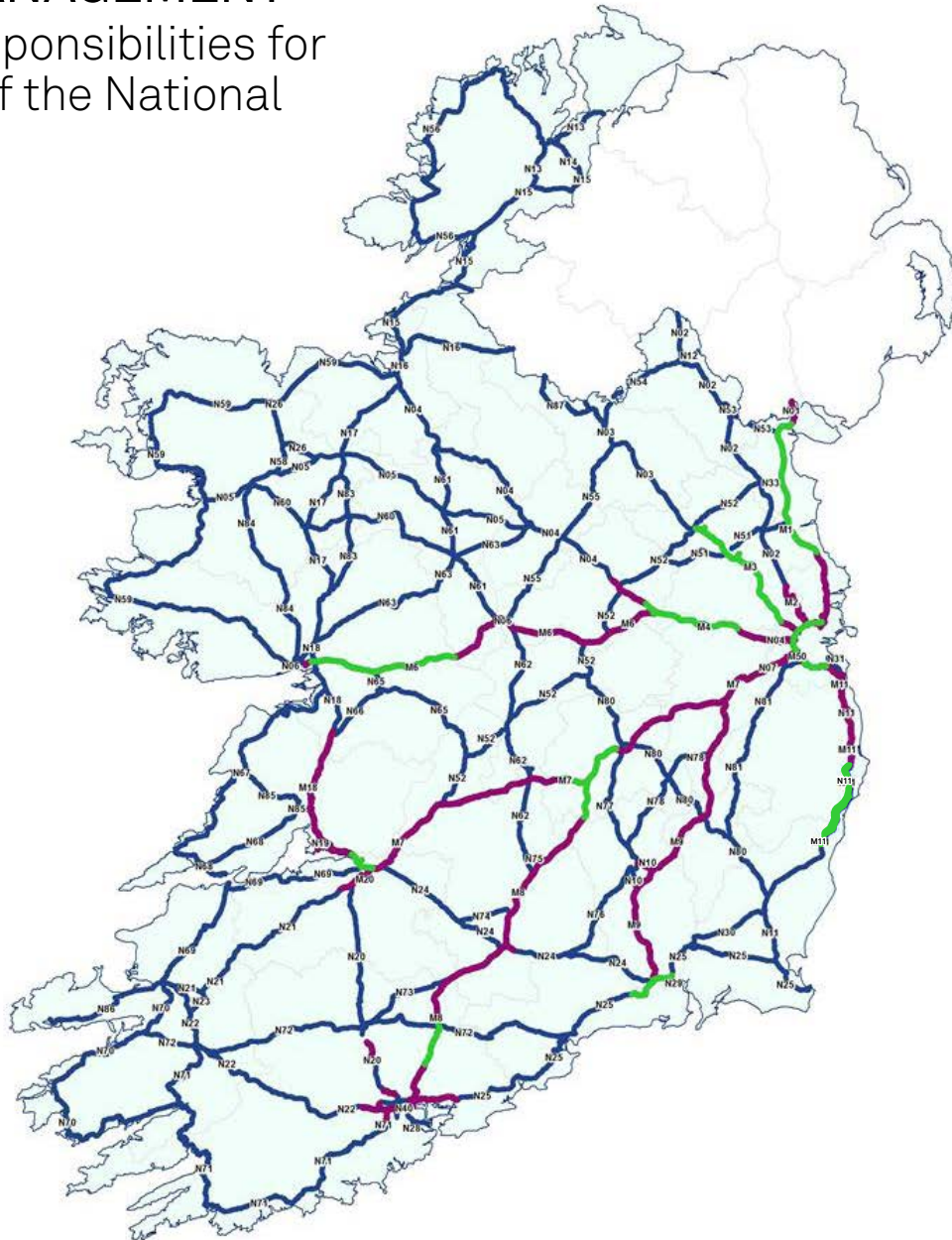
H: NETWORK MANAGEMENT

Overview of the responsibilities for the Management of the National Road network








The management of the National Road network is assigned to a number of bodies with the majority share of National Primary and National Secondary roads being managed by Local Authorities. Motorways are managed under the Motorway Maintenance and Renewal Contracts (MMaRCs) or by PPP Concession companies in the case of the tolled motorways. TII manages the maintenance of 2,709 bridges, which includes all bridges on National Roads other than on PPP roads. PPP Concession companies manage a total of 472 bridges.

Routes managed by:

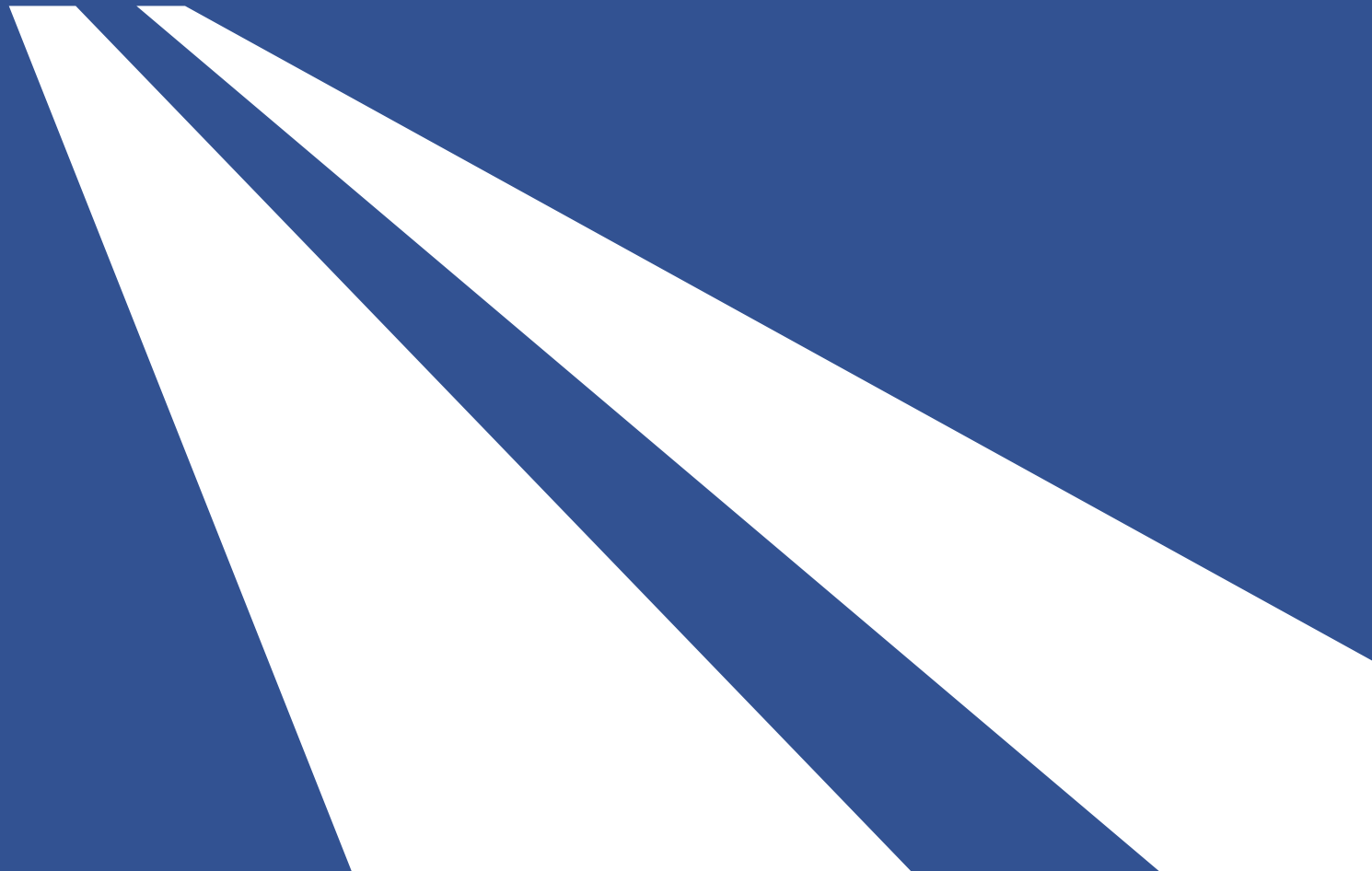
- MMaRC 
- PPP 
- Local Authority 



Key facts:

 327 demountable snow ploughs Our winter service fleet consists of:	 9,664 all emergency calls received by Motorway Traffic Control Centre including SOS phones	 30 nights in 2015 where the temperature reached below zero
 360 salt spreaders	 1,410 SOS phones in the country	 96 weather stations in operation on the National Road Network
 29,600 tonnes of salt were used on National Road Network in 2015		

TWO: ECONOMIC



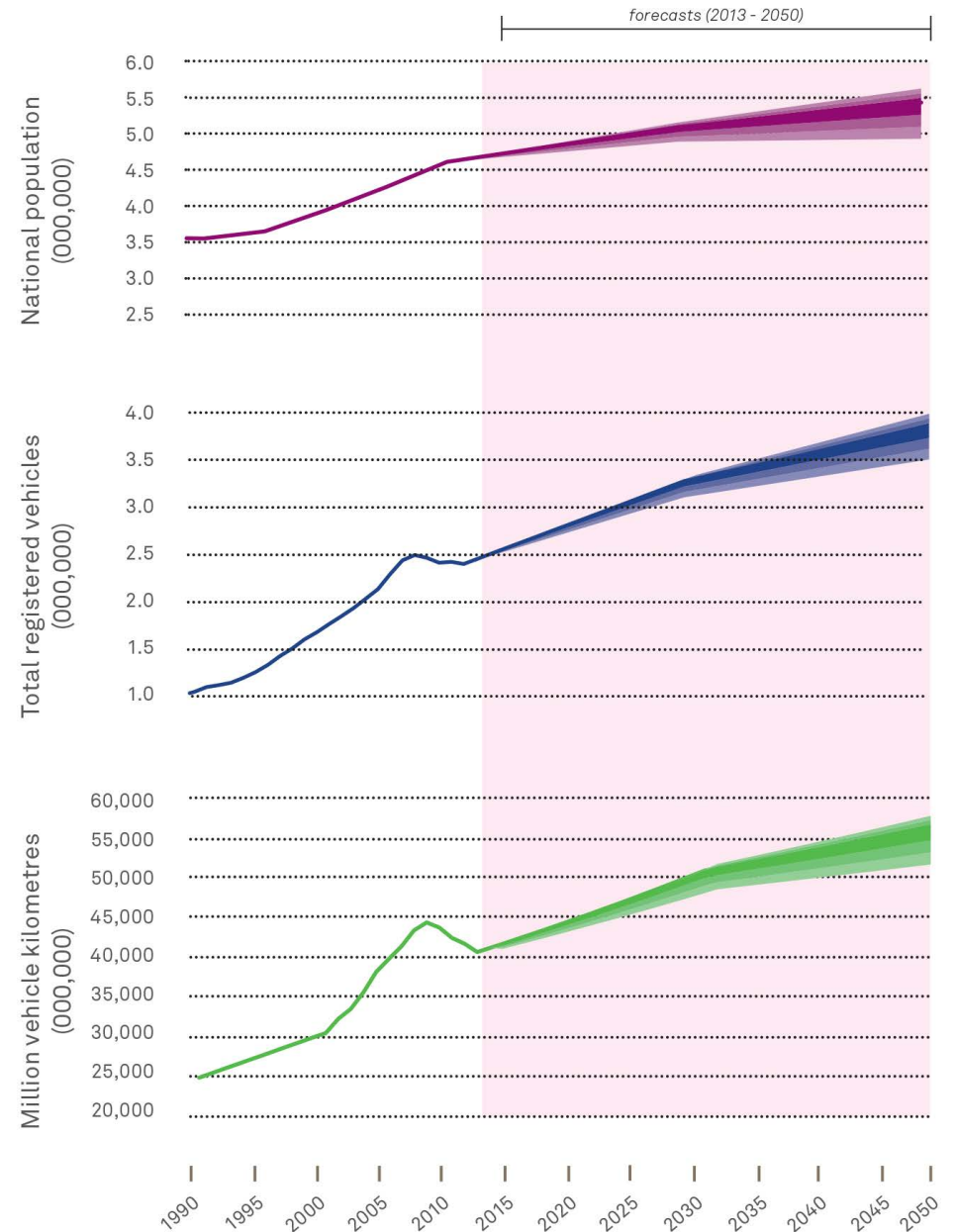
E: POPULATION, CAR OWNERSHIP AND VEHICLE KILOMETRES FORECASTS

Overview of recent experience and forecasts for the future

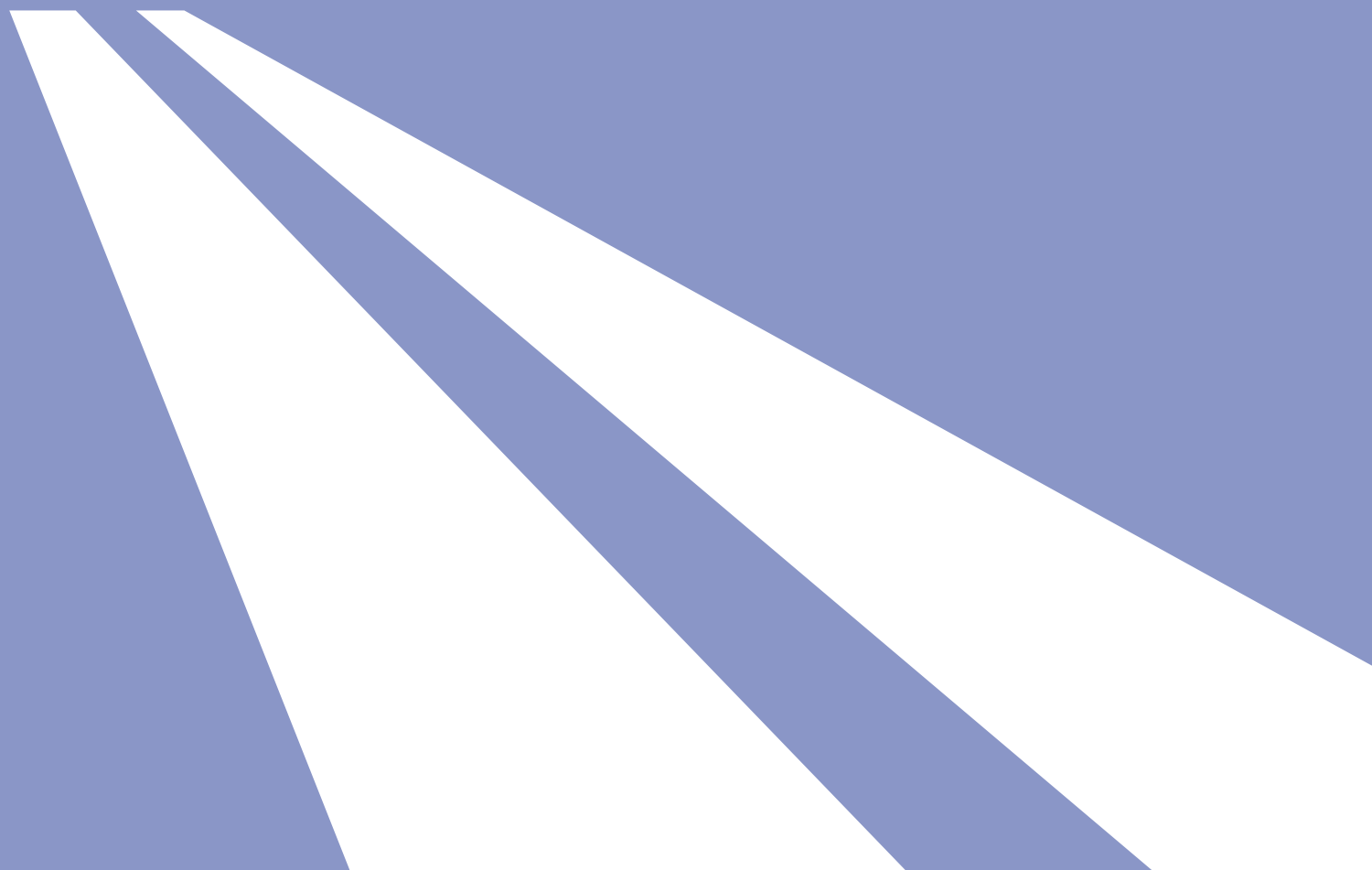
The country experienced significant increases in its level of population, number of registered vehicles and vehicle kilometres travelled over the period 1990 to 2008.

Since 2008 there has been a reduction in the level of car ownership and vehicle kilometres travelled in the country, although these have started to rise again since 2012. The ESRI Irish County Population Model (IC-POP) has produced population forecasts to 2050 by applying mortality, fertility and migration projections to Census 2011 data. According to the ESRI forecasts, the population of the country is forecast to reach between 4.91 and 5.61 million persons in 2050.

TII's 2013 update of National Transport Model incorporates these ESRI population projections and can forecast the vehicle numbers and vehicle kilometres travelled in the country to 2050. In 2050, it is forecast that there will be between 3.5 and 4.0 million vehicles registered in the country. The number of vehicle kilometres travelled is forecast to reach between 52.0 and 58.5 billion in 2050.



THREE: ROAD CONDITION



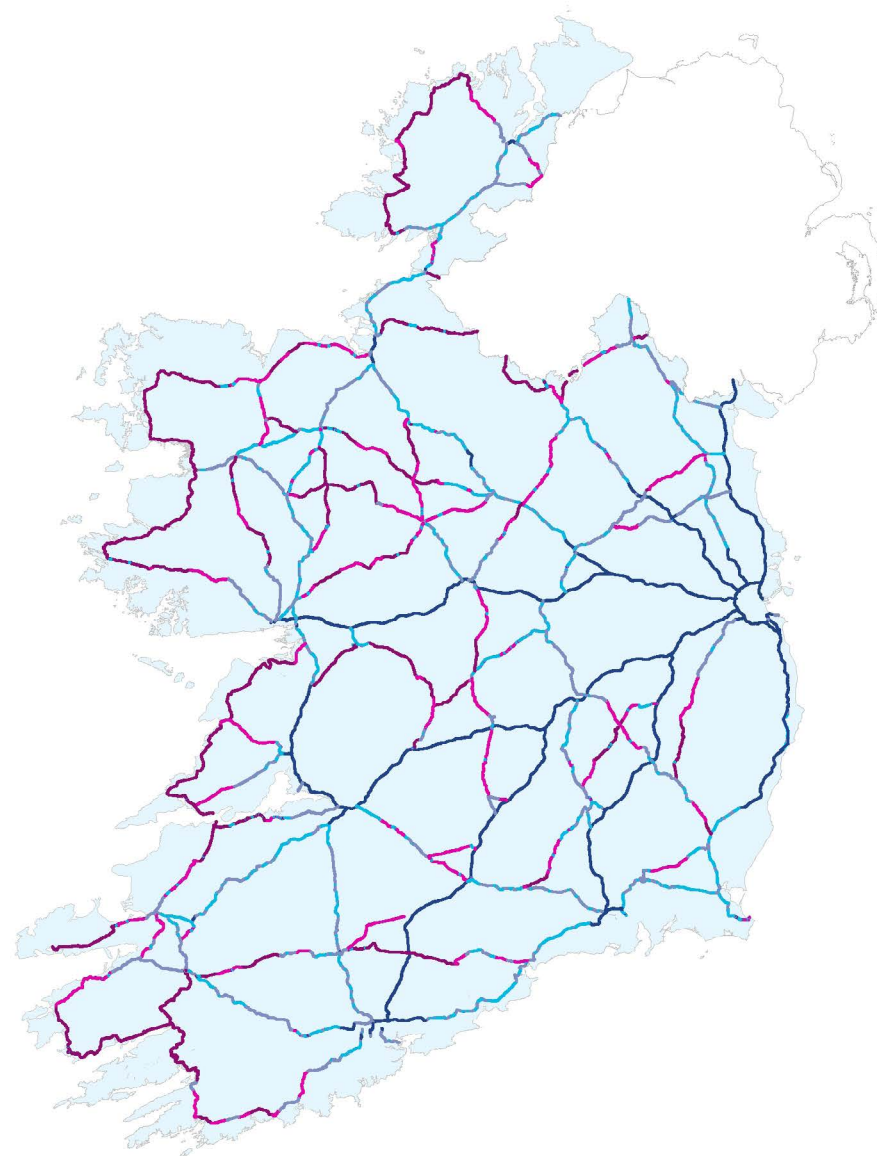
A: PAVEMENT MAINTENANCE

Overview of the status of the road pavement across the National Road network by subnetwork type

The National Road network consists of over 5,400 kilometres of road pavements. The pavements are predominately made of layers of flexible materials designed to support traffic volumes/loads over their design lifespan of between 0 and 40 years. Owing to the diversity that exists

across network pavements a series of 5 Subnetwork types has been defined, to assist in the ongoing management of the network. These Subnetworks are defined in terms of their characteristics, e.g type of pavement construction, pavement age, and traffic volumes carried.

Subnetwork	Classification
0 Motorways + dual carriageways	High speed, high volumes pavement, made up of Motorway and Dual Carriageway sections of the network. Much of this subnetwork is less than 10 years old.
1 Engineered pavement	Significant geometric and pavement design has taken place in the construction and/or rehabilitation of the pavement sections. Typically carry reasonably large volumes of traffic, and are identified by presence of hard shoulders adjacent to the carriageway.
2 Legacy pavement – high traffic	Legacy subnetwork, typically constructed without formal geometric or pavement design. Typically carries traffic volumes less than 10,000 AADT.
3 Legacy pavement – low traffic)	Legacy subnetwork, typically constructed without formal geometric or pavement design. Typically carries traffic volumes less than 5000 AADT.
4 Legacy pavement – very low traffic	Legacy subnetwork, typically constructed without formal geometric or pavement design. Typically carries traffic volumes less than 2000 AADT.



B: CURRENT STATUS OF THE ROAD PAVEMENT CONDITION

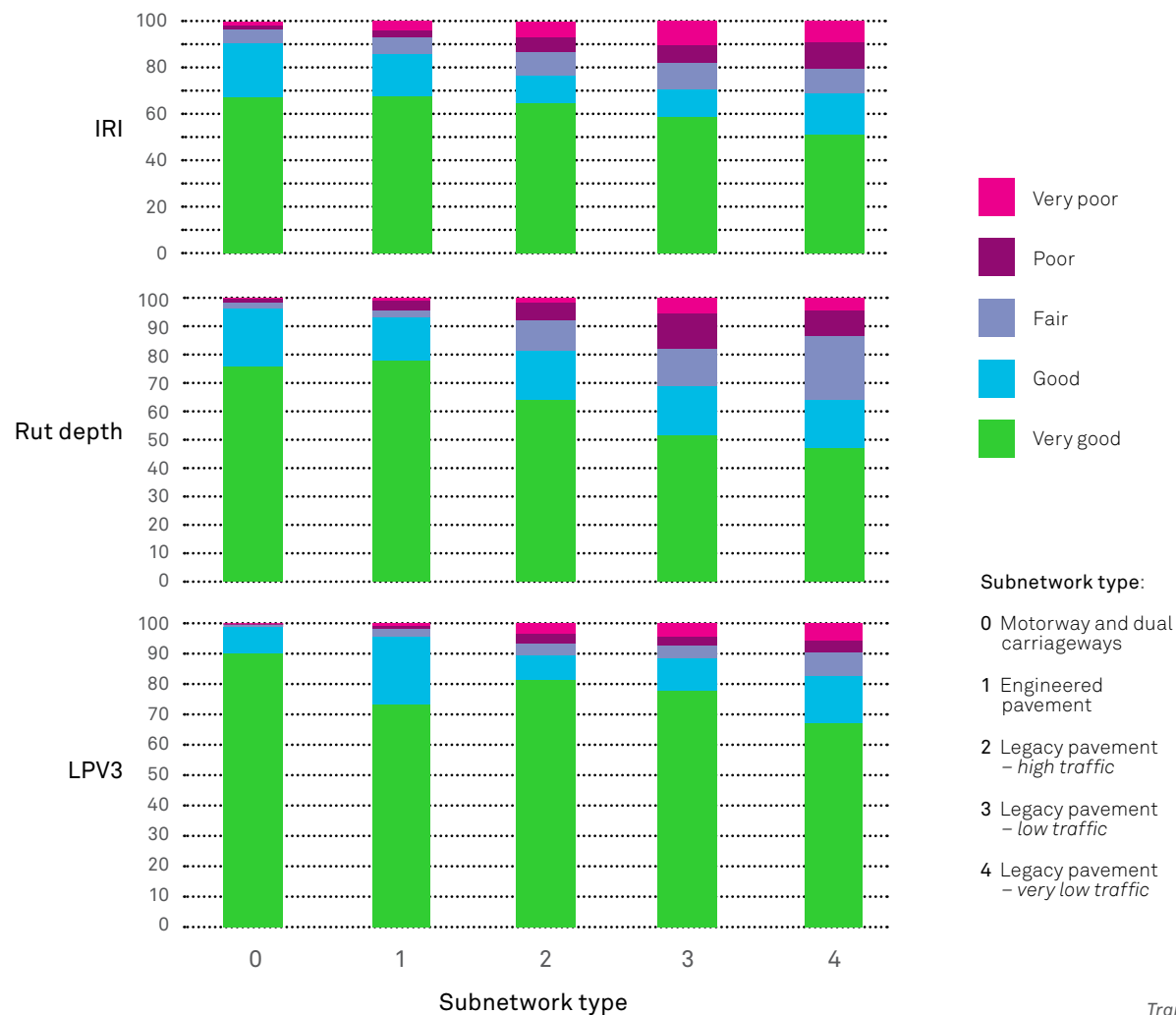
Overview of the condition of the road pavement across the National Road network by some key indicators

TII collects data on the pavement condition across the entire pavement network annually, using high speed machine survey vehicles. This data is used to select sites for treatment under the Pavement and Minor Improvements programme. As part of the annual survey of road pavement condition, data on a number of key indicator parameters are collected, including:

- **IRI (International Roughness Index)** which measures the response of vehicle to the pavement surface conditions
- **Rut Depth** which measures the level of rutting/deformation on the pavement caused by heavy traffic
- **LPV3 (Longitudinal Profile Variance)** which measures the level of bumps, potholes, sags etc in the pavement

In 2016, it was identified in relation to roads belonging to motorway/dual carriageway that:

- 67% of the network had very good IRI;
- 74% of the network had very good Rut Depth
- 90% had very good LPV3 levels



Source: NRA Pavement Condition Report

C: NATIONAL ROAD BRIDGE STRUCTURES

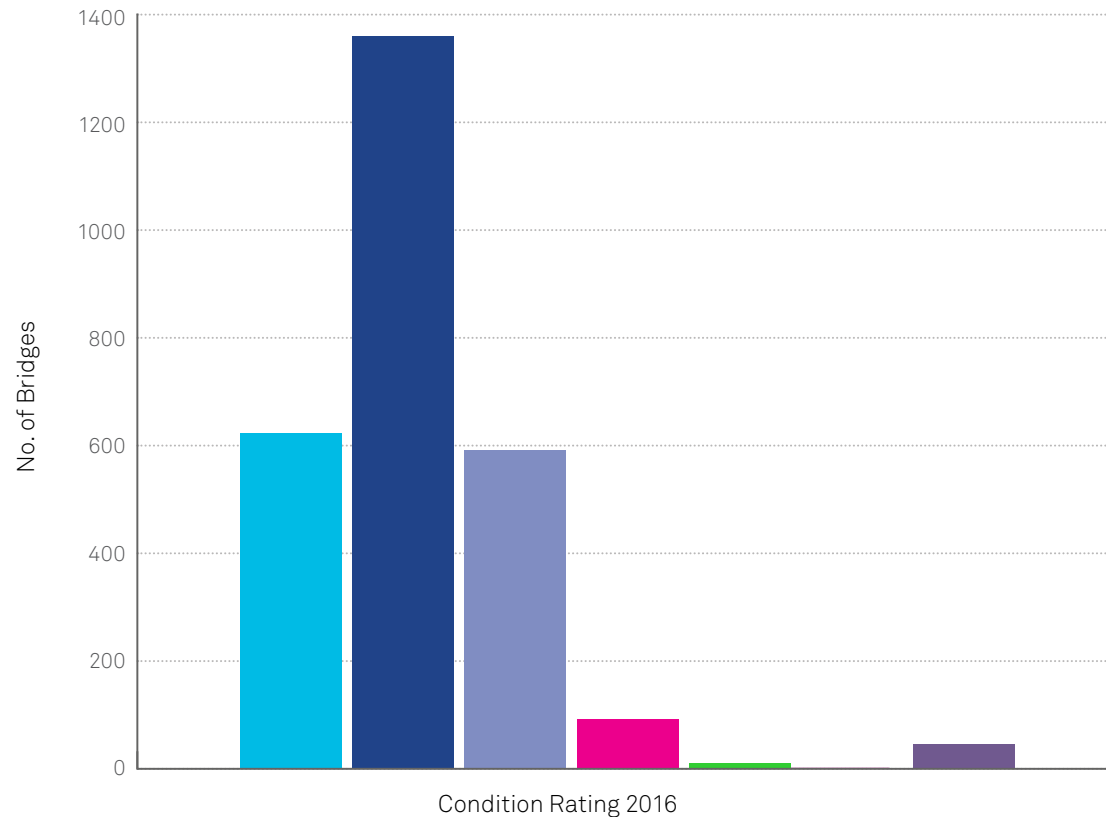
Overview of the quantum and condition of bridge structures on the National Road network

Bridges are key elements of the National Road system and maintenance and rehabilitation of bridges is a key part of the TII's asset management strategy.

The National Road network includes approximately 2,700 bridge structures of which 472 are on roads provided by public private partnerships.

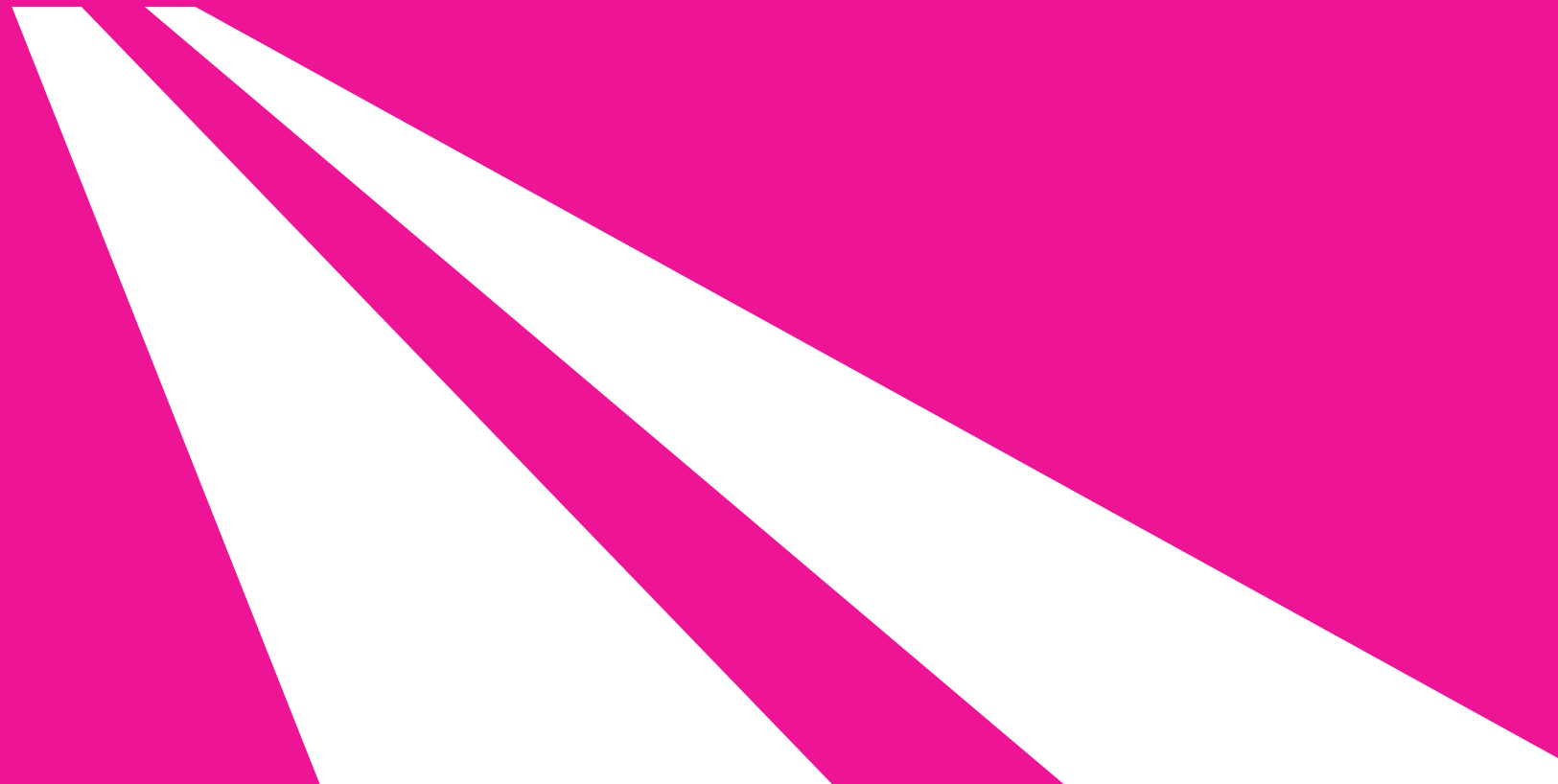
Bridges are inspected on a regular cycle. Bridge components which are allocated a condition rating of 0 or 1 do not require repair work, whereas those assigned a rating of 2 or higher are scheduled for future repair.

The amount of bridges falling into the CR1+ categories has increased since 2015.



- CR 0: No or insignificant change.
- CR 1: Minor Damage but no need of repair.
- CR 2: Some Damage, repair needed when convenient.
- CR 3: Significant Damage, repair within next financial year.
- CR 4: Damage is critical, repair at once.
- CR 5: Ultimate Damage. The component has failed or is in danger of total failure.
- N/A: Data not available due to access restrictions.

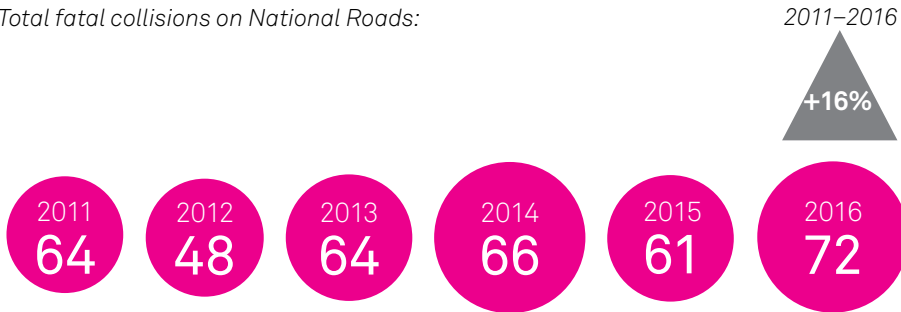
FOUR: SAFETY



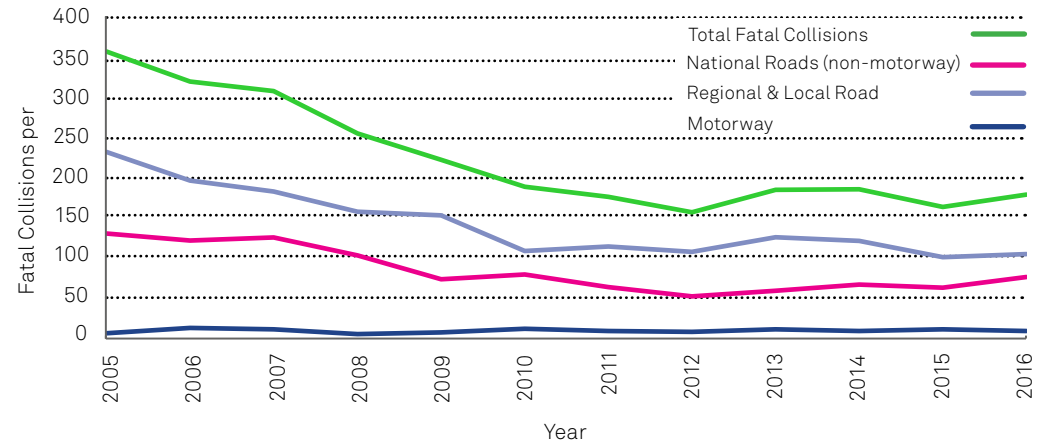
A: FATAL COLLISIONS NATIONALLY

Trends in fatal collisions nationally

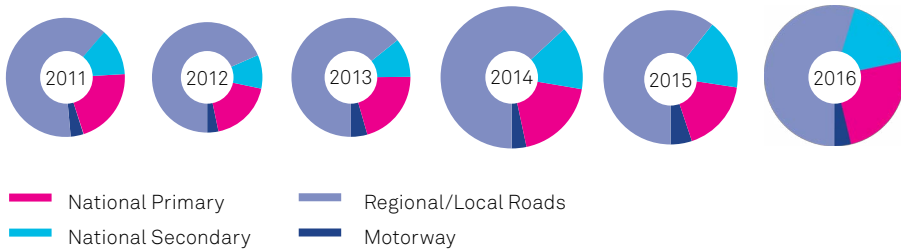
Total fatal collisions on National Roads:



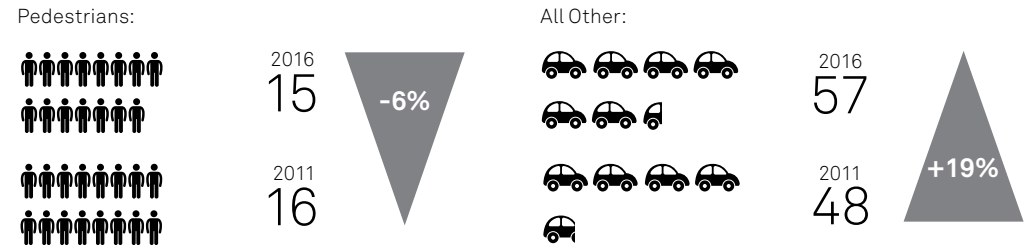
Long term trends in total fatal collisions



Distribution of fatal collisions by road type (National & non-national):

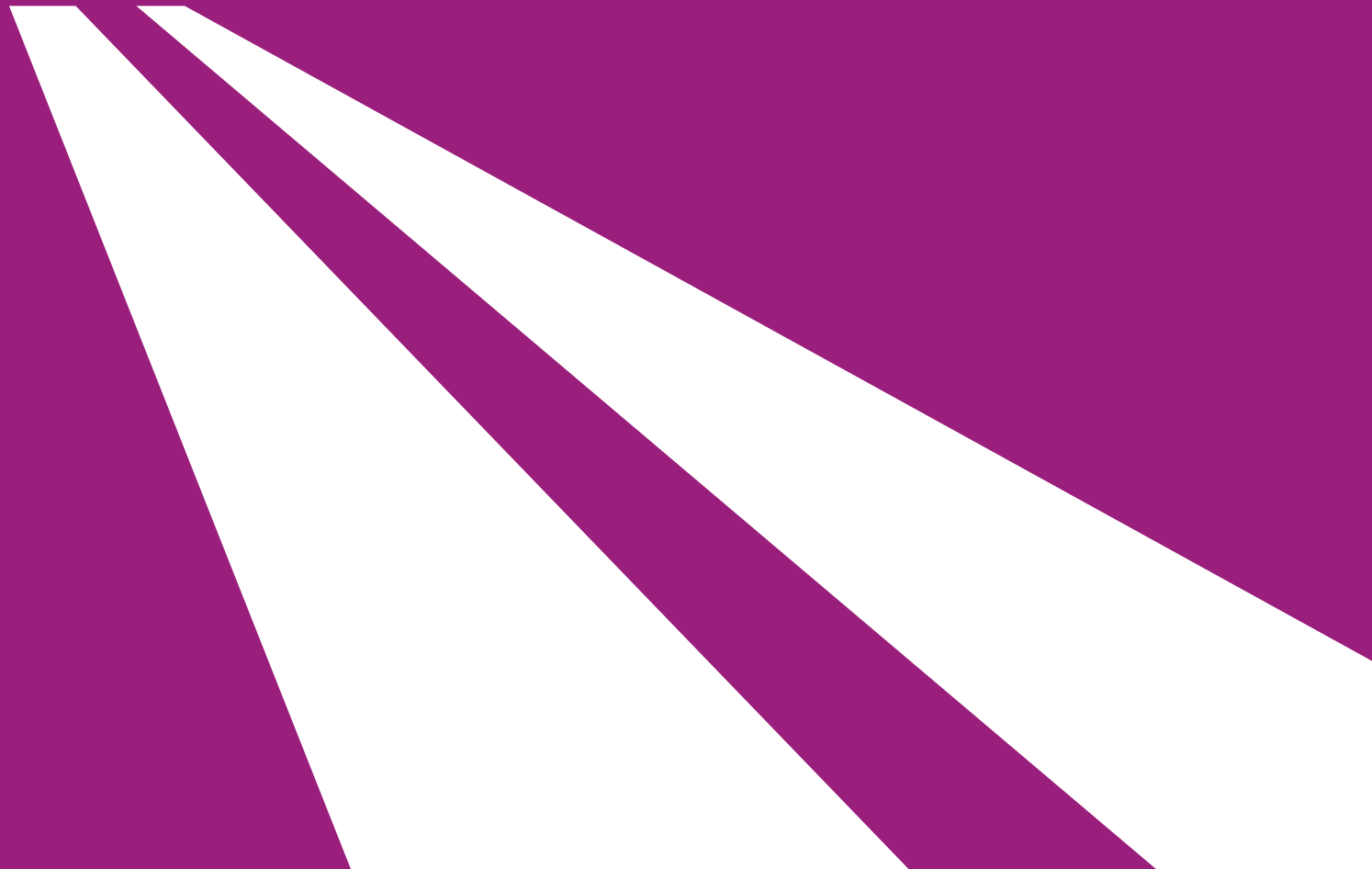


Recent trends in total fatal collisions on National Roads:



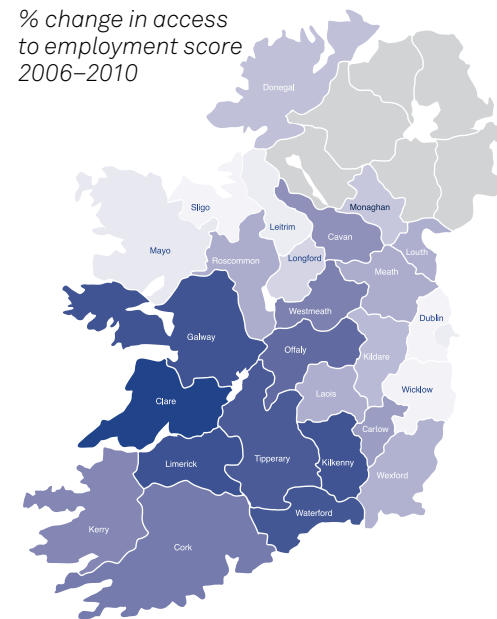
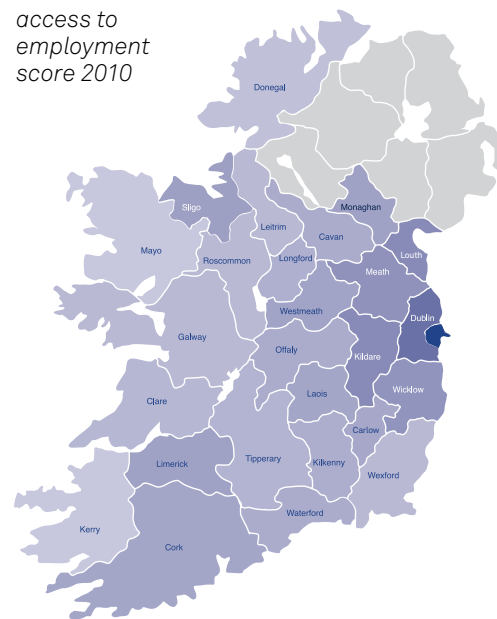
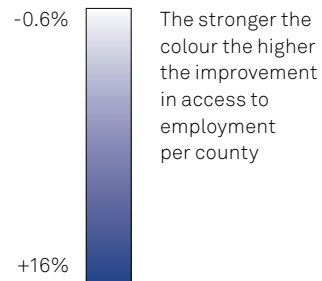
Fatal collisions 2016/2015: AGS data (not verified by RSA), Fatal collisions 2014: Garda Pulse data (not verified by RSA)*

FIVE: ACCESSIBILITY + ENVIRONMENT



A: IMPACT OF ROAD INVESTMENT ON EMPLOYMENT ACCESSIBILITY

A key benefit of a quality road system is improved accessibility to jobs




Note: *The quantified benefits relate to agglomeration wider economic impacts only; they exclude the conventional benefits arising from journey time savings and safer journeys.*

Peripheral areas tend to suffer from poor accessibility to jobs if transport links are inadequate. In 2010 the most accessible areas in the country were Dublin and Kildare followed by Louth, Wicklow and Meath. The investment in the road system over the period 2006–2010 led to an increase in job accessibility of 6.9% nationally. However, the counties of Galway, Clare, Limerick, Tipperary, Kilkenny and

Waterford have particularly benefited from improvements in accessibility of 14% or more, reflecting the impact of the investment in the major inter-urban routes. It is estimated that road improvements over the period 2006–2010 are contributing an annual benefit in GDP terms of €525m. In present value terms, over a period of 30 years, this is an aggregate benefit of some €9.5bn.

For further information see: *Transport Research and Information Note: Impact of Improvements in the Road Network on the Accessibility & Economic Potential of Counties, Urban Areas, Gateways & Hubs, 2012*



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