

TRANSPORT INFRASTRUCTURE IRELAND

NATIONAL ROADS NETWORK INDICATORS

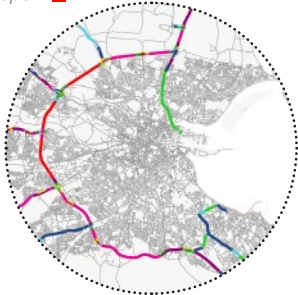
2020

A: KEY TREND SUMMARY

TRAVEL HOTSPOTS:

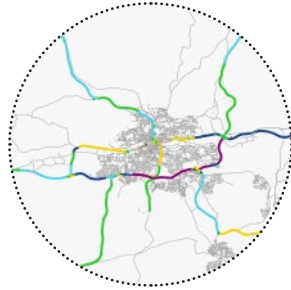
M50 Dublin area:

100,000 vehicles per day
Hotspot: ■

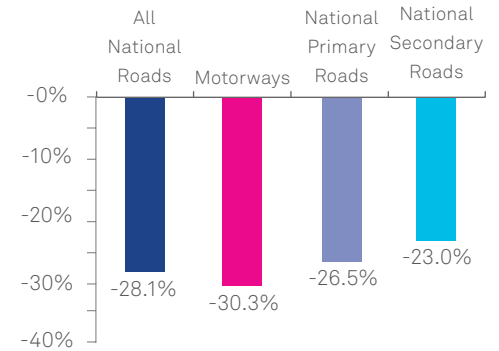
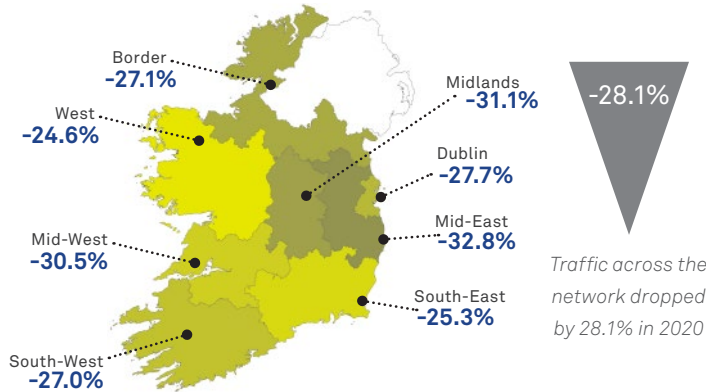


N40 Cork area:

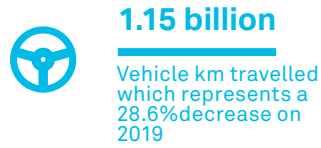
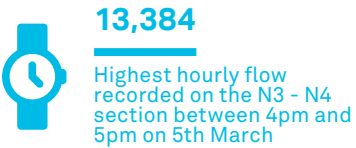
50,000 vehicles per day
Hotspot: ■



TRAFFIC GROWTH:



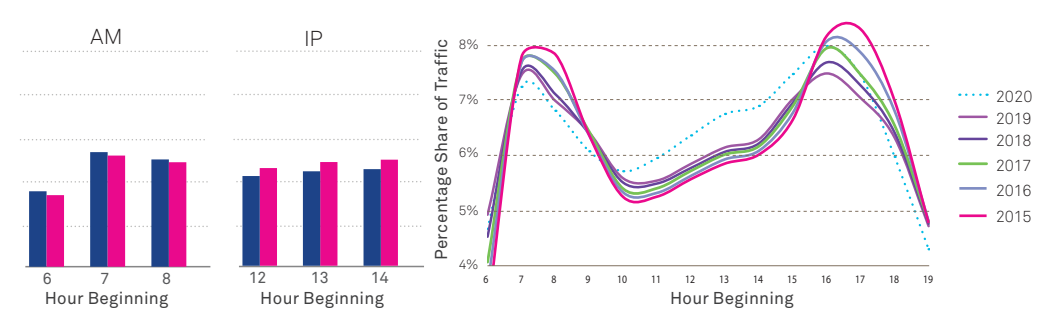
M50 KEY NETWORK STATISTICS:



CHANGES IN PEAK HOUR SPREAD M50:

The peak periods remain the same as 2019: 6.30 - 9.30 and 15.30 - 18.30, however the proportion of demand has reduced in the AM peak period due to increased home working in 2020. The proportion of activity in the Inter peak period between 10.00 - 15.00 increased in 2020.

SHARE OF DAILY TRAFFIC



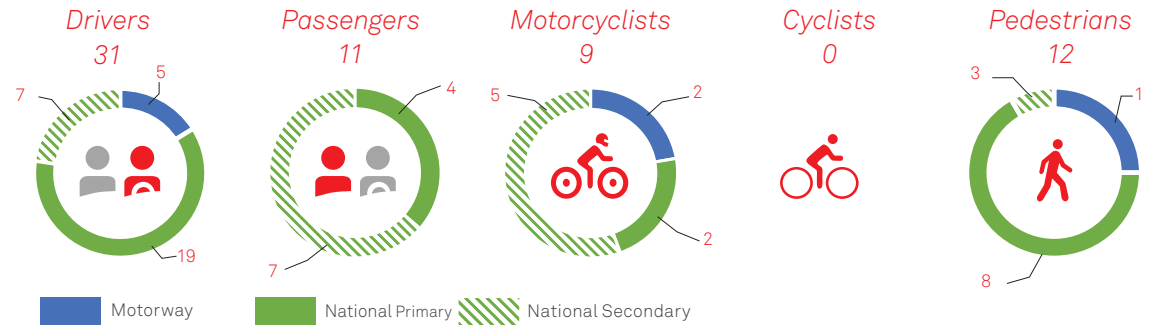
FATAL COLLISIONS ON THE NATIONAL ROADS NETWORK 2015 - 2020:

Total fatal collisions on National Roads:



*In 2020, 57 fatal collisions resulted in 63 fatalities

TOTAL FATALITIES ON THE NATIONAL ROADS NETWORK IN 2020:



B: NEWS & INFORMATION

News

Traffic Count Database

TII's traffic count database has been upgraded to a cloud based platform. The website has a new URL trafficdata.tii.ie and the website itself has undergone aesthetic changes with enhanced reporting facilities also provided. There are new individual site dashboards providing site details and summarised figures plus monthly and annualised graphs. There will also be two global reports available for download, including an all site monthly summary report and all site Annual Average Daily Traffic (AADT) and Heavy Goods Vehicle (HVG) percentage (%) report.

Emissions and Air Quality Tool

TII has developed a tool to quantify emissions from road transport to help answer key questions facing Ireland concerning Greenhouse Gas Emissions

and Air Quality Emissions and how these will change in the future. The tool draws together information on the vehicle fleet, considers how this vehicle fleet may change over time and uses vehicle emission rates combined with the number, composition and speed of vehicles projected on the roads network to make predictions on total emissions.

Information on the existing fleet in Ireland comes from sources such as the Central Statistics Office (CSO), while several alternative future scenarios in relation to the vehicle fleet (from various sources) can be assessed. Vehicle emission rates are taken from COPERT and other sources, whilst traffic volumes, speeds and compositions are provided by the TII National Transport Model (NTpM).

Information

Traffic Monitoring Units

TII has over 369 TMU sites around the country which are used to monitor traffic volumes and to plan future interventions. Additional TMU sites were delivered in 2020 and a programme of works to deliver additional TMU sites in 2021 is on-going.

See website: trafficdata.tii.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@nrta.ie

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

C: IMPACT OF COVID-19 PANDEMIC

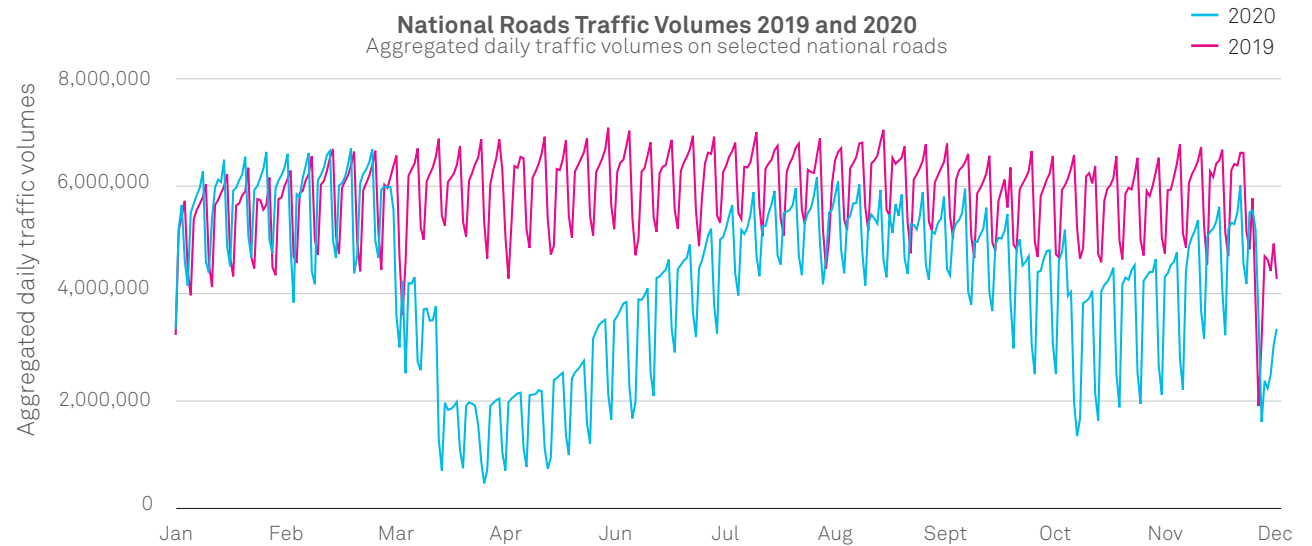
In 2020 COVID-19 changed when people travel, how they travel and whether they travel at all.

With more people working from home, there was less travel to employment centres, but more travel to and within local centres. There was less travel by public transport but more walking and cycling. The pandemic changed how goods were consumed and therefore how these goods were distributed on the National Roads Network. For example, increased online shopping redistributed delivery traffic from retail outlets to the front door of consumers.

The aggregate impact of these changes over the full year of 2020 was an approximate 28% reduction in overall traffic on the National Roads Network. The pandemic and associated travel restrictions emphasised the importance of maintaining reliable freight networks and overall freight traffic reduced by just 4% in 2020 on the National Roads Network. This is despite long periods of restrictions on the construction and retail sectors.

During the period of strictest travel restrictions in April 2020, national road traffic reduced by 60-70% of typical levels. When restrictions were then removed in July and August 2020, national road traffic was within 5 to 10% of typical levels.

These impacts mean that the traditional analysis of examining a typical day for 2020 was difficult. In addition, summarising annual average conditions in terms of demand levels and network performance may not be as meaningful for 2020. However, for consistency with previous versions of the TII National Roads Indicators reports, and to facilitate ongoing analysis of trends, the approach of representing typical network conditions and average annual analysis in this report was retained.



Overall Demand

28% reduction on 2019



HGV Demand

4% reduction on 2019



Largest Daily Reduction

69% reduction



Smallest Daily Reduction

8% reduction

CONTENTS

INTRODUCTION	P6
1. ROAD NETWORK	P7
2. ECONOMIC	P24
3. ROAD CONDITION	P26
4. SAFETY	P33
5. ACCESSIBILITY + ENVIRONMENT	P37
6. EMISSIONS	P40

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 Roads network.

Efficient use of the National Roads network provides benefits to road passengers, bus users 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 Roads 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 Roads 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 ROADS NETWORK

Length of National Roads network by road type 2020

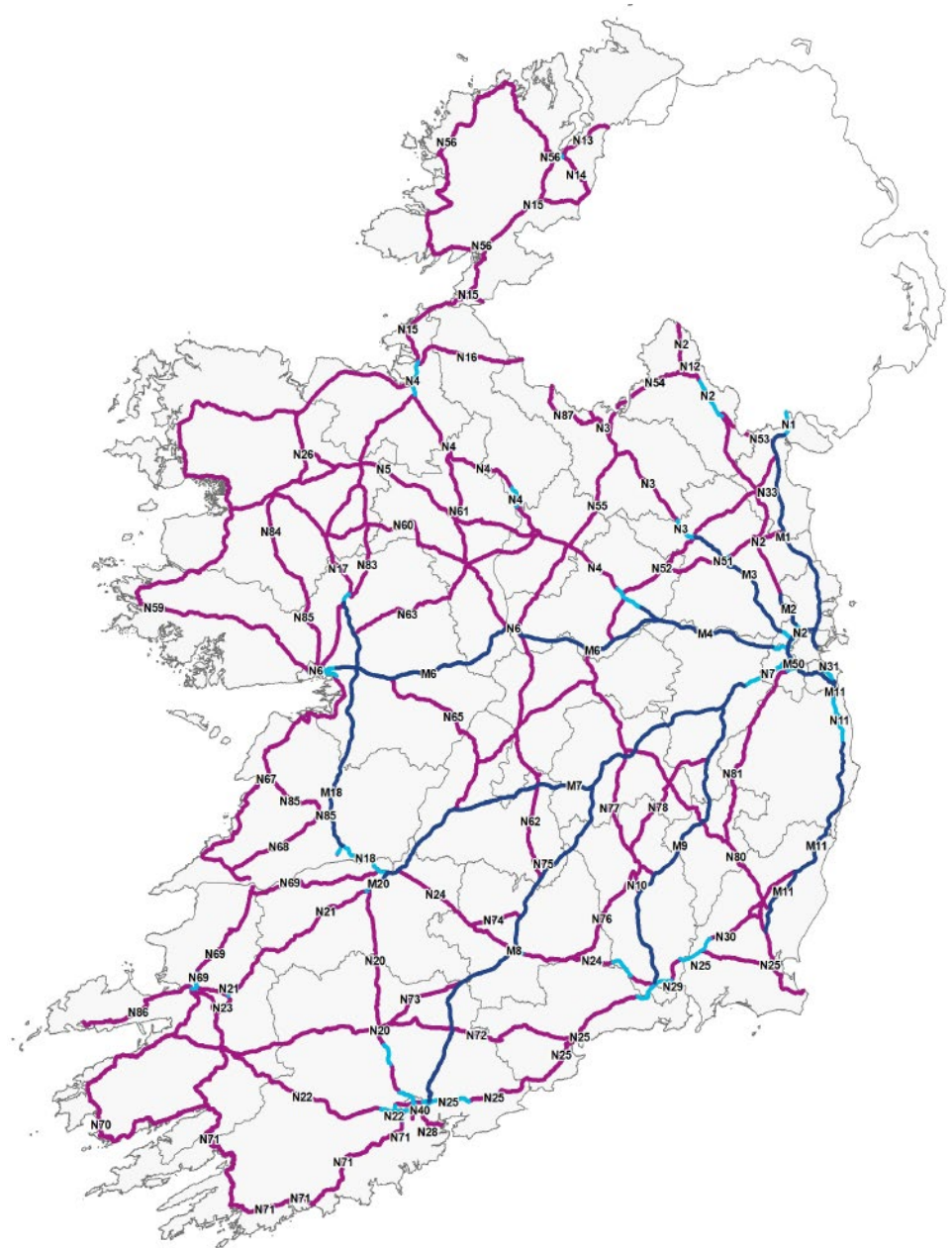
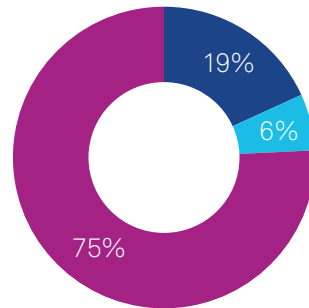
There are in excess of 5,300 kilometres of National Roads network in Ireland.

The National Roads network is comprised of 998 km of motorway, 332 km of dual carriageway and 4,023 of single carriageway.

The actual length of the National Roads network fluctuates year on year due to road reclassification, realignments to existing National Roads and completion of new roads.

Road type:

Motorway		998km
Dual carriageway		332km
Single carriageway		4,023km



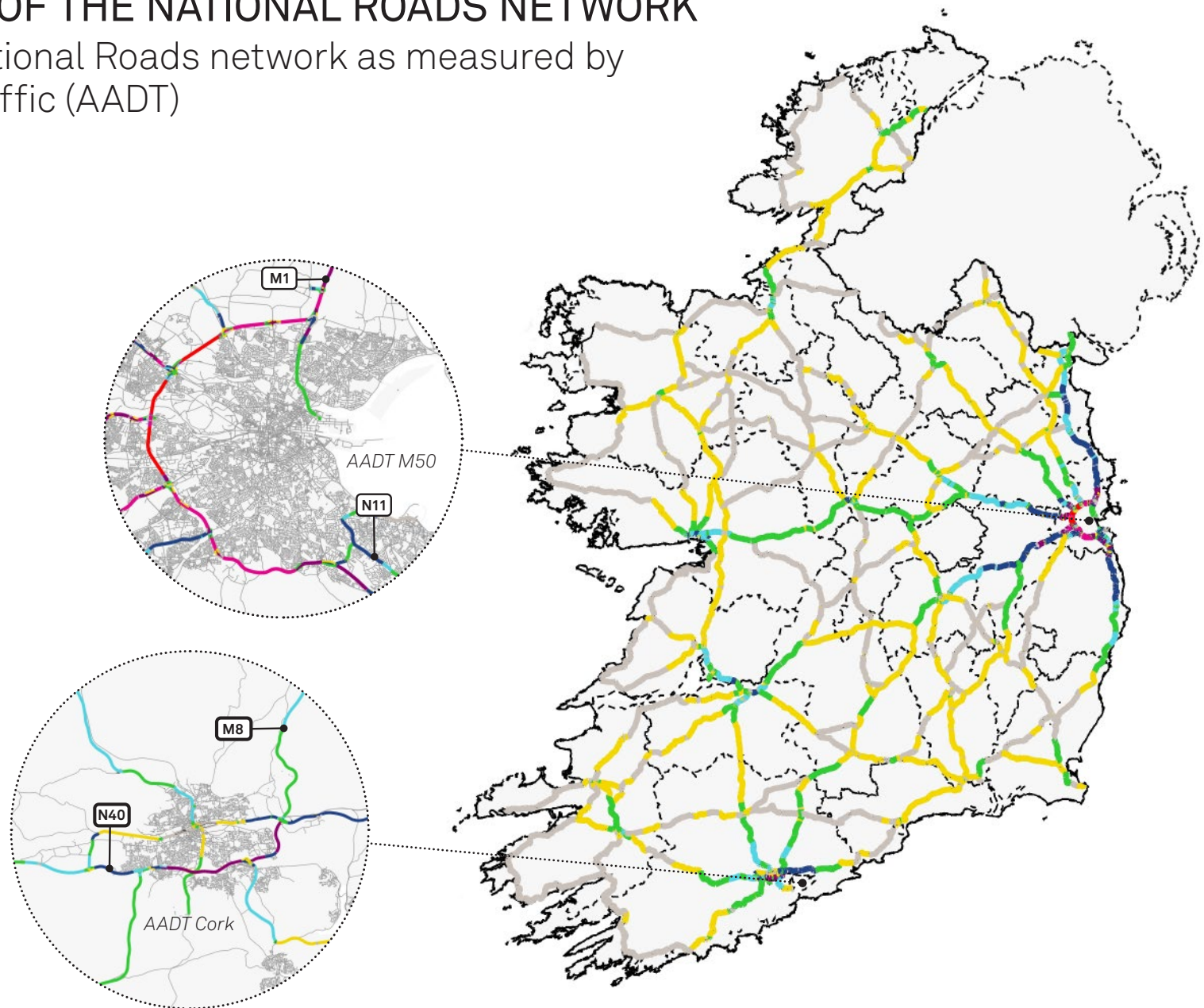
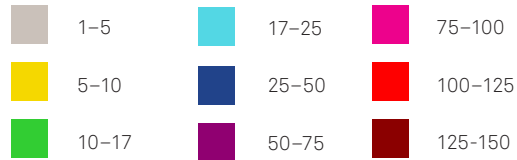
B1: LEVEL OF USAGE OF THE NATIONAL ROADS NETWORK

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

AADT levels across the National Roads network reduced on average by 28% in 2020 due to the travel restrictions associated with COVID-19.

In Dublin, the M50 still continued to experience high levels of traffic, with the section between Junction 5 (N2) and Junction 9 (N7) carrying in excess of 100,000 AADT. High traffic levels were also experienced along the N40 in Cork, which carried in excess of 50,000 AADT between Junction 4 (Sarsfield Road) and Junction 11 (Dunkettle).

AADT (thousands per day)

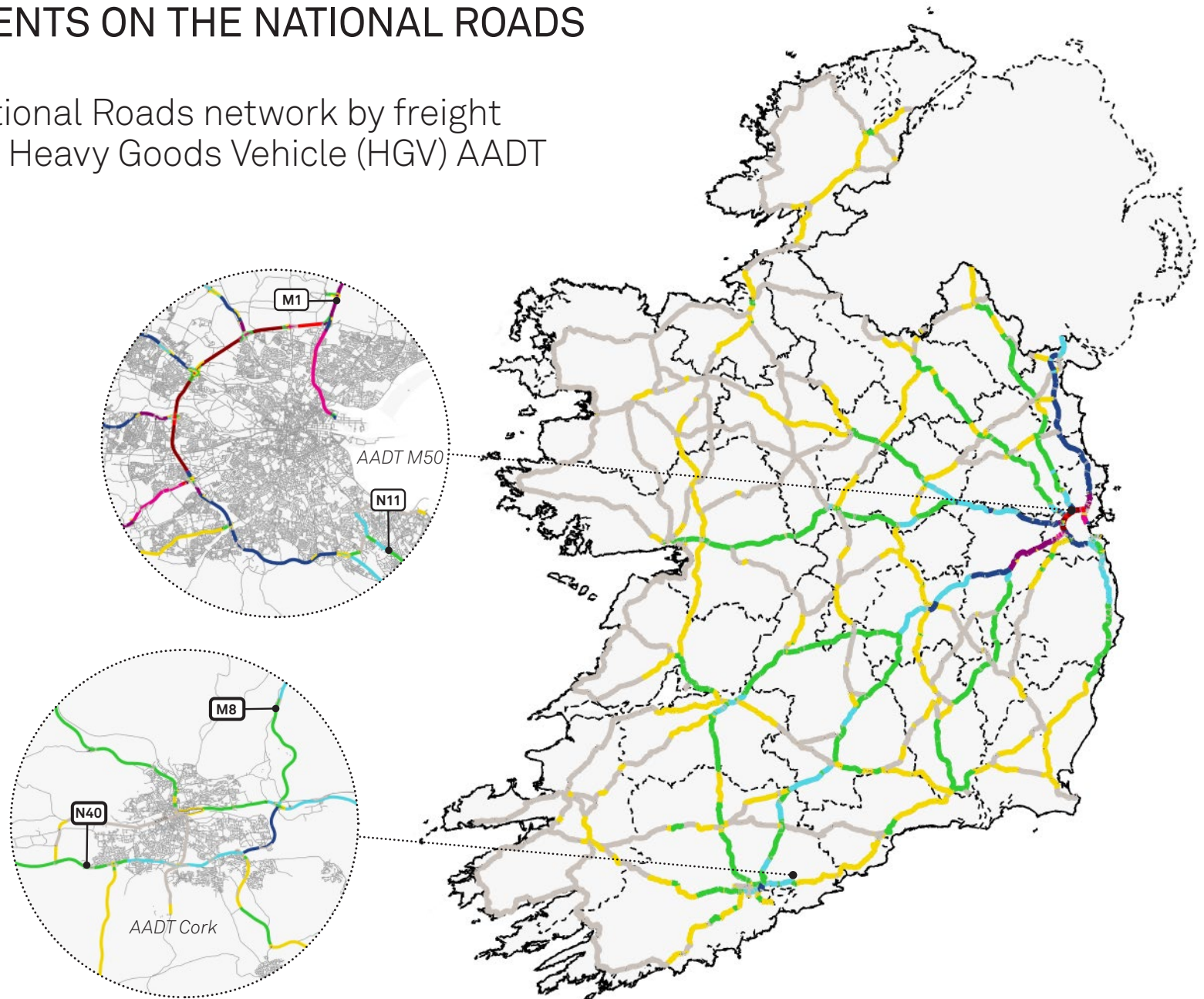
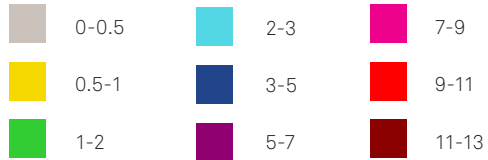


B2: FREIGHT MOVEMENTS ON THE NATIONAL ROADS NETWORK

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

The usage of the National Roads network by freight vehicles, as measured by Heavy Goods Vehicles (HGV) Annual Average Daily Traffic (AADT), reduced by 4% in 2020. The M50, Dublin Radial and N40 routes continued carry the highest level of HGV traffic in 2020.

HGV AADT (thousands per day)

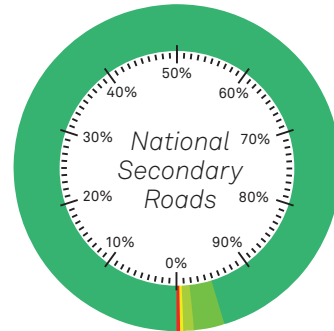
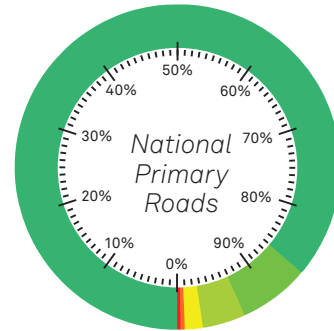
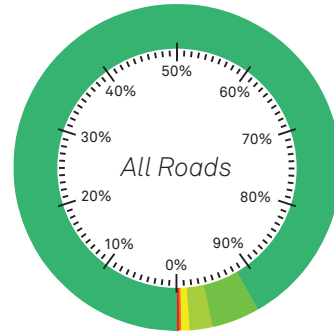


Source: TII National Transport Model, 2020

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

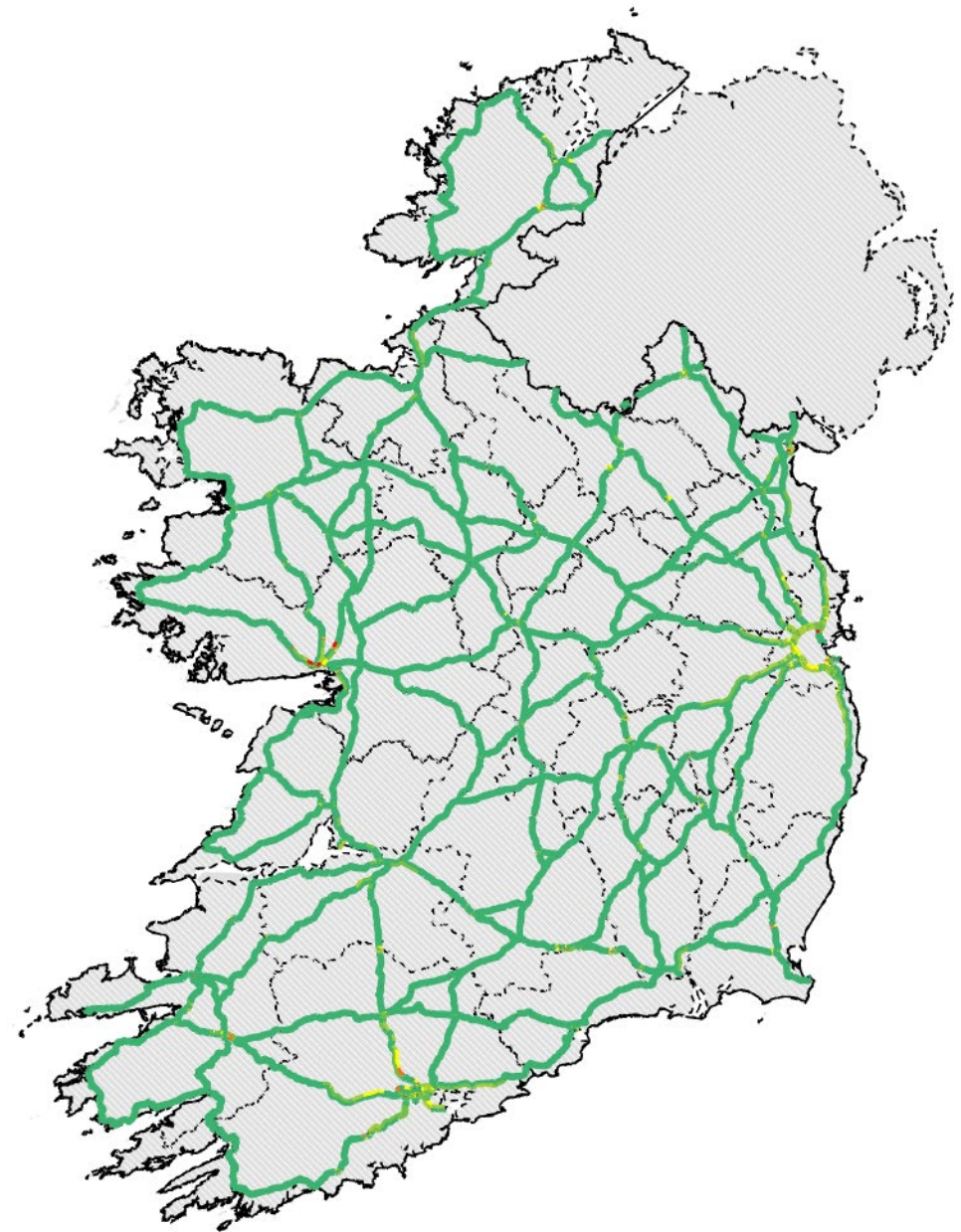
Proportion of the National Roads network operating under each level of service condition

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. In 2020 the morning rush hour experienced the largest reduction in traffic levels as a result of COVID-19, as commuting levels dropped due to increased levels of working from home. The impact of which led to a network wide improvement in LOS.



Level of Service

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



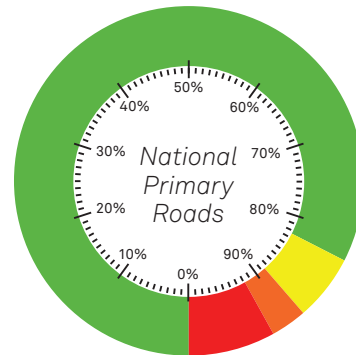
C2: VOLUME TO CAPACITY RATIO: NATIONAL PRIMARY ROADS

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

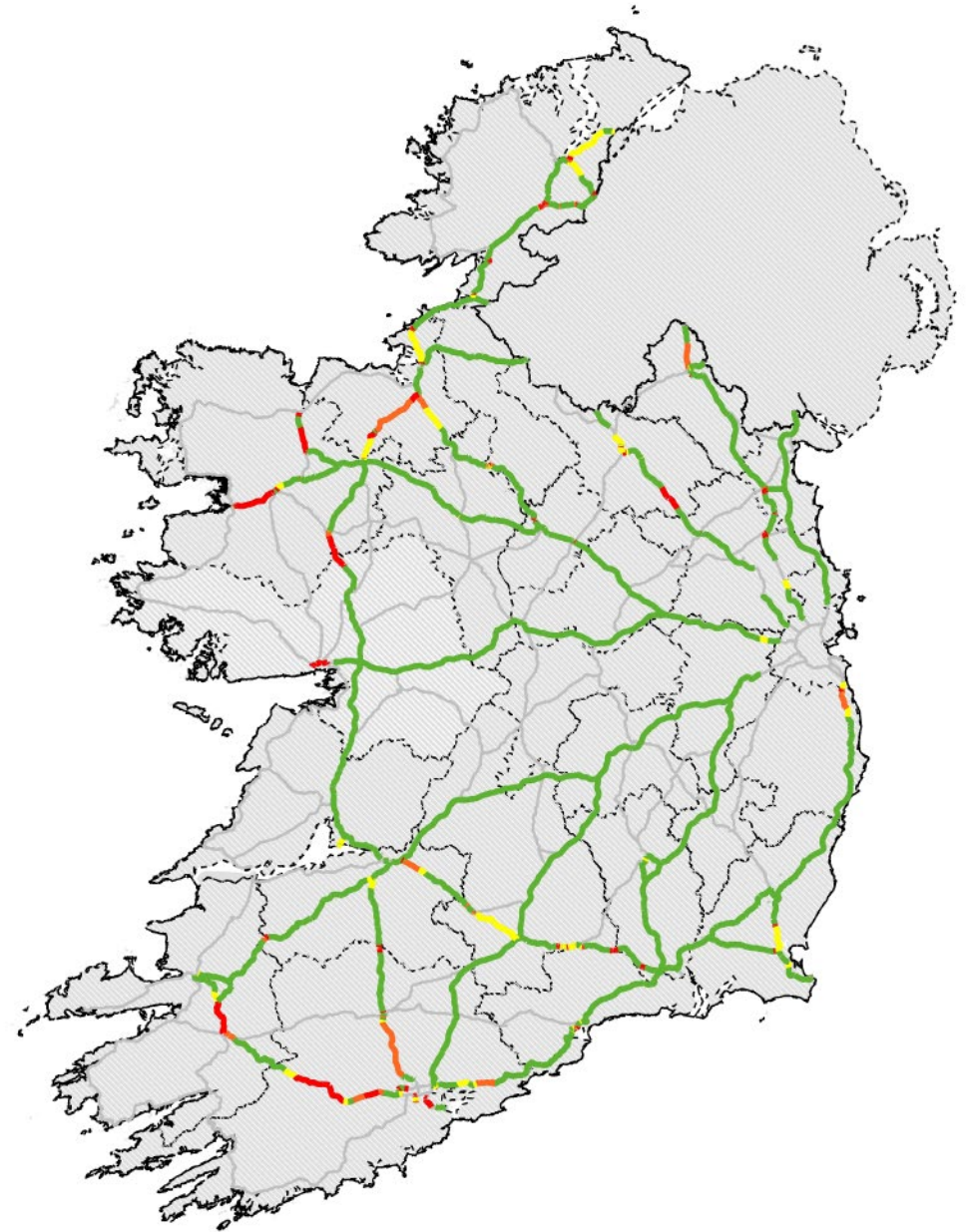
The Volume to Capacity (V/C) Ratio relates the average daily traffic volume carried on a section of road to its daily operational capacity*.

The V/C Ratio for the National Primary Roads network indicates that over 80% of roads are operating below 80% of its daily capacity. Despite the lower traffic levels associated with COVID-19 in 2020, several sections of the network were still operating over capacity.

*Capacity based on TII Rural Road Link Design Standard Table 6.1 (DN-GEO-03031)



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

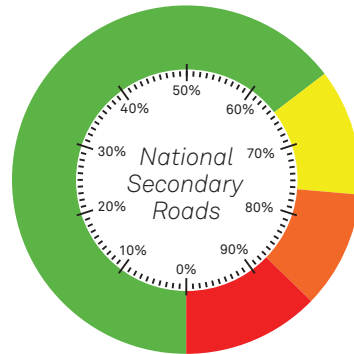


C3: VOLUME TO CAPACITY RATIO: NATIONAL SECONDARY ROADS

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

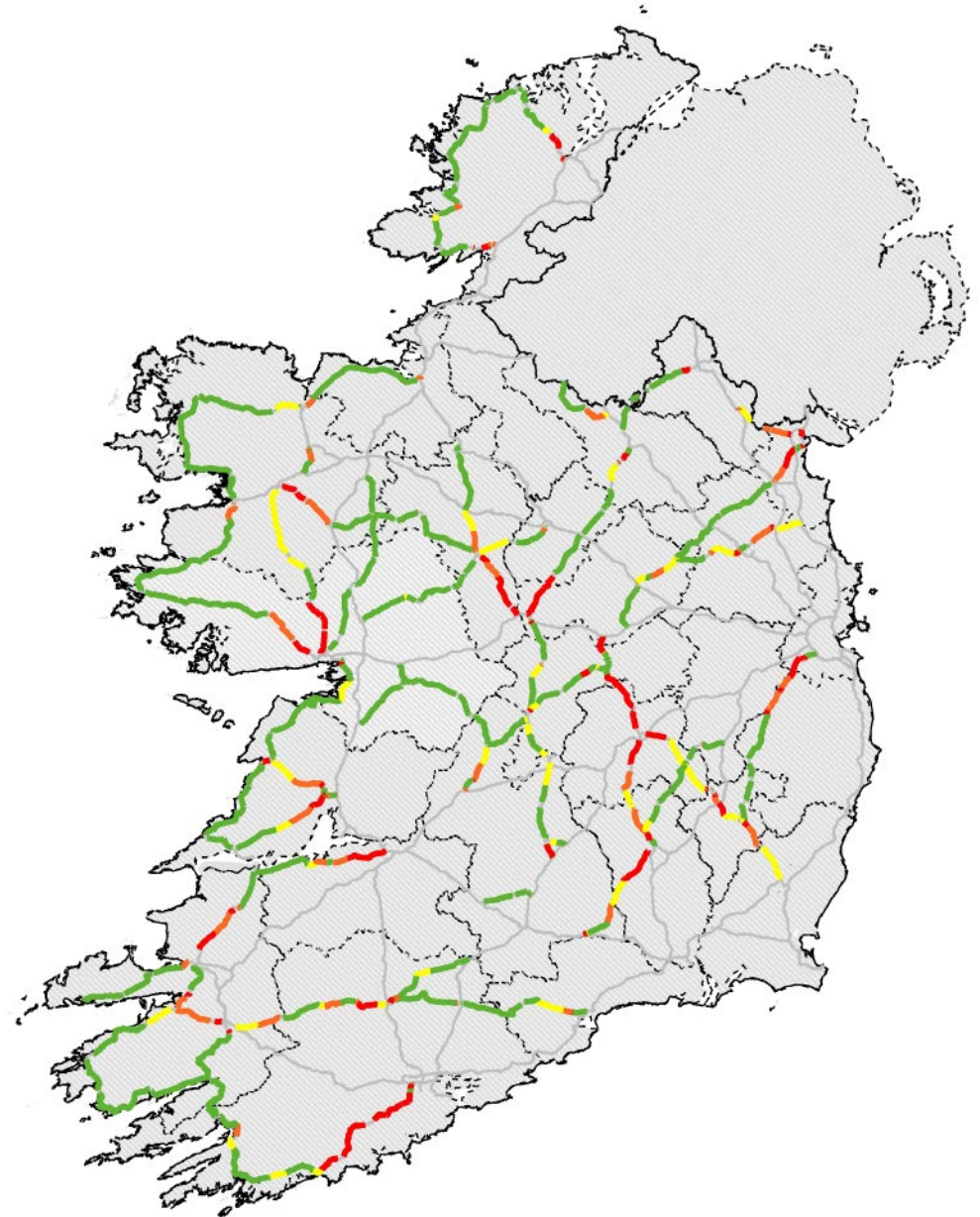
The Volume to Capacity (V/C) Ratio relates the AADT volume carried on a section of road to its daily operational capacity*.

The V/C Ratio for the National Secondary Roads network indicates that 65% of the network is operating at or below 80% of its daily capacity. The remainder of the network (35%) is still approaching or operating over capacity even allowing for the lower demand in 2020 associated with COVID-19. This indicates that investment is required in the National Secondary Roads network to match the performance of the National Primary Roads network.



*Capacity based on TII Rural Road Link Design Standard Table 6.1 (DN-GEO-03031)


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




D1: M50 PERFORMANCE SUMMARY

2020 Key network statistics

The M50 is the most heavily trafficked road in the country with over 100,000 vehicles using several sections on an average day in 2020. Overall traffic levels in 2020 on the M50 were down 28% on 2019 levels. HGV levels experienced a 4% reduction. Light vehicle traffic through the Dublin Tunnel decreased by 46%, as drivers most likely took advantage of uncongested and untolled alternative routes.



13,384
Highest hourly flow recorded on the N3 - N4 section between 4pm and 5pm on 5th March



1.15 billion
Vehicle km travelled which represents a 29% decrease on 2019



170,448
Highest Daily Flow Recorded on M50 between the N3-N4




948
Total No. of Incidents of which **363** were Traffic Collisions



FRIDAY
Busiest Typical Day



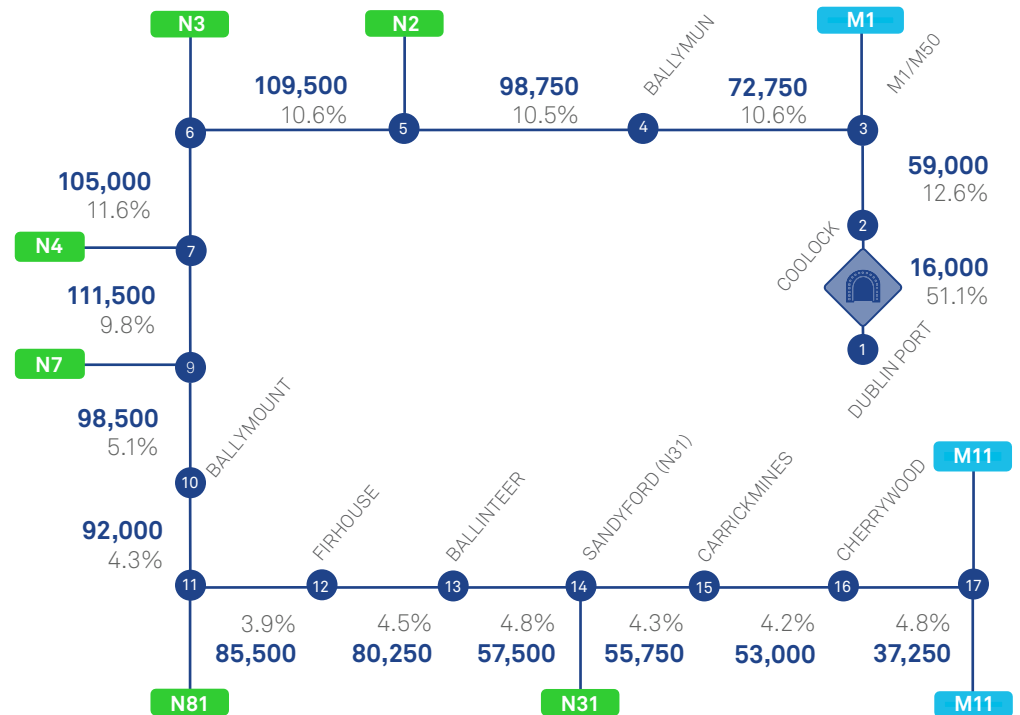
11 minutes
Average Response Time



17:00 - 18:00
Peak Incident Time



28 minutes
Median Duration of Incidents



M50 Schematic Layout
2020 Annual Average Daily Traffic (%HGV) on M50

D2: M50 PERFORMANCE SUMMARY

Traffic growth and typical working day conditions represented by level of service

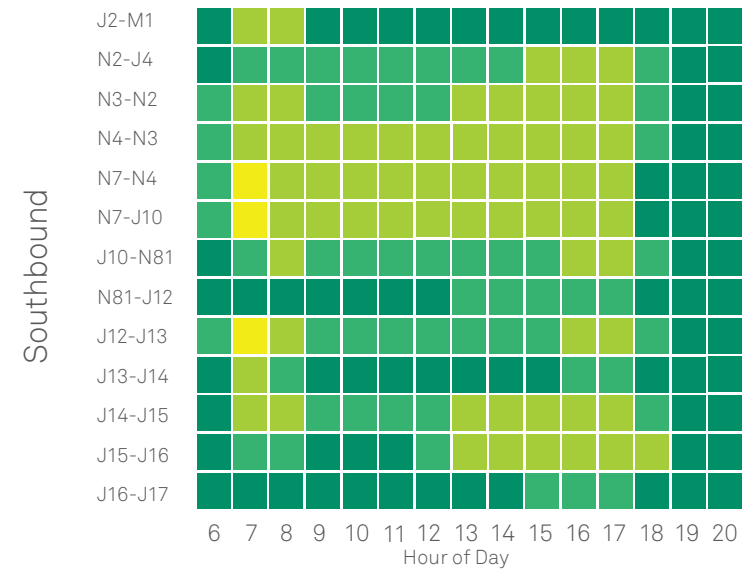
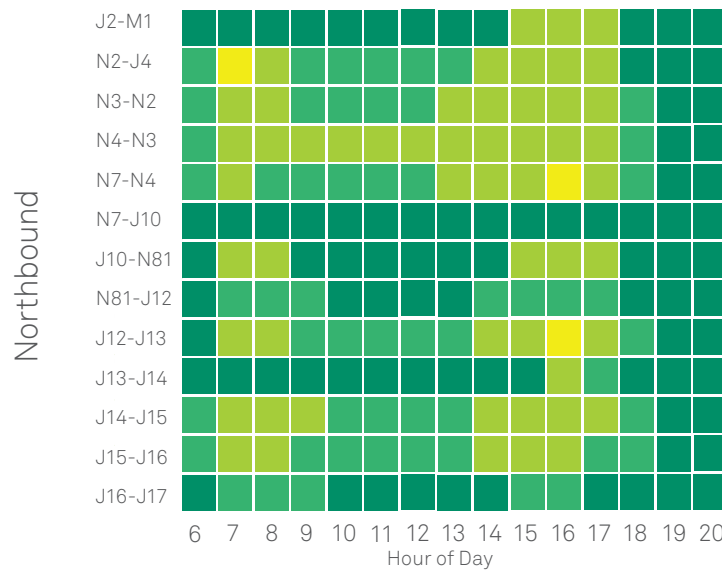
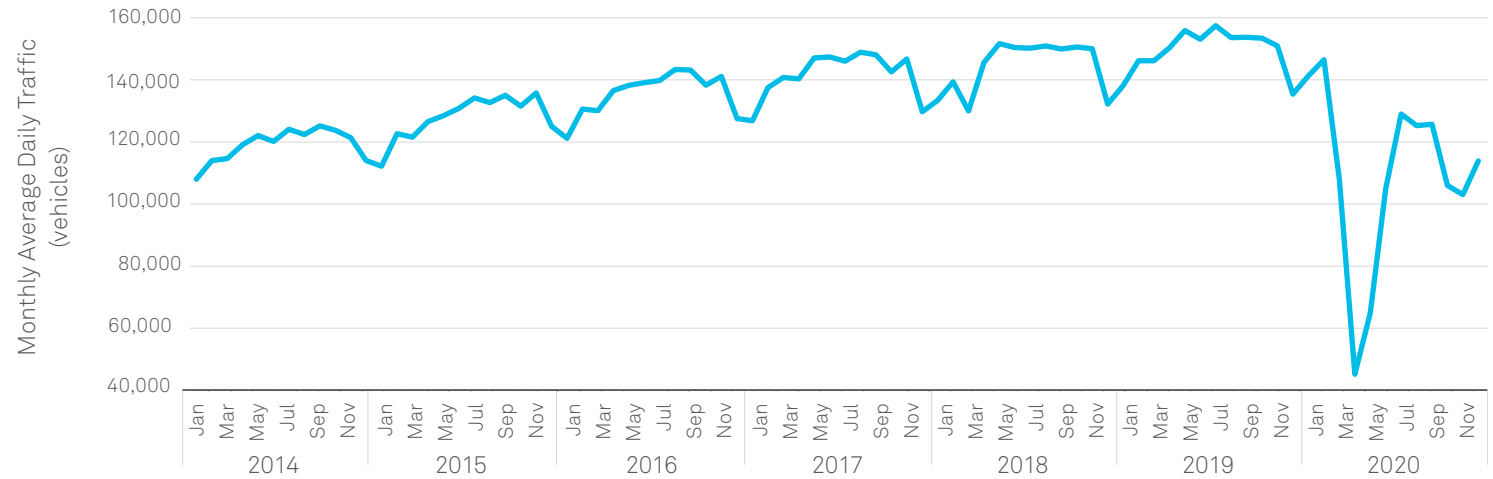
The level of service (LOS) provided by roads may be assessed using recognised international standards. LOS is a quality measure describing operational conditions within a traffic stream.

Average hourly levels of service for the full year were analysed from TII Traffic Monitoring Units which give an indication of what the busiest times of a typical day were, and what sections of the M50 were most congested in 2020. Due to the COVID-19 related travel restrictions in 2020, it is difficult to define what a “typical working day” was on the M50. For the purposes of consistency with previous versions of this report, a typical working day in 2020 refers to all weekdays excluding school holidays and public holidays.

Level of Service

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

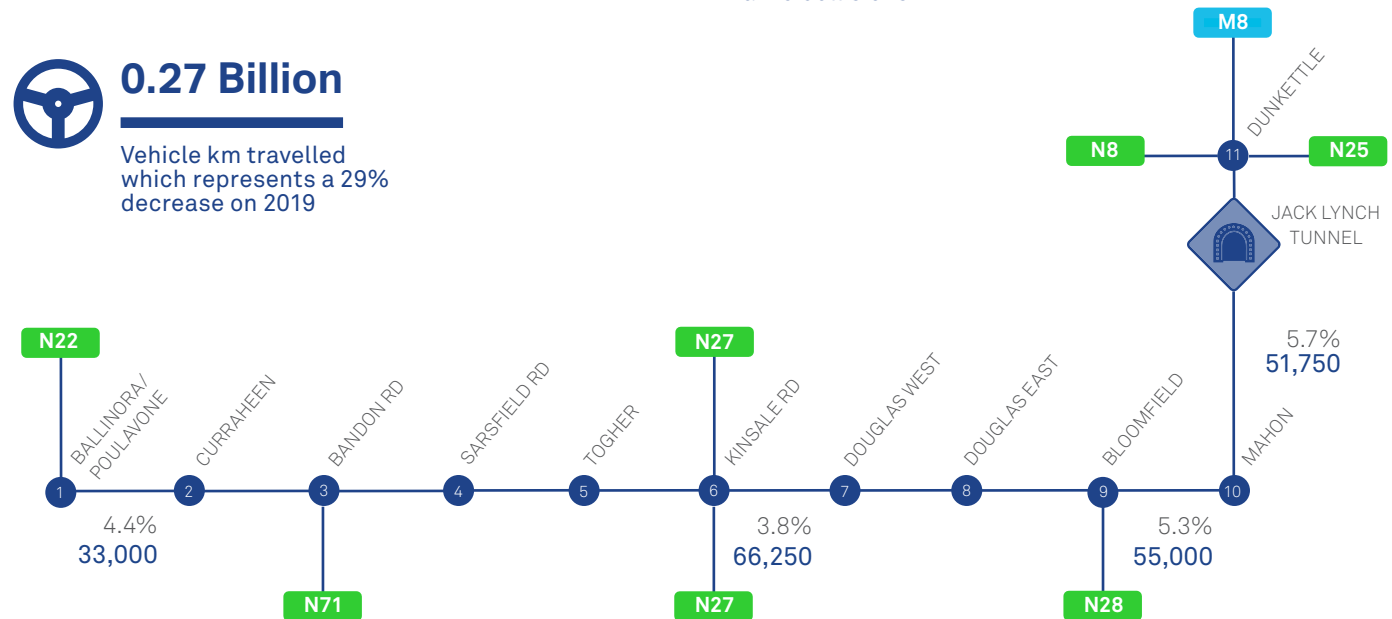
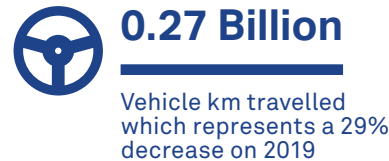
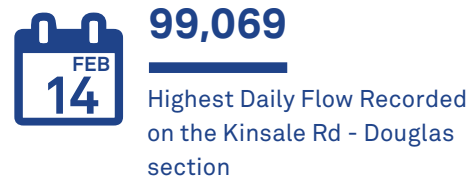
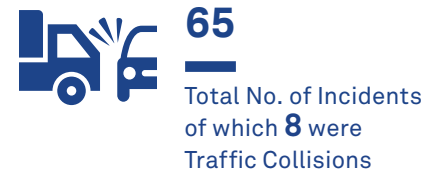
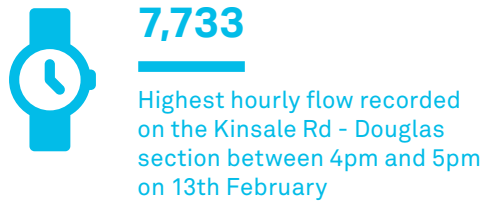
MADT at M50 (e-flow toll between J6 & J7)



D3: N40 PERFORMANCE SUMMARY

2020 Key network statistics

Several sections of the N40 Cork Southern Ring Road carry in excess of 65,000 vehicles on an average day. Overall traffic levels were down 24% on 2019 levels due to COVID-19. HGV levels did not change from 2019.



N40 Schematic Layout
2020 Annual Average Daily Traffic (%HGV) on N40

D4: N40 OPERATIONAL PERFORMANCE

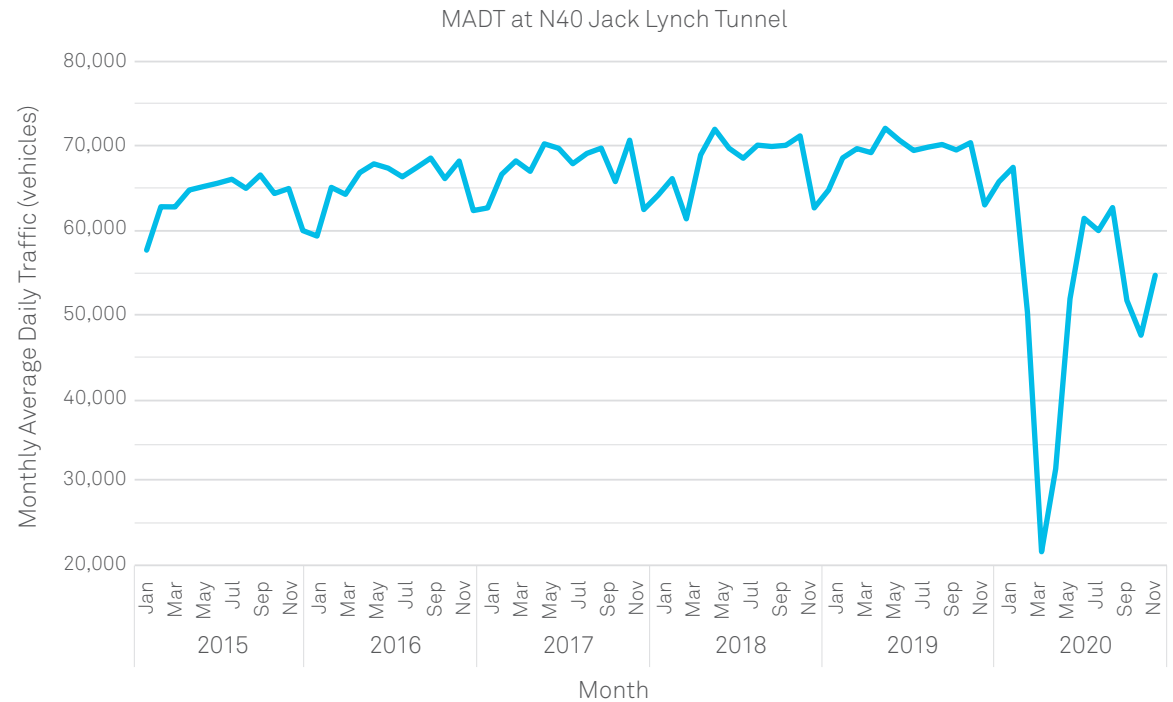
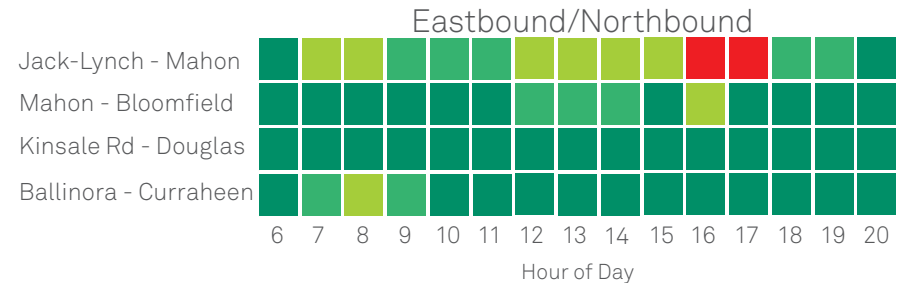
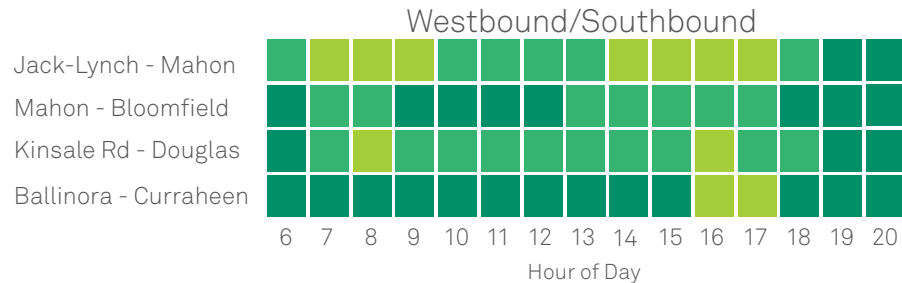
Traffic growth and typical working day conditions represented by level of service

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.

Average hourly levels of service for the full year were analysed from TII Traffic Monitoring Units which give an indication of what the busiest times of a typical day were, and what sections of the N40 were most congested in 2020. For the purposes of consistency with previous versions of this report, a typical working day in 2020 refers to all weekdays excluding school holidays and public holidays.

Level of Service

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

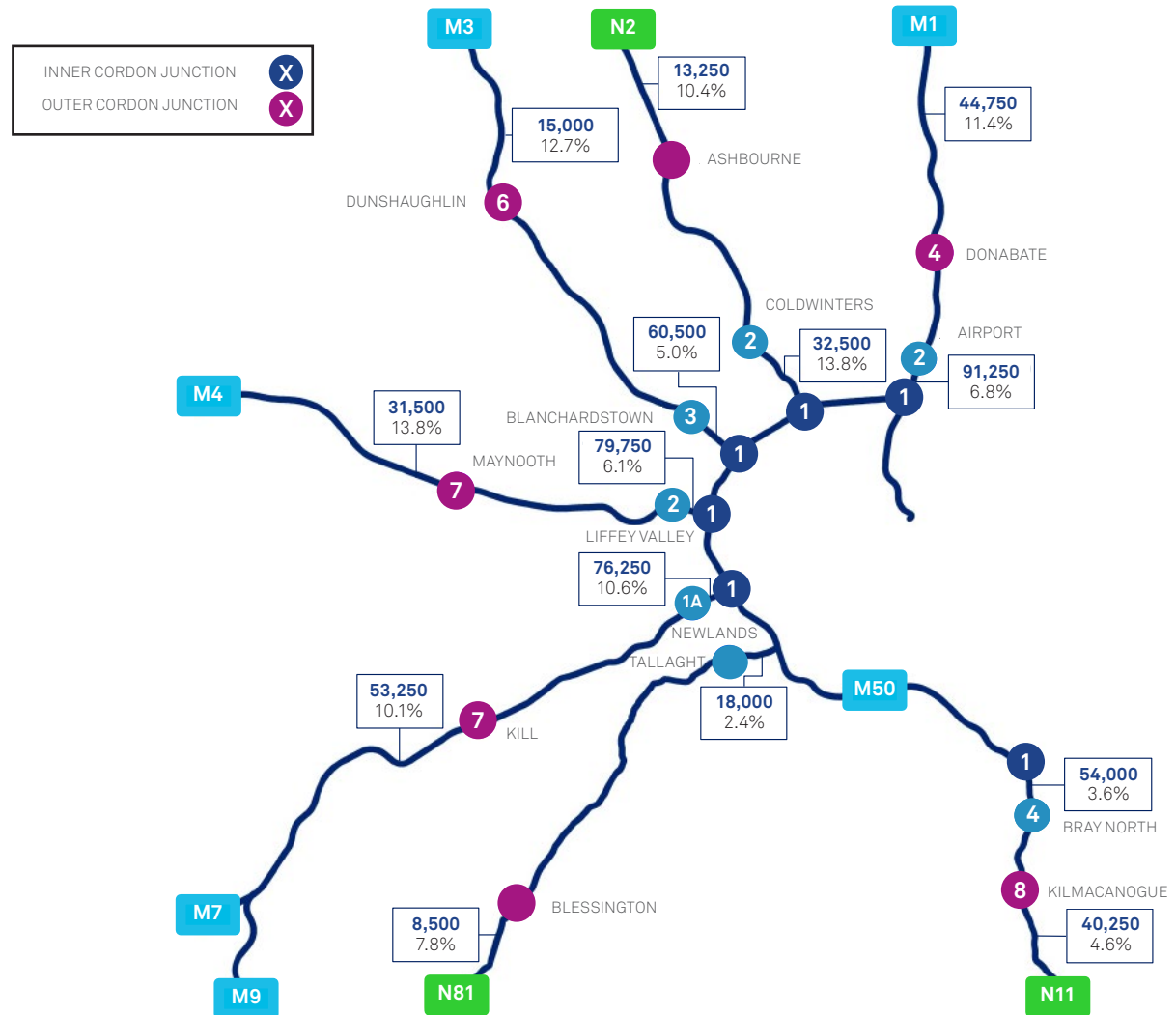


D5: DUBLIN RADIALS PERFORMANCE SUMMARY

Traffic growth and typical working day conditions represented by level of service

The Dublin Radials represent a system of routes providing access to the Dublin Area, converging onto the M50. They are composed of National Primary Routes designated M1 to M11 as one travels anticlockwise around the M50 and one National Secondary Route (N81).

The Dublin Radial Routes consisting of the M1, N2, N3, M4, N7, N81 and M11 are some of the busiest routes in the country. The schematic on the right contains average daily traffic information for these routes for 2020 from the Traffic Monitoring Units which are displayed as inner and outer cordons on the map of the Greater Dublin Area. Generally there is a very significant drop off in traffic between the inner and outer cordons as the population and job densities decrease.



Dublin Radials Schematic Layout
 2020 Annual Average Daily Traffic (%HG) on Dublin Radials

116,814
 Mar 06
 Highest Daily Flow Recorded on the M4 between the M50 and Liffey Valley

152,465
 Feb 28
 Highest Daily Flow Recorded on the M1 between the M50 and Dublin Airport

125,802
 Feb 28
 Highest Daily Flow Recorded on the N7 between the M50 and Newlands

84,627
 Mar 05
 Highest Daily Flow Recorded on the M11 between the M50 and Bray North

D6: DUBLIN RADIALS PERFORMANCE SUMMARY

Traffic growth and typical working day conditions represented by level of service

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.

Average hourly levels of service for the full year were analysed from TII Traffic Monitoring Units which give an indication of what the busiest times of a typical day were, and what sections of the Dublin radial routes were most congested in 2020.

For the purposes of consistency with previous versions of this report, a typical working day in 2020 refers to all weekdays excluding school holidays and public holidays.

Level of Service

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

The LOS figures show congestion occurring at specific locations (i.e. N3 and N11) within the inner cordon during the peak periods. Stable flow conditions occurred at the outer cordon in 2020.

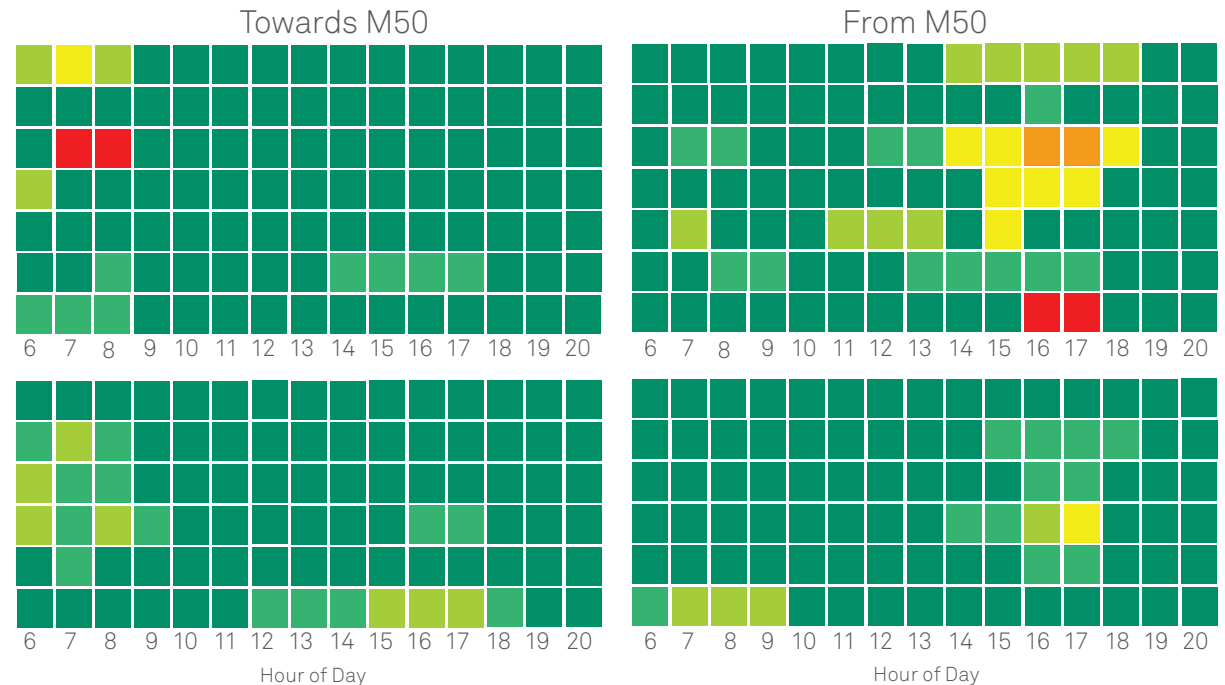
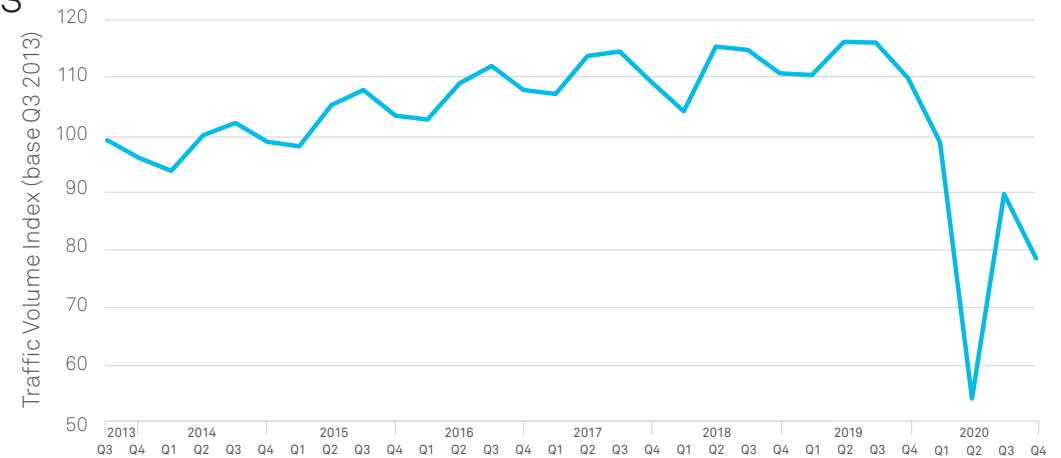
Inner Cordon

- M1-M50 to Airport
- M2-M50 to Coldwinters
- N3-M50 Blanchardstown to Clonee
- N4-M50 to Liffey Valley
- N7-M50 to Newlands
- N81-M50 to Tallaght
- N11-M50 to Bray North

Outer Cordon

- M1- Donabate to Balbriggan
- N2- Ashbourne to Slane
- M4- Maynooth to Kilcock
- N7- Kill to Johnstown
- N81- Tallaght to Blessington
- N11- Kilmacanogue to Glen of the Downs

Quarterly Traffic Profile of Dublin Radials*

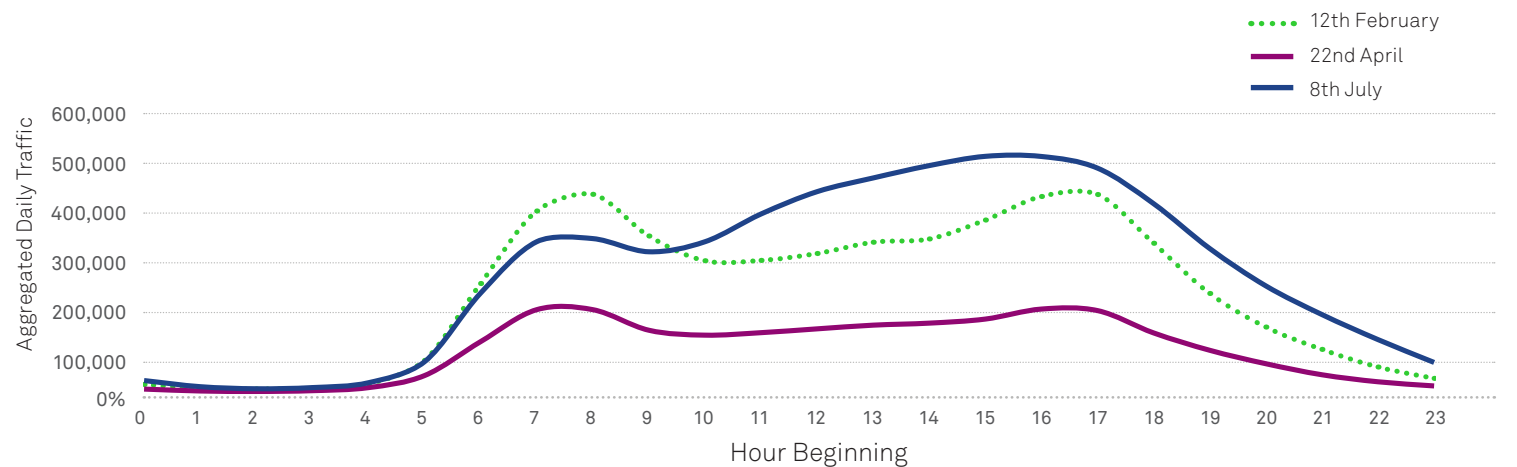
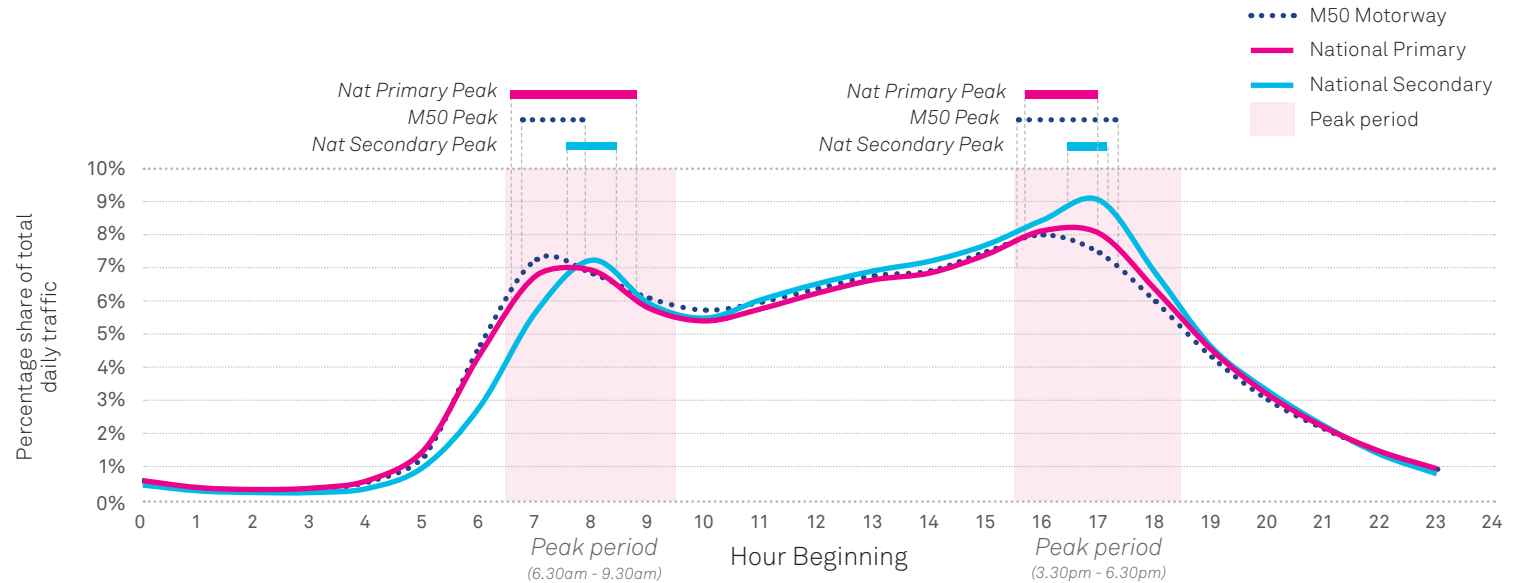


E: ROADS USAGE OVER THE DAY

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

As a result of the travel restrictions associated with COVID-19, there was a drop in the overall proportion of traffic during the traditional morning and evening peak periods on the National Roads network as fewer people commuted to and from work.

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 40% above off-peak levels. At an aggregate level traffic levels during the traditional AM and PM peak periods dropped by over 30% in 2020 on the National Roads Network, while traffic levels during the inter-peak periods were down by approximately 22%.



Source: TII TMU data

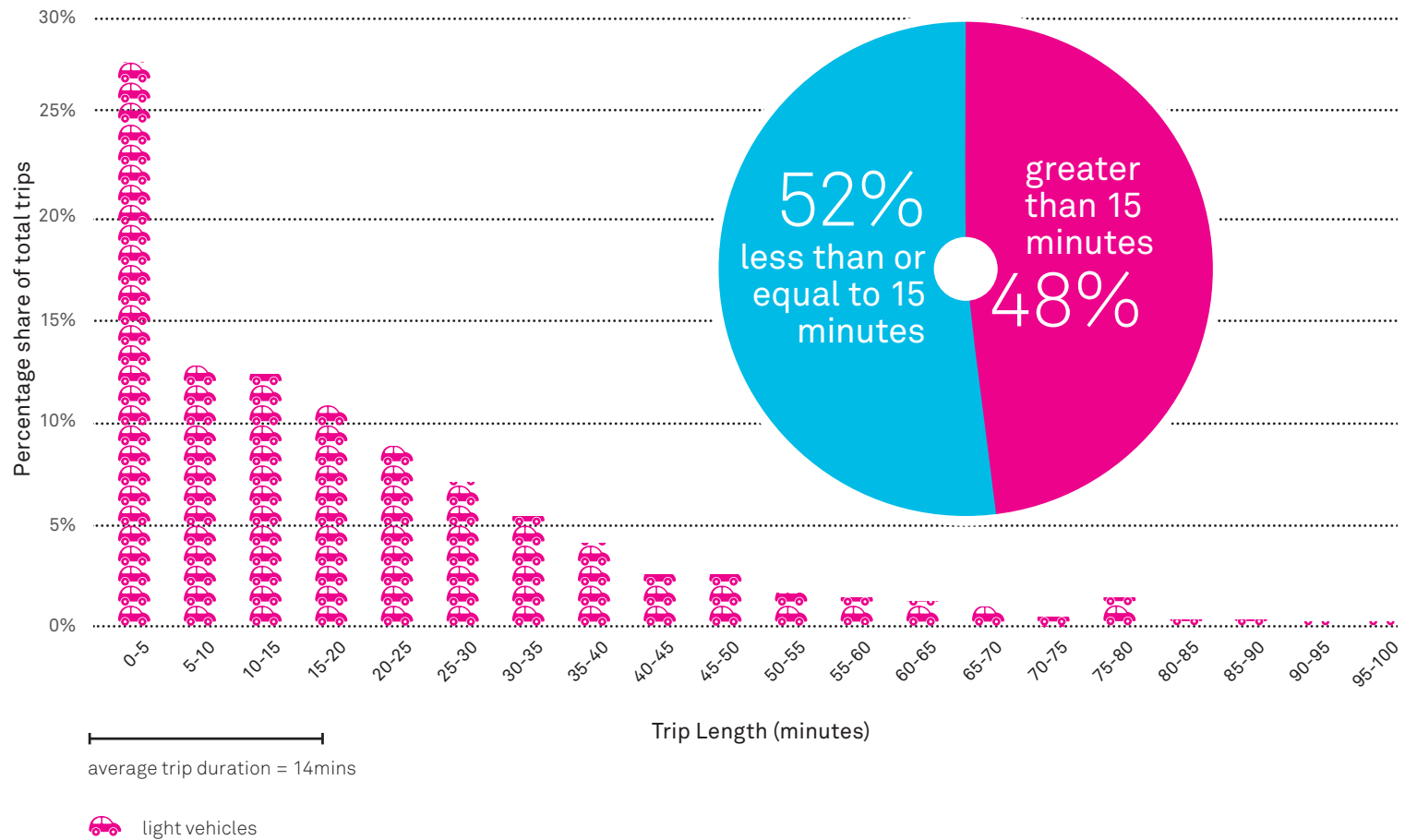
F: TRIP DURATION

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, 52% of trips are of 15 minutes duration or less.

The travel restrictions in 2020 resulted in a significant increase in short distance trips on the road network.



Source: TII National Transport Model, 2020

H: ANNUAL TRAFFIC GROWTH RATES

Annual Traffic Growth 2019-2020

Traffic growth reduced by 28.1% across the network in 2020

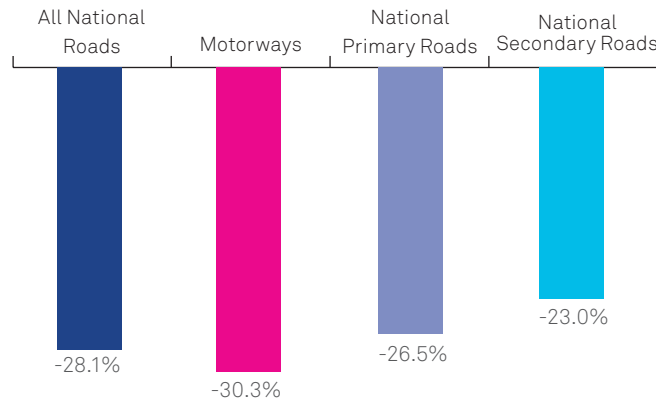
Across the National Roads network there was a reduction in traffic in 2020 of 28.1%. The Mid-East region recorded the highest reduction in traffic at 32.8%, while the lowest reduction of 24.6% was recorded in the West region.

The impact of COVID-19 on HGV levels in 2020 was significantly lower than on general traffic. Overall there was a reduction of 4.1% across the network. The Border region experienced the largest drop of 7.4%, while the Midlands region experienced a growth of 1.4%.

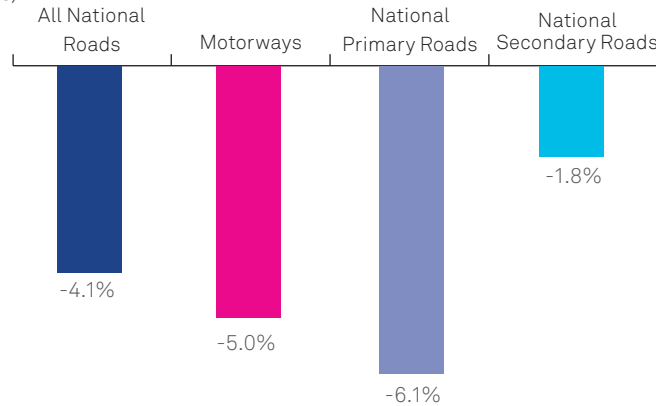
In terms of road type, Motorways experienced the largest reduction in general traffic levels at 30.3%, while National Secondary Roads experienced the lowest reduction at 23%.

In terms of HGVs, National Primary Roads experienced the biggest drop at 6.0%, with a 1.8% drop on National Secondary Roads.

Growth by Road Type (All Vehicles)

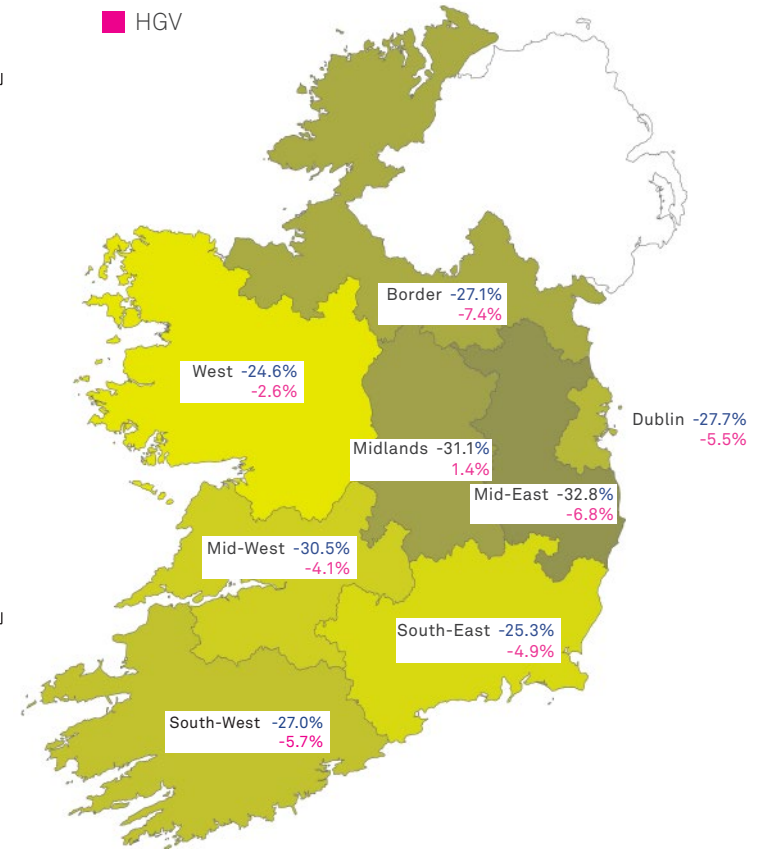


Growth by Road Type (HGVs)



Growth by Region

- All Vehicles
- HGV

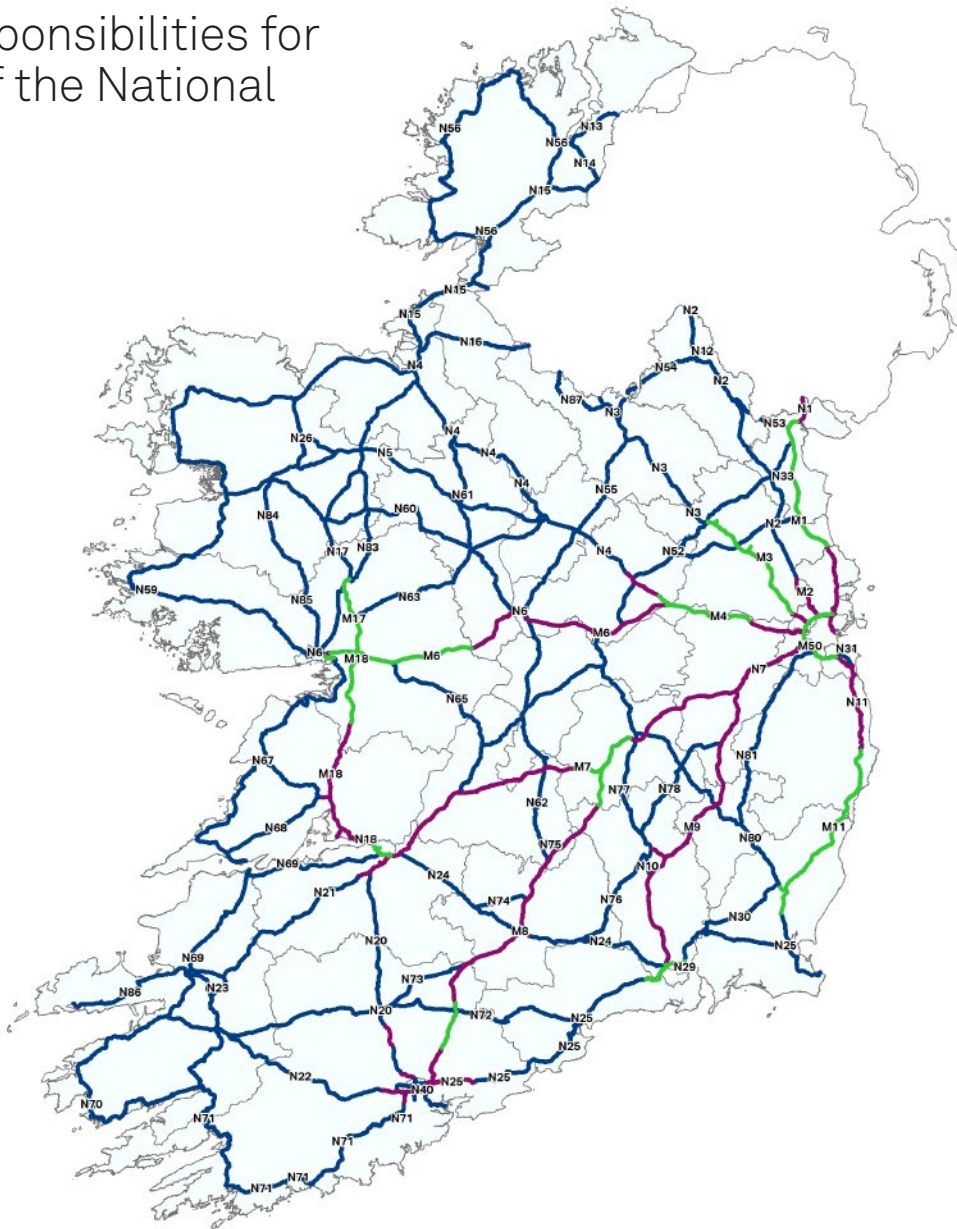


Source: TII Traffic Monitoring Units

I: NETWORK MANAGEMENT

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








The management of the National Roads 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 total there are 3,289 bridges on the National Roads network, with PPP concession companies manage a total of 593 of these bridges.



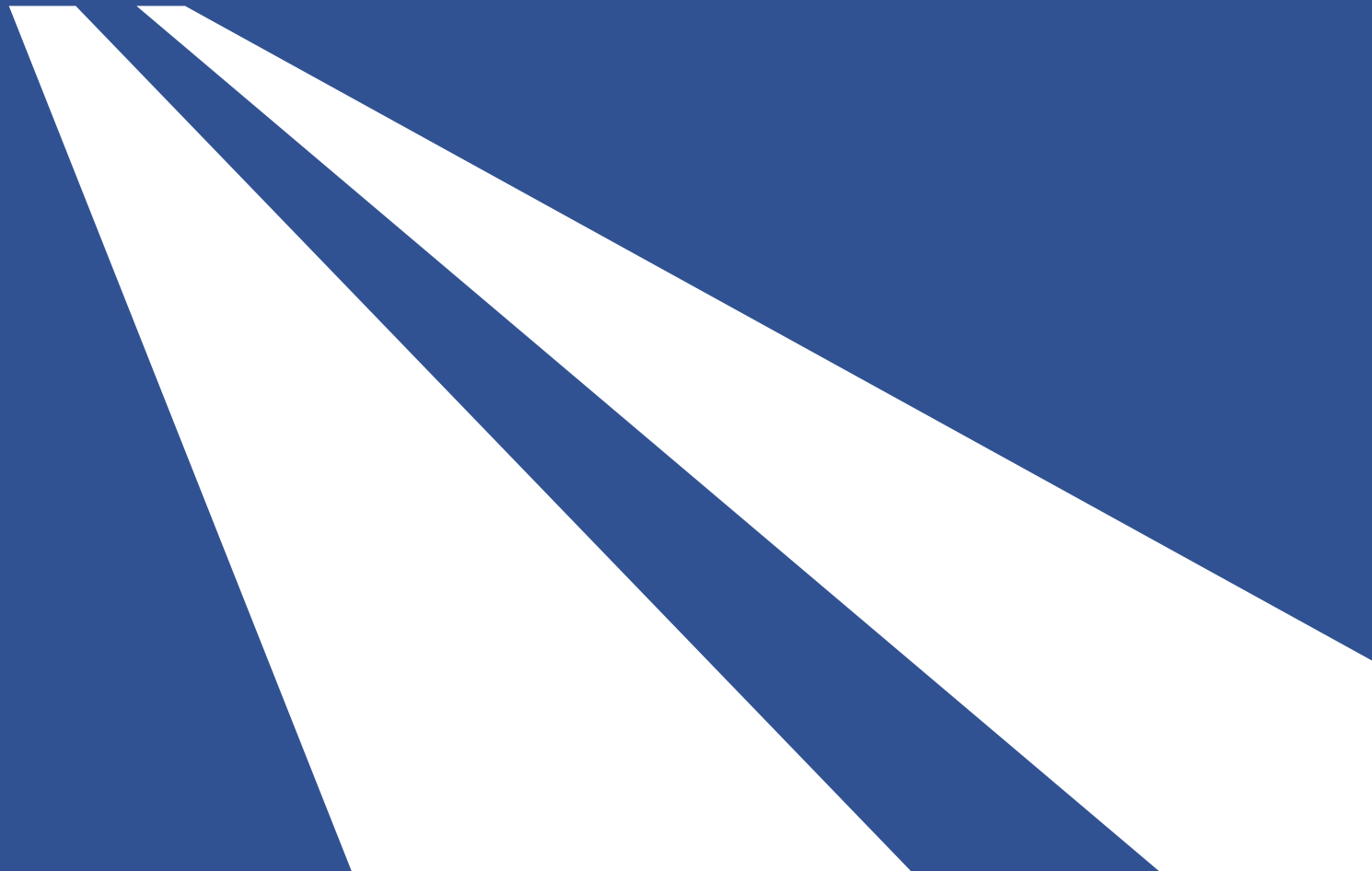
Routes managed by:

- MMaRC
- PPP
- Local Authority

Key facts:

 327 demountable snow ploughs Our winter service fleet consists of:	 7,455 all emergency calls received by Motorway Traffic Control Centre including SOS phones	 79 nights in 2020 where the temperature reached below zero
 360 salt spreaders	 1,478 SOS phones in the country	 114 weather stations in operation on the National Roads Network
 45,311 tonnes of salt were used on National Roads Network in 2020		

TWO: ECONOMIC



A: ECONOMICS TRENDS AND TRANSPORT

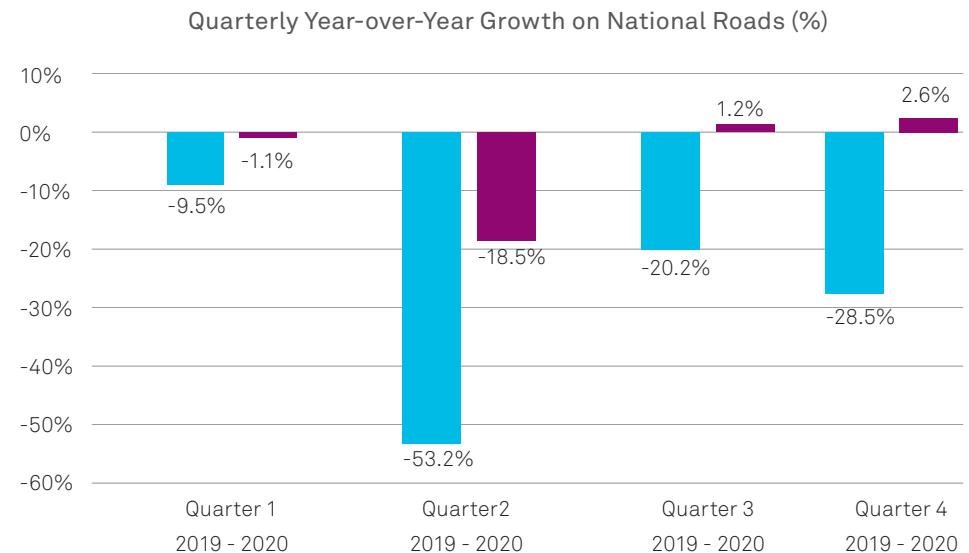
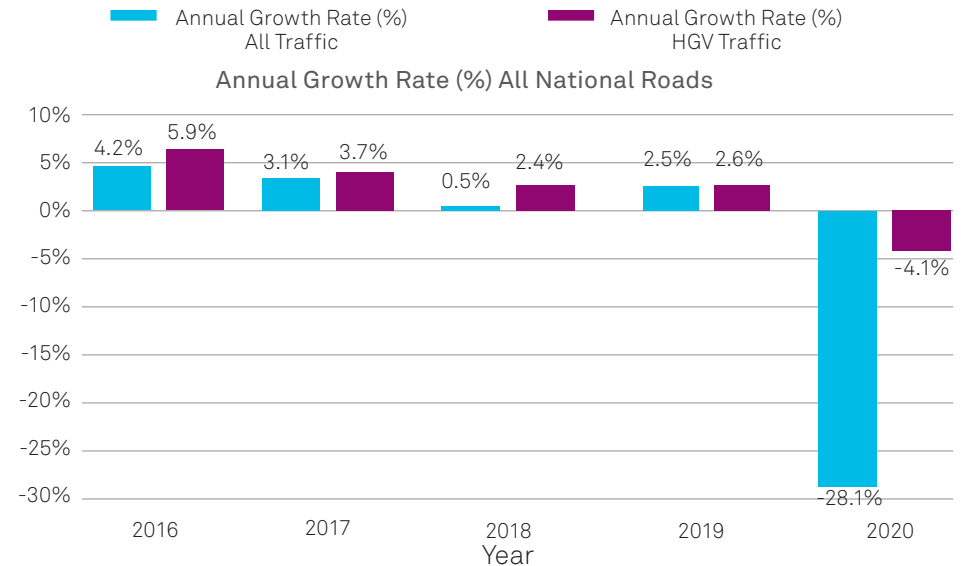
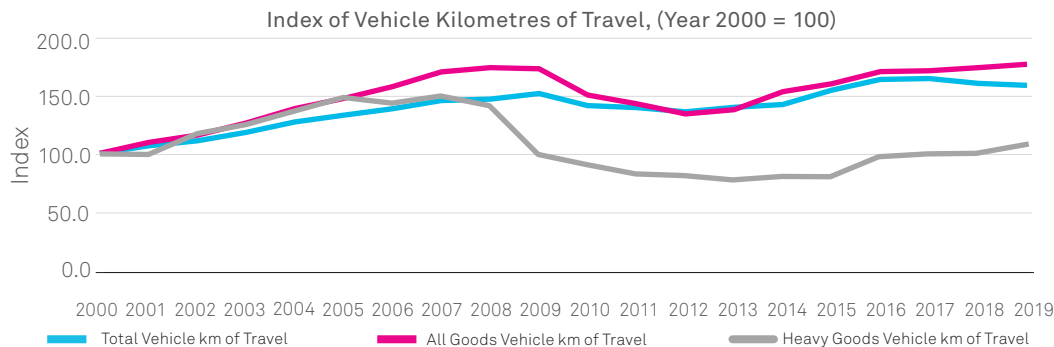
Modified Domestic Demand was down by 5.4% in 2020 while total traffic volumes reduced by 28%.

Traditionally total transport demand in Ireland is closely related to national economic performance. When the economic and financial crisis occurred, vehicle kilometres of travel in total declined by 10% and goods traffic by 22% between 2009 and 2012. Economic growth began to recover in a sustained way in 2012 and employment levels a year later. By 2015, vehicle kilometres of travel had returned to its pre-crisis level.

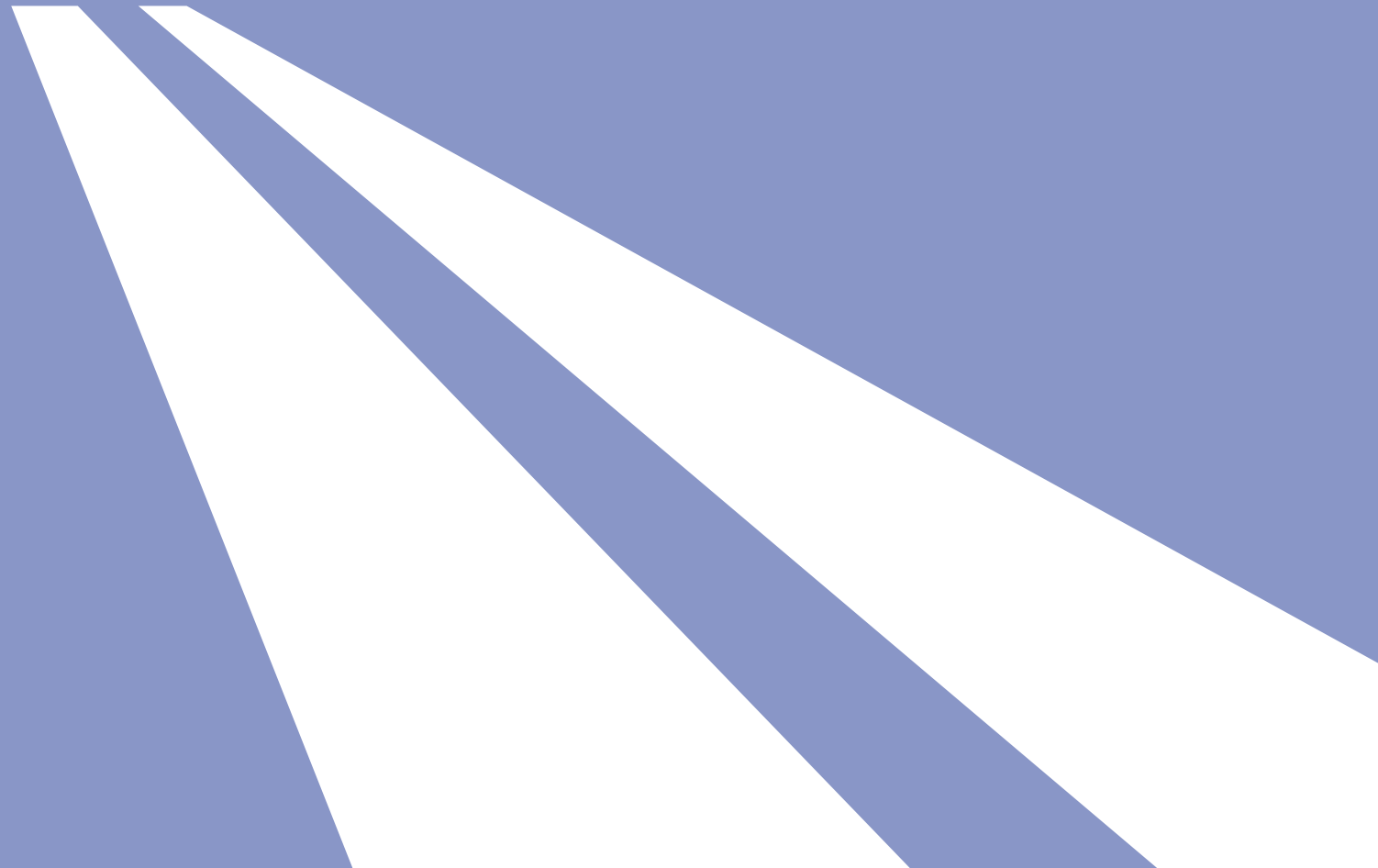
With regard to personal travel, overall employment in the economy influences commuting traffic and personal incomes are the major determinant of non-commuting traffic. Regarding the carriage of goods, economic output is traditionally the major determinant, particularly the output of the building and construction sector which is very transport intensive.

The COVID-19 pandemic in 2020 had significant impacts on national economic performance with a reduction in Modified Domestic Demand (MDD) of 5.4%. The MDD indicator excludes globalisation effects such as trade in intellectual property and trade in aircraft by leasing companies and is an important indicator of underlying demand.

However, there were other more significant impacts on travel behaviour due to the pandemic. Overall traffic volumes on the National Roads Network reduced by 28% in 2020 when compared to 2019. While reductions in economic activity and employment will have contributed to this reduction, the unprecedented restrictions to personal travel introduced to combat the spread of COVID-19 had the most significant impact on transport demand in 2020.



THREE: ROAD CONDITION



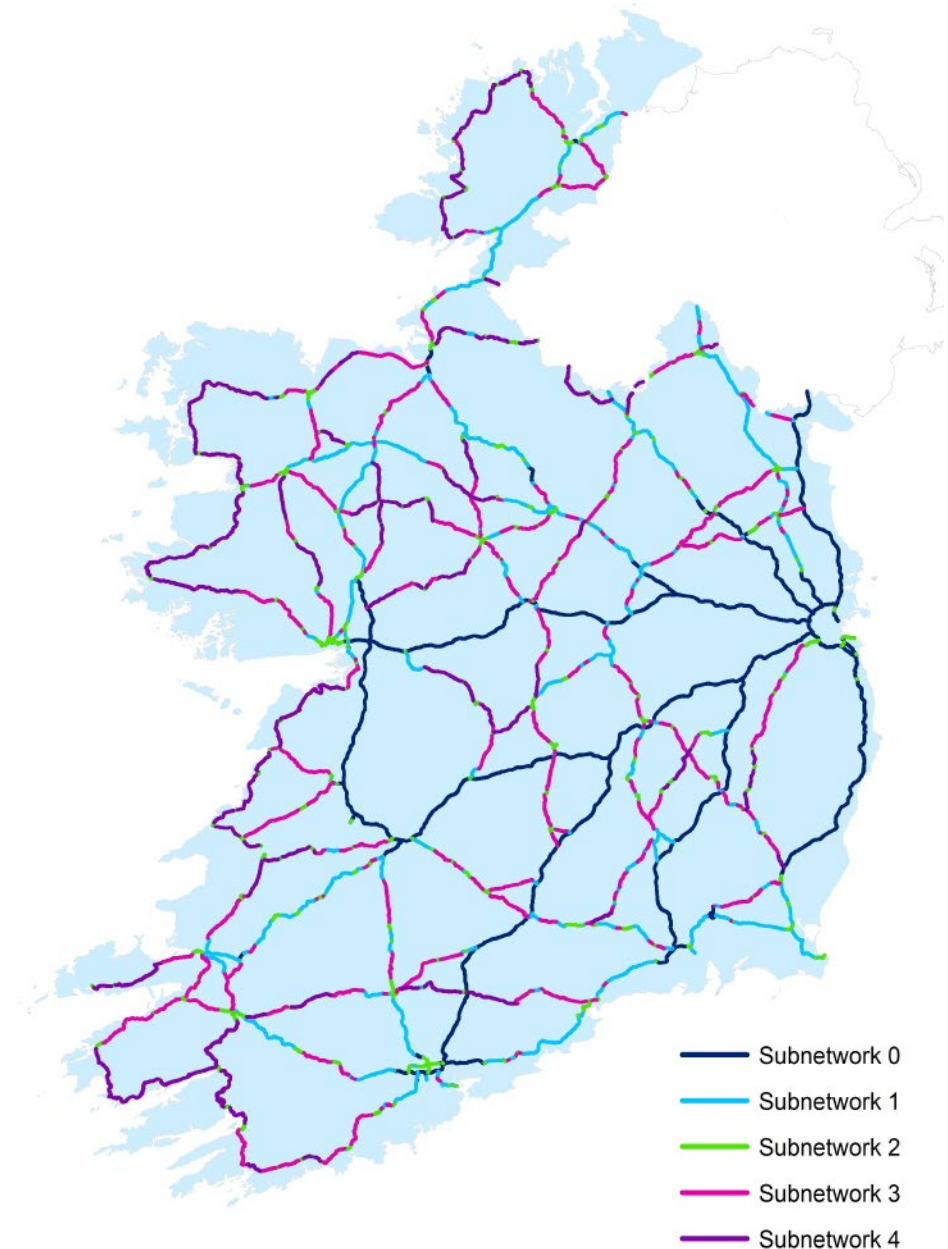
A1: PAVEMENT MAINTENANCE

Overview of subnetwork classification of National Roads network

The National Roads network consists of over 5,300 kilometres of road pavements. There is a very significant variation across the TII network in terms of pavement construction, pavement age, carriageway width, lane width, geometric design and traffic volumes carried.

In order to effectively manage this diverse network, a series of 5 subnetwork types were defined to manage and identify the variation in pavement condition, traffic and construction type within each subnetwork. The breakdown of subnetworks and map to the right are shown for 2020 when the Pavement Condition Report was published.

Subnetwork	Classification	% of Network	
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.	23%
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.	22%
2	Urban Areas	Low to medium speed, typically short sections through towns that are not bypassed, also includes longer sections within the cities and larger towns where National Roads start and end.	13%
3	Legacy pavement – high traffic	Legacy subnetwork, typically constructed without formal geometric or pavement design. Typically carries traffic volumes less than 10,000 AADT.	24%
4	Legacy pavement – low traffic	Legacy subnetwork, typically constructed without formal geometric or pavement design. Typically carries traffic volumes less than 5000 AADT.	18%



A2: MEASURING PERFORMANCE OF PAVEMENTS ON NATIONAL ROADS NETWORK

Overview of the strategic indicators used across the National Roads network pavement sub networks

Road pavement condition is a critical element in ensuring the safety and efficiency of the National Roads network. In order to maintain acceptable performance levels of road pavement significant investment is required annually.

Road pavements are made up of different layers. The surface layer is key in the road-wheel interface and influences both the safety and overall condition of the pavement. Timely upgrade of the pavement surface can prolong the lifecycle of the sub-surface / structural layers of the pavement.

Various engineering parameters are used to measure the performance of aspects of the pavement but these do not give an understanding of overall performance of the pavements on the network.

TII has therefore developed strategic level performance indicators which address three key characteristics – Pavement Surface Health; Pavement Surface Safety, Pavement Structural Health.

Within the pavement sub networks, pavement condition is ranked on a five point scale:
Very Poor, Poor, Fair, Good , Very Good.

TII research indicates that on average it takes approximately 7 years for a pavement to transition between points on the scale.

To ensure the safety and efficiency of the network TII have set performance targets for each of the subnetwork categories under each of the performance indicators.



Pavement Surface Health



Pavement Surface Safety



Pavement Structural Health

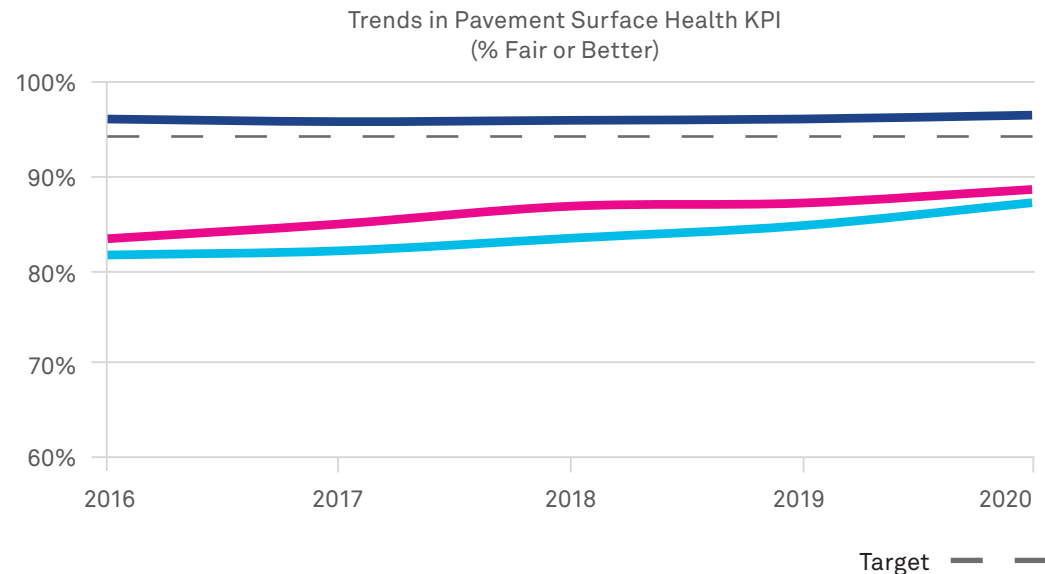
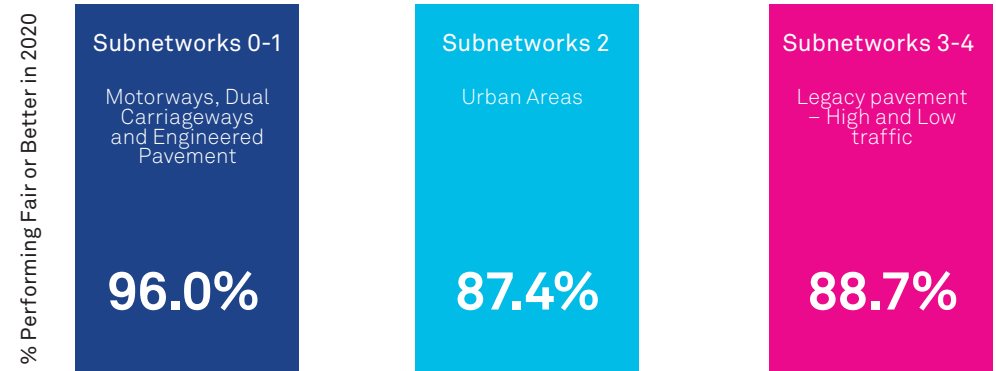
B1: CURRENT STATUS OF THE ROADS PAVEMENT CONDITION

Pavement Surface Health

The Engineered pavement subnetworks are consistently above the target level over the five year analysis period. The remainder of the network is at a higher KPI level than the Pavement Structural Health parameter, but the rate of improvement in performance is lower than that seen with Structural Health. An increased investment in the Legacy Subnetworks shows an improved upward trend line.



TII target 95% performing fair or better for all sub-networks



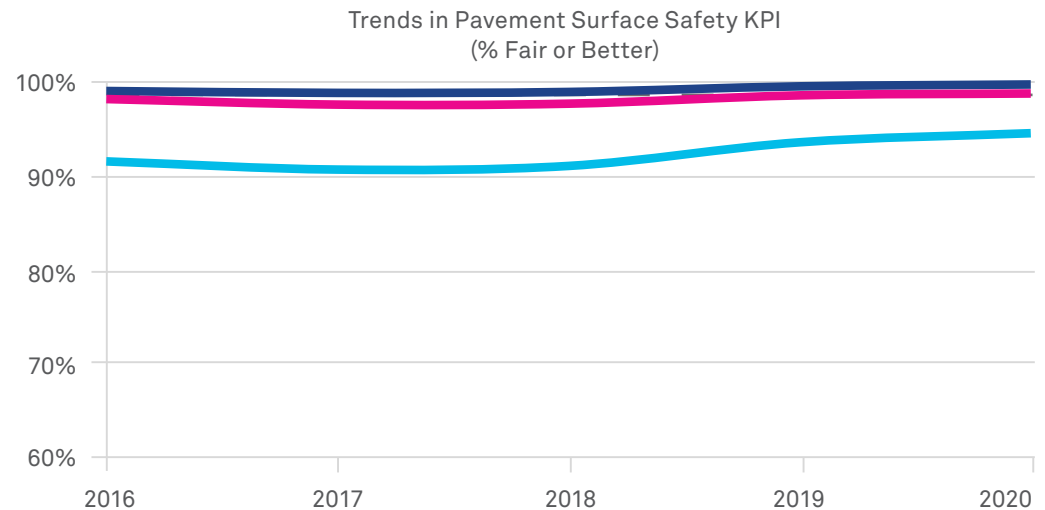
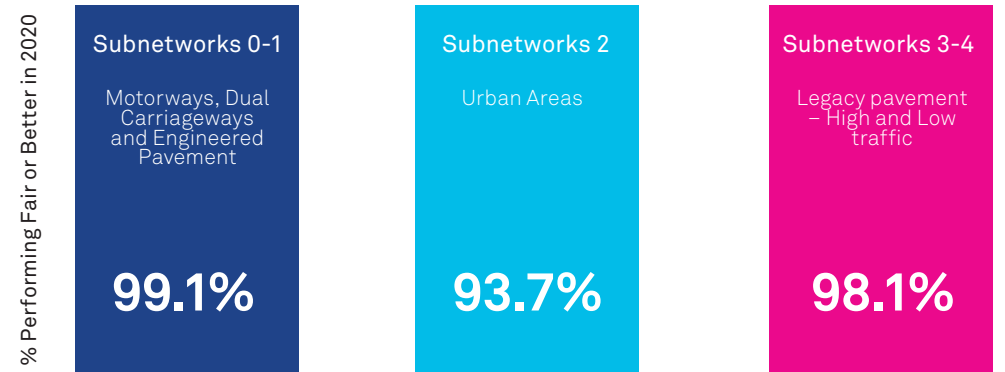
B2: CURRENT STATUS OF THE ROADS PAVEMENT CONDITION

Pavement Surface Safety

This KPI is derived from network level Skid Resistance surveys. The target level is set to have 99% of the network in a safe condition based on annual skid resistance measurements. This has been consistently achieved on the Engineered Subnetworks (0 and 1) over the 5 year period as seen by the trend line. The Legacy Subnetworks are below but close to the target line, the trend line is generally flat but has improved in 2020. The Urban subnetwork is considerably below the remainder of the network. There has been an increased emphasis on treatment within urban areas in the past 2 years, and this has produced an improvement in the KPI level.



TII target 99% performing fair or better for all sub-networks



Target — —

Source: TII Pavement Condition Report 2020

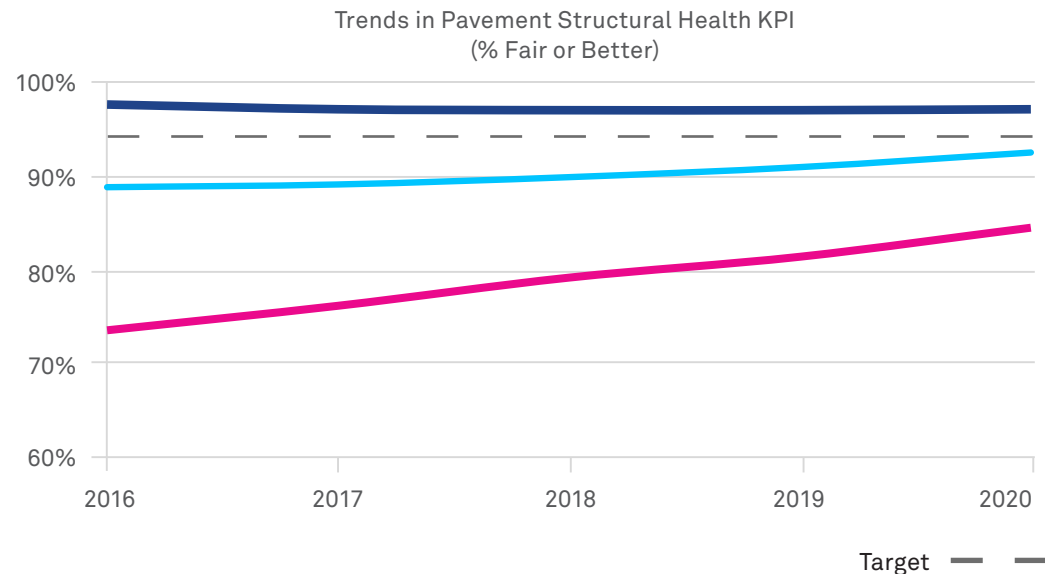
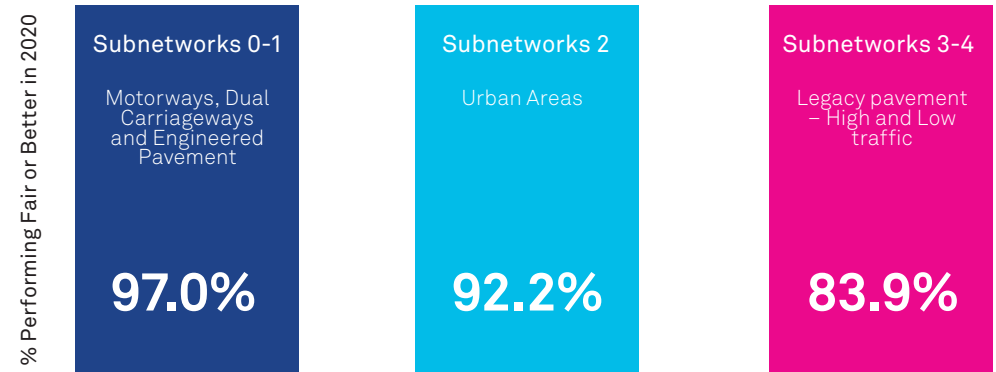
B3: CURRENT STATUS OF THE ROADS PAVEMENT CONDITION

Pavement Structural Health

There is a very clear difference between Subnets 0 and 1 (Engineered Pavements) and the remainder of the network. Subnet 0-1 is consistently above the target of 95% in Fair or Better condition, reflecting the relatively new age profile of the majority of the road sections in this category. The Urban subnetwork (Subnet 2) is in significantly better condition than the Legacy Subnetworks (subnets 3 and 4). The 5 year trend lines show an overall upward trend, reflecting a concentration on improving the worst-performing sections over the five year period.



TII target 95% performing fair or better for all sub-networks



Source: TII Pavement Condition Report 2020

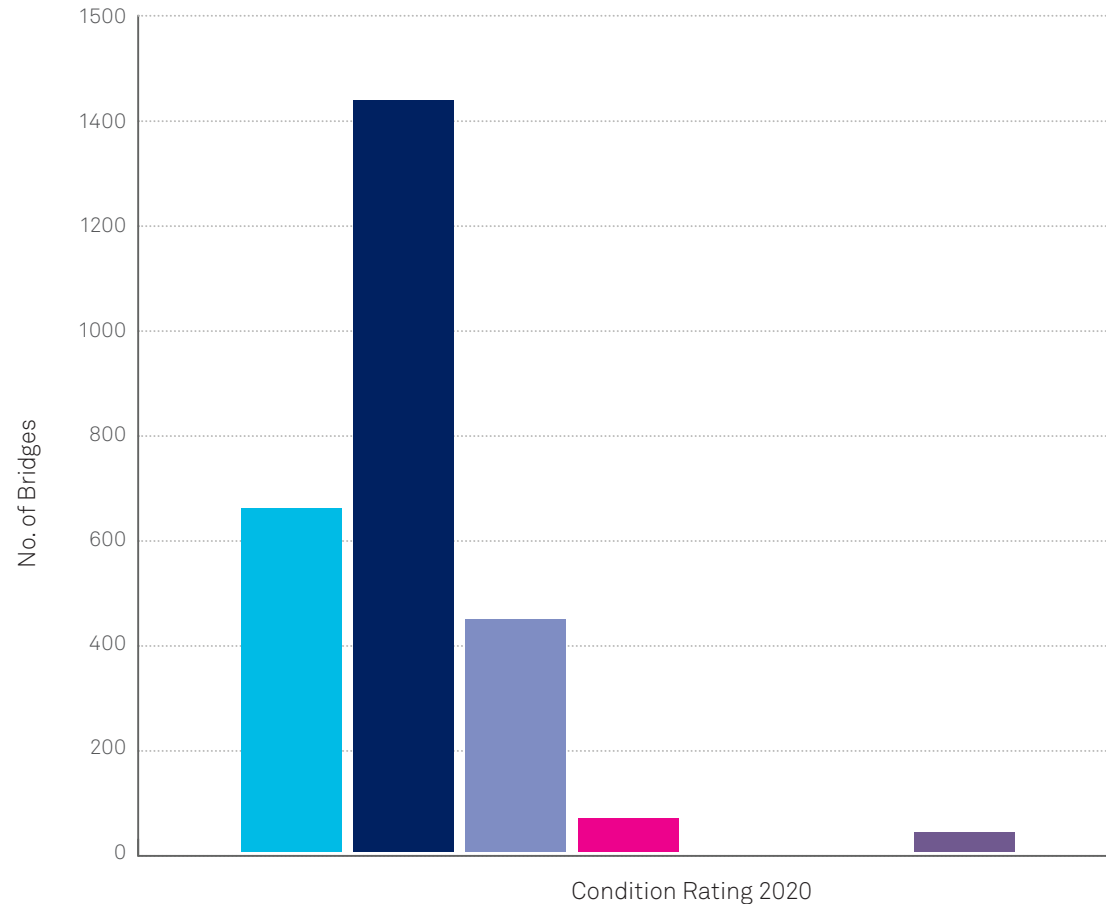
C: NATIONAL ROAD BRIDGE STRUCTURES

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

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

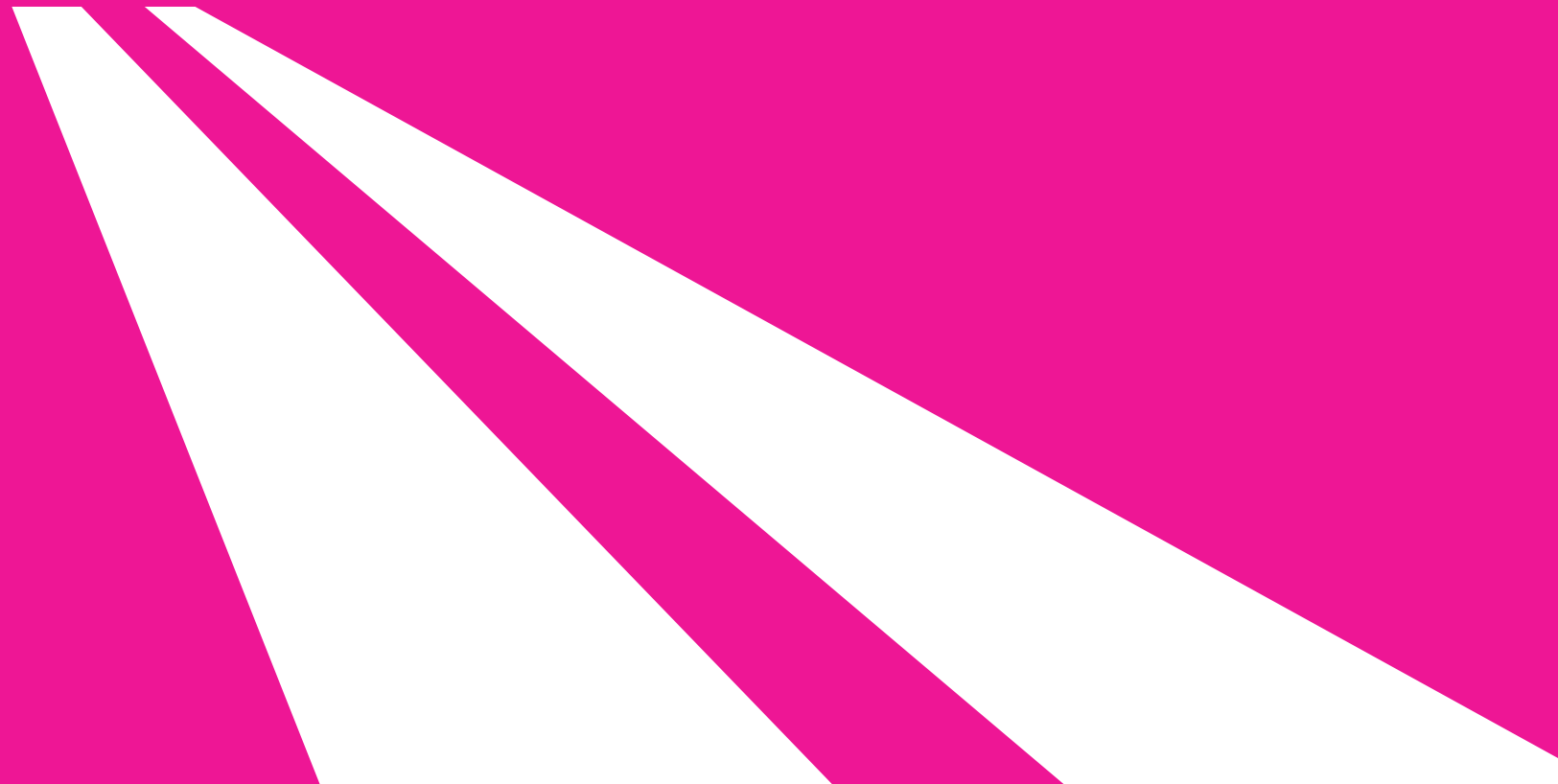
The National Roads network includes 3,289 bridge structures of which 593 are on roads provided by public private partnerships.

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.



- 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



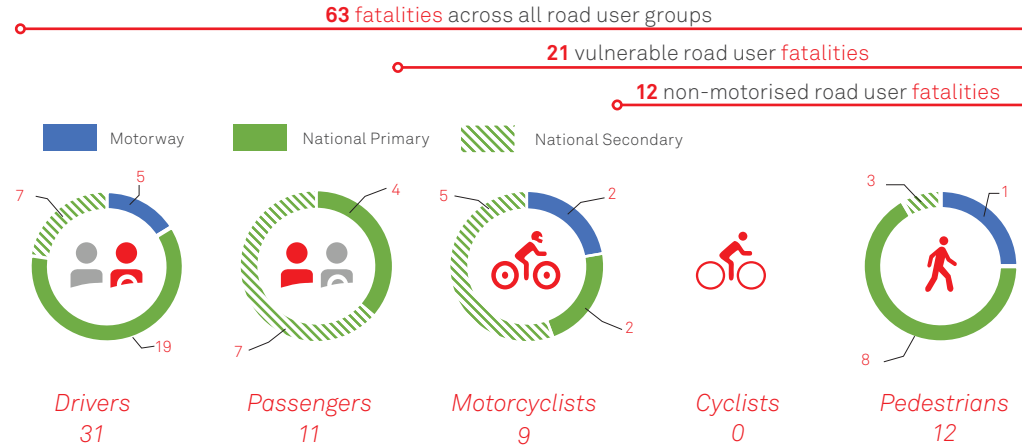
A: FATAL COLLISIONS ON THE NATIONAL ROADS NETWORK:

Key Statistics* for 2020 are presented. For further details on road safety and national trends please see www.rsa.ie

According to the Safe Systems approach, death and serious injury in road accidents are largely preventable. It should be a shared responsibility at all levels to ensure that road collisions do not lead to serious or fatal injuries. The Directive 2008/96/EC on road infrastructure safety management was amended by the Directive (EU) 2019/1936.

However, the amended Directive includes the strategic goal to move close to zero fatalities by 2050.

Summary of reported fatalities 2020



2020 Reported figures for National Roads

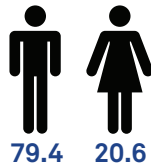
Fatal Collisions



Fatalities



Percentage Fatalities



Percentage of fatalities by Collision Category



Head-On
42.9%



Single vehicle
22.2%

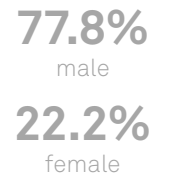
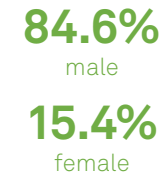
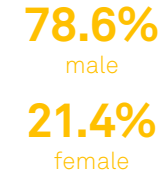
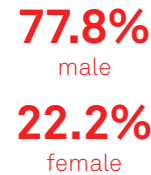
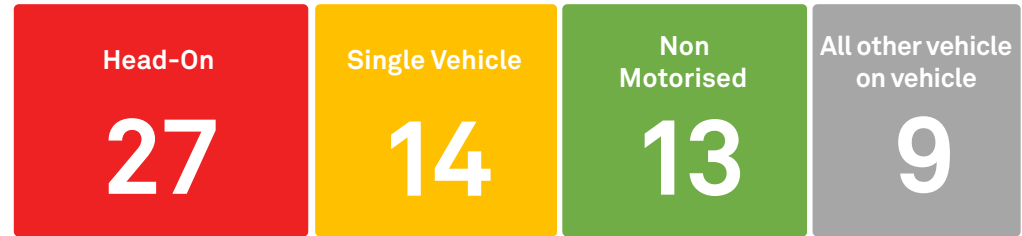


Non-motorised
20.6%



All Other
14.3%

2020 Count of fatalities by Collision Category



*Pedestrians on Motorways include individuals who have left their vehicle. All figures shown are provisional and subject to revisions.

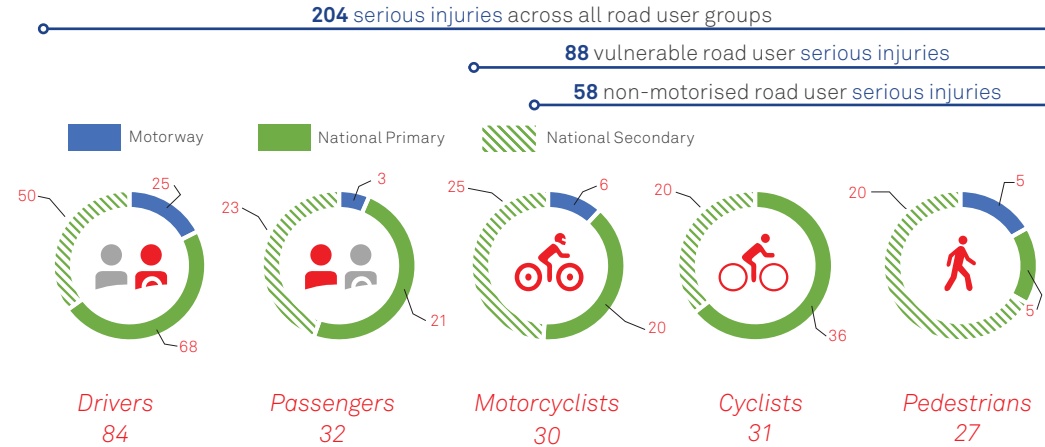
B: SERIOUS INJURIES ARISING FROM COLLISIONS ON THE NATIONAL ROADS NETWORK

Key Statistics* for 2020 are presented. For further details on road safety and national trends please see www.rsa.ie

According to the Safe Systems approach, death and serious injury in road accidents are largely preventable. It should be a shared responsibility at all levels to ensure that road collisions do not lead to serious or fatal injuries. The Directive 2008/96/EC on road infrastructure safety management was amended by the Directive (EU) 2019/1936.

These amendments included a new interim target of halving the number of serious injuries by 2030 compared with 2020.

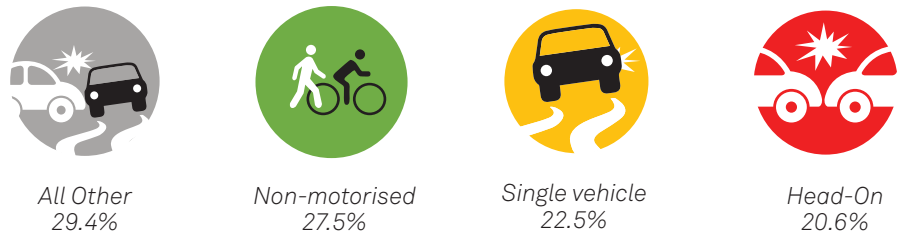
Summary of reported Serious Injuries 2020



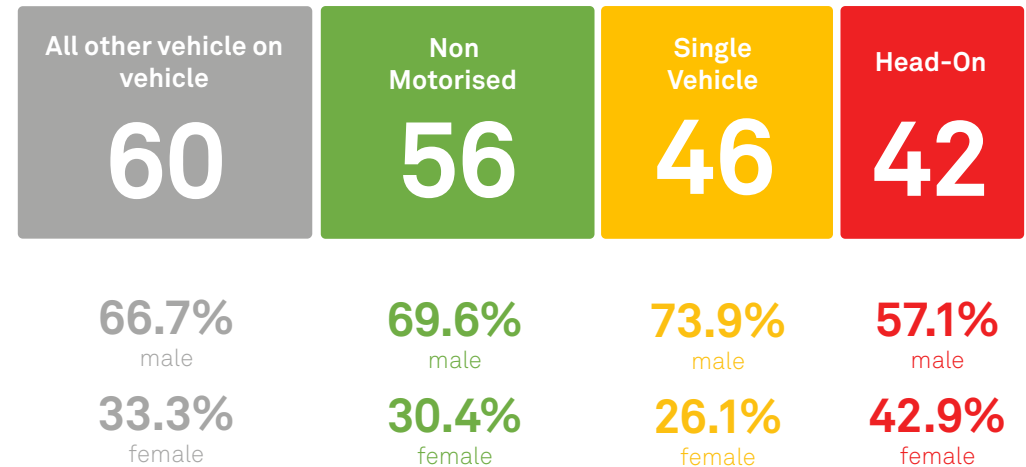
2020 Reported figures for National Roads



Percentage of fatalities by Collision Category



2020 Count of Serious Injuries by Collision Category

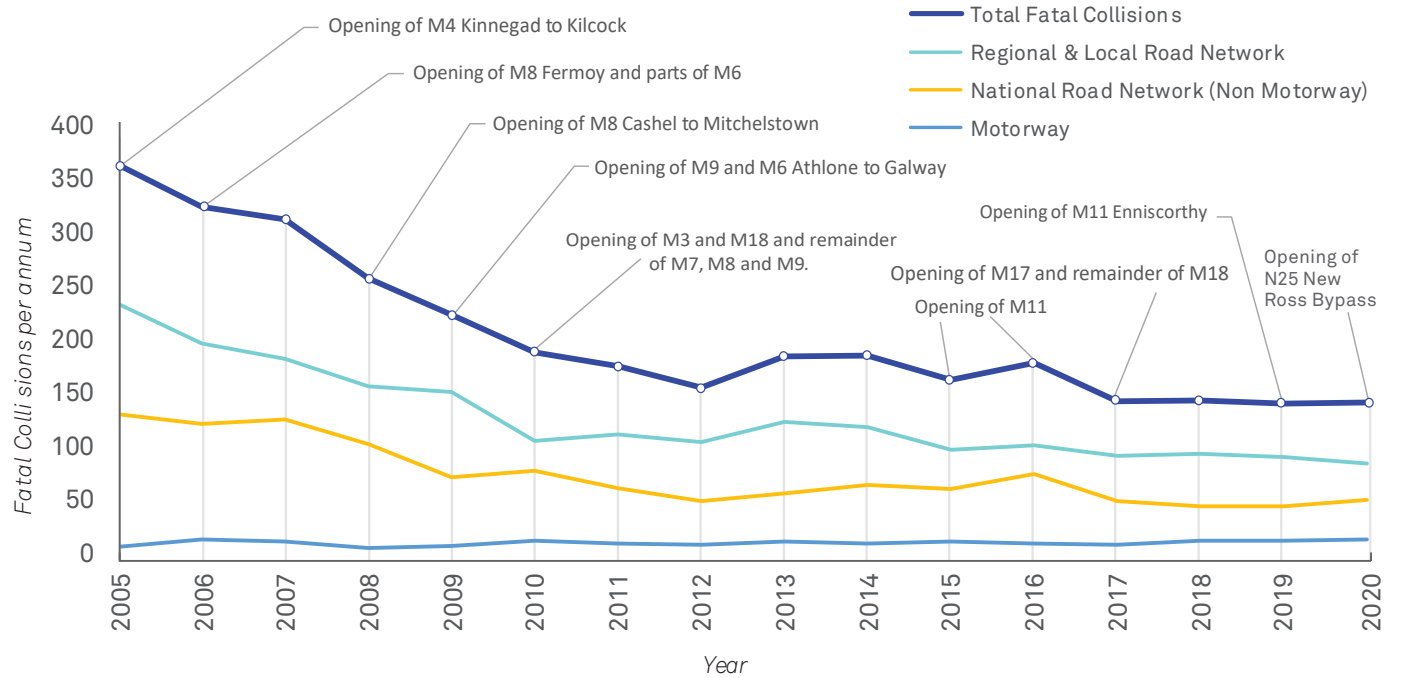
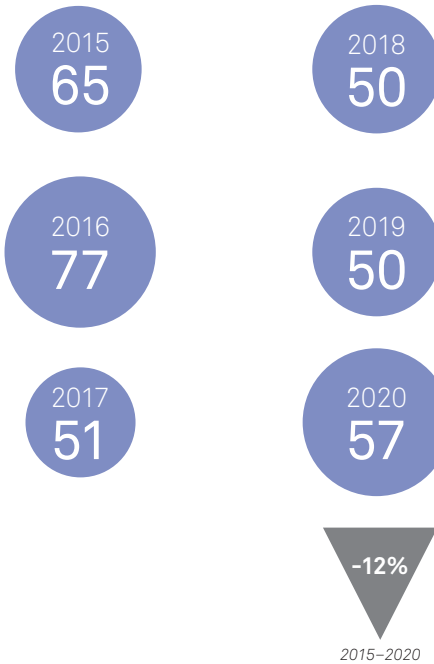


*The RSA have noted in their recent reports the increase in reported serious injuries and have said the increase "is attributable in part to enhanced reporting and validation system" and they say that "it will take around five years' before any appreciable trends in the data can be confirmed. As a result this should be considered as a break in the time series for the data on the number of injuries and injury collisions". The RSA and An Garda Síochána continue to use the historic definition of serious injuries: An injury for which the person is detained in hospital as an 'in-patient' or any of the following injuries whether or not detained in hospital: fractures, concussion, internal injuries, crushing, severe cuts and lacerations, severe general shock requiring medical treatment.

C: TRENDS ON NATIONAL ROADS NETWORK

Trends in fatal collisions nationally by road type and collision type*

Total fatal collisions on National Roads:

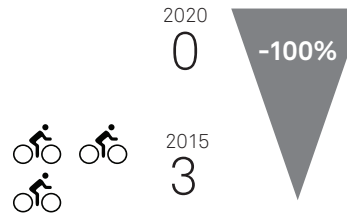


Recent trends in total fatalities* on National Roads:

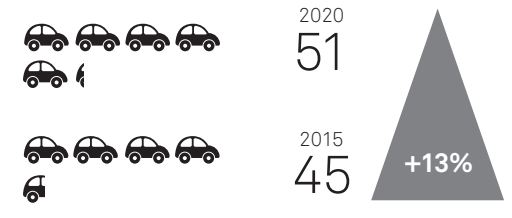
Pedestrians:



Cyclists:

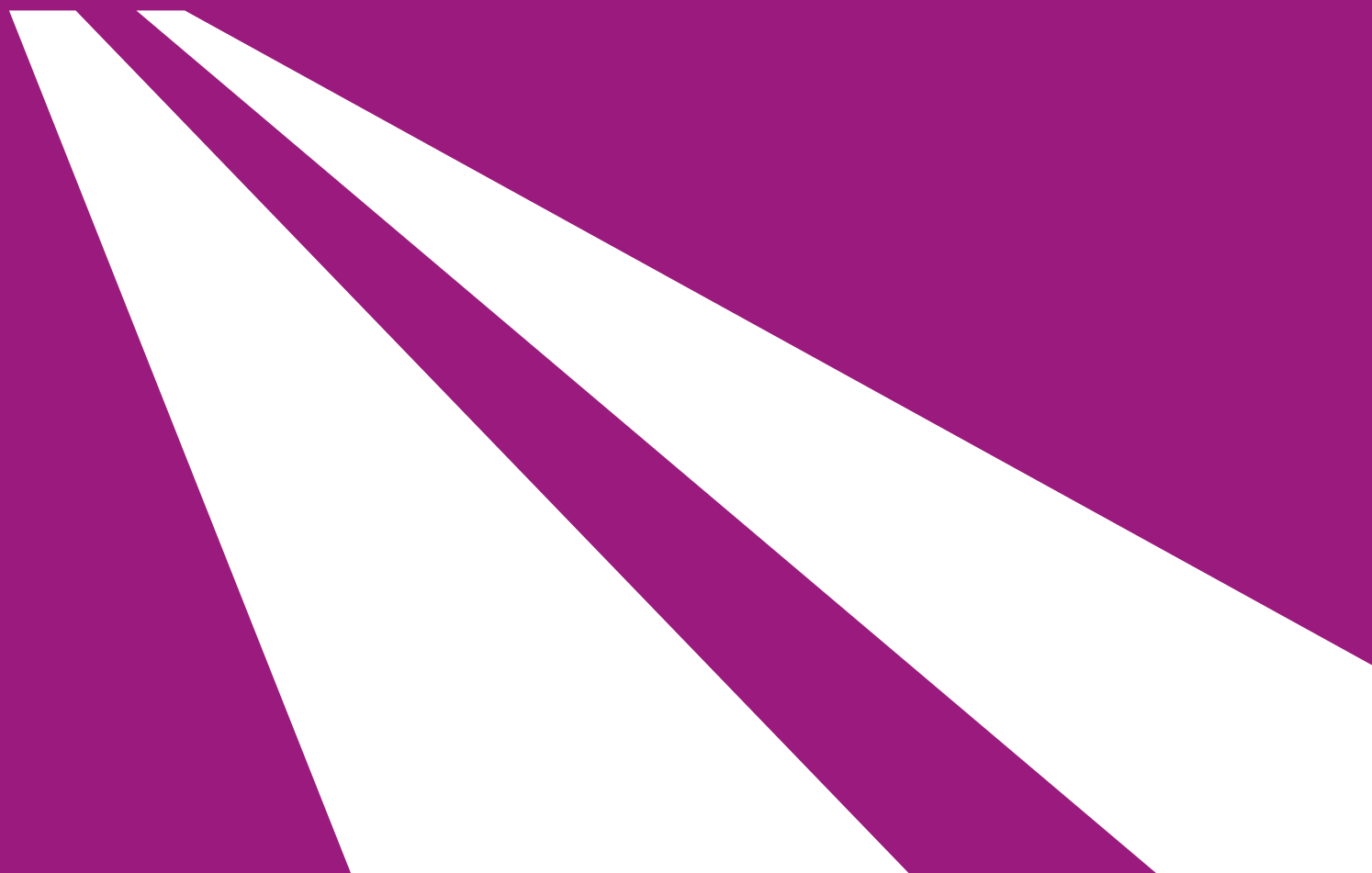


All Other:



* Fatal collisions 2017 - 2020: An Garda Síochána data

FIVE: ACCESSIBILITY + ENVIRONMENT

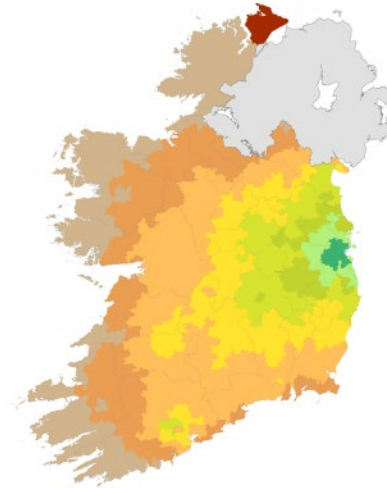


A1: IMPACT OF ROAD INVESTMENT ON EMPLOYMENT ACCESSIBILITY

Key milestones in the development of the National Roads network

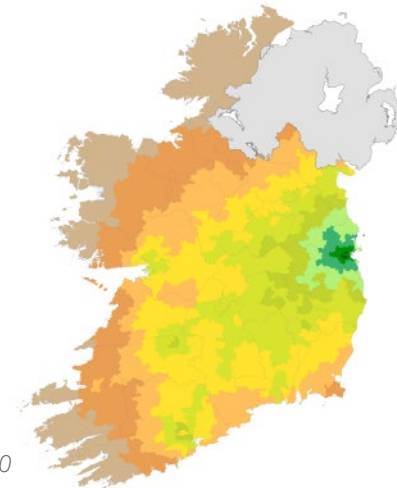
Building on the methodology put forward within the TII Transport Research and Information Note: Impact of Improvements in the Road Network on the Accessibility & Economic Potential of Counties, Urban Areas, Gateways & Hubs, 2012; TII has plotted accessibility to jobs for a number of key milestones in the development of the National Roads Network.

Employment Accessibility Score by NTM Zone



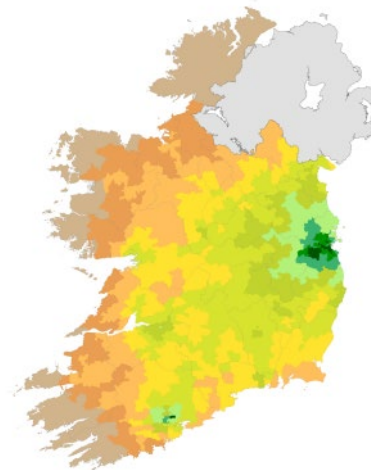
2006

In 2006, prior to the completion of the Major Inter Urban (MIU) corridors linking Dublin to the other cities; accessibility to jobs within peripheral regions was weak.



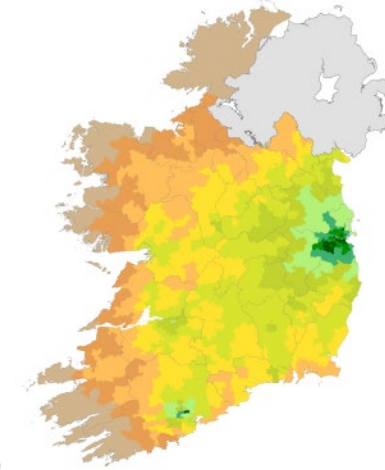
2010

By 2010 the development of the MIUs delivered significant improvements in terms of accessibility to jobs in some of the more peripheral areas.



2016

Since 2016, there are only subtle changes in accessibility, related to the reduced capital spend on National Roads infrastructure during that time.



2020

The M17/M18, M11 Gorey to Enniscorthy and N25 New Ross Bypass projects were completed since 2016. These projects have enhanced accessibility in the West and South-East of the country.

A2: IMPACT OF ROAD INVESTMENT ON EMPLOYMENT ACCESSIBILITY

2016 versus 2020

A significant proportion of the road capital spend from 2016 to 2020 was within the west and south-east of the country and this has resulted in improved employment accessibility for these areas.

Difference in Accessibility:

+10%



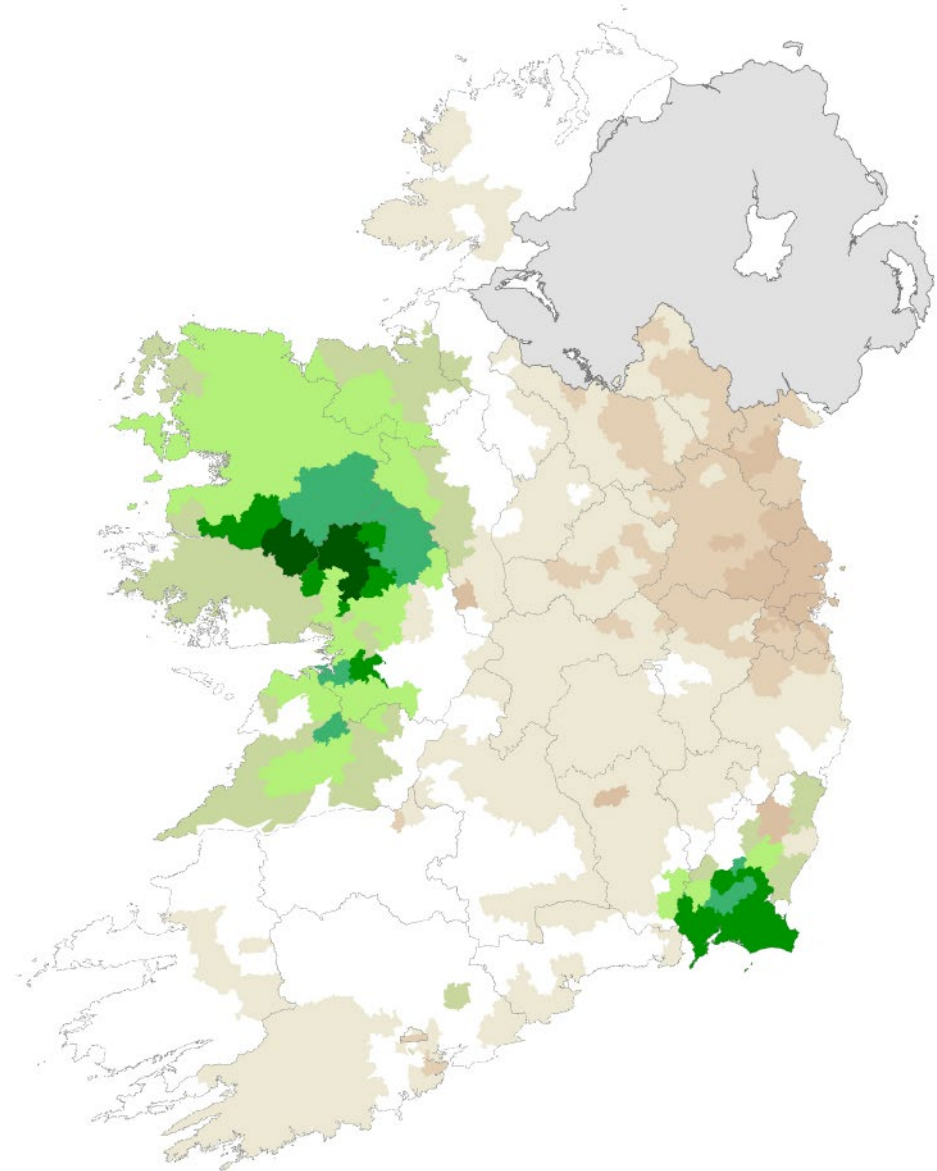
-2%

The image compares accessibility to jobs between 2016 and 2020 (relative percentage change), and effectively presents two stories:

1) Improvements in accessibility to jobs in the West and South-East related to the completion of the M17/18, M11 Gorey to Enniscorthy and N25 New Ross Bypass projects.

2) Ongoing traffic growth in the east, particularly on the routes into Dublin has contributed to increased journey times and in turn slight reductions in accessibility to jobs in the Greater Dublin Area.

Despite the above, peripheral areas in North-West, West and South-West and South-East still tend to suffer from poor accessibility to jobs as shown on Accessibility + Environment - A1.



*Assessment based on the change in accessibility to employment only as a result of the network investment. Employment levels have been held constant at 2016 levels as part of the assessment.

SIX: EMISSIONS



A1: Vehicle Emissions on the National Roads Network

Vehicle emissions associated with travel on the National Roads Network from 2018 onwards can be estimated using the TII Emissions and Air Quality Tool.

Methodology

The TII National Transport Model provides up to date estimates of traffic volumes and speeds on the National Roads Network. TII also profiles the emissions of Nitrogen Oxides (NO_x), Particulate Matter (PM₁₀) and Carbon Dioxide (CO₂e)¹ from the vehicle fleet on a county basis. This is done using existing fleet information², projections concerning the vehicle fleet³, and standard emission rates^{4,5}. This information is combined to generate estimates of emissions for all links on the National Roads Network.

The key factors affecting emissions from year to year are the make-up of the vehicle fleet, e.g. proportions of light and heavy vehicles, the emissions standards of vehicles in the fleet, the type of fuel consumed, the total vehicle kilometres travelled and the speed at which these vehicles travel on the network.

Emissions in 2020

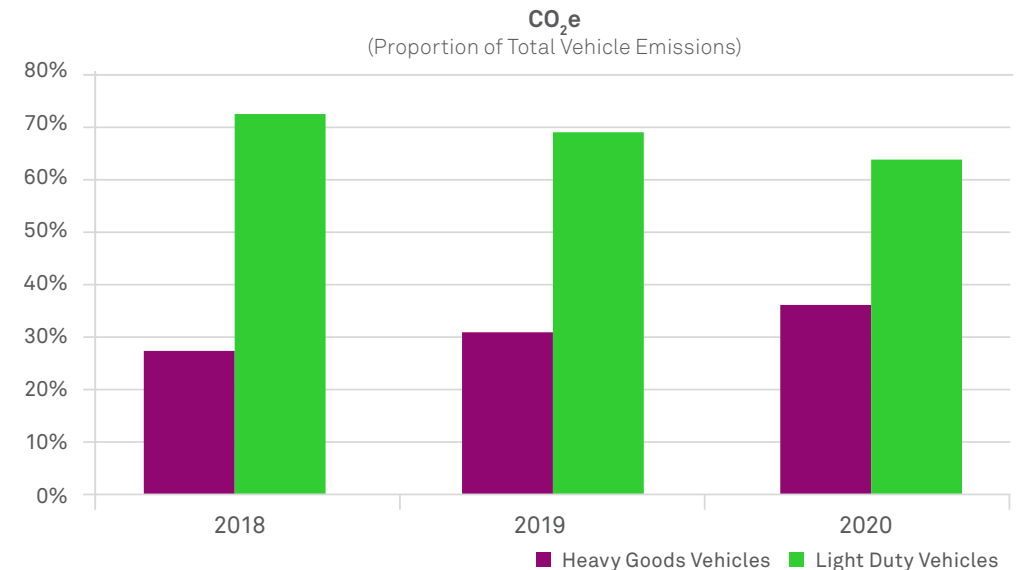
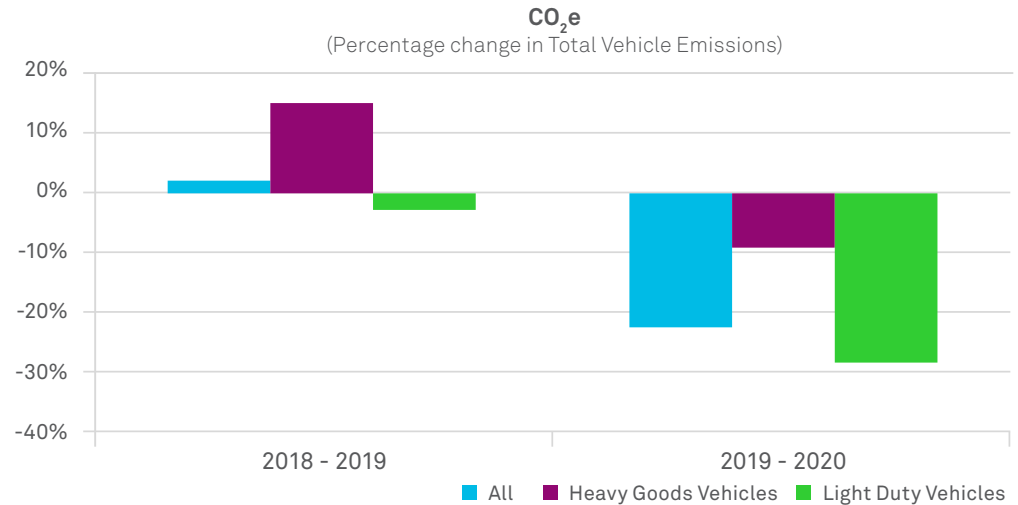
In 2020 vehicle kilometres travelled were significantly down on previous years and this resulted in a reduction in emissions of NO_x, PM₁₀ and CO₂e. In 2020 the proportion of heavy vehicles on the network were higher than usual due to the restrictions on personal travel. Less congestion on the National Roads Network in 2020 may also have contributed to a reduction in emissions.

Greenhouse Gases

Total greenhouse gas emissions from travel on the National Roads Network, were relatively stable between 2018 and 2019. The reduction in personal travel in 2020 led to a reduction of 23% in greenhouse gas emissions represented by CO₂e.

If we examine average CO₂e emissions per vehicle per kilometre travelled (CO₂e/veh/km), we see a year on year increase of 4.6% between 2019 and 2020. This is driven by a greater proportion of Heavy Goods Vehicles (HGV) per kilometre travelled in 2020, which have higher average emission rates compared to light vehicles. This trend was also seen between 2018 and 2019, albeit with a smaller increase of 1.2% CO₂e/veh/km.

We can see that in 2020, light vehicles (i.e. cars and vans) represent 64% of the total CO₂e emissions on the National Roads Network. Emissions from heavy vehicles are 5.1 times higher than from cars and vans per vehicle kilometre travelled and represent 36% of the total CO₂e emissions. This is despite heavy vehicles only making up 10% of the total vehicle kilometres travelled on the network in 2020. The increased importance of HGV emissions of CO₂e is a trend that can be observed from 2018 onwards.



¹ CO₂e: Carbon dioxide equivalent (CO₂e) is a term for describing different direct greenhouse gases in a common unit. For any quantity and type of greenhouse gas, CO₂e signifies the amount of CO₂ which would have the equivalent global warming impact. The seven direct greenhouse gases recognised by the Kyoto Protocol, and included within the definition of CO₂e, are: CO₂, CH₄, N₂O, HFCs, PFCs, SF₆ and NF₃. Most CO₂e datasets,

for road transport, include only CO₂, CH₄, N₂O.

² Central Statistics Office data search <https://data.cso.ie/#>

³ University College Cork (2021) Irish Car Stock Model v2.1

⁴ COPERT EU standard vehicle emissions calculator. Available from: <https://www.eea.europa.eu/themes/air/links/guidance-and-tools/copert4-road-transport-emissions-model>

⁵ Emissions Factors Toolkit v10.1 <https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html>

A2: Vehicle Emissions on the National Roads Network

Air quality emissions of Oxide of Nitrogen (NO_x) and particulate matter (PM₁₀) reduced notably in 2020 largely due to the reduced distance travelled during the pandemic.

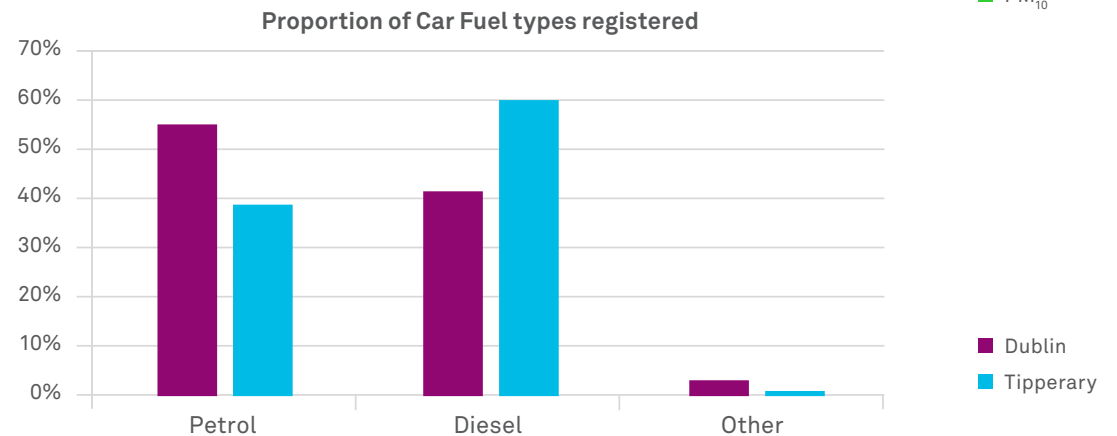
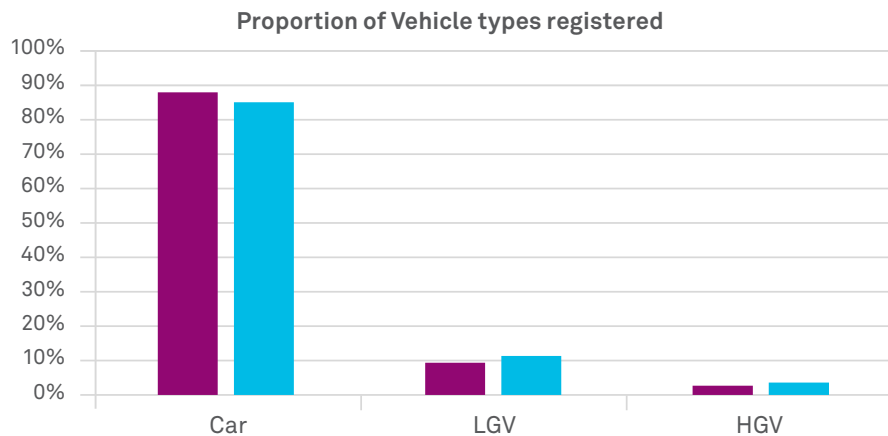
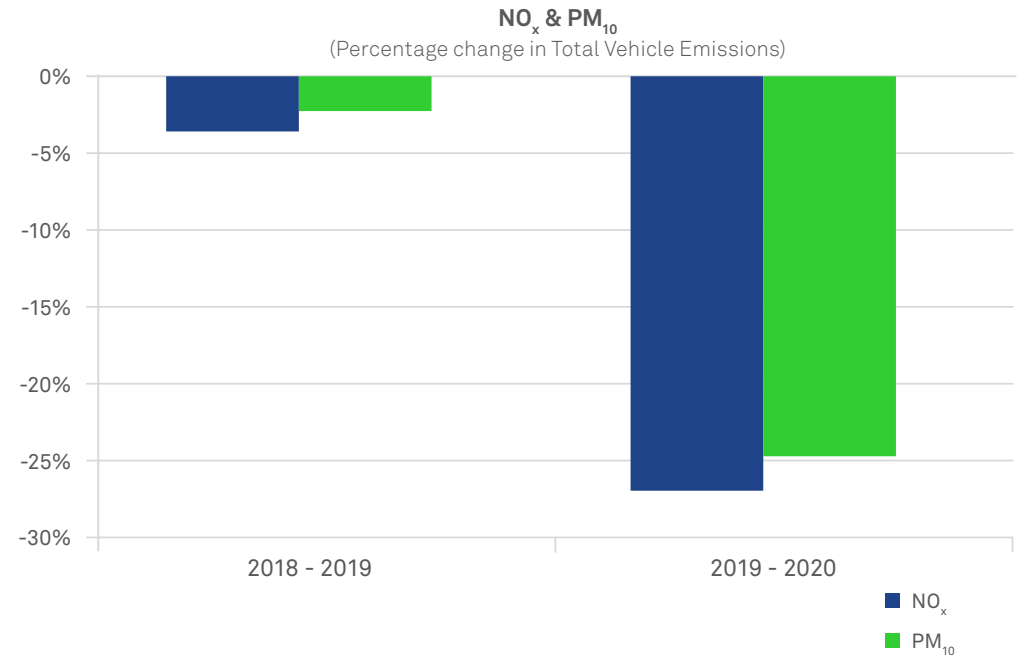
Air Quality Emissions include Oxide of Nitrogen (NO_x) and particulate matter (PM₁₀) are of local and national concern for human health and/or ecosystems.

Total emissions of NO_x and PM₁₀ decreased year-on-year with a 3.6% and 2.3% reduction respectively between 2018 and 2019. Whilst in 2020 NO_x and PM₁₀ reduced by 27.2% and 24.9% respectively.

Information from the TII Emissions and Air Quality Tool show variations in emissions of NO_x and PM₁₀ between the different counties across Ireland. This is due to variations in the density of the road network, variations in vehicle speeds, and also the composition of the local fleet age and fuel-type. Particularly clear variations in emissions of NO_x and PM₁₀ can be seen between rural and urban areas.

Case Study

In urban areas trips are being made with a larger proportion of newer vehicles and more petrol and alternative fuel cars compared to more rural counties. We can compare the more urban county of Dublin with an example rural county of Tipperary to demonstrate this. Average NO_x and PM₁₀ emissions per vehicle per kilometre travelled are 26.6% and 5.7% lower respectively in Dublin compared to Tipperary.





Transport Infrastructure Ireland
Parkgate Business Centre
Parkgate Street, Dublin 8
D08 DK10
T: +353 1 6463600 **W:** www.tii.ie