

A27 Arundel Bypass
Western tie-in: local roads
study

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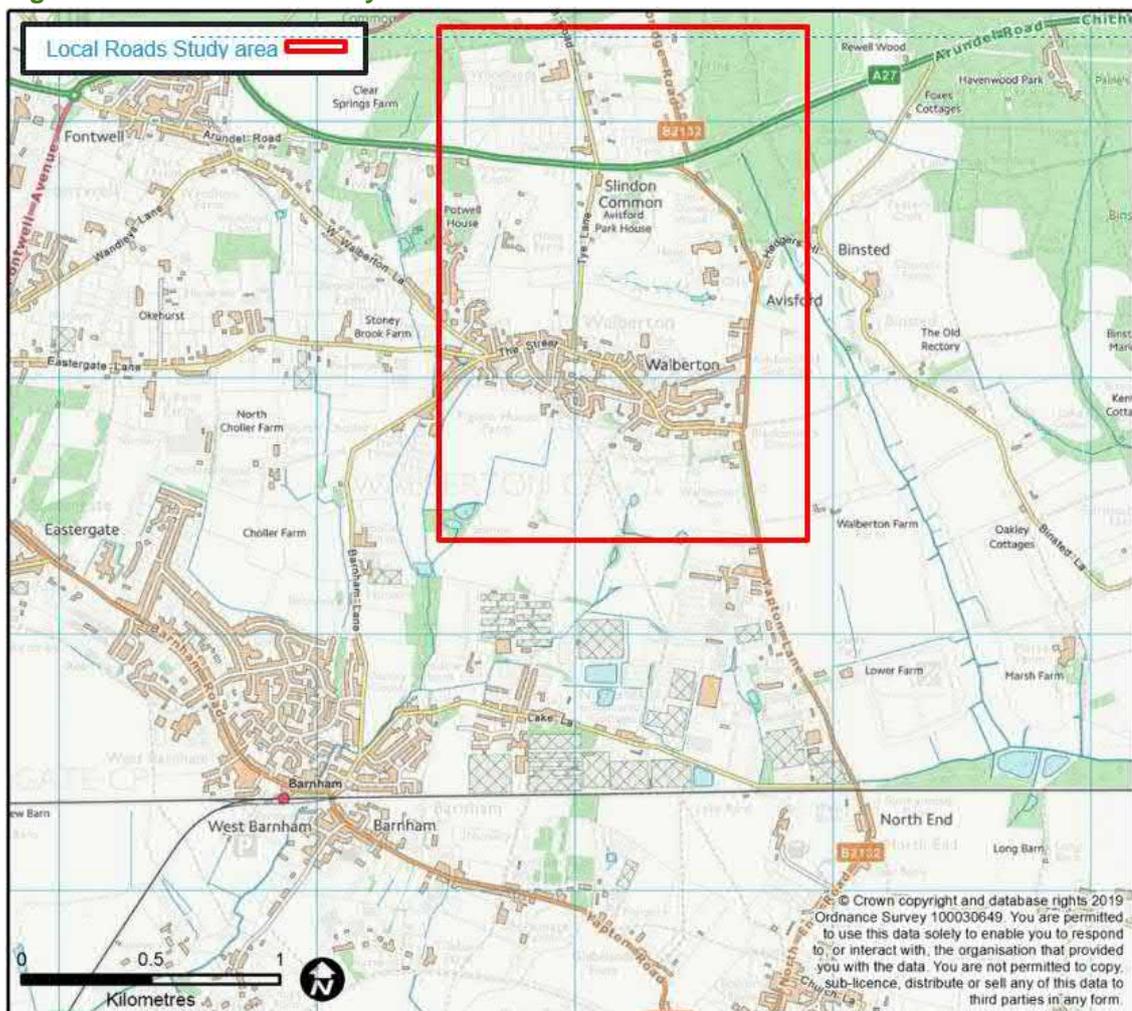
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1 Introduction

1.1 Purpose of report

1.1.1 Highways England is developing the A27 Arundel Bypass scheme through PCF Stage 2 Further Consultation. All six A27 Arundel Bypass scheme options include a junction at the western end of the route with the existing A27 to maintain connectivity with the local road network. For assessment purposes, this junction has been described as the ‘western tie-in’. Apart from providing connectivity with local roads, the western tie-in is the location at which the existing A27 merges with the new bypass. This report is referred to as the ‘Western tie-in: local roads study’ and covers the area shown in Figure 1-1.

Figure 1-1: Local roads study area



1.1.2 The purpose of this report is to provide a description of the current and future transport conditions, as well as to discuss the traffic impacts of each of the Scheme

options, on the highway network within the vicinity of the A27 Arundel Bypass western tie-in.

- 1.1.3 This study is supplementary to the Interim Scheme Assessment Report (SAR¹) and the Combined Modelling and Appraisal Report (ComMA²). The report is informed by the traffic survey data which was collected in early July 2019, specifically on the local road network within the study area. This data is additional to the traffic surveys undertaken for analysis in PCF Stage 1 and PCF Stage 2, in March and June 2015. The report has been produced to further articulate the impacts associated with the western tie-in junction designs, which were produced as part of the PCF Stage 2 Further Consultation scheme development.

1.2 Project background

- 1.2.1 The A27 is a strategically important corridor on the south coast, which is used by both long distance strategic traffic and local traffic alike. The Arundel section is one of a number of bottlenecks which causes delay and variable journey times due to the single carriageway alignments and the number of junctions.
- 1.2.2 The Road Investment Strategy (RIS) announcement in December 2014 described the Scheme as 'a new dual carriageway Bypass, linking together the two existing dual carriageway sections of road'.
- 1.2.3 In May 2018 a preferred route was announced for the proposed A27 Arundel Bypass, known as Option 5AV3, following public consultation in autumn 2017. Following the announcement, further scheme development work was undertaken which included looking at alternatives for minimising impacts on protected ancient woodland and biodiversity at the western end of the route.
- 1.2.4 In October 2018, Highways England announced the decision to undertake a further consultation to give the public and stakeholders another opportunity to comment on the options proposed for the Scheme.

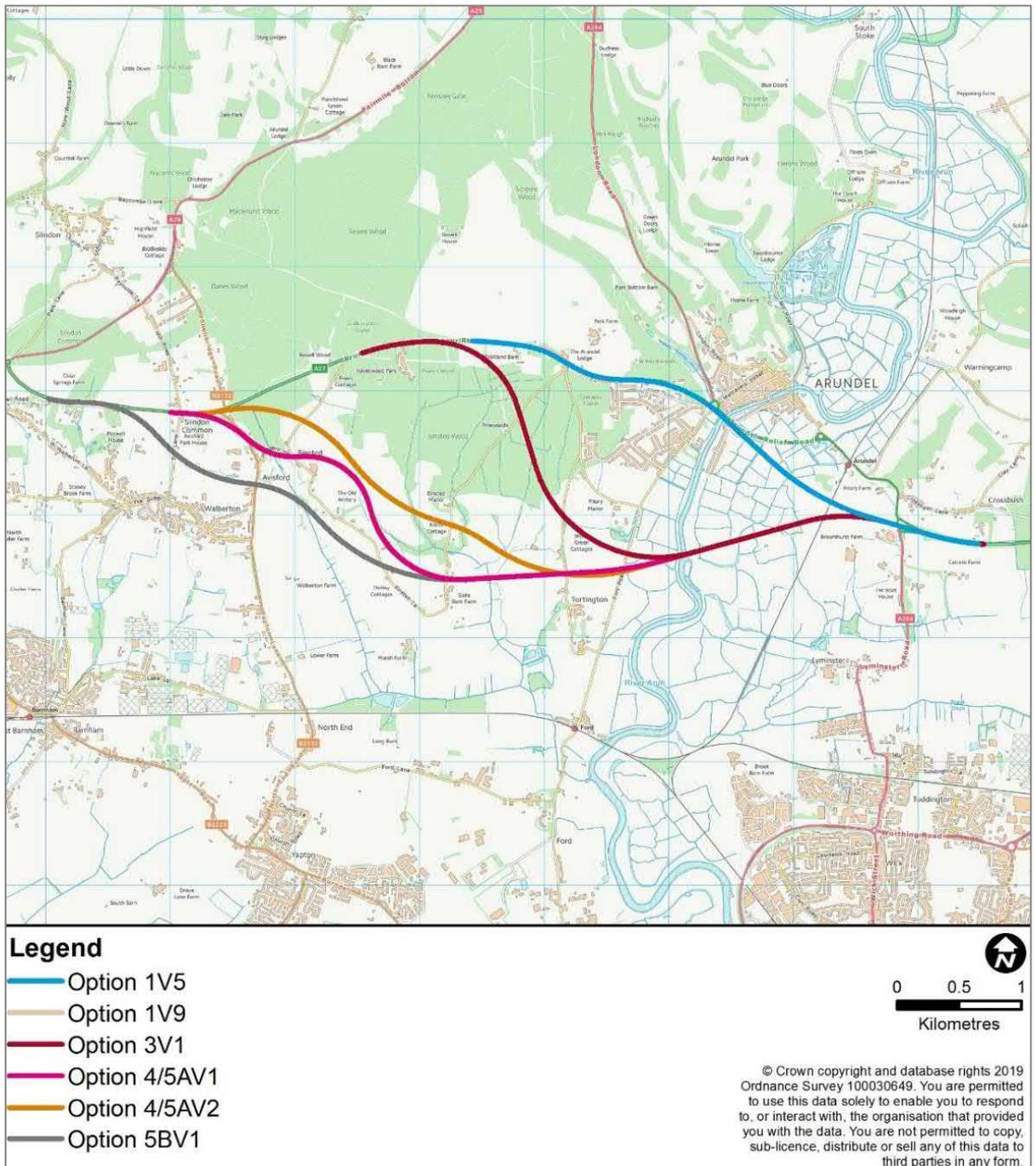
1.3 A27 Arundel Bypass scheme options

- 1.3.1 Figure 1-2 illustrates the options that have been assessed for the A27 Arundel Bypass Scheme during PCF Stage 2 Further Consultation. For clarity, Option 1V9 (Beige) follows the same alignment as Option 1V5 and cannot be seen on Figure 1-2.

¹ A27 Arundel Bypass, PCF Stage 2 Further Consultation Scheme Assessment Report (August 2019).

² HE551523-WSP-GEN-SWI-RP-TR-00017-P03 – A27 Arundel Bypass, PCF Stage 2 Further Consultation Combined Modelling and Appraisal Report (August 2019)

Figure 1-2: A27 Arundel Bypass scheme options



Option 1V5 and Option 1V9

- 1.3.2 Option 1 consists of online dualling with a short offline section between Ford Road Roundabout and a fully grade separated Crossbush junction, bypassing Arundel station. Option 1V5 includes a grade-separated junction at the current Ford Road roundabout with no connection between the local and strategic road network. Option 1V9 proposes an expanded signalised through-about form of junction at Ford Road Roundabout, with speed restriction to the west.

Option 3V1

- 1.3.3 This option would be a new offline dual carriageway south of Arundel tying into the existing A27 west of Arundel with a partial movements grade separated junction, and with a fully grade separated all movements Crossbush junction to the east.

Option 4/5AV1, Option 4/5AV2 and Option 5BV1

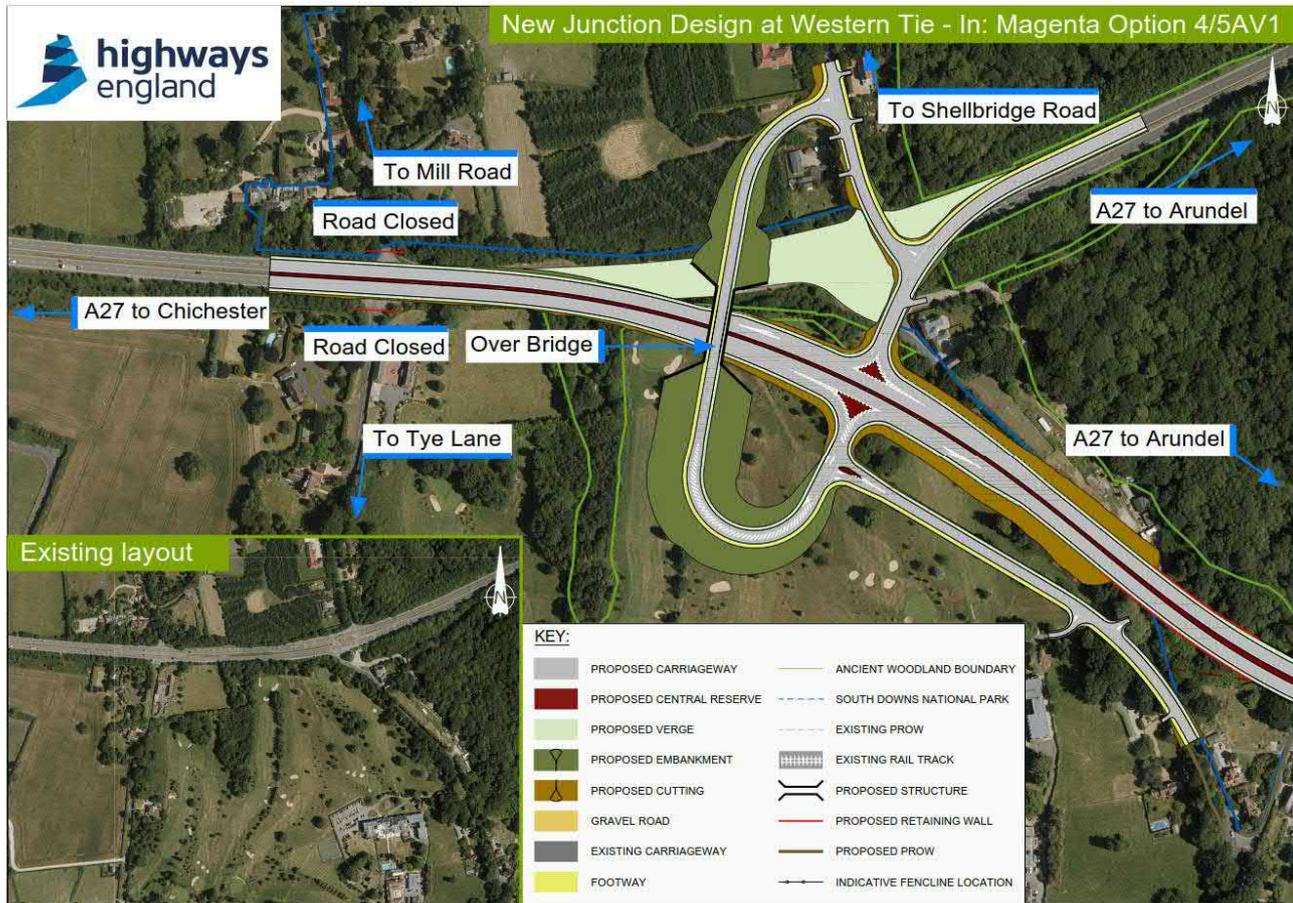
- 1.3.4 These options would provide a new offline dual carriageway passing to the south of Arundel. The alignments would provide a new connection between a fully grade separated all-movements Crossbush junction to the east, and a new grade separated form of junction to tie into the existing A27 to the west, to the north of Walberton.
- 1.3.5 There is a proposed new footbridge for pedestrians near Yapton Lane to cross the A27 dual carriageway in Option 5BV1
- 1.3.6 A more detailed description of all the options is presented in chapter 8 of the SAR.

1.4 Western tie-in junction

- 1.4.1 The Option 1 scheme options (1V5 and 1V9), Option 3V1 and Option 4/5AV2 would result in limited change to the western tie-in location considered within the study. The key difference would be that the central reservation at Yapton Lane / Shellbridge Road would prevent the right turning movements into Shellbridge Road and Yapton Lane. Drawings of these layouts are presented within Appendix A-1.
- 1.4.2 Options 4/5AV1 and 5BV1 include a new western tie-in junction which ties the new bypass back into the existing A27 route. The western tie-in junction for these options comprises revised junction arrangements with the existing A27 road connections with Tye Lane, Yapton Lane, Mill Road and Shellbridge Road. For ease of reference, illustrations of the western tie-in junction arrangement for these options are presented in Figure 1-3 and Figure 1-4. Larger versions of the layout are presented at Appendix A.

Option 4/5AV1

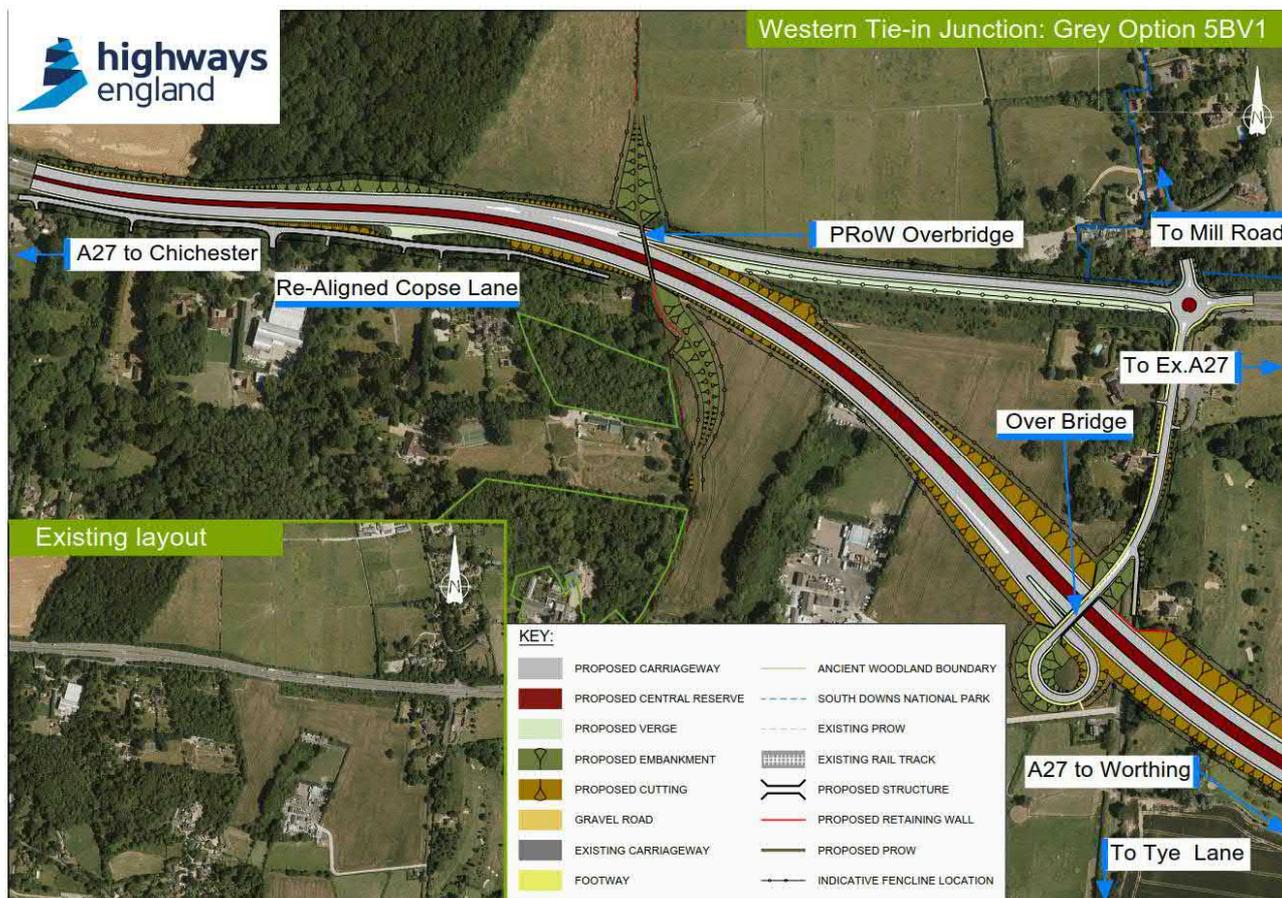
Figure 1-3: Option 4/5AV1 western tie-in junction



1.4.3 For Option 4/5AV1, a new compact grade separated junction would be provided connecting a realigned Yapton Lane, Shellbridge Road and the existing A27 to the proposed A27. This would allow for all movements onto and off the proposed A27.

Option 5BV1

Figure 1-4: Option 5BV1 western tie-in junction



- 1.4.4 Figure 1-4 illustrates that, for Option 5BV1, a new grade separated junction is provided, connecting Tye Lane north of the route and the existing A27 to the proposed A27. This would allow for movements from the existing A27 westbound to the proposed A27 westbound and from the proposed A27 eastbound to the existing A27 eastbound only. Tye Lane would be closed south of the proposed route to prevent the road becoming a cut-through to the proposed A27. The existing A27 between Copse Lane and Tye Lane would be retained to provide the eastbound off slip.

2 Current conditions

2.1 Introduction

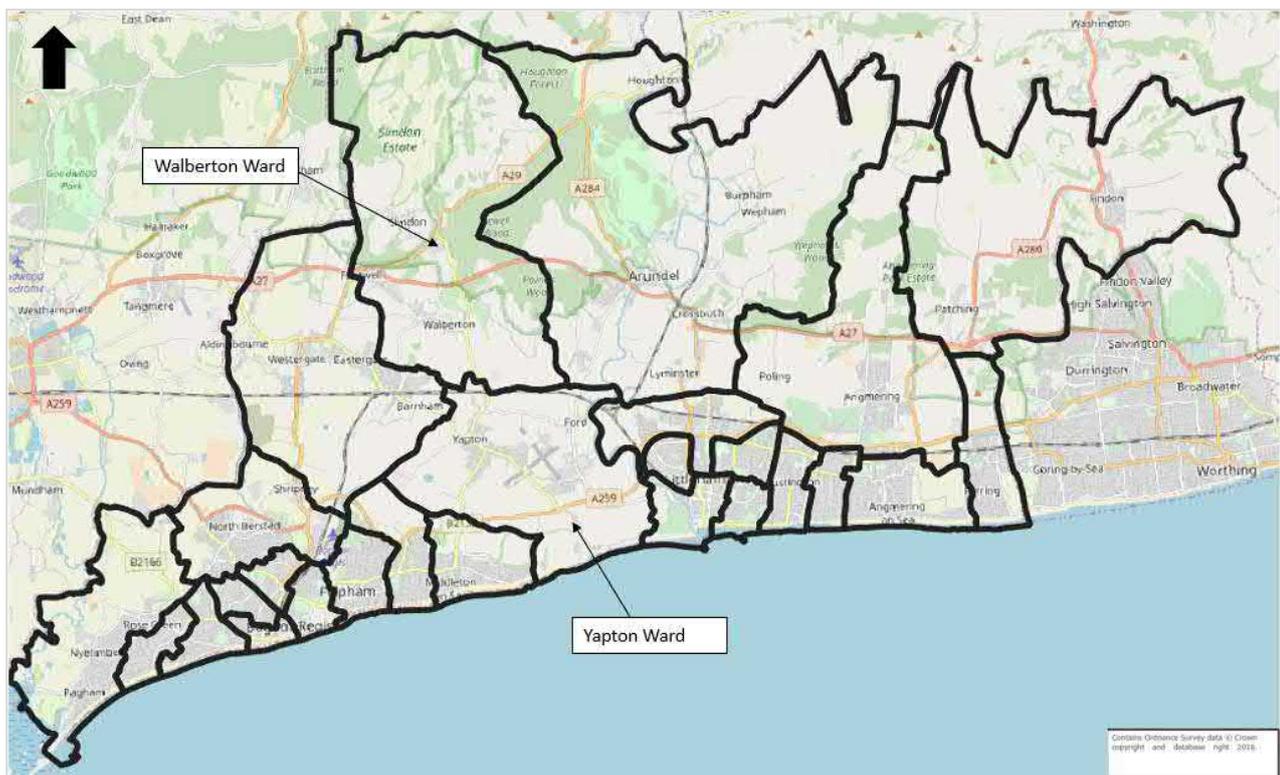
2.1.1 This section summarises the existing population, land use and transport infrastructure supply and demand within the study area. Travel conditions within the study area, including traffic volume, journey patterns, congestion and delay are described using a variety of data sources. Provision for public transport and non-motorised users is described with data related to travel volumes where available.

2.2 Existing land use and demographics

2.2.1 Arun district is on the south coast of England within the county of West Sussex. The town of Arundel lies within the Arun District, inland from the coast at the foot of the South Downs National Park (SDNP). Other major urban areas within Arun District include Littlehampton and Bognor Regis.

2.2.2 Arun District has a population of 149,518, as per the 2011 census data. The wards within Arun District are presented in Figure 2-1. The western tie-in is located within the Walberton ward with Yapton Lane extending to the south into the Yapton ward. These wards contribute 5.9% of the overall Arun population.

Figure 2-1: Arun district wards



- 2.2.3 The age group with the largest population in the Yapton and Walberton wards is 45 – 64, at almost a third (30.2%), and above the average for the Arun District overall, at 27%. The over-65 age group makes up 20.5% of the population of the two wards³.
- 2.2.4 Overall, 90% of households in Yapton and Walberton have access to at least one vehicle, which is 10% higher than the Arun District average. The main travel mode for employed residents aged (16-74) in Yapton and Walberton wards is by car or van as a passenger or driver, contributing to 71.9% of overall work travel. Walking is the second highest mode of travel at 6.8%, and cycling 3.9%⁴. This is lower than the West Sussex average, with 10% of the population walking to work.
- 2.2.5 The majority of travel to work movements are those which are travelling out of the district, at over 27,000 (75%). This is compared to nearly 9,000 (25%) which travel into the district to work⁵. The major inflows into Arun District are from the east, with inflows from Worthing accounting for 35% of the total journey to work movements and Adur accounting for 6%. From the west, 25% of the in-flows originate in Chichester, and 7% are from Horsham⁶.
- 2.2.6 The highest commuter traffic movements from Arundel are for destinations to the west, with 39% of outflows associated with Chichester and 7% to Horsham. To the east, 21% of outflows travel to Worthing while 3% travel to Adur⁶. This illustrates a tidal movement of journey to work trips, which is highest in a westbound direction in the morning peak, into and out of Arun, with the reverse pattern of movement in an eastbound direction during the evening peak.
- 2.2.7 The main sources of employment within the Yapton and Walberton area are south of Yapton Lane in the North End / Barnham Road area, where there are multiple office spaces and industrial park warehouses. Fontwell Park is located just to the west of Walberton, south of the A27. Further from the Yapton area, the main areas for employment are in the surrounding villages of Bognor Regis, Littlehampton and further beyond⁷.

³ 2011 <https://www.nomisweb.co.uk/census/2011/ks102ew>

⁴ 2001 <https://www.nomisweb.co.uk/datasets/uv037>

⁵ <https://www.nomisweb.co.uk/census/2011/qs701ew>

⁶ ONS, Census WU03UK – Location of usual residence and place of work by method of travel to work. <https://www.nomisweb.co.uk/census/2011/WU03UK/chart/1132462325>

⁷ <https://www.arun.gov.uk/download.cfm?doc=docm93jjm4n4471.pdf&ver=4143>

2.3 Road network

- 2.3.1 The A27 is the only east-west trunk road south of the M25. It links many of the towns and cities along the south coast, including Portsmouth, Havant, Chichester, Arundel, Worthing, Adur, Brighton and Hove, Lewes, and Eastbourne, serving a combined population of around 1.2 million people as well as a large number of businesses. The A27 also provides access to the wider Strategic Road Network (SRN⁸) and is an important corridor for both long distance travel and local traffic.
- 2.3.2 Locally to Arundel, there are two east-west routes used as alternatives to particular sections of the A27. To the north, there is the A29 / B2139 / A283, which passes through the SDNP and the villages of Storrington and Steyning. To the south, is the B2233 / A259 which runs through Eastergate, Barnham, Yapton and Climping, north of Littlehampton and then on to Goring-by-Sea and Worthing. Access to the A259 / B2233 from Yapton is achieved through unrestricted turns from single carriageway roads which have speed limits of around 30-40mph.
- 2.3.3 There are numerous traffic calming measures, including speed humps, narrow roads and reduced speed limits in the residential areas to the south of the A27 in Yapton and Walberton.

2.4 Bus network

- 2.4.1 Yapton and Walberton have bus services connecting them to Arundel, Littlehampton, Chichester and Worthing. Arun district is served by two main bus providers, Stagecoach South and Compass Travel. There are nine bus routes which connect Yapton and Walberton to the surrounding areas, these routes are displayed in Figure 2-2 and Table 2-1.

⁸ The Strategic Road Network is made up of motorways and trunk roads

Figure 2-2: Bus routes within Arundel

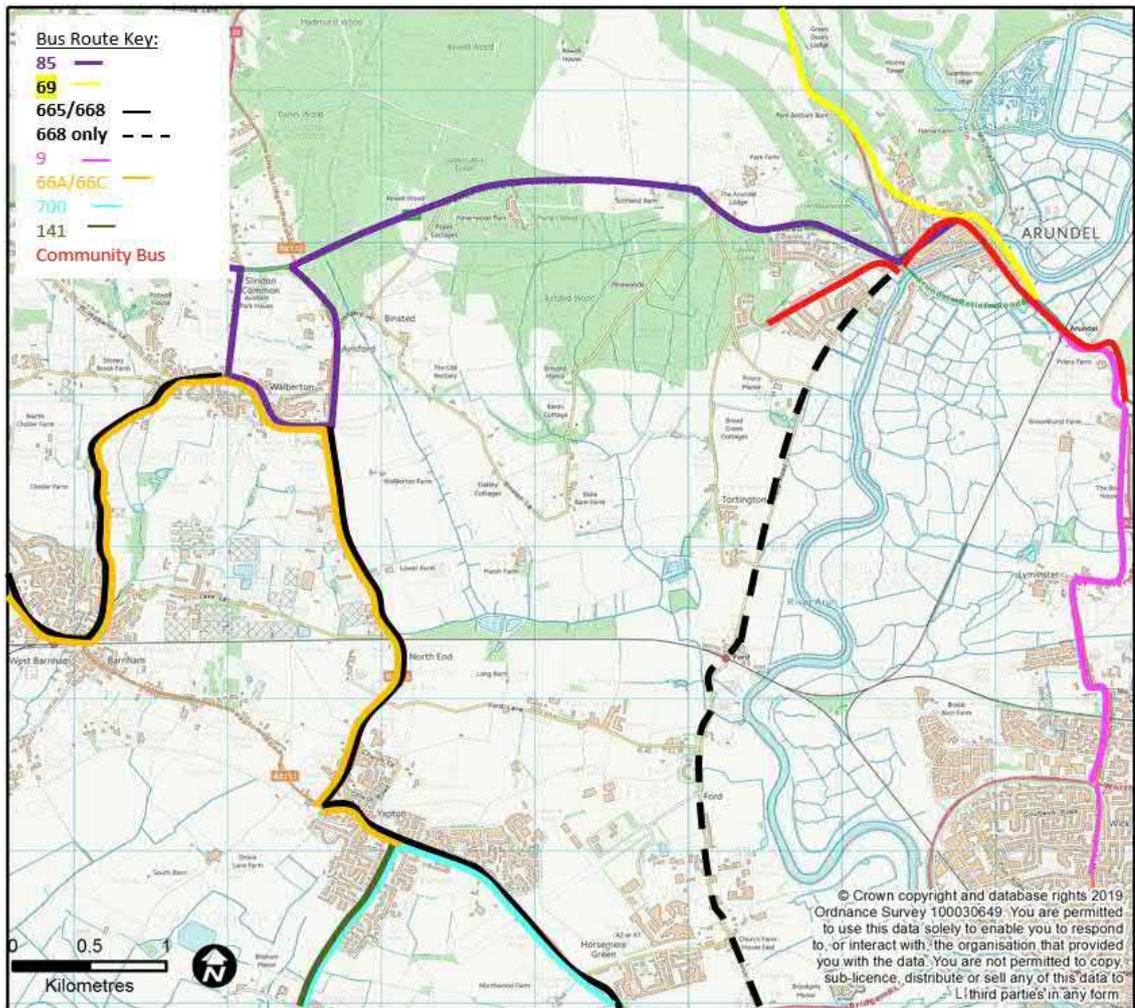


Table 2-1: Bus services serving Yapton/ Walberton⁹

| Route number | Direction | Weekday frequency | Saturday frequency | Weekday first service | Weekday last service |
|--|---|---|---|-----------------------|----------------------|
| 66A | Eastergate- Woodgate - Yapton | 4/ day | 3/day | 07:24 | 17:56 |
| 66C | Bognor Regis – Yapton – Eastergate | 3/day | 3/day | 08:15 | 16:35 |
| 85 (Only Monday – Friday) | Arundel- Walberton - Chichester | 3 / day | - | 06:55 | 15:55 |
| 85A (Only Monday – Friday) | Arundel- Walberton - Chichester | 2/ day | - | 09:55 | 13:55 |
| 141 | Yapton – Felpham - Bognor | 1/day | - | 06:42 | - |
| 668 (Schooldays only, excluding Fridays) | Ormiston Six Villages Academy - Yapton - Arundel – Tangmere | 1 / day | - | 15:50 | - |
| 665 (Schooldays only) | Littlehampton – Walberton - Westegate | 1/day | - | 07:10 | - |
| 700 | Felpham- Yapton- Bognor Regis- Chichester | 3/ hour between 05:29 – 19:04. 1/ hour 19:34 – 22:34 | 3/ hour between 06:07 – 19:04. 1/ hour 19:34 – 22:34 | 05:29 | 22:34 |

2.5 Walking and cycle network

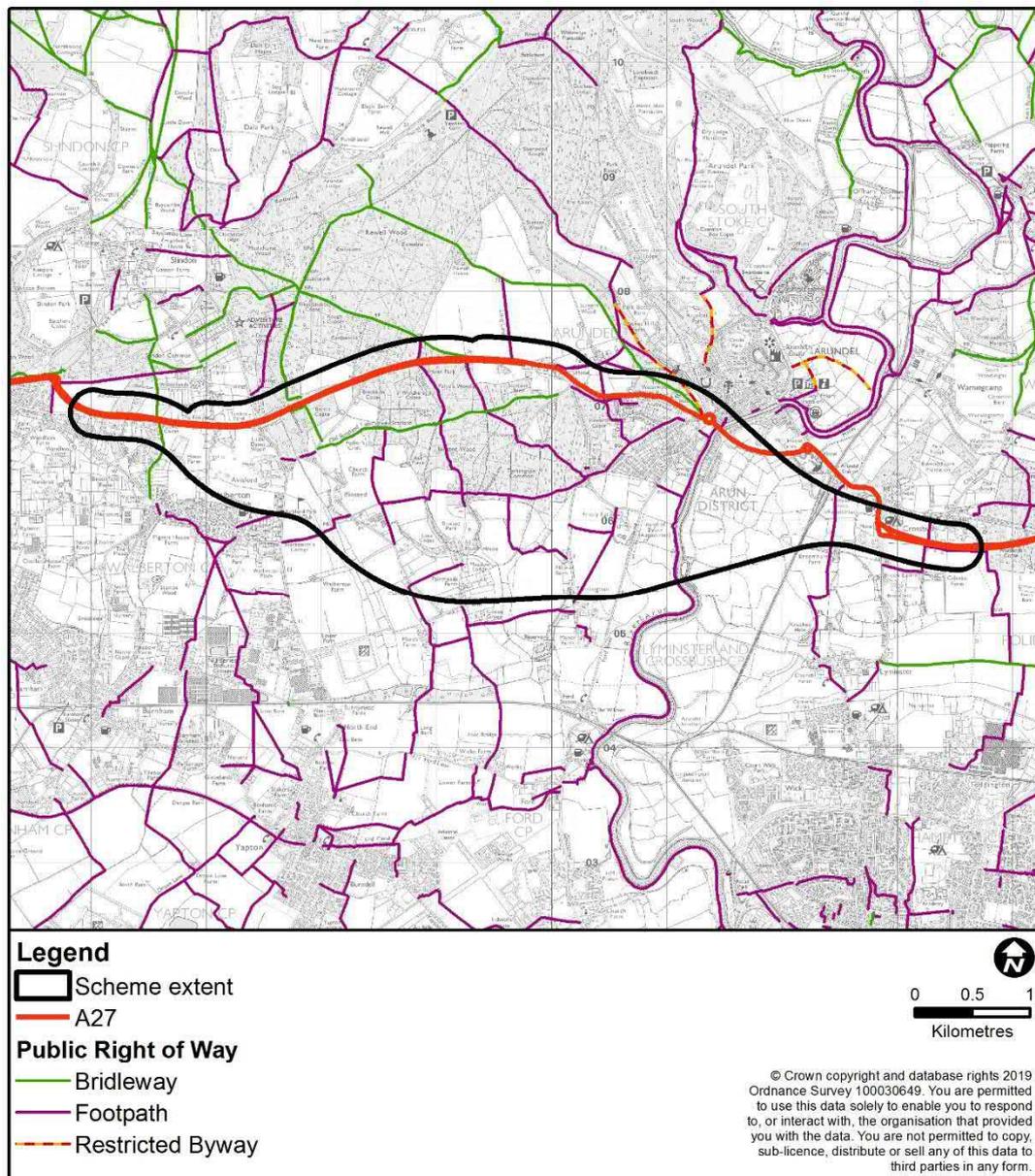
- 2.5.1 The area in proximity to the scheme in West Sussex is flat, and the climate is typically clement in comparison to the rest of the nation¹⁰.
- 2.5.2 The local Public Rights of Way Network (PROW) network shown in Figure 2-3 highlights the walking and bridleway network within the vicinity of the scheme and within the study area.
- 2.5.3 There are walking routes in the Yapton and Walberton residential areas linking these areas to Barnham rail station, Arundel town centre, the SDNP and the industrial estate around North End Road and Yapton Road.

⁹ <https://tison-maps-stagecoachbus.s3.amazonaws.com/Timetables/SouthWorthing/WG%209%2030-4-17.pdf>
<https://bustimes.org/services/85a-arundel-barnham-chichester>
<https://bustimes.org/services/668-ormiston-six-villages-academy-tangmere?date=2019-09-25>
<https://bustimes.org/services/665-littlehampton-westergate-chichester-high-schoo?date=2019-09-27>
<https://bustimes.org/services/700-coastliner-brighton-worthing-littlehampton>
<https://bustimes.org/services/66a-bognor-regis-yapton-bognor-regis?date=2019-09-25>
<https://bustimes.org/services/141-yapton-felpham-bognor-regis-bishop-luffa-schoo>

¹⁰ https://www.westsussex.gov.uk/media/9584/walking_cycling_strategy.pdf

2.5.4 There are designated public footpaths linking Walberton, Barnham residential areas with the employment areas in Yapton.

Figure 2-3: Public rights of way network



2.5.5 The A27 corridor between the A27 Chichester Road and the Ford Road roundabout has high traffic flows (see section 2.3 of ComMA), and is characterised a lack of controlled pedestrian crossing facilities.

2.6 Rail network

- 2.6.1 The nearest railway station, from the Yapton and Walberton area, is Barnham railway station situated around 2 miles from the Walberton village. The station is located on the West Coastway Line between Brighton and Southampton and provides interchange for other destinations, including Portsmouth Harbour, Worthing and Brighton, with departures occurring approximately every 20 minutes¹¹.
- 2.6.2 Yapton and Walberton are connected to the railway network via Barnham railway station. This can be accessed using 66A, 66C and 85 bus routes.
- 2.6.3 The level crossing on Yapton Lane is closed for a period of time in the morning and evening peak periods. Table 2-2 shows an overall reduction in vehicle flows between August 2017 and July 2019..

Table 2-2: Traffic flows near Yapton Lane level crossing

| Count | Direction | ADT (veh/hr) | AWT (veh/hr) | AM peak period average flow (veh/hr) | PM peak period average flow (veh/hr) |
|---|-----------|--------------|--------------|--------------------------------------|--------------------------------------|
| Yapton Lane (Before closure August 2017) | NB | 2862 | 3161 | 349 | 175 |
| | SB | 3077 | 3367 | 168 | 386 |
| Yapton Lane (Post closure July 2019) | NB | 2643 | 3054 | 340 | 172 |
| | SB | 2559 | 3198 | 186 | 340 |

2.7 Traffic volumes

- 2.7.1 On the A27, approximately two thirds (67%) of the traffic is through traffic, with the remaining third (33%) being local traffic¹². Various lower order roads within the study area are considered sensitive to traffic volumes due to their residential or rural nature, and have potential to be affected by 'rat-running' traffic which can utilise local roads in the event of congestion or incidents on the SRN. These roads include Ford Road and Yapton Lane. The occurrence of rat-running on Yapton Lane has been highlighted by residents and other stakeholders during previous consultations on the A27 Arundel Bypass scheme.

¹¹ <https://ojp.nationalrail.co.uk/service/ldbboard/dep/BAA>

¹² Based on traffic on the A27 between Crossbush roundabout and Causeway roundabout. Local traffic defined as having an origin or destination within Arundel. Through-traffic has an origin and a destination outside of Arundel. Source: A27 Arundel Transport Model (2015 Base)

- 2.7.2 For the purposes of this study, traffic data was collected, on the local roads in the areas of Barnham, Slindon Common, Walberton and Yapton, between 03-07-2019 and 13-07-2019, during school term time. Further details of site locations and in-depth traffic volume data is presented in Appendix B-1 and Appendix B-2.
- 2.7.3 Figure 2-4 and Figure 2-5 summarise the observed turning movements to and from Tye Lane, Mill Road, Shellbridge Road and Yapton Lane in the AM (8:00-9:00) and PM (17:00-18:00) peak periods. Of the four junctions with the A27 at the western tie-in location, the total junction turning count at Yapton Lane junction during both peak periods is around five times higher than the equivalent flows at Tye Lane junction, which has the next highest total turning count.
- 2.7.4 Figure 2-4 and Figure 2-5 demonstrate that Shellbridge Road, Mill Road and Tye Lane have total junction turning movements of less than 100 vehicles in the peak hours.

Figure 2-4: AM turning movements existing western tie-in

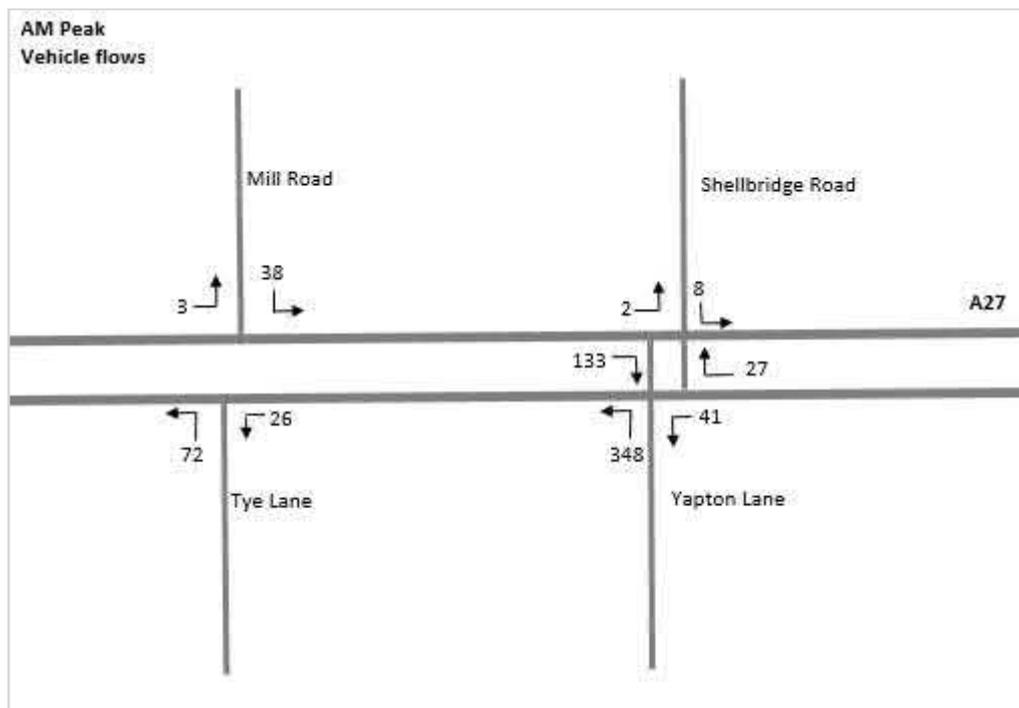
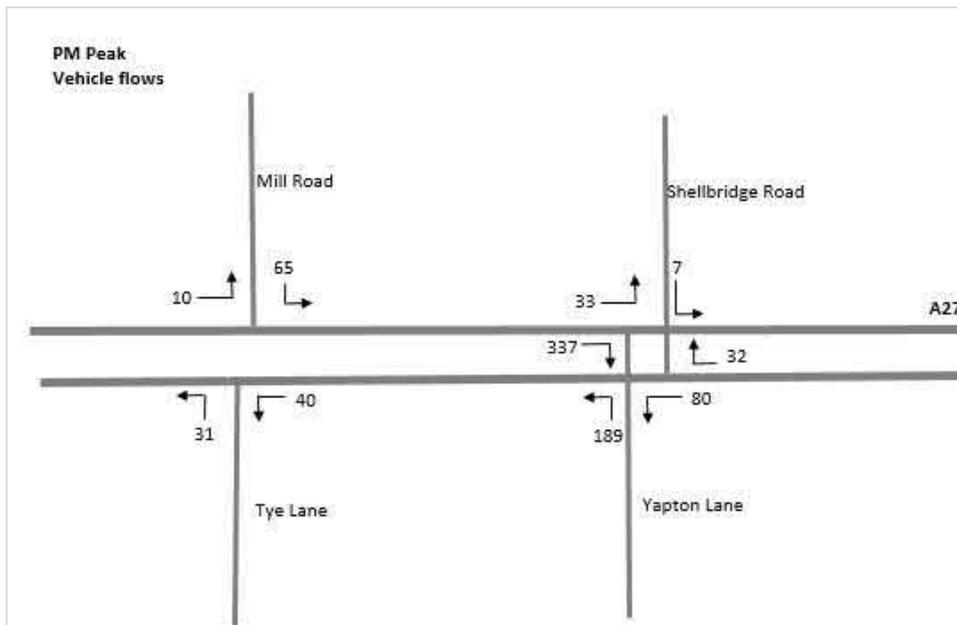
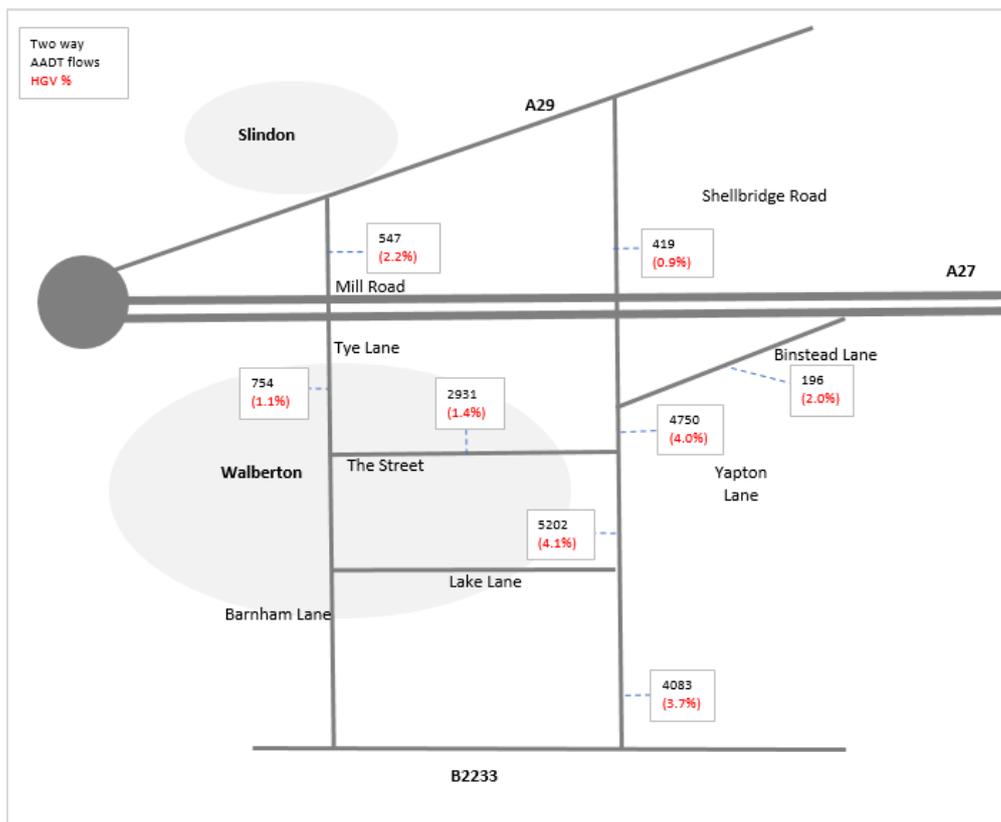


Figure 2-5: PM turning movements for existing western tie-in



2.7.5 Figure 2-6 presents the Annual Average Daily Traffic (AADT) and HGV percentages, by direction, on the local roads considered within the study.

Figure 2-6: AADT flows in the local network



- 2.7.6 The AADT flows highlight that there is considerably more traffic using Yapton Lane in comparison to other roads within the local network. The figures also highlight higher percentages of HGVs (4%) using Yapton Lane in comparison to the rest of the local road network (2% or less) within the study area. The industrial land uses around the North End Road / Yapton Road area is likely to be a contributory factor for the higher levels of HGVs.
- 2.7.7 Figure 2-7 and Figure 2-8 summarise the AM and PM peak flows, HGV percentage and Volume / Capacity (V/C) for each link. Capacity is defined in TA 79/99¹³ as the maximum sustainable flow of traffic passing in one hour, under favourable road and traffic conditions and is measured in one-way hourly flow in each direction. It should be noted that link flows presented in Figure 2-7 and Figure 2-8 are based on Automatic Traffic Counts averaged over a seven-day period. These link flows, therefore, do not directly correspond to the turning flows presented in Figure 2-4 and Figure 2-5, which are based on a single day's count.
- 2.7.8 Peak V/C compares traffic volume with the capacity of the road. A V/C value of 1.0 would indicate a road operating at capacity. The closer the value is to a V/C of 1.0, the closer the road is to capacity, and therefore the more prevalent congestion is likely to be. The figures illustrate that all roads are operating well within theoretical link capacity during the AM and PM peak periods.

¹³Design Manual for Roads and Bridges (DMRB), Volume 5, Section 1, Part 2, TA 79/99 Traffic Capacity of Urban Roads (February 1999)

Figure 2-7: 2019 AM peak hour flow, HGV% and V/C

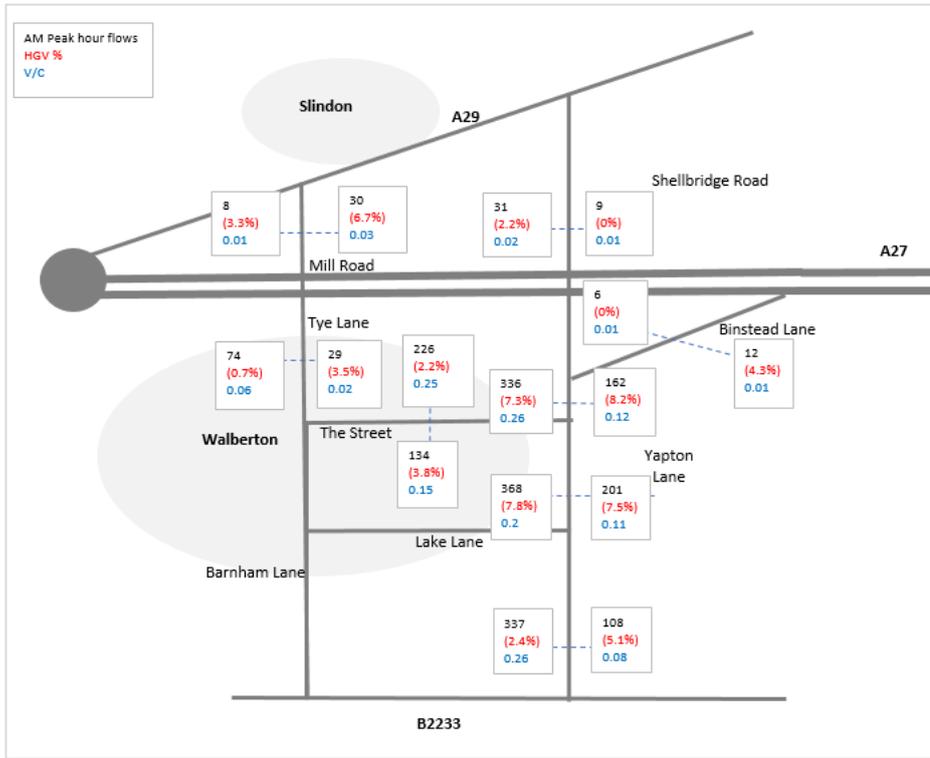


Figure 2-8: 2019 PM peak hour flow, HGV% and V/C

