

NATIONAL ROADS AUTHORITY

# NATIONAL ROAD NETWORK INDICATORS 2013

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# INTRODUCTION

The National Road Authority's primary function is to secure the provision of a safe and efficient network of national roads.

For this purpose, it has overall responsibility not only for planning and supervision of 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 short and predictable journey times and safe journeys.

The National Roads Authority considers it important to monitor the performance and use of the national road network and to share this information with the public at large.

This publication sets out some key road transport, economic, safety and environmental 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 2013

*There are in excess of 5,300 kilometres of national road network in Ireland*

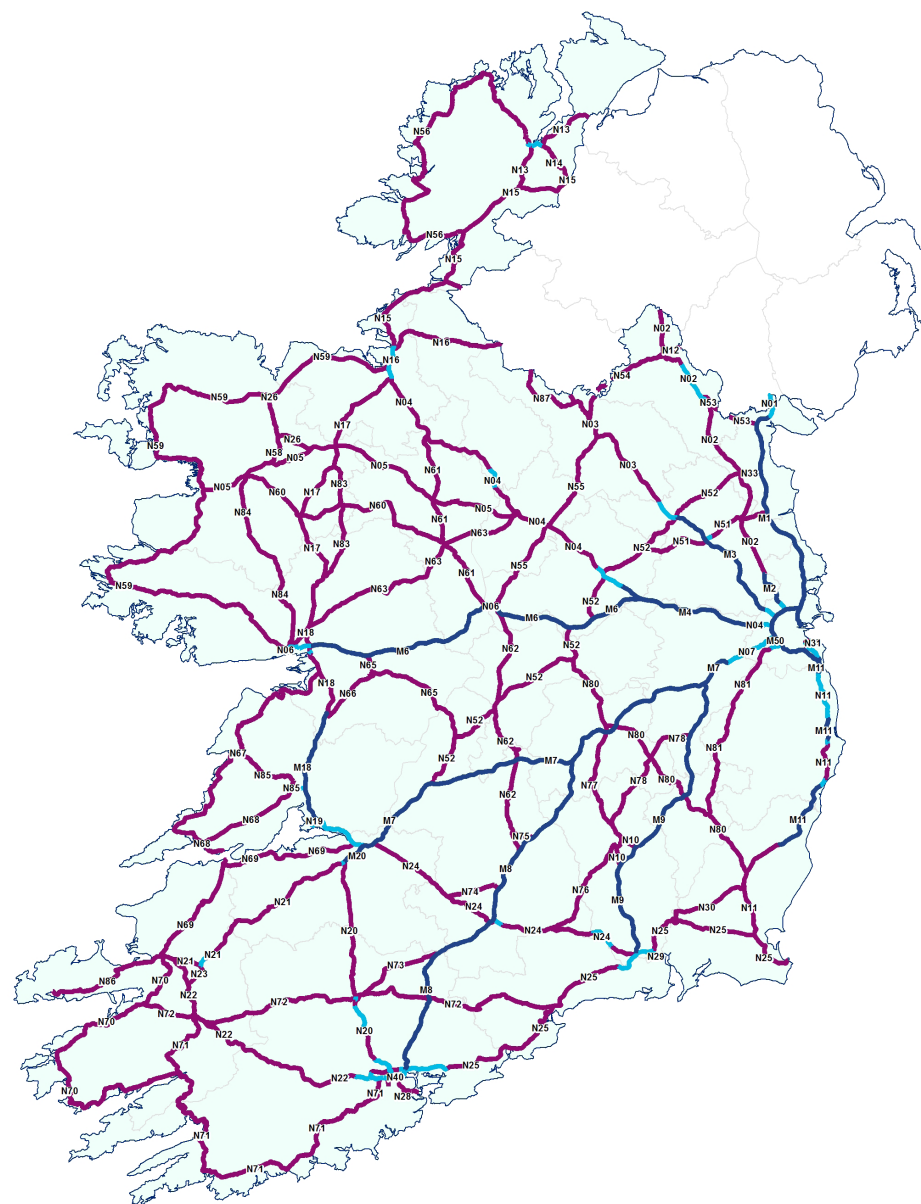
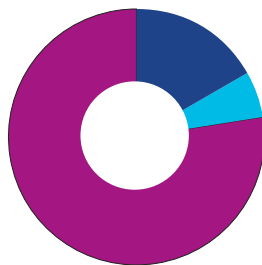
The national road network is comprised of 897 kilometres of motorway, 298 kilometres of dual carriageway, and 4,110 kilometres of single carriageway.

The national road network's classification status comprises 2,651 kilometres of National Primary and 2,654 kilometres of National Secondary roads.

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 and updating of data in the NRA Roads Database.

Road type:

motorway	897km
dual carriageway	298km
single carriageway	4,110km



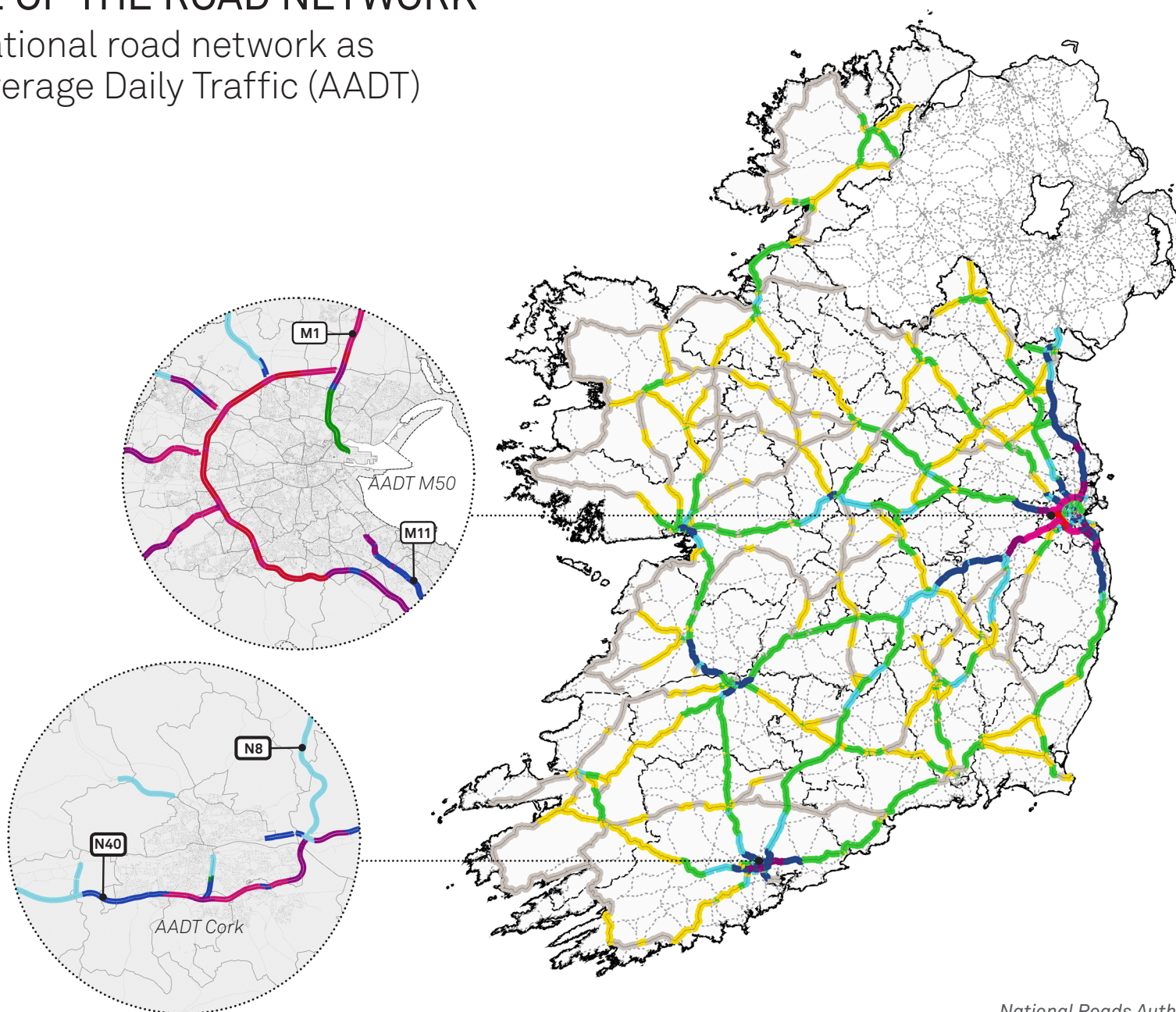
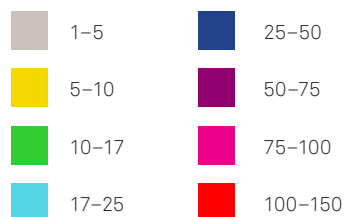
## B1: LEVEL OF USAGE OF THE ROAD NETWORK

Level of usage of the national road network as measured by Annual Average Daily Traffic (AADT)

*Emergence from the economic downturn is clear with growth in traffic. The national road network continues to be heavily used*

On the M50 the annual average daily traffic flow (2-way AADT) in places is in excess of

AADT (thousands per day)



Source: NRA National Transport Model, 2013



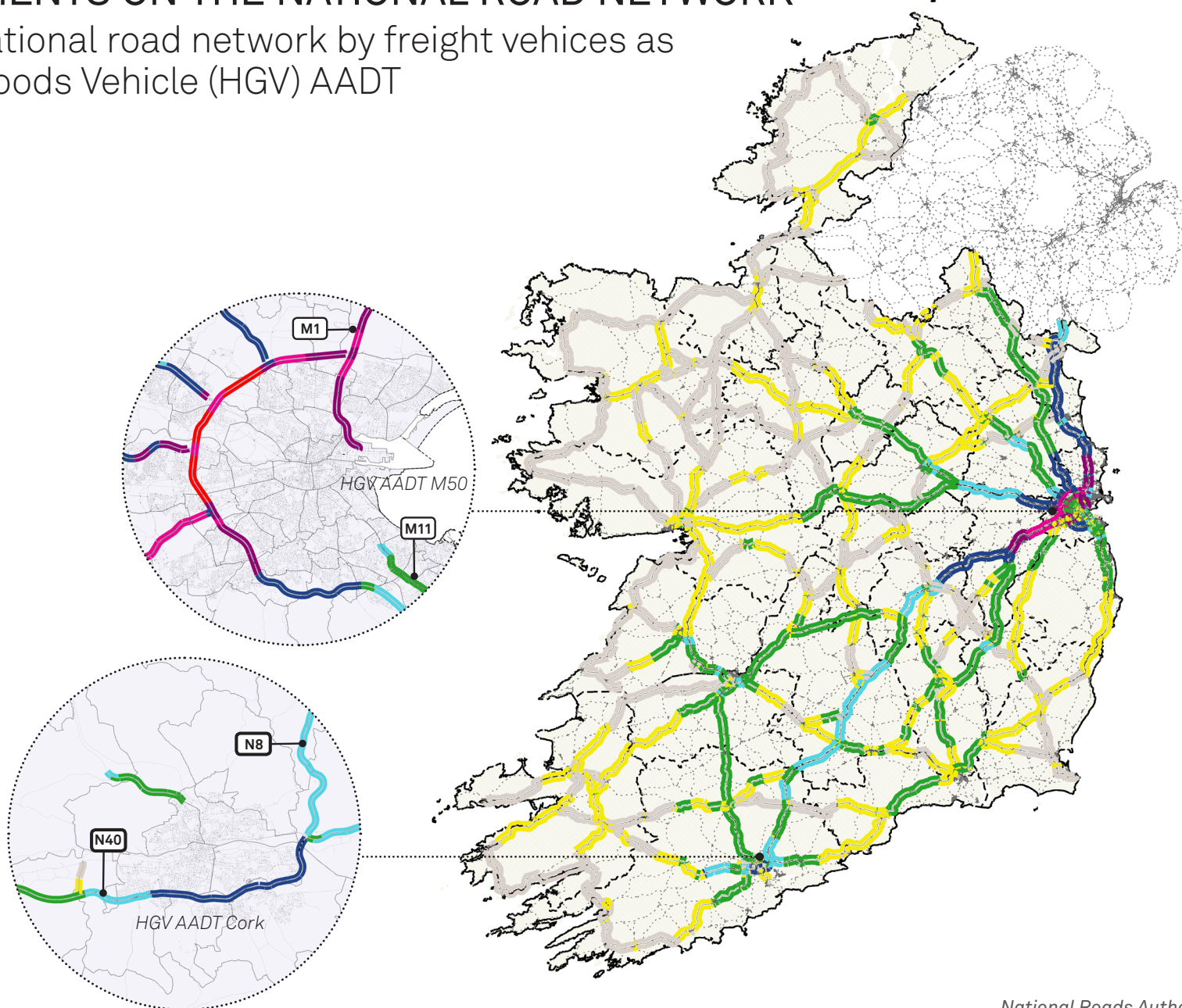
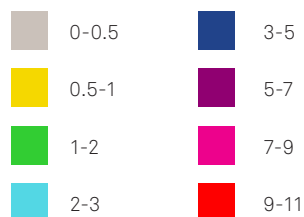
## B2: FREIGHT MOVEMENTS ON THE NATIONAL ROAD NETWORK

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

*In 2013, an estimated 220,000 HGV trips were undertaken on roads in Ireland on a typical day*

An analysis of the geographical dispersion of HGV trips shows that 21% of all HGV trips travel from Dublin and 9% from Cork. This highlights the importance of the major ports.

AADT (thousands per day)



Source: NRA National Transport Model, 2013

# 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.

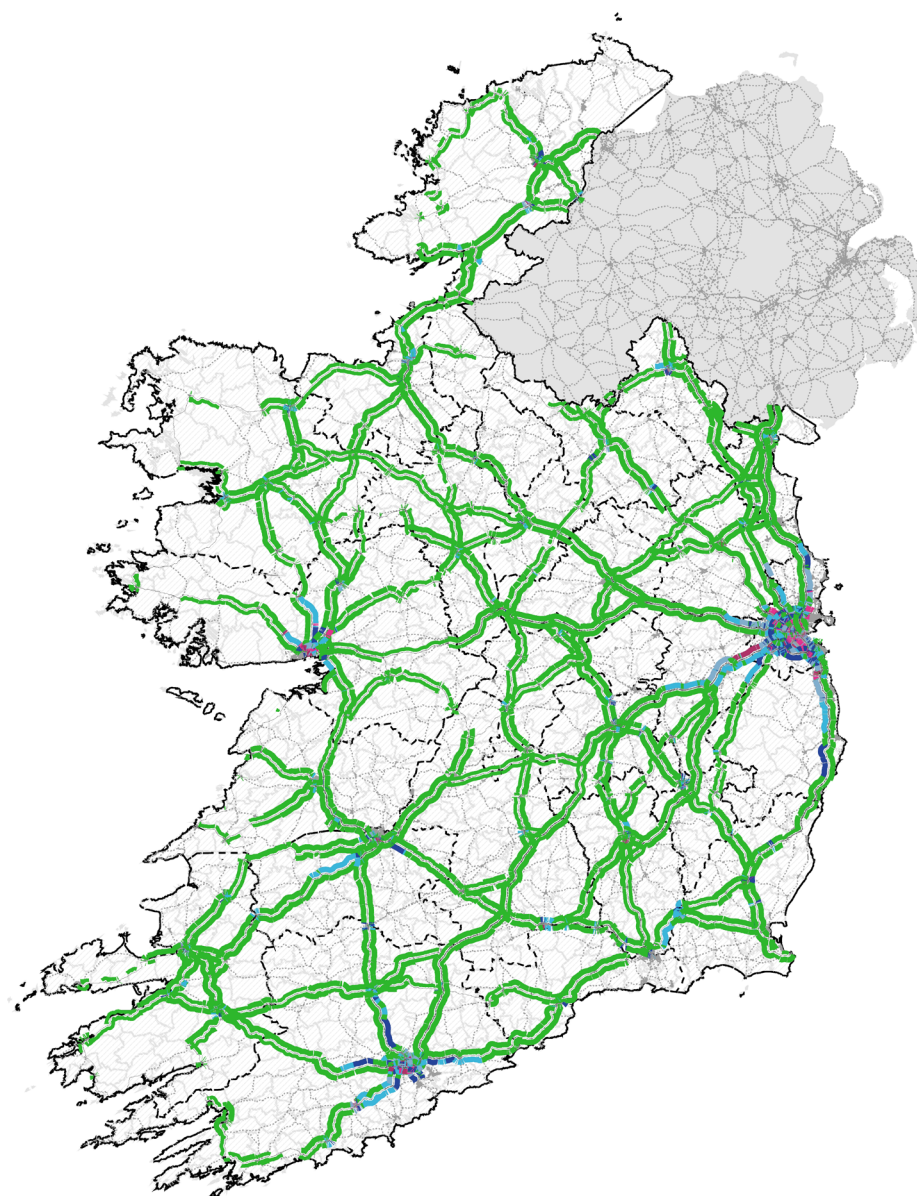
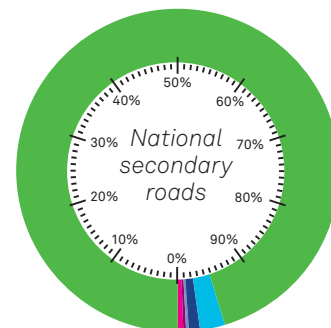
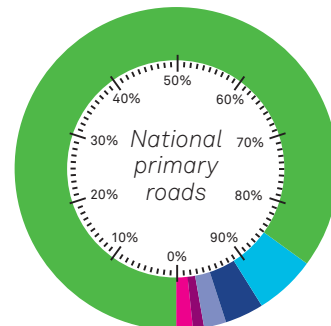
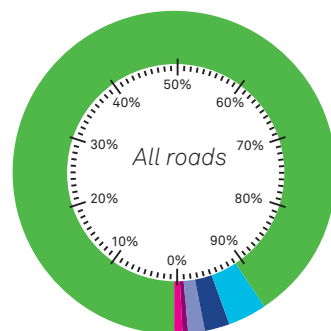
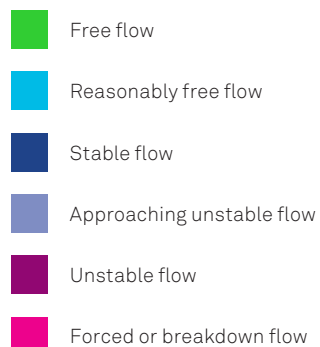
For further information see:

*Transport Research and Information*

*Note: A Study of Lane Capacity, 2012*

online at [http://nra.ie/Publications/](http://nra.ie/Publications/TransportResearchandInformationNotes/)

[TransportResearchandInformationNotes/](http://nra.ie/Publications/TransportResearchandInformationNotes/)

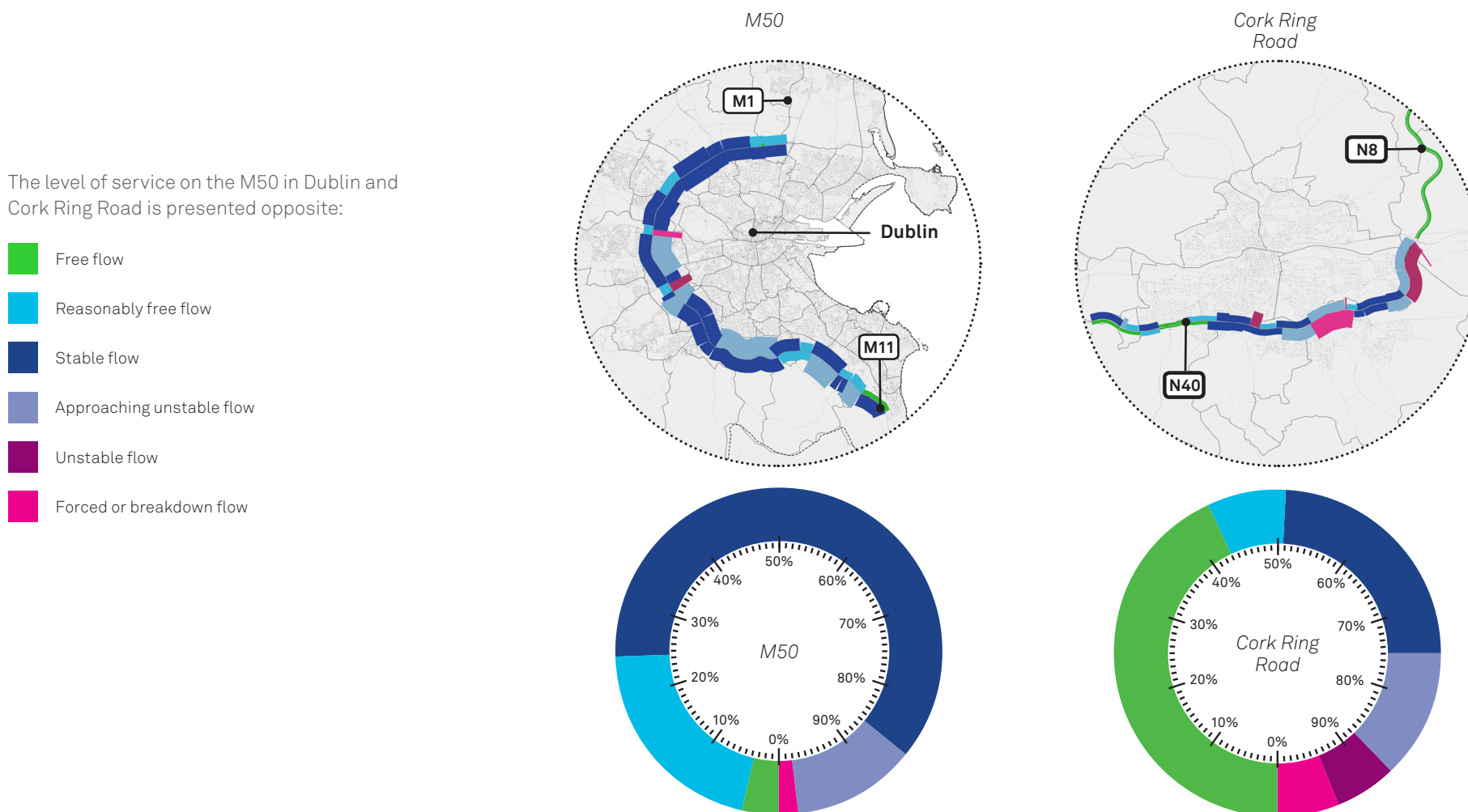




## C2: LEVEL OF SERVICE

### MORNING RUSH-HOUR, NATIONAL ROADS, ETC

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



Source: NRA National Transport Model, 2013

## D: ROADS USAGE OVER THE DAY

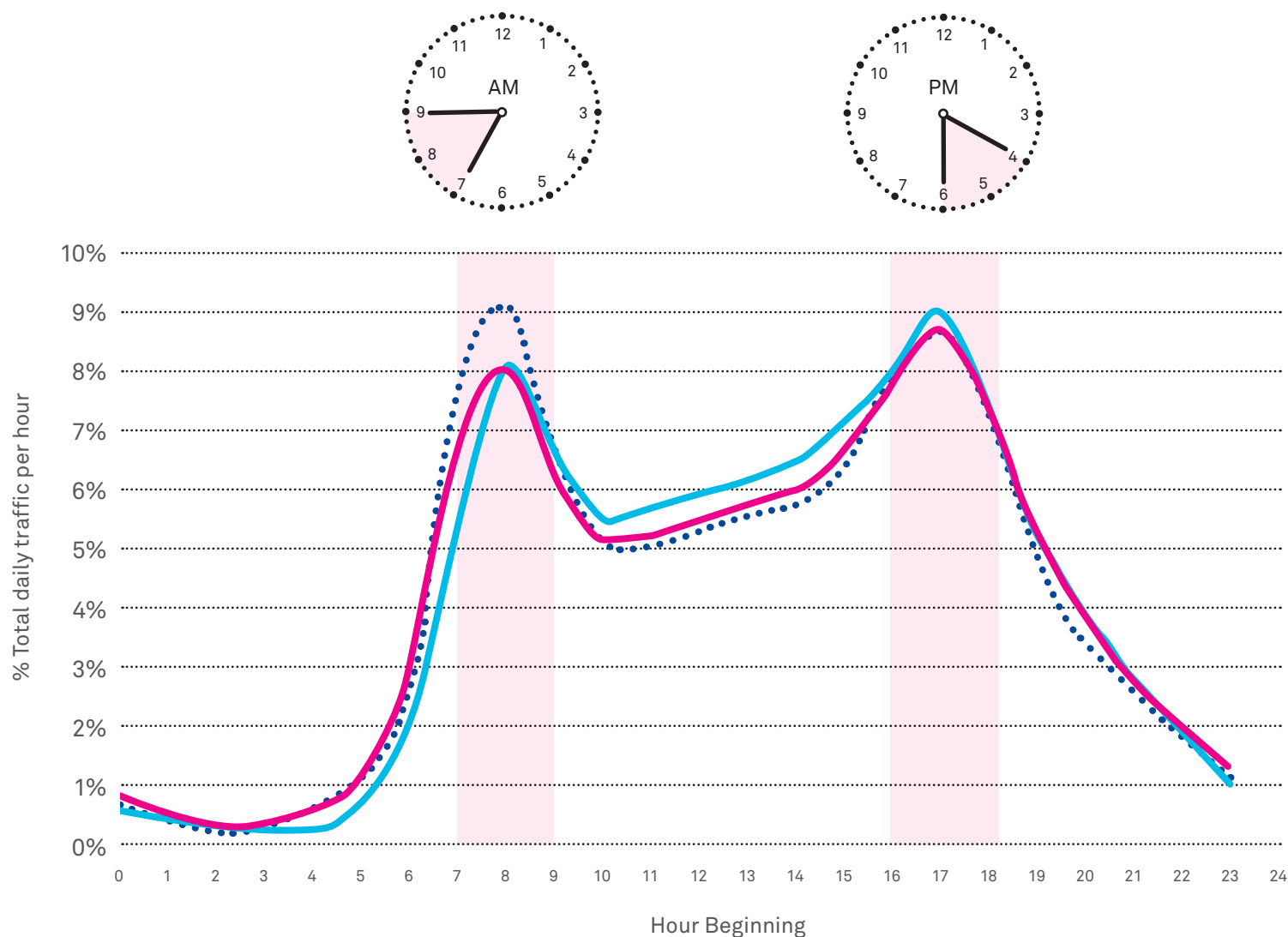
Profile of the usage of the road network by time of day

*The majority of roads are more heavily trafficked in the morning and evening peaks*

In the morning peak traffic builds to peak around the hour beginning at 8am. In the evening, the peak is usually reached in the hour beginning at 5pm. Peak traffic hours have a level of traffic some 30% to 50% above off-peak levels.

The M50 is the most trafficked road in the country with daily weekday traffic of nearly 130,000. The peaks on the M50 are more prolonged than other roads with significant traffic flows being maintained during off-peak periods.

- M50 motorway
- national primary
- national secondary
- peak period

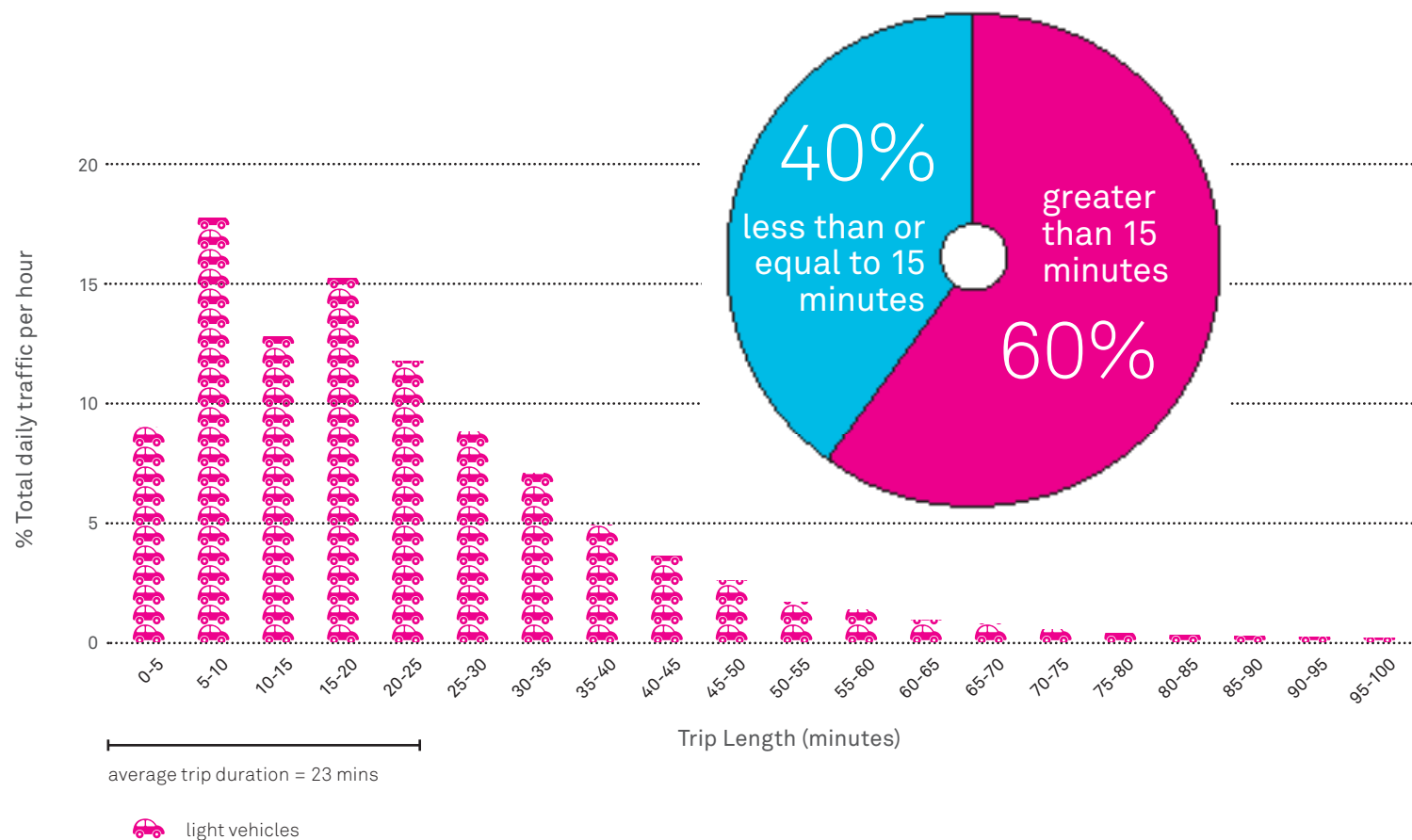


## E: TRIP DURATION

### 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 large portion of trips that people make are of short duration. In total, 40% of trips are of 15 minutes duration or less

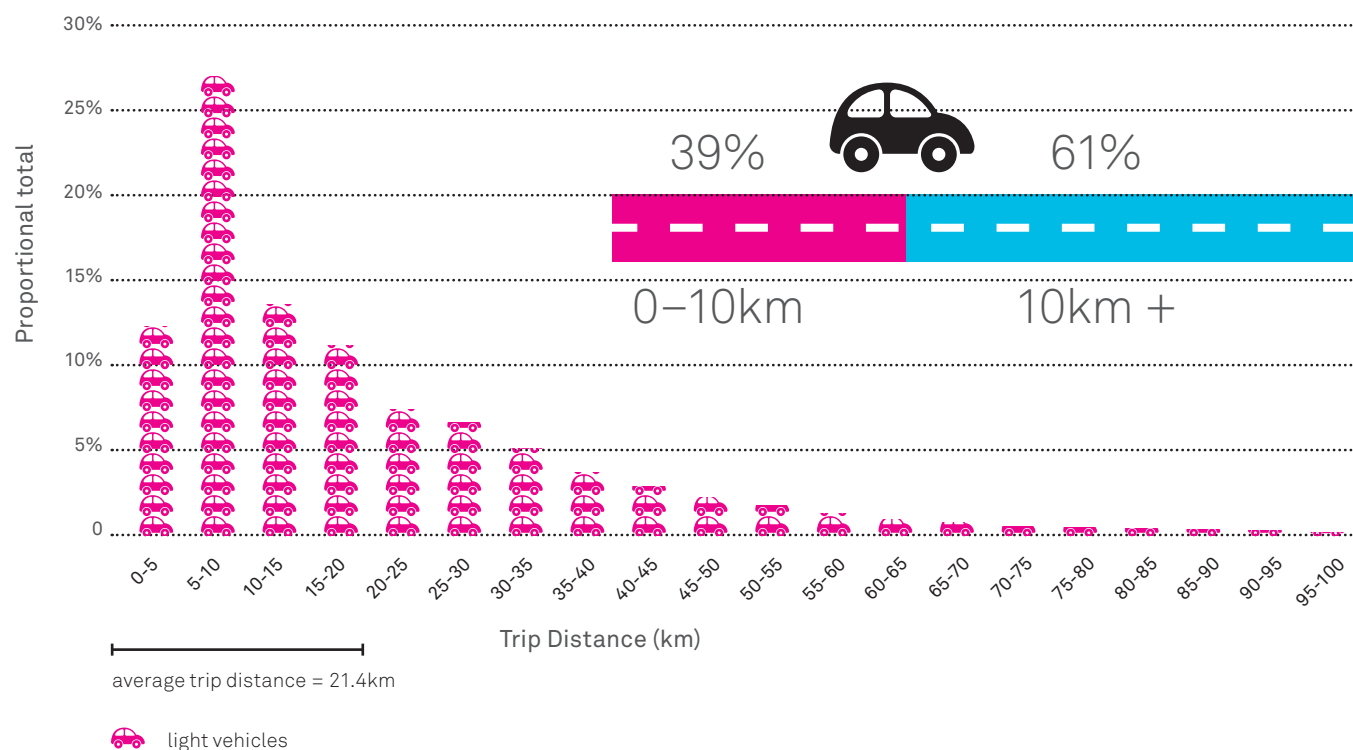


## F: TRIP DISTANCE

### NATIONAL AND REGIONAL ROADS - AM PEAK

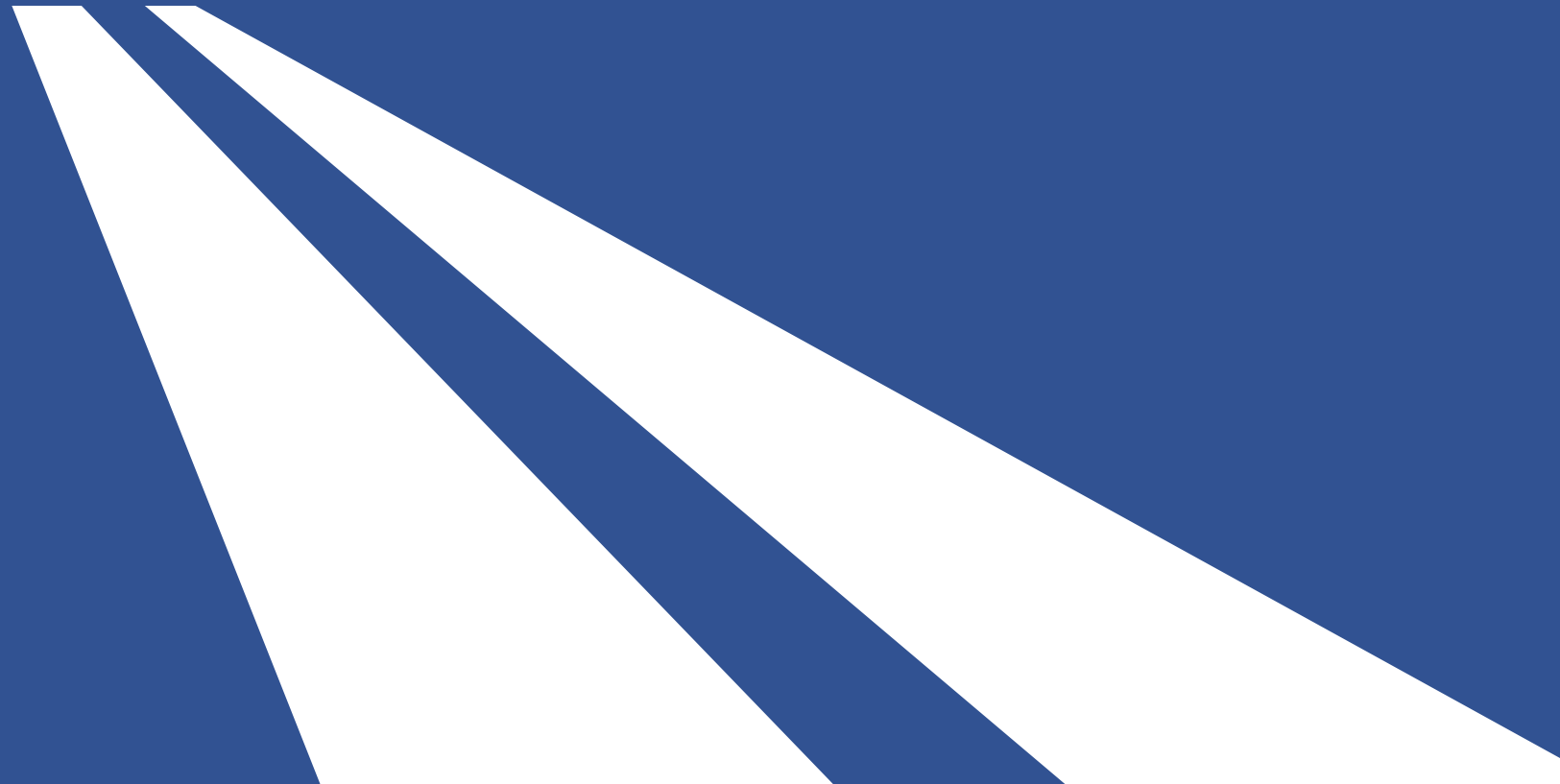
Profile of the trips made on the national and regional roads network by their distance

*Across the road network, a large portion of trips that people make are short distance. In total, 39% of trips on the national and regional roads network are 10 kilometres or less*





# TWO: ECONOMIC



## A: ROAD VEHICLE FLEET IN IRELAND BY FUEL TYPE

Changes in the distribution of the vehicle fleet in Ireland by type of fuel

*Roads users are switching to diesel vehicles*

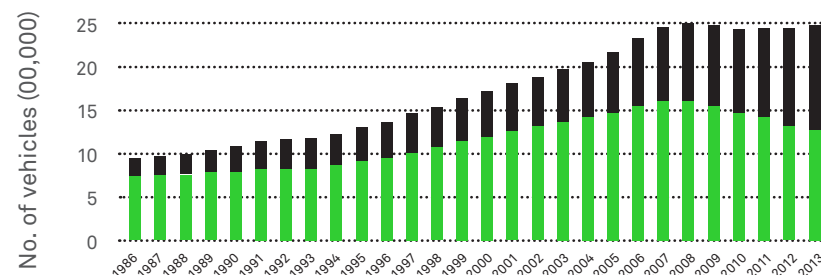
■ diesel  
■ petrol

In 2013 there were 2.46 million vehicles in Ireland. This represents a 169% increase over the number of vehicles in the country in 1986. The vehicle fleet peaked in size in 2008, where there were 2.49 million vehicles in the country.

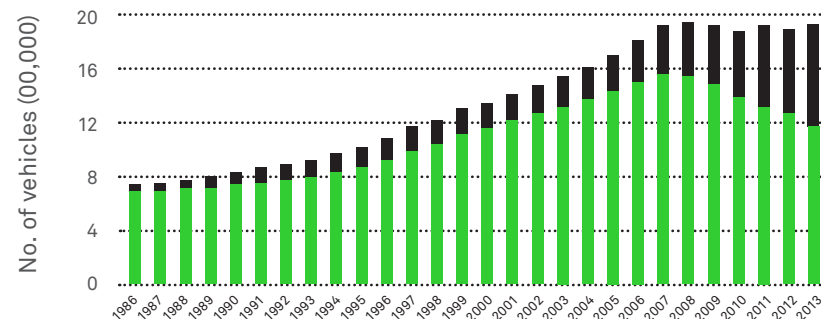
In response to changes in the motor vehicle taxation system, there has been a significant change in the fuel-type split of the vehicle fleet since 2007. The change has been particularly pronounced in the passenger car fleet. In 2007, 18% of the passenger car fleet were diesel vehicles; the equivalent proportion in 2013 was 37%.



Distribution of Total Vehicle Fleet by Fuel Type



Distribution of Passenger Car Fleet by Fuel Type



## B: FUEL CONSUMPTION IN IRELAND BY FUEL TYPE

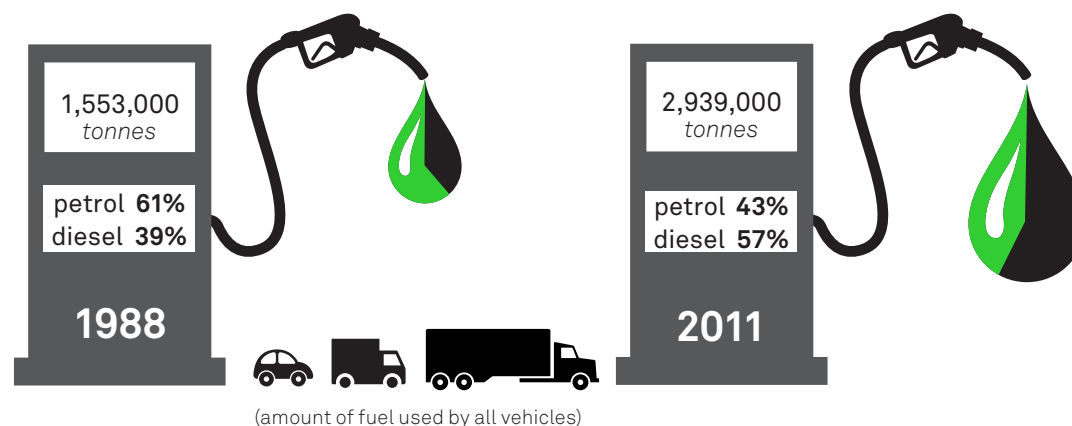
Profile of the vehicle fuel consumption  
in Ireland by type of fuel

*Diesel is accounting for a growing  
proportion of road transport fuel  
consumed by all vehicles*

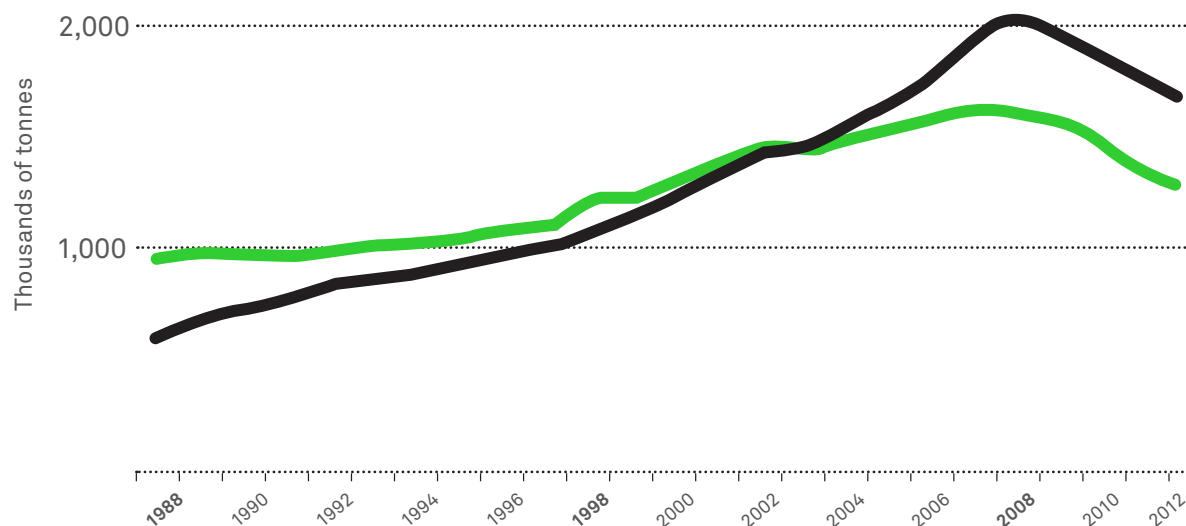
petrol  
diesel

Based on the latest data available from NRA research in 2013, fuel consumption in road transport has increased by 70% over the two decades to 2011, to 2.94 million tonnes. Peaking in 2007, national fuel consumption has declined by 20% from that peak. This reflects both the increased fuel efficiency associated with the vehicle fleet as well as a decline in traffic volumes.

Since 2007, petrol consumption has fallen more than diesel consumption in percentage terms. This in part reflects an ongoing switch by car users from the petrol to the diesel car, as well as a move to smaller petrol vehicles. In 2011, 57% of the road fuel consumed in Ireland was diesel and 43% was petrol.



Trends in fuel consumption



## C: ELASTICITY OF VEHICLE KILOMETRES TRAVELLED TO CHANGES IN FUEL PRICES

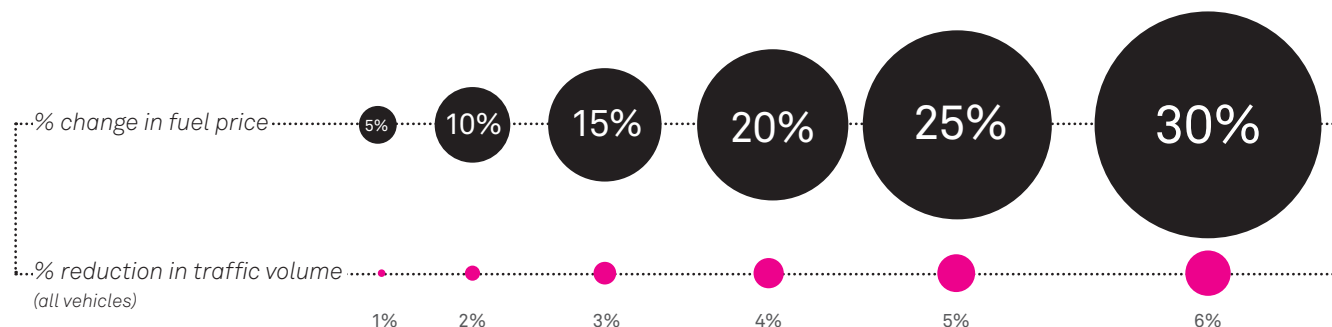
How responsive are Irish drivers to changes in fuel prices?

*Petrol and diesel prices in Ireland doubled in the period 2001–2012*

Research shows that when fuel prices increase by more than the general rate of inflation, road traffic volumes reduce. A 10% increase in fuel prices over and above general inflation rates reduces road travel by some 2%, but encourages a greater increase in fuel efficiency.

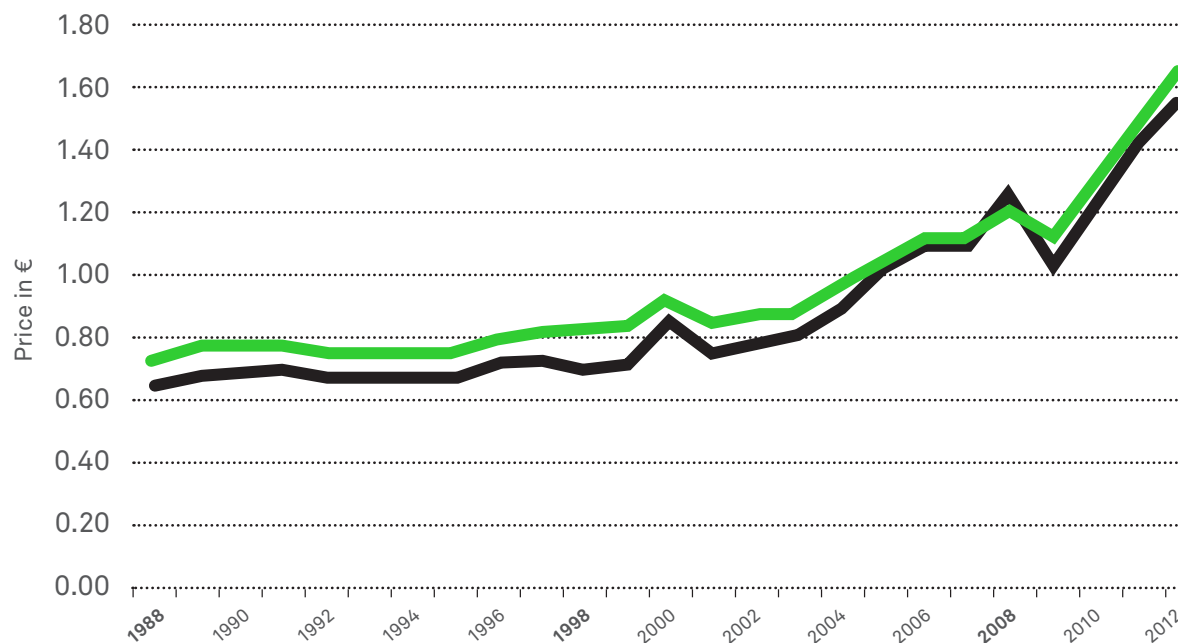
For further information see: *Transport Research and Information Note: The Impact of Fuel Prices on Fuel Consumption and Traffic in Ireland, 2013* online at <http://nra.ie/Publications/TransportResearchandInformationNotes/>

petrol  
diesel



*Fuel price in Ireland, 1986–2012\**

\*Data from CSO Statistical Yearbook 2013, Chapter 16 – Prices, Table 16.3



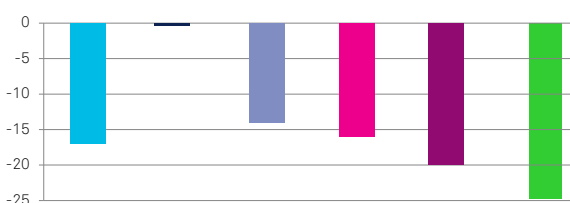
## D: EMISSIONS FROM THE ROAD VEHICLE FLEET


Changes in the level of emissions from the road vehicle fleet over the 2008 – 2012 period\*

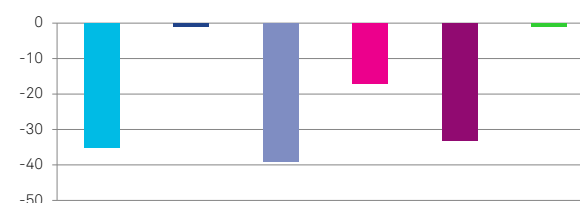
Changes in Emissions / Fuel Consumption per Vehicle km (due to changes in more efficient vehicle fleet)



cars 

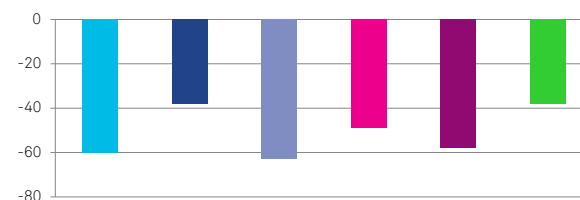
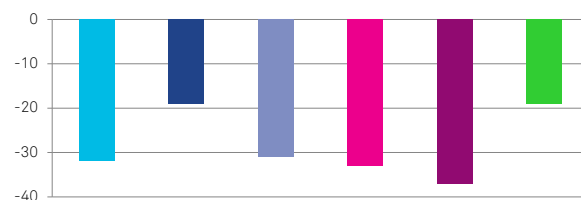
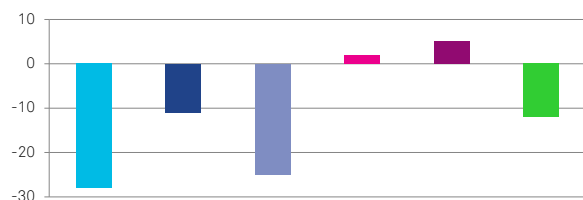


light goods vehicles 



heavy goods vehicles 

Overall Changes in Emissions from Vehicle Fleet (due to changes in more efficient vehicle fleet and changes in vehicle km travelled)



There have been significant changes in the vehicle fleet between 2008 and 2012. Newer, more fuel efficient vehicles have entered the vehicle fleet and a shift has taken place towards the purchase of diesel fuelled passenger cars. Over the 2008 – 2012 period the changes related to fleet technologies and the fuel type of the fleet are estimated to have reduced CO<sub>2</sub> emissions per vehicle kilometre travelled by 5% for passenger cars.

In addition to changes in the vehicle fleet, there has been a dramatic reduction in the vehicle kilometres travelled

by goods vehicles over the 2008 – 2012 period. The reduction for the private car fleet was more modest. The combination of changing fleet technologies and changing vehicle kilometres travelled totals has combined to effect reductions in fuel consumption and the emissions of many pollutants including the greenhouse gas CO<sub>2</sub>. Notable exceptions are NOx and particulate matter emissions for private cars whose levels have increased due to the increased use of diesel in the car fleet.

\*Sources: CSO Primary Data and TRL Emission Rates

## E: POPULATION, CAR OWNERSHIP AND VEHICLE KILOMETRES FORECASTS

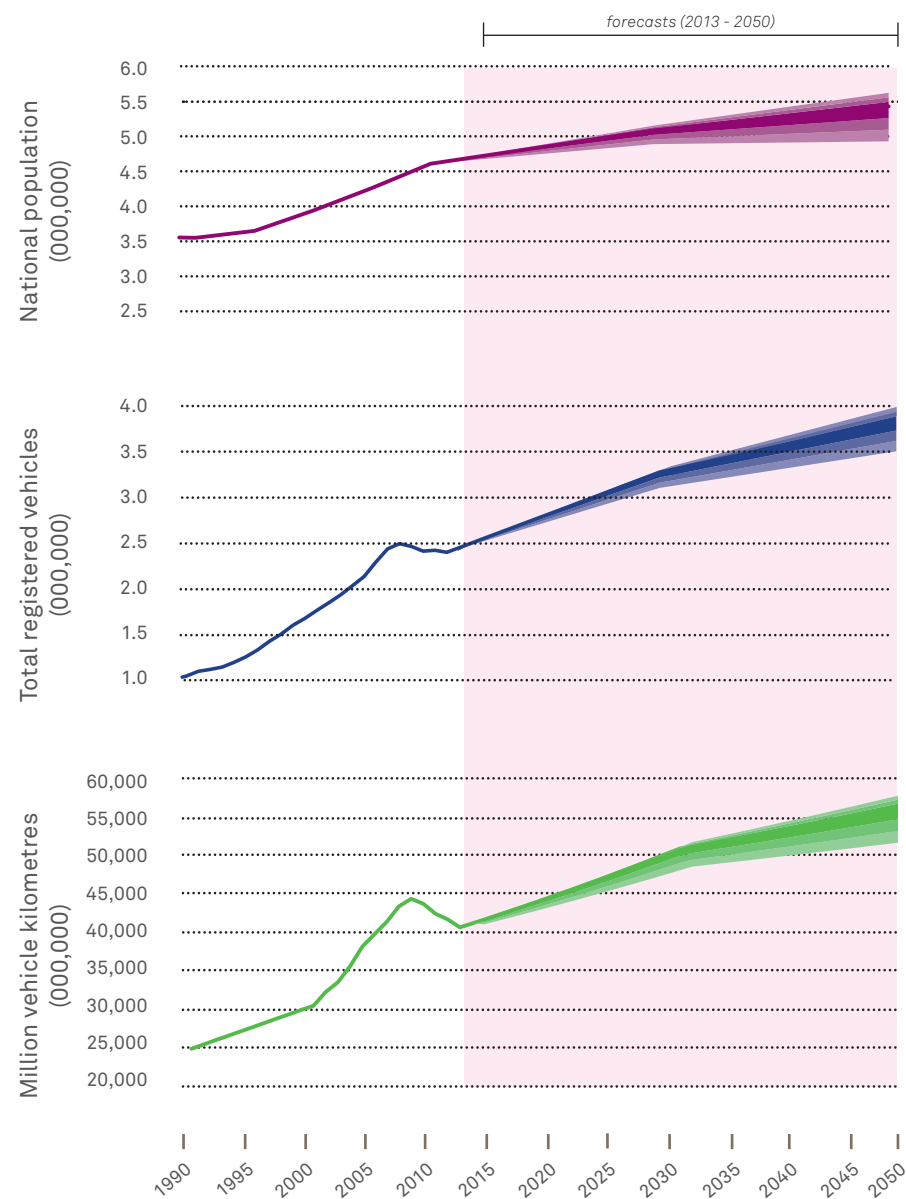
Overview of recent experience and forecasts for the future

*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.

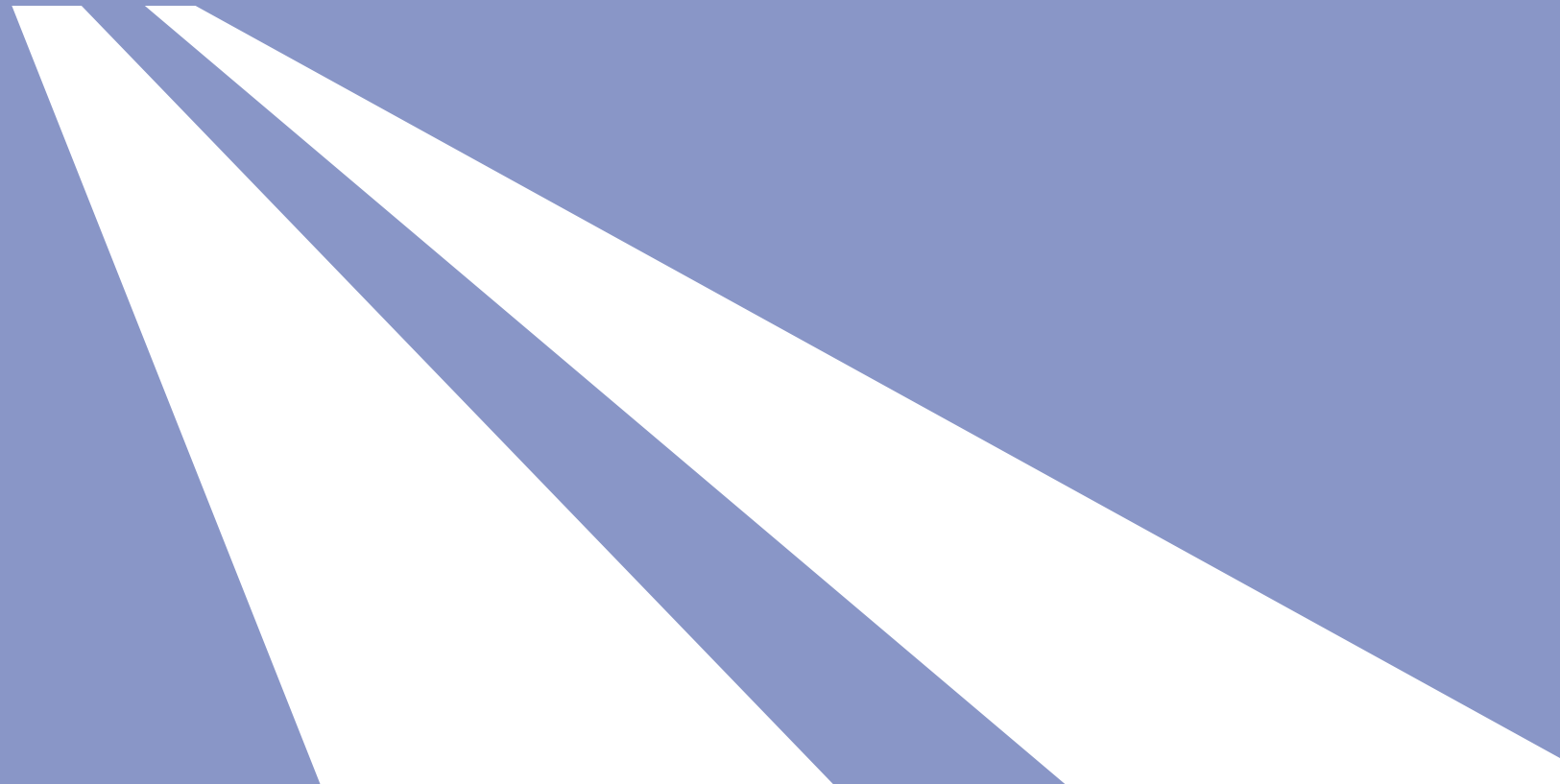
The ESRI Irish County Population Model (IC-POP) has produced population forecasts to 2050 by applying mortality, fertility and migration projections to Census 2011 data. According to the ESRI forecasts, the population of the country is forecast to reach between 4.91 and 5.61 million persons in 2050.

The NRA'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.



Source: 2013 National Transport Model

# THREE: ROAD CONDITION



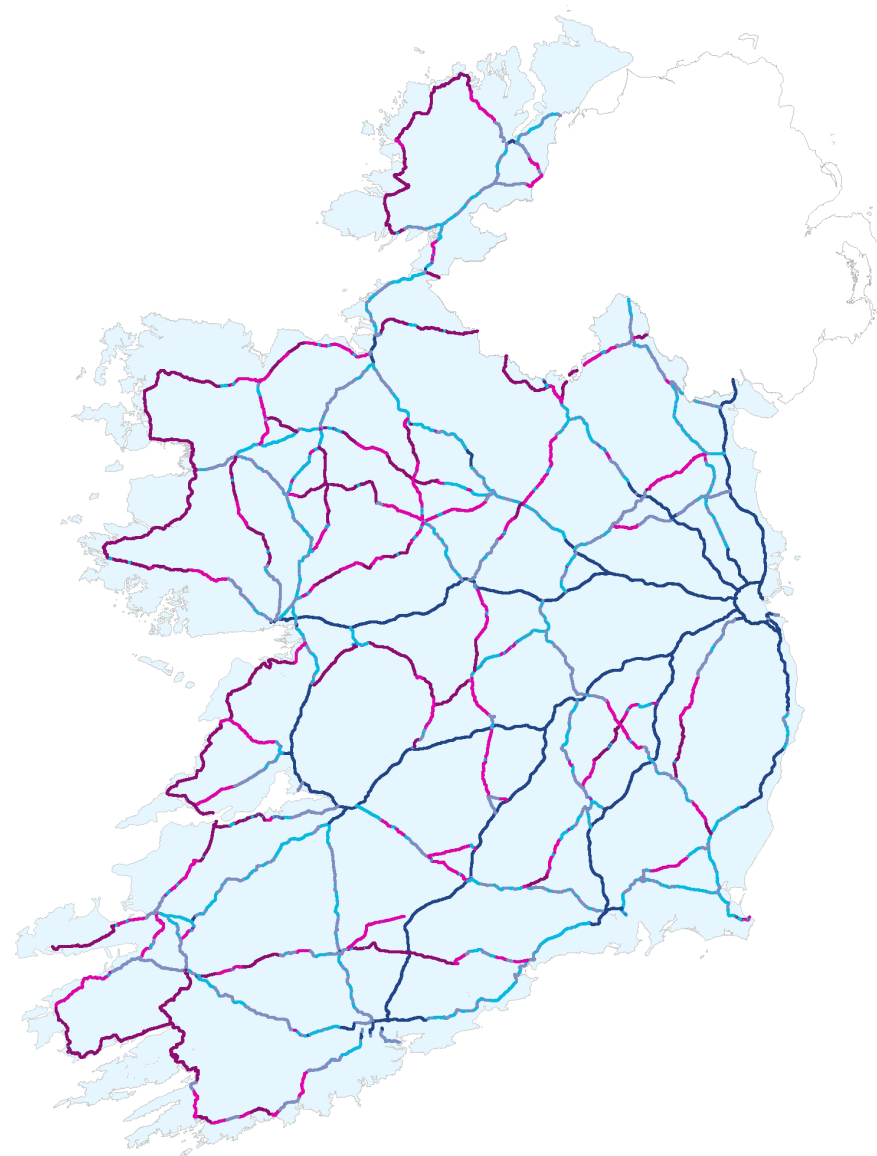
## A: PAVEMENT MAINTENANCE

### Overview of the status of the road pavement across the national road network by subnetwork type

The National Road network consists of over 5,300 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	Length Km
0	Motorways + dual carriageways	High speed, high volumes pavement, made up of Motorway and Dual Carriageway sections of the network. Much of this sub network is less than 10 years old	1,155
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	1,019
2	Legacy pavement – high traffic	Legacy subnetwork, typically constructed without formal geometric or pavement design. Typically carries traffic volumes less than 10,000 AADT.	1,106
3	Legacy pavement – low traffic)	Legacy subnetwork, typically constructed without formal geometric or pavement design. Typically carries traffic volumes less than 5000 AADT.	877
4	Legacy pavement – very low traffic	Legacy subnetwork, typically constructed without formal geometric or pavement design. Typically carries traffic volumes less than 2000 AADT.	1,163





## 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

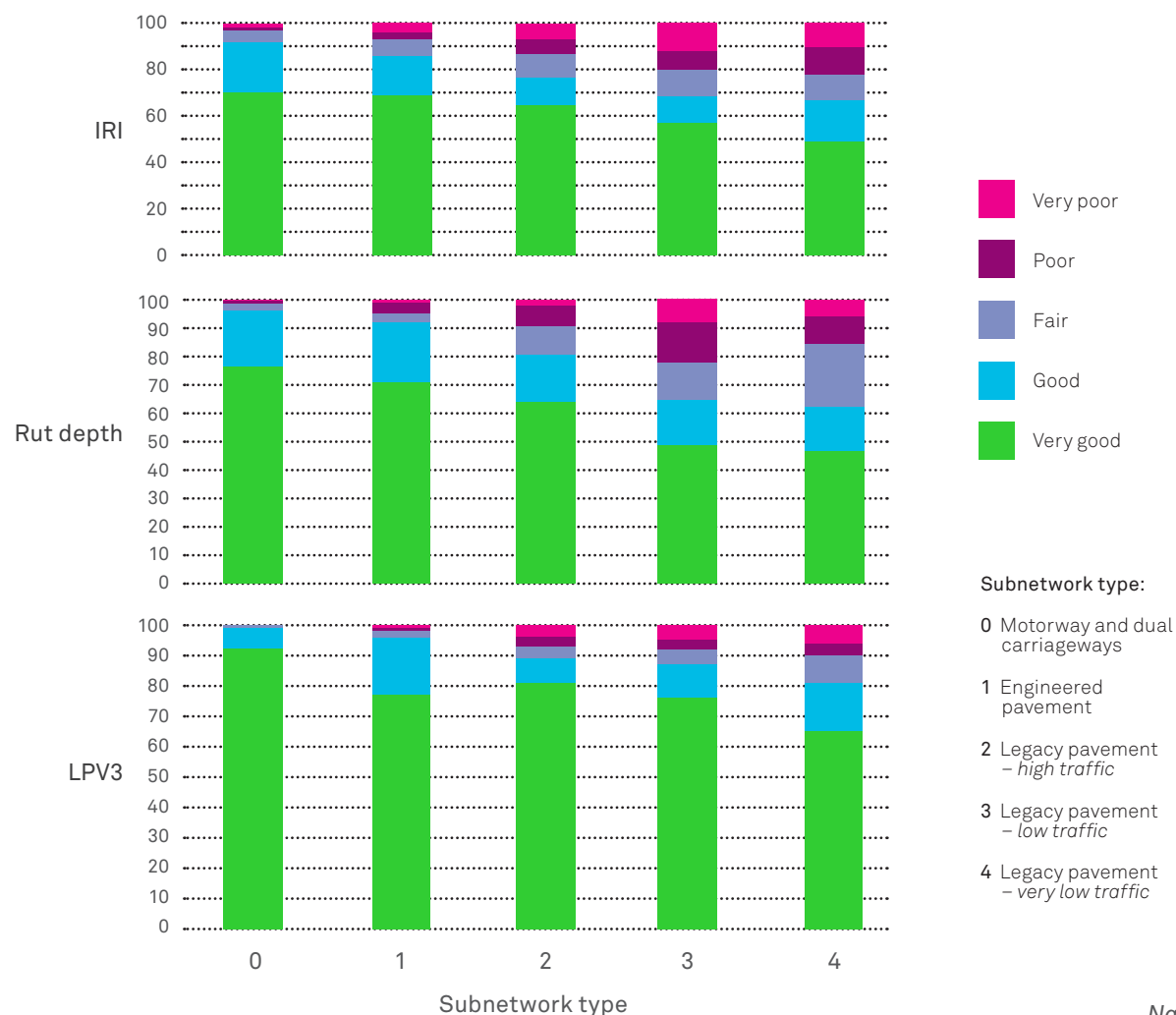
The NRA collects data on the pavement condition across the entire pavement network annually, using high speed machine survey vehicles. This data is used to select sites for treatment under the Pavement and Minor Improvements programme.

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 2013, it was identified in relation to roads belonging to motorway/dual carriageway that:

- 70% of the network had very good IRI;
- 76% of the network had very good Rut Depth
- 92% had very good LPV3 levels



Source: NRA Pavement Condition Report 2013

## C: NETWORK MANAGEMENT

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

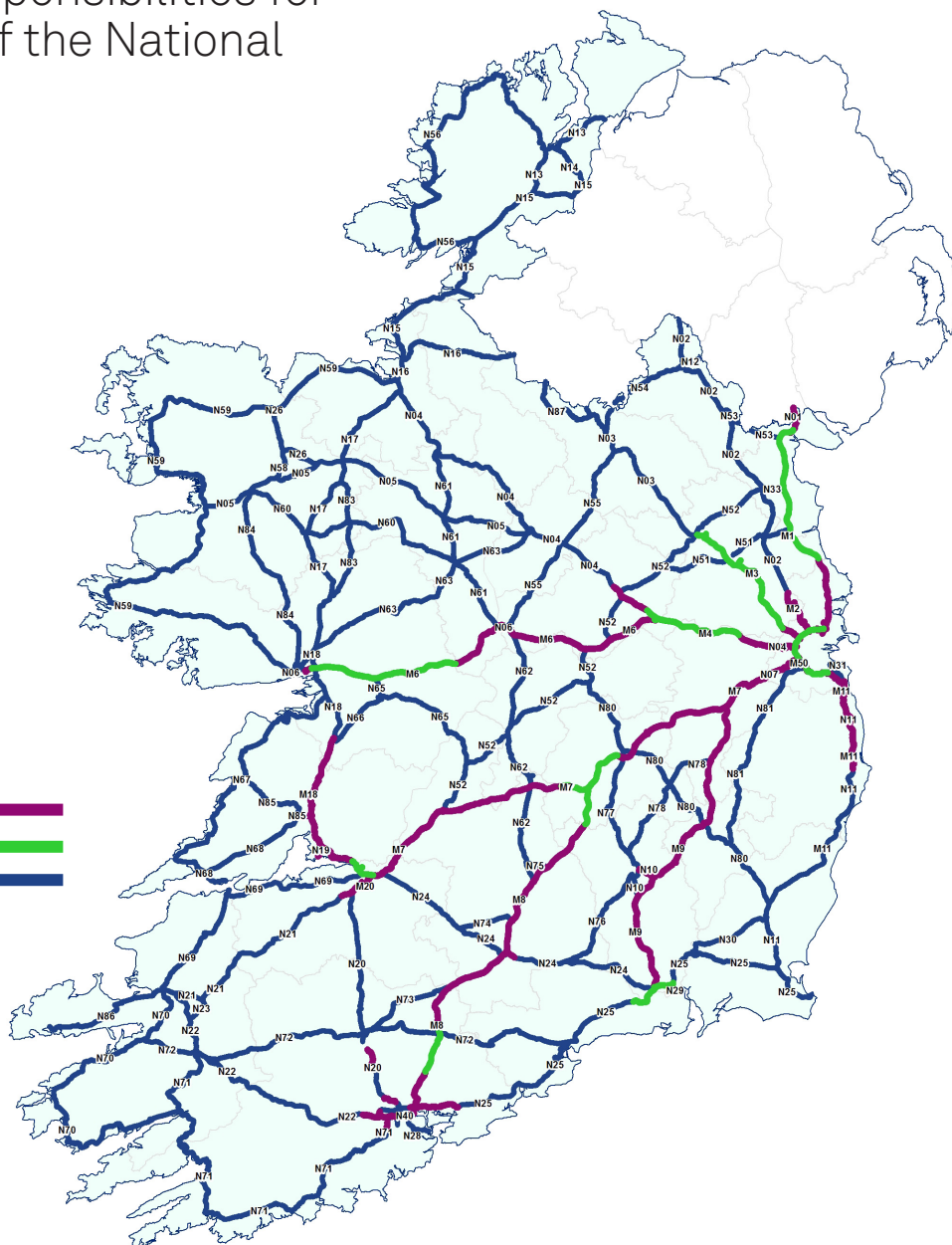
The management of the national road network is assigned to a number of bodies with the majority share of National Primary and National Secondary roads being managed by Local Authorities. Motorways are managed under the Motorway Maintenance and Renewal Contracts (MMaRCs) or by PPP Concession companies in the case of the tolled motorways. The NRA manages the maintenance of 2,296 bridges, which includes all bridges on national roads other than on PPP roads.

Routes managed by:

MMaRC 

PPP 

Local Authority 



Key facts:



**255**

demountable  
snow ploughs

Our winter service  
fleet consists of:



**303**

salt spreaders



**59,000**

tonnes of salt were  
used on National Road  
Network in 2013



**2,033**

emergency calls  
received in 2013



**1,340**

SOS phones  
in the  
country



**68**

nights in 2013  
where the  
temperature  
reached below  
zero



**84**

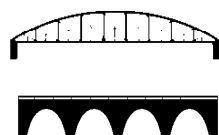
weather stations  
in operation on  
the National Road  
Network

## D: NATIONAL BRIDGE STRUCTURES

### Overview of the quantum and condition of bridge structures on the National Road Network

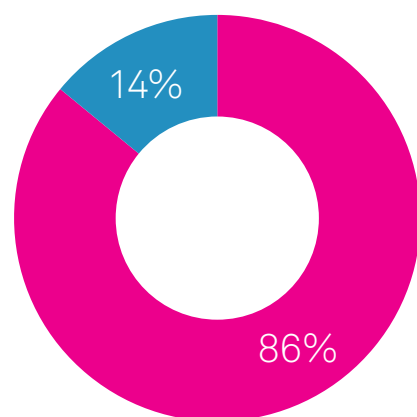
Bridges are key elements of the national road system and maintenance and rehabilitation of bridges is a key part of the NRA asset management strategy.

The national road network includes approximately 3,000 bridge structures of which 421 are on roads provided by public private partnerships. The NRA was responsible for the maintenance and repair of 2,622 bridge structures in 2013.

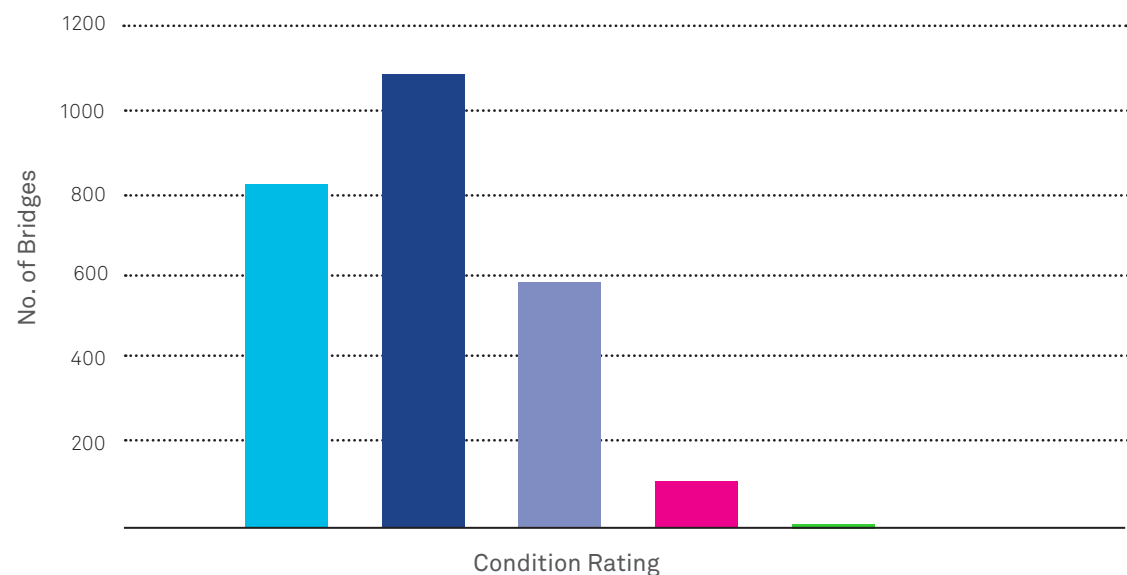


■ NRA Managed Bridges

■ PPP Managed Bridges



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



■ CR 0 No or Insignificant Damage

■ CR 1 Minor Damage but no need of repair

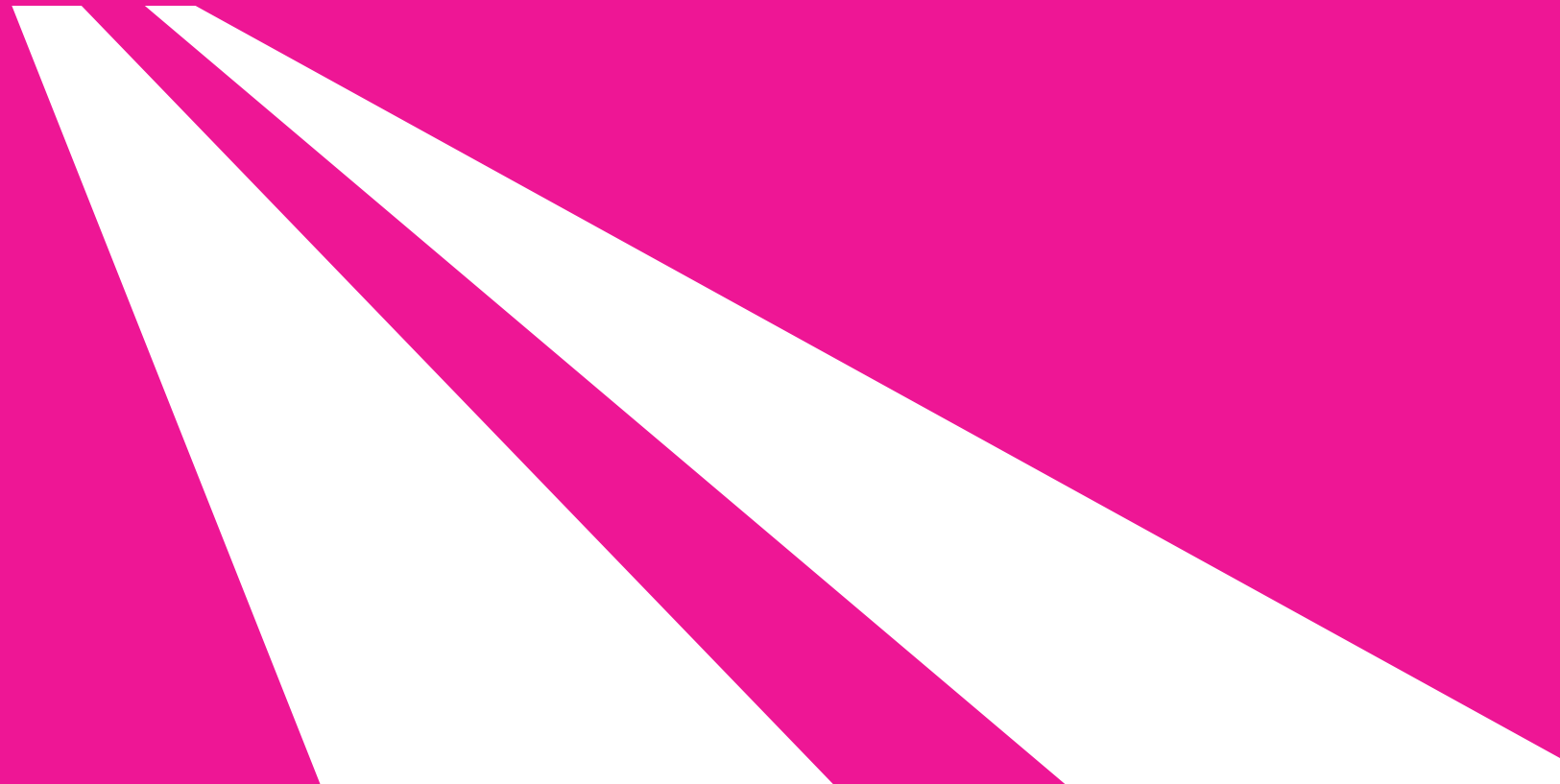
■ CR 2 Some Damage, repair when convenient

■ CR 3 Significant Damage, repair needed very soon

■ CR 4 Damage is critical, execute repair works at once

■ CR 5 Ultimate Damage. Failed / in danger of failure

# FOUR: SAFETY



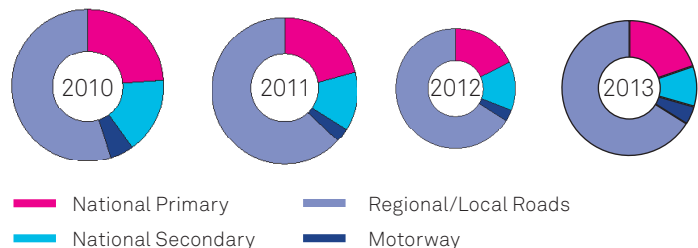
## A: FATAL COLLISIONS ON THE NATIONAL ROAD NETWORK

Trends in fatal on the national road network  
by road type and collision type\*

Total fatal collisions on national roads:



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



Whilst the number of fatal collisions on the national road network have declined in recent years, the number of pedestrian related fatal collisions has increased.

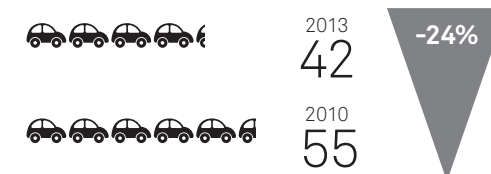
The number of fatal collisions on the National Road Network in Ireland has declined significantly over recent years. However 2013 saw an increase in fatal collisions on national roads. Trends in the distribution of fatal collisions, by the road type on which they occur, shows an increasing proportion of fatal collisions are occurring on non-national roads.

Recent trends in total fatal collisions on national roads:

Pedestrians:



All Other:

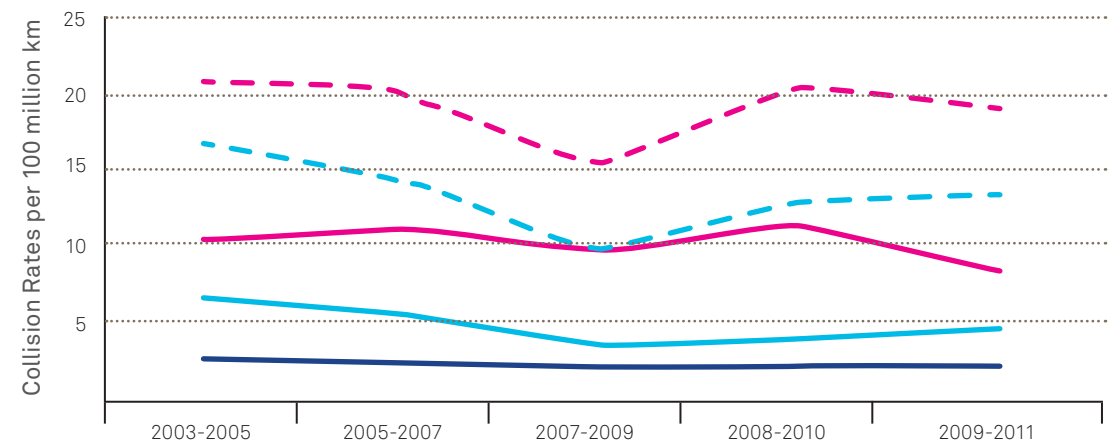
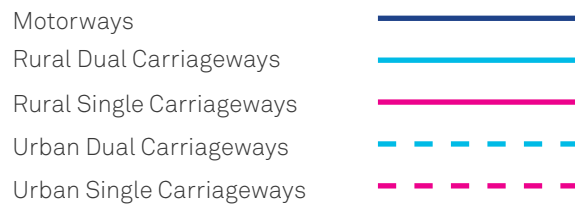


\*based on Road Safety Authority / An Garda Síochána data

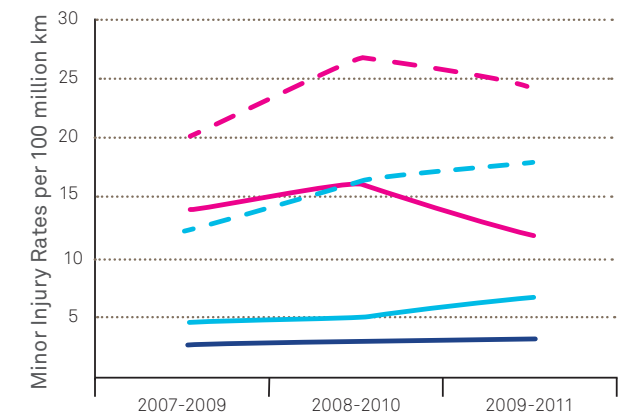
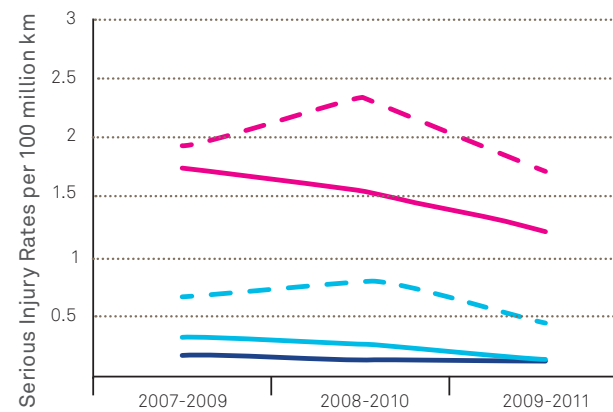
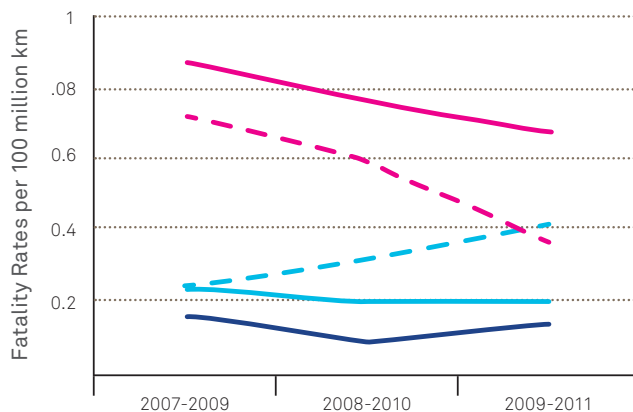
## B: NATIONAL ROAD COLLISION RATES

Collision rates measure the exposure to risk associated with the number of vehicles travelling on the road

A collision rate is the ratio between the frequency of collisions and the vehicle kilometres of travel over a section of road. The NRA produce an assessment of the average collision rate of each road type on the national road network on a three year cycle.



Trends of collision rates indicate that the national road network has become safer over the period 2003-2011 with reduced collision rates on all road types. The recent rate of decline in fatalities and serious injury collisions on the network has been significant, particularly on rural roads.

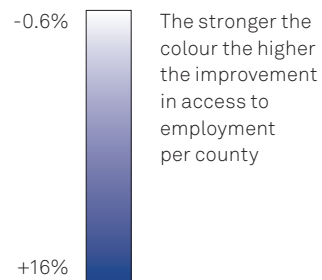


# FIVE: ACCESSIBILITY + ENVIRONMENT



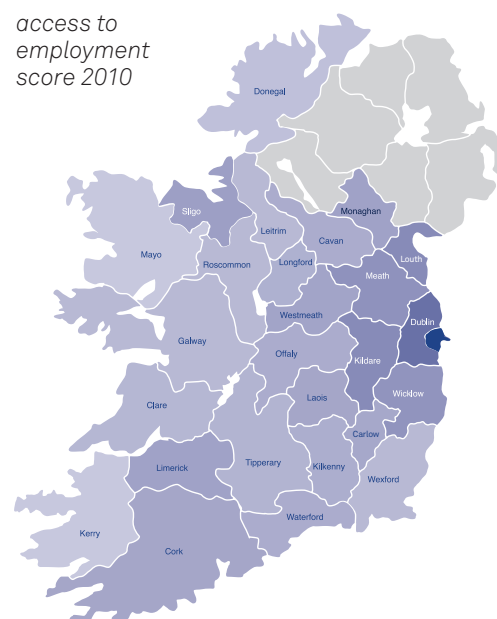
## A: IMPACT OF ROAD INVESTMENT ON EMPLOYMENT ACCESSIBILITY

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



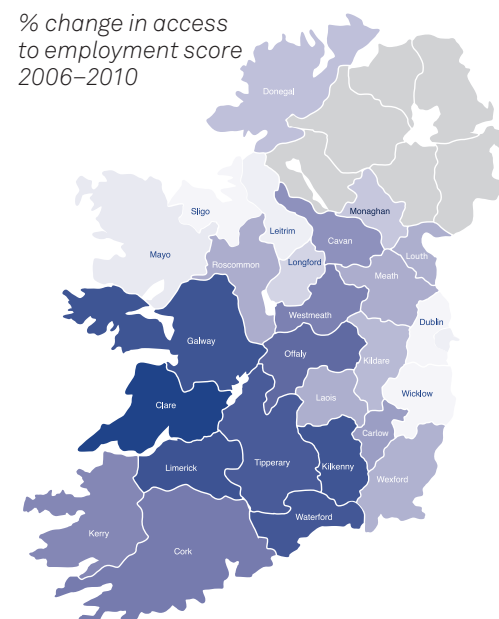
**Note:** The quantified benefits relate to agglomeration wider economic impacts only; they exclude the conventional benefits arising from journey time savings and safer journeys.

access to employment score 2010



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

% change in access to employment score 2006–2010



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*



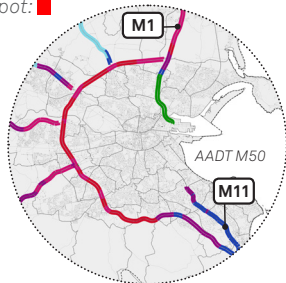
# SIX: DISSEMINATION



# A: KEY TREND SUMMARY

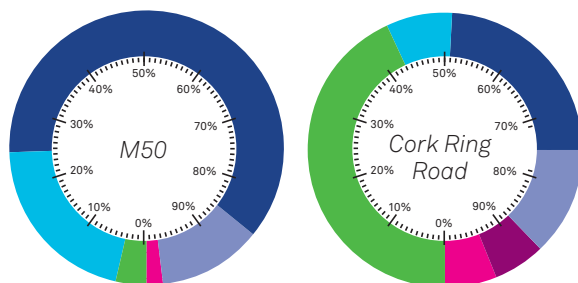
## TRAVEL HOTSPOTS:

M50 Dublin area:  
130,000+ vehicles per day  
Hotspot: ■

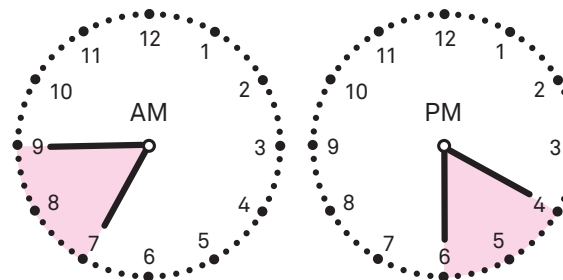


## LEVEL OF SERVICE:

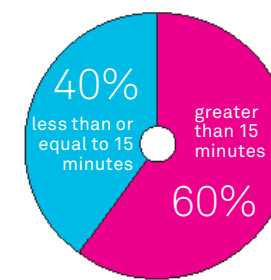
Morning rush hour: Free flow to → forced or breakdown flow



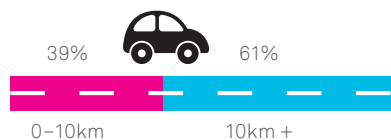
## ROADS USAGE OVER THE DAY:



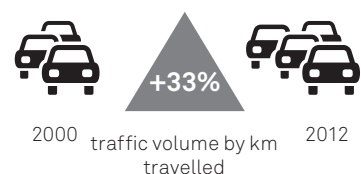
## TRIP DURATION:



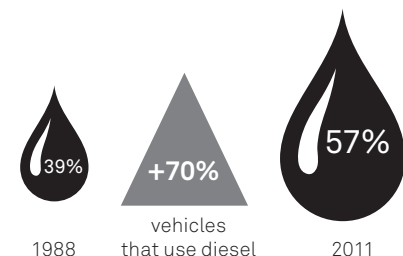
## TRIP DISTANCE:



## TRAFFIC VOLUMES:

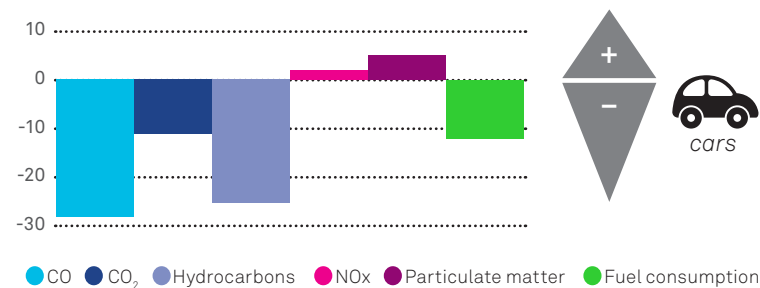


## DIESEL USAGE:

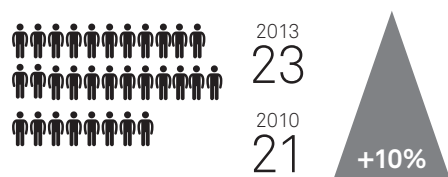


## EMISSION TRENDS IN MORE EFFICIENT CARS:

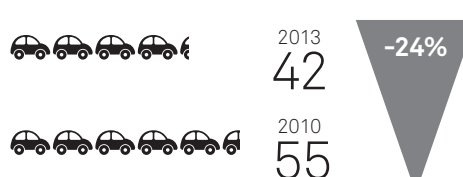
Changes in Emissions / Fuel Consumption per Vehicle km



## PEDESTRIAN ROAD FATALITIES:



## ALL OTHER FATALITIES:



## FATAL COLLISIONS:

Total fatalities on national roads (2010-2013):



## B: NATIONAL ROADS AUTHORITY: NEWS + UPDATES

This section sets out recent NRA news and provides information on services provided by the NRA

### **National Transport Model**

Documentation regarding the National Transport Model can be located on the NRA website at <http://nra.ie/policy-publications/project-appraisal-guideli/in Unit 20.3>

### **Traffic Monitoring Units**

The NRA have recently installed over 270 traffic monitoring units around the country which will be used to monitor traffic patterns and will be used to plan future interventions. See website: <http://www.nratraffic.ie/>

### **Transport Research and Information Notes**

The NRA has published a number of Research Papers on topics related to the National Roads Network. The papers cover topics such as Lane Capacity, Electric Vehicles, Emissions amongst others and are available online at <http://nra.ie/policy-publications/transport-research-and-in/>

### **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](mailto:operator@nraits.ie)

*Further information and live traffic updates are available on [www.nratraffic.ie](http://www.nratraffic.ie)*

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