

Adran yr Economi a'r Seilwaith  
Department for Economy and Infrastructure



**Objection Ref OBJ0247 - Cycling UK**

Llywodraeth Cymru  
Welsh Government

**File Refs      WG/REB/OBJ0247-1- Professor S Cole**

**Response to Objector's Evidence: Professor S Cole - Traffic**

1.	Author	3
2.	Scope and Purpose of this Proof of evidence	4
3.	REBUTTAL – Professor Stuart Cole (Blue route)	5

**1. AUTHOR**

- 1.1 I am Bryan Whittaker. I am a Director of WSP|PB, a multi-disciplinary consultancy. I was previously an Associate Director of Ove Arup and Partners Ltd (Arup). My professional qualifications are set out in my main proof of evidence and are not repeated here.
  
- 1.2 The evidence which I have prepared and provide in this proof of evidence has been prepared and is given in accordance with the guidance of my professional institution and I confirm that the opinions expressed are my true and professional opinions.

## **2. SCOPE AND PURPOSE OF THIS PROOF OF EVIDENCE**

2.1.1. Cycling UK have submitted Statements of Evidence in relation to the draft statutory Orders associated with the Welsh Government's proposals for the M4 Corridor around Newport (the Scheme), which has been received via the Programme Officer.

2.1.2. The evidence of Cycling UK is provided in three proofs of evidence from different witnesses as follows:

- i. Professor Stuart Cole (OBJ0247)
- ii. Dr Steve Melia (OBJ0247)
- iii. Mr Roger Geffen & Mr Hugh Mackay (OBJ0247)

2.1.3. This part of my evidence will respond to the points raised in Cycling UK's evidence from Professor Stuart Cole where it relates to the traffic aspects of the Scheme: the M4 Corridor around Newport (hereafter referred to as the Scheme), comprising a proposed new dual three lane motorway to the south of Newport and complementary measures.

2.1.4. My evidence is presented in the following structure, with a detailed contents provided at the start of the document.

1. Author
2. Scope and Purpose of this Proof of evidence
3. Response to Professor Stuart Cole: Blue Route Alternative Rebuttal

### 3. REBUTTAL – PROFESSOR STUART COLE (BLUE ROUTE)

3.1.1. The Proof of Evidence submitted by Professor Cole contains a number of key points that are detailed below and which I address in turn.

**“The need for a six lane motorway has been questioned by many.”**

3.1.2. Congestion and breakdown in flow currently occurs on a regular basis, primarily in the Westbound direction between J24 (Coldra) and Junction 26 (Malpas) and M4 Eastbound between Junction 28 Tredegar Park to Junction 26 Malpas. The ‘Heat Chart’ shown in the Proof of Evidence (WG 1.2.1) shows the average speed in miles per hour by 15 minute time periods for weekdays between 6am and 10pm in September and October, which are clearly periods outside of the high season. The cells shown in red indicate that the average speed for the 15 minute period was less than 50mph and occurs on a number of sections of the motorway between junctions. Professor Cole agrees with the Welsh Government that additional capacity in some modal form is required. In the Design Year (2037), the Do-Minimum AADT traffic flow exceeds 100,000 between Junctions 23-24, 24-25, 25-25a whilst between Junctions 26-27, 27-28 and 28-29 range between AADT’s of 128,000 and 136,000. As a consequence, between Junctions 25 and J29 (including through Brynglas Tunnels) the Ratio of Flow to Capacity (AADT/CRF) exceeds 1.0.

3.1.3. The inclusion of the proposed new section of motorway to the south of Newport, reduces the traffic flows on the reclassified existing M4 between Junctions 23 and 29. With the proposed scheme in place, traffic flows are reduced on the existing M4 removing congestion whilst the new route would not be expected to experience any congestion by the design year. The new section of motorway would address the current and future congestion problems on the M4 around Newport. The scheme would provide sufficient capacity and resilience to the network by taking up to about half of the traffic and most of the heavy goods vehicles from the existing M4. Through traffic would use the new section of motorway, whilst the reclassified existing M4 would continue

to carry traffic connecting north of Newport, such as to the A4042 and A449 which would have the benefit of reduced congestion as a result of the scheme.

**“The correct decision depends on the credibility of the forecast assumptions and capacity that is required to meet the future year flows.”**

- 3.1.4. All forecasting is of course subject to uncertainty. In producing the Reference Case that is an input in the Demand Modelling process, demand growth in the forecast years for car drivers and passengers was derived from the National Trip End Model (NTEM) dataset through the TEMPRO software that presents the NTEM dataset. The NTEM datasets are long term forecasts, they represent the Department of Transport's estimate of the long term response to demographic and economic trends. The growth factors are not forecasts, they are factors based on predicted demographic changes and they do not take account of changes in the generalised cost of travel changes or in the disutility that individuals attach to different elements of generalised cost. WebTAG Unit M4 states that future year forecasts should be based on NTEM growth in demand, thereby allowing transport models to be developed on a fully consistent basis. The Reference Case demand growth.
- 3.1.5. Transport Statistics Great Britain shows that between 1985 and 1990, traffic in Britain grew by 33%, greatly exceeding forecasts. Between 2007 and 2012, traffic in Britain fell by around 3.5%, falling short of the forecasts. In both cases, the differences can be attributed to be those related to economics – the credit boom in the first instance and the credit crunch in the second instance. These periods can be seen to be exceptions to the general case in which traffic grows steadily, paralleling long-term growth in the economy.

- 3.1.6. Reference Case demand growth has been derived from NTEM 7.2 replacing NTEM V6.2 following a systematic review of the key drivers of road demands. It was concluded following the review that those factors customarily highlighted as being key drivers of road demand – incomes, costs and population – have been important drivers of recent trends in traffic, but there are other factors that need to be considered and reflected in the NTEM growth factors. These other factors include such issues as the increasing concentrations of people living in urban areas, increased costs such as company car taxation and insurance, capacity constraints and technological developments which allow for homeworking and online shopping.
- 3.1.7. Whilst there is little direct evidence on the impact that certain issues, such as online shopping, may be having on travel decisions, it is known that most of the recent fall in per car mileage has arisen through a decline in the number of trips people are making. The National Travel Survey (NTS) data has shown that the average number of trips has been falling and that there has been a general downward trend in trip rates. The two most common journey purposes (shopping and commuting) exhibit statistically downward trends with reductions of 6% and 10% respectively between 2003 and 2010. The trends in this data are not uniform and vary according to trip purpose and segmentation (e.g. gender, area and household type).
- 3.1.8. For example, the personal and employers' business purposes are stable while the holiday trip rate is increasing, and that the trips that are reducing tend to be shorter trips. However, the recent decline is also partly due to economic conditions, and as these are forecast to improve in the future, the Department for Transport take the view that there is reason to believe the decline will not continue at its current rate in the long term and this view is reflected in the latest in the latest NTEM central growth forecast.

3.1.9. The latest NTEM central growth scenario therefore is based on the latest trip rate data collected in the trip rate review and assumes a declining trend in trip rates between its base of 2011 and 2016 and then constant trip rates thereafter.

**“Car use has plateaued due to the recent economic downturn road congestion, rail service improvements, income, smarter choices, demographics and travel lifestyle changes.”**

3.1.10. Traffic growth has occurred on all sections of the M4 on a yearly basis since 2011. There is therefore no indication in the count data that traffic growth has stopped or flattened out, which would be the case should the peak car philosophy be correct. According to provisional figures published by the DfT, road traffic in Britain hit a record high in 2016. The estimate of 320.5 billion vehicle miles is 1.2% higher than 2015 and 2% higher than the pre-recession peak in the year ending 2007. Car traffic increased by 0.7% to a record 249.5 billion vehicle miles, this being 1.3 billion miles more than the pre-recession peak in the year ending September 2007. Traffic levels on motorways and rural ‘A’ roads increased to new record levels, rising by 2.1% and 2.5% respectively.

3.1.11. To the extent that that there is a philosophy behind ‘peak car’, it is generally attributed to social change rather than economic factors. The resurgence of traffic growth on the M4 as the economy recovers from the global recession that commenced in 2008 demonstrates that such a philosophy understates the importance of economic factors. It should also be noted that the ‘peak car’ hypothesis is that ‘per capita car use is close to its maximum level and may stabilise or turn down. As this hypothesis relates to per capita car use growth in population will result in an increase in the absolute number of cars and car miles driven, even if the use of cars per person does stabilise. Second, it ignores spatial and demographic differences in the growth in car use.

3.1.12. A decline in car use has been observed only in very dense urban areas such as central London and in particular amongst young men.

**“Congestion is restricted to peak flows on weekdays and around the time of major leisure events. The existence of a tunnel section, the Brynglas tunnels, does not of itself justify the provision of additional capacity.”**

3.1.13. The ‘Heat Chart’ referred to in 1 above show that on an average day, the speed in miles per hour drops below 50mph in time periods outside of the peak hours.

**“The South Wales Metro / Electrification of the mainline will reduce traffic and car demand in SE Wales. The traffic analysis excludes the Metro.”**

3.1.14. It is incorrect to say that the traffic analysis excludes the Metro. The ‘Updated Public Transport Overview’ (Document 2.4.19) sets out the public transport schemes that have been included in the M4CaN Transport Model. In summary, the public transport schemes included in the model comprise of Great Western Route Modernisation + Metro Phase 1 related to stations and facilities + Metro Phase 2 comprising of the Valley Lines Modernisation (the final specification will be established through the award of the Wales and Borders Franchise, but for the purpose of the M4CaN model, it is represented as a light rail network to the north of Cardiff Central with heavy rail services retained on the City Line, Vale of Glamorgan, Maesteg, Ebbw Vale and Penarth Lines + Metro Phase 3 including improvements to the Welsh Marches Line but excluding new stations + Great Western Main Line Relief Services which incorporate proposed solutions to line speed and the provision of new stations to enable greater use to be made of these routes in the future.

3.1.15. Outside of the transport model, an alternative approach has been developed which assumes further and enhanced rail elements of a South Wales Metro and a strategic Park and Ride site at Llanwern, together with Newport Bus Rapid Transit in order to assess the potential effect on traffic flows on the existing M4 Corridor.

3.1.16. The combined effect of all the public transport measures result in a mode transfer which represents a significant increase in public transport patronage and is also recognised that the South Wales Metro will impact a wide range of movements in the region, many of which will be north-south rather than east-west. However, the results show that the combined effect of the public transport measures is to reduce M4 traffic by a maximum of 6% in the PM Peak Hour which does not resolve the problems on the M4 and is consistent with the Welsh Governments position that the M4 proposal and the Metro schemes should be viewed as complementary.

**“The A4810 and SAR is already capable of providing relief capacity for the M4 between J23/ 24 and J28.”**

3.1.17. It is agreed that the A4180 and SDR do offer some level of resilience during normal operating conditions. However, following the impact of an incident or a prolonged period of congestion on the M4 the resilience in the network is severely limited. The M4 CaN model has been used to estimate the impacts of a closure between Junctions 28 and 24 in an eastbound direction. The impacts of the closure are shown in the 'Appendices to Proof of Evidence – Traffic' for both the wider model area and the Newport area. The Figures indicate that the closure leads to queuing as demand exceeds capacity on the eastbound off slip at Junction 28, queuing at Junction 24 resulting from the volumes of eastbound traffic wishing to re-join the M4, queuing eastbound at the traffic signals on the A48 SDR and queuing eastbound on the A4810 approaching Junction 23.

3.1.18. The inability of the SDR and A4810 to provide the necessary resilience causes significant diversion to the A465 Heads of the Valleys roads to occur as an alternative route for longer-distance traffic. Some of the longer distance demand traffic seeks to avoid all of these delays by additionally rerouting to the A472 Newbridge to Pontypool road or the coast road (Lighthouse Road) between Cardiff and Newport.

**“The Blue Route will attract traffic to/from both Severn crossings and the A449/M50 routes into Wales.”**

3.1.19. The Blue Route does not attract traffic to/from both the Severn Crossings and the A449/M50 routes into Wales

**“The Blue Route option increase east-west road capacity and reduce M4 congestion.”**

3.1.20. The Blue Route involves works to junctions along roads joining the SDR between Junction 28 and 24, and along the SDR and A4810 between Junctions 28 and J23A. To develop the Blue Route for appraisal purposes, a combination of at-grade and grade separations have been considered to facilitate improve capacity and resilience, with free flowing through movements wherever practicable, taking into account the physical constraints. The A48 SDR and the adjoining section of the A4810 comprise urban dual 7.3m carriageways. The section of A4810 between the TATA main access and the M4 Junction 23A is currently single carriageway and would be upgraded to the same urban dual carriageway standard, in order to facilitate additional capacity for traffic transferring from the motorway at peak times.

- 3.1.21. With the Blue Route in place, the two-way AADT traffic flows would reduce on the existing M4 between Junctions 27 and 28 by about 7%, 4% and 2% respectively in 2022, 2037 and 2051. In the AM Peak Hour, the two-way traffic flows would reduce by about 7%, 3% and 0% respectively in 2022, 2037 and 2051. At Brynglas Tunnel, the two-way AADT traffic flows reduce by 8%, 4% and 3% respectively in 2022, 2037 and 2051. This contrasts with the forecasts produced by the proposed motorway, which would reduce traffic on the existing M4 by 30 - 50%. In the AM Peak Hour, the two-way traffic flows would reduce by 3% in 2022 and 0% in 2037 and 2051.
- 3.1.22. Between Junction 23A and 24, the two-way traffic flows reduce by 8%, 3% and 1% respectively in 2022, 2037 and 2051. In the AM Peak Hour, the two way traffic flows would reduce by 4% in 2022, however traffic flows increase between Junctions 23A and 24 in 2037 by 3% and 6%. This arises as a result of traffic growth in the later years when Queensway Meadow approaches capacity resulting in some trips that previous accessed the A4180 component of the Blue Route switching to the existing M4.
- 3.1.23. Traffic forecasts for the Blue Route scenario indicate that, in 2037, around 86,000 vehicles per day (AADT) will use Brynglas Tunnels compared to around 89,000 vehicles per day (AADT) for the Do-Minimum. Traffic volumes on the A48 Usk River Crossing, however would increase from 45,000 vehicles per day (AADT) to 69,000 vehicles per day (AADT). These results suggest that the main beneficiaries of the Blue Route scenario will be localised traffic movements, rather than traffic using the M4 motorway.

**“Initial traffic modelling showed that travel time on the network would be reduced, though there would be delays during construction.”**

3.1.24. Information on journey times through the network have been extracted from the Do-Minimum and Blue Route. The journey times between Junction 30 of the M4 and the Toll Plaza at the Second Crossing have been analysed on two routes;

- a) via the existing M4 through the Brynglas Tunnels; and
- b) via the A48 SDR/A4810 with and without the Blue Route improvements.

The results of the journey time analysis are shown below:

Direction	Time	Route	2022		2037		2051	
			Central Growth		Central Growth		Central Growth	
			Do Min	Do Som	Do Min	Do Som	Do Min	Do Som
<b>East</b>	AM	Via existing M4	19:30	18:48	24:23	22:30	28:00	26:22
	IP	Via existing M4	17:30	17:07	19:34	18:49	22:10	20:27
	PM	Via existing M4	18:04	17:38	20:51	19:52	23:02	21:30
	AM	Via Blue Route	29:37	23:30	33:23	28:03	36:44	31:53
	IP	Via Blue Route	28:07	22:00	23:19	23:36	30:53	24:44
	PM	Via Blue Route	29:04	22:42	18:08	25:42	36:27	29:19
<b>West</b>	AM	Via existing M4	19:56	18:27	23:19	21:15	26:08	23:51
	IP	Via existing M4	17:12	16:53	18:08	17:36	18:53	18:14
	PM	Via existing M4	19:33	18:49	24:04	22:49	27:22	26:52
	AM	Via Blue Route	27:49	23:15	32:22	26:27	36:23	28:22
	IP	Via Blue Route	25:38	21:00	26:44	22:26	27:27	22:21
	PM	Via Blue Route	27:44	23:29	35:47	28:00	39:17	31:12

3.1.25. The results show that journey times along the A48/A4180 route reducing by 13-22% as a result of the Blue Route improvements. Along the existing M4, the improvement in journey time in 2022 is similar to that predicted as a result of the new motorway south of Newport, but by 2037 the journey time reduction that would result from the Blue Route improvement is much lower than that achieved by the new motorway proposal. In addition, while the journey times via the Blue Route is significantly lower compared to the Do-Minimum route along the SDR and A4810, these times would continue to be much longer than the time via the existing M4. This then explains the much lower transfer of traffic predicted from the M4 to the Blue Route, and the almost complete absence of through traffic predicted to use the Blue Route.

**“The present traffic flows on the A48 southern distributor route around Newport route are lower than were expected.”**

3.1.26. It is unclear whether this statement refers to the current A48 flows or whether it means in the future with the A48 being part of the Blue Route.

**“By providing relief to congestion on the M4 at peak weekday and evening times, the Blue Route increases the predictability of journey times”**

3.1.27. The reduction in congestion on the M4 at peak weekday and evening times is such that it will have very little effect on improving the predictability of journey times on the M4.

**“The travel experience by car will be improved by reducing the frustration resulting from slow moving stop/start traffic.”**

3.1.28. It is likely that the level of slow moving stop/start traffic conditions will not materially change as a result of the Blue Route.

**“The added capacity from the Blue Route will be adequate for the future traffic flows.”**

3.1.29. The Blue Route does not provide sufficient added capacity for future traffic flows

**“The Black Route is more than a necessary solution - 20% need, but capacity for 40% of existing traffic.”**

3.1.30. It is not clear how the figures quoted have been derived.

**“Cities with high incomes and growing population show the greatest reduction in car use. There have also been reductions in medium sized towns and where high density new urban developments have occurred. This is the case in Cardiff and Newport.”**

3.1.31. The source of this information is unclear and how it can be applied to Cardiff and Newport.

**“Between 2007 and 2011 Wales saw reductions in all modes of transport except cycling.”**

3.1.32. The years quoted coincide with the onset of the recession period and through the recession period. It is not to be unexpected through this particular period that travel by all motorised modes would be reduced whilst cycling and walking would increase.

**“Limitations of the Blue Route as a four-lane dual carriageway (of ‘expressway’ standard) - It is accepted that the speed limit may only be 50mph. Even so it would be attractive to motorway traffic when there were severe operational problems. If the motorway was moving at 0-20mph and the SDR even at a 50mph speed limit a route change is likely.”**

3.1.33. Whilst the speed limit may be 50mph the demand on the Blue Route would be such that it is unlikely that speeds of 50mph would be achievable in early years and certainly not in later years.

3.1.34. The speed of the motorway is 70mph, but quite correctly pointed out when congestion and operational problems arise, the speed limit cannot be achieved.

**“The creation of three intersections on the Black Route does not achieve separation of through and local traffic.”**

3.1.35. The primary purpose of the proposed motorway is to cater for through strategic traffic such that the existing M4 provides better access for local traffic. The proposed motorway facilitates local access to South Newport and the development sites along the route

**“The Blue Route provides increased resilience during problem periods (e.g. morning and evening peaks and major events) and provide increase network resilience.”**

3.1.36. The Blue Route by adding capacity does provide resilience but to a far lesser extent than the proposed motorway. However, congestion will still arise on the existing motorway and capacity problems will occur on the Blue Route.