# Proposed Development at Mountfield Park:

# Transport and Highways Review on behalf of the South Canterbury Alliance


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## Appendices

## 1. INTRODUCTION

1.1. This report sets out a review of the transport and highways work that has been undertaken in support the proposed Mountfield Park development south of Canterbury (Planning application ref. CA/16/00600). The work has been commissioned by the South Canterbury Alliance that comprises the following:

- Barton Residents' Association;
- Langton and Nackington Residents' Association;
- Oaten Hill and District Society;
- Saint Augustine's Road Residents' Association;
- Saint Michael's Road Area Residents' Association;
- South Canterbury Residents' Association;
- Southern Canterbury Alliance and the Alliance of Canterbury Residents' Associations.

1.2. The purpose of this work is to assess the reliability of the transport supporting information and identify whether there are any risks that the proposed transport and access strategy will lead to unacceptable (severe) impacts.

1.3. The review is based on the information set out in the following documents that are available on the Canterbury City Council planning website:

1. Transport Assessment, Russell Giles Partnership Ltd (RGP) February 2016 (ref. CMB/2013/1749/TA26), prepared on behalf of Corinthian Mountfield Ltd, subsequently referred to as the TA;
2. Interim Transport Assessment, RGP January 2015 (ref. CC/2014/1749/ITA16), prepared on behalf of Corinthian Mountfield Ltd, subsequently referred to as the Interim TA;
3. Overarching Travel Plan, RGP, February 2016, subsequently referred to as the Overarching TP;
4. Environmental Statement, South Canterbury, Chapter 5 Transport, David Lock Associates, June 2015, subsequently referred to as the ES Chapter;
5. Forecasting Report: Canterbury VISUM Model Update Run, Amey March 2016;
6. Canterbury District Transport Strategy 2014-31 (Draft), Canterbury City Council 2014.

1.4. This report focuses on a number of key issues:

- The assumptions that have been made to derive vehicle trip generation rates;
- The assumptions that have been made to derive traffic growth;

- The impact of the proposed development on the operation of the local highway network;
- The feasibility of the proposed improvements to the local highway network;
- Issues relating to the strategy for travel on foot, by bicycle and by bus;
- The environmental impact of the proposals;
- The issue of rat-running on Nackington Road.

1.5. These issues are explored in the following sections. A summary and conclusion is set out in Section 8.

## 2. TRIP GENERATION

### Residential Development

2.1. Residential trip generation rates are based on those adopted by Amey for the purposes of preparing a VISUM area wide model to test development options as part of the Local Plan review process. It appears from an examination of the background Local Plan modelling work that the trip rates were previously derived by Jacobs who developed the model in the first instance. The trip rates were then adopted by Amey in relation to the current Local Plan assessments.

2.2. The vehicle trip generation source data are attached as Appendix Z of the TA. This provides three hour morning and afternoon peak hour vehicle trip generation rates as reproduced in the following table:

*Table 2.1: Peak Period Residential Vehicle Trip Rates*

| Peak Period | arrivals | departures | 2-way |
|---|---|---|---|
| AM peak 07:00-10:00 | 0.370 | 0.770 | 1.140 |
| PM peak 16:00-19:00 | 0.860 | 0.550 | 1.410 |

Source: Figure 6.1 of TA

2.3. The peak period vehicle trip rates are converted to peak hour vehicle trip rates. No information is provided to support the assumptions that have been made to convert three hour trip rates to one hour trip rates. The resulting one hour trip rates are reproduced in the following table:

*Table 2.2: Peak Hour Residential Vehicle Trip Rates*

| Peak Period | arrivals | departures | 2-way |
|---|---|---|---|
| AM peak 08:00-09:00 | 0.142 | 0.296 | 0.438 |
| PM peak 17:00-18:00 | 0.331 | 0.212 | 0.543 |

Source: Figure 6.2 of TA

2.4. Typical 1 hour vehicle trip rates fall between 0.5 and 0.7 2-way vehicle movements per hour. The Amey trip rates fall at the bottom end of this range and therefore make some allowance for internalised trips and a reasonable level of access to facilities by non-car modes. This would not be an unreasonable approach to adopt in a location such as this offering some opportunities to travel by non-car modes.

Adjustment of Generic Car Trip Generation Rates

2.5. The methodology employed in the TA applies an adjustment to reduce the 'generic' car trip rates. The car trips between the site and Canterbury city are reduced to reflect the opportunities to access the city centre by non-car modes. The assumptions underlying these adjustments are set out in Appendix BB of the TA and the calculation of the adjusted trip rates is set out in Appendix AA of the TA.

2.6. The car trips to the city centre are split into journey purposes (work, education and shopping/leisure) and an estimate is made of the proportion of each category that are expected to transfer from car to sustainable modes. The level of transfer that results from the assumptions that have been applied in the TA is reproduced in the following table which draws data from Appendix BB of the TA:

*Table 2.3: Level of Transfer of Car Trips to Sustainable Modes from TA*

| Journey purpose | AM Peak | | | PM Peak | | |
|---|---|---|---|---|---|---|
| | car | non-car | % transfer | car | non-car | % transfer |
| work | 8.81% | 9.71% | 52.4% | 7.34% | 13.30% | 64.4% |
| education | 7.66% | 17.93% | 70.1% | 0.94% | 0.77% | 45.0% |
| Shopping/leisure | 10.64% | 11.66% | 52.3% | 16.62% | 25.23% | 60.3% |
| All trips | 27.10% | 39.30% | 59.2% | 24.90% | 39.30% | 61.2% |

Source: Appendix BB of TA

2.7. The above levels of transfer of trips from car to non-car are very significant, ranging from 45.0% to 70.1%. It should be noted that these reductions are applied to base car trip rates that are already towards the lower end of the typical range of residential car trip rates and therefore already include some allowance for good accessibility by non-car modes.

2.8. Given the surprisingly high levels of transfer from car to non-car modes suggested in the TA, further investigation has been undertaken to assess the validity of the underlying assumptions and calculations.

2.9. The methodology set out in Appendix BB of the TA is very subjective. It allocates a number between 1 and 5 to reflect opportunities for transfer in relation to distance, opportunities for mode change and car parking availability at the destination. On the basis of the aggregated scores, a level of transfer is identified. There are a number of fundamental issues associated with this methodology that bring into question its reliability:

1. It has been assumed that 19% of non-A2 work trips will be internal to the development (Appendix BB of TA). It is calculated, in the TA, that there will be 3,750 employees within the 45,000sqm of commercial development on the site (para. 6.3.15 of the TA). According to the 2011 census there are around 37,000 work places in Canterbury city (see attached **Appendix 1**). The TA assumes 48% of non-A2 work destinations are in Canterbury city (this figure is itself an overestimate – see below). The census data suggests that there should be around 10 times more work destinations within the city than within the development. The assessment work assumes 2-3 times more destinations in the city centre than within the development and therefore greatly exaggerates the level of containment of work trips.
2. It has been assumed that 30% of 'local' shopping and leisure trips will be within the proposed development. Given the very diverse nature of the leisure trip purpose category and the very limited shopping opportunities available within the site it is considered that this is a significant over-estimate if internalisation. The suggested decreases in overall external car trip generation of between 6.69% and 12.55% resulting from the internalisation of shopping and leisure trips are considered overly optimistic and do not properly reflect the nature of this category of trip purpose.
3. No criteria are provided to justify the numbers that have been allocated to various possible destinations to represent distance. Walking, for example, is rarely a mode of travel for journeys over 2km and there is a rapid decline in the level of attractiveness of walking for journeys between 800m and 2km. The scaling system applied in the TA is very subjective and crude. There is no explanation as to how the distance rating is applied to walking, cycling and bus use.
4. The 'opportunity for mode change' is applied as either '1' or '5' representing either' no opportunity' or 'opportunity'. It is assumed (see note under the table on the second page of Appendix BB of the TA) that there will be a 'definite' transfer of trips if there is a score of 15. This score would include a score of 5 for the opportunity to transfer from car. The methodology makes no allowance for choice. The availability of an alternative mode does not guarantee that someone will use it. In reality there is a more subtle relationship between non-car mode availability and overall mode share. The methodology appears to bias the overall results towards mode transfer without the proper background evidence to demonstrate that this is realistic and achievable.
5. The 'car parking availability at destination' measure is flawed in two fundamental ways. The absence of parking at schools is assumed to deter driving. Very few schools provide parking for drop-off and pick-up yet car use to transport children to and from school is common as parents will stop nearby to drop children off and find somewhere to park, often illegally to pick up. The methodology has therefore over-estimated the transfer of education trips to non-car modes. Canterbury city centre has been allocated a '3' for car parking availability. No allowance has been made for private non-residential parking that is beyond the control of the city council and would be available to a significant number of residents employed in the city.
6. The criteria for identifying mode transfer is arbitrary and easily skewed by the subjective assumptions made within the individual scoring categories. Any score between 10 and 14 is assumed to be 'equally likely to transfer'. Both shopping and work trips to the city centre, the two largest individual categories of trips, just achieve a score of 10 and are therefore achieve a

significant transfer. If the 'cut-off' were set at 11 rather than 10 the overall transfer to non-car modes would be reduced by almost 10%.

2.10. From a close examination of the background information used to derive mode transfer it is concluded that the methodology is crude, overly subjective and significantly over-estimates the likely transfer of trips from car to sustainable modes.

Assumptions about Trips to Canterbury City

2.11. The level of transfer of overall trips depends heavily on the assumptions that have been made to identify the overall proportion of car trips that are to Canterbury city. The calculation of the overall figure is set out in Figure 4.16 of the Scoping Note that is attached as Appendix C of the TA. Supporting information is provided in Appendix G of the TA.

2.12. Census data have been used to identify the percentage of trips by all modes that start in the peak hours. These percentages have been adjusted to reflect the differences in levels of car use for the various trip purposes (for example, business trips are much more likely to be undertaken by car than education trips). This method results in the percentages of car trips by purpose set out in Figure 4.14 of the TA.

2.13. The comparative 'draw' of work destinations has been calculated on the basis of census work journey distances. It is not known why this indirect method has been used since census data can also provide details of work destinations for trips originating in the south of Canterbury. **Appendix 2** contains details of the data extracted to compare the results that have been derived as part of the TA. The following table compares the results set out in the TA with census data as set out in **Appendix 2**:

*Table 2.4: Comparison of Distribution of Car Work Trips*

| Major Route | Destinations | % in TA | Census Data (2011) |
|---|---|---|---|
| City Centre | A28 NE, A257, B2068, Canterbury | 47.1% | 33.8% |
| A2 (W) | Mid and west Kent districts, Whitstable and Herne Bay, Surrey, A28 SW | 43.3% | 20.1% |
| A2 (E) | Dover district and part of Shepway | 9.6% | 19.4% |
| A28 (NE) | | | 10.8% |
| A290 (NW) | | | 5.0% |
| A28 (W) | | | 10.8% |
| **Total** | | **100%** | **100%** |

2.14. There are some significant differences between the distribution based on assumptions used in the TA and the census data:

1. The TA allocates almost half of work trips to Canterbury city centre. It is clear from the 2011 census data that only about a third of car work trips are to the city centre. The TA has allocated all trips that are not assigned to the A2 to the city centre. It is, however, clear that there is a significant amount of employment that is not within Canterbury city centre that is accessed via routes other than the A2 such as the A28 north-east, the A28 west and the A290 north-west. The effect of over-estimating the proportion of work trips to the city centre is to inflate the potential for local trips to be made by modes other than the private car.
2. The TA allocates more than double the amount of work trips to the A2 west than currently made by people living in south Canterbury. The TA also allocates less than half the number of trips to the A2 east than are currently made by local people. This significant discrepancy in distribution will affect the assessments that have been undertaken of the operation of the proposed new A2 junction and the associated highway infrastructure.

2.15. Assumptions have been applied to distribute shopping and leisure trips. The percentage of shopping and leisure trips that start in the peak hours has been multiplied by the percentage of shopping and leisure trips that are undertaken by car to derive the percentage of car trips by purpose shown in Figure 4.14 of the TA (calculation set out in Appendix G of TA). A subjective assumption is made in paragraph 4.50 of the Scoping Report (Appendix C of the TA) that 85% of shopping and leisure trips are to and from the city centre. Figure 4.13 of the Scoping Report shows that the average car journey length for shopping trips is 8km and the average car journey length for leisure trips is 17km. The much higher average journey distance for leisure trips reflects the diverse nature of this trip category, including visits to friends at home and elsewhere, entertainment, sport, holidays and day trips. Given the fact that leisure trips are very different in nature to shopping trips it is unreasonable to assume that the same assumption about distribution can be applied to both. It is also unreasonable to assume that such a high percentage of both shopping and leisure trips will be to the city centre. Given the fact that shopping and leisure trips together account for 26.3% of car trips in the AM peak hour and 49.3% of car trips in the PM peak hour, the overall pattern of trip making can be seen to be highly sensitive to the assumptions that have been made about shopping and leisure distribution. It is entirely unacceptable to apply what is acknowledged to be a subjective assumption, ***that is not supported by any data***, to arrive at only 15% of shopping and leisure trips having destinations outside of the city centre. It appears that the method that has been employed grossly exaggerates the number of shopping and leisure trips that have destinations within the city centre and

therefore over-estimates the opportunity for shopping and leisure trips to be made by sustainable modes.

2.16. In order to test the trip generation model, Figure 4.16 of the Scoping Report has been reproduced in **Appendix 3** with a revised calculation based on census data for work trips and more realistic distributions for shopping and leisure trips.

2.17. The revised calculation shows a reduction in city centre car trips of 14% in the AM peak hour and 22% in the PM peak hour. The assumptions made in the TA about transfer of trips from car to non-car modes suggests that approximately 60% of city centre trips will be transferred to non-car modes (see **Table 2.3** above). On the basis of the revised calculation that adopts more reasonable assumptions about the proportion of leisure and shopping trips undertaken locally, the *overall* car trip generation rate would be 8% higher in the AM peak hour and 13% higher in the PM peak. In terms of trip numbers, these increases in trip generation represent between 85 and 170 car trips in the peak hours on routes other than the A2.

2.18. The revised calculation also shows an increase in car trips on the A2 east from 6.3% to 15.2% in the AM peak hour and from 7.7% to 21.3% in the PM peak hour. In terms of numbers of car movements these increases represent between 100 and 280 additional vehicle trips in the peak hours using the highways infrastructure between the site and the A2. The implications of these increases are discussed further below.

## Conclusion on Residential Trip Generation

2.19. A review of the work undertaken to derive estimates of the level of transfer of residential car trips to non-car modes indicates that:

1. The opportunities for non-car travel have been significantly over-estimated since too many trips have been assumed to be to Canterbury city centre;
2. The likely level of transfer of trips from car to sustainable modes has been over-estimated.

2.20. **Appendix 4** contains a revised calculation of the level of trip transfer for those trips to the centre of the city. The calculation undertaken as part of the TA is also reproduced as a second sheet in **Appendix 4** for the purpose of comparison. The following points can be drawn from the information shown in **Appendix 4**:

1. The reduced overall percentage of trips to destinations within Canterbury is reduced as described above and shown in **Appendix 3**;
2. The percentages of shopping/leisure and work trips internalised within the site are reduced as described above. The displaced trips are allocated to the city centre or elsewhere within Canterbury;

3. The subjective scaling system has been amended in accordance with the discussion above. An overall score of 10-14 is assumed to result in a 25% transfer to non-car modes and a score between 7 and 10 is assumed to result in a 10% transfer of trips;
4. The overall transfer of trips in the AM peak hour is seen to be around 19% and in the PM peak hour 8%. This compares with transfers of 39% in both peak hours assumed for the purposes of the TA. The very significant change in the transfer in the PM peak results from the corrections made to the percentage of work and leisure trips made to within the city;

2.21. The effect of the above is that the reduction in generic trip generation rates is significantly less than that predicted in the TA. The application of more justifiable and reasonable assumptions about trip distribution and trip transfer gives the following changes in overall trip generation:

*Table 2.5: Revised Residential Trip Generation Rates*

| Scenario | AM Peak | | PM Peak | |
|---|---|---|---|---|
| | Car trip rate | Car trip generation* | Car trip rate | Car trip generation |
| Generic | 0.438 | 1,752 | 0.543 | 2,172 |
| TA calculation | 0.266 | 1,064 | 0.329 | 1,316 |
| revised % reduction | 19.1% | | 8.2% | |
| revised trip rate | 0.354 | 1,417 | 0.498 | 1,994 |
| difference | | +353 | | +678 |

* 4,000 dwellings

2.22. It is concluded that the assessments set out in the TA under-estimate the residential car trip generation of the proposed development by between 350 and 680 vehicle movements in the peak hours.

## Employment Trips

2.23. Section 6.5 of the TA deals with employment trip rates. Generic trip rates are based on the 3 hour trip rates used by AMEY in relation to the testing of the Local Plan. These are converted to 1 hour trip rates using a factor of 38.5% (see **Appendix 5**). No justification for the use of this factor is provided in the TA. The application of this factor means that it has been assumed that in the peak hour the trip rate is just 5% higher than the average hourly trip rate over the 3 hour peak period. A review of business park trip rate surveys within the TRICS database reveals that the peak hour (08:00-09:00 and 17:00-18:00) trip rates are 50% or more of the average 3 hour peak period rates (07:00-

10:00 and 16:00-19:00). On this basis the trip rates in the TA underestimate the commercial trip rates by around 45%. Peak hour trip rates for business parks and industrial estates in the south of England and the Midlands have also been extracted from the TRICS database to undertake a range check of the rates used in the TA. Details are set out in **Appendix 5**. The data suggest that the peak hour trip rates used in the TA are between 30% and 40% lower than the average observed trip rates at similar sites. This confirms that the TA commercial trip rates significantly under-estimate the amount of traffic generated by this element of the development.

2.24. An uplift in commercial car trip rates of 40% represents increases in car trip generation of 350 and 253 in the AM and PM peak hours.

2.25. It is noted that Highways England in their response dated 13 April 2016 point out the low level of employment trip rates but are willing to accept the rates on the basis that no adjustment is made to allow for the internalisation of trips within the development. Although the Interim TA stated that no allowance would be made, the basis for assessment in the TA has changed with an allowance being made for the internalisation of 62 trips in the AM peak hour and 85 trips in the PM peak hour. The allowance also represents double this number of trips since the internalisation removes trip generation from both origin (residential) and destination (employment) land uses. It has already been demonstrated above that this allowance is excessive and should, in reality by around one tenth of the level identified. The overall trip generation of the development should therefore be between 112 and 153 trips higher than has been assumed in the TA.

## Attraction of External Trips

2.26. No allowance has been made in the TA for trips attracted to non-commercial land uses within the proposed development. The proposed primary schools will employ a significant number of staff, the vast majority of whom will travel into the site from elsewhere. Given current education policy it will not be possible to limit the catchment area of the primary schools to the proposed development and there will inevitably be a proportion of children attending the schools who will live outside of the proposed development. Some of these will be driven to and from the schools. Other land uses, such as a doctor's surgery and convenience shops will also attract some external trips. The effect of attracting external car trips will be to increase the impact of the development on all junctions, but particularly those close to the development.

## 3. TRAFFIC GROWTH

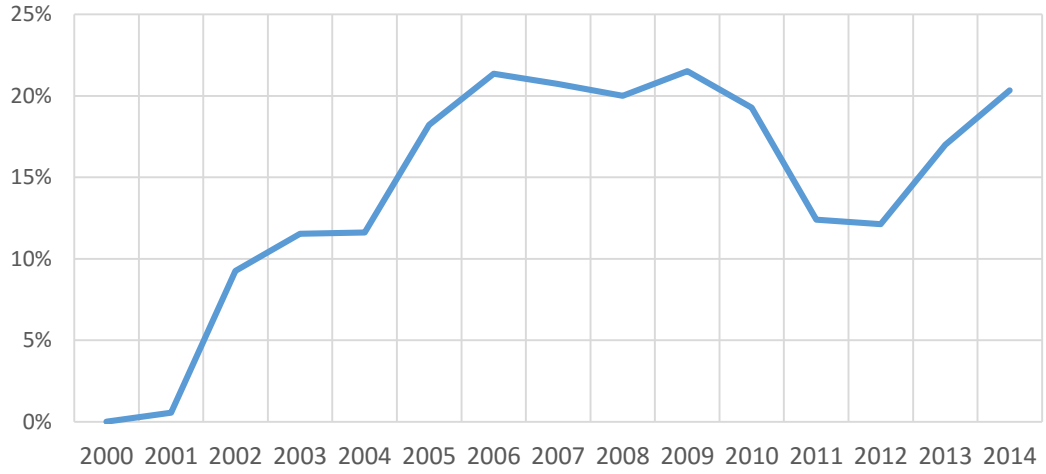
### Background Traffic Growth

3.1. Traffic growth rates would normally be derived using TEMPRO. The rates predicted using TEMPRO have been reduced in the TA to avoid double counting and to reflect a suggested slowing of background traffic growth in Canterbury.

3.2. The assessments set out in the TA assume a level of background traffic growth of 17%-18% between 2014 and 2031. The TEMPRO growth rates for the same period are around 25% for urban principal roads in this area. A reduction in growth rates is justified in the TA on the basis that the proposed development is already accounted for in the projected growth rates.

3.3. Traffic growth on the A2050 New Dover Road as recorded by the Department for Transport (DfT) since 2000 has shown the following variation:

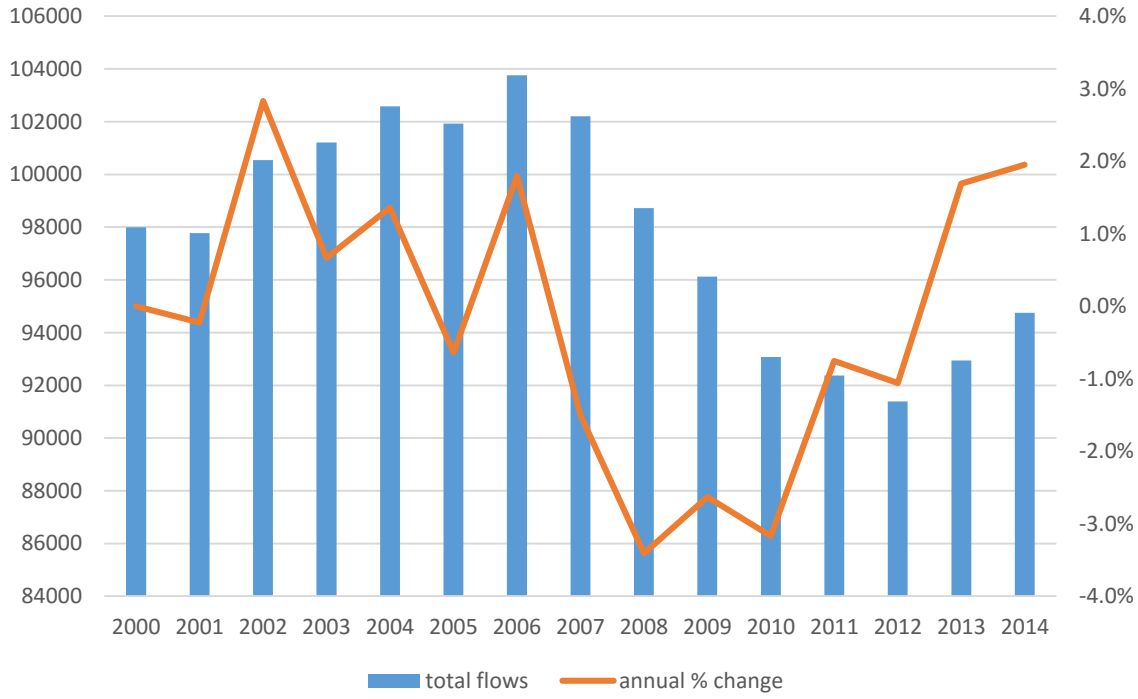
Graph 3.1: % Change in Traffic Flows on New Dover Road since 2000




3.4. The DfT data that are represented in the above graph are attached as **Appendix 6**. It can be seen that between 2000 and 2014 there has been a 20% growth in traffic along this corridor. This growth is despite no significant new development accessed from the New Dover Road corridor over this period. It can also be seen that the overall level of growth has been subdued over the 2009-2012 period most likely because of the effect of the general recession. After 2012 the rate of growth has been around 4% per year. This pattern of traffic growth does not suggest any general slow-down in growth on the A2050 corridor, indeed it suggests that traffic is growing on this corridor much more quickly than even the TEMPRO figures would suggest.

3.5. The Canterbury District Transport Strategy 2014-2031 states at paragraph 1.14 that, '*the level of traffic passing through [cordons around the city] has changed little during [the period 2001-2010*]'. A review of all the most recent DFT data that is available on the DFT website indicates that this is not the case. Relevant data from the main radial routes into Canterbury is attached as **Appendix 7**. The data are summarised in the following graph:

*Graph 3.2: Change in Flows on A2050 (E), A257, A28(E), A290, A2050 (W) and A28 (W) 2000-2014*




**Source**: DfT Traffic Counts website, sites 26110, 78137, 78141, 78138 and 78136

3.6. The graph shows a clear pattern with traffic levels decreasing over the period 2006 to 2012, corresponding with the general economic slowdown associated with the recession and a general increase in traffic levels before the recession and a clear upward trend following the recession in 2012-2014. The rate of annual growth in traffic between 2012 and 2014 is around 2% per year.

3.7. A comparison of graphs 3.1 and 3.2 suggests that both show that traffic levels have been affected by the recession, both show that traffic is currently growing as fast as it had been before the recession and that traffic growth on the A2050 corridor east of Canterbury shows significantly stronger growth than elsewhere around the city.

3.8. It is concluded that the most recently available observed data on changes in traffic levels entering Canterbury city show that traffic is currently increasing by 2% and

along the New Dover Road corridor it is increasing by 4% per year. These significant increases are not taken into account in deriving forecasts of traffic against which to assess the impact of the proposed development.

3.9. The VISUM model that has been used to test development options as part of the Local Plan review is based on 2008 data. There has been no model validation or calibration against observed traffic flows or journey time surveys since the 2008 data collection. The traffic flow data since 2008 show significant changes in traffic flows and variations in changes between different radial routes into the city. It is therefore likely that the reliability of the VISUM model has reduced significantly since 2008 and the model outputs should be treated with a degree of caution.

## Effect of New A2 Junction

3.10. The Amey modelling report states:

> *'4.3.17 The addition of an Old Dover Road Bus Gate and an improved A2 junction at Bridge will significantly increase demand on A2050 New Dover Road in the DS2 scenario.'* (para. 4.3.17, Amey, March 2016)

3.11. Despite this clear statement, no allowance is made in the TA for the additional traffic that will be attracted to the New Dover Road corridor by the proposed improved A2 junction.

3.12. The removal of delays from the junctions connecting the A2 junction with the New Dover Road and the increased directness of the route into Canterbury via the A2 junction is likely to attract a number of existing journeys that currently use other A2 junctions (particularly the A28 Wincheap junction) and contribute towards greater congestion on the New Dover Road and the associated routes into and out of Canterbury. This effect is reflected in the results of the VISUM modelling which show journey times into Canterbury along the New Dover Road to more than double from 5.4 minutes to 11.0 minutes in the AM peak hour and the journey out of Canterbury to increase from 3.9 minutes to 6.6 minutes in the PM peak hour as a result of the proposed development allocations, including Mountfield Park. This modelling outcome is in stark contrast to the conclusion of the TA work that states that:

> *'9.2.13 Journey 7A* [A2 west to city centre] *would experience significantly less delay during the AM peak hour in the 2031 'Do Something' scenario when compared with the existing scenario, and a comparable amount of delay during the PM peak hour.*
>
> *9.2.14 Journey 7B* [city centre to A2 west] *is anticipated to experience significantly less delay during the AM peak hour in the 2031 'Do Something' scenario when compared with the existing scenario, whilst during the PM*

*peak hour an impact of an additional 60 seconds could occur, compared to the existing scenario, however this would be comparable to the 2031 'Do Minimum' Scenario.' (paras. 9.2.13 and 9.2.14, TA)*

3.13. It therefore appears that the level of background growth has been underestimated and the assessment work in the TA is deficient in that it omits to consider the fact that the improved A2 junction will attract additional traffic to the New Dover Road corridor. The background growth in traffic on the New Dover Road corridor is therefore likely to be significantly higher than the 17%-18% that has been assumed.

3.14. The conclusions drawn in the TA on the issue of journey times are also shown to be incorrect due to deficiencies in the modelling of junctions described in the following section.

## Committed Developments

3.15. The 'Local Plan Preferred Option Testing Report' (Amey, 17/02/2014) lists the developments that are taken into account in the VISUM model:

1. South Canterbury (4,000 homes and 70,000sqm employment);
2. Land at Sturry/Broad Oak (1,000 homes and business floorspace);
3. Herne Bay Golf Club (400 homes and 1 ha mixed commercial);
4. Strode Farm (800 homes and 15,000sqm employment);
5. Hillborough (1,000 homes and 10 ha business floorspace);
6. Land at Hersden (800 homes and 1 ha business floorspace);
7. Thanet Way (400 homes).

3.16. The Do-Minimum VISUM model, that excludes the above developments, predicts peak hour growth, that is not related to committed developments, of between 17% and 18% to 2031 (see Table 4 of Amey report, 2016).

3.17. The TA states that it has taken the following developments into account as committed development:

1. Howe Barracks (500 dwellings);
2. Site 10 (KCC/CCC land) (300 homes);
3. Thanington Park (750 homes).

3.18. However, the TA assumes that all traffic associated with the Howe Barracks site, Site 10 and Thanington Park is included within the background traffic growth. The TA does not, therefore include any additional traffic associated with committed development.

3.19. Although it is justifiable to consider whether there is a risk of double counting when applying traffic growth and adding traffic associated with committed development it is also important to recognise that traffic associated with committed development does not lead to a 'blanket' increase in traffic flows across the network but a series of 'hot spots' of traffic growth centred on the development area. The approach that has been adopted in the TA is to assume that all committed development traffic is evenly spread across the network. This approach is likely to underestimate traffic growth in certain areas. It is likely, for example, that the proposed development at Thanington Park will lead to a disproportionate increase in traffic on the New Dover Road corridor since it may well be preferable for drivers to access areas to the east and north of Canterbury via the new A2 junction rather than negotiate the congested Wincheap and inner ring road corridor.

3.20. It is concluded that there is a risk that by adopting an approach that assumes an even spread of committed development traffic, increases in traffic at certain points in the network, particularly on the main radial routes such as the New Dover Road corridor, the level of traffic growth associated with committed development will be underestimated.

3.21. It should also be noted that no account is taken in either the VISUM modelling or in the TA of the effects of an increasing numbers of students living within the city over recent years and likely to increase further in the future in association with the plans of the educational establishments within Canterbury to expand.

## 4. JUNCTION IMPACT ASSESSMENT

### Calibration of Junction Models

4.1. It is standard practice to undertake queue length observations concurrently with junction turning count surveys, particularly when dealing with congested networks. The purpose of this is to allow calibration of the computer models that are set up to assess the change in junction performance in the future year with changes in turning movements at the junction. An existing junction has a given capacity. If the amount of traffic arriving at the junction exceeds this capacity, any turning counts will only record the vehicle movements that are able to pass through the junction. The results will show that the level of traffic arriving at the junction equals the junction's capacity whereas in reality, if the level of traffic arriving at the junction is greater than the level of traffic that is able to pass through the junction, the excess traffic will appear as a queue and vehicles will be subject to additional delays.

4.2. Queue observation have only been undertaken at the Old Dover Road/Oaten Hill/Nunnery Fields, Old Dover Road/St Lawrence Road and the Old Dover Road/Nackington Road junctions with some comments on exceptional queuing events at New Dover Road/Barton Road and Nackington Road/Underwood Close. The lack of queue information undermines the reliability and validity of the junction modelling that has been undertaken. The following are just some examples of the inaccuracies and inconsistencies in the base year modelling reported in the TA:

- The Riding Gate roundabout is shown in section 8.9 of the TA to be currently operating well within capacity with maximum queues of 3 vehicles. This situation does not reflect the reality of queuing at the junction in the peak hours. However, there are no queue observations available to allow proper calibration of the junction model;
- The modelled queues at the Old Dover Road/St Lawrence Road junction are 2-3 times those observed on site. Observed queues are up to 14 and 16 vehicles in the AM and PM peak hours whereas modelled queues are up to 39 and 31 vehicles in the AM and PM peak hours respectively. The effect of over-estimating the existing queues at the junction is to over-estimate the benefits that result from the proposed alterations to the junction;
- The modelling of the Nackington Road/Old Dover Road junction shows queues in the AM peak hour of 29 vehicles on Nackington Road. However, the queue observations at the Nackington Road/Underwood Close junction report queueing back along Nackington Road past the Underwood Close junction during the AM peak hour. This suggests a queue length of over 650m or a queue of over 100 vehicles. The queue length observations at the junction indicate a queue of up to 14 vehicles on Nackington Road in the AM peak hour. The discrepancy between reported queues and the current reality of the situation on Nackington Road appears to indicate only that short section of the queue that is visible from the Old Dover Road junction is reported.

4.3. The absence of queue length information not only undermines the reliability and validity of the operational assessments that have been undertaken but also undermines all the work that has been undertaken to derive changes in journey times. This issue is considered further below.

## Results of Operational Assessments

4.4. Results of junction operational assessments are set out in section 8 of the TA. The following sections consider the results of the modelling work at specific junctions with an overall conclusion provided at the end of this section.

Junction 1 – A2 off-slip/Bekesbourne Road

4.5. The modelling shows that the existing junction is currently operating over capacity during the AM peak hour and it is stated that Highways England will not support any development in this part of Canterbury before some improvement to the junction is delivered.

4.6. The preamble to the modelling section of the TA states that junctions have been modelled on the basis of the 'one hour' data input option that synthesises a profile of traffic during the peak hours. It is noted that the existing priority arrangement has been modelled with the 'direct' flow input option. No explanation is provided for this inconsistency.

4.7. A signalised arrangement is shown to operate within capacity in 2020 with construction traffic and 1,000 dwellings. It is concluded that the interim signalised arrangement is able to accommodate traffic at this point in the network until 2022 when the new A2 junction arrangement would be opened. It is unclear why the assessment of the signalised arrangement has not been undertaken past 2020 when the new junction is not expected to open until 2022. An assessment of the signalised junction arrangement should have been undertaken for the 2022 situation.

Junction 2 - Town Hill/Station Road/High Street

4.8. The modelling work shows that the existing junction arrangement would operate over capacity in the AM peak hour in the absence of any development and significantly over capacity with development in place. The reason for the very poor performance of this junction with development is the proposed conversion of Bekesbourne Road to one-way eastbound. This would displace vehicles turning right out of Bekebourne Road onto the right turn out of Town Hill.

4.9. It is proposed to convert the junction to a mini-roundabout. The modelling of this roundabout shows it to operate within capacity in 2031 with all development traffic.

4.10. No plan of the proposed junction is included in the TA. It appears that the junction is tightly constrained and no information is provided to demonstrate that the applicant has control over the land necessary to achieve the proposed improvement. It is also noted that a mini-roundabout in this location may be inappropriate for safety reasons. Vehicles approaching on the High Street arms are likely to be travelling at speed and will not expect to give way to vehicles emerging from the right. It is necessary for the applicant to demonstrate that a mini-roundabout in this locations is both safe and achievable.

4.11. It is noted that this junction forms part of the construction traffic route. The existing junction is constrained in terms of size, the alignment of the Town Hill arm and the visibility from the Town Hill arm. Tyre markings on the existing road surface suggest that heavy vehicles are unable to turn left into Town Hill without encroaching into the path of vehicles approaching the junction from Town Hill. Given that the queuing during the AM peak hour is predicted to be mainly on Town Hill this suggests a conflict between queuing traffic and turning HGVs. No swept path analyses have been undertaken at this junction to demonstrate that construction vehicles can safely negotiate the necessary turns. The conversion of Bekesbourne Road to eastbound only may encourage HGVs to use Bekesbourne Road in an eastbound direction to avoid the tight left turn into Town Hill at the Town Hill/Station Road junction.

Junction 3 – Gate Inn Roundabout

4.12. The modelling work shows the New Dover Road south arm of the junction to operate over capacity in the AM peak hour in 2031 without development. The junction that is proposed to replace this roundabout (Area C – New Dover Road/Development Accesses) is discussed below.

Junction 4 – Barton Road/New Dover Road

4.13. The modelling results show the existing ghost island priority junction to operate within capacity in all development scenarios.

Junction 5 – St Lawrence Road/New Dover Road

4.14. The results of the modelling work show the existing junction to currently operate well within capacity. In the future years with development the junction is shown to operate over capacity in both peak hours with moderate levels of queuing (up to 17 vehicles). No improvements to this junction are proposed. No queue length surveys have been

undertaken at this junction to confirm that the modelling of the current situation is reliable (see Appendix F of Technical Note attached as Appendix K of TA).

Junction 6 – St George's Place/ Upper Chantry Lane/Lower Chantry Lane/New Dover Road

4.15. The results of the modelling show the existing junction to currently operate within capacity although no queue length observations are provided to support this result. In the future year without development the existing junction is shown to operate over capacity.

4.16. Paragraphs 7.7.6-7.7.7 of the TA describe the proposed amendments to this junction. They include the banning of the right turn from St George's Place to Upper Chantry Lane. Paragraph 7.7.6 refers to drawing 2013/1749/036. This drawing shows that the right turn into Upper Chantry Lane is retained. There is therefore no drawing that shows the layout of the junction that has been assumed in undertaking operational assessments. It appears that it would not be possible to introduce any physical measures to prevent drivers from making this right turn. The acceptability of the proposal is therefore questionable both in terms of enforceability and in terms of highway safety.

4.17. It is proposed to provide additional capacity for traffic on New Dover Road by 'double cycling'. The stage sequence for the proposed modified junction shows no designated stage for pedestrians to cross the Upper Chantry Lane or St George's Place arms of the junction. The TA does not make it clear whether the proposed staging will introduce any additional delays for pedestrians.

4.18. The junction is very heavily used by pedestrians, particularly students accessing the nearby university and college facilities. No pedestrian counts or observations of existing pedestrian demand have been carried out in support of the proposed amendments to the junction. Further work is required to demonstrate that the proposals will not either introduce new delays for pedestrians or lead to adverse safety impacts.

4.19. It is noted that Ruth Goodie of Canterbury City Transportation and Environment has raised concern, in her response to Development Management dated 12 May 2016, about the banned right turn from St George's Place to Upper Chantry Lane. She states that she could not support the additional traffic that would be displaced onto Dover Street or the diversion of buses onto Dover Street. The inability to ban this turn due to its adverse impacts elsewhere casts more doubt on the ability for this key junction to operate without severe impacts with development traffic in the future year.

Junction 7 – St George's Roundabout

4.20. The results of the modelling show the existing St George's Place arm to operate well over capacity in the future year with development. It is proposed that a three lane entry to the roundabout will improve the situation and the results of modelling of such an arrangement suggest that this would be the case. However, the proposed improvement works as shown on drawing 036 rev. D show widening on the nearside, close to the existing subway, and are likely to require significant engineering works at this point. It is also noted that although some limited widening may be possible at the entry, the length of the widened section will be very limited so that it is likely that the widening will lead to a very limited increase in capacity.

4.21. It should be noted that capacity issues at the St George's roundabout are exacerbated by queuing on the ring road that hinders the ability of vehicles to access the ring road during peak times. It is therefore questionable whether an increase in the capacity of the St George's Place arm of the roundabout will secure the level of improvement suggested in the TA.

Junction 8 – Riding Gate Roundabout

4.22. The results of the operational assessments show the Old Dover Road arm of the junction to operate over capacity in the AM peak hour in the future year with development. An improvement comprising the widening of this arm is suggested to mitigate this impact. No allowance is made for trips diverted to this junction due to the proposed ban on right turns from Old Dover Road to Oaten Hill (see below).

4.23. The junction is currently heavily influenced by the presence of the signalised pedestrian crossing on the Old Dover Road arm of the junction. The crossing is currently heavily used and its use will increase further with the development of a large student accommodation facility south of Rhodaus Town. It is also noted that the junction is sporadically affected by traffic queuing back from the Old Dover Road/Nunnery Fields junction less than 250m to the south-east. The TA gives no consideration to either of these significant influences on the operation of the junction.

4.24. No allowance has been made in the TA for vehicles turning right at the Riding Gate roundabout when banned from turning right into Oaten Hill from Old Dover Road.

Junction 9 – Oaten Hill/Nunnery Fields/Old Dover Road

4.25. The results of the modelling show the junction to be currently operating at capacity in the AM peak hour and close to capacity in the PM peak hour. In the future year with no development the existing junction is shown to operate well over capacity in the AM peak hour and slightly over capacity in the PM peak hour.

4.26. It is proposed to ban all right turns at this junction. If this were done, the modelling suggests that the junction will operate within capacity in the future year with development.

4.27. The banning of all right turns at the junction is an unorthodox approach and drivers are likely to attempt to turn right unless physically prevented from doing so. This may lead to highway safety issues for both drivers and pedestrians. There will also be significant capacity issues if the configuration of the junction is deemed to be unacceptable and has to be returned to its current configuration. Dealys at this junction will also have a significant adverse impact on the bus access strategy. The problem of unenforced right turn bans is identified at paragraph 3.6.8 of the Road Safety Audit that is attached as Appendix M of the TA. The Road Safety Audit Response Report does not refer to this problem (or a number of other problems). This is unacceptable and a resolution to this and the other problems that have not been addressed should be sought.

4.28. All right turns from Old Dover Road to Oaten Hill are assumed to use St Lawrence Road to access the New Dover Road corridor. There is therefore predicted to be no adverse impact in terms of increased right turn movements at the Riding Gate roundabout. In reality a proportion of the diverted trips, for example, those that originate between St Lawrence Road and Oaten Hill, would be diverted to this roundabout. The TA therefore underestimates the impact of the proposed right turn ban on the operation of the Riding Gate roundabout.

4.29. A significant proportion of the right turn movement into Nunnery Fields 'disappears' in the Development Option A scenario. The existing right turn in the AM peak hour is 145 vehicles and in the PM peak hour it is 124 vehicles. However, for the Development Option A scenario only 24 vehicles are shown to be removed from the right turn in the AM peak hour (flow diagram 25) and 86 are shown to be removed in the PM peak hour (flow diagram 26). No explanation is given as to where these vehicles have diverted. It seems likely that they have been assumed to use part of the local road network around Wincheap. These roads are sensitive, constrained, traffic calmed and link to a very congested A28 corridor along Wincheap. If the proposals lead to increased vehicle movements in this area, there needs to be further assessment undertaken of the likely consequences.

Junction 10 – Ethelbert Road/Old Dover Road

4.30. The results of the modelling show the existing junction to operate within capacity in all development scenarios, albeit with the Old Dover Road north ahead and right turn

approaching capacity in the AM peak hour in 2031 with development. As has been stated above, it appears that the amount of traffic redistributed from the right turn from Old Dover Road to Nunnery Fields has been underestimated, and since Ethelbert Road provides an alternative route for this banned right turning traffic. It may therefore be the case that the operation of this junction will be worse than predicted in the TA.

Junction 11 – St Lawrence Road/The Drive/Old Dover Road

4.31. The modelling work shows the existing junction to operate slightly over capacity currently and well over capacity in the future years. It is proposed to introduce a dedicated right turn lane on Old Dover Road south and link this junction with the Nackington Road junction to the south. With these alterations the modelling results show the junction to operate within capacity in all scenarios.

4.32. The operational assessments included in Appendix JJ of the TA do not include phase or stage diagrams so it is not clear how pedestrians have been allowed for in the modelling work. Further information is required on this point.

Junction 12 – Nackington Road/Old Dover Road

4.33. The modelling work shows the existing junction to operate slightly over capacity currently and well over capacity in the AM peak hour in the future years. It is proposed to link the junction to the St Lawrence Road junction and to implement some minor alterations to a stop line location and length of right turn lane. Again, no phase or stage diagrams are provided so it is not possible to understand what assumptions have been made in relation to the use of the pedestrian facilities. It is noted that the cycle time for the future year scenarios is assumed to be 120 seconds. This is the maximum cycle time and is not ideal for pedestrians who are generally unwilling to wait this long before being allowed to cross.

Junction 13 – Underwood Close/ Nackington Road

4.34. The modelling results show this junction to operate within capacity in all situations although it was observed during the traffic surveys that traffic queues back to this junction from the north-east.

Junction A – New 5-arm roundabout within development

4.35. This 5 arm roundabout lies between the development and the A2. The modelling reported in the TA shows the junction to operate within capacity in the peak hours with all development scenarios.

4.36. It has been noted above that the TA underestimates the amount of development traffic that is likely to travel to and from the east via the A2. It is therefore likely that the Link Road south will carry more trips than currently allowed for in the model. This arm is shown to operate with some spare capacity in the future year but it is not known how sensitive this arm would be to additional vehicle movements during the peak hours. This issue needs to be highlighted with Highways England.

Junction B – New 3-arm roundabout within development

4.37. This 3 arm roundabout caters for the A2 eastbound on-slip and allows connection to Bridge and areas to the south. The modelling results show the junction to operate within capacity in all development scenarios.

Area C – New Dover Road and development accesses

4.38. The modelling results show the proposed new signalised junctions to operate within capacity in the future year with development. Since no phase or stage diagrams are attached to Appendix JJ of the TA it is not possible to establish what allowance has been made for pedestrians crossing at the junctions.

Junction D – New Dover Road Bus Gate

4.39. The results of the modelling show the bus gate to operate without undue delays to other vehicle movements along New Dover Road.

Junction E – P&R exit

4.40. The results of the modelling show this junction to operate within capacity in the future year situations.

## Conclusion on Junction Assessments

4.41. The following issues have been identified in relation to the operational assessment of junctions within the study area:

1. All operational assessments under-estimate the impact of development traffic given the assessment of trip generation and potential trip transfer set out above;
2. Most operational assessments lack credibility since no queue length observations have been undertaken at the majority of junctions. The computer models of the existing situation cannot, therefore, be properly calibrated. Where queue length observations have been undertaken they have not, in some case, been used to calibrate base year models and the benefits of the proposed highway amendments have been over-estimated;
3. The Town Hill/Station Road/High Street junction is shown to operate well over capacity in 2031 and the proposed replacement of the existing junction

with a mini-roundabout has not been shown to be deliverable without third party land or a safe junction configuration in this location;

4. The St Lawrence Road/New Dover Road junction is shown to operate over capacity in 2031. No junction improvement is proposed;
5. The proposed ban on right turners from St George's Place into Upper Chantry Lane is not supported by CCC Transportation and Environment who consider it unacceptable to divert traffic, including buses onto Dover Street. The inability to deliver this ban on right turns will lead to an increased impact on the St George's Place/Upper Chantry Lane junction that may be severe;
6. The St George's Roundabout is shown to operate well over capacity in 2031 with development. It has not been shown that the proposed widening of the St George's Place arm of this junction is feasible given the proximity of the pedestrian underpass and possible other constraints and it is questionable whether the suggested reduction in queues and delays at the junction will materialise given the very limited length of the section of road to be widened and the fact that the operation of the junction is adversely affected by queuing on the ring road that blocks vehicles entering from side arms during peak periods;
7. The modelling of the Riding Gate roundabout is deficient in that it makes no allowance for the busy pedestrian crossing on the Old Dover Road arm of the junction or traffic queuing back from the Nunnery Fields junction;
8. No allowance is made in the operational assessment of the Riding Gate roundabout for trips diverted by the proposed ban on right turning vehicles from Old Dover Road into Oaten Hill;
9. The Oaten Hill/Nunnery Fields/Old Dover Road junction is critical to the success of the development proposals since it lies on the main bus route incorporating the fast bus link and it lies on one of the main pedestrian and cycle routes between the site and the city. It is necessary to ban all right turns at the junction in order to achieve an increase in vehicle capacity. It has not been demonstrated that any such scheme is realistic or achievable;
10. It appears that vehicle movements have been removed from the study network and assumed to use the local highway network around Wincheap despite the roads being sensitive, traffic calmed residential streets connecting with the congested A28 Wincheap corridor. No assessment of the possible implications of this displaced traffic is presented;
11. The information that is available within the TA appendices does not make it clear what has been allowed for in terms of pedestrians crossing at a number of key junctions (including the St Lawrence Road/The Drive/Old Dover Road junction, the Nackington Road/Old Dover Road junction and Area C – New Dover Road and development accesses). This is critical information since a failure to allow for pedestrian movement will undermine both the sustainable travel strategy and the vehicle access strategy since the vehicle capacity of these junctions may have to be reduced.
12. The proposed junctions serving the A2 require further modelling work to reflect the required uplift in overall trip generation rates, the inaccurate distribution of A2 traffic and the fact that the improved A2 junction will attract vehicles that are currently using other routes to access Canterbury.

## Vehicle Delay

4.42. It has already been stated that the lack of queue length observations and the inconsistent application of the queue length data that are available undermine the credibility of the vehicle delay calculations that are set out in the TA.

4.43. The TA at paragraph 9.2.17 states:

> *'It is evident that the local road users would generally experience similar or less delay to their journeys at junctions during the peak periods on the local highway network in the 2031 'Do Something' scenarios when compared with existing conditions (2014) and considerably less delay when compared with the 2031 'Do Minimum' scenario.'* (para. 9.2.17 of TA)

4.44. This conclusion has no credibility given the lack of calibration of the junction models due to the failure to undertake queue length observations.

4.45. The conclusion is also in stark contrast to the conclusion of the VISUM modelling of the development options. The 2016 VISUM update includes the majority of the key infrastructure improvements such as the new A2 junction, the Fast Bus Link, bus priority measures and the increased capacity of the park and ride at New Dover Road. The results of the modelling comparing the 2031 'do minimum' with the 2031 'do something' scenarios, however, show journey times on the New Dover Road to more than double in the AM peak hour from around 5 minutes to around 11 minutes (inbound) and to increase from less than 4 minutes to over 6 minutes in the PM peak hour (outbound).

## 5. SUSTAINABLE TRAVEL

### Walking

5.1. The achievement of the predicted level of mode transfer from car to non-car modes relies heavily on the ability for trips to be made on foot. The most commonly quoted source for assessing opportunities to undertake trips on foot is Table 3.2 of the Institute of Highways and Transportation's (IHT's), 'Providing for Journeys on Foot (IHT, 2000). This identifies a desirable walking distance of 400m, an acceptable walking distance of 800m and a preferred maximum walking distance of 1,200m for locations 'elsewhere'. For commuting, school and sightseeing the preferred maximum walk distance increases to 2,000m. Although it is not made clear exactly what is meant by desirable, acceptable and preferred maximum, the general interpretation is that over 800m opportunities for walking reduce and few walk trips are over 1,200m. The TA quotes a study of walk distances undertaken by White Young Green (WYG) in 2015 that generally supports the IHT guidelines as it shows that half of walk trips are under 800m. The study identifies a mean walk distance of 1,150m and an 85$^{th}$ percentile walk distance of 1,950m. The latter is in line with the preferred maximum walk distance for commuting and school trips identified by the IHT. The WYG figures are less helpful, in a way, as they do not provide any indication of the proportion of trips that are under these distances. It appears that the mean and 85$^{th}$ percentile distances may be skewed by a small number of longer walk journeys since 20% of walk journeys in the study were not ascribed to any specific purpose, they included 'just walk' and were around 50% longer than trips with specified purposes. Notwithstanding the above, the WYG figures are used to categorise the walk journeys to local facilities based on the distances set out in Figure 3.3 of the TA:

*Table 5.1: Opportunities for undertaking journeys on Foot*

| Trip Type | Destination | Distance from northern half | Distance from southern half |
|---|---|---|---|
| **Education** | Simon Langton Grammar School for Boys | 1.8km | 0.7km |
| | Simon Langton Grammar School for Girls | 1.1km | 1.1km |
| | St Anselm's Catholic School | 0.7km | 0.7km |
| | Chaucer Technology School | 1.2km | 2.3km |
| | Pilgrim's Way Primary School | 0.9km | 2.0km |
| **Higher Education** | Canterbury Christ Church University | 2.3km | 3.0km |
| | University of Creative Arts | 2.0km | 2.5km |
| | Canterbury College | 2.0km | 2.5km |
| **Healthcare** | Kent and Canterbury Hospital | 2.4km | 1.0km |
| | Chaucer Hospital | 1.8km | 0.7km |
| **Retail** | Sainsbury's Local | 1.4km | 1.6km |
| | Canterbury City Centre | 2.4km | 2.8km |
| | Waitrose | 2.2km | 2.6km |
| | Morrison's | 4.3km | 4.4km |
| | Sainsbury's | 3.6km | 4.0km |
| | Asda | 4.5km | 4.9km |
| **Leisure** | St Lawrence Cricket Ground | 1.4km | 1.6km |
| **Transport** | Old Dover Road bus stops | 0.6km | 0.8km |
| | Canterbury West Rail Station | 2.8km | 2.4km |
| | Canterbury East Rail Station | 3.5km | 3.9km |
| | Less than 800m (median trip distance) | | |
| | Between 800m and 1,150m (mean trip distance) | | |
| | Between 1,150m and 1,950m (85th percentile trip distance) | | |
| | Over 1,950m | | |

5.2. The table shows that the majority of destinations are beyond the 85th percentile walk trip distance and only a very small proportion are within the median trip distance. The city centre, although between 2.4km and 2.8km from the site does is not within walking distance for the vast majority of residents. It is concluded that for the vast majority of trips to 'local' destinations, walking does not offer a realistic choice of mode for most people. The only land use that will be provided within the site that will offer a significant opportunity for walk trips will be the provision of primary education. It is therefore not justifiable to assume that the site's location offers significant benefits in terms of providing opportunities for travel on foot. This issue has also been examined in the context of trip transfer above.

## Cycle Improvements

5.3. There is a significant difference in level between the site and the city centre. This represents a significant barrier to cycling from the centre to the site. The deterrence effect of this difference in level has not been considered in the TA. In reality the difficulty that people will face cycling from the city to the site will serve to limit the potential for mode shift to cycling. This deterrence effect is independent of any measures that are proposed to facilitate the movement of cyclists along routes and through junctions.

5.4. It is noted that Drawing 024 rev C (Phase 2 Transport Infrastructure) shows a cycle improvement between the southern section of the site and Juniper Close/Stuppington Lane. This is a largely off-road route that connects with residential streets. The route is labelled as, 'cycle/pedestrian improvements between site and city centre' on drawing 024 rev C. The route is also shown on Plan 5.20A, 'Proposed Cycle and Pedestrian Improvements'. Figure 7.2 of the TA, however, states that., 'No new significant infrastructure planned in this phase due to majority of sustainability measures front loaded to infrastructure delivery'. The improvement is not identified as part of the Phase 1 cycle infrastructure. Later phases show this improvement to be in place. The summary of proposed infrastructure improvements at section 4.10 of the TA refer to the Public Right of Way (PROW) CC49 that includes the off-road section between Nackington Road and Juniper Close but only identified a crossing of Nackington Road and improvements along Nunnery Fields.

5.5. The PERS assessment (Appendix H of the TA) also identifies a lack of lighting on this route and the fact that the route is not well overlooked (therefore raising issues of personal security). The issues are reiterated in the cycle audit (Appendix I of the TA).

5.6. Given this link's importance as a high quality, partially car free link between the site and the city it is necessary to understand how and when the proposed improvement is going to be delivered. The TA fails to provide this information.

5.7. It is noted that a significant amount of work has been undertaken to assess the available pedestrian and cycle routes between the site and the city. It is clear from this work that the routes, without exception, are mixed in standard with numerous issues relating to safety, the crossing of busy roads, obstructions, on-street parking, delays, gradients etc. Efforts have been made to overcome the most serious of the concerns but it is clear that there is no single route that provides a high quality, direct and convenient link between the site and the city centre for cyclists. This fact needs

to be considered when assessing the potential for transferring trips from car to non-car modes.

## Bus Access Strategy

5.8. Technical Note 35 that is attached as Appendix F of the TA provides details of the proposed bus access strategy.

5.9. The final bus access strategy is dependent on the delivery of the fast bus link between the site and Nunnery Fields. The interim bus access arrangements are indicated for up to Phase 2 (2022/1,600 dwellings). The implication is that development will not progress beyond phase 2 until the fast bus link is implemented.

5.10. The latest version of VISUM modelling for Canterbury assesses the likely effects in terms of transfer of car driver trips to bus trips based on the range of bus measures that are proposed as part of the Mountfield Park development and other schemes in the city. The report concludes that,

> *'4.2.6 The forecast average peak mode share for HBW and HBO trips demonstrate relatively little change between the Do Minimum and DS2 scenarios.*
>
> *4.2.7 In the wider strategic sense, there are only small incentives being applied to encourage mode shift from car to bus, therefore, it is not considered surprising that the mode choice model has minimal effect. The bus priority measures are helping to enable the current bus timetables to be effective into the future; however do not introduce significant priority, for example at key junctions, to give bus users a tangible time saving.'* (paras 4.2.6 and 4.2.7 of Amey Report, March 2016)

5.11. This conclusion is at odds with the expectation expressed in the TA that the level of bus use will rise from the existing 5.5% level of bus use in the area to 9.3% with the proposed development. The Amey conclusion adds further weight to the conclusion, set out in section 2, that the transfer of trips from car to non-car modes has been significantly over-estimated in the TA.

5.12. The TA assumes that the bus mode share for those working within the proposed development will be 9.3%. For existing people working within the super output area, middle layer Canterbury 016 (between the site and the inner ring road) only 1.8% of workers travelling up to 5km (i.e. from within Canterbury) travel by public transport to and from work. This suggests that the target bus mode share for the commercial uses within the site is even less likely to be achieved than that for residents living within the site.

5.13. It is noted that the incentive of free bus travel for 3 months and half price bus travel for 2 years will only be available to one person per household. It is possible that this approach will undermine the effectiveness of the strategy since the main car user in the household may be disincentivised to use the bus if no subsidy is available for a second person.

5.14. It has been noted above that the assumptions that have been made to identify the proportion of trips that are to destinations within the city are overly optimistic. It is therefore likely that the number of trips that are potentially made by local bus is less than predicted in the TA with the knock-on effect that the overall level of bus patronage will be reduced. This will also reduce the commercial viability of the services and the likelihood that bus services will continue to be available into the future.

## Access to Rail

5.15. It is shown above that both northern and southern sections of the site lie beyond a reasonable walking distance of both railway stations within Canterbury. The cycle routes between the site and the railway stations suffer from the same constraints have been outlined above and apply to other cycle journeys between the site and the city centre. There is the further deterrent of crossing the inner ring road and passing through the constrained city centre in order to access Canterbury West station by bicycle.

5.16. At present 2.7% of residents living close to the proposed site travel to work by train to London and 4.8% of residents use train to access work to all destinations (see **Appendix 2**). Technical Note 22 that deals with the bus access strategy does not indicate any direct buses between the site and the railway stations. There is a suggestion that the route of one bus journey every 30 minutes could be extended to provide direct access to Canterbury West railway station. However, no detail is provided as to what the implications of this diversion would have in terms of the requirement for additional buses to maintain the proposed frequency of bus service, particularly at peak times.

5.17. The proposed site does not have good access to rail services in terms of access on foot, by bicycle or by bus. Rail does not, therefore, provide an opportunity to encourage the transfer of trips from car to rail. Further, it appears that it will be difficult, if not impossible to achieve a level of rail use from the proposed site that exceeds the level currently observed in existing residential areas in south Canterbury.

## 6. ENVIRONMENTAL IMPACT

6.1. Environmental impact in the context of changes in transport covers a range of issues including driver delay, pedestrian delay, community severance, fear and intimidation, highway safety and air quality.

6.2. Chapter 5 of the Environmental Statement deals with transport issues and concludes that all impacts will be negligible after the implementation of mitigation measures. The chapter relies on the traffic flow predictions set out in the TA. The chapter makes no reference to the fact that the proposed development will have an impact on Air Quality Management Areas (AQMAs), conservation areas or the fact that the part of Canterbury city centre immediately north of the St George's Place/Lower Bridge Street junction is designated as a World Heritage Site.

6.3. Chapter 6 of the Environmental Statement deals with air quality issues. It is stated in Chapter 6 that, '[…] *the rate of reduction* [in emissions] *due to cleaner technologies is expected to be less than previously anticipated and additional measures will be required in order to reduce background and roadside NO2 concentrations to below the National Objective*' (para. 6.4.2). The centre of Canterbury is particularly sensitive to increases in vehicle emissions since the inner ring road is designated as part of an AQMA.

6.4. CCC is committed to undertaking a comprehensive air quality assessment for the area around the inner ring road. This study is yet to be undertaken. It is likely that the outcome of the study will have significant implications for major development that will impact on the inner ring road and the major radial routes that link with it. It is clear from the assessment of the work undertaken in support of the Mountfield Park proposals that there are significant risks that the level of impact in terms of numbers of additional vehicles and levels of congestion within and close to the AQMA, conservation areas and the World Heritage Site will be significantly higher than predicted in the TA. The reasons for this, that have been described in detail above include:

- Trip generation rates are likely to be higher than anticipated in the TA;
- The level of transfer from car to non-car modes is likely to be lower than anticipated in the TA;
- The level of background traffic growth is likely to be higher than anticipated;
- The levels of queuing, both now and in future, is greater than reported in the TA and there has been a failure to undertake the queue length surveys that are required to calibrate the junction models;

- A number of the highway improvements proposed to mitigate the predicted increase in vehicle movements on the local highway network, including those at and close to the inner ring road have either not been shown to be feasible for highway safety or deliverability reasons or are not supported by CCC Transportation and Environment. It is therefore likely that the level of impact in terms of numbers of vehicle movements and levels of queuing predicted in the TA are underestimated.

6.5. Given the above, it is considered that it would be premature to allow the major development at Mountfield Park before the air quality assessment is undertaken and the errors and areas of uncertainty set out in this report and elsewhere are properly addressed.

6.6. It should also be noted that the areas around the inner ring road are particularly sensitive to changes in air quality since they comprise conservation areas, AQMAs and the part of Canterbury city centre immediately north of the St George's Place/Lower Bridge Street junction is designated as a World Heritage Site. These designations provide a broad context of high sensitivity against which adverse impacts in terms of vehicle queue and delays, highway safety issues, pedestrian delay and severance and air quality should be judged. The threshold of a 'severe' impact in the context of an area of high sensitivity is lower than that for an area of lower sensitivity. This leads to the conclusion that there is an urgent need to ensure that the levels of predicted impacts are robust and properly assessed and that care is taken to ensure that the significance of impacts is judged in the context of an area of high sensitivity.

## 7. IMPACT ON NACKINGTON ROAD

7.1. The TA assigns no development traffic to Nackington Road. Nackington Road provides a direct and reasonable quality route to areas to the south (Hythe and Folkestone) via junction 11 of the M20. The distances and travel times for the route between the Nackington Road/Old Dover Road junction to Junction 11 of the M20 via Nackington Road and via the A2 junction are set out in the following table:

*Table 7.1: Route between Old Dover Road and M20 Junction 11*

| Route | Distance | Time (from Google Maps) |
|---|---|---|
| Via Nackington Road | 13.2 miles | 20 min |
| Via A2 | 19.5 miles | 27 min |
| difference | 6.3 miles | 7 min |

7.2. It can be seen that the route via Nackington Road is 6.3 miles shorter than the route via the A2 and 7 minutes quicker. It is concluded that the route offers a relatively attractive alternative route for those travelling south. Census data shows that 5.2% of work journeys from south Canterbury have destinations in Shepway (Folkestone, Hythe and Lydd). It is therefore possible that up to around 5% of development traffic will use the Nackington Road route to access areas to the south. This could represent an increase in 2-way flows on this route of up to 100 vehicle movements in the peak hour. In addition, the improved A2 junction may also attract other existing trips travelling on the A2 and bound for destinations in Shepway to divert from the A2 and use the Nackington Road route rather than negotiating the longer route via the A2 east.

7.3. No measures are proposed to mitigate the possible adverse impacts of increased traffic on Nackington Road. On the contrary, the section within the TA that described the proposed improvement to the Nackington Road/Old Dover Road junction (paras. 7.7.13 to 7.7.24) specifically cite the increase in capacity of the Nackington Road arm of the junction as a benefit without considering the implications that this will have in terms of encouraging increased use of this route.

## 8. SUMMARY AND CONCLUSION

8.1. This report sets out a review of the transport and highways work that has been undertaken in support the proposed Mountfield Park development south of Canterbury (Planning application ref. CA/16/00600). The work has been commissioned by The South Canterbury Alliance. The purpose of this work is to assess the reliability of the transport supporting information and identify whether there are any risks that the proposed transport and access strategy will lead to unacceptable (severe) impacts.

8.2. A review of the work undertaken to derive estimates of the level of transfer of residential car trips to non-car modes indicates that:

1. The opportunities for non-car travel have been significantly over-estimated since too many trips have been assumed to be to Canterbury city centre;
2. The likely level of transfer of trips from car to sustainable modes has been over-estimated.

8.3. The effect of the above is that the reduction in generic trip generation rates is significantly less than that predicted in the TA. The application of more justifiable and reasonable assumptions about trip distribution and trip transfer suggests that the overall residential car trip generation should be around 350 car trips higher in the AM peak hour than suggested in the TA and around 680 car trips higher in the PM peak hour than suggested in the TA.

8.4. A review of the method used to derive commercial trip generation rates suggests that the trip rates used in the TA underestimate the likely trip rates by up to 40% or by between 350 and 253 car trips in the AM and PM peak hours respectively.

8.5. The level of internalisation of employment trips is grossly exaggerated in the TA. Highways England has also expressed concern over this aspect of the assessments and have requested that no reduction in employment trips be applied. Despite these concerns, the TA still applies the reduction in employment trips assumed from the grossly over-optimistic level of trip internalisation.

8.6. The TA makes no allowance for the attraction of non-commercial car trips into the development. These will include the staff at the primary schools, a number of pupil escort trips and trips to other facilities within the development.

8.7. From a review of the most recently available observed data on changes in traffic entering the city it is concluded that that traffic is currently increasing by 2% per year and along the New Dover Road corridor it is increasing by 4% per year. This growth is despite no significant new development accessed from the New Dover Road corridor over this period. These significant increases are not taken into account in deriving

forecasts of traffic against which to assess the impact of the proposed development. The assumptions that have been made to reduce background traffic growth between 2014 and 2031 are not supported by the historical pattern of traffic growth on this corridor and it is likely that the level of background traffic growth has been underestimated in the assessments reported in the TA.

8.8. No allowance has been made in the assessments for the attraction of existing trips that are currently using other A2 junctions to the proposed improved A2 junction.

8.9. All traffic generated by committed developments is assumed to be spread evenly across the network. This approach fails to take into account the fact that traffic associated with committed development will be concentrated in certain areas and on certain main routes into and out of the city. Given the increased attractiveness of the New Dover Road corridor resulting from the provision of the new A2 junction it is likely that the assessments underestimate the level of traffic growth on this corridor associated with committed development.

8.10. The following issues have been identified in relation to the operational assessment of junctions within the study area:

1. All operational assessments under-estimate the impact of development traffic given the assessment of trip generation and potential trip transfer set out above;
2. Most operational assessments lack credibility since no queue length observations have been undertaken at the majority of junctions. The computer models of the existing situation cannot, therefore, be properly calibrated. Where queue length observations have been undertaken they have not, in some case, been used to calibrate base year models and the benefits of the proposed highway amendments have been over-estimated;
3. The Town Hill/Station Road/High Street junction is shown to operate well over capacity in 2031 and the proposed replacement of the existing junction with a mini-roundabout has not been shown to be deliverable without third party land or a safe junction configuration in this location;
4. The St Lawrence Road/New Dover Road junction is shown to operate over capacity in 2031. No junction improvement is proposed;
5. The proposed ban on right turners from St George's Place into Upper Chantry Lane is not supported by CCC Transportation and Environment who consider it unacceptable to divert traffic, including buses onto Dover Street. The inability to deliver this ban on right turns will lead to an increased impact on the St George's Place/Upper Chantry Lane junction that may be severe;
6. The St George's Roundabout is shown to operate well over capacity in 2031 with development. It has not been shown that the proposed widening of the St George's Place arm of this junction is feasible given the proximity of the pedestrian underpass and possible other constraints and it is questionable whether the suggested reduction in queues and delays at the junction will materialise given the very limited length of the section of road to be widened

and the fact that the operation of the junction is adversely affected by queuing on the ring road that blocks vehicles entering from side arms during peak periods;

7. The modelling of the Riding Gate roundabout is deficient in that it makes no allowance for the busy pedestrian crossing on the Old Dover Road arm of the junction or traffic queuing back from the Nunnery Fields junction;
8. No allowance is made in the operational assessment of the Riding Gate roundabout for trips diverted by the proposed ban on right turning vehicles from Old Dover Road into Oaten Hill;
9. The Oaten Hill/Nunnery Fields/Old Dover Road junction is critical to the success of the development proposals since it lies on the main bus route incorporating the fast bus link and it lies on one of the main pedestrian and cycle routes between the site and the city. It is necessary to ban all right turns at the junction in order to achieve an increase in vehicle capacity. It has not been demonstrated that any such scheme is realistic or achievable;
10. It appears that vehicle movements have been removed from the study network and assumed to use the local highway network around Wincheap despite the roads being sensitive, traffic calmed residential streets connecting with the congested A28 Wincheap corridor. No assessment of the possible implications of this displaced traffic is presented;
11. The information that is available within the TA appendices does not make it clear what has been allowed for in terms of pedestrians crossing at a number of key junctions (including the St Lawrence Road/The Drive/Old Dover Road junction, the Nackington Road/Old Dover Road junction and Area C – New Dover Road and development accesses). This is critical information since a failure to allow for pedestrian movement will undermine both the sustainable travel strategy and the vehicle access strategy since the vehicle capacity of these junctions may have to be reduced.
12. The proposed junctions serving the A2 require further modelling work to reflect the required uplift in overall trip generation rates, the inaccurate distribution of A2 traffic and the fact that the improved A2 junction will attract vehicles that are currently using other routes to access Canterbury.

8.11. The conclusion of the TA that vehicle delay in 2031 with development will be similar or less than that experienced by drivers in 2014 has no credibility both because the modelling of junctions has not been calibrated against existing observed queue lengths and because the conclusion is in stark contrast to the results of the VISUM modelling that shows journey times on the New Dover Road to more than double as a result of development in 2031 in the AM peak hour and increase by over 50% in the PM peak hour.

8.12. A review of the distance between the proposed site and key destinations shows that the vast majority of destinations are beyond reasonable walk trip distance. The city centre, although between 2.4km and 2.8km from the site does is not within walking distance for the vast majority of residents. It is concluded that for the vast majority of trips to 'local' destinations, walking does not offer a realistic choice of mode for most people. It is

therefore not justifiable to assume that the site's location offers significant benefits in terms of providing opportunities for travel on foot.

8.13. The proposed cycling routes, without exception, are mixed in standard with numerous issues relating to safety, the crossing of busy roads, obstructions, delays, gradients etc. It is clear that there is no single route that provides a high quality, direct and convenient link between the site and the city centre for cyclists. It is concluded that although many facilities are within cycling distance of the site, cycling as a mode is unlikely to offer the potential for significant mode transfer from private car.

8.14. A large section of the key cycle route between the southern section of the site and the city centre and train station is unlit and not overlooked. It appears that the developer has no power to remedy these deficiencies.

8.15. The VISUM modelling of the proposed development indicates that there is very limited potential to achieve significant mode transfer from car to bus due to the very limited incentives that are available to make bus more attractive than car travel. In contradiction to this conclusion the TA relies on a significant transfer of car trips to bus.

8.16. The proposed site does not have good access to rail services in terms of access on foot, by bicycle or by bus. Rail does not, therefore, provide an opportunity to encourage the transfer of trips from car to rail. Further, it appears that it will be difficult, if not impossible to achieve a level of rail use from the proposed site that exceeds the level currently observed in existing residential areas in south Canterbury.

8.17. An assessment of the relative attractiveness of the Nackington Road route compared to the A2 route to areas to the south (Shepway) indicates that the proposed development is likely to lead to a significant increase in the number of vehicle movements on this route. No mitigation measures are proposed in response to this increase in traffic.

8.18. The proposed development will impact on conservation areas, AQMAs and on a World Heritage Site. These environmental designations increase the sensitivity of the areas affected by the proposed development and need to be considered when assessing whether or not the adverse impact resulting from the development should be considered severe. The work presented in the TA fails to properly assess the impact of development in this context.

8.19. Air quality is a recognised problem in Canterbury. It is premature to allow major development that has the potential to have a significant adverse impact on traffic flows, queues and delays in sensitive areas around Canterbury before CCC has concluded the forthcoming air quality assessment.

8.20. In summary, this report has identified the following issues in relation to the transport work undertaken in support of the Mountfield park proposals:

- The work significantly underestimates the car trip generation of the proposed development;
- The work significant over-estimates the potential for the transfer of car trips to non-car modes;
- The work makes insufficient allowance for background traffic growth and traffic generated by committed developments;
- The lack of queue length observations at junctions undermines the reliability and validity of the junction modelling and undermines the conclusions of the modelling and journey time work;
- The outputs of the VISUM model should be treated with caution since the model has not been validated or calibrated against observed traffic flows or journey times since 2008;
- A number of key elements of the proposed highway mitigation strategy are not viable, are not supported by the Highway Authority or their impacts have not been properly assessed;
- The assessment work does not acknowledge the increased sensitivity of the areas affected by the proposals resulting from the presence of AQMAs, conservation areas and the designation of the city as a whole as World Heritage Site;
- The proposed development is likely to have an adverse impact on Nackington Road and no mitigation is proposed.

8.21. It is concluded that the transport work undertaken in support of the Mountfield Park proposals underestimates its adverse transport impact and fails to present a credible and effective access strategy. The application is premature in relation to urgent air quality assessment work and further transport work is required to provide reliable evidence demonstrating that the proposals can proceed without leading to severe transport impacts.

# Appendices

**Appendix 1**: 2011 Census Data: Number of Workers in Canterbury

**2011 Census Data**

## WP101EW - Population (Workplace population)

| 2011 Ward | workers |
|---|---|
| E05004903 : Barton | 11,455 |
| E05004904 : Blean Forest | 4,145 |
| E05004916 : Northgate | 5,583 |
| E05004918 : St Stephens | 2,140 |
| E05004921 : Sturry South | 672 |
| E05004924 : Westgate | 9,485 |
| E05004925 : Wincheap | 3,288 |
| **Total** | **36,768** |

**Appendix 2**: 2011 Census Data: Work Destinations from Area Canterbury 016

**WU03EW - Location of usual residence and place of work by method of travel to work (MSOA level)**

| living in | E02005025 : Canterbury 016 (2011 super | | | | | | | | % |
|---|---|---|---|---|---|---|---|---|---|
| | **all** | **train** | **bus** | **m/c** | **driver** | **pass** | **cycle** | **foot** | **car driver** |
| Adur | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| Arun | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| Ashford | 165 | 19 | 4 | 0 | 133 | 4 | 0 | 5 | 9.0% |
| Aylesbury Vale | 3 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0.1% |
| Basingstoke and Deane | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0.1% |
| Bracknell Forest | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| Brighton and Hove | 2 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0.0% |
| Cherwell | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| Chichester | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| Chiltern | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| Crawley | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0.2% |
| Dartford | 17 | 0 | 2 | 0 | 12 | 0 | 0 | 3 | 0.8% |
| Dover | 227 | 6 | 22 | 1 | 173 | 15 | 2 | 8 | 11.8% |
| East Hampshire | 3 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0.1% |
| Eastbourne | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| Eastleigh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| Elmbridge | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| Epsom and Ewell | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| Fareham | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.0% |
| Gosport | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| Gravesham | 14 | 1 | 1 | 0 | 6 | 0 | 0 | 1 | 0.4% |
| Guildford | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0.1% |
| Hart | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.0% |
| Hastings | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| Havant | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| Horsham | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| Isle of Wight | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| Lewes | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| Maidstone | 59 | 1 | 0 | 0 | 54 | 3 | 0 | 1 | 3.7% |
| Medway | 52 | 8 | 2 | 0 | 39 | 3 | 0 | 0 | 2.7% |
| Mid Sussex | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0.1% |
| Milton Keynes | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| Mole Valley | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0.1% |
| New Forest | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| Oxford | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| Portsmouth | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| Reading | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0.1% |
| Reigate and Banstead | 14 | 1 | 2 | 0 | 9 | 2 | 0 | 0 | 0.6% |
| Rother | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| Runnymede | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0.1% |
| Rushmoor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| Sevenoaks | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0.2% |
| Shepway | 96 | 2 | 4 | 0 | 76 | 8 | 2 | 3 | 5.2% |
| Slough | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| South Bucks | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| South Oxfordshire | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| Southampton | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| Spelthorne | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| Surrey Heath | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0.1% |
| Swale | 114 | 15 | 2 | 1 | 89 | 6 | 0 | 1 | 6.1% |
| Tandridge | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| Test Valley | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| Thanet | 80 | 3 | 2 | 1 | 65 | 5 | 0 | 3 | 4.4% |
| Tonbridge and Malling | 16 | 0 | 0 | 0 | 16 | 0 | 0 | 0 | 1.1% |
| Tunbridge Wells | 13 | 2 | 0 | 1 | 9 | 0 | 0 | 1 | 0.6% |
| Vale of White Horse | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| Waverley | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| Wealden | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| West Berkshire | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| West Oxfordshire | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| Winchester | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| Windsor and Maidenhead | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0.0% |
| Woking | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0.1% |
| Wokingham | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| Worthing | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.0% |
| Wycombe | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0.1% |
| London | 169 | 89 | 11 | 1 | 43 | 5 | 2 | 10 | 2.9% |
| E02005010 : Canterbury 001 | 27 | 0 | 2 | 0 | 22 | 2 | 0 | 1 | 1.5% |
| E02005011 : Canterbury 002 | 7 | 0 | 1 | 0 | 6 | 0 | 0 | 0 | 0.4% |
| E02005012 : Canterbury 003 | 15 | 0 | 2 | 0 | 11 | 1 | 0 | 1 | 0.7% |
| E02005013 : Canterbury 004 | 11 | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 0.7% |
| E02005014 : Canterbury 005 | 40 | 0 | 3 | 0 | 35 | 1 | 0 | 1 | 2.4% |
| E02005015 : Canterbury 006 | 4 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 0.2% |
| E02005016 : Canterbury 007 | 7 | 0 | 2 | 0 | 5 | 0 | 0 | 0 | 0.3% |
| E02005017 : Canterbury 008 | 20 | 0 | 3 | 0 | 13 | 0 | 1 | 3 | 0.9% |
| E02005018 : Canterbury 009 | 26 | 0 | 0 | 1 | 21 | 3 | 0 | 1 | 1.4% |
| E02005019 : Canterbury 010 | 21 | 0 | 5 | 1 | 13 | 0 | 1 | 0 | 0.9% |
| E02005020 : Canterbury 011 | 62 | 0 | 3 | 1 | 28 | 6 | 7 | 17 | 1.9% |
| E02005021 : Canterbury 012 | 206 | 2 | 58 | 2 | 104 | 10 | 12 | 17 | 7.1% |
| E02005022 : Canterbury 013 | 40 | 0 | 2 | 0 | 22 | 1 | 2 | 13 | 1.5% |
| E02005023 : Canterbury 014 | 203 | 0 | 3 | 2 | 81 | 3 | 14 | 96 | 5.5% |
| E02005025 : Canterbury 016 | 753 | 2 | 14 | 1 | 165 | 13 | 38 | 516 | 11.2% |
| E02005026 : Canterbury 017 | 42 | 0 | 4 | 1 | 26 | 4 | 1 | 6 | 1.8% |
| E02005027 : Canterbury 018 | 59 | 0 | 6 | 0 | 36 | 11 | 0 | 6 | 2.4% |
| E02006855 : Canterbury 019 | 100 | 0 | 0 | 0 | 44 | 8 | 5 | 41 | 3.0% |
| E02006856 : Canterbury 020 | 530 | 3 | 17 | 3 | 81 | 16 | 44 | 365 | 5.5% |
| | **3239** | **155** | **178** | **17** | **1470** | **131** | **133** | **1127** | **100.0%** |
| | | 4.8% | 5.5% | 0.5% | 45.4% | 4.0% | 4.1% | 34.8% | |

# Work Destinations for Existing Residents in south Canterbury

total Canterbury City (areas 019, 016, 014, 020, 013, 012)
**33.8%**

total A28 north-east (areas 001, 002, 003, 004, 006, 010, 011, Thanet)
**10.8%**

total north-west via A290 (areas 005, 007, 008, 009)
**5.0%**

total A28 west (areas 017 and Ashford)
**10.8%**

total A2 south-east (area 018, Dover, Shepway)
**19.4%**

total A2 north-west
**20.1%**

**100.0%**

**2.7%** train to London

**Appendix 3**: Revised Calculation of Trips to City Centre

# Calculation of Trips to Canterbury (local trips with potential for mode transfer)

## Calculation set out in Figure 4.16 of TA

| | | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | Trip purpose | % of car trips in peak hour | % of car trips to destination | % of trips by purpose and destination | % of car trips in peak hour | % of car trips to destination | % of trips by purpose and destination |
| A2 E | work | 39.4% | 9.6% | 3.78% | 43.9% | 9.6% | 4.21% |
| | business | 6.0% | 20.0% | 1.20% | 5.0% | 20.00% | 1.00% |
| | education | 28.5% | 0.0% | 0.00% | 1.9% | 0.00% | 0.00% |
| | shopping | 5.2% | 5.0% | 0.26% | 11.8% | 5.00% | 0.59% |
| | leisure | 21.1% | 5.0% | 1.06% | 37.5% | 5.00% | 1.88% |
| | **all** | **6.3%** | | | **7.7%** | | |
| A2 W | work | 39.4% | 43.3% | 17.06% | 43.9% | 43.3% | 19.01% |
| | business | 6.0% | 80.0% | 4.80% | 5.0% | 80.0% | 4.00% |
| | education | 28.5% | 10.0% | 2.85% | 1.9% | 10.0% | 0.19% |
| | shopping | 5.2% | 10.0% | 0.52% | 11.8% | 10.0% | 1.18% |
| | leisure | 21.1% | 10.0% | 2.11% | 37.5% | 10.0% | 3.75% |
| | **all** | **27.3%** | | | **28.1%** | | |
| City Centre | work | 39.4% | 47.1% | 18.56% | 43.9% | 47.1% | 20.68% |
| | business | 6.0% | 0.0% | 0.00% | 5.0% | 0.0% | 0.00% |
| | education | 28.5% | 90.0% | 25.65% | 1.9% | 90.0% | 1.71% |
| | shopping | 5.2% | 85.0% | 4.42% | 11.8% | 85.0% | 10.03% |
| | leisure | 21.1% | 85.0% | 17.94% | 37.5% | 85.0% | 31.88% |
| | **all** | **66.6%** | | | **64.3%** | | |

## Revised Calculation

| | | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | Trip purpose | % of car trips in peak hour | % of car trips to destination | % of trips by purpose and destination | % of car trips in peak hour | % of car trips to destination | % of trips by purpose and destination |
| A2 E | work | 39.4% | **19.4%** | 7.64% | 43.9% | **19.4%** | 8.52% |
| | business | 6.0% | 20.0% | 1.20% | 5.0% | 20.00% | 1.00% |
| | education | 28.5% | 0.0% | 0.00% | 1.9% | 0.00% | 0.00% |
| | shopping | 5.2% | **20.0%** | 1.04% | 11.8% | **20.0%** | 2.36% |
| | leisure | 21.1% | **25.0%** | 5.28% | 37.5% | **25.0%** | 9.38% |
| | **all** | **15.2%** | | | **21.3%** | | |
| A2 W | work | 39.4% | **20.1%** | 7.92% | 43.9% | **20.1%** | 8.82% |
| | business | 6.0% | 80.0% | 4.80% | 5.0% | 80.0% | 4.00% |
| | education | 28.5% | 10.0% | 2.85% | 1.9% | 10.0% | 0.19% |
| | shopping | 5.2% | **20.0%** | 1.04% | 11.8% | **20.0%** | 2.36% |
| | leisure | 21.1% | **25.0%** | 5.28% | 37.5% | **25.0%** | 9.38% |
| | **all** | **21.9%** | | | **24.7%** | | |
| City Centre | work | 39.4% | **33.8%** | 13.32% | 43.9% | **33.8%** | 14.84% |
| | business | 6.0% | 0.0% | 0.00% | 5.0% | 0.0% | 0.00% |
| | education | 28.5% | 90.0% | 25.65% | 1.9% | 90.0% | 1.71% |
| | shopping | 5.2% | **60.0%** | 3.12% | 11.8% | **60.0%** | 7.08% |
| | leisure | 21.1% | **50.0%** | 10.55% | 37.5% | **50.0%** | 18.75% |
| | **all** | **52.6%** | | | **42.4%** | | |
| Reduction in trips to Canterbury city compared with TA | | **-13.9%** | | | **-21.9%** | | |

RED data derived from 2011 census
GREEN assumed 60% shopping trips to city centre
BLUE assumed 50% of leisure trips to city centre

**Appendix 4**: Revised Calculation of Transfer of Trips to Non-Car Modes

## Phase 4 Likelihood of car travel accessibility index: Revised

| Shopping and Leisure | | AM Peak | | PM Peak | | | | | | residual car % | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Weighting | % of all trips | transfer | % of all trips | transfer | distance | opp for transfer | parking availability | total | AM | PM | |
| city centre | 55% | 7.52% | 0.75% | 14.21% | 1.42% | 2 | 4 | 3 | 9 | 6.77% | 12.79% | 10% transfer |
| Stour Retail Park | 10% | 1.37% | | 2.58% | | 1 | 1 | 1 | 3 | 1.37% | 2.58% | |
| Wincheap | 10% | 1.37% | | 2.58% | | 2 | 1 | 3 | 6 | 1.37% | 2.58% | |
| Internal | 15% | 2.05% | 2.05% | 3.87% | 3.87% | 5 | 3 | 5 | 13 | 0.00% | 0.00% | |
| Kingsmead | 10% | 1.37% | | 2.58% | | 2 | 1 | 3 | 6 | 1.37% | 2.58% | |
| | 100.00% | 13.67% | | 25.83% | | | | | | 10.87% | 20.53% | |

| Education | | AM Peak | | PM Peak | | | | | | residual car % | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Weighting | % of all trips | transfer | % of all trips | transfer | distance | opp for transfer | parking availability | total | AM | PM | |
| Simon Langton Schools | 10% | 2.57% | 0.64% | 0.17% | | 3 | 4 | 3 | 10 | 1.92% | 0.17% | 25% transfer |
| St Anselms | 10% | 2.57% | 0.64% | 0.17% | | 4 | 4 | 3 | 11 | 1.92% | 0.17% | 25% transfer |
| Chaucer Tech College | 25% | 6.41% | 1.60% | 0.43% | | 3 | 4 | 3 | 10 | 4.81% | 0.43% | 25% transfer |
| Internal | 45% | 11.54% | 11.54% | 0.77% | 0.77% | 5 | 5 | 5 | 15 | 0.00% | 0.00% | |
| University of Kent | 10% | 2.57% | | 0.17% | | 2 | 1 | 1 | 4 | 2.57% | 0.17% | |
| | | 25.65% | | 1.71% | | | | | | 11.22% | 0.94% | |

| Commuting/Employment | | AM Peak | | PM Peak | | | | | | residual car % | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Weighting | % of all trips | transfer | % of all trips | transfer | distance | opp for transfer | parking availability | total | AM | PM | |
| Stour Retail Park | 1% | 0.13% | | 0.15% | | 1 | 1 | 1 | 3 | 0.13% | 0.15% | |
| Internal | 5% | 0.67% | 0.67% | 0.74% | 0.74% | 5 | 5 | 5 | 15 | 0.00% | 0.00% | |
| Wincheap | 3% | 0.40% | | 0.45% | | 2 | 1 | 3 | 6 | 0.40% | 0.45% | |
| City Centre | 58% | 7.72% | 0.77% | 8.61% | 0.86% | 2 | 4 | 2 | 8 | 6.95% | 7.75% | 10% transfer |
| Kent and Canterbury Hospital | 14% | 1.86% | 0.47% | 2.08% | 0.52% | 3 | 4 | 4 | 11 | 1.40% | 1.56% | 25% transfer |
| University of Kent | 19% | 2.53% | | 2.82% | | 1 | 1 | 3 | 5 | 2.53% | 2.82% | |
| | 100.00% | 13.32% | | 14.84% | | | | | | 11.41% | 12.72% | |
| **Overall Total** | | 52.64% | **19.13%** | 42.38% | **8.19%** | | | | | 33.50% | 34.19% | |

| | | | |
|---|---|---|---|
| % work trips in peak hour | 39.40% | 43.90% | |
| % business trips in peak hour | 6.00% | 5.00% | |
| % education trips in peak hour | 28.50% | 1.90% | |
| % shopping/leisure trips in peak hour | 26.30% | 49.30% | |
| | | | |
| % work trips to city | 33.80% | 33.80% | amended from 47.1% based on census data |
| % education trips to city | 90.00% | 90.00% | |
| % shopping/leisure trips to city | 51.98% | 52.39% | amended from 85% to reflect complexity and length of car leisure trips |

Based on Table comprising second page of Appendix BB of TA.

**Appendix 5:** Commercial Trip Generation

# Commercial Trip Rates

| AMEY Rates | B1a (business park) | | | B1c (light industry) | | | composite | | |
|---|---|---|---|---|---|---|---|---|---|
| | arr | dep | tot | arr | dep | tot | arr | dep | tot |
| AM peak period | 2.86 | 0.64 | 3.5 | 1.45 | 0.77 | 2.22 | 2.578 | 0.666 | 3.244 |
| PM peak period | 0.32 | 2.2 | 2.52 | 0.43 | 1.25 | 1.68 | 0.342 | 2.01 | 2.352 |

0.8 B1a
0.2 B1c

| TA Rates | B1a (business park) | | | B1c (light industry) | | | composite | | |
|---|---|---|---|---|---|---|---|---|---|
| | arr | dep | tot | arr | dep | tot | arr | dep | tot |
| AM peak hour | 1.1 | 0.246 | 1.346 | 0.558 | 0.296 | 0.854 | 0.9916 | 0.256 | 1.2476 |
| PM peak hour | 0.123 | 0.846 | 0.969 | 0.165 | 0.481 | 0.646 | 0.1314 | 0.773 | 0.9044 |

| % of peak period | B1a (business park) | | | B1c (light industry) | | | composite | | |
|---|---|---|---|---|---|---|---|---|---|
| | arr | dep | tot | arr | dep | tot | arr | dep | tot |
| AM peak hour | 38.5% | 38.4% | 38.5% | 38.5% | 38.4% | 38.5% | 38.5% | 38.4% | 38.5% |
| PM peak hour | 38.4% | 38.5% | 38.5% | 38.4% | 38.5% | 38.5% | 38.4% | 38.5% | 38.5% |

| TRICS Rates | B1a (business park) | | | B1c (light industry) | | | composite | | |
|---|---|---|---|---|---|---|---|---|---|
| | arr | dep | tot | arr | dep | tot | arr | dep | tot |
| AM peak hour | 1.671 | 0.17 | 1.841 | 0.519 | 0.27 | 0.789 | 1.4406 | 0.19 | 1.6306 |
| PM peak hour | 0.149 | 1.317 | 1.466 | 0.122 | 0.444 | 0.566 | 0.1436 | 1.1424 | 1.286 |

| % difference | B1a (business park) | | | B1c (light industry) | | | composite | | |
|---|---|---|---|---|---|---|---|---|---|
| | arr | dep | tot | arr | dep | tot | arr | dep | tot |
| AM peak hour | 52% | -31% | 37% | -7% | -9% | -8% | 45% | -26% | 31% |
| PM peak hour | 21% | 56% | 51% | -26% | -8% | -12% | 9% | 48% | 42% |

**Appendix 6:** Traffic Flows on New Dover Road 2000-2014

## DETR Daily Traffic Flows 2000-2014: A2050 between Barton Road and A2

| AADF Year | all motor vehicles | CP | Region | LocalAuthority | Road | Road Category | Easting | Northing | Link Start | Link End | All Motor Vehicles |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2000 | 13883 | 26110 | South East | Kent | A2050 | PR | 616600 | 156000 | Barton Rd | A2 | 13883 |
| 2001 | 13959 | 26110 | South East | Kent | A2050 | PR | 616600 | 156000 | Barton Rd | A2 | 13959 |
| 2002 | 15169 | 26110 | South East | Kent | A2050 | PR | 616600 | 156000 | Barton Rd | A2 | 15169 |
| 2003 | 15484 | 26110 | South East | Kent | A2050 | PR | 616600 | 156000 | Barton Rd | A2 | 15484 |
| 2004 | 15497 | 26110 | South East | Kent | A2050 | PR | 616600 | 156000 | Barton Rd | A2 | 15497 |
| 2005 | 16413 | 26110 | South East | Kent | A2050 | PR | 616600 | 156000 | Barton Rd | A2 | 16413 |
| 2006 | 16847 | 26110 | South East | Kent | A2050 | PR | 616600 | 156000 | Barton Rd | A2 | 16847 |
| 2007 | 16761 | 26110 | South East | Kent | A2050 | PR | 616600 | 156000 | Barton Rd | A2 | 16761 |
| 2008 | 16660 | 26110 | South East | Kent | A2050 | PR | 616600 | 156000 | Barton Rd | A2 | 16660 |
| 2009 | 16871 | 26110 | South East | Kent | A2050 | PR | 616600 | 156000 | Barton Rd | A2 | 16871 |
| 2010 | 16559 | 26110 | South East | Kent | A2050 | PR | 616600 | 156000 | Barton Rd | A2 | 16559 |
| 2011 | 15606 | 26110 | South East | Kent | A2050 | PR | 616600 | 156000 | Barton Rd | A2 | 15606 |
| 2012 | 15566 | 26110 | South East | Kent | A2050 | PR | 616600 | 156000 | Barton Rd | A2 | 15566 |
| 2013 | 16242 | 26110 | South East | Kent | A2050 | PR | 616600 | 156000 | Barton Rd | A2 | 16242 |
| 2014 | 16706 | 26110 | South East | Kent | A2050 | PR | 616600 | 156000 | Barton Rd | A2 | 16706 |

**Appendix 7:** Traffic Flows on Radial Routes 2000-2014

| AADF Year | CP | Region | Local Authority | Road | Road Category | Easting | Northing | Start Junction | End Junction | All Motor Vehicles |
|---|---|---|---|---|---|---|---|---|---|---|
| 2000 | 26110 | South East | Kent | A2050 | PR | 616600 | 156000 | Barton Rd, Canterbury | A2 | 13883 |
| 2001 | 26110 | South East | Kent | A2050 | PR | 616600 | 156000 | Barton Rd, Canterbury | A2 | 13959 |
| 2002 | 26110 | South East | Kent | A2050 | PR | 616600 | 156000 | Barton Rd, Canterbury | A2 | 15169 |
| 2003 | 26110 | South East | Kent | A2050 | PR | 616600 | 156000 | Barton Rd, Canterbury | A2 | 15484 |
| 2004 | 26110 | South East | Kent | A2050 | PR | 616600 | 156000 | Barton Rd, Canterbury | A2 | 15497 |
| 2005 | 26110 | South East | Kent | A2050 | PR | 616600 | 156000 | Barton Rd, Canterbury | A2 | 16413 |
| 2006 | 26110 | South East | Kent | A2050 | PR | 616600 | 156000 | Barton Rd, Canterbury | A2 | 16847 |
| 2007 | 26110 | South East | Kent | A2050 | PR | 616600 | 156000 | Barton Rd, Canterbury | A2 | 16761 |
| 2008 | 26110 | South East | Kent | A2050 | PR | 616600 | 156000 | Barton Rd, Canterbury | A2 | 16660 |
| 2009 | 26110 | South East | Kent | A2050 | PR | 616600 | 156000 | Barton Rd, Canterbury | A2 | 16871 |
| 2010 | 26110 | South East | Kent | A2050 | PR | 616600 | 156000 | Barton Rd, Canterbury | A2 | 16559 |
| 2011 | 26110 | South East | Kent | A2050 | PR | 616600 | 156000 | Barton Rd, Canterbury | A2 | 15606 |
| 2012 | 26110 | South East | Kent | A2050 | PR | 616600 | 156000 | Barton Rd, Canterbury | A2 | 15566 |
| 2013 | 26110 | South East | Kent | A2050 | PR | 616600 | 156000 | Barton Rd, Canterbury | A2 | 16242 |
| 2014 | 26110 | South East | Kent | A2050 | PR | 616600 | 156000 | Barton Rd, Canterbury | A2 | 16706 |
| 2000 | 78137 | South East | Kent | A257 | PU | 616250 | 157750 | A2050 | Villiers Road | 11334 |
| 2001 | 78137 | South East | Kent | A257 | PU | 616250 | 157750 | A2050 | Villiers Road | 11028 |
| 2002 | 78137 | South East | Kent | A257 | PU | 616250 | 157750 | A2050 | Villiers Road | 11242 |
| 2003 | 78137 | South East | Kent | A257 | PU | 616250 | 157750 | A2050 | Villiers Road | 10976 |
| 2004 | 78137 | South East | Kent | A257 | PU | 616250 | 157750 | A2050 | Villiers Road | 11182 |
| 2005 | 78137 | South East | Kent | A257 | PU | 616250 | 157750 | A2050 | Villiers Road | 10804 |
| 2006 | 78137 | South East | Kent | A257 | PU | 616250 | 157750 | A2050 | Villiers Road | 10920 |
| 2007 | 78137 | South East | Kent | A257 | PU | 616250 | 157750 | A2050 | Villiers Road | 10782 |
| 2008 | 78137 | South East | Kent | A257 | PU | 616250 | 157750 | A2050 | Villiers Road | 10572 |
| 2009 | 78137 | South East | Kent | A257 | PU | 616250 | 157750 | A2050 | Villiers Road | 10785 |
| 2010 | 78137 | South East | Kent | A257 | PU | 616250 | 157750 | A2050 | Villiers Road | 10816 |
| 2011 | 78137 | South East | Kent | A257 | PU | 616250 | 157750 | A2050 | Villiers Road | 10892 |
| 2012 | 78137 | South East | Kent | A257 | PU | 616250 | 157750 | A2050 | Villiers Road | 10777 |
| 2013 | 78137 | South East | Kent | A257 | PU | 616250 | 157750 | A2050 | Villiers Road | 10768 |
| 2014 | 78137 | South East | Kent | A257 | PU | 616250 | 157750 | A2050 | Villiers Road | 10629 |
| 2000 | 78140 | South East | Kent | A28 | PU | 615950 | 158900 | Kingsmead Rd/Northgate | Vauxhall Rd | 25484 |
| 2001 | 78140 | South East | Kent | A28 | PU | 615950 | 158900 | Kingsmead Rd/Northgate | Vauxhall Rd | 25894 |
| 2002 | 78140 | South East | Kent | A28 | PU | 615950 | 158900 | Kingsmead Rd/Northgate | Vauxhall Rd | 25839 |
| 2003 | 78140 | South East | Kent | A28 | PU | 615950 | 158900 | Kingsmead Rd/Northgate | Vauxhall Rd | 25781 |
| 2004 | 78140 | South East | Kent | A28 | PU | 615950 | 158900 | Kingsmead Rd/Northgate | Vauxhall Rd | 25739 |
| 2005 | 78140 | South East | Kent | A28 | PU | 615950 | 158900 | Kingsmead Rd/Northgate | Vauxhall Rd | 25044 |
| 2006 | 78140 | South East | Kent | A28 | PU | 615950 | 158900 | Kingsmead Rd/Northgate | Vauxhall Rd | 25156 |
| 2007 | 78140 | South East | Kent | A28 | PU | 615950 | 158900 | Kingsmead Rd/Northgate | Vauxhall Rd | 24404 |
| 2008 | 78140 | South East | Kent | A28 | PU | 615950 | 158900 | Kingsmead Rd/Northgate | Vauxhall Rd | 24128 |
| 2009 | 78140 | South East | Kent | A28 | PU | 615950 | 158900 | Kingsmead Rd/Northgate | Vauxhall Rd | 21461 |
| 2010 | 78140 | South East | Kent | A28 | PU | 615950 | 158900 | Kingsmead Rd/Northgate | Vauxhall Rd | 21077 |
| 2011 | 78140 | South East | Kent | A28 | PU | 615950 | 158900 | Kingsmead Rd/Northgate | Vauxhall Rd | 21073 |
| 2012 | 78140 | South East | Kent | A28 | PU | 615950 | 158900 | Kingsmead Rd/Northgate | Vauxhall Rd | 20874 |
| 2013 | 78140 | South East | Kent | A28 | PU | 615950 | 158900 | Kingsmead Rd/Northgate | Vauxhall Rd | 21837 |
| 2014 | 78140 | South East | Kent | A28 | PU | 615950 | 158900 | Kingsmead Rd/Northgate | Vauxhall Rd | 22108 |
| 2000 | 78141 | South East | Kent | A290 | PU | 614000 | 158600 | A290 St Peters Place | Rough Commo | 12554 |
| 2001 | 78141 | South East | Kent | A290 | PU | 614000 | 158600 | A290 St Peters Place | Rough Commo | 12211 |
| 2002 | 78141 | South East | Kent | A290 | PU | 614000 | 158600 | A290 St Peters Place | Rough Commo | 12439 |
| 2003 | 78141 | South East | Kent | A290 | PU | 614000 | 158600 | A290 St Peters Place | Rough Commo | 12117 |
| 2004 | 78141 | South East | Kent | A290 | PU | 614000 | 158600 | A290 St Peters Place | Rough Commo | 12315 |
| 2005 | 78141 | South East | Kent | A290 | PU | 614000 | 158600 | A290 St Peters Place | Rough Commo | 12246 |
| 2006 | 78141 | South East | Kent | A290 | PU | 614000 | 158600 | A290 St Peters Place | Rough Commo | 12022 |
| 2007 | 78141 | South East | Kent | A290 | PU | 614000 | 158600 | A290 St Peters Place | Rough Commo | 11871 |
| 2008 | 78141 | South East | Kent | A290 | PU | 614000 | 158600 | A290 St Peters Place | Rough Commo | 10845 |
| 2009 | 78141 | South East | Kent | A290 | PU | 614000 | 158600 | A290 St Peters Place | Rough Commo | 11051 |
| 2010 | 78141 | South East | Kent | A290 | PU | 614000 | 158600 | A290 St Peters Place | Rough Commo | 9830 |
| 2011 | 78141 | South East | Kent | A290 | PU | 614000 | 158600 | A290 St Peters Place | Rough Commo | 9877 |
| 2012 | 78141 | South East | Kent | A290 | PU | 614000 | 158600 | A290 St Peters Place | Rough Commo | 9780 |
| 2013 | 78141 | South East | Kent | A290 | PU | 614000 | 158600 | A290 St Peters Place | Rough Commo | 9767 |
| 2014 | 78141 | South East | Kent | A290 | PU | 614000 | 158600 | A290 St Peters Place | Rough Commo | 10050 |
| 2000 | 78138 | South East | Kent | A2050 | PR | 612300 | 158120 | A2(T) spur | Knight Avenue | 18765 |
| 2001 | 78138 | South East | Kent | A2050 | PR | 612300 | 158120 | A2(T) spur | Knight Avenue | 19362 |
| 2002 | 78138 | South East | Kent | A2050 | PR | 612300 | 158120 | A2(T) spur | Knight Avenue | 19868 |
| 2003 | 78138 | South East | Kent | A2050 | PR | 612300 | 158120 | A2(T) spur | Knight Avenue | 21429 |
| 2004 | 78138 | South East | Kent | A2050 | PR | 612300 | 158120 | A2(T) spur | Knight Avenue | 21979 |
| 2005 | 78138 | South East | Kent | A2050 | PR | 612300 | 158120 | A2(T) spur | Knight Avenue | 22385 |
| 2006 | 78138 | South East | Kent | A2050 | PR | 612300 | 158120 | A2(T) spur | Knight Avenue | 22821 |
| 2007 | 78138 | South East | Kent | A2050 | PR | 612300 | 158120 | A2(T) spur | Knight Avenue | 22318 |
| 2008 | 78138 | South East | Kent | A2050 | PR | 612300 | 158120 | A2(T) spur | Knight Avenue | 22184 |
| 2009 | 78138 | South East | Kent | A2050 | PR | 612300 | 158120 | A2(T) spur | Knight Avenue | 21785 |
| 2010 | 78138 | South East | Kent | A2050 | PR | 612300 | 158120 | A2(T) spur | Knight Avenue | 20814 |
| 2011 | 78138 | South East | Kent | A2050 | PR | 612300 | 158120 | A2(T) spur | Knight Avenue | 20772 |
| 2012 | 78138 | South East | Kent | A2050 | PR | 612300 | 158120 | A2(T) spur | Knight Avenue | 20770 |
| 2013 | 78138 | South East | Kent | A2050 | PR | 612300 | 158120 | A2(T) spur | Knight Avenue | 20785 |
| 2014 | 78138 | South East | Kent | A2050 | PR | 612300 | 158120 | A2(T) spur | Knight Avenue | 21411 |
| 2000 | 78136 | South East | Kent | A28 | PU | 613250 | 156740 | Tonford Lane | A2 | 15975 |
| 2001 | 78136 | South East | Kent | A28 | PU | 613250 | 156740 | Tonford Lane | A2 | 15320 |
| 2002 | 78136 | South East | Kent | A28 | PU | 613250 | 156740 | Tonford Lane | A2 | 15985 |
| 2003 | 78136 | South East | Kent | A28 | PU | 613250 | 156740 | Tonford Lane | A2 | 15423 |
| 2004 | 78136 | South East | Kent | A28 | PU | 613250 | 156740 | Tonford Lane | A2 | 15875 |
| 2005 | 78136 | South East | Kent | A28 | PU | 613250 | 156740 | Tonford Lane | A2 | 15036 |
| 2006 | 78136 | South East | Kent | A28 | PU | 613250 | 156740 | Tonford Lane | A2 | 15993 |
| 2007 | 78136 | South East | Kent | A28 | PU | 613250 | 156740 | Tonford Lane | A2 | 16070 |
| 2008 | 78136 | South East | Kent | A28 | PU | 613250 | 156740 | Tonford Lane | A2 | 14332 |
| 2009 | 78136 | South East | Kent | A28 | PU | 613250 | 156740 | Tonford Lane | A2 | 14169 |
| 2010 | 78136 | South East | Kent | A28 | PU | 613250 | 156740 | Tonford Lane | A2 | 13978 |
| 2011 | 78136 | South East | Kent | A28 | PU | 613250 | 156740 | Tonford Lane | A2 | 14149 |
| 2012 | 78136 | South East | Kent | A28 | PU | 613250 | 156740 | Tonford Lane | A2 | 13622 |
| 2013 | 78136 | South East | Kent | A28 | PU | 613250 | 156740 | Tonford Lane | A2 | 13536 |
| 2014 | 78136 | South East | Kent | A28 | PU | 613250 | 156740 | Tonford Lane | A2 | 13843 |

**TOTALS**

| year | total flows | annual % change |
|---|---|---|
| 2000 | 97995 | 0.0% |
| 2001 | 97774 | -0.2% |
| 2002 | 100542 | 2.8% |
| 2003 | 101210 | 0.7% |
| 2004 | 102587 | 1.4% |
| 2005 | 101928 | -0.6% |
| 2006 | 103759 | 1.8% |
| 2007 | 102206 | -1.5% |
| 2008 | 98721 | -3.4% |
| 2009 | 96122 | -2.6% |
| 2010 | 93074 | -3.2% |
| 2011 | 92369 | -0.8% |
| 2012 | 91389 | -1.1% |
| 2013 | 92935 | 1.7% |
| 2014 | 94747 | 1.9% |