OXFORDSHIRE COUNTY COUNCIL

Technical Note 1: Summary of Development and Infrastructure Strategic Modelling

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1 Introduction

1.1 WYG have been commissioned by Oxfordshire County Council to carry out a study to consider the future movement demands in and around the town of Witney, West Oxfordshire.

1.2 As the first stage of this work, WYG have been commissioned to analyse the initial modelling work undertaken using the Central Oxfordshire Transport Model to forecast the traffic situation in Witney by 2030, based upon a number of potential major development sites and supporting transport infrastructure. This report is based upon results provided from the model and does not provide any commentary upon, or assessment of, the modelling process undertaken.

1.3 This Technical Note summarises that first stage of work, which provides an overview of the main impacts of different growth options and infrastructure schemes at a strategic level. This modelling exercise is not intended to provide a detailed assessment of the impacts of proposed or planned growth on individual junctions or links. These will be assessed in more detail separately at a later stage. The remainder of this note provides the following:

- Section 2: Summarises the various development scenarios assessed and provides details of the major residential sites, employment sites and infrastructure assumptions within each scenario;
- Section 3: Outlines a number of assumptions understood as being included within the modelling work;
- Section 4: Provides details of the network wide headline findings of the modelling work;
- Section 5: Provides a more detailed initial assessment of each of the main scenarios modelled and the wider impacts of traffic growth; and
- Section 6: Briefly identifies areas where local improvement works could be investigated in greater detail.

2 The future growth of Witney

2.1 Witney has been identified within the West Oxfordshire District Council Local Development Framework as one of the main locations planned to accommodate growth within the District, with a number of potential locations for growth being considered.

2.2 In order to identify the expected impacts of these growth options, a number of development scenarios were tested using the Central Oxfordshire Transport Model (COTM), with varying packages of supporting strategic highway infrastructure also assessed considering a future forecast year of 2030.

2.3 The various scenarios considered are summarised in **Table 1** (following page)

2.4 It should be noted that Scenario 1 "Do Nothing" assumes all committed development outside of the major growth sites considered in this report and also assumes a number of local highway improvements, including:

- The signalisation of the Bridge Street double mini roundabout
- Changing the signal control junction of Ducklington Lane / Station Lane / Thorney Leys to a roundabout and the provision of additional approach widths from the south for northbound traffic.

2.5 As such the Do Nothing scenario, whilst excluding the traffic impacts of the major growth sites, does include considerable growth in traffic related to the effects of other development in and around Witney and across Oxfordshire as a whole, assumed to be in place by the 2030 assessment year.

Table 1 – 2030 Forecast Scenario Details

Scenario	Housing	Employment	Strategic Highway Improvements
1 – Do Nothing	No major housing	No major employment	No major infrastructure
2 – West Witney a	1000 units (West Witney)	10 Ha West Witney	Downs Road at-grade junction
3 – West Witney b	1000 units (West Witney)	10 Ha West Witney	Downs Road at – grade junction and west facing slip roads at Shores Green
4 – North Witney a	1500 units (North Witney)	15 Ha West Witney	Northern Perimeter Road and WEL2
5 – North Witney b	1500 units (North Witney)	15 Ha West Witney	Northern Perimeter Road and west facing slip roads at Shores Green
6 – East and West Witney	1000 units (West Witney) & 450 units (East Witney)	15 Ha West Witney	Downs Road at-grade junction and west facing slip roads at Shores Green
7 – East Witney	450 units (East Witney)	10 Ha East Witney	West facing slips at Shores Green
8 – West and North Witney a	1000 units (West Witney) & 1500 units (North Witney)	10 Ha West Witney	Northern Perimeter Road, Downs Road at-grade junction and west facing slip roads at Shores Green
9 – West and North Witney b	1000 units (West Witney) & 1500 units (North Witney)	10 Ha West Witney	Northern Perimeter Road, Downs Road at-grade junction and WEL2

3 Witney Transport Model Assumptions

3.1 The modelling work used to inform this Technical Note has been undertaken using the Central Oxfordshire Transport Model. As a strategic level transport model there are a number of assumptions within the modelling work and the subsequent reporting which are appropriate to take into account, both when reviewing the results of any modelling work and when carrying out any further assessment, as described below.

3.2 Bridge Street junction: The Bridge Street / West End junction is coded in the forecast scenarios as a single four arm signal controlled junction, which represents one potential improvement scheme option when compared to the current double mini roundabout arrangement. From an initial review it appears likely that the current signal timings and phasing within the model may not maximize the capacity of the junction, which may impact upon potential junction capacity and operation within the model.

3.3 Ducklington Lane junction: The Ducklington Lane / Station Lane / Thorney Leys junction is assumed to have been improved in the forecast scenarios, including the change of the current signal controlled cross roads to a roundabout, with increased road widths on the Ducklington Lane southern approach.

3.4 Both the Bridge Street signalisation scheme and the Ducklington Lane Junction roundabout scheme were included within all the scenarios assessed, (including the 'Do-Nothing' scenario). At this stage the improvements assumed in the model are indicative and the improvements proposed at these junctions may change at the detailed design stage.

3.5 Re-routing of traffic 1: Each of the 2030 scenarios shows a considerable number of trips selecting to route around the north of Witney via Dry Lane and Witney Road (in the region of 1,300 two way trips on Dry Lane in the 2030 'Do-Nothing' scenario compared to less than 300 trips in the 2007 base). It may be that the model is overestimating the number of journeys using this route, due to re-routing resulting from the levels of delay and congestion predicted at the Bridge Street / West End junction. It should be noted that the high level of predicted journeys routing around the north of Witney within the forecast model means that one of the results of strategic improvements tested is a reduction in northern rat-run traffic as well as purely reductions in the levels of traffic within the town itself.

3.6 Re-routing of traffic 2: The modelling work also appears to show significant *strategic* re-routing of longer distance traffic as a result of introducing measures such as the Shores Green west facing slips. For example, scenarios 2 and 3 include identical development assumptions at West Witney, with Scenario 3 including the addition of the Shores Green slip road improvements. This change results in the model assigning considerably more traffic onto the A40 to the west of Shores Green, (1561 two way trips in the AM peak), of these 583 trips appear to enter / leave the model area via the A4095 to the north–east. This appears to be more pronounced in the PM peak hour model, in which the A40 carries an additional 1602 trips, with 683 additional trips on the A4095.

4 Network wide statistics

4.1 Each of the scenarios considered have differing effects upon the overall operation of the transport network within Witney, with the following Tables (**Table 2 & Table 3**) giving a summary of the network wide impacts of each option. Areas where the network performs more poorly than the 'Do-Nothing' are highlighted in orange, whilst areas where the highway network performs more efficiently are highlighted in green (whether in terms of reductions in total network journey time or distance travelled, reduced levels of queuing or increased average speeds). The relative ranking of each scenario (ranked on the basis of difference in levels of predicted over capacity queuing when compared to the 'Do Nothing' scenario) is also provided in brackets following the scenario name, ranked from 1 as the best performing scenario to 8 as worst performing).

Table 2 – Network Wide Summary Results (AM Peak)

Scenario	Total Travel Time (PCU Hrs)	Total Travel Distance (PCU Hrs)	Over capacity queues (PCU Hrs)	Average Speed (Km/hr)
1 – Do Nothing	3050	115520	740	37.9
2 – West Witney a (6)	3100	120100	760	38.7
3 – West Witney b (1)	2970	125610	570	42.3
4 – North Witney a (7)	3190	119680	820	37.5
5 – North Witney b (5)	3180	127010	700	40.0
6 – East and West Witney (3)	3090	128180	630	41.5
7 – East Witney (2)	2980	122510	620	41.1
8 – West and North Witney a (4)	3220	130410	680	40.5
9 – West and North Witney b (8)	3310	122260	880	36.9

Table 3 – Network Wide Summary Results (PM Peak)

Scenario	Total Travel Time (PCU Hrs)	Total Travel Distance (PCU Hrs)	Over capacity queues (PCU Hrs)	Average Speed (Km/hr)
1 – Do Nothing	4700	125210	2180	26.6
2 – West Witney a (5)	4030	130100	1440	32.3
3 – West Witney b (1)	3740	132770	1160	35.5
4 – North Witney a (8)	4420	129420	1840	29.3
5 – North Witney b (7)	4430	134540	1760	30.4
6 – East and West Witney (3)	3980	134540	1290	34.2
7 – East Witney (2)	3800	129550	1270	34.1
8 – West and North Witney a (4)	4010	135650	1340	33.8
9 – West and North Witney b (6)	4160	131470	1540	31.6

4.2 The results in **Table 2** and **Table 3** (and throughout this report) use PCU values for reporting on numbers of predicted vehicles. 1 PCU (Passenger Car Unit) is a standard value for a standard car, with larger vehicles, such as Goods Vehicles or Buses each being classed as a multiple of a PCU due to their larger size, i.e. a bus is classed as 2.5 PCU or equivalent in traffic impacts to 2.5 cars. This allows for a standard value to be used for comparing total traffic volumes.

4.3 It can be seen that the operation of some areas of the highway network in and around Witney are predicted to be congested by 2030, even before taking into account the potential major growth sites considered, with the 'Do-Nothing' option (which assumes no new major urban extensions to Witney) showing increased levels of queuing and delay across the network compared to the 2007 base model. For example the speed of travel in the Witney area in the morning peak hour is expected to reduce significantly, from an average speed of 56.3kph in

the 2007 base year to 37.9 kph in the 2030 forecast assessment (i.e. a reduction in average speeds of circa 33%).

4.4 The network statistics in **Table 2** and **Table 3** provide an overview of how different balances of major development and infrastructure perform when compared to the 'Do-Nothing' scenario, i.e. the extent to which the strategic infrastructure options offset any additional traffic impacts related to the development options considered; and potentially the extent to which they could also mitigate some of the background traffic growth included in the 'Do-Nothing' scenario.

4.5 In every instance the total distance travelled increases with the inclusion of major development sites in the model, as may be expected with additional trips being added to the network. However Scenario 3 (West Witney with the Downs Road junction and the Shores Green west facing slips), and Scenario 7 (East Witney with the Shores Green Improvement) do show a slight reduction in total network travel time in both peak periods.

4.6 These two scenarios also result in reduced levels of queuing delay and increased average speeds in both the AM and PM peak periods when compared to the 'Do-Nothing' scenario, suggesting that the infrastructure improvements proposed provide an overall benefit in addition to the mitigation of the major development sites included in each scenario option.

4.7 In the AM peak hour only scenarios 2, 4 and 9 show an increase in queues. In the PM peak hour all scenarios perform better than the 'Do-Nothing' Scenario

4.8 When considering network wide statistics across the various scenarios considered, the best performing is Scenario 3, (West Witney with the Downs Road at-grade junction and the Shores Green west facing slips), followed by Scenario 7, (East Witney with the Shores Green west facing slips) and Scenario 6 (East and West Witney with the Downs Road at-grade junction and the Shores Green west facing slips). These scenarios have a greater level of total distance travelled than a number of the other options considered, largely due to traffic choosing to re-route via the A40 for east – west trips, as a longer (but faster) option than travelling through the centre of Witney or bypassing the town via more minor roads to the north.

4.9 In order to investigate this initial assumption further, a comparison of the total number of trips passing through the Bridge Street / West End junction in the centre of Witney was carried out. The results have been summarised in **Table 4** (below):

Table 4 – Total traffic (Bridge Street / West End Junction)

Scenario	Total junction traffic (am peak)	Difference from 'Do-Nothing'	Total junction traffic (pm peak)	Difference from 'Do-Nothing'
1 – Do Nothing	2057	N/A	2037	N/A
2 – West Witney a	2101	+44	2030	-7
3 – West Witney b	1882	-219	1887	-143
4 – North Witney a	2019	+137	1973	+86
5 – North Witney b	1797	-222	1924	-49
6 – East and West Witney	1915	-142	1905	-132
7 – East Witney	1967	-211	1915	-126
8 – West and North Witney a	1719	-248	1819	-96
9 – West and North Witney b	1969	+250	1904	+85

4.10 Scenarios 3,5,6,7, and 8 all show a decrease in traffic predicted as travelling through the Bridge Street / West End junction when compared to the 'Do-Nothing' scenario, each of which are options which include the Shores Green West Facing Slip Roads as part of the supporting transport infrastructure. Of these, Scenario 3 (West Witney with the Downs Road at-grade junction and the Shores Green west facing slips) shows the greatest level of reduction in trips passing through the junction across the two peak hours.

4.11 Scenarios which include North Witney and the provision of WEL2 and the Northern Perimeter Road, i.e. Scenarios 4 and 9 show the largest levels of overall predicted volume of traffic through the Bridge Street / West End junction in total (although it should be noted that the flows on some individual approaches are lower, including the Bridge Street approach).

4.12 As a further check on the degree to which the strategic improvements proposed could be expected to result in the displacement of journeys onto the A40, **Table 5** provides a summary of the changes in flow predicted on the A40 between the Ducklington Junction and the Shores Green Junction.

Table 5 – Two way traffic (A40 between Ducklington and Shores Green)

Scenario	Two way trips (am peak)	Difference from 'Do-Nothing'	Two way trips (pm peak)	Difference from 'Do-Nothing'
1 – Do Nothing	3544	0	3758	0
2 – West Witney a	3749	+205	4007	+249
3 – West Witney b	5310	+1766	5609	+1851
4 – North Witney a	3625	+81	3873	+115
5 – North Witney b	5321	+1777	5449	+1691
6 – East and West Witney	5446	+1902	5716	+1958
7 – East Witney	5111	+1567	5353	+1595
8 – West and North Witney a	5609	+2065	5511	+1753
9 – West and North Witney b	3746	+202	3968	+210

4.13 In each scenario the levels of traffic on the A40 increase, as might be expected with additional development traffic, however the greatest levels of increase in A40 flow are associated with the options which reduce flows through the Bridge Street / West End junction, specifically Scenarios 3, 5,6,7 and 8.

4.14 Based upon the network wide statistics, it therefore appears that the highway network options which include the Shores Green west facing slips perform the most efficiently, with considerable increases in flows on the A40 as traffic is encouraged to use this faster road network rather than travel through Witney or bypass the town to the north.

4.15 It should be noted that whilst the A40 passing Witney itself is predicted to remain within capacity in each instance, there is a degree of predicted congestion to the east of the town, which is discussed in more detail in **Section 5**. However this congestion is largely consistent across all scenarios, including the 'Do-Nothing' in which no major sites are assessed.

4.16 In each scenario in which it is included the westbound approach to the Downs Road at-grade roundabout junction on the A40 is also shown to be operating slightly above capacity in the PM peak hour. Subject to ongoing more detailed modelling of the junction it is expected that

revisions to the junction should enable the approach to be brought back within reasonable capacity.

5 Initial Model Assessment

DIRECTIONS OF GROWTH

5.1 Whilst the network wide statistic allows a number of initial conclusions to be reached with regards to the various scenarios, this section of the report provides a more detailed assessment and related commentary on the relative impacts of each of the development options considered and in particular the differences between the supporting infrastructure packages modelled.

West Witney Only

5.2 The first two development scenarios tested consider the impacts of development at West Witney, with Scenario 2 considering the development of 1,000 residential units and 10 Ha of employment land, with a new at-grade roundabout junction onto the A40 at Downs Road.

5.3 Scenario 3 predicts the traffic impacts of the same development location and mix, but with the addition of west facing slip roads at Shores Green. The difference in traffic levels (demand flows) between the two scenarios is shown for a number of example links summarised in **Table 6** (below).

Table 6 – Difference (demand flow in PCU) West Witney with and without Shores Green

Link (two way)		Oxford Hill	Jubilee Way	Bridge Street	Station Lane	Corn Street	Crawley Road	Dry Lane	Witan Way
SC3 - SC2	AM	+1201	+831	-87	-237	-107	-155	-181	-418
	PM	+1223	+769	-49	-26	-53	-251	-266	-85

5.4 In **Table 6** increases in traffic on links as a result of introducing the Shores Green Improvements are highlighted in orange, whilst reductions in traffic levels are highlighted in green. The modelling work undertaken predicts a significant increase in traffic levels on both the A40 (between Ducklington and Shores Green junctions) and on Jubilee Way to the east of Witney following the introduction of west facing slips, whilst levels of traffic within Witney are largely expected to decrease. These decreases include significant reductions on the route around Station Lane and Witan Way, although predicted traffic levels still remain sufficiently high to require significant improvement works to both the Ducklington Lane / Station Lane /

Thorney Leys junction and the southern approach on the A415. There is also a smaller predicted decrease in traffic levels on Bridge Street.

5.5 The level of traffic rat-running around the north of the town via Dry Lane and Crawley Road is also predicted to significantly reduce following the introduction of the west facing slips, with more traffic bypassing the town centre selecting to do so via the A40 rather than the more minor roads to the north.

East Witney Only

5.6 Scenario 7 considers the impacts of 450 residential units to the East of Witney, delivered in association with the Shores Green West Facing Slip Roads. As this was the only infrastructure option considered for the East Witney no comparative assessment between East Witney development options has been carried out. However when compared to other development locations East Witney performs the second best (after West Witney as a single urban extension) and also performs well when delivered alongside West Witney (as the third best performing scenario in terms of impacts on the network as a whole).

North Witney Only

5.7 Scenarios 4 and 5 considered the impacts of a single residential extension to the north of Witney, with 1,500 residential units located to the north-west of the A4095 (Woodstock Road) and 15 Ha of employment land located at West Witney.

5.8 In Scenario 4 the model assumptions include the provision of a Northern Perimeter Road connecting Hailey Road with the A4095 (Woodstock Road) and the construction of the WEL2 link, between West End and the A4095 (Mill Street).

5.9 Scenario 5 assumes the same level of development, but supported by alternate highway infrastructure consisting of the Northern Perimeter Road with the Shores Green west facing slips, (but excluding the WEL2 scheme).

Table 7 – Difference (demand flow in PCU) North Witney between WEL2 and Shores Green

Link (two way)		Oxford Hill	Jubilee Way	Bridge Street	Station Lane	Corn Street	Crawley Road	Dry Lane	Witan Way
SC5 – SC4	AM	+1333	+836	+95	-75	+65	-39	-128	-310
	PM	+1445	+890	+22	-136	-157	-121	-37	-204

5.10 In **Table 7** increases in traffic levels as a result of delivering the Shores Green west facing slips compared to the WEL2 scheme are highlighted in orange, whilst decreases in predicted traffic flows are highlighted in green.

5.11 The main changes predicted through the modelling work are that traffic levels on the A40 are expected to significantly increase, as large numbers of drivers select to use the A40 to bypass the town accompanied by a reduction in levels of traffic on key links within Witney. The exception to this is an expected (although relatively small) increase in traffic levels on Bridge Street, as the exclusion of the WEL2 scheme from Scenario 5 results in the loss of the alternative route this offers to traffic passing through the Bridge Street / West End junction.

North / West Witney Comparison of impacts

5.12 A further set of difference plots showing the difference in impacts between the larger single urban extension sites is provided in **Table 8**. This shows the difference between scenarios 5 and 3, i.e. the two scenarios including the Shores Green Improvements, considered likely to (generally) result in the greater levels of reduction in town centre traffic and more efficient overall network performance.

Table 8 – Difference (demand flow in PCU) North Witney / West Witney

Link (two way)		Oxford Hill	Jubilee Way	Bridge Street	Station Lane	Corn Street	Crawley Road	Dry Lane	Witan Way
SC5 – SC3	AM	+181	+411	+68	+54	+20	-25	-51	+106
	PM	+321	+396	-29	-286	+35	+35	+232	-302

5.13 **Table 8** summarises the predicted levels of change in traffic flows on a number of key links within Witney when comparing Scenario 3 (West Witney with the Downs Road at-grade junction and the Shores Green west facing slips) and Scenario 5 (North Witney with the Shores Green west facing slips and northern perimeter road). The relative traffic impacts of the two development options appear to be largely based upon the tidality of movements to and from the respective sites, with Scenario 5 (residential at North Witney and employment at West

Witney) generating a greater number of trips on the A40 than the West Witney only option, with reduced traffic levels on Bridge Street, Station Lane and Witan Way in the PM peak hour and increased traffic levels on Corn Street, Crawley Road and Dry Lane; in the AM peak this trend is reversed.

5.14 In addition to the options considering single residential areas of development, two of the scenarios also considered a mix of development sites, with scenarios 6 (East and West Witney), 8 and 9 (West and North Witney) each predicting the impacts of delivering two main residential extensions to the town.

5.15 **Table 9** provides a comparison between the two infrastructure options considered alongside the West and North Witney sites when delivered together, with Scenario 9 assuming the Downs Road At-Grade junction, the Northern Perimeter Road and the WEL2 Scheme, whilst Scenario 8 assumes the delivery of Downs Road, the Northern Perimeter Road and the Shores Green west facing slips.

Table 9 - Difference (demand flow in PCU) West & North Witney between WEL2 and Shores Green

Link (two way)		Oxford Hill	Jubilee Way	Bridge Street	Station Lane	Corn Street	Crawley Road	Dry Lane	Witan Way
SC8 – SC9	AM	+1460	+956	+18	-138	+145	+58	-118	-350
	PM	+1286	+773	+29	+99	-198	-107	-75	+66

5.16 The levels of traffic on the A40 are expected to be considerably greater in Scenario 8 than Scenario 9. The number of trips within the town is relatively balanced between the two scenarios, although Scenario 8 appears to remove a slightly greater amount of traffic from the key links identified in **Table 9** within Witney.

5.17 A further assessment comparing the delivery of a two site growth option (Scenario 6, 1,500 units split between East and West Witney), with a single larger site option (Scenario 4, 1,500 units at North Witney), is provided in **Table 10**.

Table 10 - Difference (demand flow in PCU) between East and West Witney and North Witney

Link (two way)		Oxford Hill	Jubilee Way	Bridge Street	Station Lane	Corn Street	Crawley Road	Dry Lane	Witan Way
SC6 – SC4	AM	+1316	+429	+58	-149	+68	+74	-69	-460
	PM	+1280	+552	+55	+237	-221	-146	-211	+228

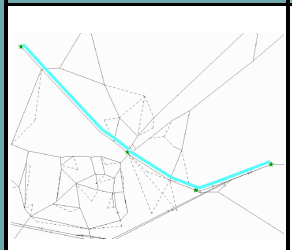
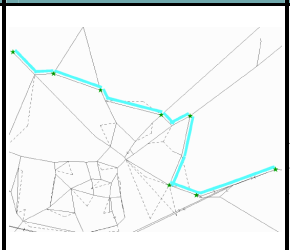
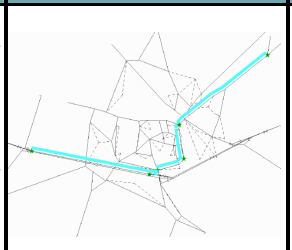
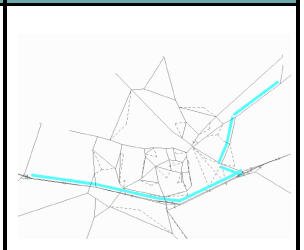
5.18 As with the other scenarios including the Shores Green west facing slips, the levels of traffic on Oxford Hill and Jubilee Way are predicted to be much higher in Scenario 6 (East and West Witney), whilst the levels of overall traffic elsewhere within the town is predicted to be lower overall when compared to Scenario 4 (North Witney with the Northern Perimeter Route and WEL2).

JOURNEY TIMES

5.19 The forecast models were also used to estimate the journey times for routes north – south and east – west across the town, in order to get a greater understanding of how the various options considered may affect ease of movement across Witney.

5.20 Example plots showing the journey time routes followed and a summary of the journey times assessed are provided in **Table 11** on the following page.

Table 11 – Journey time comparisons (time in seconds)

Route		Route 1		Route 2		Route 1a		Route 2a		Route 2b	
											
Scenario	**Period**	**EB**	**WB**	**NB**	**SB**	**EB**	**WB**	**NB**	**SB**	**NB**	**SB**
SC1	AM	1188	809	1792	1504			1968	1384		
	PM	1109	802	2672	1751			2964	2120		
SC2	AM	1311	760	1751	1435			1680	1274		
	PM	1172	774	2401	1578			2398	1643		
SC3	AM	1248	757	1406	1226			1335	1063	813	650
	PM	844	759	1813	1566			1819	1613	701	742
SC4	AM	1006	925	1942	1524	1117	755	1859	1367		
	PM	1019	802	2476	1542	1045	809	2560	1783		
SC5	AM	1182	756	1918	1493	1070	718	1848	1329	706	656
	PM	849	762	2192	1738	872	737	2241	1878	703	664
SC6	AM	1254	758	1473	1276			1367	1112	861	651
	PM	873	760	1894	1647			1892	1692	751	754
SC7	AM	1240	759	1690	1297			1620	1133	837	662
	PM	847	761	1967	1548			1980	1618	800	663
SC8	AM	1055	756	1752	1405	1005	715	1682	1205	815	650
	PM	809	758	2031	1576	816	714	2027	1615	701	701
SC9	AM	1017	884	1828	1467	1104	731	1744	1291		
	PM	950	797	2073	1316	872	783	2300	1578		

5.21 Route 1 is a south – north route starting on the A40 to the east of Witney and travelling north through the town, via the Bridge Street / West end junction to Witney Road.

5.22 Route 2 runs east – west, starting on the A40 to the west of Witney, entering Witney via the Ducklington junction and routing around the town centre via Tower Hill, Burford Road and Bridge Street, before finishing to the north-east of the town on the A4095 Woodstock Road.

5.23 A number of alternate routes were also tested, including two options taking into account the new routing options offered by new infrastructure included in the forecast scenarios.

5.24 Route 1a starts and ends at the same locations as route 1, but routes via Jubilee Way and the new Northern Perimeter Road rather than passing through the Bridge Street / West End junction.

5.25 Route 2a assesses a slight variation on Route 2, in which traffic routes around the town centre to the east rather than the west (i.e. via Station Lane / Witan Way rather than Tower Hill / Burford Road).

5.26 Route 2b begins on the A40 to the west of Witney and terminates on the A4095 Woodstock Road (as with Route 2 and 2a), but bypasses the town on the A40 and uses the new west facing slips at Shores Green.

5.27 Scenario 8, which includes the development of both West and North Witney and is supported by the Northern Perimeter Road, the Downs Road At-Grade junction and the Shores Green west facing slips shows improved journey times on every route considered when compared to the 'Do-Nothing' scenario, which is perhaps unsurprising as it is one of the more infrastructure heavy options.

5.28 Scenario 3 (West Witney with Shores Green), Scenario 5 (North Witney with Shores Green), Scenario 6 (West and East Witney with Shores Green) and Scenario 7 (East Witney with Shores Green) also improved journey times on most of the routes assessed, whilst Scenario 4 (North Witney with the Northern Perimeter Road and WEL2) performs less well. This may suggest that the WEL2 improvement scheme is not providing sufficient overall relief as a stand alone scheme to the Bridge Street / West End junction to improve east – west journey times on routes passing through that junction.

5.29 Scenario 9 (North and West Witney with Downs Road, Northern Perimeter Road and WEL2) also performs more poorly in terms of journey times on the selected routes, when compared to equivalent level of development in Scenario 8 (which includes Shores Green but excludes the WEL 2 scheme).

5.30 In terms of journey times (and on the basis of the example routes assessed) the best performing single site option, from initial assessment is Scenario 3, West Witney with the Downs Road at-grade junction and the Shores Green west facing slips, followed by Scenario 7, East Witney with Shores Green. The best performing combination of development sites is Scenario 6, East and West Witney (with the Downs Road at-grade junction and the Shores Green west facing slips).

ROUTE CHOICES

5.31 In order to identify the main demands for travel in and around the town a series of select link analysis were undertaken using the Witney models. These predict the routes followed by traffic using specific sections of the Witney Highway network, with the following main areas considered:

- Bridge Street
- West End
- Ducklington Lane (South of the Station Lane junction)
- Oxford Hill (north of Shores Green)

5.32 This series of select link analysis were used to determine whether any major changes in trip patterns could be expected as a result of the introduction of the major infrastructure proposals considered in the forecast scenarios.

Shores Green

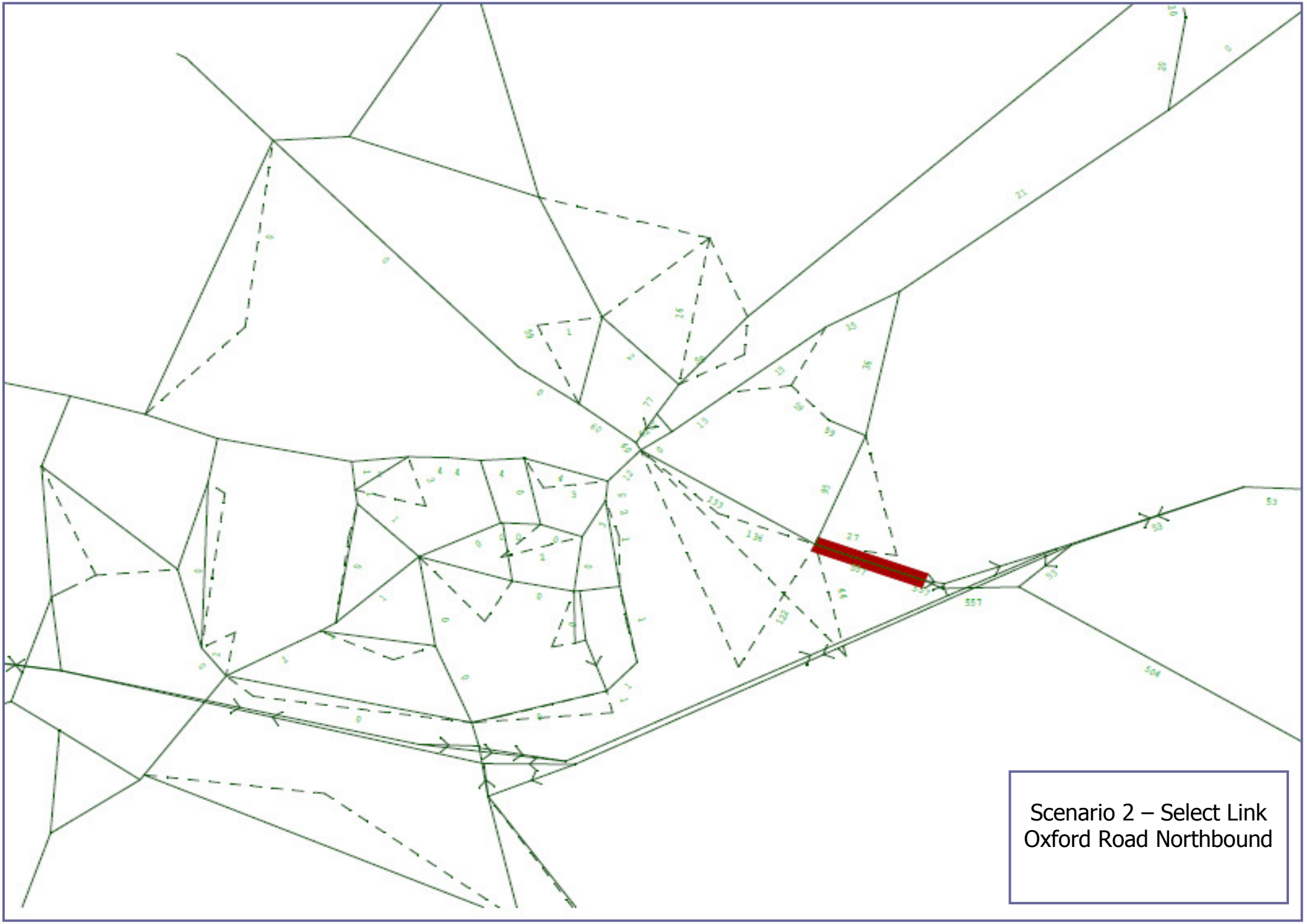
5.33 To assess the potential impacts of the Shores Green west facing slips a Select Link Analysis for the section of Oxford Hill (inbound towards Witney) was carried out comparing Scenario 2 (West Witney the Downs Road at-grade junction but with no Shores Green) with Scenario 3 (West Witney with the Downs Road at-grade junction and Shores Green).

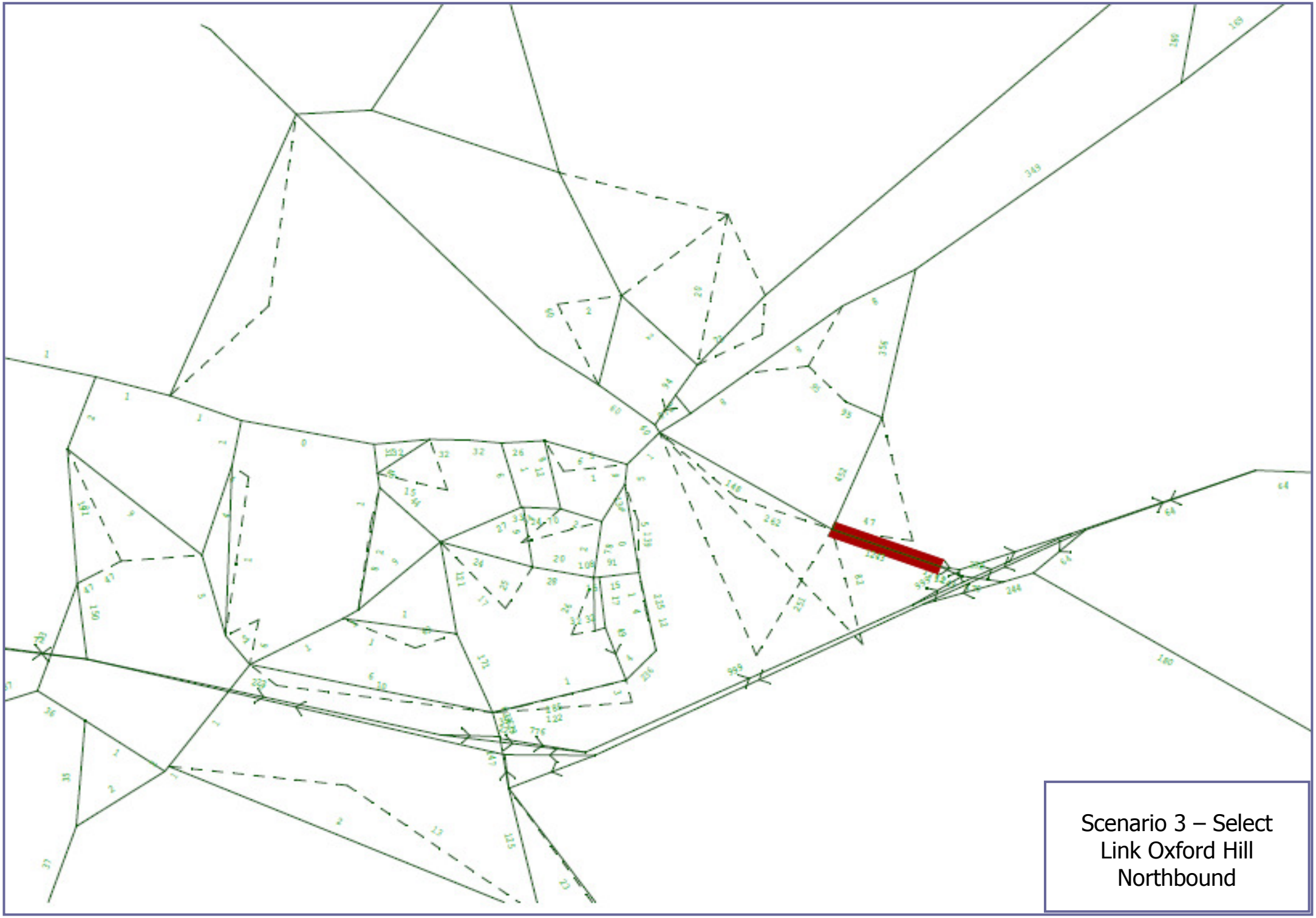
5.34 The two plots for the PM peak hour are provided on the following pages and show a significant difference in the levels of predicted traffic on Oxford Hill (with 1243 northbound trips in Scenario 3 compared to 557 in Scenario 2). In the case of Scenario 3 a large number of trips using this route originate from the western side of Witney (with 629 trips predicted as routing towards Oxford Hill after heading south out of Witney at the Ducklington junction onto the A40), conversely in Scenario 2 the number of trips originating from the western side of Witney is minimal.

5.35 In Scenario 3 Trips from Oxford Hill are then predicted to disperse amongst the residential areas to the north east, with a reasonable proportion of trips (349) also routing out of Witney on the A4095, whilst in Scenario 2 the number of longer distance trips is much lower (21 northbound on the A4095), with most journeys having a purely local destination.

5.36 This initial assessment shows a considerable change in local trip patterns as a result of introducing the west facing slips at Shores Green, with 629 local trips (out of total number of 1243 northbound trips on Oxford Hill in the PM peak) being predicted as using this route to move between the eastern and western sides of the town.

5.37 The example plans on the following two pages shows the origins and destinations of northbound trips on Oxford Hill during the PM peak hour. The first plan shows the origins and destinations of trips in Scenario 2 (in which West Witney is delivered with the Downs Road at-grade junction but no Shores Green) whilst the second plan shows the origins and destinations of trips in Scenario 3 (in which West Witney is delivered with both the Downs Road at-grade junction and Shores Green).


Scenario 2 – Select Link
Oxford Road Northbound



Scenario 3 – Select Link Oxford Hill Northbound

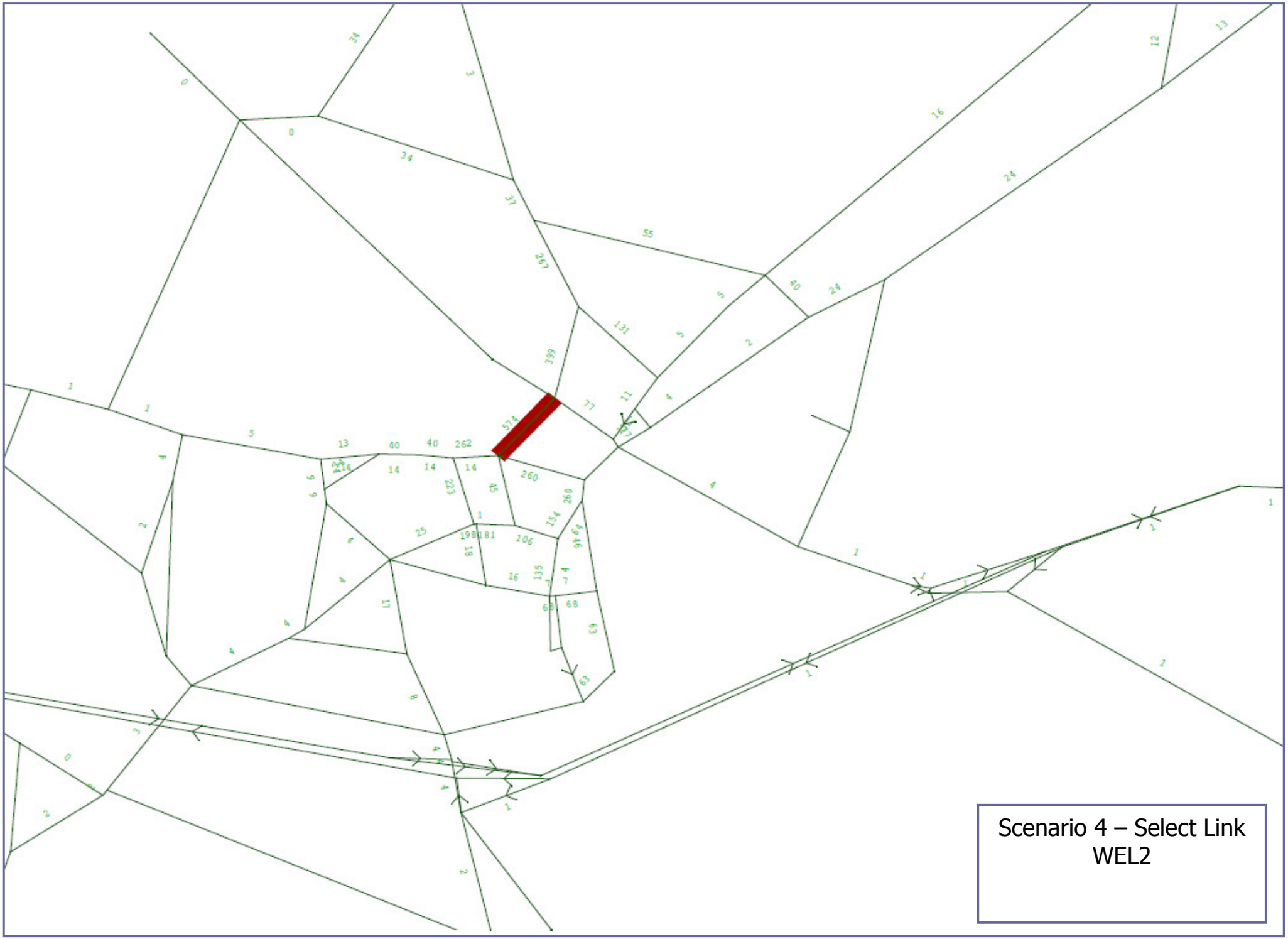
West End Link 2

5.38 Select Link Analysis were also carried out on the West End Link 2 (WEL2) route to the north west of the Bridge Street / West End junction to predict the potential use of the route in Scenario 4 (North Witney), as the scenario most likely to benefit from the scheme.

5.39 The select link results show a good level of demand for the use of the route, with much of the traffic carried being very local to the link. In particular a large proportion of the traffic using the route originates either from the North Witney development itself, or the surrounding existing residential areas.

5.40 WEL2 can therefore be expected to remove a degree of local traffic from the Bridge Street junction if implemented, however the scheme appears to be very closely related to the adjacent Witney North residential development in order to realise its main benefits and, as a stand alone scheme, it may not be as efficient a solution for other development areas.

5.41 The example plans on the following pages show the origins and destinations of northbound trips using the WEL2 link during the PM peak hour period.

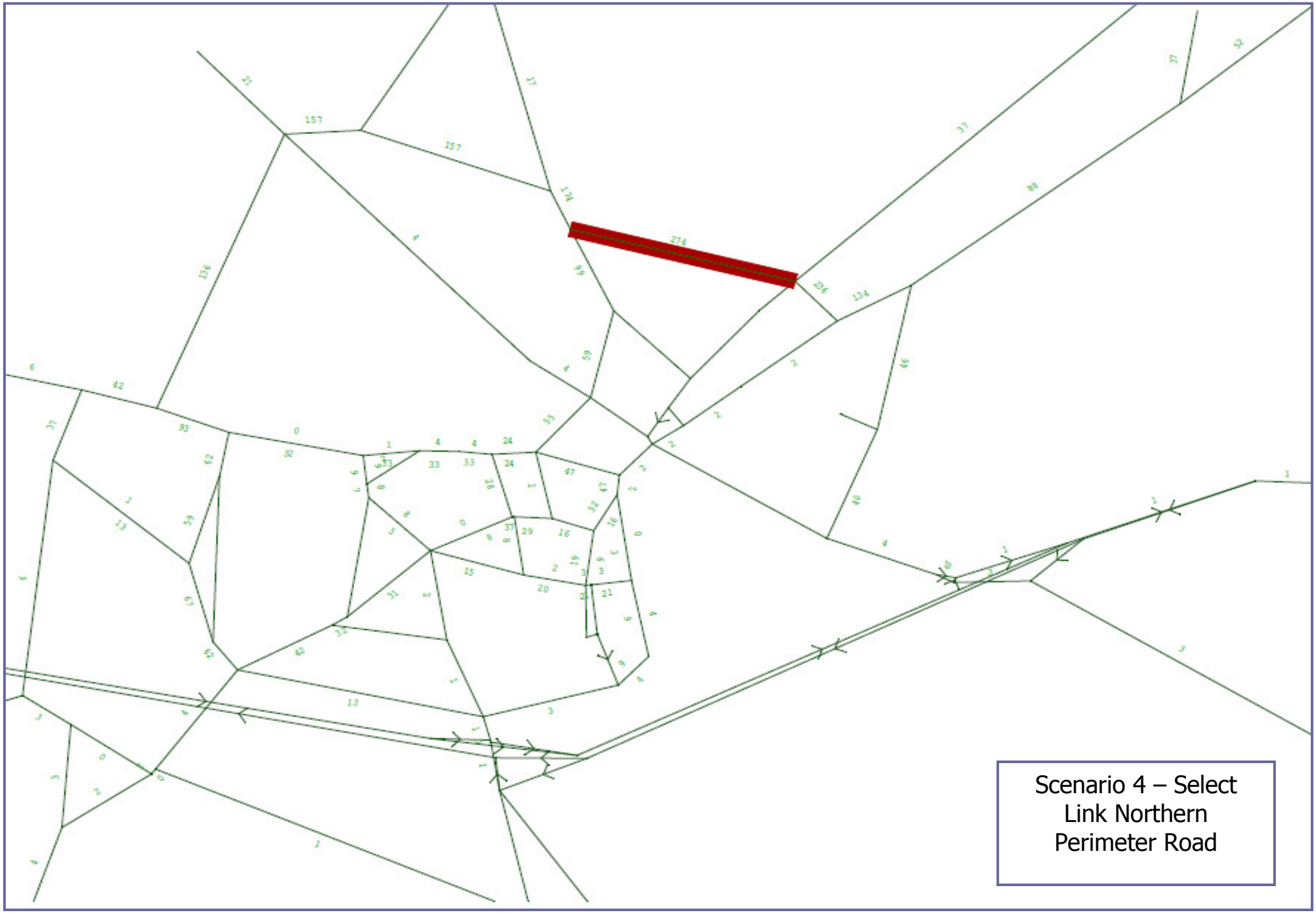

Scenario 4 – Select Link
WEL2

Northern Perimeter Route

5.42 The third major infrastructure proposal assessed through the modelling work was the northern perimeter route, running between Hailey Road and the A4095.

5.43 The northern perimeter road is predicted to serve mainly local traffic when considering the model results, with Select Link Analysis showing the main origins of trips using the perimeter road being either traffic from areas immediate to the road, or (to a relatively large degree), traffic which is using Dry Lane. Scenarios 4 and 9, the two which include the Northern Perimeter Road have the two highest levels of rat-running to the north of the town outside of Scenario 2 (which assumes no supporting infrastructure other than the Downs Road at-grade junction).

5.44 The example plan on the following page shows the main origins and destinations of eastbound trips on the northern perimeter route during the PM peak.


Scenario 4 – Select Link Northern Perimeter Road

WIDER IMPACTS

5.45 The levels of growth planned for Witney can also be expected to have traffic impacts outside of the immediate urban area of the town; as such an initial review of the expected changes in the levels of traffic through a number of the villages surrounding the town was carried out. **Table 12** below provides a summary of the difference between the number of trips predicted to pass through each village under each development option and the predicted future situation if no major sites were developed.

Table 12 – Change in flows through villages (in PCU)

Scenario		Difference in number of two way trips from the 'Do-Nothing' Scenario:				
		Hailey	Crawley	New Yatt	South Leigh	Total
Sc2	AM	20	45	-5	77	331
	PM	-2	-211	246	161	
Sc3	AM	8	-135	-57	63	**-499**
	PM	27	-477	76	-4	
Sc4	AM	179	-59	-187	58	362
	PM	204	-207	197	177	
Sc5	AM	131	-187	-94	81	93
	PM	138	-244	140	128	
Sc6	AM	6	-128	-34	83	**-337**
	PM	27	-418	78	49	
Sc7	AM	10	-112	-53	12	-291
	PM	-2	-343	169	28	
Sc8	AM	25	-148	-135	137	-152
	PM	49	-319	108	131	
Sc9	AM	75	-31	-193	64	240
	PM	129	-244	219	221	

5.46 In most Scenarios a degree of increase in the levels of traffic passing through the nearest villages to either the major growth site or related infrastructure is predicted, with increases in South Leigh expected in most scenarios. Increased numbers of trips through Hailey are also predicted in most scenarios, whilst trips through Crawley are generally predicted to decrease (potentially due to the infrastructure proposals associated with the major development sites helping to reduce rat running to the north of the town).

5.47 Changes in flows through New Yatt appear to be largely tidal in nature, with a general reduction in flows in the morning peak and some predicted increase in the evening, this may

be due to longer distance drivers being predicted to reroute via more minor roads to avoid congestion on the A40 in the evening peak hours.

5.48 Of the Scenarios considered Scenario 3 (West Witney, with Downs Road and Shores Green) and Scenario 6 (East and West Witney with Downs Road and Shores Green). result in the greatest overall reduction in rat-running trips through local villages when compared to the 'Do-Nothing' scenario,

5.49 Despite the additional attractiveness of the Shores Green junction, following the introduction of the west facing slips, the modelling shows modest increases in traffic flows through South Leigh in scenarios which include the scheme, and a reduction in flows compared to scenarios in which the scheme is not introduced.

5.50 As with the other modelling work undertaken, it should be noted that this assessment work outlined in **Table 12** provides a comparison between scenarios in which no major sites are delivered with those in which major sites and infrastructure schemes are included. It is expected that by the 2030 forecast year there will be increases in traffic across the Witney network, including routes through the nearest villages, even without the introduction of major growth sites and as such there will be a need to plan suitable highway works to discourage rat-running and protect local villages from the impacts of traffic growth.

STRATEGIC TRAFFIC LEVELS ON THE A40

5.51 Any major development in Witney is also expected to have an impact on the major strategic routes surrounding the town, in particular with regards to increases in levels of predicted congestion on the A40 to the east of Witney, as the main road route between Witney and Oxford.

5.52 The summary considers two of the junctions to the east of the town and provides an indication of the levels of expected overall queuing and delay expected (totaled across all approaches to the junctions) for both the "Do-Nothing" and for two of the best performing scenarios.

Table 13 – Impacts on A40

Scenario	Time Period	B4449 Roundabout		Cassington	
		Delay (seconds)	Average Queue (PCUs)	Delay (seconds)	Average Queue (PCU)
SC1	AM	156	18	1159	177
	PM	80	4	904	169
SC3	AM	195	39	1307	190
	PM	77	3	948	178
SC6	AM	120	9	1361	209
	PM	80	4	1009	192

5.53 It can be seen that increased levels of queuing and delay can be expected at important junctions to the east of Witney as a result of growth in the town, as such any package of mitigation associated with major development sites is likely to also have to take into account issues of capacity at key locations on the A40 between Witney and Oxford.

SUMMARY OF MODELLING RESULTS

Directions of Growth

5.54 The model results, whilst at an initial and strategic level, show a general pattern of variation in travel patterns to, from and within Witney, which varies according to both the location of major growth sites within the town and the supporting major infrastructure delivered alongside the development scenarios.

5.55 The three best performing scenarios are:

- 1) West Witney if delivered with the Shores Green west facing slips and the Downs Road at-grade junction, with this option having the most positive overall impact across the network in terms of total journey times, queuing and traffic speeds. This option also provides the fastest journey times on the individual routes assessed in this note.
- 2) East Witney if delivered with the Shores Green west facing slips, although the site provides a lower quantum of residential development.

- 3) East and West Witney with the Downs Road at-grade junction and the Shores Green west facing slips.

Supporting Infrastructure

5.56 The initial model results for a number of the development options considered appear to show those options which include Shores Green as having the most positive effect upon the wider Witney transport network, generally resulting in better overall network journey times, faster speeds and reduced levels of traffic within Witney than comparative options including the Northern Perimeter Road or the WEL2 scheme. In development scenarios including West Witney, the inclusion of the Downs Road at-grade junction also forms part of the infrastructure necessary to deliver growth, allowing for direct access to the A40 for longer distance trips and also for trips to and from the east of the town via the A40 and the improved Shores Green junction.

5.57 Both the WEL2 scheme and the Northern Perimeter Road also demonstrate some benefit in reducing traffic levels passing some of the more sensitive approaches to the Bridge Street / West End junction and also provide an alternate traffic route for trips to and from the surrounding area, but appear to provide a lesser degree of wider benefits when compared to the Shores Green west facing slips scheme, with scenarios including these options having the least overall benefits in terms of overall journey times, queuing and delay.

5.58 As such, whilst not being predicted to provide the same levels of overall as the Shores Green West Facing Slip Roads, the WEL2 and Northern Perimeter Link Road schemes do show benefits, particularly to the areas most local to the Bridge Street / West End junction and to traffic associated with development to the north of the town.

5.59 Over the Plan period, it is highly unlikely that Witney will have three new development sites; however, it will be important that the alignment of WEL2 is protected to ensure that this infrastructure can be constructed beyond the life of this Plan.

6 Local Improvements

6.1 Assessment of the origins and destinations of predicted trips within Witney in the forecast models shows a reasonable proportion of trips through sensitive roads, such as Bridge Street, being local in nature. For example when considering trips on Bridge Street in Scenario 1, the 'Do-Nothing' scenario, 71% of two way trips originate within Witney in the AM peak, with 68% of PM peak trips also originating within the town. Select Link Analysis plots for Bridge Street showing the origin and destination of trips passing through the junction in the 'Do-Nothing' scenario are provided in **Appendix A**.

6.2 A number of junctions within the town are predicted as being at, or over capacity by the 2030 forecast year prior to the delivery of the major development sites assessed, these include:

- Junction of Downs Road with Burford Road
- Junction of Ducklington Lane / Station Lane / Thorney Leys
- Junction of Bridge Street / West End / Woodgreen Hill / Newland
- Junction of Corn Street / Tower Hill / Welch Way / Curbridge Road and Ducklington Lane
- Junction of Oxford Road / Jubilee Way / Cogges Hill Road
- Junction of Welch Way with Woodford Way
- Dry Lane

6.3 Whilst the strategic improvements proposed do mitigate against the impacts of traffic associated with the proposed major urban extension sites, the levels of traffic growth predicted within the 2030 forecast model are such that the town network continues to be subject to congestion at a number of key locations.

6.4 The introduction of major infrastructure schemes is also predicted to have an effect on the way that traffic routes around the town, as identified in Section 4; with options including Shores Green west facing slips resulting in considerable increases in flows on the A40, including local trips between the Ducklington Lane and Shores Green junctions.

6.5 As such key local junctions on the routes to and from these major junctions onto the A40 will need particular attention, with major improvement works expected to be required at the Ducklington Lane / Station Lane / Thorney Leys junction and with improvements also

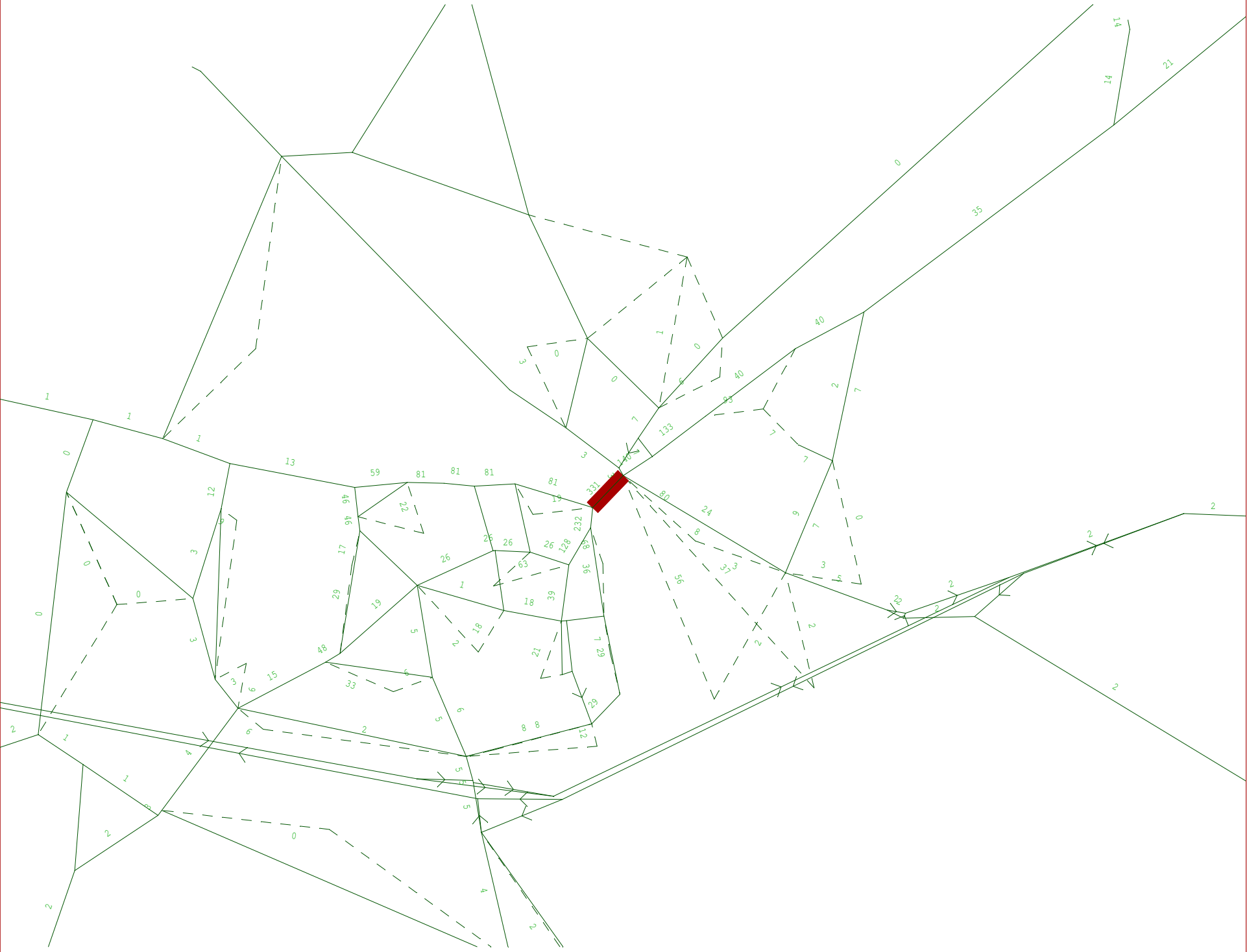
considered likely to be required at the junction of Oxford Hill / Jubilee Way and Cogges Hill Road.

6.6 In scenarios including the provision of the Shores Green west facing slip improvements, the addition of signal controls on the east bound off slips for the Ducklington Lane and Shores Green junctions from the A40 are also expected to be required to ensure that excessive queuing does not take place on the slip roads.

6.7 The modelling work also predicts considerable levels of rat-running on the minor roads around the north and west of Witney as drivers seek to avoid congestion within the town for cross town journeys. Whilst the scenarios which include Shores Green show the lowest increases in rat running in these areas, this remains an area to be addressed within any future strategy proposals.

6.8 A package of local measures has the scope to provide some relief with regards to the current and predicted issues surrounding congestion and accessibility affecting the town and the surrounding villages in the shorter term, providing time for the more complex strategic schemes to be developed, funded and delivered.

Appendix A – Bridge Street Select Link Analysis



SATURN

Atkins Ltd /
DVV / ITS

C1\AM_2030_S
1_CORDON.UFS

Scale 26001

Link Annot:

S.L.A.

Selected
Link
Assignment
Thru links:
35080 35015

Total Demand
Flow = 331

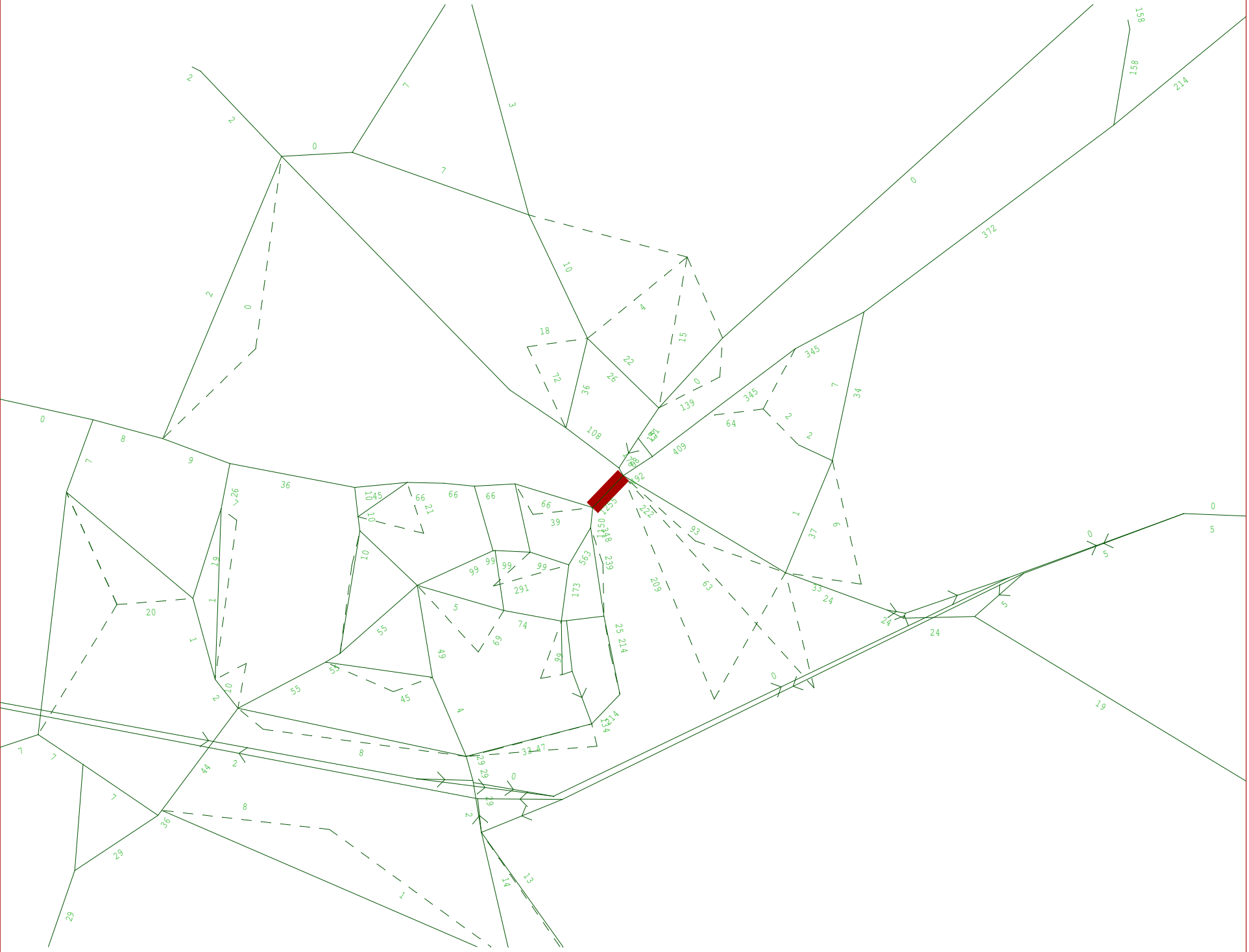
Mean OD time
1239.1 S

Mean OD dist
2213.1 M

Network fixd
Flow = 4

All User Cls

15- 8-12
WHITE YOUNG



SATURN

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C1\AM_2030_S
1_CORDON.UFS

Scale 26001

Link Annot:

S.L.A.

Selected
Link
Assignment
Thru links:
35015 35080

Total Demand
Flow = 1255

Mean OD time
839.6 S

Mean OD dist
2773.2 M

Network fixd
Flow = 2

All User Cls

15- 8-12
WHITE YOUNG