A27 Arundel Bypass
Traffic Modelling Summary

Introduction

This note describes the purpose and application of traffic modelling within the context of the A27 scheme at Arundel. More detailed documents covering this topic are available on our website: **www.highways.gov.uk/a27arundel** and copies will be available at the exhibitions.

Why do we carry out traffic modelling?

The A27 Arundel Bypass scheme may have both positive and negative impacts beyond the immediate area of the scheme itself, as people may make different travel and route choices. Information from the traffic model is used to assess the value for money, environmental impact and highway design of each option. Traffic modelling is used to provide forecast traffic data in terms of vehicle volumes, speeds and highway capacity.

To measure these considerations, we have developed a computer-based traffic model using specialist transport modelling software. The model uses data collected in 2015 to represent vehicle trips made in the West Sussex Coastal area between Chichester and Brighton, including areas north of the South Downs such as Steyning and Storrington. The routes taken by vehicles are estimated by the model based on the lowest cost in terms of time or distance, and re-routeing of vehicles in response to congestion.

The traffic model forecasts how busy our roads would be if we made any fundamental changes to the road network. It forecasts how many motorists would use the new route and how many would continue to use alternative routes (given that some motorists are currently likely to be avoiding particular routes due to congestion but would be attracted to the new route once completed). This is assessed against 'doing nothing', to quantify the changes in traffic patterns as a result of the scheme.

What factors are taken into account in traffic modelling?

The A27 Arundel Bypass scheme cannot be looked at in isolation. The model includes other highway improvements that may be implemented across the local road network which are associated with development. It also considers the impacts that developments such as new homes, schools, employment areas and other local amenities may have on future traffic growth. Lastly, we take into account demographic changes such as population levels and travel choice trends, including car ownership levels, which may change in the future.

Within the context of the A27 Arundel Bypass, all of the above in combination will have an impact on traffic volumes in the future. The purpose of the traffic model is to measure and assess these predicted impacts, including how well the proposed options will cope with the traffic volumes

as forecast by the traffic model. We also use the model to assess the economic benefits of each option in terms of journey time, vehicle operating costs and accident savings, and environmental changes in terms of air quality and noise.

The model we have used to assess the Arundel Bypass options takes account of other committed highway schemes, such as those planned or under construction by West Sussex County Council. However the A27 Chichester Improvements scheme (which has been cancelled by the Government) and the planned A27 Worthing and Lancing improvements scheme are not included in the traffic model because each scheme has to show that it has benefits on its own. Work will be carried out in the next stage of development to assess how the scheme will operate in combination with other planned A27 improvements.

What are the components of a traffic model?

The traffic model extent covers an area larger than the proposed scheme. This is to capture long-distance journeys with a choice of routes, and to ensure impacts that reach well beyond the scheme are captured. A traffic model has four component parts:

- Links - which represent the roads in the network, including dual carriageways, rural roads, town centre roads and so on.
- Nodes - which represent the junctions in the network, including roundabouts, traffic signal controlled junctions and 'give way' junctions.
- Zones - which are geographical areas that identify where trips begin (origin) or end (destination) such as residential areas, employment areas, educational sites (schools, colleges, etc.), hospitals, shopping areas, etc. Zones are often aligned with Census or administrative boundaries.
- The final component is the traffic itself. Traffic is represented as beginning and ending in the zones. The traffic model will route the traffic from the origins to the destinations using the route of least cost – in terms of time and fuel consumption – through the network (via the links and nodes) taking into account the other traffic in the model. In this way, the traffic model can measure congestion by calculating the delays at the nodes (junctions) and also the volumes of vehicles along the links (roads). The model also calculates the number of trips re-routing as a result of congestion.

Will building a new road just generate more traffic?

When a new road is built, new traffic may divert onto it, people may make new trips and may travel longer distances which is known as 'induced traffic'. We have undertaken low growth and high growth assessments which show that the A27 Arundel improvement scheme gives benefits even with lower or higher level of traffic on the network. This issue will be explored in greater detail in the next stage of scheme development.

How accurate is traffic modelling?

The traffic model has to be representative of current traffic volumes and journey times through the road network. The model developed for the A27 at Arundel is representative of traffic conditions in 2015, which is when the observed data was collected.

Department for Transport (DfT) guidance states that observed origin-destination data is valid for 6 years, so the age of the data is up-to-date. A traffic model's accuracy is measured against stringent criteria set by the DfT. When measured against those criteria, our traffic model showed that 92% of road link flows met the validation criteria in the AM peak and PM peak periods, and 100% in the inter-peak, against a target for acceptability of 85%. When comparing the modelled journey times against observed journey times, all 3 time periods 100% of all journey time routes met the DfT criteria, against an acceptability target of 85%.

How do we forecast future traffic growth?

The scheme will take a number of years to design and construct, so we must base our modelling on traffic growth forecasts for the future. Traffic growth happens as a result of:

- demographic changes, such as population growth and car ownership levels
- land use changes, such as new homes and employment sites or other new developments
- economic activity, such as fuel prices and household income levels
- infrastructure changes, such as new or improved highway schemes or junction improvements.

The DfT provides advice on these topics including statistics for anticipated annual traffic growth. These growth values are adjusted to take account of local planning information using growth factors by Local Planning Authorities from local plans, provided by the Government's National Trip End Model. Heavy goods vehicle growth is applied using national growth factors from the National Transport Model. The traffic growth, which is normally a percentage increase, is then applied to the 2015 Base Year traffic model to produce future year traffic models. These future year traffic models can then be used to predict the impacts and benefits of the proposed scheme.

All Highways England Road Investment Strategy (RIS) schemes have an opening year and a horizon year. The principal inputs to our design are the forecast traffic flows at the new road opening date (2023) and a 2041 horizon year.