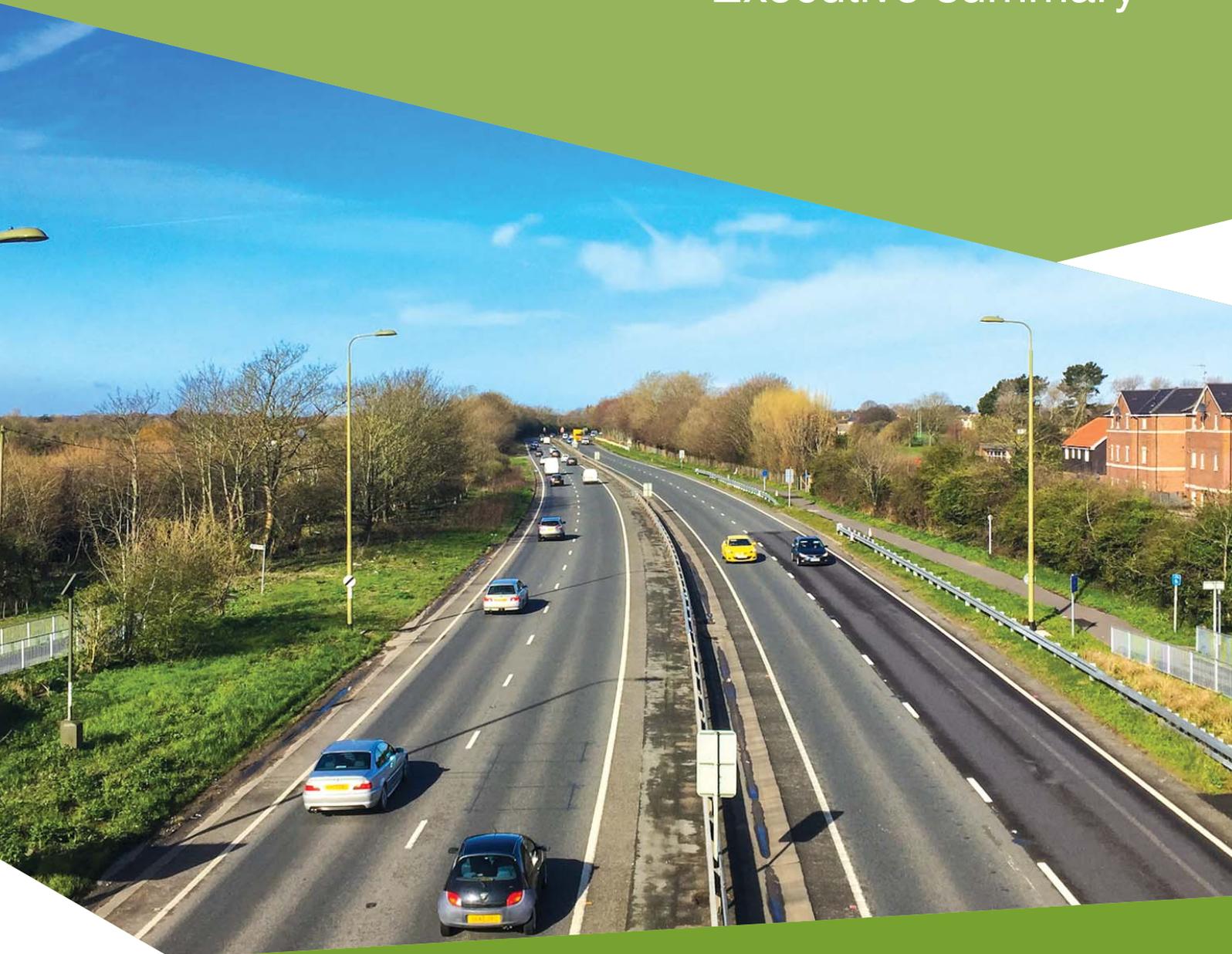


# A27 Chichester Bypass Scheme Assessment Report

Executive summary



March 2017

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## Scheme Assessment Report

343538-90-060-RE-002

March 2017

This document has been prepared on behalf of Highways England by Mott MacDonald Sweco JV for Highways England's Project Support Framework 2011-2016

# Executive summary

## Report purpose

This report describes the development of the A27 Chichester Bypass Improvement scheme under the current PCF (Project Control Framework) through Stage 2; collating the current context, future conditions, design options considered, traffic, economics and costs, as well as the environmental assessment and a summary of the Public Consultation.

It also provides a summary of the Technical Appraisal Report (report no. 343538-90-060-RE-002-P02) and the *Public Consultation Report* (report no. 343538-90-120-LF-003).

## PCF context

Highways England's Project Control Framework sets out the methodology for delivery of a major highways scheme. The process is in 8 stages, of which this scheme is currently in Stage 2, as follows:

- **Stage 0** (strategy, shaping and prioritisation)
  - problem definition, scheme requirements and strategic business case.
- **Stage 1** (option identification)
  - option identification and sifting out of options that are likely to perform less well compared to others.
- **Stage 2** (option selection)
  - detailed option assessment and selection of the preferred option, including detailed public consultation on the options.
- **Stage 3** (preliminary design)
  - scheme development including design of the preferred option in sufficient detail to produce draft orders and preparation of the Environmental Assessment.

- **Stage 4** (statutory procedures and powers)
  - gaining authority to construct the scheme through the normal statutory processes as laid down in legislation.
- **Stage 5** (construction preparation)
  - procurement of the construction contractor and detailed design of the scheme.
- **Stage 6** (construction)
  - construction of the scheme.
- **Stage 7** (handover and close-out)
  - project close out.

Proposals for improvements had been developed over a number of years but had most recently been stopped as part of the Comprehensive Spending Review in 2010. The current scheme to provide improvements to the A27 Chichester Bypass was announced as part of the 2013 Spending Round (SR13) where the improvements were described as '*upgrading 6 junctions on the existing 3.5m bypass*' and confirmed in the Road Investment Strategy in December 2014 where the improvements were described as '*upgrading the four junctions on the Chichester bypass*'.

## Background

The A27 Chichester Bypass is a 5.5km section of trunk road passing to the south of Chichester and is part of the only strategic route along the south coast of England. This section has 6 at-grade junctions along its length, with roundabouts at Fishbourne, Stockbridge, Whyke, Bognor Road and Portfield, and with a signal controlled cross-roads at Oving. Congestion occurs daily during peak time along this stretch of road causing delays to the travelling public and constraining the local economy. In addition to the existing traffic levels and predicted future increase, the Chichester District Council (CDC) Local Plan 2014

to 2029 outlines the creation of a large number of new homes and expanding the economy, likely to put further pressure on an already congested section of the strategic road network.

### Need for intervention

The congestion around Chichester acts as an economic deterrent for the region and a constraint to travel for traffic between Portsmouth, Southampton (and the ports there), as well as other locations to the west and locations to the east such as Worthing, Brighton, Hastings and Eastbourne.

The 6 junctions on the bypass are where the radial routes between the south coast (Manhood Peninsula and Bognor Regis) and the city centre cross the bypass. Junction spacing varies from 0.5km to 1.1km and is identified as a key limitation for the options proposed. The average annual daily traffic on the links between junctions is in the order of 35-45,000 vehicles, below the standard value for link capacity, which indicates that the current delays and queues are caused by insufficient junction capacities.

Although intended to act as a strategic route, in reality the long-distance (through) traffic on Chichester bypass competes for access at the junctions with the local traffic, either wanting to cross the bypass or join it for short trips. These local trips, defined as having both their origin and destination within Chichester district, are assessed to be approximately 12% out of all journeys using the bypass. A further 42% of trips on the bypass are for journeys with either an origin or destination inside the Chichester district boundary. Traffic data indicates that approximately 46% of traffic using the bypass, or parts of it, is estimated to be through traffic with both the origin and destination outside of the Chichester district.

It is therefore a combination of the close proximity of the junctions and the conflict between the competing north-south and east-west traffic flows

that result in significant congestion and extensive queuing at most of the junctions at peak times, disrupting the mainline flow of the road and compromising its operation as a strategic route.

Other problems associated with congestion on the bypass include rat-running through residential areas, commercial areas and on minor roads, causing congestion through local villages.

The Chichester Local Plan (2014) identifies the need for around 6900 new homes in the city and the immediate area to be delivered by 2029. This large number of additional homes is likely to further exacerbate the problem, with the A27 being the closest strategic route to these developments but already with insufficient junction capacity.

It is therefore evident that due to congestion the bypass acts as a constraint to development in and around Chichester.

### Planning factors

The A27 and more specifically Chichester bypass, features on a series of current or draft planning documents and policies at local, regional and national level.

At local level, Chichester bypass is located within the Chichester district, also bordering closely with the Arun district to the east and the South Downs National Park to the north. As such, it is integrated in the Local Plans of these 3 authorities in policies for transport links and strategic infrastructure as well as access, communication, environment and wider aspects related to the economy such as employment, mobility and services. The bypass is also key to the policies for homes and the Strategic Development Areas identified, particularly in the Chichester Local Plan. Both are considered constrained by traffic congestion linked to junctions on the bypass.

At regional level, the A27 is essential to policies for planning factors such as Coastal West Sussex and Greater Brighton Local Strategic Statement and the West Sussex Transport Plan that manage spatial planning issues with impact on more than one local planning area. These recognise as a priority the improvements needed to road infrastructure facilitating the east-west movement along the A27 corridor through the region, in order to improve reliability and safety and increase the competitiveness of local businesses and attract investment.

At national level, Highways England Delivery Plan 2015-2020 includes Chichester bypass alongside other schemes on the A27 corridor, where the Chichester bypass is part of a package of 26 schemes announced in June 2013 and anticipated to start construction by end 2019/20. The National Environmental Policies, National Planning Policy Framework and the National Policy Statement for National Networks also set policies that have a bearing on the A27 as part of the Strategic Road Network (SRN), mainly related to environment, ecology, landscape, social and community aspects and associated requirements for sustainable development.

## Project objectives

The project objectives were derived in cooperation with West Sussex County Council (WSCC) and Chichester District Council (CDC) and are set out in the Client Scheme Requirements.

### The key objectives are as follows:

- Reduce congestion on the Chichester bypass.
- Improve road safety, during construction, operation and maintenance for all, as defined in DMRB Volume 0 Section 2 Part 3 GD 04/12:
  - Road workers

- Road users
- Other parties
- Reduce adverse environmental impacts and eliminate where possible:
  - Address existing Air Quality Management Areas (AQMAs) and ensure no further AQMAs are created as a result of the selected option
  - Address existing noise priority areas and ensure no further noise priority areas as a result of the selected option
- Improve journey time reliability on the Strategic Road Network (SRN).
- Improve capacity and support the growth of regional economies:
  - Facilitate timely delivery of the scheme to enable provision of housing demand in line with the Chichester Local Plan
  - Improve regional connectivity
  - Improve accessibility to areas with tourist activity
- Improve the safety and security of the route to all road users, including vulnerable groups and non-motorised traffic.

## Stage 1 options

During Stage 1 (option identification) over 20 options were identified, including mainly road-based solutions as well as a number of alternative solutions involving a tunnel, a collector distributor road, or a combination of public transport measures. The alternative solutions were discounted prior to the sifting process as they were deemed unviable due to either the substantial cost, buildability issues or lack of alignment to the project objectives. As such, 17 road-based options were considered further in Stage 1 and taken through the sifting process.

The sifting process was carried out in line with the Department for Transport's (DfT) Transport Appraisal Process guidance, and resulted in 6 options identified as potential candidates for meeting the project objectives and were taken forward to Stage 2. Details of the sifting process can be found in the Options Assessment Report (343538-09-101-RE-003). The 6 sifted options taken forward from Stage 1 were as follows:

- Options 1, 2 and 3 – online improvements
- Options 4 and 5 – offline new bypass routes to the north of Chichester
- Option 6 – hybrid option consisting of online improvements and an offline bypass to the south east of Chichester

Early in Stage 2 a value management workshop was held to identify elements of the 6 options that could be improved further. With concerns raised over the proximity of the Stockbridge Link Road element of Option 2 to Chichester Harbour Conservancy, an alternative option was put forward to investigate the use of a link road running parallel to the existing A27. This alternative option was named Option 2A.

## Interim review

In February 2016, an interim review of all the Stage 2 options was undertaken reflecting on the detailed information gathered throughout this Stage. From this, it was decided to discontinue the new bypass route options namely Option 4, Option 5 and the hybrid Option 6 as they were found to exceed the upper threshold of road investment strategy's budget range (£100 million to £250 million). Option 4 and 5 were also found to impact on the South Downs National Park (SDNP). The SDNP Authority raised serious reservations in this regard. At the same time, Option 2A was excluded as it was found to be inferior in performance to the original Option 2.

Two sub-options (Option 1A and Option 3A) were also introduced as part of this review to examine alternatives that could offer value at the lower end of the budget range and can contribute to meeting the project objectives.

## Stage 2 options

The remaining 5 options, namely Option 1, Option 1A, Option 2, Option 3 and Option 3A, were then subject to further assessment in all areas to prepare for the public consultation and subsequent selection of a preferred option.

All 5 options were presented at public consultation between July and September 2016.

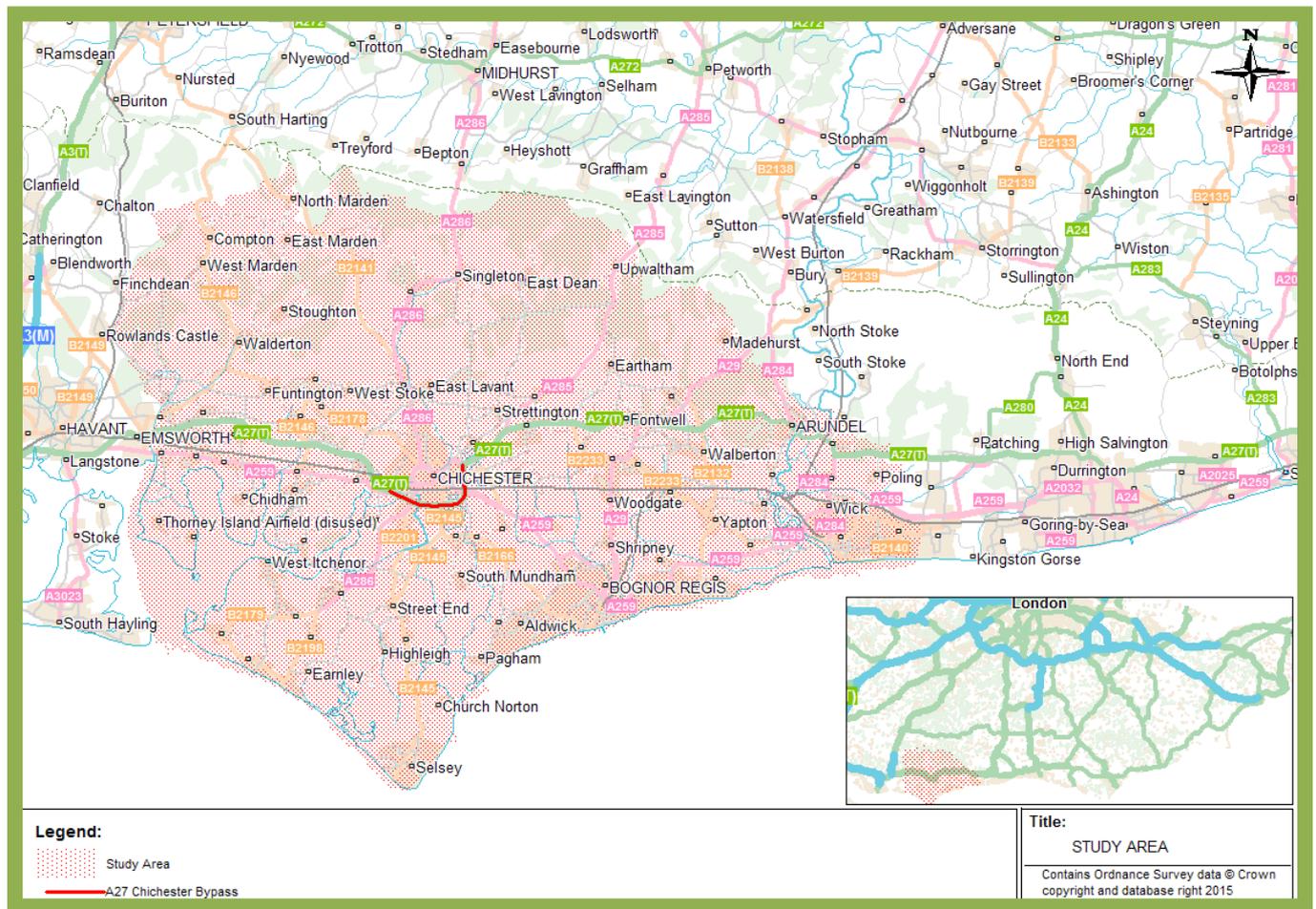
## Traffic assessment

The study area for traffic model, which was defined and agreed with West Sussex County Council and Chichester District Council, was developed to cover the area directly affected by the options being tested, with the potential to assess some peripheral impacts on strategic routes in the vicinity.

The study area comprised the south of Chichester district (to the northern edge of the South Downs) and a portion of Arun district west of Arundel including the River Arun as shown in

**Figure 0.1.**

Figure 0.1: study area



The network model was calibrated and the flows and journey times compared to independent surveyed flows, to validate the model. The results produced fulfilled the Design Manual for Roads and Bridges (DMRB) and the Department for Transport (DfT) WebTAG model validation criteria. Further details are provided in the Local Model Validation Report (LMVR).

A comparison of the link flows across the Chichester network was undertaken between the Do Minimum<sup>1</sup> scenario and each option using the 2035 Design Year<sup>2</sup> AM/PM Peak flows. In general, it can be seen that the increase in capacity on

the A27 in each option increases traffic flows on the strategic route compared to the Do Minimum scenario. For each option there is a reduction in traffic travelling through Chichester City, to the North via East Lavant, to the east via Drayton Lane and via Whyke Road to the south that had been previously used as diversion (rat-running) routes to avoid the delays on the A27. There are also specific differences between the options, with restricted movements or the removal of junctions creating re-assigned/diverted traffic and increased volumes on adjacent roads. An outline summary of each option is provided on the next page.

<sup>1</sup> Do Minimum: defined as the continuation of the existing road conditions from the 2014 Base Year traffic model to 2035, without improvements, apart from those already committed in adopted planning documents – refer to Traffic Forecast Report.

<sup>2</sup> Design Year: defined as based on the opening year for the scheme, assumed to be 2020 plus 15 years as required in the Design Manual for Roads and Bridges Vol 12.2.1.

This comparison shows that, compared with the 2035 Do Minimum scenario, **Option 1** has long distance savings (between Havant and Fontwell) but showed some minor delays in local journeys to the south, (due to the banned right turns at the Stockbridge and Whyke junctions) and minor improvements elsewhere.

**Option 1A** shows similar journey time savings as Option 1, but generally the overall savings are smaller and there are delays in some long distance journeys and journeys from the south, due to the increased congestion at the Stockbridge and Whyke roundabouts which are unchanged.

**Option 2** has the largest long distance improvements in journey times and generally the largest improvements in local journey times. There are some small increases in journey times to/from the Birdham area south of Chichester due to the increase in traffic now approaching the new Stockbridge Link road.

**Option 3** shows minor improvements in journey times between most areas. However, a few local movements show small increases, due to the removal of right turns at Stockbridge and Whyke junctions. The improvements are generally smaller than the increases seen in Do Minimum compared to the base year, showing that Option 3 does not represent in 2035 an improvement on the 2014 situation.

**Option 3A** shows some improvement in journey times compared to Option 3 particularly on some longer distance journeys, for example between Oving and Fishbourne, Oving and Havant and Bognor Regis and Fishbourne. The savings from Fishbourne are created by the improvement to Terminus Road, which reduces congestion at Fishbourne roundabout. Local movements show increases in journey times.

## Economic assessment

An economic assessment has been undertaken over a 60-year period in accordance with the requirement of DfT's Transport Analysis Guidance (TAG) Unit A1.1 to facilitate the quantification and monetisation of scheme costs and benefits. The full economic assessment is shown in the Economic Assessment Report. A summary of the Economic Assessment Results can be seen in **Table 0.1** below. All values are discounted to 2010.

**Table 0.1: Headline of economic assessment results – core scenario (£ million)**

Scheme options	Present value of benefits	Present value of costs	Present value benefits
Option 1	£349	£137	2.55
Option 1A	£279	£112	2.49
Option 2	£551	£207	2.66
Option 3	£185	£45	4.13
Option 3A	£308	£136	2.27

**Note:** All monetary values are discounted to 2010 and in 2010 market price unit of account.

Overall, Option 2 has the highest Present Value Benefits (PVB) of around £551 million, but also the highest Present Value Costs (PVC) of around £207 million, providing it with a Benefit Cost Ratio (BCR) of 2.66, second only to Option 3. Option 3 has the highest BCR of 4.13, aided by the PVC only being £44.8 million, but subsequently the PVB are only £185 million, a third of those delivered by Option 2. All of the options presented at public consultation have a BCR above 2.

It should be noted that the accident assessment shows a decrease in accidents overall for Options 1A, 2 and 3, whilst there is a slight increase of accidents for Option 1 and Option 3A over a 60-year assessment period.

## Operational assessment

To understand the operational aspects of the scheme a microsimulation model was produced for each option. This model was supplementary to the strategic SATURN model that was used to assess the wider implications and produce economic assessment and instead identifies potential operational issues with individual design elements and their interaction with surrounding elements.

Broadly the modelling identified the following operational issues in 2035 with the proposed design options:

- **Option 1, 1A and 2** – the new roundabout on Cathedral Way between Fishbourne Road East and Terminus Road shows long queues in the am peak as vehicles leaving Fishbourne Road East fail to compete with other traffic on the roundabout. This roundabout off the bypass can adopt the design as in Option 3A to address this aspect.
- **Option 3 and 3A** – Fishbourne roundabout in a through-about configuration causes queuing on the A259 (Fishbourne Road West) due to the large number of arms and short distances between stop lines making the signal timing design sub-optimal. This may need further enlargement or grade-separation.
- **Option 1 and 3A** – Stockbridge signal controlled cross-roads shows queues on the northbound approach. Provision of additional lanes on the approach may be required subject to mitigating space constrained.
- **Option 1A** – Stockbridge and Whyke roundabouts are retained as per original arrangements which also retains some of the capacity associated issues. There is potential entry lane(s) widening or signalisation to further mitigate but this may only offer limited improvement.
- **Option 1** – Bognor Road junction begins to experience queuing on the northbound off-slip road, which could potentially be eliminated with widening or signalisation of the slip road, roundabout arm.
- **Option 3** – Bognor Road roundabout reaches capacity limit in 2035 and causes significant queuing in all directions, tailing back through other junctions such as Whyke and Oving. The junction size becomes inadequate for the volume of traffic it carries and number of arms and may need to be further enlarged or grade-separated.

- **Option 3A** – Bognor Road junction experiences queuing on the new roundabout between Vinnetrow Road and the A259. This may be improved with signalisation of that roundabout or additional entry lanes. Alternatively repositioning of new Vinnetrow Road roundabout further east could reduce or eliminate queuing.
- **Option 1, 1A, 2 and 3A** – Portfield junction experiences queuing on the westbound approach. Widening the roundabout and a more efficient configuration could help alleviate this problem, subject to modification to Shopwhyke Lake development access proposals.
- **Option 2** – roundabouts on the proposed link road have not yet been optimised and so show queuing during peak periods. These may need wider entries or additional entry lanes.

This information should be considered in relation to a selected preferred option and the issues identified addressed in the next stage of design.

## Maintenance assessment

We consulted the maintenance contractors about maintenance issues on the A27 in the areas to ensure that these were taken into consideration in the scheme option proposals. Key to improving the maintainability of the route is addressing the concerns raised and ensuring that features in the design do not create any further hazards for the maintenance operatives and road users.

In summary, the maintenance implications of all the options are largely similar. Because

the options are essentially upgrades along the existing bypass, the improvements that can be made to the maintainability of the road are constrained to this. However, larger improvements can be made in Option 2 due to the new offline link road section – Stockbridge Link Road.

In all options the maintainability of the A27 can initially be improved through better access, providing maintenance laybys at suitable locations throughout the scheme, setting up cross-over points for contraflow operation to aid in temporary traffic management, or installing permanent variable message signs that reduce the risk to operatives in setting up any traffic management. These can also be used to warn road users of incidents ahead, any seasonal changes in traffic due to touristic activities or local events.

## Environmental assessment

The environmental assessment covered a wide range of topics and is presented in detail in the environmental study report. The key headings assessed are air quality, cultural heritage, landscape, nature conservation, geology and soils, materials, noise and vibration, effects on all travellers, communities and private assets, road drainage and water environment, combined effects and cumulative effects.

Once operational, effects would, on balance, be neutral for Options 1, 1A and 3, as beneficial effects associated with some of the proposed options combine with any adverse effects and lead to an overall cumulative neutral effect. Options 2 and 3A would be anticipated to have an, on balance, cumulative non-significant adverse effect during operation, due to the more adverse effects anticipated for landscape and ecology.

## Public consultation

Sixteen public consultation events were held during July to September 2016 with a total of 5,388 visitors attending. Following these, 4,869 responses were received either via the questionnaire directly at events or via email/letter. This rate of engagement demonstrates the high level of local interest in the scheme. From the feedback obtained, 90% of respondents agreed that congestion is a problem on the A27 Chichester Bypass and it is also cited as the issue that most concerns respondents.

When asked to express their preference in terms of the options, 47% of respondents chose not to select one of the 5 options, and instead selected 'No Option'. Option 2 with 31% was the next largest response. Less than 6% of respondents chose any of the 4 other options. Option 3A was the least chosen option with 2%. 85% of the 'No Option' responses and 56% of the overall responses commented that a new bypass should be implemented, commonly referring to the two options to the north of Chichester that had previously been discounted.

Key stakeholders, businesses and other organisations were typically in favour of Option 2, while local authorities (West Sussex County Council and Chichester District Council) and Parish Councils favoured "No Option", with Option 2 the next favoured response. All the local authorities and Parish Councils that favoured "No Option" requested the discounted northern bypass be reinstated.

## Conclusion and the recommended option

All the 5 options considered give a 'high' or 'very high' return in economic terms as defined by DfT 'value for money' terminology. They vary in level and magnitude of intervention as well as impacts and benefits, therefore contributing to meeting the project objectives in various degrees and requiring different mitigations to the effects introduced.

Taking into consideration the factors presented throughout this report and the comparative analysis between the options in economics, traffic, environment, social and safety terms it is evident that Option 2 performs better when compared against all the competing options. This option also contributes more than its competitors to meeting the project objectives as agreed between Highways England and the local authorities and it has also garnered a significant level of support in the public consultation. Therefore, Option 2 is the best performing option, securing more support than the others during the public consultation. The performance of this option is assessed and all options are compared in more detail in the full scheme assessment report.



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