



Oxfordshire County Council

Witney Transport Strategy 2017

First Issue

Bridge Street Option Generation Study

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EXECUTIVE SUMMARY

WYG has been appointed by Oxfordshire County Council (OCC) to further develop the transport strategy for the town of Witney. This work is necessary because of the proposed Main Modifications to the draft West Oxfordshire District Council Local Plan 2031 published in November 2016 that has seen the proposed level of development around the District increase following the Inspector's initial review of the draft Plan submitted in 2015.

Whilst the study considers Witney in its entirety, particular attention has been focussed upon the potential impact of additional development and potential mitigation options along sensitive highway and transport corridors within the heart of the built-up area, notably Bridge Street and the town centre.

APPROACH TO ASSESSMENT

The Oxford Strategic (Highways) Model (OSM) covering Witney was used to assess network performance assuming several alternative potential development and mitigation scenarios. A number of model runs had already been undertaken prior to commencement of the study, as summarised below. Results drawn from the pre-existing model runs were used to identify existing and predicted network issues and to inform development of an emerging mitigation and improvement strategy.

- 2013 Baseline Model Run – used to identify existing network issues
- 2031 “Do Minimum” – a scenario including only newly built and known committed developments in addition to those included within the 2013 Baseline together with a limited number of highway improvements
- 2031 “Preferred Development” – a scenario including a level of proposed development additional to committed and recently built-out developments consistent with development set out within the Local Plan

The results of the 2013 Baseline model run indicate existing operational issues at the locations summarised below:

Within Witney	
AM Peak	PM Peak
<p>Bridge Street: Northbound link operates at 104% capacity, southbound at 96% V/C¹. The A4095 / B4022 double mini-roundabout to the north approaches capacity operating at 91% V/C.</p> <p>Station Lane: Westbound approach to the Ducklington Lane signal junction operates at 101% V/C.</p>	<p>Bridge Street: Both northbound and southbound links operate in excess of capacity (102% and 101% respectively).</p> <p>Station Lane: The westbound approach to the Ducklington Lane signal junction operates at 101% V/C.</p> <p>B4047 Burford Road: Westbound approach to the Deer Park Road junction operates at 101% V/C.</p>
East of Witney	
AM Peak	PM Peak
<p>A40 Corridor at Eynsham: Both eastbound and westbound approaches to the Witney Road junction and the junction itself operate in excess of 95% capacity. The A40 / Cassington Road junction operates between 85% and 95% capacity.</p> <p>A44 Corridor between Woodstock and Oxford North: Both north and southbound links approaching the Rutten Lane / Sandy Lane roundabout at Yarnton operate in excess of 95% V/C. The A44 southbound links between Yarnton and Oxford operate in excess of 95% capacity.</p> <p>Wolvercote & Cutteslowe roundabouts, north Oxford: Both operate between 85% and 95% capacity with several link approaches to the Wolvercote roundabout operating above 95% capacity.</p>	<p>A40 Corridor at Eynsham: Both eastbound and westbound approaches to the Witney Road junction and the junction itself operate in excess of 95% capacity. The eastbound approach to the Cassington Road junction operates in excess of 95% capacity.</p> <p>A44 Corridor between Woodstock and Oxford North: Both north and southbound links approaching the Rutten Lane / Sandy Lane roundabout at Yarnton operate in excess of 95% V/C. The northbound link approaching the Cassington Road roundabout at Yarnton operates in excess of 95% capacity.</p> <p>Wolvercote & Cutteslowe roundabouts, north Oxford: Both operate in excess of capacity and several link approaches over 95% V/C</p>
West of Witney	
AM Peak	PM Peak
No major performance issues identified.	No major performance issues identified.

The 2031 “Do Minimum” scenario includes delivery of only limited highway interventions: a new at-grade roundabout at the A40 / Downs Road junction plus the recently completed improvements to the Ducklington Lane / Station Lane / Thorney Leys junction and both Cutteslowe and Wolvercote roundabouts in north Oxford. Model results demonstrate that the new highways infrastructure provided accommodates

¹ V/C is the Volume over Capacity ratio for the link or junction in question. Expressed as a percentage, it provides a measure of the operational performance of a given length or section of highway.

predicted traffic flows through the Ducklington Lane signals and at both Wolvercote and Cutteslowe roundabouts but there are some minor capacity issues on the A40 associated with delivery of the new at-grade Downs Road roundabout. The model output also indicates that growth has the effect of exacerbating congested conditions and air quality issues along Bridge Street and marginally increasing traffic flows and associated capacity issues at the B4022 Burford Road / Deer Park Road junction.

The 2031 "Preferred Development" scenario includes the assumed delivery of significantly more residential development within and around the town than the "Do Minimum" (3,600 units compared to c. 1,000). The following highway schemes and alterations are included within this scenario in addition to the highway schemes included within the 2031 "Do Minimum" scenario:

- Delivery of west facing slips to provide an all-movements junction on the A40 at Shores Green;
- Delivery of all phases of the North Witney Distributor Road inclusive of improvements at Jubilee Way roundabout; and,
- Delivery of the West End Link (WEL2) providing a second crossing of the River Windrush approximately 300 metres to the north-east of Bridge Street.

The model results indicate that delivery of the proposed highway schemes provides some improvement of traffic conditions along Bridge Street during both AM and PM peak hour periods. This is principally due to a combination of the WEL2 link road and delivery of the west facing slips at the A40 Shores Green junction providing viable alternative routes for cross-town traffic. However, without further measures to encourage a greater proportion of traffic to transfer from Bridge Street to alternatives, it is clear from the model results that the benefit of new infrastructure provided would not be maximised.

Results drawn from the 2031 "Preferred Development" model run also indicate emerging operational issues in the vicinity of the Oxford Hill / Cogges Hill Road junction to the south-east of the town and a minor exacerbation of predicted capacity issues at the proposed A40 / Downs Road junction that is forecast to be operating at capacity during both AM and PM peak periods.

Further capacity issues are apparent along the A40 corridor to the east of the town in the vicinity of Eynsham and Cassington and the A4095 corridor to the north-east however further assessment would be required to understand the proportionate impact on these corridors of proposed development in and within the direct vicinity of Witney itself and that of separate, large-scale development anticipated for delivery near Eynsham.

DEVELOPMENT OF FURTHER OPTIONS

Following assessment of previous model output summarised above, two further options were developed to test the operational implications and mitigation requirements of proposals to increase the scale of proposed residential development within the Witney Sub Area from 3,700 dwellings modelled previously to c. 4,400.

As a starting assumption, the key highways and transport mitigation proposals as set out within the 2031 "Preferred Development" scenario were retained within the assessment.

The development of additional options for assessment seeks to build on and lock in the benefits of the emerging strengths of the strategic infrastructure package developed as part of the 2031 "Preferred Development" scenario tested in 2016 including:

- the apparent effectiveness of new infrastructure in re-routing through-traffic out of the town centre onto more appropriate peripheral routes (notably the Northern Distributor Road and A40 via both Shores Green and the new Downs Road junctions); and
- the impact of the WEL2 link in reducing pressure on Bridge Street and transferring through-traffic out of sensitive routes within the town centre and surrounding villages.

Option One proposes implementation of a partial gyratory system operating in a clockwise direction using a combination of the B4022 West End / A4095 Bridge Street and A4095 Mill Street plus the new WEL2 link incorporating retention of two-way flows. Option Two proposes full closure of Bridge Street to general traffic (with potential to retain access for public transport vehicles) and continued accommodation of two-way traffic flows along the B4022 West End, A4095 Mill Street and new WEL2 link. In both cases, measures were also proposed to restrict general traffic flows along the northern section of High Street between its junctions with Witan Way and Welch Way.

The results of each model run indicate that implementation of either proposal would be likely to have a significant beneficial impact on traffic conditions and associated air quality issues along the Bridge Street corridor and would also result in a significant reduction in traffic flows through the centre of the town along High Street. A summary of the key impacts of both Options is provided below:

Option One

- Predicted traffic flows on Bridge Street reduce by c. 50% in comparison to the previously modelled 2031 “Preferred Development” scenario due to closure to northbound traffic;
- Traffic flows on the WEL2 link increase markedly during AM and PM peak periods. The northbound link is predicted to operate marginally over capacity however initial assessment indicates that this would be resolved through minor works to amend the alignment and increase capacity of the proposed B4022 Hailey Road / West End / Crawley Road / WEL2 junction;
- Traffic flows on the B4022 West End link increase significantly during both AM and PM peak periods however the link is predicted to remain operating comfortably within capacity during both peak periods;
- Traffic flows on the A4095 Mill Street link increase slightly during both AM and PM peak periods however the link is predicted to remain operating comfortably within capacity during both peak periods;
- Traffic flows along High Street and Welch Way reduce very significantly in comparison to the 2031 “Preferred Development” scenario and provide an opportunity to consider full or partial pedestrianisation of key shopping streets within the town centre;
- Traffic flows along Witan Way increase marginally in comparison to the 2031 “Preferred Development” scenario. However, as Witan Way forms an eastern distributor route around the town and is predicted to remain operating comfortably within capacity, the additional traffic is not considered problematic. This is particularly the case as it accommodates vehicles displaced from more sensitive sections of the network and facilitates potential improvements elsewhere (e.g. High Street);
- Traffic flows along Woodford Way are predicted to increase markedly in comparison to the 2031 “Preferred Development” scenario. Although it is predicted that the link would remain operating well within capacity, the wider operational and local environmental impacts would need to be considered in more detail; and,
- Model results indicate that link capacities along the Oxford Hill corridor and Cogges Hill Road would be exceeded as a result of the addition of traffic gaining access to and from the A40 at Shores

Green. Initial assessment of improvement options indicates that significant operational improvements could be gained from optimising the operation of the proposed signal installations at the Oxford Hill / Cogges Hill Road / Jubilee Way junction.

Option Two

- Predicted traffic flows on Bridge Street reduced to negligible levels due to assumed closure to general traffic;
- Traffic flows on the WEL2 link increase markedly during AM and PM peak periods. Both north and southbound links are predicted to operate marginally over capacity however initial assessment indicates that this would be resolved through minor works to amend the alignment and increase capacity of the proposed B4022 Hailey Road / West End / Crawley Road / WEL2 and A4095 Mill Street / Woodford Way / WEL2 junctions;
- Traffic flows on the B4022 West End link increase significantly during both AM and PM peak periods however the link is predicted to remain operating comfortably within capacity during both peak periods;
- Traffic flows on the A4095 Mill Street link decrease significantly during both AM and PM peak periods although Option Two does assume retention of a two-way traffic flow;
- Traffic flows along High Street and Welch Way reduce very significantly in comparison to the 2031 "Preferred Development" scenario and provide an opportunity to consider full or partial pedestrianisation of key shopping streets within the town centre;
- Traffic flows along Witan Way decrease marginally in comparison to the 2031 "Preferred Development" scenario;
- Traffic flows along Woodford Way are predicted to increase markedly in comparison to the 2031 "Preferred Development" scenario. Although it is predicted that the link would remain operating well within capacity, the wider operational and local environmental impacts would need to be considered in more detail; and,
- Model results indicate that link capacities along the Oxford Hill corridor and Cogges Hill Road would be exceeded as a result of the addition of traffic gaining access to and from the A40 at Shores Green. Initial assessment of improvement options indicates that significant operational



improvements could be gained from optimising the operation of the proposed signal installations at the Oxford Hill / Cogges Hill Road / Jubilee Way junction.



1 INTRODUCTION

1.1 PREAMBLE

1.1.1 WYG has been appointed by Oxfordshire County Council (OCC) to further develop the transport strategy for the town of Witney. This work is necessary as a result of the proposed Main Modifications to the West Oxfordshire District Council Local Plan 2031 published in November 2016 that has seen the proposed level of development around the District increase following the Inspector's initial review of the draft Plan submitted in 2015.

1.1.2 The 2015 Plan made provision for 10,500 new houses across the District. c. 3,700 of which were proposed for delivery on sites within the Witney Sub Area.

1.1.3 In response to the Inspector's comments on the previous Plan, updated series of proposed Main Modifications (to the) Local Plan were published for consultation in November 2016. The Main Modifications Plan significantly increased the proposed scale of residential development across the District to 15,950 dwellings (13,200 to meet West Oxfordshire's need and 2,750 to meet Oxford's unmet need) and the proposed number of jobs from an additional c. 12,000 to c. 28,000. The proportion of housing allocated with the Witney sub area was increased from 3,700 to 4,400 dwellings.

1.2 PREVIOUS ASSESSMENT WORK

1.2.1 To assess the transport and highway implications of the proposed amendments to the Plan, two outline development scenarios were input to and tested using the Oxfordshire Strategic Model (OSM). Output from a third model run assessing 2013 baseline conditions was also made available to the study.

1.2.2 The first (2031 "Do Minimum") scenario model run considered only developments that were already constructed or identified as committed together with accompanying committed transport and highways improvement schemes. The second (2031 "Preferred Development") scenario considered the implications of delivering the full allocation of proposed (housing and employment) development sites across the District as identified by the Authority as being required to meet needs by 2031. Further details of the specific developments and assumed highway and transport mitigation proposals included in each model run are set out within **Chapter 2.0.**



2 PREVIOUS MODELLING WORK

2.1 PREAMBLE

2.1.1 The Following chapter provides details of results drawn from a number of previous model runs covering the 2013 Baseline, 2031 “Do Minimum” and 2031 “Preferred Development” scenarios as described in **section 1.2.2**.

2.1 BASELINE MODEL RUN

2.1.1 A review of output from the 2013 AM and PM peak Baseline models was undertaken. This was to identify existing performance issues on the network and review previously proposed mitigation proposals with a view to potentially developing them further.

2.1.2 The results indicate several areas where the existing network experiences stress during both peak periods, summarised within **Table 1.0** below:

Table 1.0: Summary of Existing Network Stress (AM & PM Peaks) 2013 Baseline

Within Witney	
AM Peak	PM Peak
<p>Bridge Street: Northbound link operates at 104% capacity, southbound at 96% V/C. The A4095 / B4022 double mini-roundabout to the north approaches capacity operating at 91% V/C.</p> <p>Station Lane: Westbound approach to the Ducklington Lane signal junction operates at 101% V/C.</p>	<p>Bridge Street: Both northbound and southbound links operate in excess of capacity (102% and 101% respectively).</p> <p>Station Lane: The westbound approach to the Ducklington Lane signal junction operates at 101% V/C.</p> <p>B4047 Burford Road: Westbound approach to the Deer Park Road junction operates at 101% V/C.</p>
East of Witney	
AM Peak	PM Peak
<p>A40 Corridor at Eynsham: Both eastbound and westbound approaches to the Witney Road junction and the junction itself operate in excess of 95% capacity. The A40 / Cassington Road junction operates between 85% and 95% capacity.</p> <p>A44 Corridor between Woodstock and Oxford North: Both north and southbound links approaching the Rutten Lane / Sandy</p>	<p>A40 Corridor at Eynsham: Both eastbound and westbound approaches to the Witney Road junction and the junction itself operate in excess of 95% capacity. The eastbound approach to the Cassington Road junction operates in excess of 95% capacity.</p> <p>A44 Corridor between Woodstock and Oxford North: Both north and southbound links approaching the Rutten Lane / Sandy</p>



<p>Lane roundabout at Yarnton operate in excess of 95% V/C. The A44 southbound links between Yarnton and Oxford operate in excess of 95% capacity. Wolvercote & Cutteslowe roundabouts, north Oxford: Both operate between 85% and 95% capacity with several link approaches to the Wolvercote roundabout operating above 95% capacity.</p>	<p>Lane roundabout at Yarnton operate in excess of 95% V/C. The northbound link approaching the Cassington Road roundabout at Yarnton operates in excess of 95% capacity. Wolvercote & Cutteslowe roundabouts, north Oxford: Both operate in excess of capacity and several link approaches over 95% V/C</p>
West of Witney	
AM Peak	PM Peak
No major performance issues identified.	No major performance issues identified.

2.1 2031 "DO MINIMUM" SCENARIO

2.1.1 The "Do Minimum" scenario tests the performance of the highway network in 2031 assuming delivery of development already built out and allocated within the West Oxfordshire Local Plan 2031, prior to the Main Modifications proposed in November 2016.

2.1.2 In West Oxfordshire, the land use assumptions include a total of 5,088 new dwellings and 12,182 new jobs in addition to the 2013 Base Year scenario. Of these, around 1,000 houses are allocated and committed within the Witney Sub-area on a site at West Witney. Details of the quantum and location of development is presented within the Atkins Evaluation of Transport Impacts Technical Note published in November 2016.

2.1.3 The 2031 "Do Minimum" scenario includes the following alterations to the highway network compared to the 2013 Base that are considered relevant to the study:

- Improvements to the A415 Ducklington Lane / Station Lane / Thorney Leys signal junction to deliver increased capacity and improve pedestrian / cycle amenity (this scheme was delivered in 2014);
- Delivery of a new at-grade roundabout connecting the A40 into Downs Road to provide access to the West Witney development site; and,
- Capacity upgrades to the Cutteslowe and Wolvercote roundabouts in north Oxford (scheme delivered in 2016).

Key Conclusions

2.1.4 A summary of the key conclusions drawn from assessment of the 2031 “Do Minimum” model run output is provided within **Table 2.0** and commentary below:

Table 2.0: Summary of Key Link V/C (AM & PM Peaks) 2013 Baseline / 2031 “Do Minimum” Comparison

Link	Direction	Alternative Scenarios Predicted Link V/Cs			
		2013 Baseline		2031 “Do Minimum”	
		AM	PM	AM	PM
A4095 Bridge Street	Northbound	104	102	103	101
	Southbound	96	101	102	102
West End Link (WEL2)	Northbound	N/A	N/A	N/A	N/A
	Southbound	N/A	N/A	N/A	N/A
B4022 West End	Northbound	24	35	24	30
	Southbound	19	13	15	11
A4095 Mill Street	Eastbound	59	51	60	50
	Westbound	34	35	32	34
High Street	Northbound	62	72	59	69
	Southbound	52	61	55	54
Welch Way	Eastbound	44	36	31	31
	Westbound	32	51	29	35
Woodford Way	Northbound				
	Southbound				
Witan Way	Northbound	7	28	19	42
	Southbound	8	2	13	9
B4022 Newland	Eastbound	31	34	29	32
	Westbound	62	67	65	67
B4022 Oxford Hill	Eastbound	9	12	8	9
	Westbound	51	54	29	34
Cogges Hill Road	Northbound	72	50	47	97
	Southbound	3	3	3	3
Jubilee Way*	Northbound	10	7	8	7
	Southbound	33	44	44	45
Station Lane	Eastbound	49	28	38	31
	Westbound	101	101	28	35
A40 (West of Downs Road)	Eastbound	33	24	92	55
	Westbound	18	30	17	31
A40 (Downs–Ducklington)	Eastbound	33	24	47	36
	Westbound	18	30	51	75
A40 (Duck – Shore Green)	Eastbound	36	28	39	36
	Westbound	25	30	30	30



			PM		
A40 (East of Shores Green)	Eastbound	73	65	80	
	Westbound	33	35	35	
A4095 Burford Road	Eastbound	67	45	65	
	Westbound	82	101	96	100
A4095 Curbridge Rd	Northbound	25	18	31	
	Southbound	42	68	64	

Within Witney

- The impact of development and wider background growth results in a marginal worsening in performance of the Bridge Street link within the town with both north and southbound links operating above 95% capacity during both AM and PM peak periods;
- The A415 Ducklington Lane / Station Lane / Thorney Leys junction improvement scheme constructed in 2014 has the effect of eliminating existing capacity issues and accommodates predicted future growth associated with the "Do Minimum" scenario by 2031;
- Some capacity issues remain on the B4022 Burford Road westbound approach to the Deer Park Road junction where respective AM and PM link V/Cs are recorded as 96% and 100%. Traffic flows through the junction increase marginally;
- Implementation of the A40 / Downs Road at-grade roundabout coupled with delivery of the 1,000 residential units as part of the West Witney development results in some minor capacity issues on the A40 eastbound approach to the new junction during the AM peak where link V/C operates at 92%. Delivery of the new development and new junction results in Curbridge Road northbound operating at 97% V/C during the AM peak period and minor capacity issues on the southbound link during the PM peak;
- Despite the addition of traffic on the local highway network associated with the West Witney development, the new A40 / Downs Road junction and Ducklington Lane junction improvement scheme appear to have the effect of reducing the volume of traffic on routes through the town centre (including sections of High Street, Welch

Way and Ducklington Lane). It is however notable that volumes along Bridge Street increase (albeit marginally) in comparison to the 2013 Baseline;

- The reduction in demand through the town centre appears to be because of a combination of factors including:
 - Trips originating from / destined for the north of Witney use the A40 Downs Road junction in preference to the A415 Ducklington Lane junction; and,
 - Some traffic chooses to route via Witan Way in preference to Ducklington Lane to gain access to / from the A40 via the A415 junction. This is probably as a result of capacity enhancement of the Ducklington Lane signals making this route more attractive.

East of Witney

- Similar capacity issues are in evidence along the A40 corridor around Eynsham and the A44 between Oxford and Woodstock in the 2031 "Do Minimum" scenario as were identified in the 2013 Base model output. It is however noted that overall traffic volumes along the A40 corridor in the direct vicinity of Eynsham reduce slightly implying the overall effect of new development on the operation of the corridor is mixed. However, this scenario does not include the proposed strategic development sites at Eynsham;
- There is some evidence of emerging capacity issues along the A4095 corridor resulting from a reasonably sizeable increase in predicted traffic flows immediately to the north of Witney (+c.15% northbound, +c.50% southbound during the AM peak; +c.50% northbound, +c.20% southbound during the PM peak). This is particularly apparent on approaches to the A4095 / A44 Bladon Roundabout. Further assessment work would be required to understand where this traffic originates from and is destined for; and,
- Improvement schemes at the Wolvercote and Cutteslowe roundabouts that were delivered in 2016 in north Oxford all but eliminate capacity issues at both junctions and approach links.

West of Witney

- As with the 2013 Base model run, there are no major performance issues identified with the operation of the network to the west of Witney.

2.2 2031 "PREFERRED DEVELOPMENT" SCENARIO

2.2.1 The 2031 "Preferred Development" Scenario assessed the performance of the highway network in 2031 assuming delivery of the "Do Minimum" development plus potential housing and employment sites identified by the District Council in the 2016 proposed Main Modifications review as being required to meet objectively identified needs to 2031.

2.2.2 The Main Modifications Local Plan, proposes delivery of 13,200 dwellings over the plan period 2011 - 2031 to meet West Oxfordshire's housing needs. The plan also proposes to provide 2,750 dwellings to assist Oxford in meeting their unmet housing needs. This equates to 15,950 dwellings in total. Previously (in 2015) the Local Plan was proposing to only provide for 10,500 homes to meet West Oxfordshire's need only. This is considered further in **Chapter 4.0**.

2.2.3 Within the 2016 Main Modifications Plan an estimated 4,400 were allocated for delivery on sites in and around the Witney Sub Area. However, the previous 2031 "Preferred Development" model run undertaken in 2016 included for only 3,800. This was broadly comprised of the c. 1,000 units as part of the committed West Witney development, c. 1,400 units as part of Witney North, c. 450 units in East Witney and around 1,000 units on smaller windfall sites distributed around the town. Details of the housing and employment land development inclusions and exclusions assumed in the 2031 "Preferred Development" scenario are set out within the Evaluation of Transport Impacts Technical Note that was prepared by Atkins on behalf of OCC in November 2016.

2.2.4 In addition to the c. 12,000 additional jobs included within the "Do Minimum" scenario, a further c.16,000 jobs could potentially come forward across the District based on the quantum of planned employment land provision. 20ha is proposed to the west of Witney, with land to the west of Downs Road identified as an area of future long-term development potential. An additional 40ha employment site has also been identified at the proposed Garden Village to the north of the A40 at Eynsham (although in reality much of this is likely to come forward beyond 2031).

2.2.5 The 2031 “Preferred Development” Scenario includes the following alterations to the highway network in addition to schemes included within the 2031 “Do Minimum” scenario that are considered relevant to the study:

- Delivery of west facing slips to provide an all-movements junction on the A40 at Shores Green;
- Delivery of all phases of the North Witney Distributor Road inclusive of improvements at Jubilee Way roundabout; and,
- Delivery of the West End Link (WEL2) providing a second crossing of the River Windrush approximately 300 metres to the north-east of Bridge Street.

Key Conclusions

2.2.6 A summary of the key conclusions drawn from assessment of the 2031 “Preferred Development” model run output is provided within **Table 3.0** and commentary below:

Table 3.0: Summary of Key Link V/C (AM & PM Peaks) 2013 Baseline / 2031 “Preferred Development” Comparison

Link	Direction	Alternative Scenarios Predicted Link V/Cs			
		2013 Baseline		2031 “Preferred Development”	
		AM	PM	AM	PM
A4095 Bridge Street	Northbound	104	102	94	93
	Southbound	96	101	85	82
West End Link (WEL2)	Northbound	N/A	N/A	32	52
	Southbound	N/A	N/A	39	35
B4022 West End	Northbound	24	35	18	13
	Southbound	19	13	10	7
A4095 Mill Street	Eastbound	59	51	50	47
	Westbound	34	35	26	28
High Street	Northbound	62	72	59	65
	Southbound	52	61	43	42
Welch Way	Eastbound	44	36	37	30
	Westbound	32	51	22	29
Woodford Way	Northbound	27	20	21	33
	Southbound	8	5	11	10
Witan Way	Northbound	7	28	12	39
	Southbound	8	2	11	6



Link	Direction	Alternative Scenarios Predicted Link V/Cs			
		2013 Baseline		2031 "Preferred Development"	
		AM	PM	AM	PM
B4022 Newland	Eastbound	31	34	26	29
	Westbound	62	67	51	30
B4022 Oxford Hill	Eastbound	9	12	29	23
	Westbound	51	54	72	81
Cogges Hill Road	Northbound	72	50	84	141
	Southbound	3	3	3	4
Jubilee Way*	Northbound	10	7	15	16
	Southbound	33	44	69	60
Station Lane	Eastbound	49	28	33	30
	Westbound	101	101	24	30
A40 (West of Downs Road)	Eastbound	33	24	99	69
	Westbound	18	30	23	36
A40 (Downs–Ducklington)	Eastbound	33	24	51	41
	Westbound	18	30	70	90
A40 (Duck – Shore Green)	Eastbound	36	28	52	38
	Westbound	25	30	43	47
A40 (East of Shores Green)	Eastbound	73	65	96	62
	Westbound	33	35	33	32
A4095 Burford Road	Eastbound	67	45	66	56
	Westbound	82	101	95	100
A4095 Curbridge Rd	Northbound	25	18	33	27
	Southbound	42	68	60	90

Within Witney

- The impact of development and wider background traffic growth and associated mitigation strategy associated with the 2031 "Preferred Development" scenario results in an improvement in performance of the Bridge Street link in both AM and PM peak periods. Both northbound and southbound links are predicted to operate between 85% and 95% V/C in the AM peak period. During the PM peak, period the northbound link is predicted to operate at between 85% and 95% V/C with the southbound link operating just below 85%;
- Predicted traffic levels on Bridge Street reduce by 9% (c. 170 vehicles) during the AM peak period and by 12% (c. 230 vehicles) during the PM peak when compared to the 2031 "Do Minimum" scenario. Further predicted reductions in traffic are observed

during both peak periods along Witan Way to the east of the town centre. This is primarily due to traffic re-routing to use the new WEL2 link;

- The predicted level of traffic increases on the B4022 Hailey Road and highway links towards the town centre including Moorland Road, Woodford Way, Welch Way and Ducklington Lane. In part, this is because of the addition of traffic on the network associated with the proposed development at North Witney. It is also likely to be due to a transfer of trips already on the network away from routes including Bridge Street, Witan Way and Dry Lane, Deer Park Road, Tower Hill that can now route via the new WEL2 link;
- Similarly, by allowing all-movements access to / from the A40, delivery of west facing on / off slips at the Shores Green junctions appears to transfer existing trips on the network away from routes through the town centre (and during the PM peak along the north-western section of Newland) when compared to the 2031 "Do Minimum" scenario;
- Analysis of V/C output indicates capacity issues associated with traffic discharging out of the proposed East Witney development site via Cogges Hill Road onto the B4022 Oxford Hill during the PM peak period. It is however considered that this may be something of an anomaly as accompanying traffic flow data does not appear to be consistent with the emergence of issues in this location. Further outline consideration of performance issues associated with this junction is detailed in **Chapter 4.0**. It is recommended that further analysis be undertaken during further stages of the study;
- To the south-west of the town, capacity issues that emerged on the Curbridge Road corridor within the "Do Minimum" scenario still appear to be in evidence although it should be noted that the level of additional traffic predicted because of the "Preferred Development" scenario over and above the level in the "Do Minimum" is largely negligible in this location;
- Predicted traffic flows along the A40 to the south-west of the town within the "Preferred Development" scenario increase by around 20% during both AM and PM peak periods when compared to the "Do Minimum" scenario. During the AM peak the A40 eastbound link approach to the proposed Downs Road roundabout operates at

99% V/C. During the PM peak, the westbound approach operates at 90% V/C. In both peak periods the junction itself is predicted to remain operating below 85% V/C.

East of Witney

- There is a significant predicted exacerbation of link and junction capacity issues along the A40 corridor towards Oxford to the east of the town, particularly near Eynsham and Cassington. It is notable though that the predicted increase in traffic associated with the "Preferred Development" when compared to the "Do Minimum" is reasonably small during both AM and PM peak periods. Further investigation of how the proposed implementation of bus priority measures along the A40 corridor in this location and the impact of large scale development near Eynsham will be necessary to understand the reasons behind the worsening in performance;
- Emerging capacity issues along the A4095 corridor to the north-east of the town identified in the "Do Minimum" scenario are worse within the "Preferred Development" scenario. As with the A40 corridor though, further analysis of the impact of development near Eynsham will be necessary to understand the causes in more detail; and,
- Improvement schemes at the Wolvercote and Cutteslowe roundabouts delivered in 2016 in north Oxford all but eliminate capacity issues at both junctions and approach links.

West of Witney

- As with the 2013 Base model and 2031 "Do Minimum" model runs, there are no major performance issues identified with the operation of the network to the west of Witney.



3 DEVELOPMENT OF FURTHER OPTIONS FOR ASSESSMENT

3.1.1 Following assessment of the previous model output assessing performance of the network assuming delivery of the 2016 Main Modifications Plan and associated highway and transport mitigation, work has commenced to develop further options for assessment using the OSM.

3.1.2 In each case, it is proposed to increase the scale of residential development proposed by an additional c. 600 units bringing the total proposed within the Witney Sub Area to 4,400. On the basis of information provided by the Client team, **Table 4.0** indicates how the proposed additional residential development would be distributed around the town:

Table 4.0: Additional Residential Units Assumed Distribution

Additional commitments (distributed around the town)	133
East Witney	+50 (included within previous 2016 OSM model scenarios)
North Witney	+400 (included within previous 2016 OSM model scenarios)
Windfalls	+304
Woodford Way car park	+50
Land West of Minster Lovell	+85
TOTAL	+572

3.1.3 As a starting assumption, the key transport and highways mitigation proposals as set out within the 2031 “Preferred Development” Scenario (2016 Test) are retained within the assessment.

3.1.4 The development of additional options for assessment seeks to build on and lock in the benefits of the emerging strengths of the strategic infrastructure package developed as part of the 2031 “Preferred Development” scenario tested in 2016 including:

- the apparent effectiveness of new infrastructure in re-routing through-traffic out of the town centre onto more appropriate peripheral routes (notably the Northern

Distributor Road and A40 via both Shores Green and the new Downs Road junctions);
and,

- the impact of the WEL2 link in reducing pressure on Bridge Street and transferring through-traffic out of sensitive routes within the town centre and surrounding villages.

3.1.5 Each scenario has been developed to investigate ways of maximising the benefits of new infrastructure proposed, focussing particularly on the potential to implement step-change improvements to the town centre environment, particularly the need to improve air quality issues around Bridge Street.

3.1.6 At the current time, proposals to assess further development and mitigation options are at an early stage however key features of the options selected for assessment and the reasons for their selection are set out below:

3.1 OPTION ONE: INCREASING TOWN CENTRE/ RETAIL PEDESTRIAN AMENITY AND DELIVERING IMPROVEMENTS TO AIR QUALITY MANAGEMENT AREA

3.1.1 Option One includes the following key highway schemes and alterations:

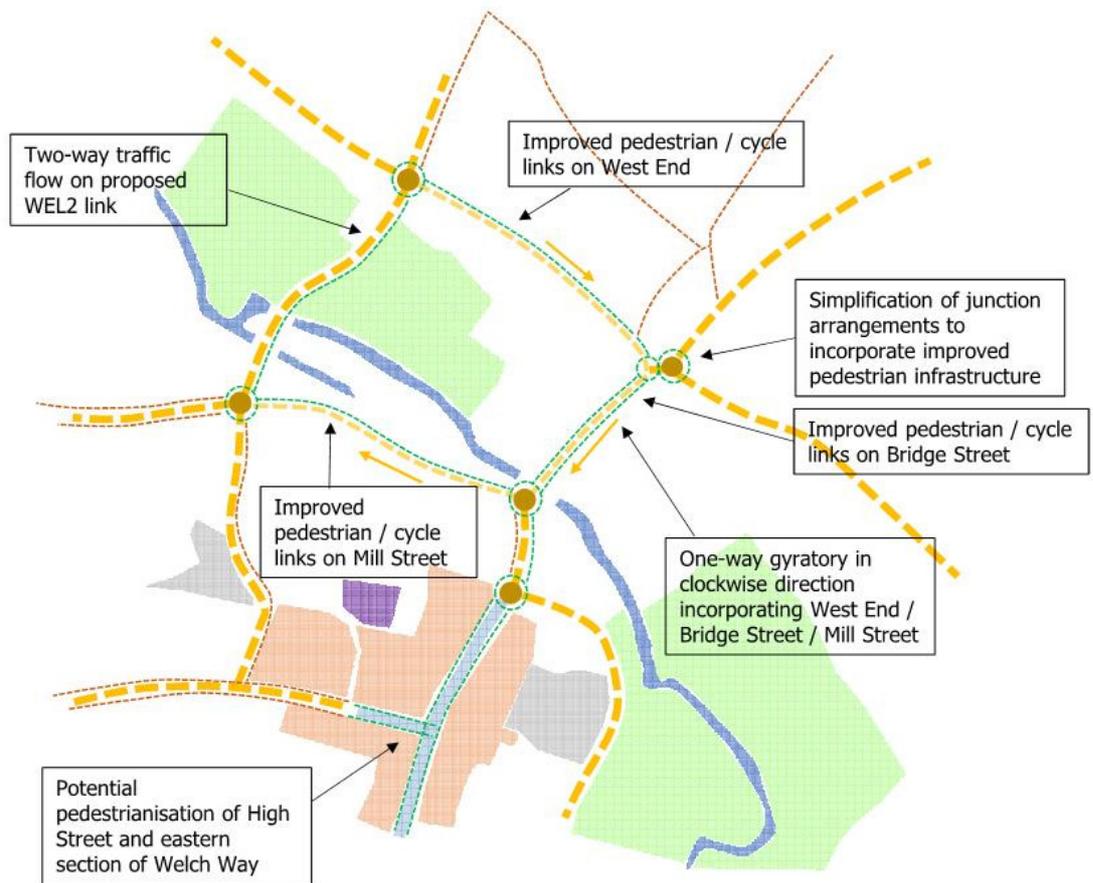
- All strategic schemes as previously modelled within the 2031 "Preferred Development" scenario including the Northern Distributor Road, WEL2 link, Shores Green Slips, Ducklington Lane signals improvement and at-grade A40 / Downs Road junction;
- Implementation of a $\frac{3}{4}$ gyratory system using a combination of the B4022 West End / A4095 Bridge Street / A4095 Mill Street that would be made one-way in a clockwise direction and the WEL2 that would allow two-way traffic. It is anticipated that each of the one-way links would (or at least could) be reduced to a single running lane to allow delivery of potential improvements to pedestrian amenity and / or possibly provide for segregated contra-flow facilities for public transport vehicles;
- Simplification of layout arrangements at both the West End / Bridge Street and Bridge Street / High Street / Mill Street junctions;
- Implementation of improvements to pedestrian amenity on High Street between its junction with Witan Way and Corn Street and along the eastern section of Welch Way

between its junctions with Woodford Way and High Street. It is assumed each would be closed to general traffic for modelling purposes; and,

- Implementation of a short stretch of one-way restriction along the central section of Corn Street between its junctions with Holloway Road and Market Square to restrict traffic to eastbound only, allowing for reasonable access whilst reducing opportunity for through-movements within the town centre.

3.1.2 **Figure 1.0** provides a plan of the key elements of the Option One infrastructure package.

Figure 1.0: Option One Infrastructure Package



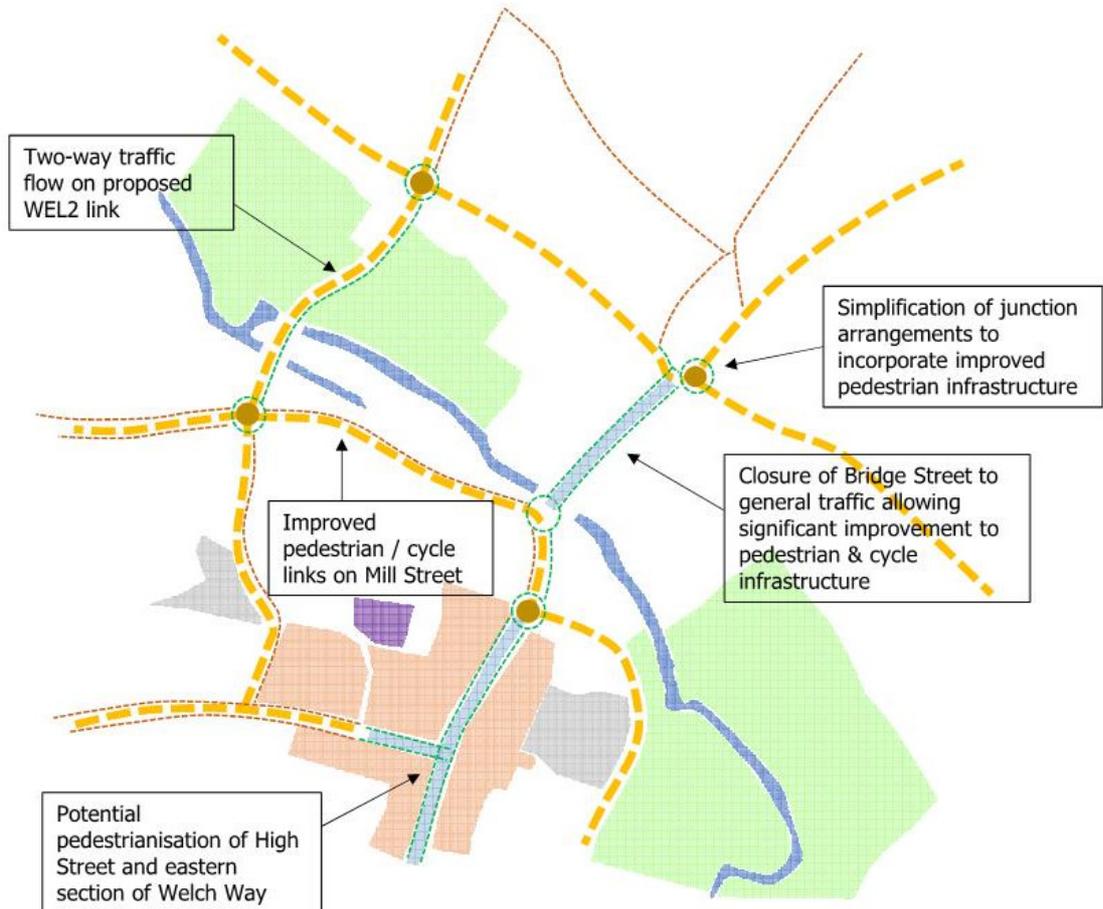
3.2 OPTION TWO: RESOLUTION OF AIR QUALITY ISSUES IN BRIDGE STREET

3.2.1 Option Two includes the following key highway schemes and alterations:

- All strategic schemes as modelled previously including the Northern Distributor Road, WEL2, Shores Green Slips, Ducklington Lane signals improvement and at-grade A40 / Downs Road junction;
- Bridge Street closed to general traffic between its junctions with West End to the north and High Street / Mill Street to the south;
- Simplification of layout arrangements at both the West End / Bridge Street and Bridge Street / High Street / Mill Street junctions;
- Implementation of improvements to pedestrian amenity on High Street between its junction with Witan Way and Corn Street and along the eastern section of Welch Way between its junctions with Woodford Way and High Street. It is assumed each would be closed to general traffic for modelling purposes; and,
- Implementation of a short stretch of one-way restriction along the central section of Corn Street between its junctions with Holloway Road and Market Square to restrict traffic to eastbound only, allowing for reasonable access whilst reducing opportunity for through-movements within the town centre.

3.2.2 **Figure 2.0** provides a plan of the key elements of the Option Two infrastructure package.

Figure 2.0: Option Two Infrastructure Package



3.1 SENSITIVITY TEST: DEMONSTRATING THE NEED FOR THE WEL2 LINK

3.1.1 The Sensitivity Test includes the following key highway schemes and alterations:

- All strategic schemes as modelled for Option Two **except for the WEL2 link that is not included**. Two-way traffic flow retained on Bridge Street that remains open to general traffic. This scenario is tested to demonstrate the need for the WEL2 link in accommodating through and cross-town traffic movements;



- Implementation of improvements to pedestrian amenity on key retail areas of High Street between its junction with Witan Way and Corn Street and along the eastern section of Welch Way between its junctions with Woodford Way and High Street. It is assumed each would be closed to general traffic for modelling purposes; and,
- Implementation of a short stretch of one-way restriction along the central section of Corn Street between its junctions with Holloway Road and Market Square to restrict traffic to eastbound only, allowing for reasonable access whilst reducing opportunity for through-movements within the town centre.

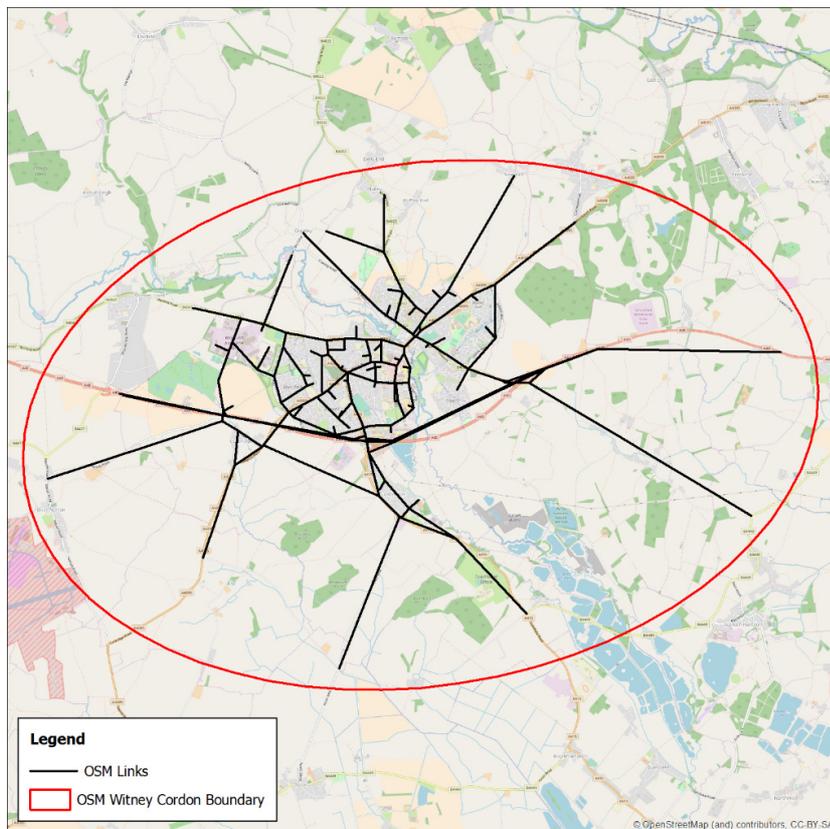
4 FURTHER OPTIONS MODELLING

4.1.1 The following chapter provides details of further modelling work that has been undertaken to assess the network implications and performance associated with the alternative development scenarios set out within **Chapter 4.0**.

4.1 APPROACH TO MODELLING

4.1.1 To assess the impact of proposals to both increase the proposed scale of residential development in and around the town from 3,700 in the submitted Local Plan to 4,400 in the November 2016 Main Modifications Local Plan together with additional highway mitigation options as set out within the previous chapter, a cordon model was extracted from the OSM covering the built-up area of Witney. A plan of the area covered by the cordon model is presented within **Figure 3.0**.

Figure 3.0: Coverage of Cordon Model



4.1.2 Extracting a cordon area from the OSM model involves 'cutting out' an area of interest from the larger model producing a smaller model from which to test the options. Use of a cordon allows fast run times and fixes the matrix so that the number of trips across the whole cordon remains constant although the routing can vary over the cordon area in response to the options to be tested.

4.1.3 For this study, it was determined that using a cordon from the OSM model would be the most suitable method to test options as it allows the highway impacts to be tested on a like for like basis giving a clearer picture of the effect on routing without the impact of the demand responses. The rapid run times also allows more options to be tested within a limited period of time meaning that a preferred option can potentially be selected from a larger range of tested options.

4.1 CODING ADDITIONAL RESIDENTIAL DEVELOPMENT

4.1.1 The additional development proposals as set out within **Table 2.0** were coded into the model to allow assessment of the two alternative mitigation scenarios and sensitivity test as identified within **sections 3.2 – 3.4**.

4.1 ASSESSING THE NEED FOR THE WEL2 LINK

4.1.1 The Sensitivity Test model run was undertaken first in order to assess performance of the network following delivery of the upper level of growth anticipated by 2031 but incorporating no WEL2 link and retaining unrestricted, two-way access for all traffic along Bridge Street. All other proposed highway mitigation schemes including new Shores Green slips, Northern Distributor Road and Downs Road roundabout were retained within the model as per the original 2031 "Preferred Development" scenario that was tested in 2016. The resulting impact on Bridge Street and key routes within the town centre was of particular interest.

4.1.2 Analysis of the resulting network performance associated with the Sensitivity Test scenario (without implementation of West End Link) indicates a worsening of conditions on Bridge Street principally resulting from traffic growth associated with development. Results drawn from a combination of the 2031 "Do Minimum" and 2013 "Sensitivity Test" model runs demonstrate that predicted link V/Cs and traffic flows on Bridge Street northbound increase markedly as a result of the assumed increase in District-wide residential development and

expansion of employment sites between the two scenarios. This is particularly apparent during the PM peak where predicted V/C values associated with the respective "Do Minimum" and "Sensitivity Test" scenarios are 101% and 140% and traffic flows increase from 883 in the 2031 "Do Minimum" to 1,119 in the 2031 "Sensitivity Test".

- 4.1.3 Demand flows on Bridge Street during the AM peak period are c. 12% (c. 195 vehicles) higher in the Sensitivity Test than in the 2031 "Preferred Development" scenario that included delivery of the WEL2 link and retained the existing Bridge Street unchanged. Predicted flows in the PM peak are approximately 26% (c. 430 vehicles) higher.
- 4.1.4 Assuming delivery of the Sensitivity Test scenario, both north and southbound links on Bridge Street operate above capacity during both AM and PM peak periods. During the AM peak period capacity is only exceeded by a relatively small margin with north and southbound links operating at 105% V/C and 102% respectively. This compares reasonably favourably with results taken from the 2031 "Do Minimum" scenario run undertaken by Atkins in 2016 where respective predicted V/Cs are 103% and 102%. It should be noted however, that in the 2031 "Do Minimum" scenario, there is a more substantial volume of traffic on Dry Lane to the north-west of the town (c. 960 vehicles during the AM peak compared to c. 780 in the 2031 "Sensitivity Test" scenario). It would seem reasonable to assume that the underlying reason behind much of this difference is likely to be due to traffic using Dry Lane to cross the River Windrush in preference to Bridge Street in the "Do Minimum" scenario that seeks to gain access to and from the A40 at the proposed Downs Road roundabout. Although this has no immediately notable operational impact on the local network (in terms of link and node V/Cs), the results indicate that predicted traffic volumes through Crawley would be approximately 200 vehicles higher in the "Do Minimum" AM peak period than in the 2031 "Sensitivity Test".
- 4.1.5 During the PM peak period the predicted link V/C on Bridge Street southbound remains at the same level as within the 2031 "Do Minimum" scenario (102%) however the northbound link is predicted to operate significantly above its capacity at 140% V/C. This would result in a very significant level of queuing, congestion and network delay and would significantly exacerbate existing air quality issues in the local area. For this reason it is concluded that delivery of the full scale of proposed Local Plan development would not be feasible without delivery of an alternative river crossing to serve north – south traffic across the town.

4.1 IMPORTANCE OF THE WEL2 LINK

- 4.1.1 A comparison was made between results drawn from the Sensitivity Test and those from the 2031 "Preferred Development" scenario to assess the effectiveness of the WEL2 link in reducing traffic levels on Bridge Street. The results indicate that delivery of the WEL2 link would be expected to facilitate an 11% reduction in traffic flows on Bridge Street during the AM peak and 21% reduction during the PM peak. This is despite the assumed delivery of residential units being c. 15% (c. 600 units) higher within the Sensitivity Test scenario than in the 2016 "Preferred Development" scenario.
- 4.1.2 Whilst delivery of the WEL2 link has a beneficial impact in reducing the predicted traffic level on the sensitive Bridge Street corridor, the above results indicate that the likely transfer of trips onto the new link would be relatively limited without further measures to "lock in" the benefits and would only be likely to result in a marginal improvement to the operation and environmental conditions within the vicinity of Bridge Street.
- 4.1.3 Whilst the predicted level of traffic on the new WEL2 corridor associated with the 2031 "Preferred Development" scenario is substantial (c. 800 two-way movements during the AM peak, c. 900 during the PM), it is notable that this level of traffic remains significantly below the predicted level of traffic that would continue to use the Bridge Street link assuming it remains open to general use (c. 1,650 in both AM and PM peaks). Furthermore, whilst the Bridge Street corridor links are predicted to operate at or approaching capacity, by contrast the WEL2 link capacities operate at only c. 40% maximum during the AM peak and c. 50% in the PM, indicating Bridge Street remains the most attractive route for trips.
- 4.1.4 Predicted north and southbound link capacities on Bridge Street assuming delivery of the 2031 "Preferred Development" scenario operate at or approaching capacity during both AM and PM peak periods. Whilst this is marginally better than results drawn from the 2031 Sensitivity Test, it is reasonable to conclude that if the Preferred Development scenario were implemented, traffic conditions on Bridge Street would remain congested and be the primary cause of ongoing air quality issues in the area if, following delivery of the WEL2 link, no further action is taken to encourage a greater proportion of traffic to transfer from Bridge Street onto the new link.
- 4.1.5 By way of illustration, a review of model output taken from the 2031 "Preferred Development" scenario indicates that the predicted traffic demand on Bridge Street would be extremely

similar to existing, 2013 Baseline levels (+3% in the AM peak and -4% in the PM peak), a level of traffic that is currently causing significant air quality issues in the area.

4.1.6 From the above analysis, it is possible to draw the following conclusions:

- Delivery of Local Plan growth at North and East Witney would not be feasible without delivery of a new crossing of the River Windrush (the WEL2 crossing). This is due to the significant operational pressure that additional traffic would place upon the Bridge Street link causing significant congestion issues (particularly during the PM peak period) and exacerbate air quality issues in the area, but that...;
- ...without making further alterations to the operation of the Bridge Street link, delivery of the WEL2 link (alongside a further package of mitigation schemes around the town as per the 2031 "Preferred Development" scenario) would only result in a limited transfer of traffic out of Bridge Street that would continue to accommodate a comparable level of traffic to 2013 Baseline levels, operate broadly at capacity and suffer from associated air quality issues; and,
- That without making further alterations to the operation of Bridge Street to encourage / force a greater proportion of traffic to use the WEL2 link (and other routes) as alternatives to Bridge Street, the WEL2 link will only operate at around 40% - 50% of its available capacity. In order to reduce pressure on Bridge Street and mitigate existing air quality problems along the corridor, it would be preferable for the WEL2 link to accommodate a far more substantial proportion of the cross-town demand.

4.2 FURTHER OPTIONS ASSESSMENT

4.2.1 Whilst the above analysis of model results clearly demonstrates the justification for delivery of the WEL2 link, it should not automatically be concluded that this implies a need to retain two fully accessible crossings of the River Windrush.

4.2.2 Two further model runs were undertaken to assess the feasibility of implementing further physical alterations to the network to reinforce and maximise the beneficial impacts of delivering the WEL2 link road and other mitigation measures proposed. In relation to the town centre and WEL2 link road specifically, the scenarios were so designed to:

- Reduce traffic flows, congestion and associated air pollution along Bridge Street;
- Appropriately maximise use of capacity provided by delivery of the WEL2 link to accommodate cross-town traffic movements; and,
- Investigate the feasibility of implementing full and / or partial pedestrianisation of key shopping streets within the town centre and diverting through-traffic away from sensitive routes within the central area (e.g. High Street, Welch Way) onto more appropriate peripheral routes including Witan Way, Burford Road and the A40 to the south of the town;

4.2.3 Key features of both options are set out within **Chapter 3.0**. The results of the Option One and Two model runs have been compared to results drawn from previously modelled scenarios as set out within **Chapter 2.0**. In each case, the key conclusions drawn are set out in the following section.

4.1 COMPARING OPTION ONE WITH THE 2031 “PREFERRED DEVELOPMENT” SCENARIO

4.1.1 Implementation of a ¾ one-way gyratory system utilising Bridge Street, West End, Mill Street and the proposed WEL2 link results in an overall reduction in traffic flows on the Bridge Street link of c. 50% in both AM and PM peak periods. This is overwhelmingly due to the proposed closure of the northbound link to general traffic: there is no evidence of any transfer of traffic off the southbound link to use alternative routes. A comparison of flow differences between the 2031 Option One and 2031 “Preferred Development” scenarios indicates that approximately 95% of trips removed from Bridge Street northbound in the Option One scenario during the AM peak period would transfer to use the WEL2 link. During the PM peak, it is estimated approximately 70% of trips would transfer to the WEL2 link with a further c. 25% transferring to route around the town to the south via a combination of the A40 and B4022 Oxford Hill, taking advantage of the proposed junction upgrade at Shores Green.

4.1.2 **Table 5.0** provides a summary of predicted link V/Cs on key routes within the town together with a comparison to the 2031 “Preferred Development” scenario.

Table 5.0: Summary of Key Link V/C (AM & PM Peaks) 2031 “Preferred Development” / 2031 Option One Scenario Comparison

Link	Direction	Alternative Scenarios Predicted Link V/Cs					
		2031 Preferred Development Scenario		2031 Development Scenario Option One		Difference between Option One and 2031 Preferred Scenario	
		AM	PM	AM	PM	AM	PM
A4095 Bridge Street	Northbound	94	93	N/A	N/A	-94	-93
	Southbound	85	82	86	81	+1	-1
West End Link (WEL2)	Northbound	32	52	99	107	+67	+55
	Southbound	39	35	44	30	+5	-5
B4022 West End	Northbound	18	13	N/A	N/A	-18	-13
	Southbound	10	7	46	34	+36	+27
A4095 Mill Street	Eastbound	50	47	N/A	N/A	-50	-47
	Westbound	26	28	61	63	+35	+35
High Street	Northbound	59	65	23	23	-36	-42
	Southbound	43	42	28	23	-15	-19
Welch Way	Eastbound	37	30	1	1	-36	-29
	Westbound	22	29	3	3	-19	-26
Woodford Way	Northbound	21	33	36	41	+15	+8
	Southbound	11	10	19	18	+8	+8
Witan Way	Northbound	12	39	18	27	+6	-12
	Southbound	11	6	16	13	+5	+7
B4022 Newland	Eastbound	26	29	23	24	-3	-5
	Westbound	51	30	52	28	+1	-2
B4022 Oxford Hill	Eastbound	29	23	28	21	-1	-2
	Westbound	72	81	73	104	+1	+23
Cogges Hill Road	Northbound	84	141	91	144	+7	+3
	Southbound	3	4	3	4	0	0
Jubilee Way	Northbound	15	16	16	24	+1	+8
	Southbound	69	60	68	60	-1	0
Station Lane	Eastbound	33	30	33	25	0	+5
	Westbound	24	30	27	35	-3	-5
A40 (West of Downs Road)	Eastbound	99	69	99	70	0	-1
	Westbound	23	36	23	36	0	0
A40 (Downs–Ducklington)	Eastbound	51	41	52	42	-1	-1
	Westbound	70	90	70	91	0	-1
A40 (Duck – Shore Green)	Eastbound	52	38	54	44	-2	-6
	Westbound	43	47	44	48	-1	-1
A40 (East of Shores Green)	Eastbound	96	62	96	62	0	0
	Westbound	33	32	33	32	0	0
A4095 Burford Road	Eastbound	66	56	65	57	+1	-1
	Westbound	95	100	100	100	-5	0



Link	Direction	Alternative Scenarios Predicted Link V/Cs					
		2031 Preferred Development Scenario		2031 Development Scenario Option One		Difference between Option One and 2031 Preferred Scenario	
		AM	PM	AM	PM	AM	PM
A4095 Curbridge Rd	Northbound	33	27	32	23	+1	+4
	Southbound	60	90	55	85	+5	+5

4.1.3 Analysis indicates that the introduction of a partial gyratory system as per Option One would increase predicted traffic flows along the B4022 West End in comparison to the 2031 “Preferred Development” scenario from c. 370 vehicles to c. 920 (+147%) in the AM peak and from c. 270 vehicles to c. 720 (+163%) during the PM peak. Predicted flows along the A4095 Mill Street (the southern arm of the gyratory) would also increase but not as markedly (by c. 10% in the AM peak and c. 14% in the PM).

4.1.4 Whilst the predicted increases in traffic along the B4022 West End are significant, in both cases the link remains operating well within capacity at only 46% V/C in the AM peak and 34% during the PM. Similarly, the predicted link capacity of Mill Street remains well within capacity operating at 61% V/C in the AM peak and 63% during the PM. Furthermore, by allowing diversion of traffic away from the Bridge Street corridor, this option would appear to offer potential to facilitate delivery of improved air quality along the Bridge Street corridor without simply transferring a significant problem to another area of the town (subject to further, more detailed assessment of the likely impacts and careful consideration of the detailed design for the WEL2 link).

4.1.5 Assuming delivery of Option One, the retained southbound link on Bridge Street operates at a predicted 86% of its link capacity during the AM peak and 81% during the PM peak. This is almost identical to the southbound link V/C results (85% and 82% respectively) drawn from the 2031 “Preferred Development” scenario model run. As set out above, whilst the southbound traffic flow would remain largely unaltered in terms of the total number of vehicles, the removal of the northbound flow essentially means total traffic on the corridor would be cut by c. 50%. Furthermore, it is anticipated that amendments and simplification of junction arrangements at either end of Bridge Street might help ease traffic flows along the route itself.

Predicted Operation of / Impact on the WEL2 Link

- 4.1.6 Model results drawn from Option One indicate that northbound traffic flows on the proposed WEL2 link would increase markedly when compared to the 2031 “Preferred Development” scenario due to displacement of northbound traffic out of the Bridge Street corridor (by c. 800 vehicles and c. 600 vehicles in respective AM and PM peaks). Conversely, predicted southbound traffic flows remain largely unchanged.
- 4.1.7 Using the pre-existing 2031 Preferred Development model run as the basis for comparison, the predicted northbound link V/C in the Option One scenario increases from 32% to 99% in the AM peak and from 52% to 107% during the PM peak. It is however notable that total predicted traffic volumes on the WEL2 link in the Option One scenario (c. 1,600 vehicles in the AM peak, c. 1,550 in the PM) are significantly lower than the 2013 Baseline flows along Bridge Street (c. 1,825 vehicles and c. 1,900 during respective AM and PM peak periods). The southbound link remains operating well within capacity.
- 4.1.8 Predicted V/C at the indicative A4095 / Woodford Way / West End link junction remains below 85% in both AM and PM peak periods. However, the model results predict localised capacity issues at the indicative B4022 / Crawley Road / West End link junction principally caused by the volume of traffic trying to enter the roundabout from the northbound WEL2 link. It is this constraint on the capacity of the WEL2 northbound approach to the junction that appears to be the primary cause of capacity issues on the WEL2 link itself. This issue is further discussed in **sections 4.6.11 to 4.6.13**.
- 4.1.9 In the 2013 Baseline scenario the northbound link on Bridge Street exceeds 100% V/C in both AM and PM peak periods, operating at a maximum of 104% during the AM peak. The southbound link operates at 96% V/C in the AM peak and 101% in the PM peak. In the 2031 “Do Minimum” scenario both links operate at between 101 and 103% V/C during both AM and PM peak periods.
- 4.1.10 By comparison, predicted V/C values for the WEL2 link assuming delivery of the Option One scenario remain below 100% V/C on the southbound link during both AM and PM peak hour periods and on the northbound link during the AM peak. It is only during the PM peak period when V/C values on the northbound link exceed 100%, peaking at 107%.

- 4.1.11 Further investigation into the underlying causes of capacity issues on the WEL2 link experienced during the 2031 Option One scenario PM peak indicates the assumed single lane approach to the indicative B4022 / Crawley Road / WEL2 roundabout struggles to accommodate demand. For the purpose of further model tests, indicative layout alterations were made to the assumed design of both the link and junction layout to reflect an assumption that the northbound WEL2 approach to the junction would include a short flare length. This would allow a two-lane entry into the junction that would in turn allow for separation of right-turning traffic into West End from traffic destined for Hailey Road and / or Crawley Road.
- 4.1.12 The indicative alterations were coded into the 2031 "Option One" model that was re-run. As illustrated by **Table 6.0**, the re-run results indicate that the assumed design alterations resolve localised junction and link V/C capacity issues on the WEL2 route that is predicted to operate within capacity during both AM and PM peak periods.

Table 6.0: Comparison of Alternative Scenario Link Capacities (incorporating indicative amendments to include flare on WEL2 approach to northern junction)

Link	Direction	Alternative Scenarios Predicted Link V/Cs %					
		2013 Baseline		2031 Do Minimum		2031 Development Scenario Option One	
		AM	PM	AM	PM	AM	PM
A4095 Bridge Street	Northbound	104	102	103	101	N/A	N/A
	Southbound	96	101	102	102	86	83
West End Link (WEL2)	Northbound	N/A	N/A	N/A	N/A	69	84
	Southbound	N/A	N/A	N/A	N/A	44	33

- 4.1.13 A further air quality study of the WEL2 corridor would be required to comment specifically on the possible air quality impact. However, predicted demand will be between c. 12% and 18% lower in respective peaks than existing flows along Bridge Street. Furthermore, the design of the proposed WEL2 corridor, purpose-built specifically to accommodate significant movements of traffic, will almost certainly be significantly less constrained and built-up than Bridge Street. It is therefore considered reasonable to conclude that air quality issues in the general area of the town would be significantly improved in comparison to the existing situation despite the predicted overall growth in traffic anticipated by 2031. This would principally be achieved by removing a greater proportion of traffic from the constrained Bridge Street corridor.

Impact on the Central Area Network

- 4.1.14 The effect of proposing the closure of High Street to general traffic (although making allowance for continued passage of public transport and emergency vehicles) would result in displacement of c. 600 vehicles during both AM and PM peak periods. Analysis indicates that c. 350 in the AM peak and c. 300 in the PM would use Woodford Way as an alternative route through the town, implying a c. 130% increase in the AM peak and c. 68% increase in the PM peak. A resultant increase in volume over capacity is seen on Woodford Way and Moorland Road in both directions in both peaks. An increase is also seen northbound on WEL2 in both peaks and southbound in the AM peak. Despite the potential increase in volume over capacity, neither Woodford Way or Moorland Road approach capacity although the potential for additional traffic along the Woodford Way corridor to impact on localised safety and accessibility issues would need to be considered in greater detail as part of further design stages.
- 4.1.15 Around 170 additional vehicles would use the A4095 Burford Road to the west of the WEL2 link during both AM and PM peak periods representing a 15% uplift in the volume of traffic in both cases. Despite the increase, analysis of capacity values indicates Burford Road would continue operating well within capacity at 55% and 70% V/C during respective AM and PM peak periods.
- 4.1.16 The model results indicate that only around 90 additional vehicles would use Witan Way in the AM peak period assuming High Street is closed to general traffic indicating that this is generally not a preferred route for traffic to re-route to. No additional vehicles use Witan Way during the PM peak period. Both north and southbound links would be expected to continue to operate comfortably within capacity with the addition of flows. It is concluded that this is likely to be as a result of the wider anticipated transfer of trips away from Bridge Street onto a combination of the WEL2 link and towards the A40 Shores Green junction via Oxford Hill.
- 4.1.17 Finally, during the PM peak hour period, an estimated 160 additional vehicles use the A40 / Shores Green Slips / Oxford Hill route to the south of the town following the road closures and associated highway alterations in the central area although the transfer of traffic during the AM peak appears to be minimal.

- 4.1.18 The impact of additional traffic on the Oxford Hill corridor has a negligible impact along both east and westbound links during the AM peak and along the eastbound link during the PM peak, all of which are anticipated to remain operating comfortably within capacity. During the PM peak, however, the additional traffic has the effect of increasing the Volume / Capacity ratio along the Oxford Hill westbound link from 81% to 104%.
- 4.1.19 Assuming delivery of the 2031 "Preferred Development" scenario, the northbound approach to Oxford Hill on Cogges Hill Road (the primary access into the proposed East Witney development site) operates at 84% V/C during the AM peak and 141% in the PM peak. The impact of additional traffic on the Oxford Hill corridor resulting from diversion of cross-town trips assuming implementation of Option One increases the V/Cs marginally to 91% in the AM peak and 144% in the PM peak.
- 4.1.20 It should be noted that the signal timings at this junction have not been optimised to account for the changes in demand resulting from implementation of additional development in any of the scenarios tested. As such, it is likely that some capacity improvements could be made by carrying out junction optimisation using a traffic signal package such as LINSIG. It is recommended that this junction is assessed in more detail using suitable junction design software as part of any potential work to develop Option One in more detail.
- 4.1.21 Further high-level investigation was undertaken to consider the underlying causes of capacity issues centred around this junction and particularly on the Cogges Hill Road approach. This assessment indicated that the unadjusted model was artificially assigning too much priority to both the B4022 Oxford Hill and Jubilee Way approaches and insufficient time to the Cogges Hill Road approach.
- 4.1.22 Although no detailed design work has been undertaken at this stage, an Option One sensitivity test model run was undertaken within which the signal operation on all approaches to the junction were optimised in SATURN. The results of the model re-run are summarised in **Tables 7.0 and 8.0** and indicate that the operation of the junction would be significantly improved simply as a result of optimising the signal operation and without delivery of further physical works to increase it in size.

Table 7.0: B4022 Oxford Hill / Jubilee Way / Cogges Hill Road Junction: Comparison of Selected Alternative Scenario Node Capacities (incorporating signal optimisation)

	Alternative Scenarios Predicted Node V/Cs %			
	2031 Development Scenario One Un-amended Network		2031 Development Scenario One Amended Network	
	AM	PM	AM	PM
B4022 Oxford Hill North Approach	46	43	47	43
B4022 Oxford Hill South Approach	89	105	96	85
Jubilee Way Approach	82	73	82	89
Cogges Hill Road Approach	98	144	92	90

Table 8.0: B4022 Oxford Hill / Jubilee Way / Cogges Hill Road Junction: Comparison of Selected Alternative Scenario Link Capacities (incorporating signal optimisation)

		Alternative Scenarios Predicted Link V/Cs %					
		2031 "Preferred Development"		2031 Development Scenario One Un-amended Network		2031 Development Scenario One Amended Network	
		AM	PM	AM	PM	AM	PM
	Eastbound	29	23	28	21	31	33
	Westbound	72	81	73	104	76	85
	Northbound	15	16	16	24	16	24
	Southbound	69	60	68	60	64	80
	Northbound	84	141	91	144	68	58
	Southbound	3	4	3	4	3	4

Impact on the A40 Corridor

4.1.23 Under the Option One scenario traffic flows increase along the A40, particularly during the PM peak period and notably along the stretch between Ducklington Lane and Shores Green. This is likely to be the result of north-east – south-west cross-town traffic (and vice versa) making

use of the Shores Green slips to gain access to the A40 in preference to using the Ducklington Lane access.

4.1.24 When compared to the predicted operation of the A40 corridor assuming delivery of the 2031 “Preferred Development” scenario, the impact of additional traffic associated with delivery of Option One is negligible. Predicted link V/Cs remain comfortably within capacity for both east and westbound sections of the A40 between Downs Road and Shores Green during the AM peak period. During the PM peak, the westbound section between Ducklington Lane and Downs Road broadly operates at capacity at 91% V/C however this is only a very minor reduction in predicted operational performance compared to the 90% V/C predicted in the 2031 “Preferred Development” scenario.

4.1.25 Analysis of model output indicates only negligible differences between the scale of predicted traffic flows along both east and westbound links on the A40 to the west of the proposed Downs Road junction and on the westbound approach to the junction to the east. This supports the conclusion that the primary cause of flow increases on the A40 around the Shores Green junction results from traffic diverting away from routes through the town centre.

4.2 COMPARING OPTION TWO WITH THE 2031 “PREFERRED DEVELOPMENT” SCENARIO

4.2.1 The Option Two scenario model run considers the operational implications of closing the Bridge Street link to all vehicles following delivery of the WEL2 link (together with other mitigation measures as set out within **Chapter 3.0**). Unlike the Option One partial gyratory system, Option Two proposes retention of two-way traffic flows along all sections of both the B4022 West End and A4095 Mill Street.

4.2.2 The removal of all traffic (except for public transport and emergency vehicles) from Bridge Street (coupled with potential implementation of further restrictions on the movement of vehicles on routes through the town centre) has the effect of pushing significant additional traffic onto the WEL2 link although model results indicate that its impact on other nearby links in the network is more variable.

4.2.3 **Table 9.0** provides a summary of predicted link V/Cs on key routes within the town together with a comparison to the 2031 “Preferred Development” scenario.

Table 9.0: Summary of Key Link V/C (AM & PM Peaks) 2031 “Preferred Development” / 2031 Option Two Scenario Comparison

Link	Direction	Alternative Scenarios Predicted Link V/Cs					
		2031 Preferred Development Scenario		2031 Development Scenario Option Two		Difference between Option One and 2031 Preferred Scenario	
		AM	PM	AM	PM	AM	PM
A4095 Bridge Street	Northbound	94	93	5	4	-89	-89
	Southbound	85	82	3	3	-82	-79
West End Link (WEL2)	Northbound	32	52	96	110	+64	+58
	Southbound	39	35	103	105	+64	+70
B4022 West End	Northbound	18	13	56	38	+38	+25
	Southbound	10	7	44	35	+34	+28
A4095 Mill Street	Eastbound	50	47	21	11	-29	-36
	Westbound	26	28	13	12	-13	-16
High Street	Northbound	59	65	17	17	-42	-48
	Southbound	43	42	21	12	-22	-30
Welch Way	Eastbound	37	30	1	1	-36	-29
	Westbound	22	29	3	3	-19	-26
Woodford Way	Northbound	21	33	35	43	+14	+10
	Southbound	11	10	15	15	+4	+5
Witan Way	Northbound	12	39	18	29	+6	-10
	Southbound	11	6	12	7	+1	+1
B4022 Newland	Eastbound	26	29	33	36	+7	+7
	Westbound	51	30	31	13	-20	-17
B4022 Oxford Hill	Eastbound	29	23	42	40	+13	+17
	Westbound	72	81	84	109	+12	+28
Cogges Hill Road	Northbound	84	141	112	172	+28	+31
	Southbound	3	4	3	4	0	0
Jubilee Way	Northbound	15	16	15	19	0	+3
	Southbound	69	60	101	103	+32	+43
Station Lane	Eastbound	33	30	35	28	+2	+2
	Westbound	24	30	24	31	0	+1
A40 (West of Downs Road)	Eastbound	99	69	106	78	+7	+9
	Westbound	23	36	23	36	0	0
A40 (Downs–Ducklington)	Eastbound	51	41	50	42	-1	+1
	Westbound	70	90	74	101	+4	+11
A40 (Duck – Shore Green)	Eastbound	52	38	53	43	+1	+5
	Westbound	43	47	55	60	+12	+13
A40 (East of Shores Green)	Eastbound	96	62	94	62	-2	0
	Westbound	33	32	33	32	0	0
	Eastbound	66	56	65	58	-1	+2



Link	Direction	Alternative Scenarios Predicted Link V/Cs					
		2031 Preferred Development Scenario		2031 Development Scenario Option Two		Difference between Option One and 2031 Preferred Scenario	
		AM	PM	AM	PM	AM	PM
A4095 Burford Road	Westbound	95	100	92	94	-3	-6
A4095 Curbridge Rd	Northbound	33	27	32	23	-1	-4
	Southbound	60	90	46	66	-14	-24

- 4.2.4 A comparison of flow differences between the Option Two and 2031 "Preferred Development" model runs indicates that approximately 70% of trips removed from Bridge Street during the AM peak and c. 55% during the PM peak would transfer to use the WEL2 link. This implies that around 500 vehicles displaced from the Bridge Street link in the AM peak and c. 690 in the PM peak would not transfer to use the WEL2 link. Further analysis indicates that approximately 340 trips previously using Bridge Street in the AM peak and around 640 in the PM peak would instead transfer to a route via Oxford Hill, accessing the A40 at Shores Green. Model results indicate that the bulk of the residual c. 160 vehicles displaced from Bridge Street in the AM peak and c. 50 vehicles displaced in the PM peak would re-route to the south of the town.
- 4.2.5 Delivery of Option Two would reduce traffic flows along the A4095 Mill Street in comparison to the 2031 "Preferred Development" scenario from c. 620 vehicles to c. 330 in the AM peak (c. -50%) and from c. 620 vehicles to c. 230 during the PM peak (c. -65%). Conversely, AM peak traffic flows along the B4022 West End would increase from c. 370 vehicles in the AM peak to c. 1,420 (c. +280%) and from c. 270 vehicles to c.1,150 vehicles in the PM peak (an increase of c. +320%).
- 4.2.6 As with Option One, the predicted traffic increases along the B4022 West End are very significant in proportionate terms however it should be noted that both east and westbound links remain operating well within capacity during both AM and PM peak periods (between 38% and 56% V/C). The operation of the A4095 Bridge Street / Wood Green / B4022 West End / Newlands junction is significantly improved due to simplification of traffic flows through it and a reduction in conflicting / opposing movements. Similarly, the predicted link capacity of Mill Street would remain well within capacity operating at 21% V/C in the AM peak and 12% during the PM.

4.2.7 It should be noted that although the B4022 West End is predicted to remain operating well within capacity following implementation of Option Two, the potential impact of additional traffic flow on localised air quality should be assessed in more detail as part of potential work to develop this option further.

Predicted Operation of / Impact on the WEL2 Link

4.2.8 Model results drawn from Option Two indicate that predicted north and southbound traffic flows along the proposed WEL2 link would increase markedly when compared to the 2031 “Preferred Development” scenario due to displacement of traffic out of the Bridge Street corridor. In the AM peak period respective north and southbound flows would increase by c. 720 vehicles and 370 vehicles. During the PM peak predicted flow increases would be c. 640 vehicles and 270 vehicles respectively.

4.2.9 Using the 2031 Preferred Development model as the basis for comparison, the predicted V/C of the northbound link on the WEL2 corridor increases from 32% to 96% in the AM peak and from 52% to 110% during the PM peak. The southbound link V/C increases from 39% to 103% in the AM peak and from 35% to 105% in the PM peak.

4.2.10 A side by side comparison of the predicted link capacities resulting from the alternative development scenarios is presented within **Table 10.0** below:

Table 10.0: Comparison of Alternative Scenario Link Capacities

		Alternative Scenarios Predicted Link V/Cs %							
								2031 Development Scenario Option Two	
		AM	PM	AM	PM	AM	PM	AM	PM
A4095 Bridge Street	Northbound	104	102	103	101	94	93	N/A	N/A
	Southbound	96	101	102	102	85	82	N/A	N/A
West End Link (WEL2)	Northbound	N/A	N/A	N/A	N/A	32	52	96	110
		N/A	N/A			39	35	103	105

4.2.11 In overall terms, link capacity values on the WEL2 link assuming delivery of Option Two are comparable to link capacity values on the Bridge Street corridor taken from both the 2013

Baseline and 2031 "Do Minimum" model runs (neither of which include the WEL2 link). In the 2013 Baseline scenario the northbound link on Bridge Street exceeds 100% V/C in both AM and PM peak periods, operating at a maximum of 104% during the AM peak. The southbound link operates at 96% V/C in the AM peak and 101% in the PM peak. In the 2031 "Do Minimum" scenario both links operate at between 101 and 103% V/C during both AM and PM peak periods.

- 4.2.12 Under Option Two, predicted traffic volumes on the WEL2 link would be comparable to the 2013 Baseline flow on Bridge Street (c. 1,882 vehicles in the AM peak, c. 3% higher than the 1,825 vehicles using Bridge Street in the 2013 Baseline model run and c. 1,834 vehicles in the PM peak, c. 3% lower than the 1,892 vehicles using Bridge Street in the 2013 Baseline model run).
- 4.2.13 Given the satisfactory predicted operation of nearby highway links, it is concluded that delivery of Option Two would result in a broadly "nil detriment" outcome for the operation of the town centre network in terms of traffic flow whilst simultaneously facilitating potential delivery of significant environmental improvement and space for implementation of sustainable travel infrastructure in core, central areas. This being said, whilst the operation of the proposed WEL2 link would be comparable to the existing operation of the Bridge Street corridor, the results suggest that Option Two would likely result in a comparable level of congestion and queuing within the central area network as experienced in the 2013 Baseline model results although some effective mitigation might be feasible through refinement of the WEL2 link design as part of more detailed assessment.
- 4.2.14 As with the Option One assessment, further investigation into the underlying causes of capacity issues on the WEL2 link experienced during the 2031 Option Two scenario PM peak indicates the assumed single lane northbound approach to the indicative B4022 / Crawley Road / WEL2 roundabout struggles to accommodate demand. Similarly, predicted congestion issues on the southbound link appear to be caused by inefficient operation of the indicative A4095 / Woodford Way / WEL2 signal junction used for modelling.
- 4.2.15 For the purpose of undertaking further model tests, indicative layout alterations were made to the assumed design of both the WEL2 link and operation of both junctions. In the case of the B4022 / Crawley Road / WEL2 roundabout to the north, the same amendments were implemented as were used for the Option One development scenario reflecting an assumption

that the northbound WEL2 approach to the junction would include a short flare length. This would allow a two-lane entry into the junction that would in turn allow for separation of right-turning traffic into West End from traffic destined for Hailey Road and / or Crawley Road. In the case of the A4095 / Woodford Way / WEL2 signal junction to the south, minor physical amendments to the indicative layout were made to allow alterations to the signal staging and improve efficiency of the operation of the junction.

4.2.16 The indicative alterations were coded into the 2031 “Option Two” model that was re-run. As illustrated by **Table 11.0**, the re-run results indicate that the assumed design alterations resolve link V/C capacity issues on the WEL2 route that is predicted to operate within capacity along both north and southbound links during both AM and PM peak periods.

Table 11.0: Option Two Comparison of Alternative Scenario Link Capacities (incorporating indicative amendments to include flare on WEL2 approach to northern junction)

Link	Direction	Alternative Scenarios Predicted Link V/Cs %					
		2013 Baseline		2031 Do Minimum		2031 Development Scenario Option Two	
		AM	PM	AM	PM	AM	PM
A4095 Bridge Street	Northbound	104	102	103	101	N/A	N/A
	Southbound	96	101	102	102	N/A	N/A
West End Link (WEL2)	Northbound	N/A	N/A	N/A	N/A	70	84
	Southbound	N/A	N/A	N/A	N/A	52	55

4.2.17 Once again, a further air quality study of the WEL2 corridor would be required to comment specifically on the possible air quality impact of implementing Option Two on the wider town. However, it is reasonable to conclude that air quality issues in Bridge Street would be significantly improved through delivery of Option Two in comparison to the 2013 Baseline and 2031 “Preferred Development” scenario despite the higher level of development assumed. This would principally be achieved by getting traffic off the constrained Bridge Street corridor and onto the more suitable, purpose-built WEL2 link. It should however be cautioned that further assessment work to evaluate the potential air quality impact of additional traffic on several links brought about as a result of displacement (notably the B4022 West End, Woodford Way and Oxford Hill) will be required.

4.2.18 Option Two would offer additional benefits as it would free up existing capacity that is currently largely dedicated to providing for movements of motorised traffic providing a significant opportunity to deliver improved sustainable travel infrastructure (notably for pedestrians and cyclists). A further discussion of the opportunities to deliver improvements to sustainable transport infrastructure is presented in **Chapter 5.0**.

Impact on Central Area Routes

4.2.19 The effect of proposing the closure of High Street to general traffic alongside the proposed full closure of Bridge Street to general traffic (although in both cases continuing to permit the passage of public transport and emergency vehicles) would result in displacement of c. 650 vehicles during the AM peak period and c. 750 vehicles in the PM peak from High Street that would route elsewhere as described below.

4.2.20 Of the 1,600 two-way vehicles displaced from Bridge Street in both peak periods, c. 1,100 vehicles are accommodated on the WEL2 link during the AM peak and c. 900 vehicles during the PM peak as short distance rerouting. The significant proportion of the remaining trips (c.300 in the AM and c.600 in the PM) are displaced to the A40 as a longer distance rerouting avoiding Witney and leading to an overall reduction in Town Centre through trips.

4.2.21 As discussed above, analysis of the traffic model output indicates that an estimated c. 300 additional vehicles use the A40 / Shores Green Slips / Oxford Hill route to the south of the town during the AM peak and c. 620 vehicles during the PM peak following the road closures and associated highway alterations in the central area.

4.2.22 The impact of additional traffic on the Oxford Hill corridor has a negligible impact along both east and westbound links during the AM peak and along the eastbound link during the PM peak, all of which are anticipated to remain operating within capacity. During the PM peak however, the additional traffic has the effect of increasing the Volume / Capacity ratio along the westbound link from 81% to 109%.

4.2.23 Under the 2031 "Preferred Development" scenario, the northbound approach to Oxford Hill on Cogges Hill Road (the primary access into the proposed East Witney development site) operates at 84% V/C during the AM peak and 141% in the PM peak. The impact of additional traffic on the Oxford Hill corridor resulting from diversion of cross-town trips assessed as part



of Option Two increases the V/Cs significantly to 112% in the AM peak and 172% in the PM peak. In addition, the southbound approach to the junction on Jubilee Way, predicted to operate comfortably within capacity during both AM and PM peak periods assuming delivery of the 2031 "Preferred Development" scenario is predicted to operate at 101% V/C and 103% V/C during respective AM and PM peak periods.

4.2.24 As with the Option One assessment, a sensitivity test model run was undertaken within which the signal operation on all approaches to the junction was optimised in SATURN. The results of the model re-run are summarised in **Tables 12.0 and 13.0** and indicate that the operation of the junction would be significantly improved simply as a result of optimising the signal operation and without delivery of further physical works to increase it in size.

Table 12.0: B4022 Oxford Hill / Jubilee Way / Cogges Hill Road Junction: Comparison of Selected Alternative Scenario Node Capacities (incorporating signal optimisation)

Link	Alternative Scenarios Predicted Node V/Cs %			
	2031 Development Scenario Two Un-amended Network		2031 Development Scenario Two Amended Network	
	AM	PM	AM	PM
B4022 Oxford Hill North Approach	79	93	89	100
B4022 Oxford Hill South Approach	86	109	97	104
Jubilee Way Approach	101	103	94	100
Cogges Hill Road Approach	112	172	95	101

Table 13.0: B4022 Oxford Hill / Jubilee Way / Cogges Hill Road Junction: Comparison of Selected Alternative Scenario Link Capacities (incorporating signal optimisation)

Link	Direction	Alternative Scenarios Predicted Link V/Cs %					
		2031 "Preferred Development"		2031 Development Scenario Two Un-amended Network		2031 Development Scenario Two Amended Network	
		AM	PM	AM	PM	AM	PM
B4022 Oxford Hill	Eastbound	29	23	42	40	52	59
	Westbound	72	81	84	109	92	98
Jubilee Way	Northbound	15	16	15	19	15	19
	Southbound	69	60	101	103	73	101
Cogges Hill Road	Northbound	84	141	112	172	88	91
	Southbound	3	4	3	4	3	4

Burford Road

4.2.25 Implementation of Option Two would be expected to have a beneficial impact on the operation of the A4095 Burford Road westbound approach to its junction with Deer Park Road in comparison to both the 2031 "Do Minimum" and "Preferred Development" scenarios.

Impact on the A40 Corridor

4.2.26 Under the Option Two scenario traffic flows increase along the A40 when compared to the 2031 "Preferred Development" scenario, particularly during the PM peak period and notably along the stretch between Ducklington Lane and Shores Green. This is likely to be the result of north-east – south-west cross-town traffic (and vice versa) making use of the Shores Green slips to gain access to the A40 in preference to using the Ducklington Lane access.

4.2.27 When compared to the predicted operation of the A40 corridor assuming delivery of the 2031 "Preferred Development" scenario, the impact of additional traffic associated with delivery of Option Two is marginal. Predicted link V/Cs remain comfortably within capacity for both east and westbound sections of the A40 between Downs Road and Shores Green during the AM peak period. During the PM peak, the westbound section between Ducklington Lane and Downs Road broadly operates at capacity at 101% V/C a reduction in predicted operational



performance compared to the 90% V/C predicted in the 2031 "Preferred Development" scenario.

- 4.2.28 Analysis of model output indicates only negligible differences between the scale of predicted traffic flows along both east and westbound links on the A40 to the west of the proposed Downs Road junction and on the westbound approach to the junction to the east. This supports the conclusion that the primary cause of flow increases on the A40 around the Shores Green junction results from traffic diverting away from routes through the town centre.

5 DEVELOPING A SUSTAINABLE TRANSPORT STRATEGY

5.1 INTRODUCTION

5.1.1 As illustrated through analysis presented in **Chapters 3.0 and 4.0**, delivery of the WEL2 link forms a key element of a mitigation strategy to accommodate anticipated traffic growth associated with development around the town. Option testing indicates that full or partial closure of Bridge Street would prompt a greater transfer of traffic and maximise use of the WEL2 link following its delivery.

5.1.2 It is therefore considered appropriate to implement some restriction on the movement of general traffic along the Bridge Street corridor following delivery of the WEL2 link.

5.1 EXISTING CHARACTERISTICS OF THE NETWORK

5.1.1 The existing built form of much of the town centre imparts quite significant physical constraints on the existing highway network, particularly along the Bridge Street, Mill Street and West End corridors and in the vicinity of existing junctions at the northern and southern extremities of Bridge Street. In the vicinity of the northern junction, existing space constraints coupled with the need to accommodate turning movements of large vehicles means footways are narrow (in places not provided) and situated directly adjacent to the main carriageway. Crossing facilities provided are limited to two central refuges on the West End and Newland approaches. Although dropped kerbs and tactile paving is provided in each case, neither crossing point is formally controlled or designated by on-carriageway markings.

5.1.2 At the southern end of Bridge Street, the A4095 Bridge Street / Mill Street / High Street junction is slightly less space constrained and footways tend to be considerably wider and in better condition. Tactile paving and dropped kerbs are provided on all three approaches and centrally positioned refuges are provided on both Bridge Street and High Street. Within the past year, a zebra crossing facility has been installed on the Bridge Street approach.

5.1.3 The Newlands approach to the northern junction and both the Bridge Street and High Street approaches to the southern junction divide into two lanes for a short length providing separate ahead and left turn lanes for approaching vehicles. In part, it is likely that this is to provide sufficient capacity to accommodate existing demand through each junction however it is space

intensive and means that opportunities to reallocate road space for the use of non-motorised users are quite limited.

5.1 RECONFIGURATION OPTIONS

- 5.1.1 Reconfiguration of Bridge Street may take the form of a partial restriction as illustrated by the Option One scenario, limiting traffic flows to a single direction or a more comprehensive restriction prohibiting all general traffic. All options would potentially allow for continued use of Bridge Street to provide for the one or two-way passage of public transport vehicles without compromising delivery of the main traffic flow, congestion and air quality improvement benefits that would be delivered by the potential network alterations.
- 5.1.2 In addition to reducing traffic and potentially facilitating reconfiguration options along Bridge Street, by encouraging use of the WEL2 link both Option One or Two scenarios support the potential improvement of the pedestrian environment along the major shopping streets in the town centre, notably High Street and the eastern end of Welch Way where full or partial pedestrianisation options could be considered for implementation.
- 5.1.3 In exploring these options, consideration will need to be given to providing for the needs of all highway users, both motorised and non-motorised including public transport operators, retailers and the delivery requirements of local premises and residences.
- 5.1.4 Model results indicate that the potential closure of both High Street and Welch Way would be expected to load additional traffic onto Woodford Way as an alternative means of gaining access to / from the WEL2 river crossing, an issue discussed in more detail within **Chapter 4.0**. In itself this would not be expected to significantly impact on the operational efficiency of the route in terms of capacity or congestion however the impact of additional traffic on safety and accessibility for non-motorised users will need to be considered in more detail during further stages of design.
- 5.1.5 Whilst the anticipated increase in traffic flows on Woodford Way is clearly undesirable, evaluation of its operational benefit / dis-benefit should be considered in the context of allowing delivery of an opportunity to deliver major improvements to pedestrian infrastructure within the town centre. As discussed, such benefits include potential pedestrianisation of the High Street and eastern section of Welch Way. Additionally (and as a consequence), by allowing for more direct traffic access between the WEL2 link and areas to the south of the

town, modelling results indicate that a limited increase in the use of Woodford Way by vehicles could reduce traffic levels along the physically constrained A4095 Mill Street corridor by c. 300 vehicles during the AM peak and c. 400 in the PM when compared to the 2031 “Preferred Development” scenario assuming implementation of Option Two.

- 5.1.6 Alternatively, delivery of Option One would result in a similar predicted traffic flow along Mill Street as per the 2031 “Preferred Development” scenario. However, as all flows would be travelling one-way (as opposed to two-way in the “Preferred Development” scenario) it would likely be feasible to rationalise carriageway space to a single lane, thereby freeing up highway land to deliver improvements for pedestrians, cyclists and potentially use by public transport services.
- 5.1.7 By reducing traffic, improving air quality, reducing noise and improving road safety (both in “real” and “perceived” terms), it is reasonable to expect that the removal of a significant volume of traffic along Bridge Street would deliver a substantial improvement in local conditions for pedestrians and cyclists even assuming no further work is undertaken to reconfigure the existing highway layout. Furthermore, restricting / reducing traffic flows on Bridge Street could act as a catalyst for delivery of further measures to improve conditions for pedestrians, cyclists and public transport vehicles along the town’s main shopping streets including High Street and Welch Way to the south.
- 5.1.8 Immediately to the north and south of Bridge Street, the potential simplification and reduction of traffic flows through the A4095 Bridge Street / Woodgreen / B4022 West End / Newland and A4095 Bridge Street / Mill Street / High Street junctions would provide an opportunity to deliver localised improvements for pedestrians and cyclists including potential for allocation of highway space and improved crossings. In both cases, this might best be delivered through implementation of physical works to reconfigure the layout of each junction to better correspond with the rebalanced priorities and anticipated split of different users.
- 5.1.9 Although at an early stage of assessment, it is anticipated that by reducing and simplifying traffic flows / turning movements through each junction, implementation of either Option One or Two would provide a viable opportunity to reallocate highway space to provide improved facilities for pedestrians and cyclists whilst retaining an appropriate level of capacity to accommodate traffic flow demand.

Figure 4.0: Option One Indicative Plan: Central Area Key Elements

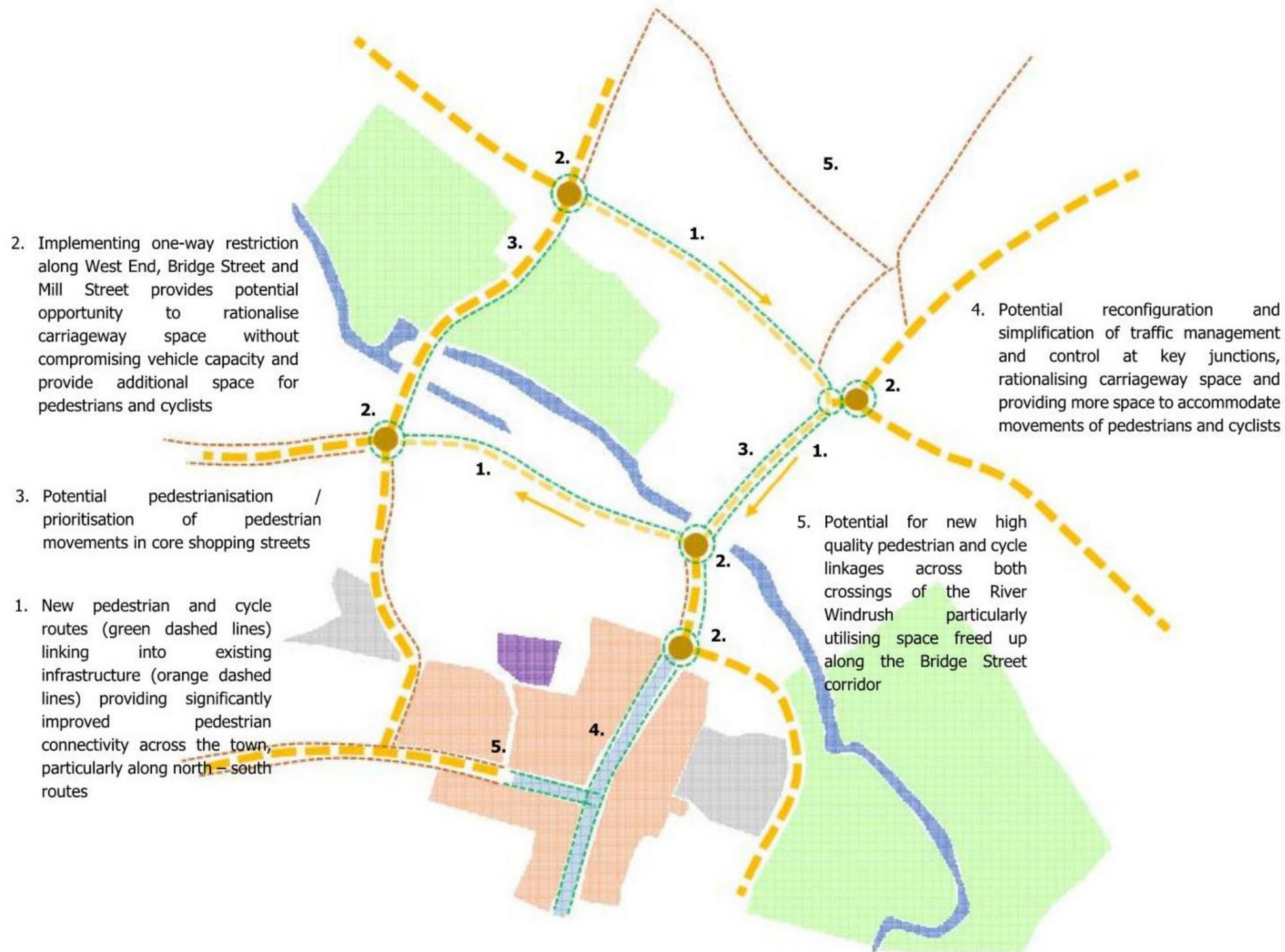
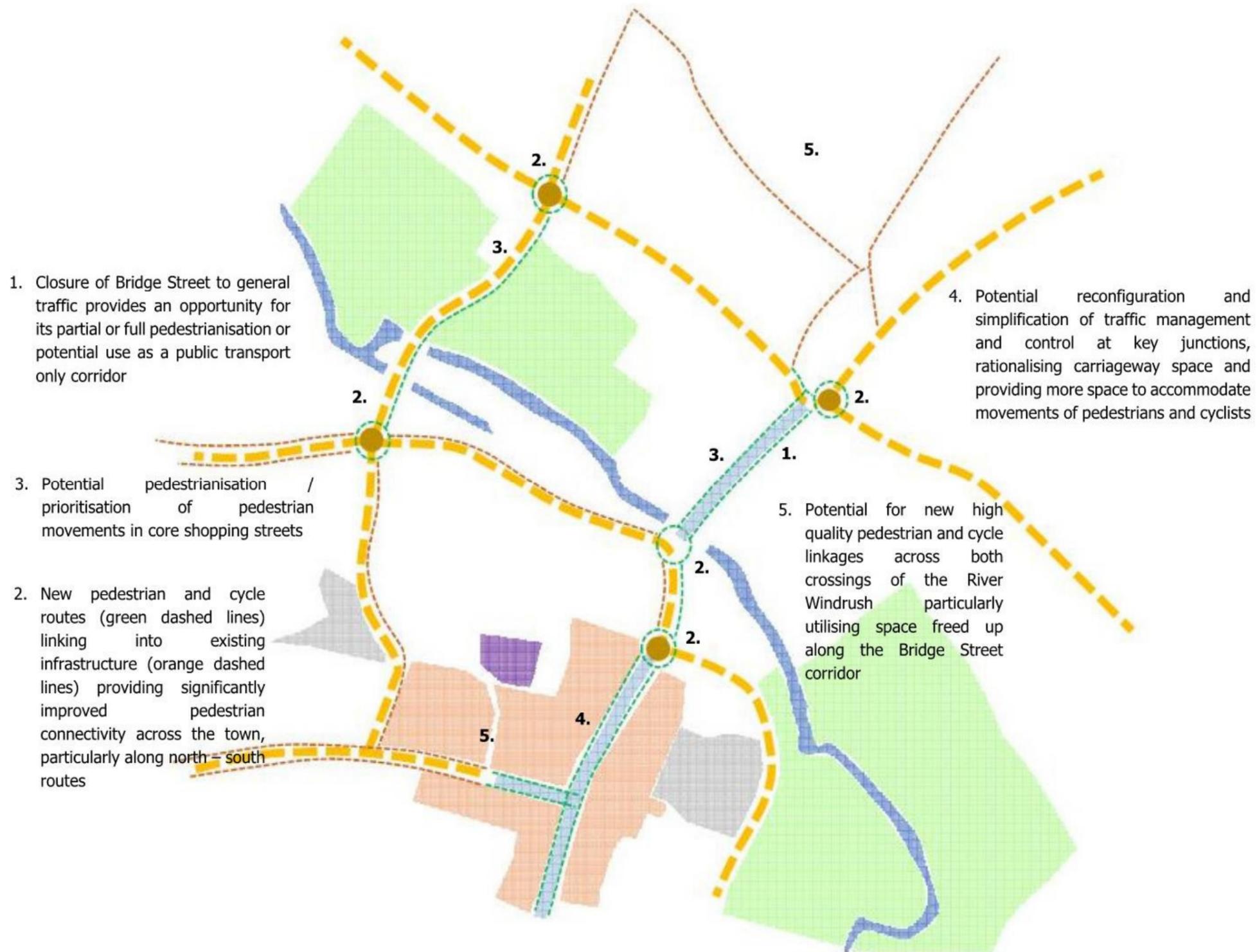


Figure 5.0: Option Two Indicative Plan: Central Area Key Elements



6 RECOMMENDATIONS & NEXT STEPS

6.1 INTRODUCTION

- 6.1.1 Results drawn from the OSM have been used to investigate options to mitigate the predicted impact of additional traffic demand resulting from predicted development associated with the proposed growth as set out within the draft Local Plan 2031 proposed Main Modifications.
- 6.1.2 Results drawn from pre-existing model runs investigating the impact of an assumed additional c. 3,700 homes around Witney as part of the 2016 "Preferred Development" scenario tested the effectiveness of an indicative highways mitigation package in accommodating predicted future traffic levels. The package tested included delivery of a new at-grade roundabout on the A40 at Downs Road, a full access junction onto the A40 at Shores Green, a second crossing of the River Windrush via the proposed WEL2 link, upgrading the Ducklington Lane signal junction and delivery of a new Northern Distributor Road connecting the B4022 Hailey Road to the A4095 Woodstock Road.
- 6.1.3 Pre-existing model output indicated that the proposed mitigation package would broadly be expected to accommodate the future level of traffic predicted as a result of the addition of 3,700 homes without having a significant detrimental impact on the overall operation of the network. However the model output did suggest that the overall mitigation package proposed did not maximise the potential benefit that might be derived from delivery of new infrastructure in all cases. This was particularly the case in the town centre where, without additional measures to alter the operation of Bridge Street to encourage / force a greater proportion of traffic to use the WEL2 link (and other routes) as alternatives to Bridge Street, the predicted future level of traffic on Bridge Street in 2031 would be broadly comparable to existing levels as per the 2013 Baseline scenario tested and would do little to resolve existing capacity and air quality issues along the corridor.
- 6.1.4 As part of assessing the operational implications of proposals to increase the proposed level of development within Witney to c. 4,400 new residential units by 2031, further consideration was given to measures to maximise the benefits of new highways and transport infrastructure. Particular attention was paid to developing proposals that maximised the beneficial impacts of delivering a new crossing of the River Windrush, particularly how delivery of new infrastructure could be employed to facilitate significant improvements to traffic conditions on

the sensitive Bridge Street corridor and other sections of the central area network notably High Street and the eastern section of Welch Way.

6.1.5 Using the previously developed 2031 “Preferred Development” scenario highways and transport mitigation package (developed during previous assessment work undertaken in 2016) as a starting point, two augmented options were developed to assess their effectiveness in providing:

- Effective mitigation for the additional traffic predicted as a result of increasing the proposed scale of additional residential development from 3,700 to 4,400 dwellings; and,
- Significant improvements to predicted conditions on Bridge Street.

6.1.6 Option One proposes implementation of a partial gyratory system operating in a clockwise direction using a combination of the B4022 West End / A4095 Bridge Street and A4095 Mill Street plus the new WEL2 link incorporating retention of two-way flows. Option Two proposes full closure of Bridge Street to general traffic (with potential to retain access for public transport vehicles) and continued accommodation of two-way traffic flows along the B4022 West End, A4095 Mill Street and new WEL2 link. In both cases, measures were also proposed to restrict general traffic flows along the northern section of High Street between its junctions with Witan Way and Welch Way.

6.1.7 The results of each model run indicate that implementation of either proposal would be likely to have a significant beneficial impact on traffic conditions and associated air quality issues along the Bridge Street corridor and would also result in a significant reduction in traffic flows through the centre of the town centre along High Street.

6.1.8 In general terms, the predicted impact of localised traffic re-routeing is largely considered manageable assuming implementation of either scenario although there are several marked differences between the scenarios that should be noted, particularly along the B4022 West End, A4095 Mill Street, the proposed WEL2 link and A4095 Bridge Street itself. Whilst it is concluded that there are no operational issues associated with either mitigation package that should be considered prohibitive at this stage of potential scheme development, several issues should be considered in more detail to refine options and make refinements and improvements to any emerging design proposals.



6.1.9 A summary of the key features of both Options One and Two is presented within **Tables 14.0 and 15.0** below to provide a side by side comparison of relative merits of the alternative packages.



Table 14.0: Relative Performance of Option One

Option One	Traffic flows on Bridge Street reduced by c. 50% due to closure to northbound traffic	+3	None.
	Traffic flows on WEL2 link increase by c. 101% and c. 67% during respective AM and PM peak periods in comparison to previous 2016 Preferred Development scenario. Link capacity is slightly exceeded on the northbound link due to predicted capacity issues at the indicative B4022 Hailey Road / West End / Crawley Road / WEL2 junction at its northern end.	0	Link purpose built to carry cross-town traffic. Further detailed modelling required to test capacity of junctions at either end of new link. Indicative assessment undertaken to date indicates that the addition of an approach lane into the junction from the south would resolve capacity issues in the area.
	Traffic flows on the B4022 West End link increase by c. 147% and c. 162% during respective AM and PM peak periods in comparison to previous 2016 Preferred Development scenario although the link is predicted to remain operating well within capacity.	-1	Although B4022 West End link predicted to remain within capacity, a wider study to consider impact on area-wide air quality issues should be undertaken.
	Overall traffic flows on A4095 Mill Street link increase by c. 10% and c. 14% during respective AM and PM peak periods in comparison to previous 2016 Preferred Development scenario although the link is predicted to remain operating well within capacity.	+2	The OSM results do not indicate a specific need to undertake more detailed model work. Although a small increase in traffic flows is predicted, results indicate its operational impact would likely be negligible. However, it is recommended further consideration be given to the localised impact of traffic flow alterations on air quality issues. Further stages of work should include consideration of how redundant carriageway space resulting from the removal of the eastbound traffic lane could be reconfigured to provide appropriate infrastructure for sustainable modes of transport including walking, cycling and potentially public transport services.
	Traffic flows along High Street and Welch Way significantly reduced in comparison to both the 2013 Baseline and 2031 Preferred Development scenario and both links remain operating well within capacity. Option provides an opportunity for full or partial pedestrianisation of core streets within the central shopping area.	+3	The OSM results do not indicate a specific need to undertake more detailed model work as a significant overall reduction in traffic flows is predicted. Further stages of work should explore longer-term reconfiguration options for both High Street and Welch Way that might include consideration of full or partial pedestrianisation, providing improved cycle infrastructure and / or enhancing the environment for use by public transport services.
	Traffic flows along Witan Way increase marginally in comparison to the 2031 Preferred Development scenario however this increase is appropriate for the class of road that remains operating comfortably within capacity	+3	Considered beneficial as facilitates removal of traffic from High Street and Welch Way without having a consequential negative impact on link capacity along Witan Way. Given limited scale of diversion it is not considered further detailed assessment would be required to investigate operational or environmental impacts.
	Traffic flows along Woodford Way are predicted to increase markedly in comparison to the 2031 Preferred Development scenario (by c. 93% and c. 55% during respective AM and PM peak periods) however the link is predicted to remain operating well within capacity.	-1	Although predicted increase in flow in absolute terms is substantial, the diversion would facilitate potential closure of High Street and Welch Way to general traffic. Furthermore the total additional flow along Woodford Way assuming delivery of the 2031 Development Scenario One would only be 60% of the volume of traffic displaced out of High Street in the AM peak and 40% in the PM peak. This implies that whilst the detailed operational and air quality impacts on Woodford Way specifically will require closer assessment in order to ensure manageability during further stages of design, in overall terms, traffic volumes in the local area would be lower and should offer an overall benefit.
	Results drawn from the OSM assessment indicate that link capacities along the Oxford Hill corridor and along Cogges Hill Road would be exceeded as a result of additional traffic using the new west facing slips to gain access to / from the A40 to the south-east of the town.	-1	Initial assessment undertaken indicates link capacity issues along both Oxford Hill and Cogges Hill Road and that conditions assuming implementation of Option One would be worse than the 2031 Preferred Development scenario previously tested. Indicative alterations to the Oxford Hill / Cogges Hill Road / Jubilee Road junction indicate significant operational improvements would be feasible simply by optimising operation of the signal control system. It is recommended further more detailed modelling work be undertaken to optimise the operation of the network in this area of the town further.
Option One Score		+8	



Table 15.0: Relative Performance of Option Two

Option Two	Traffic flows on Bridge Street reduced to virtually zero due to assumed closure to general traffic	+4	None.
	Traffic flows on WEL2 link increase by c. 137% and c. 99% during respective AM and PM peak periods in comparison to previous 2016 Preferred Development scenario. Link capacity is slightly exceeded on both north and southbound links due to predicted capacity issues at the indicative B4022 Hailey Road / West End / Crawley Road / WEL2 junction at its northern end and A4095 Mill Street / Woodford Way / WEL2 junction to the south.	0	Link purpose-built to carry cross-town traffic. Further detailed modelling required to test capacity of junctions at either end of new link. Indicative assessment undertaken to date indicates that the addition of an approach lane into the B4022 Hailey Road / West End / Crawley Road / WEL2 junction from the south and minor physical alterations to the A4095 Mill Street / Woodford Way / WEL2 junction to accommodate alterations to the proposed signal staging would resolve capacity issues in the area.
	Traffic flows on the B4022 West End link increase by c. 280% and c. 320% during respective AM and PM peak periods in comparison to previous 2016 Preferred Development scenario although the link is predicted to remain operating well within capacity.	-2	Although B4022 West End link predicted to remain within capacity, a wider study to consider impact on area-wide air quality issues should be undertaken.
	Overall traffic flows on A4095 Mill Street link decrease by c. 46% and c. 63% during respective AM and PM peak periods in comparison to previous 2016 Preferred Development scenario despite retention of a two-way traffic flow. The link is predicted to remain operating well within capacity.	+2	The OSM results do not indicate a specific need to undertake more detailed model work and an overall reduction in traffic flows is predicted. However, it is recommended further consideration be given to the localised impact of traffic flow alterations on air quality issues. Further stages of work should include consideration of measures to improve pedestrian and cycle connectivity on the back of predicted reductions in traffic volumes.
	Traffic flows along High Street and Welch Way significantly reduced in comparison to both the 2013 Baseline and 2031 Preferred Development scenario and both links remain operating well within capacity. Option provides an opportunity for full or partial pedestrianisation of core streets within the central shopping area.	+3	The OSM results do not indicate a specific need to undertake more detailed model work as a significant overall reduction in traffic flows is predicted. Further stages of work should explore longer-term reconfiguration options for both High Street and Welch Way that might include consideration of full or partial pedestrianisation, providing improved cycle infrastructure and / or enhancing the environment for use by public transport services.
	Traffic flows along Witan Way decrease marginally in comparison to the 2031 Preferred Development scenario and the routes continues to operate well within its capacity. However this may not be the best outcome as Witan Way is an appropriate route to accommodate traffic displaced from the High Street corridor.	+3	Overall reduction in traffic flows along Witan Way predicted in comparison to the 2031 Preferred Development scenario although increase in comparison to 2013 Baseline. As link remains operating well within its theoretical capacity it is not considered further detailed assessment would be required to investigate specific operational impacts likely although a high-level consideration of the potential air quality impacts might be advisable.
	Traffic flows along Woodford Way are predicted to increase markedly in comparison to the 2031 Preferred Development scenario (by c. 77% and c. 49% during respective AM and PM peak periods) however the link is predicted to remain operating well within capacity.	-1	Although predicted increase in flow in absolute terms is substantial, the diversion would facilitate potential closure of High Street and Welch Way to general traffic. Furthermore the total additional flow along Woodford Way assuming delivery of the 2031 Development Scenario One would only be 42% of the volume of traffic displaced out of High Street in the AM peak and 30% in the PM peak. This implies that whilst the detailed operational and air quality impacts on Woodford Way specifically will require closer assessment in order to ensure manageability during further stages of design, in overall terms, traffic volumes in the local area would be lower and should offer an overall benefit.
	Results drawn from the OSM assessment indicate that link capacities along the Oxford Hill corridor and along Cogges Hill Road would be exceeded as a result of additional traffic using the new west facing slips to gain access to / from the A40 to the south-east of the town.	-1	Initial assessment undertaken indicates link capacity issues along both Oxford Hill and Cogges Hill Road and that conditions assuming implementation of Option Two would be worse than the 2031 Preferred Development scenario previously tested. Indicative alterations to the Oxford Hill / Cogges Hill Road / Jubilee Road junction indicate significant operational improvements would be feasible simply by optimising operation of the signal control system. It is recommended further, more detailed modelling work be undertaken to optimise the operation of the network in this area of the town further.
Option Two Score	+8		

