



# Progress Update

17 December 2019

# Summary

---

An initial task for the South East Wales Transport Commission is to propose 'fast-track' measures to help alleviate congestion on the M4 in South East Wales. This report provides those recommendations and an update on our longer term work.

Congestion worsens when vehicles travel at different speeds and frequently change lanes. This is particularly significant when approaching the Brynglas tunnels at peak times. This causes a ripple effect that slows and disrupts flow when there are a large number of vehicles on the road. We believe there are some traffic management measures that can help alleviate some of the problem.

We are therefore making three specific recommendations to the Welsh Ministers:

1. Remove the variable speed limit from around junction 24 (Coldra) and up to junction 28 (Tredegar Park), and replace it with an average speed control of 50mph over the same extents.
2. Provide additional lane guidance on the westbound approach to the Brynglas tunnels and use physical interventions to prevent late lane changes.
3. Enhance traffic officer support by formalising response time targets and extending the range of patrolling to also cover the A48 and A4810 in Newport.

These measures have been designed to be implemented as a package.

Beyond these motorway-focused measures, our wider work continues and we will provide a further update in our interim report in the spring.

# Introduction

1. Following the First Minister's announcement in June 2019 not to proceed with the 'Black Route' M4 project, the Minister for Economy and Transport established the South East Wales Transport Commission to consider the problems, opportunities, challenges and objectives for tackling congestion on the M4, and to make recommendations on alternative solutions to improve the transport network in South East Wales.
2. The Commission comprises Lord Burns (Chair), Beverly Owen (Newport Representative), Elaine Seagriff, James Davies, Jen Heal, Lynn Sloman, Peter Jones and Stephen Gifford. It is supported by a small Secretariat.
3. The Commission's aim is to provide evidence-based recommendations to alleviate congestion in a sustainable way, while supporting the wider well-being of people who live, work and travel in the area.
4. This document provides an update on the work carried out by the Commission and our recommendations for fast-track measures.
5. These findings reflect the outcome of our discussions from the first three Commission meetings. Alongside these meetings, we have visited the South Wales Traffic Control Centre, and toured on Newport Bus and Metrobus Bristol. In parallel, the Secretariat has undertaken and commissioned evidence-gathering, analysis and modelling which has informed the contents of this report. Stakeholder engagement has also commenced, and we look forward to talking to organisations and the public about their experiences and ideas.

## Our findings so far

6. "Our Approach", published in October 2019, split our work into six phases: understanding the problem, identifying objectives, establishing the baseline, preparing a long list, assessing options and making recommendations. We have focused our activities so far on the initial phases, in particular understanding the problem.

## Congestion and journey time reliability

7. For the purposes of our work, we have concentrated on evaluating the motorway between junctions 23 (Rogiet) and 29 (Castleton). The road is a complex system, used for many different purposes at different times. Next year, we will publish an analysis of traffic patterns. At this early stage it is helpful to note a number of simple points. In this discussion, we use the term 'journey time reliability' to reflect the distribution of average speeds a typical road user is likely to experience.
8. There is clearly an acute congestion problem on this stretch of the M4 in South East Wales at certain times of the day and week. Most obviously, there are significant peak flows, which include a significant degree of commuting on weekdays (Monday to Thursday; patterns differ on Fridays). During these times, congestion and journey time reliability often deteriorates by a great deal. At its worst, drivers face median speeds of between 20mph and 30mph when travelling westbound towards the tunnels in the early evening (from junction 24 [Coldra] to junction 25 [St Julian's]). In addition, many other links experience a median speed of around 40mph. There is a wide distribution around these figures.

9. The peaks are not the same length of time. While morning flows peak between 6am and 7am, evening flows tend to start rising before 3pm and do not dissipate until after 6pm. It is important to note that, outside these peak times, both journey time reliability and average speeds are often reasonable.
10. The impact of the narrowing of the road to two lanes on either side of the Brynglas tunnels is very clear from the traffic data. In broad terms, traffic generally flows better after exiting the tunnel.
11. The majority of journeys involve one or more of Cardiff, Newport and Bristol (either the city centre or outskirts) – this suggests the majority of traffic is regional in nature. That said, the majority of journeys are over 20 miles in length and the vast majority are over 10 miles.
12. We note the data suggests that there are more people living in Wales and working in England than living in England and working in Wales. When combined with the impact of the Brynglas tunnels, this is illustrated by the journey time reliability being particularly poor on the eastbound approach to the tunnels in the morning and the westbound approach in the evening. On the westbound approach, the layout of the road also contributes to the problem.
13. By number, the composition of vehicles is largely cars. Of these, the average occupancy ratio is around 1.4. Depending on the segment and time of day, light and heavy goods vehicles comprise between 15% and 30% of traffic flows. They comprise the greatest share of traffic between the peaks, with a demonstrably lower share in the evenings.
14. By way of comparison, the M4 near Newport is the fourth most congested stretch of urban motorway in the UK and ranked within the top 50 traffic hotspots in Europe.<sup>1</sup>
15. Congestion on the road affects many more people than those travelling on it. In particular, the people of Newport are affected in many ways; the consequences of major M4 incidents are severely felt by the city's road network users and local residents, and there are localised air quality and noise pollution impacts as a result.

## The underlying causes of congestion

16. In "Our Approach", we said we intended to consider the root causes of congestion on the M4 in South East Wales. An emerging finding is that congestion is a symptom of broader issues, in particular a lack of viable or attractive alternative transport options.
17. The most fundamental and self-evident underlying problem is that the motorway struggles to provide reliable travel for more than 3,000 – 4,000 vehicles per hour. At peak times, the usage of the road approaching the tunnels is around 4,000 – 5,000 vehicles per hour. As noted above, journey time reliability deteriorates significantly when these traffic volumes are reached. This suggests that existing demand is some 1,000 to 1,500 vehicles above the level required for reliable journeys. This provides us with a sense of scale to what change might be required to alleviate congestion.
18. In "Our Approach", we said: "In light of the First Minister's decision not proceed with the 'Black Route' M4 Project, the Commission will not be considering options for a replacement section of motorway south of Newport." Instead, we intend to express the problem in terms of the demand for travel and the supply of alternative transport options.

---

<sup>1</sup> Source: Inrix data.

## Better alternatives

19. A significant amount of data is available on the origin and destination of trips on the M4. We intend to use this to examine the opportunities for alternative transport options.

20. Our initial analysis shows that for trips within the region, private car travel on the motorway is very often both quicker and cheaper than public transport, even accounting for congestion. This understandably prompts people to use their cars. This is especially relevant for people working outside the city centre, because existing public transport services usually start or finish in centres. Figure 1 illustrates this point for the journey between West Newport and Greater Bristol.

### Figure 1: An illustrative commuting journey

A typical commuter journey from West Newport through the Brynglas tunnels to Greater Bristol is one of the most common on the M4 in South East Wales. Following the removal of the Severn crossings tolls, this type of trip is increasing. The precise origin and destination within these areas will of course vary, but for illustrative purposes:

- The approximate journey time by car is between 40-85 minutes in the morning (to arrive by 9am) The fuel cost is around £4.20.<sup>2</sup>
- To use the bus would take over an hour and a half, especially when taking into account the frequency of services (less than hourly in the morning) and the need to change between buses. The bus fare for a single journey is over £16.80 each way, and includes a coach service.
- Alternatively, travelling by rail from Pye Corner to Bristol Temple Meads requires taking a bus for part of the journey (or changing services at Cardiff Central), taking between 65-70 minutes and costing £14.10. There are two services per hour.

21. If we are to alleviate congestion, we need to create attractive and viable alternatives. We believe there is merit in considering interventions to improve the alternatives for journeys for which there is a significant level of demand. In doing so, we can provide different, credible travel options so that people can make a different transport decision, should they wish.

22. This is clearly a challenge given the high proportion of private car use in the area. Reliance on the car is heavily ingrained through land use, the transport system and indeed our society. For South East Wales, we note the projections for population and trip growth, and the geographical reality of limited space within which to make the transport network operate well. These factors mean there should be increasing opportunities to provide high-quality, sustainable public transport in the region.

23. Moreover, public transport and active travel 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 CO<sub>2</sub> emission reductions and cleaner air. Other broader outcomes from well-targeted transport interventions include better place-making, reducing stress levels, enabling people to build regular physical activity into their daily lives and enabling easier access to work for people on lower incomes. These are highly relevant for pursuing the well-being goals set out in Wales' Well-being of Future Generations legislation.

---

<sup>2</sup> The fuel cost is analogous to the marginal cost of the trip. The generalised average cost would be higher and include items such as insurance and depreciation

24. Allowing more journeys by a broader range of modes should open up economic opportunities for more individuals. People search for jobs depending on commuting time; the better the transport system, the more places of employment will be within a person's catchment and the better the allocation of workers to jobs. The current transport system is in effect limiting the choice of where people can work. We believe this is particularly relevant for people living in the South Wales valleys and wishing to work in the east-west corridor.

## Our future recommendations

25. Our aim as a Commission is to recommend a set of measures which will alleviate congestion in a sustainable way that supports the wider well-being of people who live, work and travel in the area. These are significant issues which will be discussed in full in our interim report. We intend for that report to set out our objectives for selecting measures. The final report will bring together a set of recommendations for measures – both physical interventions and supporting policies – to be implemented in the short, medium and long term.

26. To give a flavour of the breadth of our work, the areas we intend to consider may include:

- New transport services that correspond to observed demand for travel between specific origins and destinations.
- Public transport improvements to give more choice for journeys between Cardiff, Newport and Bristol.
- Options for strategic commuter cycle routes between Cardiff and Newport (as are now being developed in other European countries such as Denmark and the Netherlands).
- Road improvements and enhanced traffic management of the road networks surrounding the M4, including greater bus priority.
- Tools for managing demand for different modes at different times, including charges that could provide future revenue funding for new public transport services.
- Ways to integrate modes to facilitate multi-modal, flexible journeys with a joined-up timetable (learning from national and international good practice).
- Scope for flexible working arrangements at employment sites, to help spread peak demand.
- Ways to promote modal shift from private cars to other modes, including better information, ticketing, behavioural incentives and demand management, especially working with larger employers.
- The governance required to coordinate and facilitate transport planning and service provision in the region.
- Considering the role of land use policies and transport planning to ensure that employment, shopping and leisure facilities are located at sites well served by sustainable and efficient transport modes.

27. The focus of our future recommendations will therefore be much broader than the narrow set of motorway-focused measures presented in this progress update.

28. In making recommendations, we will take account of the strategic policy context and technological trends, in order to understand how these may affect travel patterns in the study area over the longer term. This includes the likely effect of regional transport plans, local transport plans and spatial plans in the wider study area.

## Fast-track recommendations

29. As set out in our Terms of Reference, part of the Commission's task is to produce recommendations for fast-track implementation. To respond to this request, we undertook a rapid review of options which could be feasibly delivered quickly. This process commenced in October 2019 when the Commission was established.

30. In "Our Approach", we explained the need to ensure fast-track recommendations do not pre-judge or negatively affect our final conclusions. For this reason, we have focused our work on the operation of the M4 rather than other transport modes.

31. We are recommending three specific measures. The overall purpose of the measures is to improve traffic flow on the M4 in South East Wales, especially in the morning and evening peaks.

32. We recommend the Welsh Ministers:

- Remove the variable speed limit from around junction 24 (Coldra) and up to junction 28 (Tredegar Park) and replace it with an average speed control of 50mph over the same extents.
- Provide additional lane guidance on the westbound approach to the Brynglas tunnels and use physical interventions to prevent late lane changes.
- Enhance traffic officer support by formalising response time targets and extending the range of patrolling to also cover the A48 and A4810 in Newport.

33. We judge these measures could be implemented within a short timescale at a capital cost of around £1-2m. The measures work best in combination and we therefore recommend they be implemented as a package. If taken forward, we recommend the Welsh Government closely monitors the effectiveness of the measures to allow for any necessary refinements to be made.

34. While we do not pretend these measures will resolve congestion entirely, we would expect them to improve the situation, in particular to deliver better journey time reliability in peak periods. The measures should also provide wider benefits as a result of smoother traffic flow, including reduced risk of collisions (with associated reduction in congestion), reduced CO<sub>2</sub> emissions and improved air quality.

## Recommendation 1: Introduce an average speed control

35. Our analysis of traffic flow data shows that late lane changes and variable traffic speeds often lead to breakdown of flow on the M4 around Newport, especially on the approaches to the Brynglas tunnels.

36. Parts of the M4 in Wales already have some form of speed control other than the national speed limit. From around junction 38 and up to junction 43, a 50mph average speed control operates. In South East Wales, there is a variable speed limit (VSL) around junctions 24 and up to 28 – this generally switches between 40mph and 70mph (as shown in figure 2). Within this VSL system, the speed limit is fixed at 50mph around the Brynglas tunnels for air quality reasons.

37. The VSL system has been effective at regularising speeds during the inter-peak period. However, it has had a limited impact on improving traffic flow during peak periods. The locations of the spot cameras can also cause harsh accelerating and braking from some drivers. These changes in speed contribute to a breakdown of traffic flow.

38. Our analysis suggests an average speed control would help improve the regularity of traffic speeds across the problematic stretches of the M4. A fixed speed limit should encourage vehicles to travel at a more consistent speed, making many journeys quicker and more reliable. A single speed limit should also reduce driver confusion and improve safety.<sup>3</sup>

39. We have considered and modelled a range of speed limits from 40mph to 50mph and 60mph. Our analysis demonstrates 50mph to be the optimal speed in terms of journey time reliability and journey speeds, also taking account other important factors such as air quality, emissions and noise.

40. We recommend the average 50mph speed control is put in place around junction 24 (Coldra) and up to junction 28 (Tredegar Park) eastbound and westbound (as shown in figure 3). This is the same extent as the existing VSL system.

41. The impact of an average 50mph speed limit varies by the time of day and direction of travel. The measure should have most benefit in the morning and evening peak periods. Our analysis shows the benefits would be greatest in the evening peak for road users travelling westbound between junctions 24 and 25a, approaching the Brynglas tunnels. By smoothing ('platooning') traffic approaching the tunnels, we should increase the median journey speed and the number of vehicles that can pass through this pinch point.

42. Overall, the purpose of the speed control is to deliver a more reliable and swifter journey on a typical day. However, we cannot guarantee every journey will be quicker. On a very busy day, the average speed control will not eliminate low speeds when traffic is especially heavy or when there is a major incident. In addition, during off-peak periods, when traffic is relatively light, it will mean vehicles will go at a lower speed. However, it is worth noting that the case for a 50mph speed control goes beyond congestion alleviation. There are also good arguments from an emissions and road safety perspective – these apply to all parts of the day.

43. Enforcement should be delivered through regularly-spaced cameras to ensure compliance throughout the control segment. Signage should clearly accompany the cameras to ensure road users are fully aware of them. To keep implementation costs low, some cameras may be sited on existing gantries.<sup>4</sup>

---

<sup>3</sup> National and international best practice examples of this measure shows that installation of permanent average speed camera systems saw reductions in injury collisions, especially those of a higher severity. Reduction of traffic incidents will further improve journey time reliability. [Source: RAC]

<sup>4</sup> We note installation costs are declining due to the falling cost of technology and increased competition in the market.



44. Additional police resource may be required to enforce the average speed limit, in order to ensure a high level of compliance and therefore secure the full benefits of the measure.

45. We appreciate the technical and legal constraints to implementing a variable average speed control means this is not suitable for a fast-track recommendation. However, we recommend the Welsh Government continue to explore this as it is worthy of further consideration.

**Figure 2: Existing speed limits**



**Figure 3: Recommended 50mph average speed control**



## Recommendation 2: Provide additional lane guidance

46. As noted above, late lane changes and variable traffic speeds often lead to breakdown of flow on the M4. The problem is at its worst going westbound where traffic is changing lanes in the long 'lane drop' for the A4042 at junction 25a approaching the tunnels. This is illustrated in figure 4.

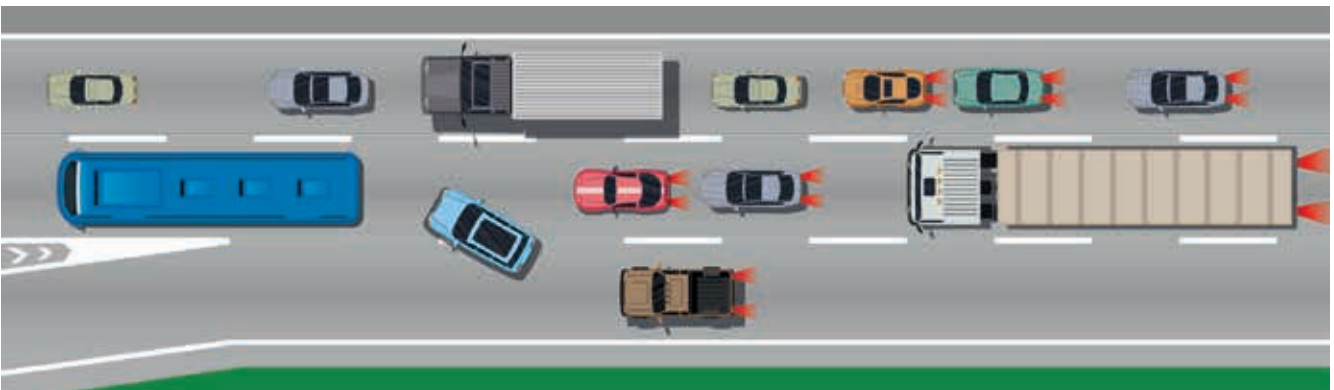
47. The fundamental issue is the fact that the motorway must drop from three lanes to two for the tunnel. To maintain regular traffic flow, this needs to happen in as orderly a fashion as possible.

48. To work towards this, we recommend a set of additional lane guidance and control measures on the westbound approach to the tunnels, namely:

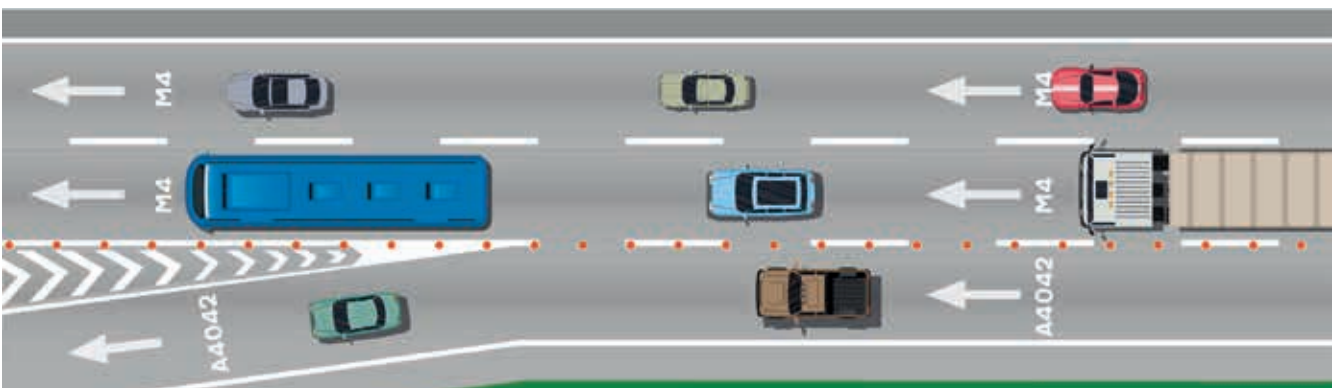
- Lengthened white line lane markings at the J25a slip road, effectively lengthening the slip road by around 300m and moving it further away from the tunnels.
- Collapsible bollards to accompany the above and direct drivers to select the correct lane earlier. This will specifically prevent late lane changes from the slip lane to the main motorway.
- Road numbers to be clearly labelled on the road surface.

49. A diagram of these measures is shown in figure 5. Traffic data and modelling demonstrate this measure, when combined with an average speed control of 50mph, should greatly reduce the 'ripple' effect of late lane changes, significantly improving flow into the Brynglas tunnels during peak periods. This should improve journey time reliability through narrowing the distribution of average speeds. Journey times along the road should therefore be more predictable as a result of the measures.

**Figure 4: 'Ripple' effect of late lane changes**



**Figure 5: Recommended additional lane guidance measures**



## Recommendation 3: Enhance traffic officer support

50. Resolving traffic incidents swiftly and safely is clearly important for maintaining safe traffic flow on a busy stretch of motorway. Traffic officers play a vital role in dealing with incidents. Over the whole of Wales, traffic officers deal with an average of 257 incidents a week. They are particularly important on the M4 in South East Wales, where parts of the M4 lack a hard shoulder. As such, the consequences of a vehicle breakdown can be particularly significant and incidents regularly have knock-on impacts on other road users and local communities.

51. In Summer 2019, the Minister for Economy and Transport announced additional traffic officers would be deployed on the M4 around Newport. Building on this measure, we recommend the Welsh Government reviews and formalises response time targets for traffic officers to reach incidents, including a 10 minute response target for peak periods. This review should ensure that patrols are fully covering the morning and evening peaks when the effects of an incident are worst felt. Progress against response time targets should be monitored and reported to allow for evaluation of performance.

52. To help meet this target, we recommend traffic officer equipment is reviewed to ensure patrol vehicles carry the best available tools for resolving incidents. This particularly applies to moving stranded vehicles onto the hard shoulder. For example, the failure of an electronic handbrake can sometimes mean a car cannot be towed by traditional means. In these circumstances, 'gojacks' trolleys could allow the vehicle to be removed safely.

53. We also recommend there would be benefits in Welsh Government traffic officers also serving the A48 Newport Southern Distributor Road and the A4810 Queensway (also known as the steelworks access road) with associated monitoring facility upgrades. These roads serve as the diversionary route during incidents on the M4 and traffic officer support would be valuable in improving safety, maintaining flow and reducing disruption to local residents.

## Next steps

54. The Commission formed in October 2019 and so this report contains only limited findings and initial recommendations.

55. Our work continues to focus on understanding the problems of congestion and its root causes. We will then move on to setting objectives for interventions and considering a wide range of options. As part of this, we have commenced engagement with a wide spectrum of stakeholders to better understand trips on the M4 and the barriers to making them by other modes.

56. We aim to publish an interim report in Spring 2020 and a final report around the end of 2020.

## Staying in touch

Regular updates on the Commission's work are available at:

Web: [www.gov.wales/south-east-wales-transport-commission](http://www.gov.wales/south-east-wales-transport-commission)

Twitter: @SEWTCommission

We welcome ideas and comments. You can contact us by email or post.

Email: [SEWTransportcommission@gov.wales](mailto:SEWTransportcommission@gov.wales)

Post: South East Wales Transport Commission Secretariat  
Welsh Government Office  
2/C08 Cathays Park  
Cardiff