COMISIWNTRAFNIDIAETH
TRANSPORTCOMMISSION
DE-DDWYRAIN CYMRU / SOUTH EAST WALES

# Emerging Conclusions

JULY 2020

Mae'r ddogfen yma hefyd ar gael yn Gymraeg.
This document is also available in Welsh.

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## FOREWORD

The First Minister established this Commission to investigate sustainable measures to tackle congestion on the M4 in South East Wales. This report sets out our key findings and emerging conclusions on the nature of future recommendations.

Like every other organisation, the COVID-19 epidemic has inevitably affected the work of the Commission. In particular, our Head of Secretariat and another member of staff were temporarily released to support the Welsh Government's response to the crisis. We have had to change our ways of working and pause some of our engagement with stakeholders. However, despite the challenges, we have made good progress and will produce our final recommendations by the end of this year.

This report has been prepared during a period when COVID-19 has had a dramatic impact on how people are travelling in South East Wales and we expect this interruption to continue for some time. It is important to pause and reflect for what this means for how best to tackle congestion in the long term.

We do not believe COVID-19 fundamentally changes the problem of congestion and our primary focus remains to reduce congestion on the M4 near Newport. However, a new priority is to consider the current and lasting impacts of COVID-19. We will ensure this is part of our process in preparing recommendations to the Welsh Government.

We are very grateful to all stakeholders, elected representatives and members of the public who have aided our work so far. This engagement will continue as we prepare our final recommendations, albeit in a different form to what we originally planned.

**Lord Burns, Chair of the South East Wales Transport Commission**

## SUMMARY

The role of the South East Wales Transport Commission is to investigate sustainable measures to tackle congestion on the M4 in South East Wales. This report sets out our key findings and emerging conclusions on the nature of future recommendations.

Congestion on the M4 is largely a peak-hours problem, predominantly associated with commuting.

A relatively small increase in traffic leads to a disproportionate increase in congestion. It is not a resilient motorway and the problems spill over onto the Newport road network, especially during incidents.

The M4 is largely used for regional, medium-distance travel, with many trips starting or ending in the cities of Cardiff, Newport and Bristol. Most journeys are over medium or long distances; there are relatively few short-distance journeys on the motorway.

Many people do not have good transport alternatives to the motorway. The combination of the rail, bus and active travel networks do not accommodate the range of the journeys that people are undertaking, particularly commutes.

All of the rail, bus and active travel networks are offering insufficient services. The individual modes are also poorly integrated, in relation to interchange, timetables and ticketing. This limits the value of each part. There is insufficient regional coordination.

Land use decisions with respect to homes, offices and retail parks have contributed to congestion and, on the current trajectory, this looks set to continue. At the same time, the population of the region's cities is projected to rise considerably. Without action, this will place additional pressure on the motorway.

If we are to alleviate congestion, we need to create attractive and viable alternatives for people. Until these exist, it is very difficult to solve the problem sustainably.

Of course, the COVID-19 epidemic has radically changed the situation – the question is for how long. Traffic is at a much lower level and we expect congestion to be less problematic while social distancing is in place.

In the long term, a substantive and sustained increase in remote working could have a meaningful impact on reducing traffic. However, our view remains that in order to function efficiently, the region requires additional, non-car transport options.

Overall, a key emerging recommendation is a 'Network of Alternatives' for South East Wales. A network approach puts a focus on integration, allowing for flexible journeys, reflecting the diversity of types of trips that people want to make. When the different parts work together, its value can be greater than the sum of its parts.

Our final report will make specific recommendations to the Welsh Government. These will cover all modes of transport, as well as wider policy on land use, governance and charging.

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## FIGURE LIST

# CHAPTER 1
# INTRODUCTION

1 The purpose of the Commission is to consider the problems, opportunities, challenges and objectives for tackling congestion on the M4, and investigate sustainable measures to alleviating it. The Commission comprises Lord Burns (Chair), James Davies, Stephen Gifford, Jen Heal, Peter Jones, Elaine Seagriff, Lynn Sloman and Beverly Owen (Newport Representative). It is supported by a small secretariat.

2 Our aim is to provide evidence-based recommendations to Welsh Ministers on how to alleviate congestion in a sustainable way, while supporting the wider well-being of people who live, work and travel in South East Wales.

## Ways of working

3 In *Our Approach (October 2019)*, we split our work into six phases: understanding the problem, identifying objectives, establishing the baseline, preparing a long list, assessing options, and making recommendations. This report describes our progress on each of these phases.

4 In undertaking our work, we have drawn on the five ways of working set out in the Well-being of Future Generations (Wales) Act 2015:

- **Long term**. We have considered future problems and opportunities as well as the current situation
- **Prevention**. We have taken a step back and reflected on what it means for people to have access to work, services and leisure. The present situation demonstrates that this does not always require transport
- **Integration**. The way we travel impacts on much more than just transport, such as social inclusion, health, air quality and climate change
- **Collaboration**. We have established relationships with central government, local authorities, stakeholder bodies and other representative organisations
- **Involvement**. We have engaged the people who use and experience the transport network each day

## This report

5 This report sets out our key findings and emerging conclusions on the nature of future recommendations.

6 *Chapter 2* sets out our key findings from our work to date and engagement findings are summarised in *Chapter 3. Chapter 4* goes on to explain how these findings are affected by the COVID-19 epidemic and what the present situation may imply for our future recommendations. We discuss in *Chapter 5* how we will assess potential recommendations and *Chapter 6* describes our emerging recommendations, and main areas of focus for the next six months. *Chapter 7* concludes with next steps.

7 Alongside this report, we are publishing four technical background documents, which provide underpinning detail to our findings:

- *Summary Background* describes the regional context, and summarises regional travel patterns and patterns of congestion on the M4. It also summarises our analysis on alternative modes of transport and compares these to the M4
- *Engagement Background* reports on the work we have undertaken with representative stakeholders and

members of the public. It includes a summary of the 'Have Your Say' online platform, which generated over 1,800 comments

- *Regional Travel Patterns Background* presents detailed analysis of how people are travelling within South East Wales across different modes of transport, including vehicles on the M4

- *M4 Traffic Background* sets out detailed, junction-by-junction analysis of traffic on the M4 in South East Wales, in particular daily and weekly patterns, composition of traffic and distribution of journey lengths

## The next six months

8 Despite the impact of COVID-19, we intend to publish our final report by the end of this year. It will contain specific recommendations to the Welsh Government.

9 The final report will concentrate on recommendations rather than restate our key findings. However, we will update our findings if the situation changes appreciably between now and that report, as it may in the light of COVID-19.

## CHAPTER 2
## OUR FINDINGS

10 This section sets out our findings which will frame our future recommendations to the Welsh Government. These have been informed by the engagement and analysis which is described in more detail in the background documents published alongside this report.

### Key finding: **Congestion on the M4 is largely a peak-hours, commuting problem**

11 The M4 around Newport is the fourth most congested stretch of urban motorway in the UK.[1]

12 Congestion on the M4 is largely a peak-hours problem, predominantly associated with commuting. For weekdays, there are two peaks: one in the morning and the other in the afternoon and early evening. Outside these peak times, the motorway often performs well. During peak hours, the most common journey purpose is commuting to and from work. The evidence suggests most commuters are the sole occupant of their vehicles.

13 The impact of the road narrowing to two lanes on either side of the Brynglas tunnels is very clear. When assessed across the motorway between Cardiff and the River Severn, congestion is often worst to the west of the tunnels in the morning (for those travelling east) and to the east of the tunnels in the afternoon (for those travelling west). This is illustrated in figure 2.2. The asymmetry suggests there are more people living in Wales and working in England than living in England and working in Wales.

14 However, congestion is not limited to the vicinity of the tunnels. Figures 2.1A and 2.1B depict the hourly traffic flow profile and the hourly traffic speed profile across two important junction links (junctions 28 to 29 eastbound and 24 to 25 westbound). In the morning, the peak period generally runs from 6am to 9am. In the afternoon, it is generally 3pm to 7pm.

15 When we consider congestion, we are interested both in the reduction in speeds (relative to a 'normal' motorway journey) and the reliability of the journey. In many ways, the ability to know how long a trip will take is as important as the sheer speed (especially for businesses). We have therefore analysed the distribution of average speeds around the median speed; a high variance indicates an unreliable journey.

16 Figure 2.2 clearly demonstrates the poor journey time reliability during peak hours. The hourly traffic speed profile demonstrates the 'trough' in speeds broadly correlates with the 'peak' in flow. At its worst, drivers face median speeds of between 20mph and 30mph when travelling westbound towards the Brynglas tunnels in the early evening. In addition, many other junction links experience a median speed of around 40mph. There is a wide distribution around these figures.

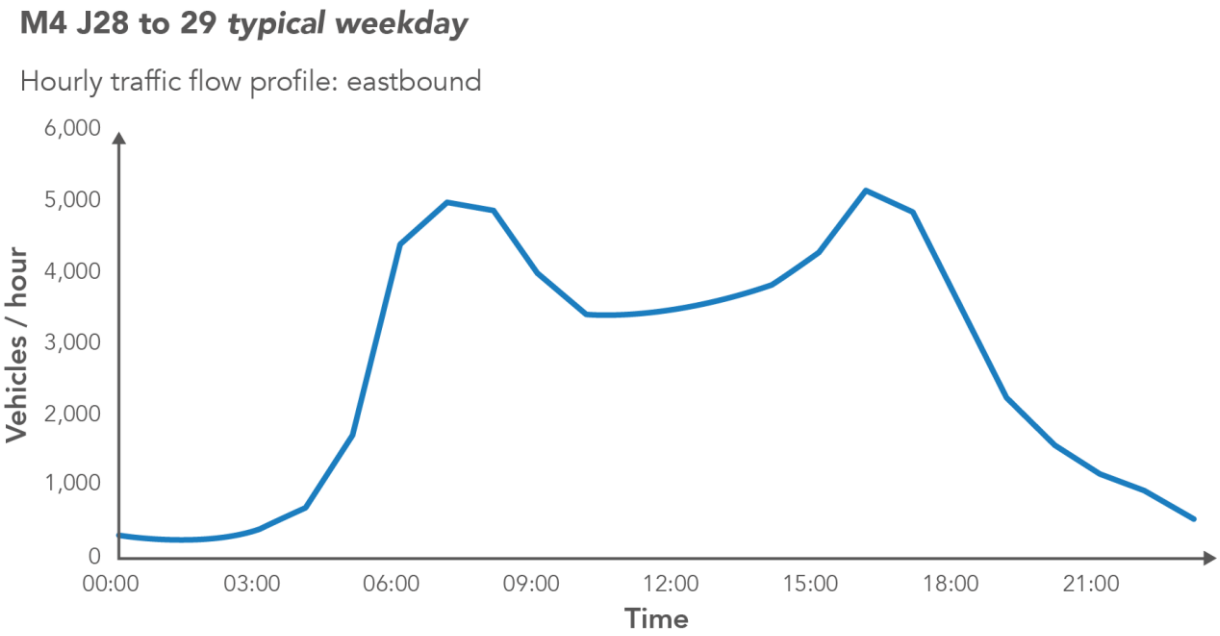
17 Friday has a less pronounced morning peak than a typical weekday morning, with higher median speeds and better journey time reliability. However, the afternoon and evening are usually much worse (in part due to weekly commuters returning home). The lowest median speed is similar to a typical weekday, but the length of the trough is

[1] Source: Inrix data

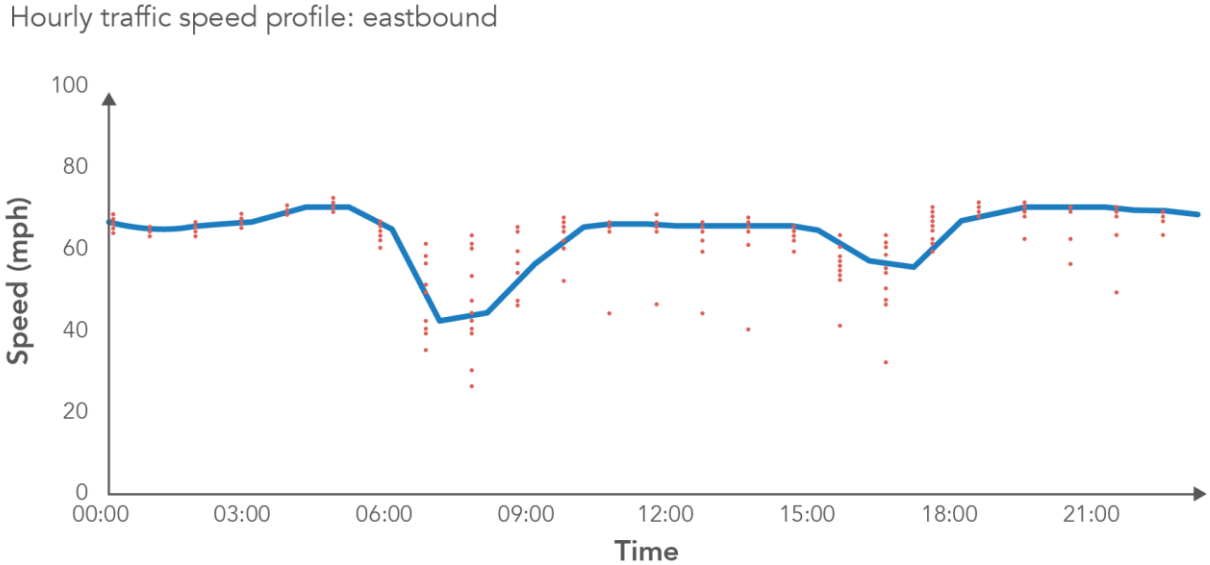
significantly longer (approximately three hours rather than one hour).

18 Saturday and Sunday are both generally better than weekdays and Fridays in terms of journey time reliability and average speeds. The flow profile is very different; there is only one peak, not two. Flows peak around lunchtime and dissipate slowly over the early afternoon.

19 It is important to note that, outside these peak times, both journey time reliability and average speeds are often reasonable.




Hourly traffic flow profile variation in average weekday (Monday to Thursday. Hourly traffic flows average across the whole of 2019. Mondays to Thursdays have been averaged on the basis that hourly traffic flow profiles on these days are very similar.



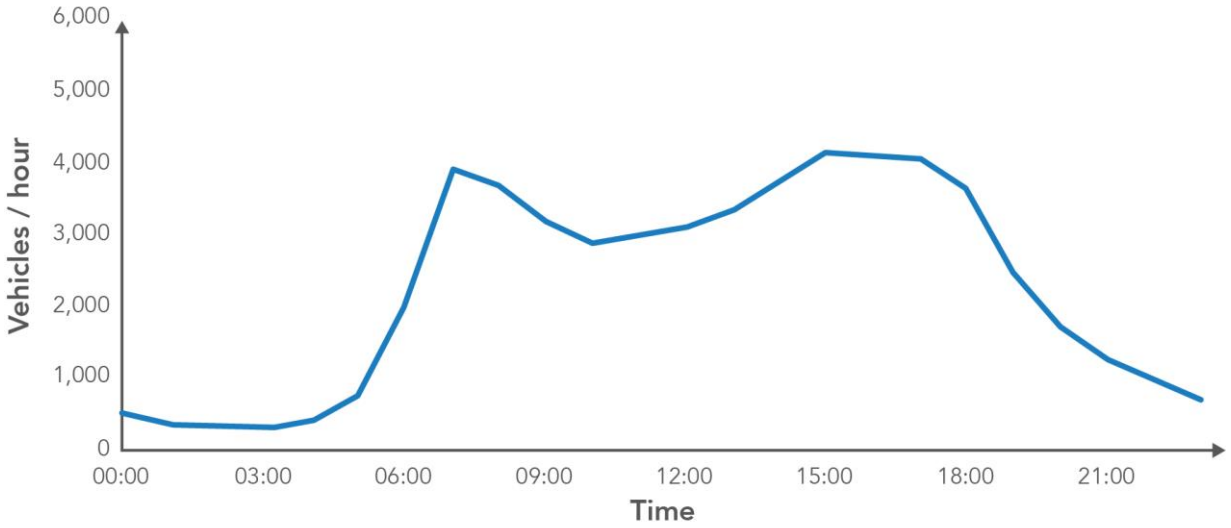

Hourly traffic flow profile variation in average median hourly speed across an average weekday (Monday to Thursday). Based on one week of data from each month in 2018. Scattered dots give an indication of speed variability on a typical weekday as a measure of journey time reliability.

*Source: Traffic Wales*

*Figure 2.1A: Traffic volumes and journey time reliability across two representative junction links (J28 to 29)*

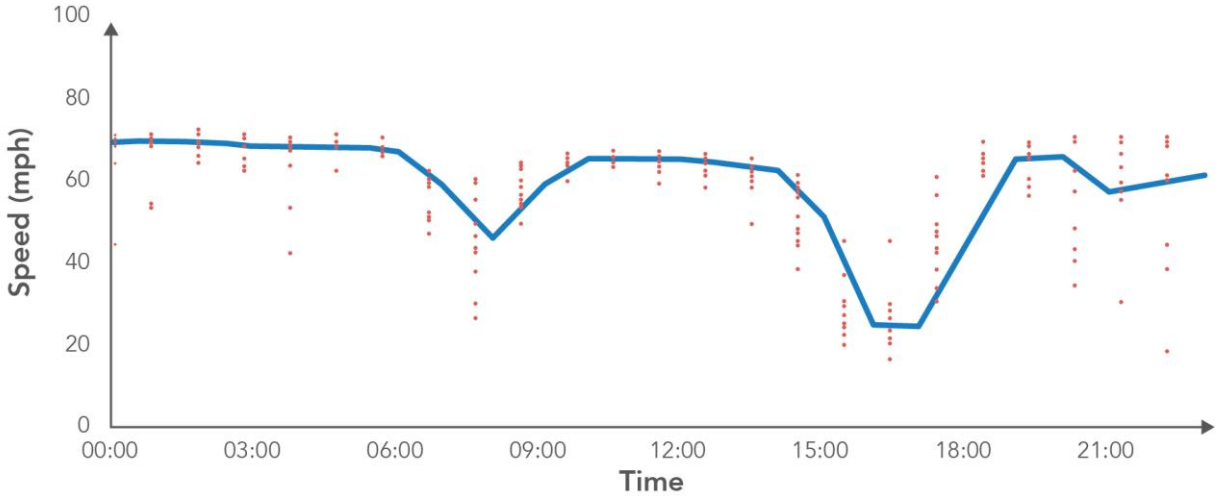
**M4 J24 to 25 *typical weekday***

Hourly traffic flow profile: westbound




Hourly traffic flow profile variation in average weekday (Monday to Thursday). Hourly traffic flows average across the whole of 2019. Mondays to Thursdays have been averaged on the basis that hourly traffic flow profiles on these days are very similar.

Hourly traffic speed profile: westbound




Hourly traffic flow profile variation in average median hourly speed across an average weekday (Monday to Thursday). Based on one week of data from each month in 2018. Scattered dots give an indication of speed variability on a typical weekday as a measure of journey time reliability.

*Source: Traffic Wales*

*Figure 2.1B: Traffic volumes and journey time reliability across two representative junction links (J24 to 25)*

| Eastbound - morning peak | | |
|---|---|---|
| Junction link | Lowest median speed | Journey time reliability |
| Junction 29 - 28 | 55 mph | Poor |
| Junction 28 - 27 | 40 mph | Poor |
| Junction 27 - 26 | 40 mph | Very Poor |
| Junction 26 - Brynglas Tunnels - 25A | 45 mph | Good |
| Junction 25 - 24 | 55 mph | Good |
| Junction 24 - 23A | 65 mph | Good |

| Westbound - evening peak | | |
|---|---|---|
| Junction link | Lowest median speed | Journey time reliability |
| Junction 23A - 24 | 45 mph | Very Poor |
| Junction 24 - 25 | 25 mph | Very Poor |
| Junction 25A - Brynglas Tunnels - 26 | 40 mph | Poor |
| Junction 26 - 27 | 50 mph | Poor |
| Junction 27 - 28 | 60 mph | Moderate |
| Junction 28 - 29 | 65 mph | Moderate |

*Source: Traffic Wales. For lowest median speed we have taken the slowest median speed during the peak period. Speeds have been rounded to the nearest 5mph*

*Figure 2.2: 'Trough' median speeds and journey time reliability at junction links*

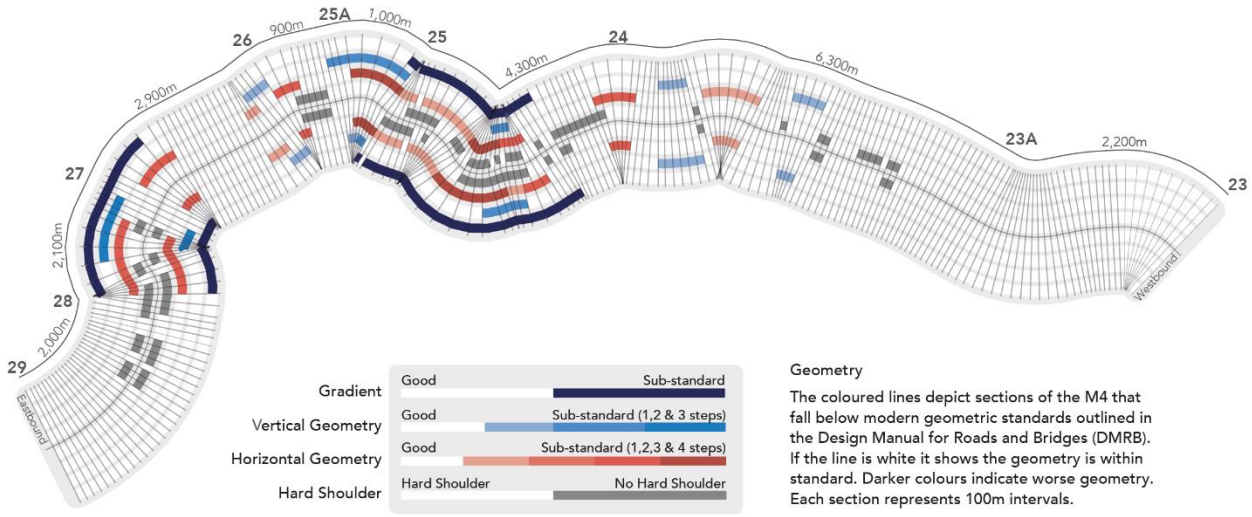
## Key finding: **The M4 is not a resilient motorway**

20 The evidence demonstrates that parts of the motorway are operating at or close to their practical capacity (although this is not the case during the current period of COVID-19 travel restrictions). This, alongside shortcomings with the road infrastructure, increases susceptibility to higher volumes of traffic and incidents – both of which can cause a disproportionate impact on congestion. This affects both the motorway and wider road network, especially in Newport. The result is a stretch of motorway with poor resilience.

21 The nature of the infrastructure contributes to congestion on the M4 in South East Wales. Most UK motorways have three or four lanes, with a hard shoulder and limited curvature and elevation. While the M4 in South East Wales exhibits some of these features some of the time, there are notable departures (illustrated in figure 2.3), in particular:

- **Lane reduction**. On many occasions, one of the three lanes is a dedicated off-slip in advance of a junction. This can cause bottlenecks similar to the Brynglas tunnels and contribute to poor lane discipline
- **Bends and slopes**. Between junctions 24 and 27 especially, the curvature and gradient of the road are significantly greater than the standards set for a national speed limit motorway
- **Hard shoulders** are intermittent, which has significant implications for the impact of incidents
- **Junction frequency** results in large changes to traffic over relatively short distances, with implications for speed and lane discipline

22 As in any complex system operating above capacity, when one thing happens, there are a series of disproportionate knock-on impacts. In particular, we have found that either a small amount of additional traffic (such as a major event) or an incident can lead to a disproportionate decrease in average speeds and journey time reliability. All this demonstrates the lack of resilience on the motorway.




*Source: Topographical Survey (Arup) and DMRB (Design Manual for Roads and Bridges contains information about current standards related to the design, assessment and operation of motorway and all-purpose trunk roads in the United Kingdom).*

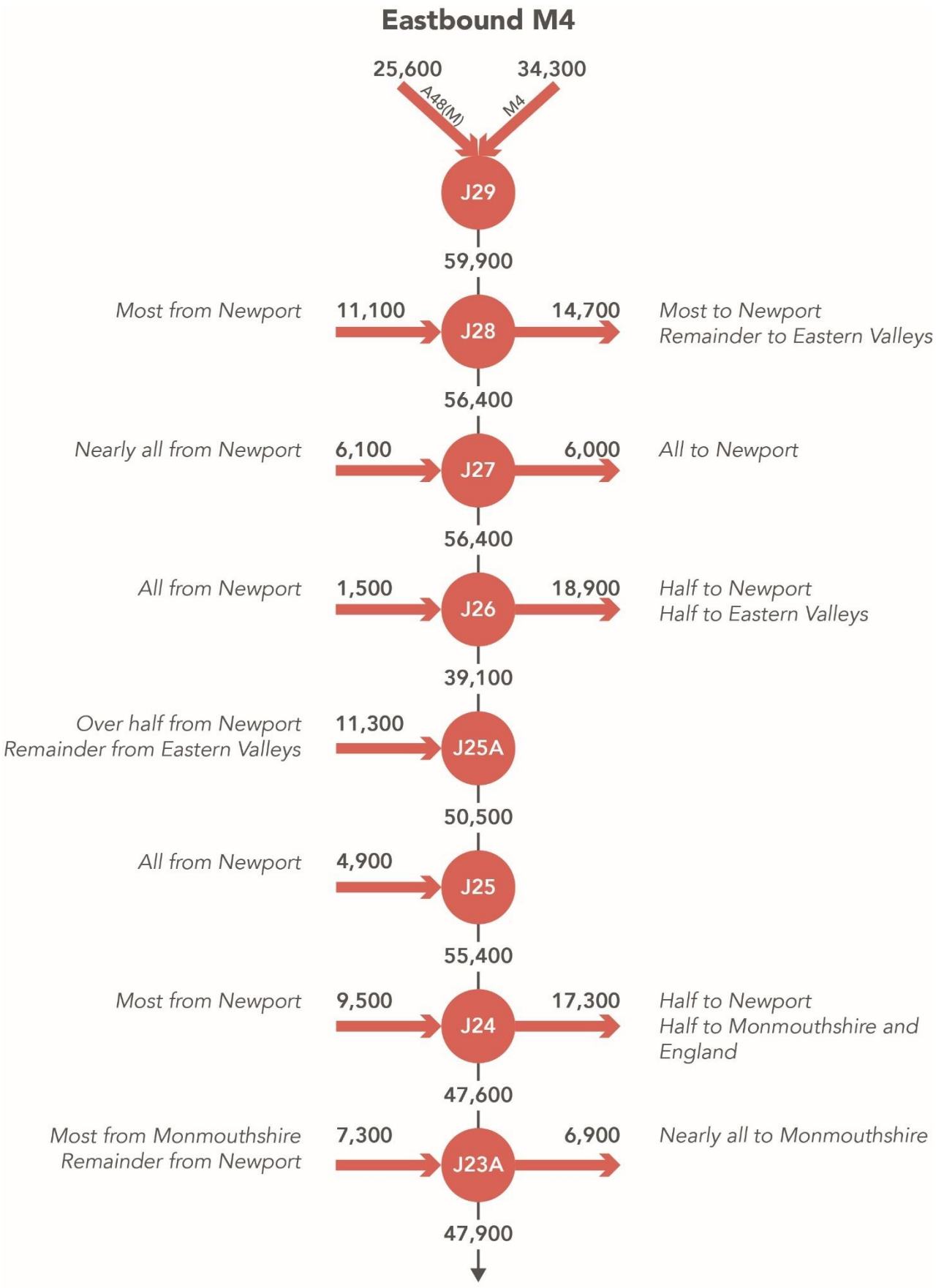
*Figure 2.3: Departures from motorway standards*

## Key finding: **Inflows and outflows vary greatly by junction, contributing to congestion**

23 The majority of traffic between junctions 23 (the M48 intersection) and 29 (the first exit to Cardiff) either joins or leaves the motorway between these junctions. We estimate the level of 'through' traffic is only around a quarter of vehicle flow.

24 The large number of junctions over a relatively short stretch of motorway means that the composition of traffic is constantly changing, often by a significant proportion between junctions. Traffic movements are far from evenly spread, both between junctions and across times of day. These large inflows and outflows contribute to flow breakdown and congestion.

25 While there is significant variation in inflows and outflows between junctions, there is significant symmetry between eastbound mornings and westbound afternoons, and westbound mornings and eastbound afternoons. This demonstrates strong, tidal commuting flows, as illustrated in figure 2.5.




*Source: South East Wales Transport Commission, Traffic Wales. Figures may not sum due to rounding to the nearest hundred*

*Figure 2.4A: Traffic volumes at and between junctions (eastbound)*

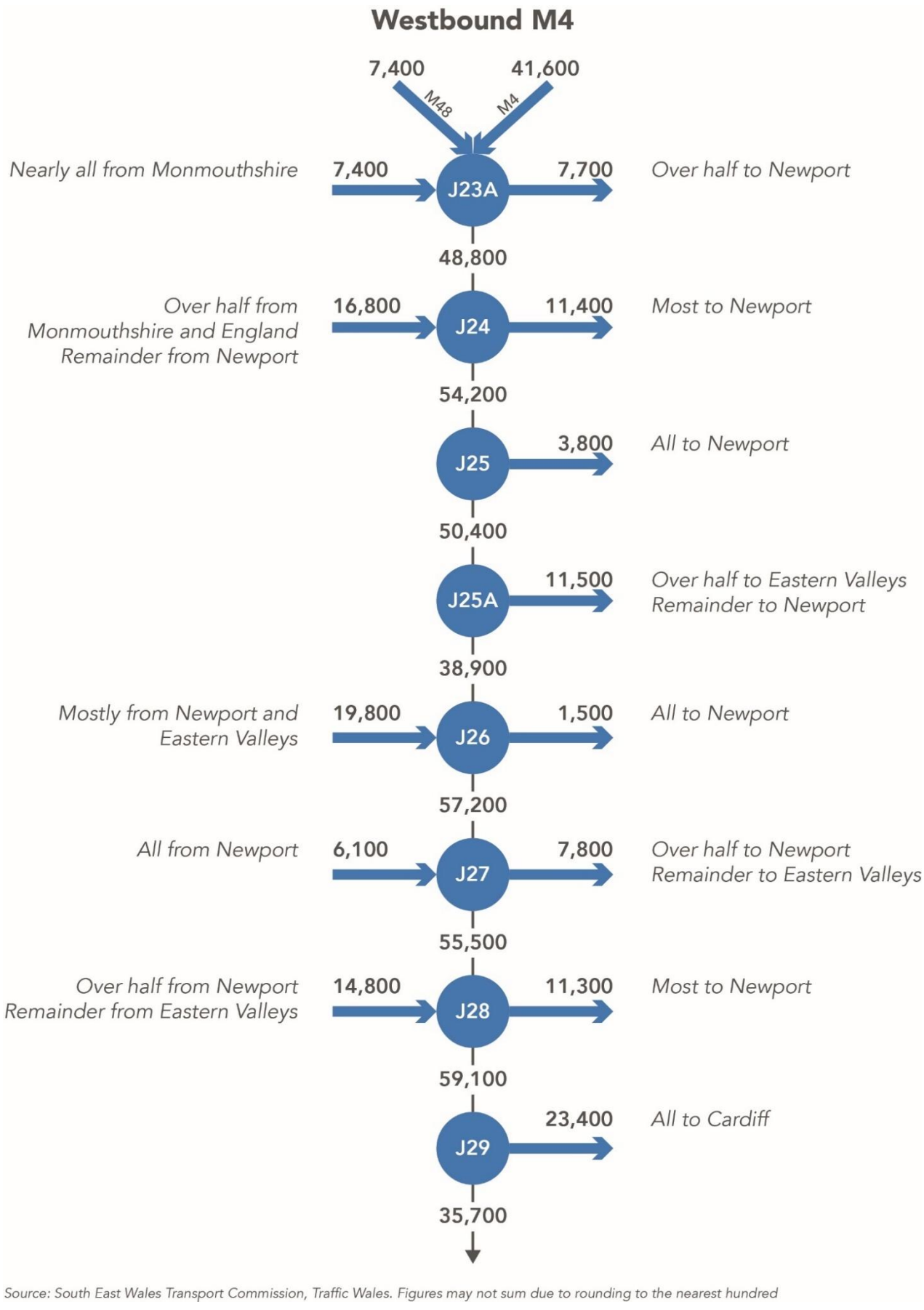



*Figure 2.4B: Traffic volumes at and between junctions (westbound)*

| | Eastbound Morning | | Westbound Evening | | Westbound Morning | | Eastbound Evening | |
|---|---|---|---|---|---|---|---|---|
| | Joiners | Leavers | Joiners | Leavers | Joiners | Leavers | Joiners | Leavers |
| J23 | not included | 750 | 750 | not included | 750 | not included | not included | 750 |
| J23A | 750 | 500 | 500 | 750 | 750 | 500 | 500 | 500 |
| J24 | 1,000 | 1,500 | 1,500 | 1,250 | 1,500 | 1,000 | 750 | 1,500 |
| J25 | 500 | no exit | no entry | 500 | no entry | 250 | 500 | no exit |
| J25A | 1,000 | no exit | no entry | 1,000 | no entry | 1,000 | 1,000 | no exit |
| **Brynglas Tunnels** | | | | | | | | |
| J26 | 250 | 1,750 | 1,750 | 250 | 2,000 | 0 | 0 | 1,750 |
| J27 | 750 | 750 | 500 | 1,000 | 750 | 500 | 500 | 500 |
| J28 | 750 | 1,250 | 1,500 | 1,000 | 1,250 | 1,500 | 1,250 | 1,750 |
| J29 | 2,500 | not included | not included | 2,250 | not included | 1,750 | 2,250 | not included |

*Source: Welsh Government, figures are rounded to the nearest 250*

*Figure 2.5: Scale of junction joiners and leavers in each direction in morning and evening*

## Key finding: **Congestion has become much worse over time**

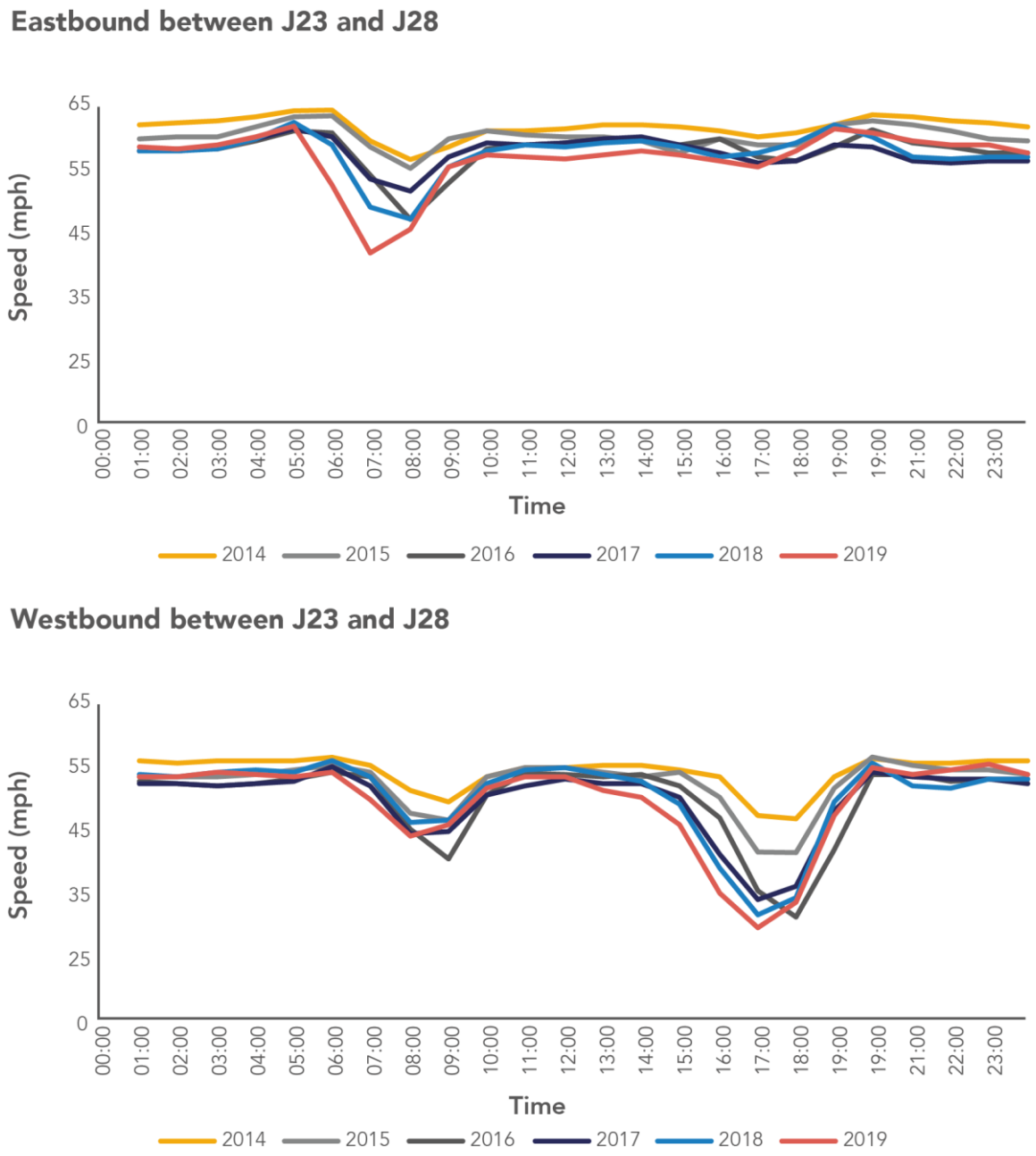
26 Traffic volumes have increased over the past twenty years, with clear implications for the reliability of the road. This is consistent with the general UK growth in motorway travel.

27 Figure 2.6 shows how average speeds on the M4 in South East Wales have decreased over the last five years. We can see that the morning and afternoon troughs have increased in duration, starting earlier in the day. This deterioration is most pronounced in the eastern parts of the road, reflecting greater travel between Wales and England, especially between Newport and Bristol.

28 Most recently, the removal of the tolls at the Prince of Wales Bridge in December 2018 has also contributed to higher traffic volumes, especially on the far eastern stretch of M4 in Wales. On this part of the motorway, traffic increased by around 10% between 2018 and 2019.[2]

29 Given the resilience of the motorway, any further increases in traffic are very likely to disproportionately increase congestion.

[2] Source: Traffic Wales




*Source: INRIX, Welsh Government*

*Figure 2.6: Average speeds going eastbound and westbound over the last six years*

## Key finding: **The M4 is largely used for medium-distance travel**

30 In this finding, we distinguish between short, medium and long-distance trips. Short-distance trips are fewer than 10 miles, medium-distance trips are between 10 and 50 miles and long-distance trips are over 50 miles.

31 A combination of topography and transport history means the M4 is now the primary east-west road corridor for regional travel within South East Wales and into England. It carries a far higher volume of traffic than it was originally designed for.

32 Overall, we have found that traffic is largely composed of private cars, performing medium-distance journeys, often between

different local authorities. As noted above, most of these trips either start or finish between Cardiff and Bristol.

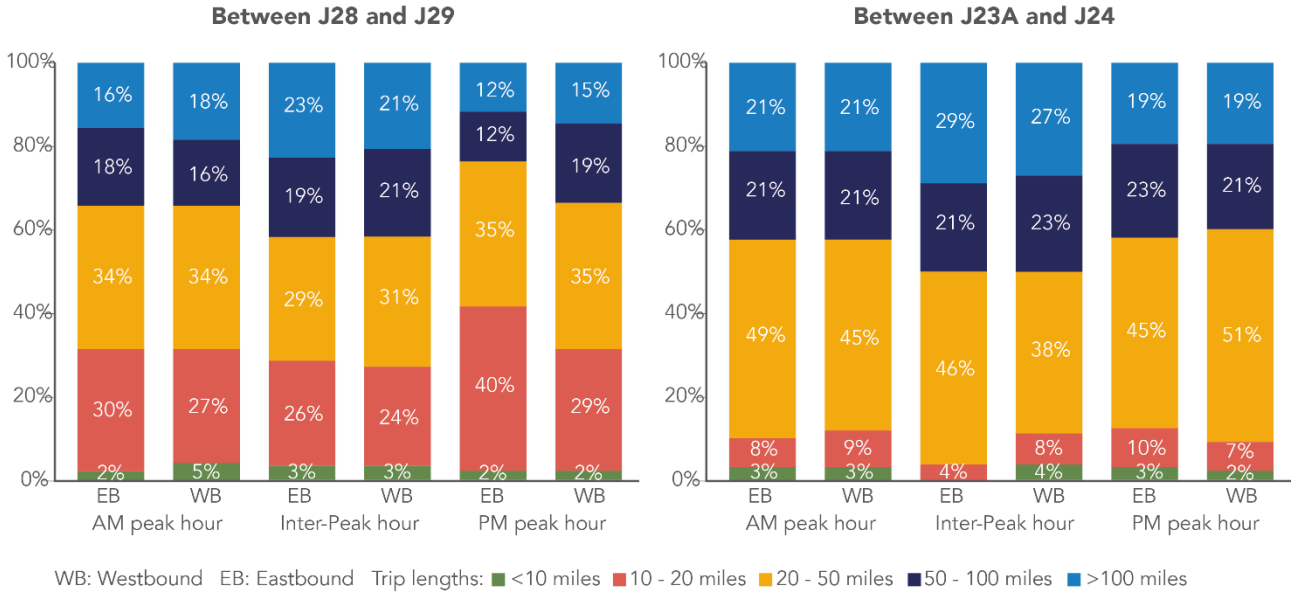
33 In terms of journey length, there is a material difference between the eastern end (junction 23A) and western end (junction 29) of the motorway:

- **Around junctions 23A and 24**, around 55% of journeys are medium distance and 40% are long distance. Around 90% of trips are longer than 20 miles. Very few journeys are less than 10 miles

- **Around junctions 28 and 29**, around 65% of journeys are medium distance and 30% are long distance. Around 65% of trips are longer than 20 miles. There is a much higher proportion of trips between 10 and 20 miles, but there are still very few journeys less than 10 miles

34 This shows that longer journeys on the road are more common at the eastern end. Overall, these patterns correspond with the prevalence of Cardiff, Newport and Bristol as origins and destinations.

35 Travel data tells us that a significant number of journeys involve trips to or from Cardiff, Newport or Bristol (either the city centre or outskirts); indeed these three cities account for more than half of all traffic on the motorway in South East Wales. The scale of Newport as an origin and destination is particularly notable, given it is around a half the size of Cardiff and a third the size of Bristol.




*Source: Welsh Government. Total trips shown on this section are by distance band by time period of a typical weekday.*

*Figure 2.7: Distribution of M4 journeys by length of trip*

### Key finding: **The M4 interacts with the wider road network, particularly in Newport**

36 The M4 in South East Wales is highly connected to the wider road network through the large number of junctions. Given the volume of medium-distance commuter traffic on the motorway, these roads are the key entry and exit points for most users of the motorway.

37 In general, these roads are not alternatives to the motorway because they are not orientated in an east-west trajectory, reflecting the topography of the region. An important exception is the A4810 and A48, which offers an alternative east-west corridor through Newport.

38 Local traffic generally uses local roads for short-distance trips, and medium-distance and long-distance traffic generally uses the M4. This is as one would want.

39 However, if traffic on the wider road network continues to grow, we expect there to be greater interaction between the two types of road as drivers search for the best route.

40 This already happens: we have observed that motorway traffic interacts with Newport traffic on the frequent occasions when the motorway is disrupted. M4 diversions become congested very quickly and these inevitably involve the Newport road network. This affects journeys which do not even involve a car, for example bus travel within Newport is very difficult if there is a major incident on the motorway.

41 In considering this, it is worth noting that, within Newport, travel is relatively car-heavy. Travel within Newport has a higher car mode share than Cardiff, reflecting a relative lack of transport alternatives, particularly rail. Many of these car journeys are short and do not include the M4.

### Key finding: **To understand travel on the M4, we need to understand broader travel patterns in the region**

42 In addition to analysing traffic on the M4, we have also analysed the general transport patterns in the region, across all modes and roads.

43 Our analysis identifies that the most significant movements of people within South East Wales can be grouped into three broad 'travel systems':

- **Travel into Cardiff**. Cardiff is a very significant attractor destination. Many trips into the city originate from the west and the north of Cardiff. Of these, very few use the M4 beyond the east of Cardiff. People travel into Cardiff from the local authorities of Bridgend, Neath Port Talbot, Vale of Glamorgan and Rhondda Cynon Taff, but do not contribute to the congestion on the M4 around Newport

- **Lateral travel between Cardiff, Newport and Bristol**. Car journeys between these cities are typically medium-distance and regional in nature

- **Travel into and within Newport**. Newport has a more concentrated catchment than Cardiff, so the journeys within Newport tend to be shorter distance. They are also very likely to be by car. As noted above, while these journeys take place in the vicinity of the M4, they tend to stay on local roads

44 Across all these systems, the most common transport mode is the car, by a very

large margin. This is no different from the rest of Wales and other parts of the UK (excluding London). There is markedly more rail travel into Cardiff than Newport, reflecting the relative provision of rail services and the location of stations. The share of travel undertaken by bus is highest in the interpeak period, suggesting it is relatively under-used for commuting.

45 Commuting is very prominent. Within the morning peak, commuting is clearly the largest journey purpose. For the afternoon peak, journey purposes are more mixed, with non-business car journeys on a similar scale to commuting journeys.

46 For private car journeys, the occupancy rate varies depending on if the journey is a work commute or for other purposes. For most commutes, the average occupancy is around 1.4 and most commuting cars carry only one traveller.

### Key finding: **Most regional travel involves the cities Cardiff, Newport and Bristol**

47 The cities of Cardiff, Newport and Bristol feature heavily in analysis of regional travel patterns, demonstrating the fact that transport movements between and into these cities comprises a significant amount of traffic on the M4. This is unsurprising given the relative density of housing and employment in these areas.

48 Cardiff and Bristol act as bookends to a significant amount of the travel along the M4 between junctions 29 and 23. Most eastbound journeys between junctions 29 and 23 do not originate west of Cardiff. Similarly, most westbound journeys do not originate east of Bristol.

49 There is significant travel between each of the three cities. The greatest movements are between Cardiff and Newport at around 27,600 journeys each day. Between Newport and Bristol, there are around 23,300 daily journeys – journeys have increased as a result of tolls being removed, especially to East Newport. As the cities get larger, this is likely to increase.

50 It is important to put these travel movements in context. Movements within cities are often far larger than the movements between them. In particular, there is a significant amount of commuting into Cardiff from the north and south, and into Newport from the north. This traffic does not generally interact with the M4; instead, it is the travel between cities that is contributing most to congestion on the M4.

### Key finding: **Land use and transport decisions are contributing to congestion**

51 South East Wales is a growing and changing region, with a unique settlement pattern shaped by geography and history. The development of the M4 since the 1960s has had a major impact on how the region has developed, heavily influencing where people live and work.

52 Our judgement is that a root cause of M4 congestion is that many important origins and destinations have been located close to the motorway without meaningful transport alternatives. We have seen prominent examples in housing estates, employment sites and retail parks. In the absence of more developed transport alternatives, the motorway has been a natural point around which to plan developments.

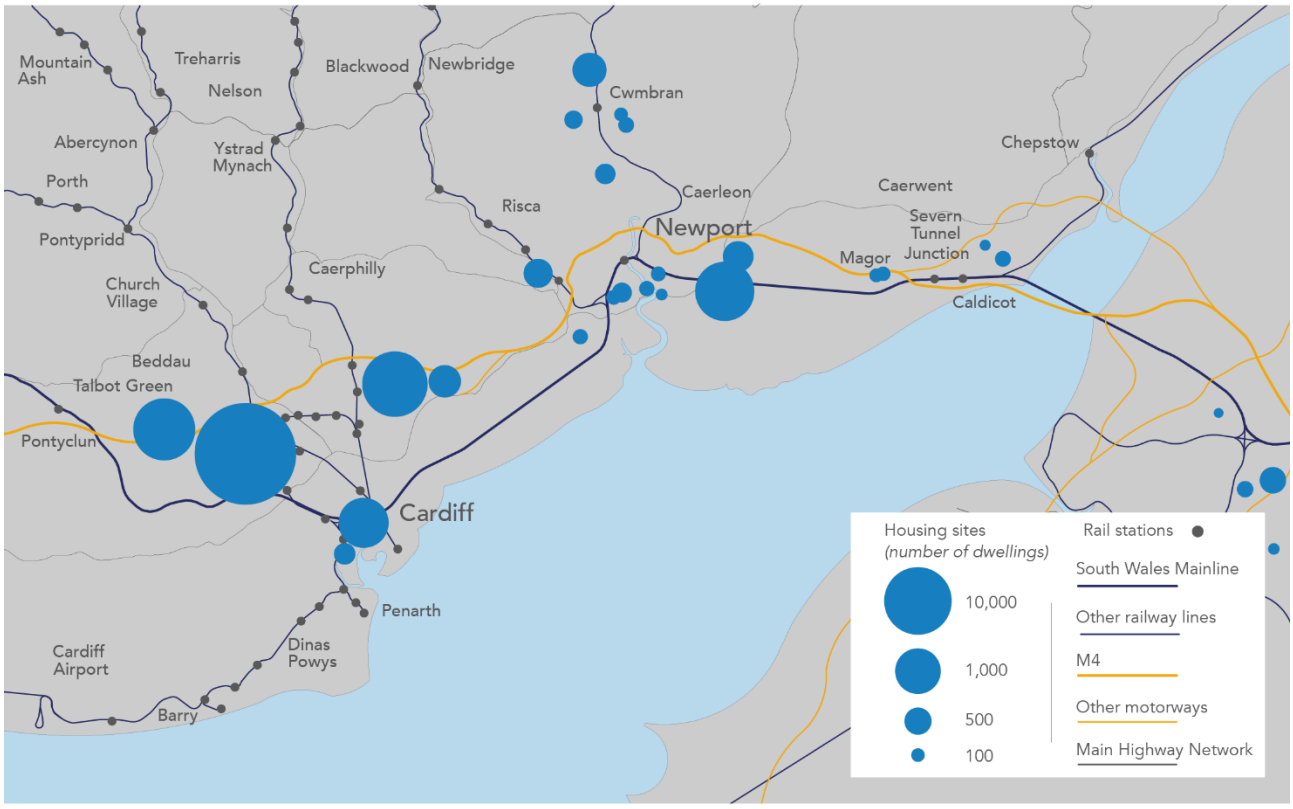
53 In the future, both Cardiff and Newport are planning for physical and economic growth. The areas for development tend to be located in an arc across the northern fringes of Cardiff and at Llanwern, in the east of

Newport. These sites are relatively close to the M4, on the edges of built-up areas and often poorly served by public transport.

54 We have identified that the spatial distribution of future planned major developments aligns with the top 10 origins and destinations observed on the motorway. This is illustrated in figure 2.8. Other things being equal, we expect these developments to increase use of the M4 and hence congestion.

55 Without transport alternatives, the design of many of these developments risks reinforcing car dependency rather than encouraging modal shift to public transport or active travel. While some car alternatives are in place for some developments, these are often only implemented once people have already made their transport decisions.

56 This car-dependent approach to development is not inevitable. Other successful city regions internationally and in the UK have located and designed new developments so that they can be served mainly by public transport and active travel.




*Source: South East Wales Transport Commission*

*Figure 2.8: Locations and sizes of future planned housing developments*

## Key finding: **Common M4 journeys are poorly served by alternatives**

57 A clear conclusion from our work is that common journeys on the M4 are poorly served by alternative transport options. As part of our analysis, we identified the top ten 'origin-destination pairs' for M4 journeys and compared them with the nearest rail and bus alternative. The results are summarised in figure 2.9.

58 In the vast majority of cases, the journeys are quicker using a car on the motorway than by other modes. Even for those journeys where the train is competitive, the frequency of services limits flexibility compared to the car. In addition, use of a car is often cheaper than taking the train or bus, especially if a public transport journey does not benefit from a season ticket or other discount.

59 Overall, at present, rail and bus perform poorly compared with the journey times, ease of use and cost of using the car, even accounting for M4 congestion. It is evident that many people are using the motorway because they have no other realistic option. We have found journeys to and from Newport are particularly poorly served by non-car alternatives.

60 The following findings on rail, bus, active travel and modal integration explain in further detail how the current transport network in South East Wales is not providing sufficient alternatives to the M4.

| | | | Car | Bus | | Rail | |
|---|---|---|---|---|---|---|---|
| Rank | From | To | M4 journey (min) | Bus journey (min) | Approx. frequency (min) | Rail journey (min) | Approx. frequency (min) |
| 1 | Cardiff | West Newport | 20-30 | 80* | 15 | 20 | hourly |
| 2 | West Newport | Cardiff | 25-55 | 80* | 20 | 25 | hourly |
| 3 | Greater Bristol | East Newport | 35-45 | 85 | hourly | 45 | 30 |
| 4 | East Newport | Greater Bristol | 40-80 | 115 | 30 | 45 | 30 |
| 5 | West Newport | West Newport | 10-20 | - | - | - | - |
| 6 | West Newport | Greater Bristol | 40-85 | 135* | < hourly | 70 | 30 |
| 7 | Greater Bristol | West Newport | 35-50 | 90* | < hourly | 65 | 25 |
| 8 | Cardiff | East Newport | 30-40 | 70* | 30 | 25 | 10 |
| 9 | Monmouthshire | Cardiff | 40-70 | 115* | 50 | 100 | 40 |
| 10 | East Newport | Cardiff | 30-50 | 70* | 30 | 30 | 10 |

** indicates interchange required*

*Source: South East Wales Transport Comission calculations based on traveline.cymru and Google Maps. The approximate centre point of each sector was used to provide a rough estimate of journey times between each Origin/Destination, so journey times will differ as the start and end point is made more specific*

*Figure 2.9: Comparison of M4 and public transport for the top 10 origin-destination pairs*

## Key finding: **Many important travel patterns in the region are not well served by the rail network**

61 As a result of Wales' industrial legacy, South East Wales has a relatively dense network of existing and former railway lines. But while there are many 'rails on the ground', the infrastructure is often either not being fully utilised or used efficiently to cater for potential demand.

62 There is a relatively high number of north-south services between Cardiff and towns to the north, and between Bristol and the major settlements running west along the South Wales Coast. However, this does not provide for the full range of people movements we observe. For example, the railway line from Cardiff Central to Merthyr Tydfil is approximately 20 miles long and includes 14 stations. A similar distance from Cardiff Central to Bristol Parkway includes only six stations, three of these being on the English side of the River Severn.

63 In particular, many post-war developments are not served by rail services, such as eastern and north-eastern parts of Cardiff, and suburban areas of Newport. Newport is particularly poorly served by rail, even after the re-opening of the Ebbw Vale branch in 2015.

64 There is a good rail service between Cardiff, Newport and Bristol city centres. However, the majority of trips made within South East Wales do not involve just the centres of the cities. As such, there is insufficient rail provision to offer a genuine alternative to the motorway.

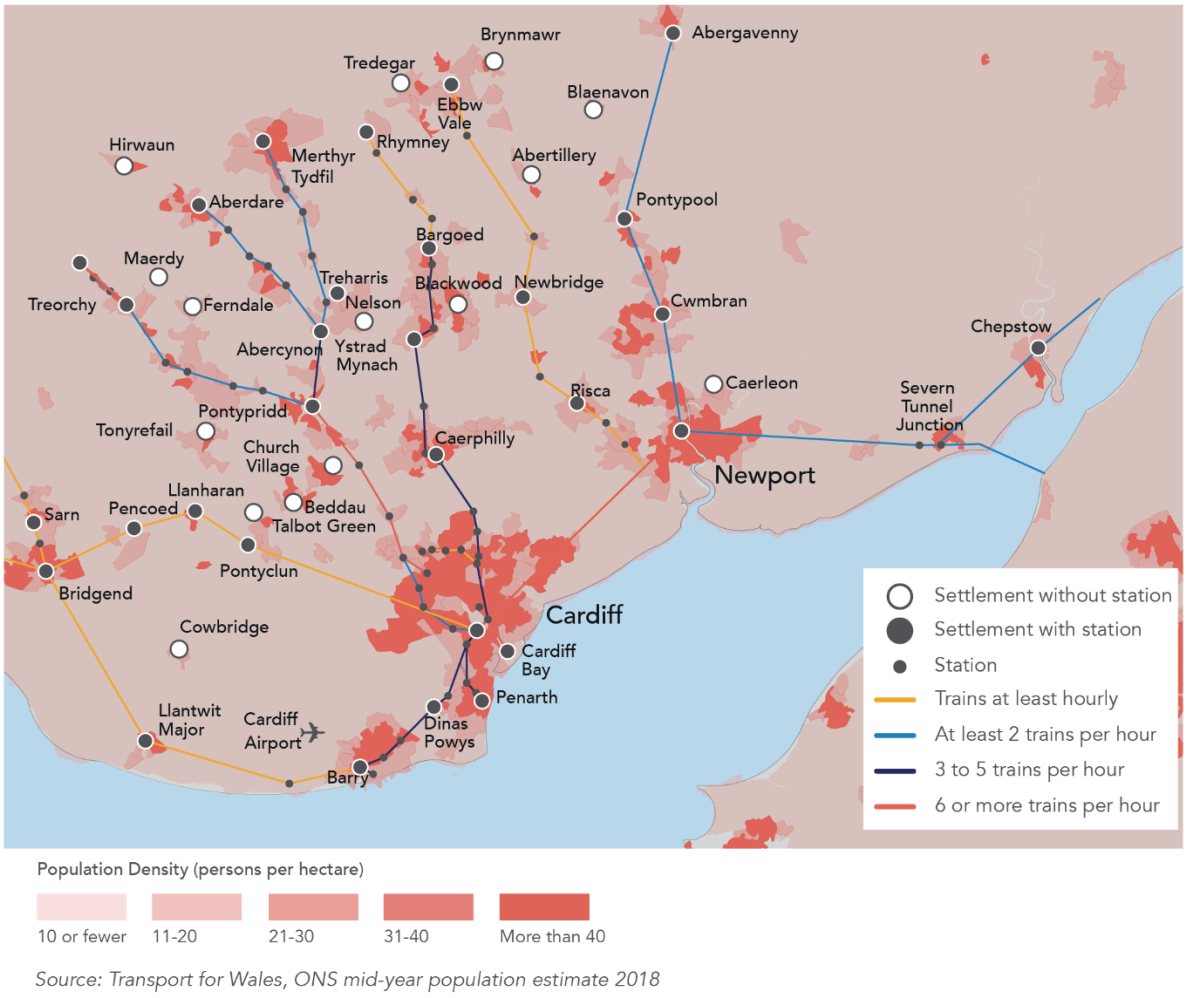
65 Where rail services exist, they are often very crowded at peak times, discouraging further uptake. We note there is significant crowding on a number of key commuter services within the region, including:

- **Cardiff – Pye Corner – Ebbw Vale**. These services are crowded, with currently only one train per hour. Based on seated capacity, trains leaving Cardiff in the afternoon peak can operate at up to 190% of capacity. We note that Ebbw Vale Town Station has recorded usage far higher than the projections prior to opening in 2015

- **Cardiff – Newport – Bristol Temple Meads**. There are only two trains per hour to and from Bristol Temple Meads. The four busiest routes on the South Wales Main Line are on this service. Again, based on seated capacity, trains leaving Cardiff to Bristol Temple Meads in the morning peak can run at capacities in excess of 170%. We note the current cascading of rolling stock is freeing up higher capacity services on this route

66 The degree of crowding suggests that there are more people who would like to use rail than are currently able. This is reinforced by the fact that car parks at key stations are often full in the morning peak period.

67 Conversely, the inter-city services between Cardiff and Newport operate at under their seated capacity, even at peak times on a weekday morning or afternoon. This is due to the higher frequency of trains between Cardiff and Newport. However, once those stations are reached, passengers face difficulties connecting to other transport modes, especially in Newport.




*Source: Transport for Wales, ONS mid-year population estimate 2018*

*Figure 2.10: Rail stations and population density in South East Wales*

## Key finding: **The bus network does not well serve travel patterns and integration is hindered by the regulatory model**

68 Bus services in Wales are provided on a largely commercial basis with some revenue support for loss-making routes, mainly in rural areas. The context is similar to that of England but with some regulatory differences.

69 A large number of local bus services are provided within Newport and Cardiff. The current bus network serves city centres, but it often does not directly connect suburban housing to out of town employment areas. Travelling across cities can also be difficult due to the legacy networks of radial routes

70 Regional bus services generally provide long distance alternatives to long distance rail journeys. There are a high number of daily scheduled coach services between Swansea, Cardiff, Newport and Bristol, but these generally have much longer travel times relative to rail. Services provided by companies such as National Express and Megabus accommodate the needs of the occasional traveller but are not well suited for commuters. This is in part due to the city centre to city centre pick-up and drop-off points.

71 Although bus services may work well for some intra-city commuting, the South East Wales bus network generally offers a poor service for the common commutes undertaken by M4 users, especially over longer distances. As in most other parts of the UK, demand for bus services has been falling, unlike rail use. We also note that bus use tends to be higher in the inter-peak period suggesting that the primary users are not commuters.

72 Deregulation of bus services has resulted in a range of operators providing services, complicating the bus system for potential passenger in terms of timetable, frequency and ticketing options. In the vast majority of cases, bus services are not coordinated with train services, so passengers often face a lengthy or uncertain wait for the next stage of their journey. In line with the current regulatory model, we have also observed instances where different bus companies schedule their buses at the same time, so that they directly compete with each other instead of complementing timetables to provide a more regular service. It is important to note there are some examples of good practice, but they are not consistent enough across the network.

### Key finding: **Active travel is insufficiently integrated with the wider transport network**

73 Active travel (cycling and walking) offers localised and short-distance alternatives to the car or public transport for either all or part of a journey. However, active travel routes are not well connected, either to each other or to the wider transport network.

74 Local authorities have active travel maps which show the existing walking and cycle routes, as well as proposed routes. But these are not generally designed to help start or finish the common journeys undertaken along the M4. For example, there is currently no dedicated active travel route between Newport station and the major employment sites of West Newport.

75 We also note there is no segregated commuter cycle route between Cardiff and Newport. The focus for each local authority appears to have been to improve routes from suburban areas into city centres, rather than to provide traffic-free routes between local authority areas, especially for commuters.

### Key finding: **There is limited regional coordination of transport**

76 If the public transport and active travel network is to serve a wide range of needs, the different modes need to operate as a single transport network. A number of elements are important, including aligned information, integrated ticketing, a coordinated timetable and seamless interchanges. This is far from the case in South East Wales.

77 Overall, there is little coordination between transport providers and between different transport modes. This lack of integration makes multi-modal journeys difficult, time consuming and expensive, especially as part of a daily commute.

78 This is particularly apparent when different modes interact. We have found the interchange between train and bus is unintuitive and usually involves walking some distance. For example:

- **At Newport**, the bus station is an eight minute walk from the rail station and the route is not clearly signposted for passengers who arrive in Newport by train. There is also more than one bus station

- **At Cardiff**, the rail station bus stops are spread over a few different locations, so it is not clear to the occasional user or visitor where a bus departs from. We note a new bus station is currently being developed

- **At Severn Tunnel Junction rail station**, bus connections are limited and there is no facility for buses to turn around in front of the rail station building

79 We note the establishment of Transport for Wales has allowed steps to be taken to address some of the problems, but much more is needed.

### Key finding: **Freight is not a major contributor to congestion, but the industry is highly affected**

80 The movement of goods operates on the same infrastructure as the movement of people, principally the M4, other trunk roads and the South Wales Main Line. The two types of movements therefore interact. While freight comprises a minority share of transport movements, it is still very important to understand, not least because of the service it offers to the people and businesses of South East Wales.

81 The M4 is the primary route for the movement of heavy goods vehicles (HGVs) in Wales, averaging more than double the number of HGVs per day compared to any other route.[3] It provides access along a key corridor of economic activity in Wales, servicing Cardiff, Newport and several major ports.

82 HGV movements along the M4 are significantly higher between Cardiff and Bristol than between Cardiff and Pembrokeshire. Long distance road freight is relatively small in volume, especially international 'land-bridge' traffic moving between the Republic of Ireland and Mainland Europe. The nature of these patterns suggests freight movements by road within South East Wales comprise predominantly delivery and servicing activity for Cardiff and Newport.

83 Around a quarter of freight movements in Wales come from the Midlands. We note that completion of the dualling of the A465 could make the Heads of the Valleys road more attractive to freight operators currently using the M4 to access South West Wales from the English Midlands and north of England.

84 While the M4 carries the majority of freight in South East Wales, rail also plays a role within the corridor. This is mainly for servicing the traditional industries in South Wales and their national and international markets.

85 We do not foresee significant growth in the industries using rail freight. We also note there is still significant spare capacity in the system as around only 50% of available freight 'paths' on the mainline are utilised. There may also be greater opportunities to schedule rail freight services outside of peak passenger times.

### Key finding: **In the future, there will be significantly more people travelling within South East Wales and to the cities**

86 Across the UK, employment is rising and concentrating in cities. We therefore expect more pressure on the transport system due to a rising population and the need to provide

[3] Source: gov.wales/road-freight-2018

transit from residential areas to employment areas.

87 In South East Wales, current and future trends signal that the major settlements will continue to grow and will provide the majority of the employment opportunities for those living in the region. We therefore expect movements to and from Cardiff, Bristol and Newport to continue to increase.

88 Figure 2.11 demonstrates the degree of projected population growth and its focus on cities. Each of the three cities is projected to get much bigger over the next 20 years.[4] Both Newport and Cardiff are designated as "national growth areas" in the Welsh Government's draft National Development Framework.

89 We note that more people are travelling into city centres each day due to increasing employment opportunities in city centre locations. There is an increasing number of jobs in city centres and increasing patronage of the rail system, in particular to access these places of work. This trend looks set to continue with some major employment sites supported by planning and economic policies, such as the Cardiff Central Enterprise Zone. In addition, our work suggests there is a latent demand for more intra-city travel by all transport modes.

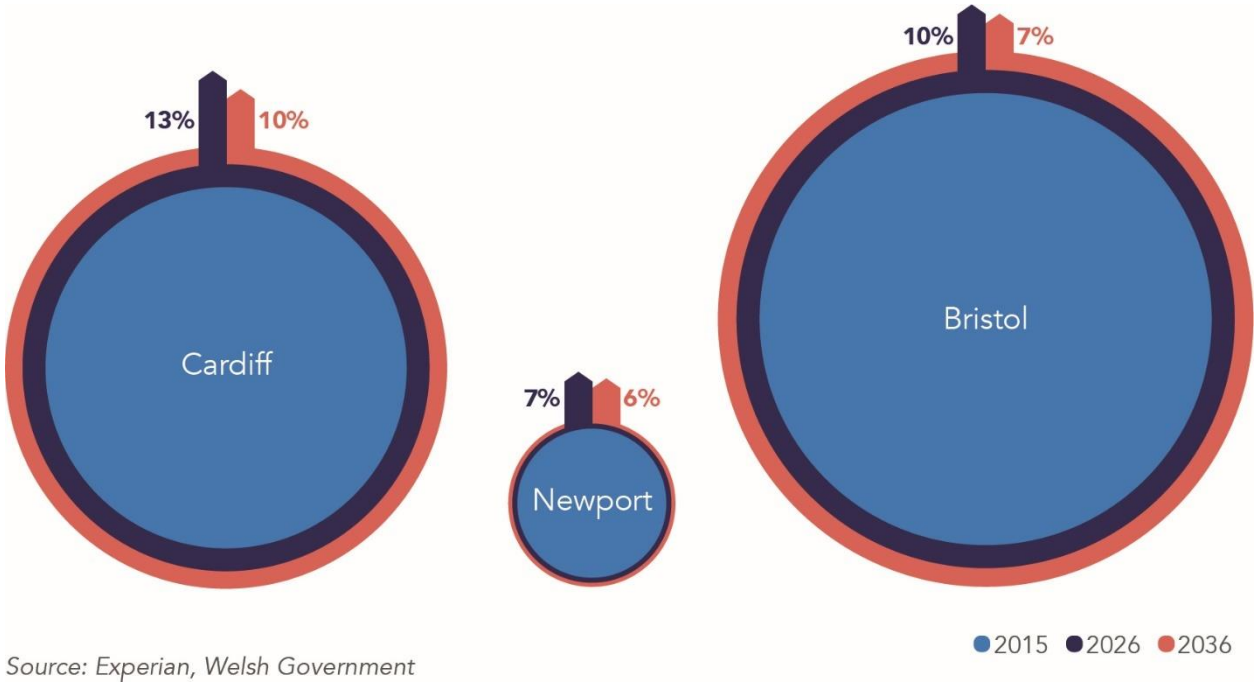



*Figure 2.11: Relative population and population growth in the cities of Cardiff, Newport and Bristol*

[4] Source: Experian 2016, Welsh Government projections

## Key finding: **Technology is unlikely to ameliorate the congestion problem**

90 We have considered the prospects for developments such as electric vehicles, connected and autonomous vehicles and alternative fuels in different scenarios. In broad terms, these do not change the fundamental nature of the problems that we observe. So long as transport is predominantly undertaken by cars (of whatever form), we are likely to see significant congestion.

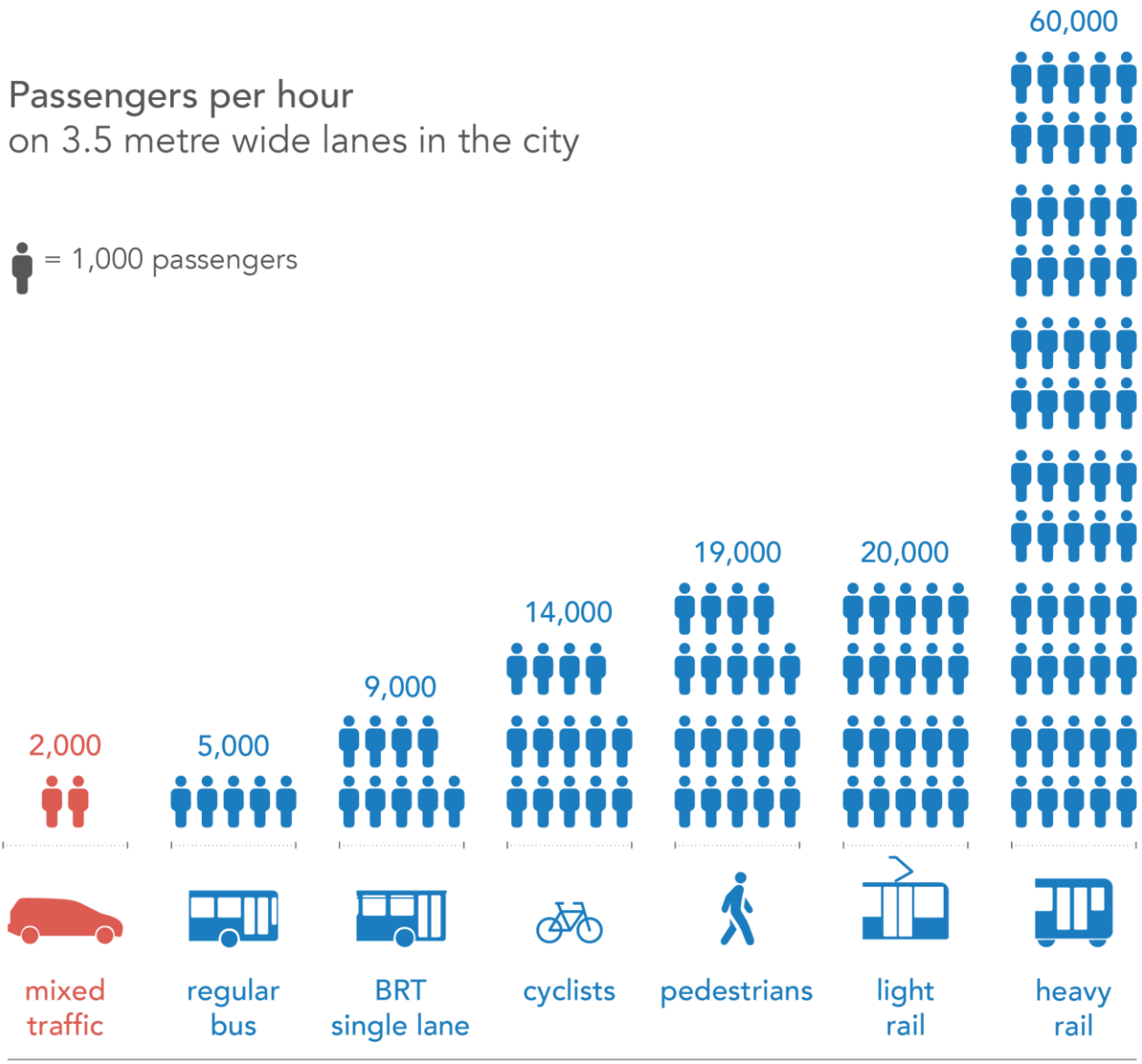
91 We expect a significant uptake of electric vehicles over the next 20 years. These will require significant infrastructure changes, such as the provision of charging points, but should lead to positive impacts in respect of air quality and carbon emissions. Other alternative fuels, such as hydrogen, may also gain traction, particularly for HGVs.

92 In the long term, autonomous vehicles may become commonplace in the coming decades. There is a risk that some people may switch from public transport to private autonomous vehicles. This will worsen congestion unless it is possible to achieve greater efficiency of roadspace ('platooning') or encourage significantly more vehicle sharing.

93 Many of these technological developments mitigate the environmental problems posed by today's cars. But they do not fundamentally alter the physical space required for private road vehicles. Private vehicles also require significant roadspace to be allocated to them if they are to transport large numbers of people, as illustrated by figure 2.12. Once at their destination, large areas then need to be set aside to allow cars to park, including car parks, roadsides and driveways. A typical car spends 96% of its time parked rather than used.[5] Put simply, more cars means less town or city.

94 For these reasons, we judge that the growth in autonomous and electric vehicles is unlikely to provide significant benefits in terms of tackling congestion.

[5] Source: Space Out, Perspectives on Parking Policy 2012, RAC Foundation




*Source: TUMI (Tranformative Urban Mobility Initiative). Illustration based on: Breithaupt based on Botma & Papendrect (1991). Traffic operation of bicycle traffic, TU Delft. https://www.uncrd.or.jp/content/documents/5594Presentation 3 - Module 1 - Mr. Breithaupt.pdf (accessed 2020)*

*Figure 2.12: Relative passenger capacities for different transport modes*

Key finding: **Future traffic growth is uncertain**

95 Before the COVID-19 epidemic, we expected to report that traffic is set to grow in the medium term, although there is significant long-term uncertainty. There is now significantly greater uncertainty, including over the medium term.

96 As noted above, traffic levels on the M4 and wider road network have increased significantly over the past decades, in particular over the last five years. Modelling shows how the population growth in the region may translate to future traffic growth in the absence of policy or behavioural changes.

97 It is interesting to note that there is international evidence that suggests some groups of people are travelling less, but it is not clear how applicable this is for South East Wales. Evidence suggests that people are making fewer trips and travelling less per person compared to 20 years ago.[6] In particular, younger people are travelling less than ever before, a trend that may continue throughout their lives.

98 As younger people move to cities for studying, employment and a choice of housing options, they may get into the habit of not driving on a daily basis at the start of the working lives. We can therefore imagine a future where larger numbers of the working population expect to be able to travel to and from work without solely relying on the car.

99 While this may be a potential direction of travel for the cities in South East Wales, it relies upon transport alternatives being available. Moreover, the impact on car traffic may be more than offset by the population growth and future low-density housing developments located at the outskirts of cities.

### Key finding: **Measures to alleviate congestion must be consistent with the Welsh Government's broader environmental ambitions**

100 The Welsh Government has set stretching targets for a number of environmental areas, including reducing greenhouse gas emissions, improving air quality and reversing the decline in biodiversity. Significant changes will be needed in order to meet these targets.

101 Even if sales of new fossil-fuelled cars are banned after 2035, most cars on the road during the 2020s will still be petrol and diesel-powered. This means that modal shift from car to rail, bus and cycling will be increasingly important, as will policies that support remote working.

102 While our remit has been mainly focussed on tackling the congestion problem on the M4, it is clear that the measures we recommend must be consistent with these wider environmental ambitions. Consistency increases the opportunity for multiple benefits to arise from the same investment.

[6] Source: The Future of Mobility January 2019, Government Office for Science

# CHAPTER 3
# SUMMARY OF ENGAGEMENT

103 This chapter describes the engagement we have undertaken over the last six months and how it has contributed to our findings. Further detail is available in *Engagement Background*, published alongside this report.

## Activities undertaken

104 The work of the Commission has been of interest to many, particularly those who use the M4 motorway or are affected by congestion. So far, our engagement activities have included:

- **Multilateral stakeholder workshops** – around 80 individuals attended sessions in Newport, Cardiff and Chepstow, representing a range of local and national organisations
- **'Travel to Work' commuter surveys** – targeted at employees working at selected offices, business parks and industrial sites close to the M4 across South East Wales and South West England
- **'Have Your Say' digital consultation** – engaging the wider public on local transport issues in the region, with over 2,500 responses received
- **Discussions with elected members** – meetings with Members of the Senedd, Members of Parliament, Council Leaders and Police and Crime Commissioners
- **Secretariat bilaterals** – we have held a large number of discussions with a wide range of stakeholders, academics and practitioners

## Engagement findings

105 Our engagement work has made an important contribution to the key findings described in the previous chapter. In some cases, it corroborated the results of analysis; in others, it told us about issues we would not otherwise have been able to identify from other sources of evidence.

106 The brief sections below describe our summary engagement findings. Of course, the wide-ranging nature of transport issues across different groups and locations means this must be considered only a high-level sketch. Further details are available in *Engagement Background*. It is important to note that the majority of our engagement activity took place before the COVID-19 epidemic.

### Private cars on the M4

107 There is a strong perception that the M4 performs poorly. Common issues raised include frequent closures, long diversions, the lack of a hard shoulder, poor road surface, frequent congestion and slow response times to incidents.

108 Engagement feedback was generally consistent with our findings on congestion, although there was often a misperception that the motorway is being used for a higher proportion of very short and very long journeys, which is not borne out by the analysis.

### Freight on the M4

109 It was frequently confirmed that there is poor journey reliability on the M4 and the surrounding road network, making it difficult to adequately plan for efficient freight movements.

110 Stakeholders noted that the scale of freight traffic in the region is linked to lifestyle

and consumer behaviours. In particular, we learnt that the popularity of online retail and next-day delivery often leads to several journeys to the same location over a short time period and the necessity of peak-time freight movements (when with more time available these times could be avoided). Peak-hours travel also becomes necessary if the receiving businesses does not operate at off-peak times.

111 Some argued for a focus on consolidating the 'final miles' of deliveries, in order to reduce the number of vehicles accessing the busiest parts of the road network. It was acknowledged that this might have limited impact on motorway congestion, but wider benefits were noted.

## M4 alternatives

112 Feedback from our engagement suggests shortfalls in the public transport system are one cause of the modal dominance of the car in the region (although the modal share for cars is broadly similar to all other parts of the UK outside of London). People confirmed that some of the key barriers to use of M4 alternatives exist in the patterns of travel featuring in the most common motorway journeys. In general, perceptions of the public transport network in South East Wales are negative and most perceive there to be obstacles to them considering it as a viable option.

113 Feedback ranged from localised transport issues, through to a lack of joined up public transport infrastructure, information and ticketing. Wider societal and economic issues raised and discussed included land use planning, employment practices, and consumer and lifestyle trends.

114 Use of public transport and active travel were considered to be unsuitable for those making multi-purpose trips such as incorporating the school run, childcare, shopping or leisure activities into journeys to or from work. Certain working patterns, such as shifts or variable hours, also mean public transport options are less viable. For other respondents, the nature of their job requires that they use a car during their working day.

115 The responses to why public transport is not used by more people were line with our own findings. For most people, public transport is less convenient, less reliable and slower than driving. Mile for mile, driving is also often cheaper. Given many employees are provided free parking, the current public transport system cannot compete.

116 The main barriers to higher take-up of active travel modes were identified as safety perceptions, a lack of extensive cycle lanes and poor integration with other modes, in particular public transport.

## Newport, Cardiff and local issues

117 In Newport, specific issues raised included the inaccessibility of the bus station, a lack of routes to strategic employment sites, limited bus priority routes and poor reliability. In Cardiff, the ongoing absence of a bus station and a lack of services to large housing developments in and outside of city were key issues raised. Buses getting caught in congestion was frequently raised in relation to both cities.

118 For travel in and around Newport, respondents noted a lack of a suburban public transport network. Specifically, there are few stations to the west of the city and no stations at all to the east. The stations to the west of Newport are on the Ebbw Vale line, but as this has no connections to Newport station, this restricts many from using the services. Trains between Newport and Cardiff are perceived

to be overcrowded (although this is not borne out in the data), and the availability and cost of parking at Newport station was also said to dissuade people from using rail. Newport respondents did not feel they would benefit from the South Wales Metro.

119 In Cardiff, respondents in the east of the city reported that they do not have a close station to access. This means that many locations, such as Newport, are easier and quicker to access by car. Respondents stated that Cardiff Central station is their main access point for many key rail routes, but it is difficult to access for people living in the outskirts of the city. Those travelling into Cardiff on one of the Valley Lines services commented that the services are very often overcrowded during commuting hours and too infrequent. They also commented on disparities in fares, for example, Abergavenny to Newport is more expensive than Ebbw Vale to Cardiff (despite the journeys being of similar distance).

## Travelling to work

120 Our engagement work paid particular focus to commuters. The 'Travel to Work' commuter survey found that around two thirds of employees are single occupancy car drivers when travelling to work, with almost 75% of employees surveyed enjoying free workplace car parking.

121 Over 65% of respondents said they experienced barriers to using public transport, active travel or car sharing for their journey to work. The train and bus were rated as 'very difficult to use' by over 40% of respondents for their work commute. In addition, a third of employees rated car sharing as a 'very difficult' option for their daily commute. Active travel fared worse: almost half of respondents rated cycling as 'very difficult' and around 60% felt walking to be 'very difficult'.

122 We found very little car sharing in workplaces. The most commonly cited barrier to more sharing was the difficulty of planning it around busy lives, complex journeys and flexible work patterns. Safety and social reasons were also noted.

## Perceptions of working arrangements before COVID-19

123 Our engagement explored current and future working practices and their implications for transport. Clearly, the findings have been overtaken by events, but we feel the feedback remains relevant for the long term.

124 While it was recognised that working patterns have become more flexible over time, including working from home, stakeholders believed that many employers subscribe to a traditional view of a site-based presence.

125 Stakeholders felt changing the way we live and work was key to changing the way we travel. 'Re-localising' lives was described as a way to reduce the demand for travel so more activities including work, schooling, health, retail and leisure are available closer to home and within the community.

126 A fundamental change in working behaviours was deemed necessary by stakeholders to end traditional '9am to 5pm' office working, which accounts for a large part of the peak time congestion on the roads (although the timing of the peak periods demonstrates a very large number of people travel to work before 9am and depart before 5pm).

127 Many felt that large employers needed encouragement to allow a broader approach to flexible working, including staggered start and finish times.

128 Some felt that the public sector should lead by example, which is particularly relevant to South East Wales given the large concentration of government employees. These sites could also operate as 'work hubs' to support local clusters of employment, thereby reducing the need to commute over long distances.

## Stakeholder ideas

129 As part of our engagement, we have received a large number of ideas for transport improvements in the region, especially in relation to public transport and active travel. While these have often been specific to certain localities, we have considered each proposal. Many ideas are potential recommendations which we intend to assess for our final report.

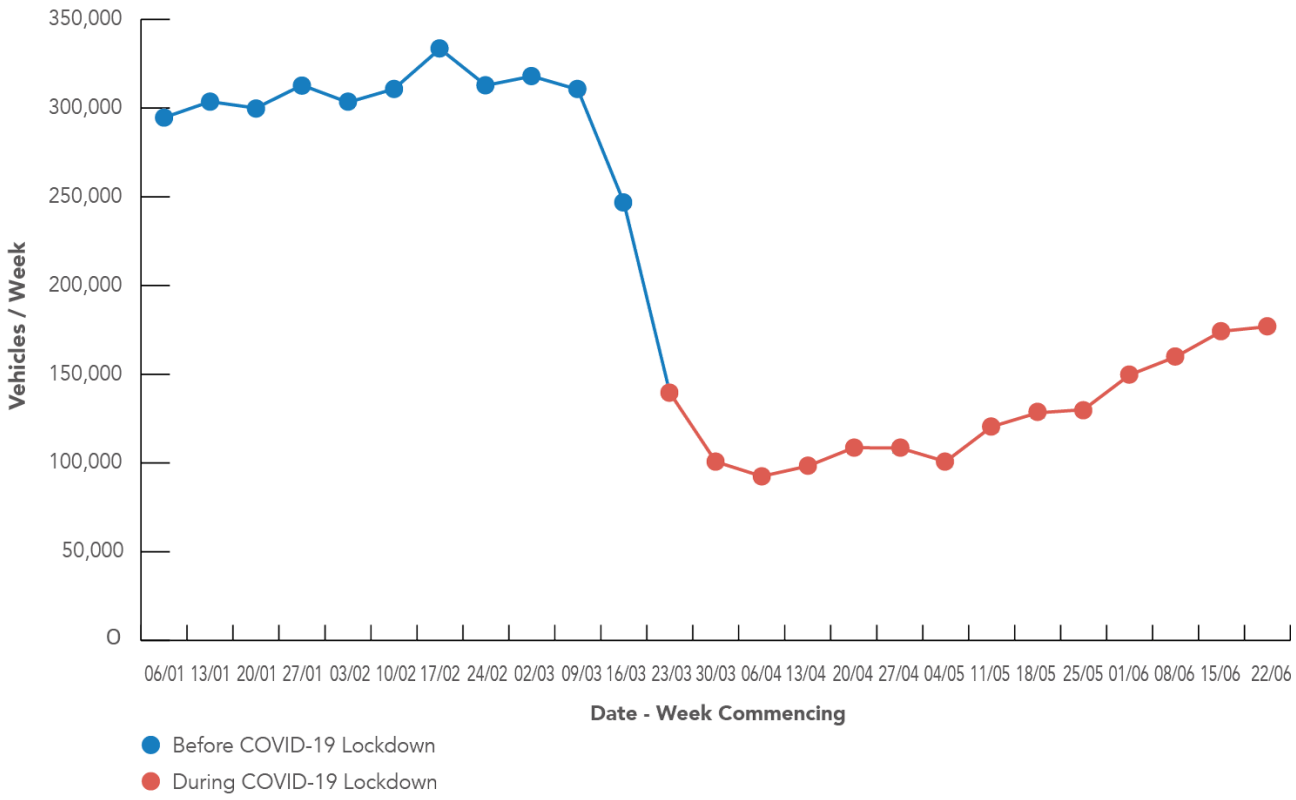
# CHAPTER 4
# COVID-19 AND OUR FINDINGS

130 This chapter reflects on the possible implications of the COVID-19 epidemic on our findings. The impact of the situation on transport and working patterns – both now and in the future – means it is vital lens through which to consider congestion on the M4. We distinguish between three phases:

- **Short term** – from now until the removal stringent social distancing
- **Medium term** – from the end of the short term until the end of all social distancing
- **Long term** – from the end of the medium term, i.e. the point at which any form of social distancing is not required

## Short term

131 At the end of March 2020, traffic levels on the M4 were around a third of their usual level. Weekend traffic was as low as a tenth of the usual level. Figure 4.1 shows the dramatic fall and then a slow, gradual increase. We expect the reduction to continue to unwind as restrictions continue to be relaxed.




Source: Traffic Wales. Based on seven day average of data measurements taken at Newport and Magor from 08 March 2020.

*Figure 4.1: Traffic levels on the M4 during COVID-19*

## Medium term

132 Even as lockdown ends, social distancing will be required in the medium term. Government guidance will remain for people to work from home if possible, partly to limit transmission in workplaces and partly to alleviate pressure on public transport. At the peak of lockdown, up to around a half of employees were working from home at least part of time. This number has gradually fallen as lockdown has eased.[7]

133 As public health guidance develops and economic activity resumes, we expect traffic to rise, even if everyone who can work from home continues to do so. Before COVID-19, evidence suggests around 5% of South East Wales' employees worked at home for the majority of the week. During lockdown, this increased very significantly.

134 The impact of social distancing on office buildings and other employment sites will greatly reduce their capacity to accommodate the usual number of workers. Given the potential susceptibility of traditional office environments on COVID-19 transmission, we expect this to significantly constrain the number of people able to go to work at any one time.

135 At the same time, public transport carrying capacity significantly falls with social distancing, constraining usual patronage by as much as 70 – 90%. Car occupancy rates may also fall if public health guidance advises against car sharing. We therefore expect an increase in the number of single occupancy cars on the M4 (although the average occupancy rate in private cars was already relatively low before the epidemic).

136 Similarly, government guidance is recommending people travel to work by walking or cycling wherever possible. We note that some local authorities are taking the opportunity to implement active travel schemes, including roadspace reallocation. While we may see the mode share of active travel rise in cities and towns, we do not expect it to significantly alleviate M4 traffic given the average length of M4 journeys (very few trips are shorter than 10 miles).

137 We expect traffic alleviation for as long as there is prolonged remote working, offset by modal shift to cars from public transport. As noted above, at this stage, we think the former will outweigh the latter, leading to a net fall in traffic relative to pre-epidemic levels. This is because the modal share for travel in South East Wales is already heavily skewed towards the car (as in every other part of the UK, excluding London).

## Long term

138 The long term is the least certain period, and there are both challenges and opportunities. The nature of the future is largely a question of the extent to which behaviours revert to their pre-epidemic states. Some of the key uncertainties include:

- **Post-COVID attitudes to close contact on public transport** – will people be willing to use crowded services in the future?
- **Degree of remote and home working** – what will be the long-term impact once social distancing measures are removed?

[7] Source: ONS, Coronavirus and the social impacts on Great Britain

- **Attitudes towards active travel –** will more people be willing to walk or cycle to work as a result of their experiences?

- **Financial models for rail and bus companies** – what will the public transport industry look like once the crisis interventions have been unwound?

139 Overall, we expect congestion to be less severe than its pre-crisis state for as long as there is an appreciable increase in remote working (relative to the pre-crisis baseline). There will still be underlying growth in demand for M4 travel, but it may take a number of years for this to outstrip the effect of new working arrangements.

140 As noted above, before the epidemic, around 5% of the workforce regularly worked from home, although a much higher proportion had the potential to work from home for some of the time. At the peak of lockdown, up to around half of employees worked from home. This number has gradually fallen as lockdown has eased.

141 Once the medium term is over and social distancing has come to an end, we do not expect the long-term proportion of home and remote working to revert entirely to its pre-crisis level. Based on a range of evidence, we judge that a reasonable and highly approximate upper bound is that around a quarter of the South East Wales workforce might work from home or remotely for some of the time. This is a high-end sense of scale and not a central forecast.[8]

142 As discussed in *Chapter 2 (Our Findings)*, a large portion of M4 traffic is comprised of commuting trips or other forms of business travel. This demonstrates that a substantive and sustained increase in remote working could have a meaningful impact on traffic and hence on congestion. We are less optimistic about the impact of staggered work times because the peak commuting times already cover around seven hours of the day (approximately three in the morning [6am to 9am] and four in the afternoon and evening [3pm to 7pm]).

143 In terms of public transport, key commuter routes were already over-crowded before the epidemic. As noted above, socially-distanced public transport will exacerbate this in the medium term. Once social distancing is no longer required, it is unclear whether public attitudes to personal contact on trains and buses will change in the long term. At this stage, we speculate that there will not be a fundamental shift, but people will be understandably attuned to these issues over the coming period.

144 We note that significant additional public subsidy has already been provided to public transport operators. This will continue to be needed given the revenue implications from heavily reduced patronage (required because of social distancing). While this may ultimately unwind in the long term, the post-crisis industry composition may be different, especially for bus. This may have implications for the appropriate regulatory model.

145 In terms of active travel, many more people are walking and cycling on a regular basis, both for exercise, leisure and travelling to work. Reduced traffic levels and perceptions of increased safety may be contributing to this, indicating some possible

[8] This analysis was informed by ONS data on the composition of the workforce, evidence on the propensity to work from home in different industries, Google tracking data during lockdown and ONS surveys on changes to behaviour during lockdown.

factors necessary for a sustained, higher up-take of active travel. It is unclear how this will translate to daily commutes, but it has the potential to be a big part of intra-urban travel and connectivity to stations. In the long term, this matters if we are trying to encourage people to change from car commutes to multi-modal public transport and active travel commutes.

## Implications for our recommendations

146 Before the epidemic, weekday congestion was largely a peak-hours, commuter problem. In the medium term, we expect peak-hours traffic levels to be lower than before COVID-19 because the impact of home and remote working is likely to be larger than the modal shift from public transport to car. This will reduce congestion.

147 In summary, our view is that the changes resulting from COVID-19 do not fundamentally alter the long-term need for additional transport options. But the changes to working patterns and the impact on the economy provide a period of breathing space. Given our emerging conclusions, this is valuable as it will take a number of years to put in place good alternatives to the motorway, especially for rail.

148 We also note there is a window of opportunity to capitalise on the behavioural disruption caused by the epidemic, in particular on home working and active travel. Many transport decisions are made at 'habit disruption' points, such as getting a new job or moving home. COVID-19 is a unique and universal habit disruption event which can be used to demonstrate the case for alternative ways of working and travelling.

## Next steps and engagement

149 We are interested in observing the performance of the motorway as traffic levels respond to the relaxation of restrictions.

150 We will also be looking closely at the success or otherwise of any roadspace reallocation schemes, especially along key active travel corridors.

151 We are particularly interested in whether businesses will aim to increase the degree of remote working in the long term (relative to pre-COVID levels), whether attitudes to active travel have changed positively and whether there are signs that long-term attitudes to public transport may change. This will be a focus for future engagement, as described in *Chapter 7 (Next Steps)*.

# CHAPTER 5
# ASSESSING RECOMMENDATIONS

152 In *Our Approach (October 2019)*, we explained we would set objectives and use them to assess a long list of measures to decide what to ultimately recommend to Welsh Ministers. This chapter describes how we will do this.

## Assessment framework

153 We will consider potential recommendations against an assessment framework. This comprises three components, which flow from our Terms of Reference, the provisions of the Well-being of Future Generations (Wales) Act 2015 and the present situation. They are:

- Specific objectives
- Wider assessment criteria
- Robustness to future uncertainty, particularly in relation to COVID-19

### Objectives

154 We have set two objectives against which to test potential recommendations:

- **Objective one** – to improve journeys on the M4 in South East Wales
- **Objective two** – to increase the modal share of public transport and active travel in the region

155 For objective one, we intend to define improvement in terms of both journey speed and journey time reliability. This is consistent with the focus of the 'fast-track' measures we recommended in *Progress Update (December 2019)*. Our preferred measure for this objective is the proportion of vehicle trips which are made at an average speed greater than 40mph at peak times. This objective is directly linked to congestion alleviation and combines the concepts of speed, throughput and journey time reliability.

156 In considering measures to meet this objective, we will have regard to the impact of our recommendations on other parts of the road network. For example, it would be superficially attractive to alleviate congestion on the M4 by directing more traffic onto the A48 Newport southern distributor road. However, this would lead to detrimental outcomes, such as displaced congestion and air quality problems, which would likely outweigh the benefits.

157 Objective one is deliberately focused on the M4 in South East Wales, reflecting the specific nature of our Terms of Reference. However, the transport network and movements within the region are a complex system and it would be inappropriate to only focus on just one aspect.

158 The purpose of objective two is to take account of a much broader range of factors. Fundamentally, the Commission's view is that a structural increase in modal choice is needed if we are to alleviate congestion sustainably. This means increasing the share of travel opportunities available by public transport and active travel across the region. This is particularly important in growing cities given the scarcity of physical space.

159 We intend to define this objective as the proportion of trips within South East Wales which include an element of public transport or active travel. To achieve this objective, non-car modes must be competitive with the car, in terms of journey time, service reliability and cost.

160 Delivering this objective will support a large number of other important issues that

come from increased use of public transport and active travel. Both can play a significant role in achieving desirable outcomes beyond alleviating congestion. In the context of the declared climate emergency, transport solutions must now give a high priority to greenhouse gas emission reductions and cleaner air. Other broader outcomes from well-targeted transport interventions include better place-making and easier access to work for people on lower incomes.

161 It is important to note that objective two allows for an increase in travel. This reflects the fact that the creation of new public transport alternatives may attract new patronage and not just encourage modal shift from drivers using the M4. This is pertinent given projected population growth in the region.

### Wider assessment criteria

162 In addition to the objectives, we intend to take account of a wider range of factors as we choose what to recommend. This reflects the fact that transport plays an important role in many other public policy outcomes, as noted above.

163 We will therefore be considering wider matters including air quality, carbon emissions, place-making, public health, economic impact, financial costs to government (capital and revenue) and technical feasibility.

164 These wider criteria will allow us to consider the impact of our recommendations across the seven goals of the Well-being of Future Generations (Wales) Act 2015 and the principles for transport appraisal set out in the Welsh Transport Appraisal Guidance (WelTAG).

### Robustness to future uncertainty

165 Even before COVID-19, there was a high degree of uncertainty around future traffic, mobility, Wales' decarbonisation pathway and wider societal trends. All of this is relevant to our recommendations, especially in the long term.

166 Current circumstances present particularly acute challenges and opportunities. As noted in *Chapter 4 (COVID-19 and Our Findings)*, we do not know the long-term impact of the epidemic. This will remain the case, even when we come to provide final recommendations to the Welsh Government. However, we expect to see a lasting impact from the experience of living through this period, albeit with some reversion to long-term trends as the immediate impact dissipates.

167 In the light of the COVID-19 epidemic and other sources of uncertainty, we will consider potential recommendations from the perspective of how transport, working patterns and wider policy may change in the future. This will mainly be a case of ensuring the recommendations are robust to the range of outcomes which may arise in the future.

## The role of modelling

168 It is traditional to use modelling to project the impact of different transport measures. For our purposes, the most relevant model is the South East Wales Transport Model (SEWTM) which is demand-led, multi-modal and crafted to the region.

169 We intend to use SEWTM to help understand current performance against our objectives and gauge how our recommendations may influence them in the future. Like all models, SEWTM has a number of limitations and these are described further

in *Summary Background*, published alongside this report.

170 In particular, the model makes projections on the basis of current policies and behaviours, such as those relating to the cost of driving, land use and modal preferences. Like the vast majority of models, it assumes these do not alter, no matter the outcomes on the ground. In reality, policies and behaviours respond dynamically as situations change. This is especially relevant at the current time, when governments and organisations are reflecting on how to tackle climate change and respond to COVID-19.

171 For these reasons, we intend to use the model as a guide only and not rely on detailed model outputs when deciding what to recommend.

# CHAPTER 6
# EMERGING RECOMMENDATIONS

172 The ultimate purpose of the Commission is to make specific recommendations to Welsh Government on ways to tackle M4 congestion. This chapter describes our emerging recommendations, flowing from the findings described in previous chapters. We will focus on these areas as we prepare our final report. All of the recommendation areas contribute to delivering an efficient, high quality and sustainable transport network for South East Wales.

## Key areas of focus

173 As noted in *Our Approach (October 2019)* and *Progress Update (December 2019),* all transport modes are in scope for our recommendations, including active travel, road, bus and rail. We are also considering measures on wider matters such as land use policy, road user charging and transport governance.

174 Building on our key findings, the engagement findings and our assessment of the COVID-19 situation, we are concentrating our work on the ten areas of focus described below. These are our emerging conclusions on the nature of future recommendations.

### Rail network and stations

175 The current rail system does not offer an attractive alternative for the majority of the journeys undertaken using the M4. The South Wales Main Line is focused on inter-city services rather than commuting services, and many residential and employment concentrations are poorly connected.

176 We note the significant potential for greater rail patronage in the region. The vast majority of journeys on the M4 are over 10 miles and the majority are longer than 20 miles; these are distances that could be served well by a train service.

177 We have considered in detail the ways to generate additional capacity on the South Wales Main Line, which runs from Cardiff to Severn Tunnel Junction. In particular, we note there are four tracks between Cardiff and Severn Tunnel Junction, essentially operating as two pairs of railway lines – a pair of main lines and a pair of relief lines.

178 In usual operation, one pair is for passenger services and the other is for freight, substantially limiting the total capacity of the line. Our technical work indicates the potential to increase capacity if the tracks are reconfigured so that one pair is used for local, stopping services and the other is used for inter-city express services (with freight interspersed). This would also require the relief lines to be upgraded for higher speeds. This reutilisation could allow for connecting services from other branch lines and new stations to be introduced without disrupting inter-city services.

179 With additional stations, a local, stopping service operating on this line could provide a new, local rail 'backbone' into which other transport modes could connect. This would support lateral travel needs between Cardiff, Newport and Bristol, as described in *Chapter 2 (Our Findings)*.

180 We will focus on developing the backbone concept as part of our work to enhance the capacity and efficiency of the South East Wales rail network. The map at the end of this chapter (figure 6.1) illustrates a potential new, local, stopping rail line in the context of existing lines and shows how it could connect into the wider rail network. The diagram notes the areas of potential for new

stations and this will be an important focus for our future work.

## Bus network and stations

181 The bus network has a key role to play in moving people around towns and cities, connecting people to the rail network and providing a flexible, local service for areas which cannot be supported by the rail system.

182 We will focus on two types of bus service. First, bus (and coach) services which may operate along key transport corridors, especially commuting corridors. To ensure reliable journeys, our starting assumption is that some form of bus priority is offered along these corridors (such as 'queue jump' stops or dedicated bus lanes), unless this is physically impractical. Second, and in addition, we will focus on services required to connect people to rail stations and the wider transport network.

183 We will also explore the options for bus services to run in lieu of new train services in the short term, depending on the time required to implement our recommendations on the rail network.

## Active travel

184 Cycling and walking are key travel modes with important benefits in terms of decarbonising travel and improving well-being. We recognise they are not appropriate for long journeys, but it is important to remember that nearly every public transport trip involves some element of active travel, usually walking. As such, it plays a critical 'first mile, last mile' role.

185 While we note that very few M4 journeys are over distances suitable for most people to walk or cycle as an alternative, we believe active travel has an important role to play in the regional transport network. This is should increase as the availability and sophistication of electric bicycles rises.

186 We are encouraged by the potential for greater take-up of active travel, especially in the light of the COVID-19 epidemic. We support plans to make use of the current circumstances to test active travel corridors and roadspace reallocation. Many of the proposed plans are highly relevant to our prospective recommendations and we will monitor their success.

187 We will focus on how active travel can connect people to bus and rail services, or run alongside them for those who wish to cycle longer distances. We will focus on what would be required to provide high-quality walking and cycling routes radiating from rail stations and bus interchanges, with adequate, secure cycle storage at stations.

188 We will also consider the case for an active travel connection between Cardiff and Newport. The potential for such a route increases as the two cities expand and get closer to each other, and as the take-up of electric bikes increases.

## Integration across transport modes

189 Analysis of origins and destinations shows the breadth of journeys that people are undertaking for work and leisure. It is clearly impossible to design a train, bus or active travel system in isolation to facilitate each of these journeys.

190 Transport systems must interact to provide a greater range of service. We will therefore focus on how each mode can be best integrated to provide a flexible transport network. We will consider measures such as integrated ticketing, a coordinated timetable, and efficient interchanges between modes.

191 Our focus will include integration with the road network. For many people in the region, the car may be an important part of a multi-modal journey (for example, driving to a station or a park and ride facility). This is especially relevant for those that live outside a city or town.

## Regional transport governance

192 The way that transport is coordinated and governed is just as important as the infrastructure itself. We consider there is insufficient integration of transport governance across South East Wales, resulting in insufficient integration across key travel modes, particularly rail and bus.

193 Drawing on UK and international best practice, we will focus on the institutional arrangements required in order to deliver the necessary integration and coordination between modes.

## Targeted road measures

194 Roads are used by cars, taxis, buses, coaches, HGVs, vans, bicycles and pedestrians. While our focus is on transport alternatives to the M4, this does not mean that we will not consider targeted road measures.

195 Our focus will be on the most efficient allocation of roadspace (for example, between private cars, buses and active travel users), and how best to integrate the road network with the public transport network (for example, road access to stations and availability of parking).

196 We will also consider the case for further M4 traffic and incident management measures, beyond the 'fast-track' recommendations we provided to Welsh Ministers and published in *Progress Update (December 2019)*. In particular, we will consider measures which may either reduce the likelihood of incidents or increase the speed of resolution.

## Managing demand for the M4

197 Space on the road network is a scarce asset, free at the point of use. We believe some form of charging mechanism is necessary to encourage up-take of public transport and active travel alternatives, and moderate demand for the motorway. We also note that a charge could provide hypothecated revenue funding for regional transport services. We recognise the difficulty in implementing any charge before new transport alternatives are in place.

198 We will focus on considering the options for charging (for example, road user charging, a workplace parking levy or other forms of parking management) and the interactions with our other emerging recommendations, including on the timing of any implementation. As part of this, we will work with Derek Turner, the independent reviewer of road user charging in Wales, who was commissioned by the Minister for Economy and Transport in March 2020.

## Freight management

199 Between 15% and 30% of traffic on the M4 in South East Wales comprises light and heavy goods vehicles. The evidence suggests this freight traffic is largely serving the population and businesses in the region, particularly Cardiff and Newport.

200 Given the nature of the freight movements, we believe there is limited opportunity to shift it from the road network to other modes. Therefore, we will focus on whether there are ways to improve the

efficiency of freight vehicles' use of the motorway and wider road network.

### Workplace travel arrangements

201 Before the COVID-19 epidemic, we had begun to consider the role of workplace travel planning and flexible working arrangements on congestion. In the light of COVID, this will now become a bigger part of our work. While the long-term impact of COVID is uncertain, the current experience has dramatically shown the impact of different working arrangements on the transport system.

202 We will focus on what policies can best support employers engaging with employees on how they travel to work, the options for supporting different types of flexible working arrangements and the links to parking policy.

203 As discussed in *Chapter 4 (COVID-19 and Our Findings)*, a sustained and substantive increase in home and remote working should lead to a meaningful reduction in congestion on the motorway.

### Land use and planning policy

204 Land use decisions determine the location of the places that people travel to and from. The role of the transport network is to facilitate this travel. As a result, land use and planning policy can have a significant impact on levels and patterns of transport, as we have found in South East Wales.

205 We will focus on considering whether policy change is required in order to ensure integrated regional land use planning can take place in South East Wales, particularly from a transport perspective. This is necessary to ensure we do not further build in car and motorway dependence into new developments. As part of this, we will consider whether developments can be better focused around places with good transport links.

## A 'Network of Alternatives'

206 Above all, if we are to alleviate congestion, we need to create attractive and viable alternatives to motorway travel. In doing so, we can provide different, credible travel options so that people can make a different transport decision, should they wish.

207 The underlying theme of all these focus areas is that they support the development of an integrated transport network across South East Wales.

208 We describe this as a 'Network of Alternatives', providing M4 drivers and other travellers with different options for making their journeys.

209 The network approach provides a way to combine a number of transport improvements into a single system. By integrating transport modes, it should allow for flexible journeys, reflecting the diversity of types of trips that people want to make. When the different parts work together, the network's value can be greater than the sum of its parts. The network also provides a framework for supporting different land use and planning decisions as there are significant opportunities to enhance places built around a public transport and active travel network.

210 We believe that South East Wales has the necessary population density to support such a network, not least given the rate at which the cities of Cardiff, Newport and Bristol are set to grow. International comparisons of similarly populated city regions demonstrate it is possible to achieve higher levels of public transport usage, especially when organised by a single

coordinating body (as seen in some European city regions).

211 Figure 6.1 illustrates the potential for a new, local, stopping rail line described above. This could underpin the 'Network of Alternatives'.

212 The figure illustrates the areas on the line which have the potential for additional stations. The connectivity of the network increases substantially with additional stations, each of which could connect to other transport modes.

213 A key focus for our future work will therefore be to consider which new stations are appropriate. We note plans exist for a new station at St Mellons (Cardiff Parkway), the Welsh Government is considering a new station at Llanwern and the residents of Magor propose a 'walk and ride' station in their community. We also note the case for a station in West Newport, which has the potential to be an important part of the network given the number of M4 journeys starting and ending in this area.

214 We will also consider how this backbone could connect into proposals for the Cardiff Metro, including Cardiff Crossrail and Cardiff Circle tram-train lines.

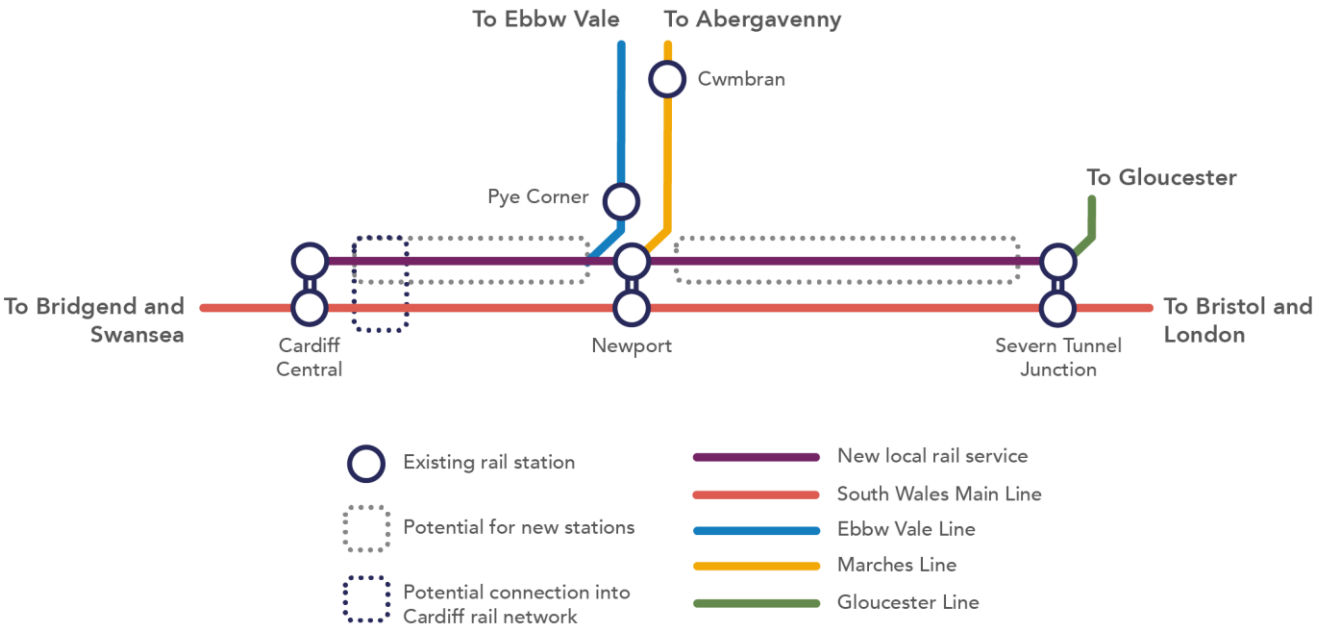



*Figure 6.1: Illustrative new, local, stopping rail line in South East Wales*

## Components of the network

215 In technical terms, the network concept comprises:

- **Points of access** – these are the places that people join or leave the public transport network, usually bus or rail stations or interchanges (for example, Newport bus station or Severn Tunnel Junction rail station)

- **Transport corridors** – either connecting different stations or radiating out from them (for example, a corridor from the centre of Newport to Tredegar Park in West Newport)

- **Service standards** – which determine the transport service which operates along each corridor and at each station (for example, frequency of service and ease of interchange)

216 The sections below set out a draft set of principles to underpin each component of the network.

## Principles for points of access

- Stations need to exist at or near the places where people live (origin) and wish to travel to (destination), especially their place of work

- Wherever possible, stations should perform both origin and destination functions. This is particularly relevant for future flexibility as peoples' travel patterns will change over time

- Stations should provide adequate car parking if – and only if – their purpose is to support multi-modal journeys involving cars. This will often not be the case. Where parking is available, it should be accessible by roads that do not materially impact the communities living close to the station

- Stations should be designed for swift and simple interchanges with other transport modes, especially bus

- Stations should be supported by a network of bus and active travel routes along transport corridors – connecting them to either communities or key destinations (or both)

- The majority of these principles are equally applicable to rail and bus stations. Indeed, wherever possible, bus and rail stations should be brought together into single interchange points

## Principles for transport corridors

- Where there is an existing rail line, train is likely to be the best mode because of its ability to move high volumes of people at speed (this is only cost-effective when there is sufficient demand)

- Where possible, corridors should separate inter-city or express services from local stopping services, so as to not disrupt swift journeys

- Our starting assumption is that key bus corridors will require appropriate infrastructure to ensure reliable journeys that are competitive with private cars

- Active travel should be considered additional to bus or rail, but it is not a substitute given it will not be accessible to all

## Principles for service standards

- Frequency of service should be linked to the degree of potential demand. High-level frequency standards should be

developed, related to population levels and density, so that people know what service frequency they can expect in different types of residential and employment location

- While it may not be possible to meet these service frequency standards in all areas straight away, they should be treated as a regional ambition. The service standards may then drive future decisions about rail and bus infrastructure investment

- Hours of operation should be sufficiently long to give people confidence that there will be a comprehensive service whenever it is needed (for example, from early in the morning to late at night, seven days a week), as this will help to foster a culture of public transport use

## Next steps

217 Both the network concept and the principles should be considered provisional and will benefit from further engagement with Welsh Government, Transport for Wales, local authorities and other stakeholders.

218 Our focus will be on developing recommendations to support and develop this network concept.

219 In parallel to our work, many other bodies are also working to improve transport in the region. Much of this work is highly pertinent to our consideration, in particular the development of the South Wales Metro. In addition to making specific recommendations to Welsh Government, we may endorse other proposals which may contribute to the network approach described above.

# CHAPTER 7
# NEXT STEPS

220 This report sets out our key findings and emerging conclusions on the nature of future recommendations.

221 Our next – and final – report will set out specific recommendations to the Welsh Government. We intend to publish this report by the end of this year.

222 The final report will concentrate on recommendations rather than restate our key findings. However, we will update our findings if the situation changes appreciably between now and that report, as it may in the light of COVID-19.

223 We will continue to engage with stakeholders and members of the public. Our engagement work will restart later this summer.

## Staying in touch

Updates on the Commission's work are available online.

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