

Vale of White Horse District Council Local Plan 2031 Part 2

Evaluation of Transport Impacts - Stage 2
Oxfordshire County Council

05 October 2017

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1. Introduction

Atkins has been commissioned by Oxfordshire County Council (OCC) and Vale of White Horse (VoWH) District Council to provide further consultancy support for an Evaluation of Transport Impacts (ETI) to support the emerging Vale of White Horse Local Plan 2031 Part 2 (LPP2). Atkins has undertaken a technical modelling assessment of the Local Plan to understand likely transport impacts on the strategic highway network. The modelling assessment is part of a staged process to inform decision making. More detailed work is on-going between the District Council, County Council and others to review local impacts of proposed developments and potential mitigation measures associated with growth.

The ETI modelling associated with this stage of work has the following elements:

- Application of the latest 2031 Do-minimum Option. The 2031 Do-minimum scenario includes homes delivered since 2013, current commitments (homes with planning approval) for the District as at March 2017 and growth plans in surrounding districts
- Updating the final packages of sites within LPP2 and testing the impact of the associated Options.

This report should be considered in the context of the VoWH ETI modelling work undertaken in previous stages. This is summarised in Table 1.

Table 1 Summary of ETI Stages

ETI and Local Plan Stage	Growth and Infrastructure Tested	Summary of Conclusions
Submission LPP1: Stage 5b ETI [November 2014]	Distribution of 20,560 homes and 23,000 jobs in the Vale along with South East Plan levels of development in the other districts in Oxfordshire. Adopted Option considers diverting traffic away from the A34 by a new Thames crossing near Culham and a Clifton Hampden bypass, utilising the A415 and A4074 as alternative routes between Didcot, Oxford and Abingdon.	The proposed mitigation for ETI Stage 5b, along with various corridor schemes that are being developed along the A420, A417, A338 and A4130 and enhanced public transport and smarter choices would contribute towards mitigating some of the impact of Vale's growth as well as enabling more people to travel and improve transport choice for all.
Updated Do-minimum [November 2016]	The land use assumptions for the Do Minimum Option include a total of 21,748 additional dwellings and 26,379 additional jobs. Development has been included elsewhere in the county at levels agreed with OCC Officers. This updates the baseline assumptions that were used to inform the Local Plan Part 1.	Overall, the issues identified along key corridors in the updated Do Minimum are consistent with the ones in LPP1 (ETI Stage 5b) in terms of location and severity. Additionally, the Do-Minimum Option, which contains more development than that assumed in LPP1, leads to other parts of the network exceeding capacity.
LPP2 preferred options: Stage 1: Clusters [November 2016]	In addition to the Do-minimum, Development Clusters ranging in size between 2,200 and 6,680 dwellings were tested. These were as follows <ul style="list-style-type: none"> • Cluster 1: 6,680 dwellings mainly focused on the A420; • Cluster 2: 3,840 dwellings North and West of Abingdon; 	Congestion is forecast to increase as follows: <ul style="list-style-type: none"> • Cluster 1 is forecast to affect the A420 at Botley interchange; • Cluster 2 is forecast to affect the already congested A34; • Cluster 3 is forecast to affect the already congested A34 and the A415;

ETI and Local Plan Stage	Growth and Infrastructure Tested	Summary of Conclusions
	<ul style="list-style-type: none"> Cluster 3: 4,590 dwellings South and West of Abingdon; Cluster 4: 2,200 dwellings between Abingdon and Didcot; Cluster 5: 4,600 dwellings in the Harwell and Milton Heights area; Cluster 6: 4,295 dwellings in the Wantage and Grove area. <p>A range of growth options were tested to assist with developing the Local Plan Part 2</p> <p>There were no differences between the Do Minimum and the alternative Options in terms of transport supply assumptions (highway, Park & Ride, and public transport).</p>	<ul style="list-style-type: none"> Cluster 4 is forecast to affect the already congested A34 but have some limited impact on the A4130; Cluster 5 is forecast to affect the already congested A34 and is also forecast to affect the A417 and A4130, but have some limited impact on the A415 and A4185; and Cluster 6 is forecast to have limited impacts on the A338 and A417.
<p>LPP2 preferred options: Stage 1: Development Scenarios ¹</p> <p>[January 2017]</p>	<p>In addition to the Do-minimum assumptions, Development Scenarios were as follows:</p> <ul style="list-style-type: none"> Scenario 1: 3,600 dwellings focused on Harwell and Dalton Barracks and four smaller sites Scenario 2: 3,600 dwellings spread over eleven sites Scenario 3: 3,600 dwellings spread over thirteen sites Scenario 4: 5,400 dwellings, adding 1,800 dwellings at South Abingdon to Scenario 1 without mitigation Scenario 5: 5,400 dwellings, adding 1,800 dwellings at South Abingdon to Scenario 1 with mitigation <p>More detailed development scenarios were tested to assist with refining the Local Plan Part 2 process</p> <p>There are no differences between the Do Minimum and the modelled Scenario tests in terms of transport supply assumptions (highway, park and ride and public transport) except that Scenario 5 includes the South-Abingdon By-pass.</p>	<p>Congestion is forecast to increase as follows:</p> <ul style="list-style-type: none"> Scenario 1 is forecast to affect network performance along the A34, particularly at the Botley, Hinksey Hill and Lodge Hill junctions. Additionally, Scenario 1 is forecast to affect network performance on the A420 near Cumnor, Fyfield and Southmoor; Scenario 2 is modelled to impact upon network performance along the A34, particularly at the Botley Hinksey Hill and Lodge Hill junctions. Furthermore, the A415 at Frilford Road westbound at the A338 approach, near Appleton Road, Marcham Road / Spring Road junction, B4017 / Ock Street junction and Ock Street/ West St Helen Street junction and A420 at Fyfield and Southmoor are forecast to exceed capacity; The modelling forecasts an impact on network performance along the A34 under Scenario 3, particularly at the Botley Hinksey Hill and Lodge Hill junctions. The A420 is modelled to exceed capacity at Cumnor, Fyfield and Southmoor. Under Scenario 4, in addition to network capacity issues identified

¹ The work of stage 1 is detailed in the report, Vale of White Horse District Council Local Plan Part 2 – Evaluation of Transport Impacts – Stage 1

ETI and Local Plan Stage	Growth and Infrastructure Tested	Summary of Conclusions
		<p>under Scenario 1, the modelling forecasts capacity impacts along the A417 between Wantage and Featherbed Lane and Westbound approach at Rowstock Roundabout and along A415 at Frilford Road westbound at the A338 approach, near Appleton Road, Marcham Road / Spring Road junction, the B4017 / Ock Street junction and Ock Street / West St Helen Street junction.</p> <ul style="list-style-type: none"> The modelling of the South Abingdon by-pass in Scenario 5 is forecast to have a comparable network performance to Scenario 1.
Current updated Do-minimum [July 2017]	<p>The land use assumptions for the Do Minimum Option include homes delivered since 2013, the latest committed development for Vale of White Horse and growth plans in surrounding districts and 2011 Core strategy allocation.</p> <p>Table 13 summarises the highway schemes that have been included in the Do Minimum Option as an addition to the Base Year network.</p>	The updated Do-minimum provides a consistent modelling basis of likely network performance in 2031 against which to compare the potential impacts of the Local Plan Options considered.
LPP2 preferred options: Stage 2: Development Options [July 2017]	<p>In addition to the Do-minimum assumptions, the updated Development Options were as follows:</p> <ul style="list-style-type: none"> Option 1: 3,940 dwellings focused on Harwell Campus and Dalton Barracks and five smaller sites Option 2: 3,440 dwellings focused on Harwell Campus and Dalton Barracks and four smaller sites Option 3: 2,840 dwellings focused on Harwell Campus and five smaller sites Mitigation scenario: Option 2 with transport mitigation schemes <p>There are no differences between the Do Minimum and the modelled Option 1, 2 and 3 in terms of transport supply assumptions (highway, park and ride and public transport). Mitigation scenario includes transport mitigation schemes in Section 7.1</p>	<p>Between the Do-minimum forecast and the Local Plan options, the trips generated by additional dwellings in all three Options are likely to increase total delay, travel time and travel distance, with average speed modelled to reduce. Average delay/vehicle (pcu) is an additional metric which is more relatable to the delay that individual vehicles may experience in the forecasts. Delay per pcu is forecast to increase by less than ten seconds among all Local Plan scenarios in comparison with the Do-minimum.</p> <p>The forecast degree of change for the Local Plan Options shows consistent results in relation to the size of proposed developments. Option 1, with the greatest number of additional housing compared to the Do-minimum, is likely to result in the greatest increase in delay, by comparison Option 3 suggests a lower increase in delay.</p>

1.1. Capacity Impact Summary

Table 2 and Table 3 summarise the network capacity impacts of the proposed Local Plan Options discussed in more detail subsequently in this report. The junctions and approaches that are at capacity (i.e. with volume to capacity ratio exceeding 95%) are listed under the Do-minimum scenario. The cases listed under the Local Plan Options in the tables are those parts of the network forecast to experience cumulative network capacity issues in addition to the Do-minimum scenario.

Table 2 Morning Peak - Network capacity impacts summary of LPP2 preferred options: Stage 2:

	Do Minimum	Option 1 - In addition to Do-minimum	Option 2 - In addition to Do-minimum	Option 3 - In addition to Do-minimum at
A34	<p>At Botley interchange:</p> <ul style="list-style-type: none"> The A34 northbound towards the Botley interchange The A34 northbound mainline through the junction The northbound on-slip to the A34 and the merge The southbound off-slip from the A34 <p>At Hinksey Hill:</p> <ul style="list-style-type: none"> The A34 northbound towards the Hinksey Hill interchange The A34 northbound mainline through the junction <p>At Lodge Hill interchange:</p> <ul style="list-style-type: none"> The A34 northbound mainline through the junction The A34 southbound towards the Lodge Hill interchange <p>At Marcham interchange</p> <ul style="list-style-type: none"> The A34 northbound towards the Marcham interchange The A34 southbound mainline through the junction <p>At Milton interchange</p> <ul style="list-style-type: none"> The northbound on-slip to the A34 and the merge The A34 southbound towards the Milton interchange 	<p>At Lodge Hill interchange:</p> <ul style="list-style-type: none"> The northbound on-slip to the A34 and the merge is forecast to operate at capacity 	<p>At Lodge Hill interchange:</p> <ul style="list-style-type: none"> The northbound on-slip to the A34 and the merge is forecast to operate at capacity 	No difference to the Do-Minimum

	Do Minimum	Option 1 - In addition to Do-minimum	Option 2 - In addition to Do-minimum	Option 3 - In addition to Do-minimum at
A415	<ul style="list-style-type: none"> The junction of A415/A338 and the westbound approach (Frilford Road) towards the junction The junctions of A415 (Marcham Road)/Spring Road, and the eastbound approach towards the junction The westbound approach towards the junction of A415 (Marcham Road)/Colwell Drive The junction of A415 (Ock Street)/Bath St and the westbound approach towards the junction The junction of A415 (Ock Street)/West St Helen and the westbound approach towards the junction 	No difference to the Do-Minimum	No difference to the Do-Minimum	No difference to the Do-Minimum
A420	<ul style="list-style-type: none"> The eastbound direction towards Buckland, Southmoor, Fyfield The northbound direction towards Bessels Leigh and Cumnor 	No difference to the Do-Minimum	No difference to the Do-Minimum	No difference to the Do-Minimum
A338	<ul style="list-style-type: none"> The northbound approach between East Hanney and Frilford 	No difference to the Do-Minimum	No difference to the Do-Minimum	No difference to the Do-Minimum
A417	<ul style="list-style-type: none"> The eastbound approach at Wantage and towards Ardington Wick and East Hendred The westbound approach towards Rowstock. 	No difference to the Do-Minimum	No difference to the Do-Minimum	No difference to the Do-Minimum

Table 3 Evening Peak - Network capacity impacts summary of LPP2 preferred options: Stage 2:

	Do Minimum	Option 1 - In addition to Do-minimum	Option 2 - In addition to Do-minimum	Option 3 - In addition to Do-minimum
A34	<p>At Botley interchange:</p> <ul style="list-style-type: none"> The A34 northbound mainline through the junction The northbound on-slip to the A34 and the merge <p>At Hinksey Hill:</p> <ul style="list-style-type: none"> The A34 northbound off-slip road The A34 southbound mainline through the junction The southbound on-slip to the A34 and the merge <p>At Lodge Hill interchange:</p> <ul style="list-style-type: none"> The A34 southbound towards the Lodge Hill interchange <p>At Marcham interchange</p> <ul style="list-style-type: none"> The A34 northbound towards the Marcham interchange The A34 southbound mainline through the junction <p>At Milton interchange</p> <ul style="list-style-type: none"> The A34 southbound towards the Milton interchange 	<p>At Marcham interchange</p> <ul style="list-style-type: none"> The southbound on-slip to the A34 and the merge is forecast to operate at capacity 	<p>At Botley interchange:</p> <ul style="list-style-type: none"> The northbound off-slip from the A34 is forecast to operate at capacity <p>At Marcham interchange</p> <ul style="list-style-type: none"> The southbound on-slip to the A34 and the merge is forecast to operate at capacity 	<p>At Marcham interchange</p> <ul style="list-style-type: none"> The southbound on-slip to the A34 and the merge is forecast to operate at capacity
A415	<ul style="list-style-type: none"> The westbound approach (Frilford Road) towards the junction The junctions of A415 (Marcham Road)/Spring Road, and the eastbound and westbound approach towards the junction The westbound approach towards junction of A415 (Marcham Road)/Colwell Drive 	<ul style="list-style-type: none"> The eastbound approach (Frilford Road) towards the junction of A415/A338 is forecast to operate at capacity 	<ul style="list-style-type: none"> The eastbound approach (Frilford Road) towards the junction of A415/A338 is forecast to operate at capacity 	<ul style="list-style-type: none"> The eastbound approach (Frilford Road) towards the junction of A415/A338 is forecast to operate at capacity

	Do Minimum	Option 1 - In addition to Do-minimum	Option 2 - In addition to Do-minimum	Option 3 - In addition to Do-minimum
	<ul style="list-style-type: none"> The junctions of A415 (Ock Street)/Bath St and the westbound approach towards the junction 			
A420	<ul style="list-style-type: none"> the westbound directions towards Tubney Wood, Fyfield, Kingston Bagpuize, Pusey, Caswell 	<ul style="list-style-type: none"> The eastbound approach towards the junction of A420/Abingdon Rd is forecast to operate at capacity 	<ul style="list-style-type: none"> The eastbound approach towards the junction of A420/Abingdon Rd is forecast to operate at capacity 	<ul style="list-style-type: none"> The eastbound approach towards the junction of A420/Abingdon Rd is forecast to operate at capacity
A338	<ul style="list-style-type: none"> The southbound approach towards Wantage 	No difference to the Do-Minimum	No difference to the Do-Minimum	No difference to the Do-Minimum
A417	<ul style="list-style-type: none"> The westbound approach at East Hendred and Ardington 	No difference to the Do-Minimum	No difference to the Do-Minimum	No difference to the Do-Minimum

2. Modelling Approach

2.1. Background

The ETI Local Plan 2031: Part 2 Stage 1 was carried out by Atkins in January 2017 and utilises a full demand model contained within the Oxfordshire Strategic Model (OSM). The current study (Stage 2) follows the same modelling approach as in Stage 1. The details of the modelling approach are described in section 2.2 and section 2.3.

The tables below chronicle the housing and employment assumptions for the ETI Local Plan 2031. The quantum for Local Plan Part 2 Stage 2 refers to the assumptions for the current updated Do-minimum scenario.

Table 4 Evolution of Housing assumptions for the ETI Local Plan 2031

	Local Plan Part 1 (LPP1): ETI Stages			Local Plan Part 2 (LPP2): ETI Stages	
District	Stage 1	Stage 3	Stage 5	Stage 1	Stage 2
Cherwell	7517	7517	7517	23669	21132
Oxford	4108	4108	4108	6895	6695
South Oxfordshire	10429	10429	10429	19076	11079
Vale of White Horse	13294	20560	20560	21748	21451
West Oxfordshire	5208	5208	5208	5088	5088
Grand Total	46869	54299	54299	76476	65445

Table 5 Evolution of Employment assumptions for the ETI Local Plan 2031

	Local Plan Part 1 (LPP1): ETI Stages			Local Plan Part 2 (LPP2): ETI Stages	
District	Stage 1	Stage 3	Stage 5	Stage 1	Stage 2
Cherwell	12480	12480	12480	33288	41434
Oxford	6191	6191	6191	30267	29967
South Oxfordshire	2856	2856	2856	4135	4282
Vale of White Horse	14300	14300	23000	26379	26232
West Oxfordshire	2323	2323	2323	12182	12182
Grand Total	37080	60080	60080	106252	114097

2.2. Description of the model

The work is based on the Oxfordshire Strategic Model (OSM) developed by Atkins for Oxfordshire County Council (OCC). The OSM modelling system was developed to represent travel conditions in 2013 and consists of three key elements:

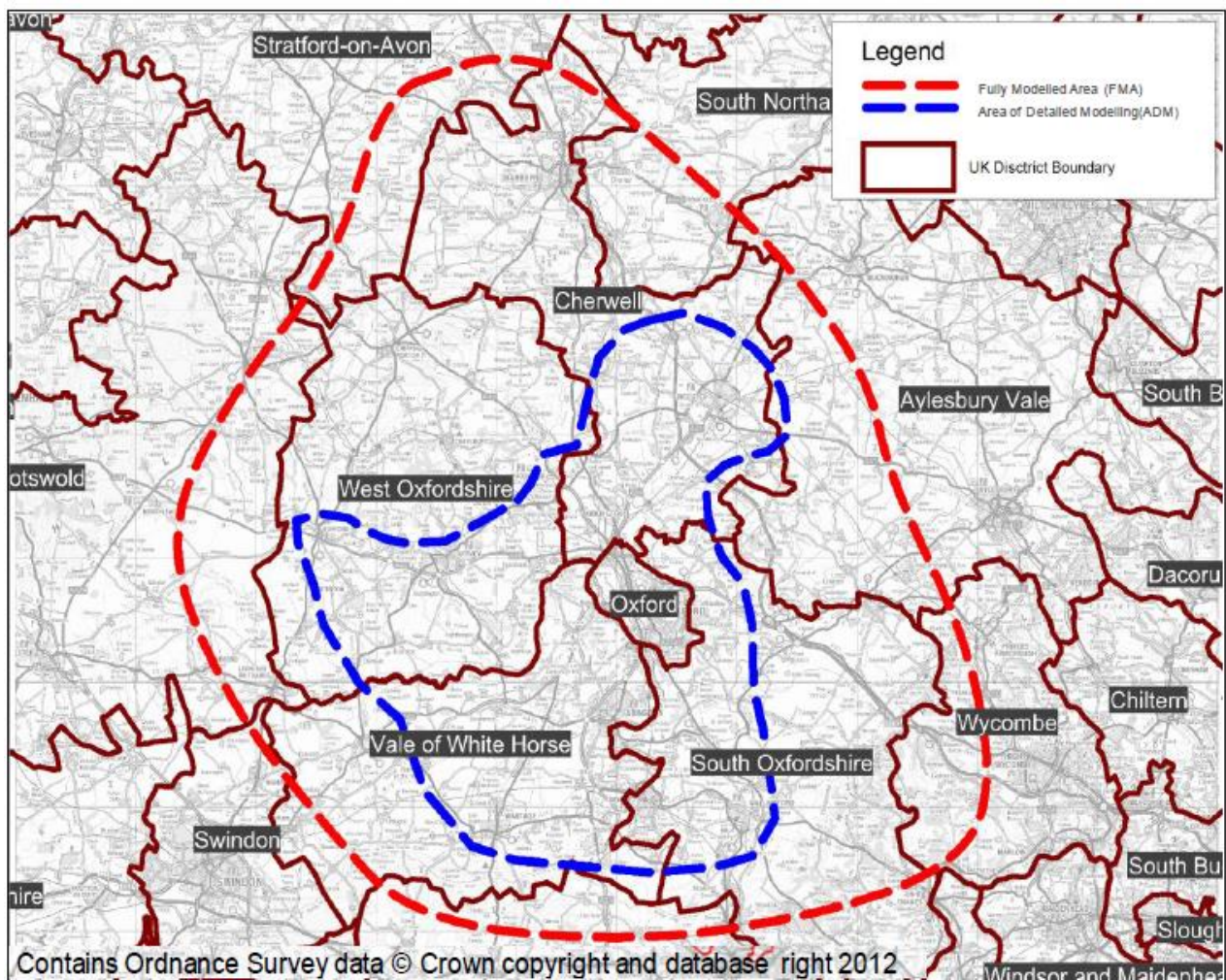
- a Highway Assignment Model (HAM) representing vehicle-based movements within and across Oxfordshire for a 2013 October weekday morning peak hour (08:00 – 09:00), an average inter-peak hour (10:00 – 16:00) and an evening peak hour (17:00 – 18:00);
- a Public Transport Assignment Model (PTAM) representing bus and rail-based movements across the same area and for the same time periods; and
- a five-stage multi-modal Demand Model (MMDM) that estimates frequency choice, main mode choice, time period choice, destination choice, and sub mode choice in response to changes in generalised costs of travel across the 24-hour period (07:00 – 07:00). It does this incrementally from the Base Year.

The entire OSM model covers the whole of Great Britain with different degrees of detail. The OSM covers the strategic links in Oxfordshire and has a detailed modelled area and a fully modelled area as shown in Figure 1. The level of detail varies as follows:

- **Fully Modelled Area:** the area over which proposed interventions have influence, and in which junctions are in SATURN simulation, is further subdivided as:
 - **Area of Detailed Modelling** – the area over which significant impacts of interventions are more certain and the modelling detail in this area would be characterised by: representation of all trip movements; small zones; very detailed networks; and junction modelling (including flow metering and blocking back).
 - **Rest of the Fully Modelled Area** – the area over which the impacts of interventions are considered to be quite likely but relatively weak in magnitude and would be characterised by: representation of all trip movements; somewhat larger zones and less network detail than for the Area of Detailed Modelling; and speed/flow modelling (primarily link-based but possibly also including a representation of strategically important junctions).
- **External Area:** the area where impacts of interventions would be so small as to be reasonably assumed to be negligible and would be characterised by: a SATURN buffer network representing a large proportion of the rest of Great Britain, a partial representation of demand (trips to, from and across the Fully Modelled Area); large zones; skeletal networks and simple speed/flow relationships or fixed speed modelling.

The VoWH District is largely situated inside the area of detailed modelled (ADM), meaning that everything within that area has been subject to calibration and validation exercises. The ADM includes Abingdon, Wantage, Grove, Faringdon and the extent of A34 from Oxford to Chilton.

Figure 1 Detailed Modelled Area

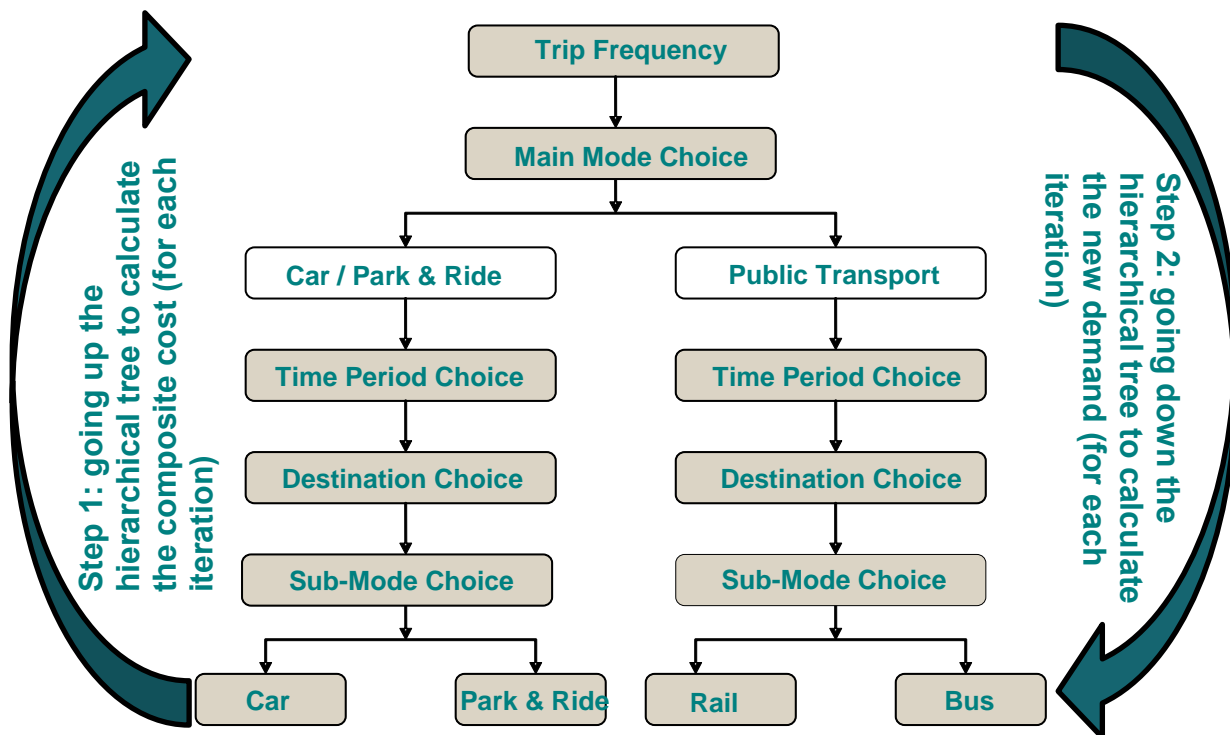


2.3. Description of the Demand Model

The MMDM has a hierarchical logit choice structure as shown in Figure 2. Following WebTAG², it has an incremental demand modelling approach which responds to changes in travel 'cost' between the 2013 Base Year and the 2031 future year Options. The process passes through different iterations until it converges.

² Department for Transport (DfT) Transport analysis guidance: WebTAG, provides information on the role of transport modelling and appraisal. <https://www.gov.uk/guidance/transport-analysis-guidance-webtag>

Figure 2 Demand Model Hierarchy



2.4. Approach

Figure 3 summarises the approach taken for every Option that is tested in OSM. The model allows changes both in terms of supply and/or demand for each Option. These inputs enter the Demand model, which will estimate how these changes will impact on the distribution of the demand over different time periods, different modes and different routes.

Once a demand model run has finished, a set of checks is performed to confirm the suitability of the results:

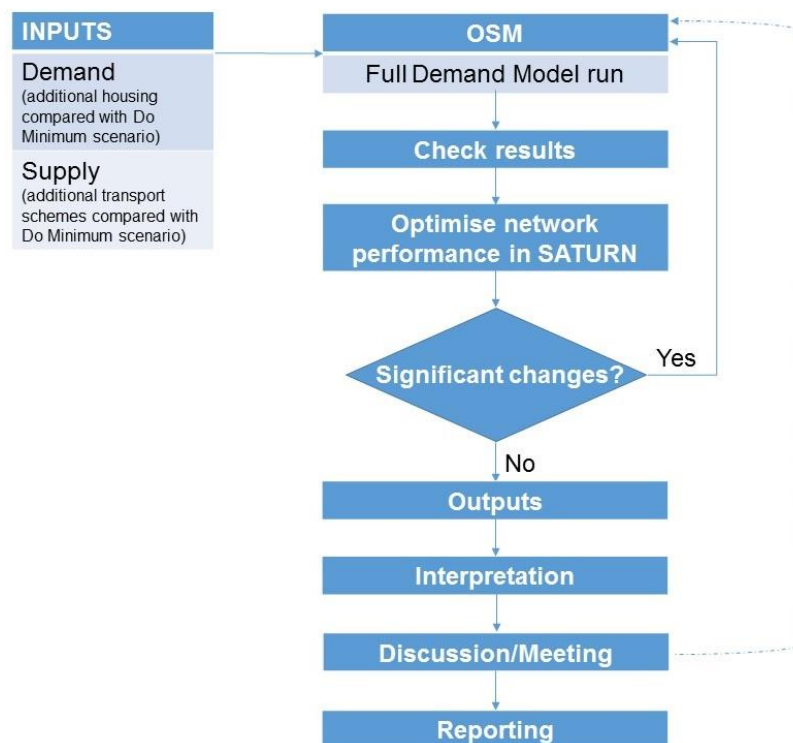
- Check that the additional demand is assigned to the expected zones and the level of post demand is consistent with the inputs;
- Check convergence of the demand model;
- Check convergence of the highway model.
- Check performance of the network near the added schemes; and
- Check delays on the highway network.

As a result of this process, some improvements might be necessary to be implemented into the network:

- Review of centroid connectors; and
- Optimisation of signal timings.

If the changes are significant (e.g. changed centroid connectors or change of a number of signal timings on main routes), the demand model is rerun with the new inputs. Once the performance of the model is satisfactory, the results are analysed and the necessary outputs are prepared.

Figure 3 Transport Model Approach



2.5. Modelled Options

For the ETI LPP2 Stage 2, an updated Do Minimum scenario, three updated Local Plan Options and a mitigation scenario are considered (as set out in Table 6). Each Local Plan Option, provided by VoWH, contains additional dwellings compared to the Do minimum scenario, to meet the VoWH assessed housing need. It should be noted that the Local Plan year (2033) is different to the reference case (2031) and therefore the results present a situation in which the 2031 VoWH Local Plan is built out 2 years earlier than planned.

Table 6 Development Options Modelled

Name	Description
Do-Minimum	Updated Do-min housing scenario 2031, including homes delivered since 2013, the latest committed development (homes with planning approval) for Vale of White Horse, growth plans in surrounding districts and Vale 2011 Core Strategy allocations.
Local Plan Part 2 2031 - Option 1 allocation	Including Do-min housing scenario and new Local Plan numbers (3,940 additional dwellings) based on the current preferred options reference case.
Local Plan Part 2 2031 - Option 2 allocation	Including Do-min housing scenario and new Local Plan numbers (3,440 additional dwellings) based on the current preferred options reference case.
Local Plan Part 2 2031 - Option 3 allocation	Including Do-min housing scenario and new Local Plan numbers (2,840 additional dwellings) based on the current preferred options reference case.
Local Plan Part 2 2031 Option 2 allocation plus infrastructure mitigation	A mitigation scenario test on Option 2.

3. Assumptions of the Do Minimum Option

3.1. Land-use assumptions

The latest housing and employment numbers were provided by OCC and the district councils and they were compiled for processing and application to an updated and revised Do-minimum model. For the employment, the Gross Floor Area is provided for each site and the number of jobs is estimated based on the use types A and B only, using the area per job summarised in Table 7.

Table 7 Area per job (sqm) used in OSM

Type	Area per job (sqm)
A	18
B	41
B1	12
B2	36
B8	75

Table 8 is a summary of the land use assumptions. In VoWH, the land use assumptions for the Do Minimum Option include a total of 21,451 additional dwellings and 26,232 additional jobs. The quantum is correct at the time of writing.

Table 8 Summary of Do Minimum Option land use assumptions

Developments 2031	Oxford	Cherwell	Vale	South	West	TOTAL
Houses	6,695	21,132	21,451	11,079	5,088	65,445
Jobs	29,967	41,434	26,232	4,282	12,182	114,097

3.2. Trip rates

Table 9 to Table 12 summarise the trip rates for the different use types. All the rates were derived from TRICS 7.1. To be noted that two development sites are using specific trip rates at the request of the developers, with the approval of OCC. The trip rates for the developments situated inside Oxford City have been revised to obtain approximately the same mode share observed in Base Year.

Table 9 Residential trip rates (trips per dwelling)

Time period	Mode	Direction	Oxford City	Rest of OXON	Northern Gateway	Valley Park
Morning peak period (07:00 - 10:00)	Car (veh.)	Arrival	0.295	0.368	0.335	0.349
		Depart	0.694	0.816	0.796	0.791
	PT (pers.)	Arrival	0.080	0.013	0.008	0.006
		Depart	0.322	0.100	0.111	0.050
Inter Peak period (10:00 - 16:00)	Car (veh.)	Arrival	0.862	1.086	1.031	1.088
		Depart	0.791	1.000	1.013	1.031
	PT (pers.)	Arrival	0.258	0.049	0.058	0.052
		Depart	0.236	0.038	0.045	0.038
Afternoon peak period (16:00 - 19:00)	Car (veh.)	Arrival	0.699	0.883	0.874	0.863
		Depart	0.457	0.598	0.569	0.587
	PT (pers.)	Arrival	0.250	0.080	0.098	0.025
		Depart	0.030	0.012	0.013	0.012

Table 10 Trip rates for commercial sites (trips per 100 sqm)

Time period	Mode	Direction	Type B Oxford City	Type B Rest of OXON	Type B1	Type B2	Type B8
Morning peak period (07:00 - 10:00)	Car (veh.)	Arrival	1.229	1.784	2.799	2.113	0.130
		Depart	0.380	0.551	0.703	0.789	0.033
	PT (pers.)	Arrival	0.700	0.127	0.698	0.090	0.000
		Depart	0.198	0.024	0.031	0.015	0.000
Inter Peak period (10:00 - 16:00)	Car (veh.)	Arrival	1.080	1.670	2.252	2.245	0.166
		Depart	1.440	1.790	2.436	2.454	0.170
	PT (pers.)	Arrival	0.951	0.116	0.230	0.026	0.000
		Depart	1.100	0.164	0.325	0.062	0.000
Afternoon peak period (16:00 - 19:00)	Car (veh.)	Arrival	0.268	0.379	0.516	0.509	0.022
		Depart	1.067	1.511	2.441	1.713	0.098
	PT (pers.)	Arrival	0.075	0.025	0.050	0.009	0.000
		Depart	0.597	0.119	0.614	0.065	0.000

Table 11 Trip rates for commercial sites at Northern Gateway

Time period	Mode	Direction	Type B1 (trips/100 sqm)	Hotel (trips/bed)
Morning peak period (07:00 - 10:00)	Car (veh.)	Arrival	2.640	0.328
		Depart	0.571	0.402
	PT (pers.)	Arrival	0.970	0.047
		Depart	0.026	0.177
Inter Peak period (10:00 - 16:00)	Car (veh.)	Arrival	1.686	0.590
		Depart	1.706	0.639
	PT (pers.)	Arrival	0.274	0.102
		Depart	0.485	0.171
Afternoon peak period (16:00 - 19:00)	Car (veh.)	Arrival	0.455	0.401
		Depart	2.451	0.326
	PT (pers.)	Arrival	0.056	0.145
		Depart	0.783	0.041

Table 12 Trip rates for other use types

Time period	Mode	Direction	Type A (trips/100 sqm)	Type C (trips/ha)	Type D (trips/100 sqm)	Health (trips/100 sqm)
Morning peak period (07:00 - 10:00)	Car (veh.)	Arrival	9.493	18.443	1.400	2.113
		Depart	6.782	16.483	0.856	0.789
	PT (pers.)	Arrival	0.266	3.391	0.719	0.090
		Depart	0.136	19.485	0.088	0.015
Inter Peak period (10:00 - 16:00)	Car (veh.)	Arrival	35.084	55.867	3.325	2.245
		Depart	33.995	58.106	3.494	2.454
	PT (pers.)	Arrival	1.177	42.673	2.193	0.026
		Depart	1.046	51.111	2.674	0.062
Afternoon peak period (16:00 - 19:00)	Car (veh.)	Arrival	14.860	20.128	2.566	0.509
		Depart	16.741	20.533	2.347	1.713
	PT (pers.)	Arrival	0.433	34.743	0.622	0.009
		Depart	0.405	21.948	0.570	0.065

3.3. Transport Supply Assumptions

3.3.1. Highway assumptions

Table 13 summarises all the highway schemes that have been included in the Do Minimum Option as an addition to the Base Year network.

Table 13 Highway schemes included in the Do Minimum Option

District	Highway scheme description
Cherwell	A41 / Neunkirchen Way roundabout (Rodney House)
Cherwell	A41 Oxford Road / Boundary Way roundabout improvement scheme
Cherwell	Bicester Town Centre changes
Cherwell	M40 J10 Improvements
Cherwell	M40 J9 Phase 2
Cherwell	Oxford Road / Pingle Drive junction
Cherwell	Bucknell Road/A4095 Howes Lane new priority junction
Cherwell	Pioneer Roundabout
Cherwell	Upper Heyford improvement
Cherwell	Updated Bicester SE Perimeter Road as indicated by OCC, Langford Lane is not included in the model for being only a local access
Cherwell	Spine Road Through SE Bicester – modelled at a speed of 40 mph (64 kph) as indicated by OCC
Cherwell	Upgrade of the SE Segment of the A4421
Cherwell	Improvements to Skimmingdish Lane
Cherwell	Tunnel under the rail line – Howes Lane Realignment and the off-site mitigation at Lords Lane
Cherwell	London Road is not available as a through route in the model to reflect the severe restrictions of the level crossing by 2031
Cherwell	Charbridge Lane – dualled
Cherwell	Banbury schemes (Banbury East of M40 J11 Link Road, Banbury Hennef Way Corridor improvements, Banbury Salt Way, Banbury Bridge Street Junction (and other town centre)) were not modelled as Banbury is just outside the simulation area.
Cherwell	Recent changes to the road design of A40-A44 link to the west of A34
Cherwell	the realignment and signalisation of the A4260/ A4095 junctions as part of the Shipton Quarry permitted use
City	Becket Street extension and new junction with Oxpens Road – New site access and link road through Oxpens site
City	Botley interchange – Capacity improvements on circulatory and approaches
City	Cutteslowe and Wolvercote Roundabouts
City	Eastern Arc
City	Frideswide Square including changes to Beckett Street
City	Hinksey Hill – A423 to A34sb
City	Hinksey Hill – Science Transit
City	Kennington Roundabout Improvements
City	The Plain and Longwall Street junction – Signal retiming at Longwall Street and cycle improvements
City	West Way / Botley Road Junction
City	Worcester Street/George Street junction
City	Infrastructure around Northern Gateway, which includes the internal link road open to through traffic, the A40-A44 link and improvements to Peartree Interchange
City	Updated Barton site access and bus link
City	Headington roundabout - phase 1 (completed)
City	Horspath Driftway (being completed as part of Access to Headington Package)
City	Includes Access to Headington package.

District	Highway scheme description
City	<p>2031 Oxford's transport mitigation packages – in this context, this refers to the latest layout around Northern Gateway development, given that the Do Minimum scenario only included the layout as defined in the spring of 2016. A new layout has been approved in November 2016 and this version will be included in the amended Do Minimum. This new version includes:</p> <ul style="list-style-type: none"> • Updated layout along A40 and A44; • Updated signal timings at Peartree Interchange and Wolvercote Roundabout • Updated layout and signal timings at Cutteslowe Roundabout; • Decrease of penalty on Banbury Road, north of Cutteslowe Roundabout; • Include penalty on Godstow Road to avoid re-routing from A34.
West	A4095/B4022 Staple Hall - Two mini-roundabouts connected by a short connecting link (2014 situation)
West	A415 Ducklington Lane/Station Lane junction improvement - Capacity increase on the Station Lane approach.
West	Brize Norton Village Traffic Calming - Capacity constraint on Minster Road between Elm Grove and Manor Road to reflect link layout change.
West	Down's Road/A40 new junction - At grade roundabout access for Downs Road connecting onto the A40.
West	B4477 Capacity Enhancement through widening (still single carriageway)
West	Straightening of the existing road between the A40 at Minster Lovell south to the roundabout junction north of Brize Norton
West	Includes bus lane eastbound between Eynsham and Duke's Cut Bridge and the related improvements to Eynsham and Cassington junction to accommodate the bus lane
West	Shilton Link Road from B4020 to Elmhurst Way
Vale/South	Harwell Link Road Section 1 (B4493 to A417)
Vale/South	Didcot Northern Perimeter Road Stage 3
Vale/South	Wantage Eastern Link Road (WELR)
Vale/South	A34 Milton Interchange Hamburger
Vale/South	A34 Chilton Northern Slip Roads
Vale/South	Foxhall Bridge Widening
Vale/South	Access to Harwell Section 2 (Hagbourne Hill)
Vale/South	Grove Northern Link Rd
Vale/South	Rowstock Roundabout improvements
Vale/South	Featherbed/Stevenston Lights junction improvements
Vale/South	Great Western Park access
Vale/South	Valley Park spine road (A4130 – B4493)
Vale/South	Coding to reflect traffic management measures in villages (Harwell)
Vale/South	Harwell Oxford all access points junction improvements
Vale/South	Improvements to traffic signals at Frilford Junction (A415/A336)
Vale/South	Junctions on A4130
Vale/South	A420 Western Vale infrastructure (Faringdon – access to The Steeds development)
Vale/South	Lodge Hill Interchange (South facing slip roads onto the A34)
Vale/South	Access to Culham Science Centre - Phase 1
Vale/South	Didcot to 'Culham Thames Crossing' (Access to Culham Science Centre - Phase 2 (Option 3))
Vale/South	Science Bridge modelled with two roundabouts as in the OCC layout & A4130 Capacity Improvements
Vale/South	South Access to Valley Park Spine Road modelled according to the layout provided by Brookbanks in October (5 arm roundabout).
Vale/South	A420-Highworth Road, Shrivenham

3.3.2. Park and Ride assumptions

All existing P&R sites remain open and the catchment areas are as defined for the A40 Corridor Study (October 2015). As agreed with OCC, the only proposed P&R site included in the Do-minimum scenario is the Eynsham P&R, with location and access information provided by West Oxfordshire District Council.

3.3.3. Public Transport assumptions

Table 14 and Table 15 summarise all the public transport schemes that have been included in the Do Minimum scenario as an addition to the Base Year network. These details were provided by OCC.

Table 14 Public Transport Schemes included in the scenario - Bus

District	Bus scheme description
Cherwell	2 new buses per hour to Banbury via Bankside plus enhancement of service s4 between Deddington and Banbury via main road
Cherwell	Create additional services between Upper Heyford and Bicester, also Upper Heyford with Oxford with an additional frequency of 1 bph for all time periods. (new frequency 2 buses per hour)
Cherwell	Create new bus service from NW Bicester to Bicester Town Centre with a frequency of 6 buses per hour in each direction
Cherwell	Create new bus service between Bicester Town Centre and Oxford going through Graven Hill (using Spine Road Through SE Bicester and Bicester SE Perimeter Road) with a frequency of 2 buses per hour in each direction
Cherwell	Update of the bus service S5 to stop at Graven Hill
Cherwell	S5 has two additional variants: <ul style="list-style-type: none"> S5a with 2 buses per hour and the following route: Glory Farm – Manorsfield Road – A41 – A34 – Bicester Road – Banbury Road – Headley Way – Brookes University S5b with 2 buses per hour and the following route: Manorsfield Road – Launton Road – Charbridge Lane – South East Bicester link Road – A41 – A34 – Bicester Road – Banbury Road – Oxford (City Centre)
Cherwell	As a consequence of the ban on London Road, all the buses using this segment previously were re-routed via Charbridge Lane.
Cherwell	Route 25A Oxford-Kirtlington-Upper Heyford-Bicester, now operating with a frequency of 2 bph; Remove Route 25 Woodstock-Kirtlington-Wendlebury-Bicester
City/Cherwell	S4 service Banbury-Deddington-Kidlington-Oxford now operating with a frequency of 2 bph
City/Cherwell	Bus service 500 became 4 buses per hour with the following route: Woodstock/Airport P&R – Bladon – Langford Lane – A44 – Water Eaton P&R – Oxford
City/Cherwell	Bus service 700 became 4 buses per hour with the following route: Woodstock/Airport P&R – Bladon – Langford Lane – A44 – Water Eaton P&R – Headington
City	Remove Route 17 Cutteslowe - Oxford
City	Frequency update for services 800 and 900
City	Bus services serving Barton development (re-routing of bus service 8 and new shuttle service between Barton and John Radcliffe Hosp. with a frequency of 2bph);
City	There are 2 new bus stops and a signalised pedestrian crossing on the A4165 (Oxford Road) adjacent to Oxford Parkway rail station. Approximate locations are shown in the drawing in Appendix C (although have changed slightly since this drawing). These are served by: <ul style="list-style-type: none"> Service 2 (and all its variations) serve these stops Service s5 (and all its variants) serve these stops Service s4 serves these stops Service 25A served these stops Services 500 and 700 serve both the Park & Ride site and also the stops on the A4165.
City/West	S7 service for Northern Gateway now operating all day with a frequency of 4 bph;
City/West	S2 service now operating with a frequency of 4 bph to serve Eynsham P&R, topped up by an additional 4 buses per hour Eynsham-Wolvercote-Oxford (new service S2a)
City/West	S1 service now operating via B4044 with a frequency of 4 bph
City/West	Remove Route 18 Oxford-Woodstock Road-A40-Eynsham-Bampton
West	2 buses per hour (Chipping Norton – Banbury) (currently one bus per hour)
Vale/South	Faringdon - Increase 66 service (Swindon-Oxford) to 3 buses/hour
Vale/South	Wallingford - Increase X39 service (Wallingford-Oxford) to 3 buses/hour
Vale/South	Thame - Increase 280 (Thame - Oxford) to 4 buses/hour
Vale/South	2 buses per hour Harwell-Crab Hill-Grove Airfield-Milton Park-Didcot (service 36) plus diversion of 2 buses per hour Wantage-Oxford through site (either x30 or 31)
Vale/South	"North East Didcot, 4 buses per hour to Didcot Town Centre and Station and then 2 of these extended to Milton Park and on to Harwell"
Vale/South	"Valley Park, 2 buses per hour Didcot-Wantage Road-Valley Park-Milton Park plus 2 buses per hour Didcot - main road - Valley Park – Harwell"
Vale/South	"Great Western Park, same pattern as at Valley Park, 4 per hour to Didcot Town Centre, 2 to Milton Park, 2 to Harwell"

Table 15 Public Transport Schemes included in the scenario - Rail

Line	Rail scheme description
East West Rail	East West Rail comprises four new services:
	• Reading – Bedford with a headway of 60 minutes all day;
	• Reading – Milton Keynes with a headway of 60 minutes all day;
	• Bletchley – Milton Keynes with a headway of 60 minutes all day;
	• Milton Keynes – Marylebone with a headway of 60 minutes all day.
Evergreen 3	Evergreen3 from Chiltern Railway consists in the creation of a new service between Oxford and London Marylebone, with a headway of 30 minutes all day.
North Cotswolds Line	The services inherited from the Base Year have been substituted by the following (for all time periods):
	• Worcester to/from London Paddington – 1 tph
	• Hanborough to/from London Paddington – 1 tph
	• Hanborough to/from Oxford – 1 tph
Culham Station	The following services now stop at Culham and Radley (in all time periods):
	• Reading to/from Bedford – 1 tph
	• Reading to/from Milton Keynes – 1 tph
Oxford to Didcot	Additionally, two more trains per hour stop at Radley and 1 train per hour stops at Appleton (in all time periods).
Didcot Parkway	For the service between Swindon and London Paddington, 1 more train per hour was added to the ones inherited from the Base Year, making a total of 3 tph (only AM and PM).
Henley-on-Thames	Shuttle service between Henley and Twyford with a frequency of 2 tph, allowing the transfer to the services to London and Oxford.
Banbury to Oxford	The direct service between Banbury and London Paddington was substituted by a shuttle between Banbury and Didcot (in AM and PM) and Banbury and Oxford (in IP) with a frequency of 1 tph.
Oxford to Heathrow	A service with 2 tph already exists between Oxford – Didcot Parkway – Reading – Heathrow – London Paddington. Updated journey time.
Oxford - Swindon/Bristol	New regional service between (Nottingham – Loughborough - Leicester – Kettering - Wellingborough -) Bedford – Bletchley – Bicester Village – Oxford Parkway – Oxford – Didcot – Swindon – Chippenham - Bath – Bristol with 1 tph.
Cowley Branch	New service between Bicester and Oxford Retail Park with a frequency of 1 tph. The line and service are coded but not currently used in the PT model as it creates instability.

4. Assumptions of Development Options

4.1. Land-use assumptions

As discussed, the updated land use assumptions, provided by VoWH, contain additional dwellings, when compared with the Do-Minimum scenario, to meet the VoWH assessed housing need. Each Option provides additional growth from the Do-Minimum scenario, growth is not cumulative between options. The location of developments within the District is shown in Figure 4. The quantum of development is summarised in Table 16. The Local Plan options have different levels of development at different sites and are thus quite different. It should be noted that ten fewer dwellings (120) have been modelled at East Hanney and the impact of this lower number of dwellings on the network is likely to be negligible.

Figure 4 Local Plan Stage 2 – key development locations

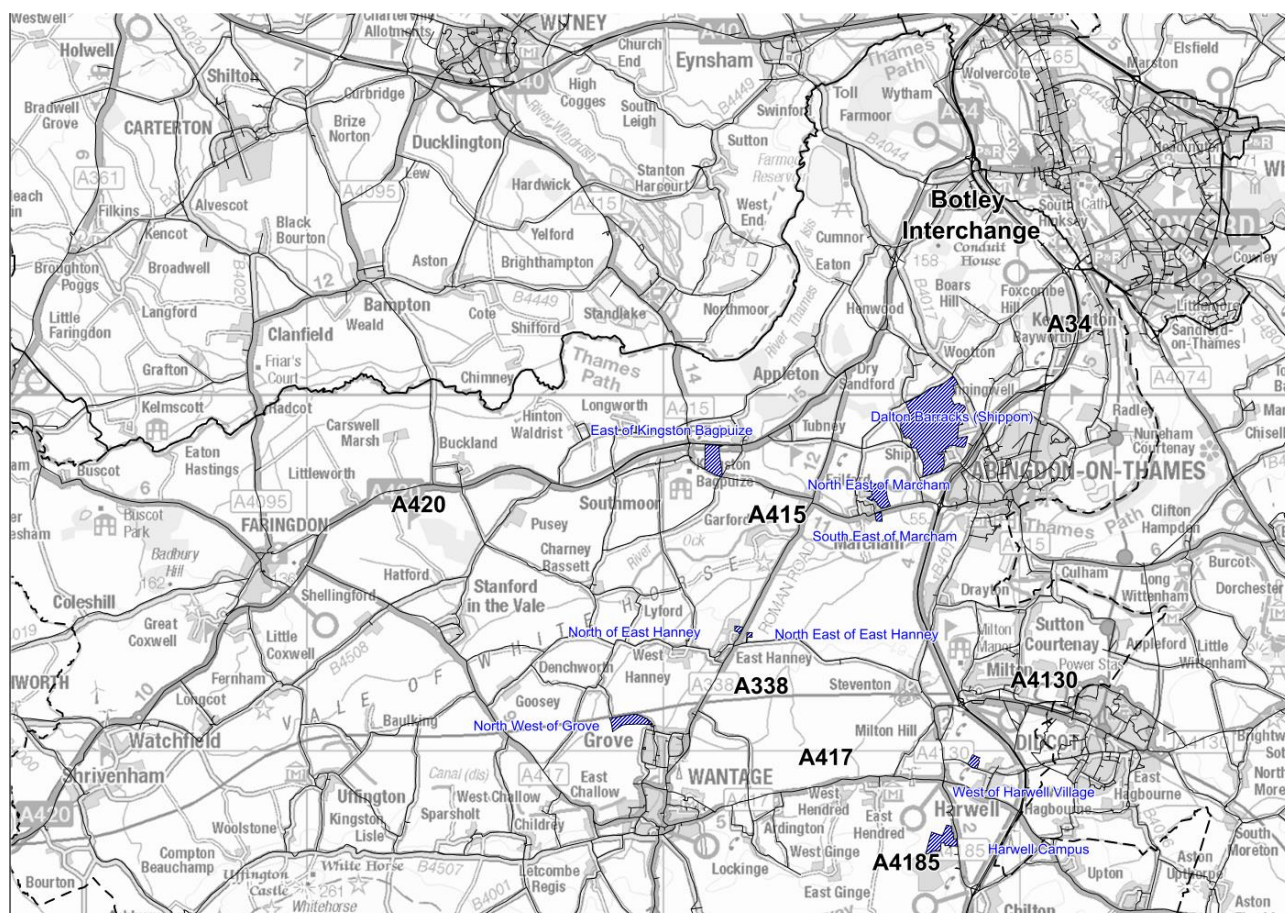


Table 16 Local Plan Stage 2 – ETI Options

Option	Site	Capacity (No. of dwellings)
Option 1	Dalton Barracks (Shippon)	1,200
	East of Kingston Bagpuize with Southmoor	600
	Marcham	520
	East Hanney	130
	Harwell Campus	1,000
	North West of Grove	400
	West of Harwell Village	100
	Total	3,950
Option 2	Dalton Barracks (Shippon)	1,200
	East of Kingston Bagpuize with Southmoor	600
	Marcham	120
	East Hanney	130
	Harwell Campus	1,000
	North West of Grove	400
	Total	3,450
Option 3	Dalton Barracks (Shippon)	600
	East of Kingston Bagpuize with Southmoor	600
	Marcham	120
	East Hanney	130
	Harwell Campus	1,000
	North West of Grove	400
	Total	2,850

4.2. Transport Supply Assumptions

There are no differences between the Do Minimum and the modelled Option 1, 2 and 3 in terms of transport supply assumptions. The transport supply assumption of the mitigation scenario based Option 2 is described in section 7.1.

5. Development Options: Demand Model results

In this chapter, the results for the 2031 forecast year (post-demand model) are compared with the 2013 Base year and the Local Plan Option, excluding the mitigation option.

5.1. Convergence

The convergence of the Demand Model was checked for all Options before preparing the results/outputs. WebTAG guidance suggests a convergence level of 0.2 within 25 iterations, which was achieved for the Do Minimum scenario and all of the alternative Options.

5.2. Growth in demand

Table 17 summarises the growth in travel demand between the 2013 base year, the 2031 Do Minimum Option and the three Option test across the model area. Between the 2013 base year and the 2031 Do Minimum Option, overall travel demand for all districts is forecast to grow by 36% over a 12 hour-period. Between the 2031 Do Minimum Option and the Local Plan Options, overall travel demand is estimated to additionally increase by 0.8% for Option 1, 0.7% for Option 2 and 0.6% for Option 3. The table does not include LGV and HGV demand.

Table 17 Summary of Demand Model results for the entire model – 12-hour period

Entire model	Base Year (BY) (2013)	Do Minimum (DM) (2031)	Option 1 (2031)	Option 2 (2031)	Option 3 (2031)
Reg car (veh.)	974,474	1,357,920	1,368,237	1,366,937	1,365,350
P&R (veh.)	6,477	8,143	8,300	8,257	8,244
Bus only (pax)	102,649	135,555	136,134	136,031	135,950
Rail (pax)	30,238	54,583	55,346	55,274	55,163
TOTAL (persons)	1,431,020	1,941,287	1,956,124	1,954,223	1,951,966

The Car and Public Transport mode share, shown in **Table 18**, for all the Options are consistent when compared to Do-Minimum scenario.

Table 18 Mode share – 12-hour period

Entire model	Base Year (BY) (2013)	Do Minimum (DM) (2031)	Option 1 (2031)	Option 2 (2031)	Option 3 (2031)
Car mode share	91%	90%	90%	90%	90%
PT mode share	11%	10%	10%	10%	10%

Table 19 and **Table 20** summarise travel demand across the District. The growth in travel demand between the 2013 base year and the 2031 Do Minimum Option shows an increase of 69% for the VoWH as an origin and an increase of 67% for VoWH as a destination when considering the trips to/from other districts over a 12-hour period. The growth in travel demand between the 2031 Do Minimum scenario and 2031 Options shows an additional increase of:

- 3% for VOWH as origin and 3% for VoWH as destination for Option 1
- 3% for VOWH as origin and 3% for VoWH as destination for Option 2
- 2% for VOWH as origin and 2% for VoWH as destination for Option 3

Table 19 Summary of Demand Model results for VoWH - Origins 12-hour period

VoWH as origin	Base Year (BY) (2013)	Do Minimum (DM) (2031)	Option 1 (2031)	Option 2 (2031)	Option 3 (2031)
Reg car (veh.)	165,567	289,017	298,475	297,295	295,836
P&R (veh.)	795	1,201	1,306	1,269	1,260
Bus only (pax)	8,351	12,190	12,564	12,505	12,458
Rail (pax)	2,128	5,617	6,049	5,999	5,936
TOTAL (persons)	232,853	392,726	405,872	404,196	402,188

Table 20 Summary of Demand Model results for VoWH - Destinations 12-hour period

VoWH as destination	Base Year (BY) (2013)	Do Minimum (DM) (2031)	Option 1 (2031)	Option 2 (2031)	Option 3 (2031)
Reg car (veh.)	165,626	285,882	294,778	293,646	292,279
P&R (veh.)	748	1,183	1,276	1,250	1,244
Bus only (pax)	8,181	12,266	12,632	12,574	12,525
Rail (pax)	1,732	5,336	5,768	5,722	5,663
TOTAL (persons)	231,895	387,730	400,112	398,519	396,640

6. Highway Network Performance

6.1. Introduction

The highway network performance is measured by using the following metrics:

- Link Cruise Time (pcu-hours): Time which would be spent travelling on links, subdivided into free-flow speeds and the flow-specific extra travel time on those links with link speed-flow curves
- Total Travel Time (pcu-hours): The sum of both link and junction times
- Delay (pcu-hours): Difference of Total Travel Time and Link Cruise Time
- Travel Distance (pcu-km): Vehicle or pcu-kms on simulation links
- Overall Average Speed (kph): Defined by (total distance) / (total time)

In the subsequent section (6.2), the overall impact of planned growth across the District will be presented, followed by the detailed analysis of model results along the following corridors:

- A34 from Chilton to Botley
- A420 from Shrivenham to Botley
- A417 from Wantage to Upton
- A415 from A420 to Abingdon
- A338 from Wantage to A420
- A4185 from Chilton to Rowstock

In addition to the above statistics, the model results can also be presented in graphics showing volume to capacity ratios for links and junctions as well as link flow differences between scenarios. In section 6.3, the volume to capacity ratio of Do-minimum will be presented and serves as the basis of comparison with the volume to capacity ratio of each Option, particularly for the network with critical traffic conditions. The link flow difference plots will also be presented between Do-minimum and each Option to provide further perspective on the analysis. The analysis focuses on the networks which operate:

- at operational capacity (i.e. conditions are such that traffic speed has dropped on links and minor incidents such as a turning vehicle have exaggerated impacts on traffic flow) with a volume to capacity ratio between 85% and 95%; and
- at capacity (i.e. it is not practically possible for additional traffic to proceed along the link) with a volume to capacity ratio of 95% and above.

6.2. Network Performance

6.2.1. District Network Performance

The modelled highway network performance within the VOWH district for the Do-Minimum and all the Options are shown in Table 21 and Table 22. The absolute difference (Diff) between the Do-minimum network performance and the Local Plan Option is also summarised in these and subsequent tables. These statistics give a high-level summary of how the model has responded to the changes in land use assumptions.

Between the Do-minimum forecast and the Local Plan options, the trips generated by additional dwellings in all three Options are likely to increase total delay, travel time and travel distance, with average speed modelled to reduce. The average delay/vehicle (pcu) is an additional metric which is more relatable to the delay that individual vehicles may experience in the forecasts. Delay per pcu is forecast to increase by less than ten seconds among all Local Plan scenarios in comparison with the Do-minimum.

The forecast degree of change for the Local Plan Options shows consistent results in relation to the size of proposed developments. Option 1, with the greatest number of additional housing compared to the Do-

minimum, is likely to result in the greatest increase in delay, by comparison Option 3 suggests a lower increase in delay.

Table 21 Vale of White Horse District modelled network performance - morning peak hour 2031

		Do- Minimum (DM)	Option 1		Option 2		Option 3	
			Value	Diff	Value	Diff	Value	Diff
Vale of White Horse	Delay (pcu hr)	2098	2248	150	2229	130	2207	109
	Total Time (pcu hr)	10867	11177	310	11140	273	11101	234
	Total Distance (pcu km)	531428	538916	7488	538152	6724	537414	5986
	Average Speed (km/h)	48.9	48.2	-0.7	48.3	-0.6	48.4	-0.5
	Delay/veh (mm:ss)	2:40	2:48	0:08	2:47	0:07	2:46	0:06

Table 22 Vale of White Horse District modelled network performance - evening peak hour 2031

		Do- Minimum (DM)	Option 1		Option 2		Option 3	
			Value	Diff	Value	Diff	Value	Diff
Vale of White Horse	Delay (pcu hr)	2961	3126	165	3095	134	3050	89
	Total Time (pcu hr)	12227	12558	331	12507	280	12457	229
	Total Distance (pcu km)	557809	565008	7199	564318	6509	564350	6541
	Average Speed (km/h)	45.6	45.0	-0.6	45.1	-0.5	45.3	-0.3
	Delay/veh (mm:ss)	3:32	3:40	0:08	3:39	0:07	3:36	0:04

6.2.2. Corridor Network Performance

The network performance along the corridors are shown from Table 23 to Table 34. Corridor performance is forecast to be consistent with model performance across the district, with additional dwellings predicted to increase total delay, travel time and travel distance, with the average speed modelled to reduce.

A34

The greatest absolute increase in delay is forecast to be experienced on the A34 corridor, in the morning and evening peak periods, under Option 1. For the evening peak the model suggests an increase in delay of 76 pcu-hr which relates to an additional 10-second delay per vehicle.

The delay along the A34 is likely to be linked to the fact that this corridor is located adjacent to the proposed Dalton Barracks development site. The Dalton Barracks site has 600 fewer dwellings in Option 3 compared to Option 1 and Option 2, hence a lower level of delay is forecast in Option 3. As a result, a lower level of delay and greater average speed is forecast along the A34 under Option 3. The increase in delay of 48 pcu-hr in the evening peak hour under Option 3 suggests an additional 7-second delay per vehicle. Generally, network performance between Option 1 and Option 2 is forecast to be at similar levels.

Table 23 A34 corridor performance in the morning peak hour in 2031

		Do-Minimum (DM)	Option 1		Option 2		Option 3	
			Value	Diff	Value	Diff	Value	Diff
A34	Delay (pcu hr)	633	679	46	679	46	664	31
	Total Time (pcu hr)	2996	3059	64	3062	66	3047	51
	Total Distance (pcu km)	190986	192308	1322	192414	1429	192407	1422
	Average Speed (km/h)	63.8	62.9	-0.9	62.8	-1.0	63.1	-0.7

Table 24 A34 corridor performance in the evening peak hour in 2031

		Do-Minimum (DM)	Option 1		Option 2		Option 3	
			Value	Diff	Value	Diff	Value	Diff
A34	Delay (pcu hr)	764	840	76	832	68	813	48
	Total Time (pcu hr)	3089	3180	92	3173	84	3160	71
	Total Distance (pcu km)	190705	191935	1230	192002	1297	192415	1711
	Average Speed (km/h)	61.7	60.3	-1.4	60.5	-1.2	60.9	-0.8

A338

The A338 corridor is forecast to experience negligible change in performance under the Local Plan Options compared with the Do-minimum scenario.

Table 25 A338 corridor performance in the morning peak hour in 2031

		Do-Minimum (DM)	Option 1		Option 2		Option 3	
			Value	Diff	Value	Diff	Value	Diff
A338	Delay (pcu hr)	111	111	0	114	3	113	2
	Total Time (pcu hr)	408	411	3	412	5	411	3
	Total Distance (pcu km)	17724	17867	143	17781	57	17758	34
	Average Speed (km/h)	43.5	43.5	0.0	43.1	-0.4	43.2	-0.3

Table 26 A338 corridor performance in the evening peak hour in 2031

		Do-Minimum (DM)	Option 1		Option 2		Option 3	
			Value	Diff	Value	Diff	Value	Diff
A338	Delay (pcu hr)	151	163	12	164	12	161	10
	Total Time (pcu hr)	476	488	13	489	13	487	11
	Total Distance (pcu km)	18140	18105	-35	18102	-39	18104	-36
	Average Speed (km/h)	38.1	37.1	-1.0	37.0	-1.1	37.2	-0.9

A4185

The greatest reduction in average speed is forecast to be experienced on the A4185 corridor, in the morning and evening peak periods. For all options, the reduction in speed is almost 2kph.

The delay along the A4185 is likely to be linked to the fact that the A4185 is located adjacent to the Harwell Campus development site. Since the size of the Harwell Campus development site remains the same in all three Options the difference in terms of network performance among them is minor.

Table 27 A4185 corridor performance in the morning peak hour in 2031

		Do-Minimum (DM)	Option 1		Option 2		Option 3	
			Value	Diff	Value	Diff	Value	Diff
A4185	Delay (pcu hr)	8	9	1	9	1	9	1
	Total Time (pcu hr)	64	72	8	72	8	72	8
	Total Distance (pcu km)	3685	4035	351	4041	357	4038	353
	Average Speed (km/h)	58.0	56.1	-1.9	56.2	-1.8	56.2	-1.8

Table 28 A4185 corridor performance in the evening peak hour in 2031

		Do-Minimum (DM)	Option 1		Option 2		Option 3	
			Value	Diff	Value	Diff	Value	Diff
A4185	Delay (pcu hr)	8	9	1	9	1	9	1
	Total Time (pcu hr)	59	69	11	69	10	69	10
	Total Distance (pcu km)	3521	4020	499	4014	493	4009	489
	Average Speed (km/h)	60.0	58.2	-1.8	58.3	-1.7	58.3	-1.7

A420

The A420 corridor is forecast to experience negligible change in performance under the Local Plan Options compared with the Do-minimum scenario, particularly in the morning peak.

Table 29 A420 corridor performance in the morning peak hour in 2031

		Do-Minimum (DM)	Option 1		Option 2		Option 3	
			Value	Diff	Value	Diff	Value	Diff
A420	Delay (pcu hr)	209	210	0	211	2	213	4
	Total Time (pcu hr)	1440	1447	7	1448	8	1450	10
	Total Distance (pcu km)	82412	82801	389	82788	375	82737	325
	Average Speed (km/h)	57.2	57.2	0.0	57.2	0.0	57.1	-0.1

Table 30 A420 corridor performance in the evening peak hour in 2031

		Do-Minimum (DM)	Option 1		Option 2		Option 3	
			Value	Diff	Value	Diff	Value	Diff
A420	Delay (pcu hr)	263	294	31	288	25	278	15
	Total Time (pcu hr)	1576	1617	42	1611	35	1605	29
	Total Distance (pcu km)	87732	88323	590	88307	575	88486	753
	Average Speed (km/h)	55.7	54.6	-1.1	54.8	-0.9	55.1	-0.6

A415

The A415 corridor is forecast to experience negligible change in performance under the Local Plan Options compared with the Do-minimum scenario.

Table 31 A415 corridor performance in the morning peak hour in 2031

		Do-Minimum (DM)	Option 1		Option 2		Option 3	
			Value	Diff	Value	Diff	Value	Diff
A415	Delay (pcu hr)	253	272	19	268	14	265	12
	Total Time (pcu hr)	573	594	21	592	20	590	17
	Total Distance (pcu km)	15719	15844	125	15880	162	15895	176
	Average Speed (km/h)	27.4	26.7	-0.7	26.8	-0.6	26.9	-0.5

Table 32 A415 corridor performance in the evening peak hour in 2031

		Do-Minimum (DM)	Option 1		Option 2		Option 3	
			Value	Diff	Value	Diff	Value	Diff
A415	Delay (pcu hr)	372	385	13	378	6	354	-18
	Total Time (pcu hr)	673	694	21	682	9	659	-14
	Total Distance (pcu km)	15802	16089	288	15881	80	15930	129
	Average Speed (km/h)	23.5	23.2	-0.3	23.3	-0.2	24.2	0.7

A417

The A417 corridor is forecast to experience negligible change in performance under the Local Plan Options compared with the Do-minimum scenario.

Table 33 A417 corridor performance in the morning peak hour in 2031

		Do-Minimum (DM)	Option 1		Option 2		Option 3	
			Value	Diff	Value	Diff	Value	Diff
A417	Delay (pcu hr)	110	123	13	121	11	121	11
	Total Time (pcu hr)	503	522	19	519	16	519	16
	Total Distance (pcu km)	21254	21502	249	21472	218	21472	218
	Average Speed (km/h)	42.3	41.2	-1.1	41.4	-0.9	41.4	-0.9

Table 34 A417 corridor performance in the evening peak hour in 2031

		Do- Minimum (DM)	Option 1		Option 2		Option 3	
			Value	Diff	Value	Diff	Value	Diff
A417	Delay (pcu hr)	135	148	13	147	11	148	12
	Total Time (pcu hr)	583	607	24	605	21	605	21
	Total Distance (pcu km)	22962	23280	318	23253	292	23229	268
	Average Speed (km/h)	39.4	38.3	-1.1	38.5	-0.9	38.4	-1.0

6.3. Capacity and Flow impacts

6.3.1. Do Minimum

- The forecast volume to capacity plots for Do-minimum across the District are shown in

Figure 5 and Figure 6. A4185 is modelled to perform below operational capacity. The other corridors contain approaches and junctions which operate at capacity and are presented below.

The **A34** is forecast to operate at capacity at the following approaches and junctions:

In the morning peak hour:

At Botley interchange:

- The A34 northbound towards the Botley interchange
- The A34 northbound mainline through the junction
- The northbound on-slip to the A34 and the merge
- The southbound off-slip from the A34

At Hinksey Hill:

- The A34 northbound towards the Hinksey Hill interchange
- The A34 northbound mainline through the junction

At Lodge Hill interchange:

- The A34 northbound mainline through the junction
- The A34 southbound towards the Lodge Hill interchange

At Marcham interchange

- The A34 northbound towards the Marcham interchange
- The A34 southbound mainline through the junction

At Milton interchange

- The northbound on-slip to the A34 and the merge
- The A34 southbound towards the Milton interchange

In the evening peak hour:

At Botley interchange:

- The A34 northbound mainline through the junction

- The northbound on-slip to the A34 and the merge

At Hinksey Hill:

- The A34 northbound off-slip road
- The A34 southbound mainline through the junction
- The southbound on-slip to the A34 and the merge

At Lodge Hill interchange:

- The A34 southbound towards the Lodge Hill interchange

At Marcham interchange

- The A34 northbound towards the Marcham interchange
- The A34 southbound mainline through the junction

At Milton interchange

- The A34 southbound towards the Milton interchange

The **A415** is also forecast to operate at capacity at the following approaches and junctions:

In the morning peak hour:

- The junction of A415/A338 and the westbound approach (Frilford Road) towards the junction
- The junctions of A415 (Marcham Road)/Spring Road, and the eastbound approach towards the junction
- The westbound approach towards the junction of A415 (Marcham Road)/Colwell Drive
- The junction of A415 (Ock Street)/Bath St and the westbound approach towards the junction
- The junction of A415 (Ock Street)/ West St Helen and the westbound approach towards the junction

In the evening peak hour:

- the westbound approach (Frilford Road) towards the junction
- The junctions of A415 (Marcham Road)/Spring Road, and the eastbound and westbound approach towards the junction
- The westbound approach towards junction of A415 (Marcham Road)/Colwell Drive
- The junctions of A415 (Ock Street)/Bath St and the westbound approach towards the junction

The **A420** is forecast to operate at capacity at the following approaches and junctions:

- In the morning peak hour, the eastbound direction towards Buckland, Southmoor, Fyfield; northbound direction towards Bessels Leigh and Cumnor.
- In the evening peak hour, the westbound directions towards Tubney Wood, Fyfield, Kingston Bagpuize, Pusey, Caswell.

The **A338** is forecast to operate at capacity at the following approaches and junctions:

- In the morning peak hour, the northbound approach between East Hanney and Frilford.
- In the evening peak hour, the southbound approach towards Wantage.

The **A417** is forecast to operate at capacity at the following approaches and junctions:

- In the morning peak hour, the eastbound approach at Wantage and towards Ardington Wick and East Hendred; the westbound approach towards Rowstock.

- In the evening peak hour, the westbound approach at East Hendred and Ardington.

Figure 5 V/C for links and junctions – 2031 Do Minimum - morning peak hour

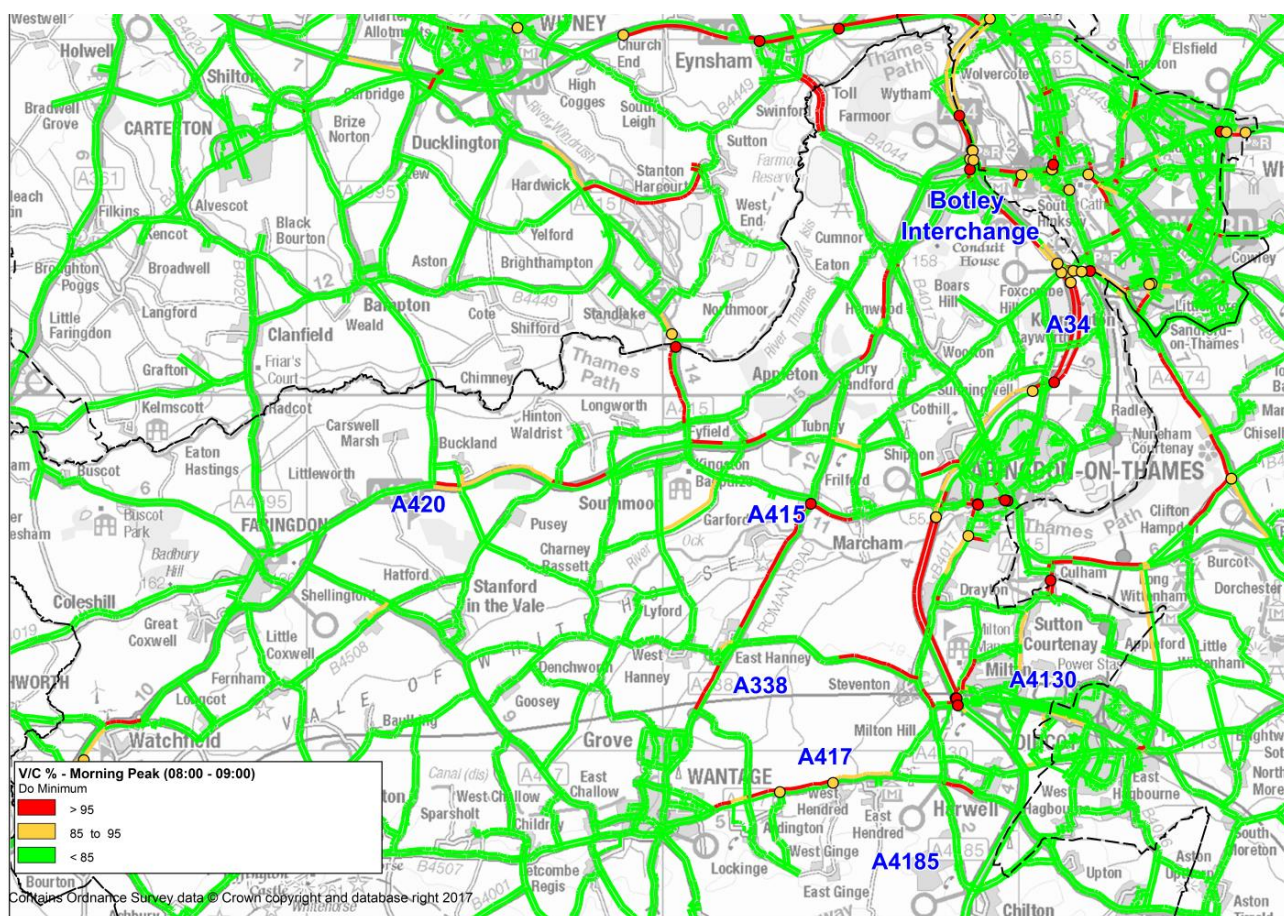
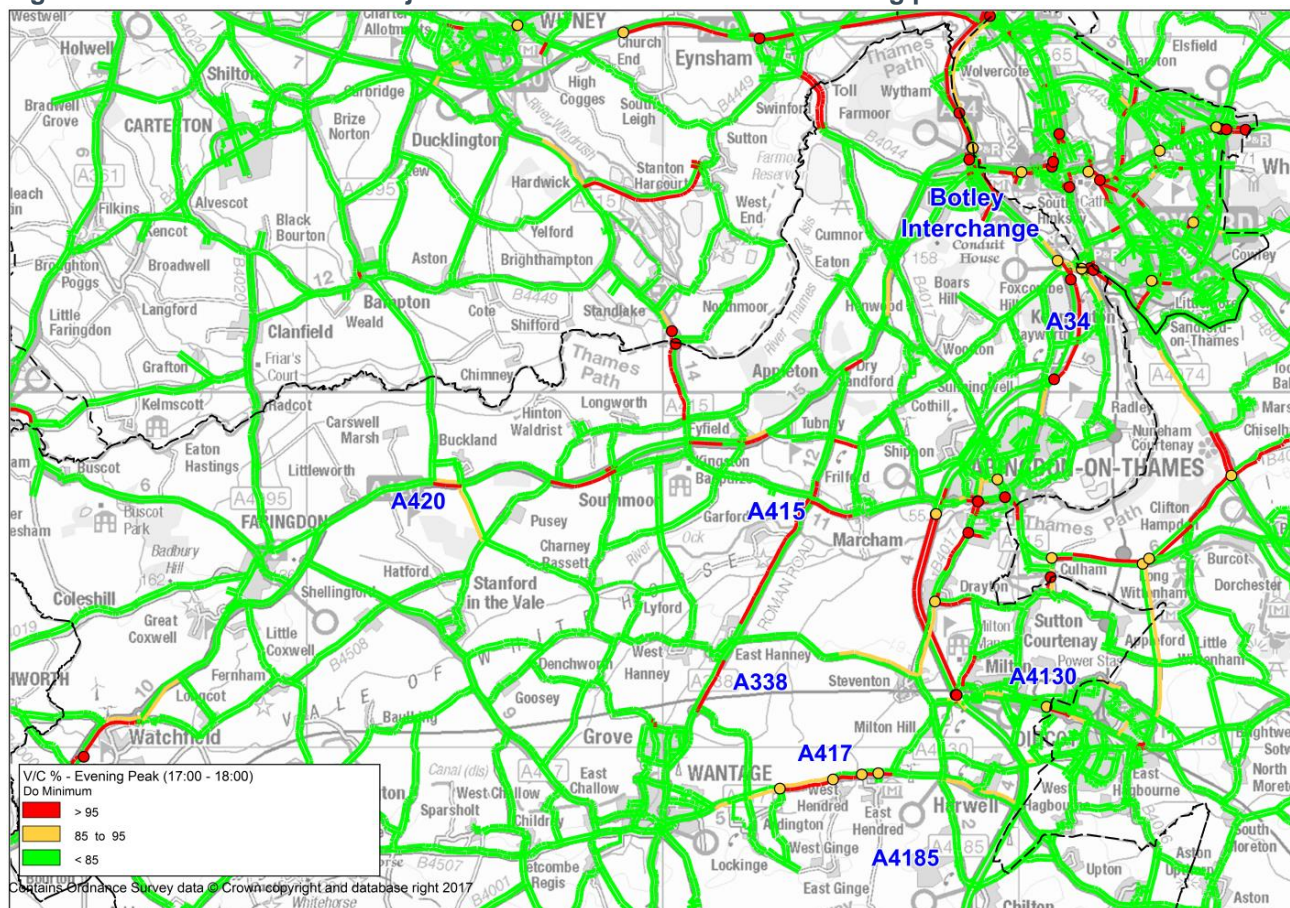


Figure 6 V/C for links and junctions – 2031 Do Minimum - evening peak hour



6.3.2. Development Options

The forecast flow difference plots for Local Plan Options in comparison to Do Minimum are shown in Figure 7 and Figure 8 for Option 1, Figure 11 and Figure 12 for Option 2 and Figure 15 and Figure 16 for Option 3

The forecast volume to capacity plots for Local Plan Options across the District are shown in Figure 9 and Figure 10 for Option 1, Figure 13 and Figure 14 for Option 2 and Figure 17 and Figure 18 for Option 3.

As with Do-Minimum, A4185 is forecast to perform below operational capacity in each option. For all other corridors, the approaches and junctions which are forecast to be at capacity are summarised in Table 2 and Table 3 in Section 1.1. Along A338 and A417 corridors, the approaches and junctions which forecast to be at capacity are the same as those forecast in the Do-minimum. Along A34, A415 and A420 corridors, there are additional approaches and junctions are forecast to have capacity issues compared to the Do-minimum scenario.

6.3.2.1. Option 1

A34

Along A34, **in the morning peak hour**, changes in network performance between the Do-minimum and Local Plan Option 1 include:

At Lodge Hill interchange:

- The northbound on-slip to the A34 and the merge is forecast to operate at capacity

In the evening peak hour:

At Marcham interchange

- The southbound on-slip to the A34 and the merge is forecast to operate at capacity.

A415

In the evening peak hour:

- The eastbound approach (Frilford Road) towards the junction of A415/A338 is forecast to operate at capacity

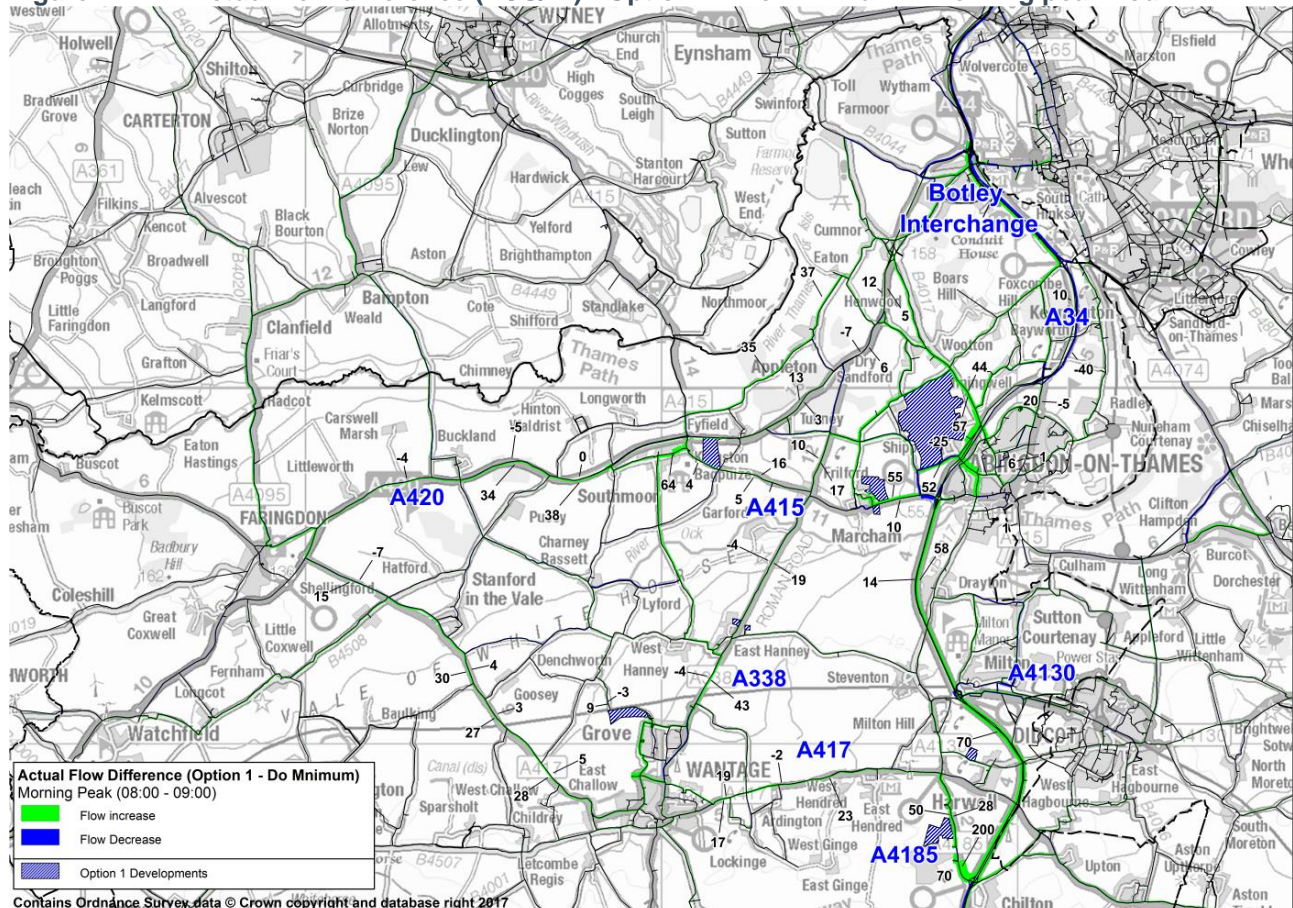
A420

In the evening peak hour:

- The eastbound approach towards the junction of A420/Abingdon Rd is forecast to operate at capacity

The change in network performance along A34 at Lodge Hill and Marcham interchanges may be related to the proximity to the proposed development at Dalton Barracks which is forecast to induce flow change between the Lodge Hill and Marcham interchanges. The network performance change along A415 may be linked to the proposed development at Marcham. Similarly, along the A420, the proposed development East of Kingston Bagpuize is forecast to affect network performance. The flow difference plots for the comparison between Do-Minimum and Local Plan Option 1 are shown in Figure 7 and Figure 8.

Figure 7 Actual flow difference (PCU/hr) - Option 1 - Do Minimum – morning peak hour



**Actual Flow Difference (Option 1 - Do Minimum)
Evening Peak (17:00 - 18:00)**

- Flow increase
- Flow decrease
- Option 1 Developments

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Figure 9 V/C for links and junctions – 2031 Option 1 - morning peak hour

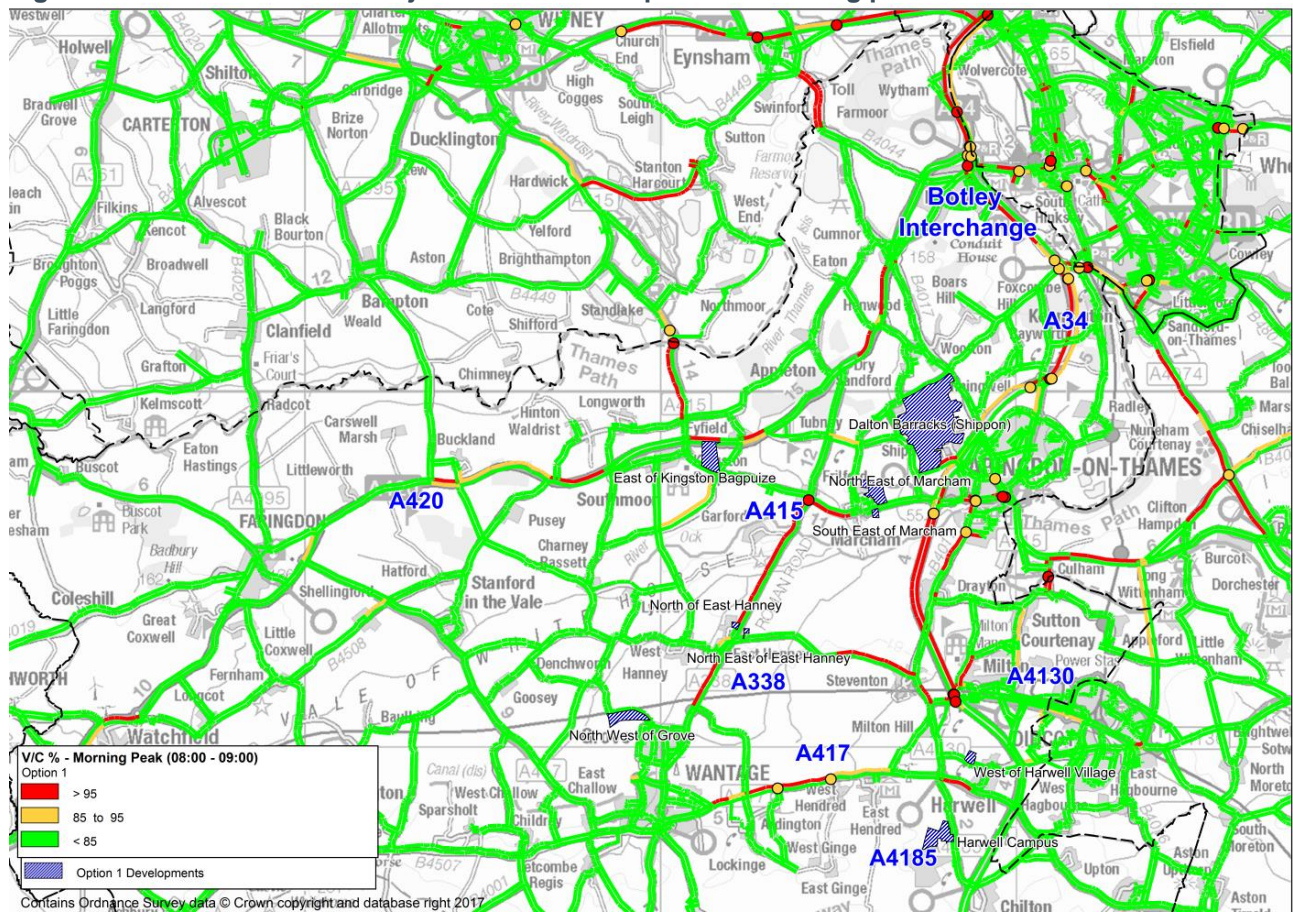
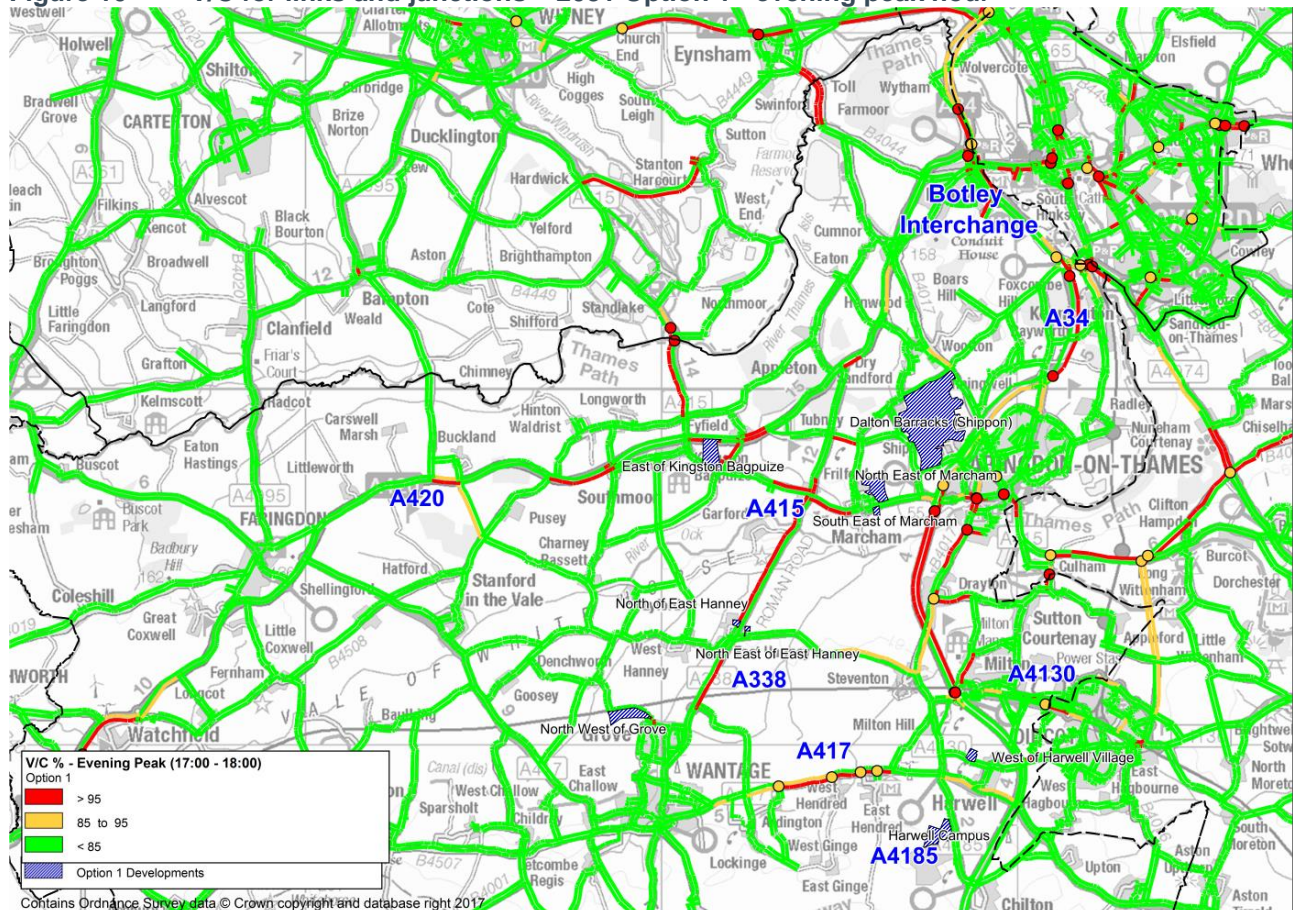


Figure 10 V/C for links and junctions – 2031 Option 1 - evening peak hour



6.3.2.2. Option 2

A34

In the morning peak hour:

At Lodge Hill interchange:

- The northbound on-slip to the A34 and the merge is forecast to operate at capacity

In the evening peak hour:

At Botley interchange

- The northbound off-slip from the A34 is forecast to operate at capacity

At Marcham interchange

- The southbound on-slip to the A34 and the merge is forecast to operate at capacity.

A415

Forecast differences are only observed in the evening peak hour:

- The eastbound approach (Frilford Road) towards the junction of A415/A338 is forecast to operate at capacity

A420

Forecast differences are only observed in the evening peak hour, as in Option 1:

- the eastbound approach towards the junction of A420/Abingdon Rd is forecast to operate at capacity

Similar to the network performance changes under Option 1, the changes under Option 2 may be related to the proximity to the proposed development at Dalton Barracks, Marcham and East of Kingston Bagpuize. The flow difference plots for the comparison between Do-Minimum and Local Plan Option 2 are shown in Figure 11 and Figure 12.

Figure 11 Actual flow difference (PCU/hr) - Option 2 - Do Minimum – morning peak hour

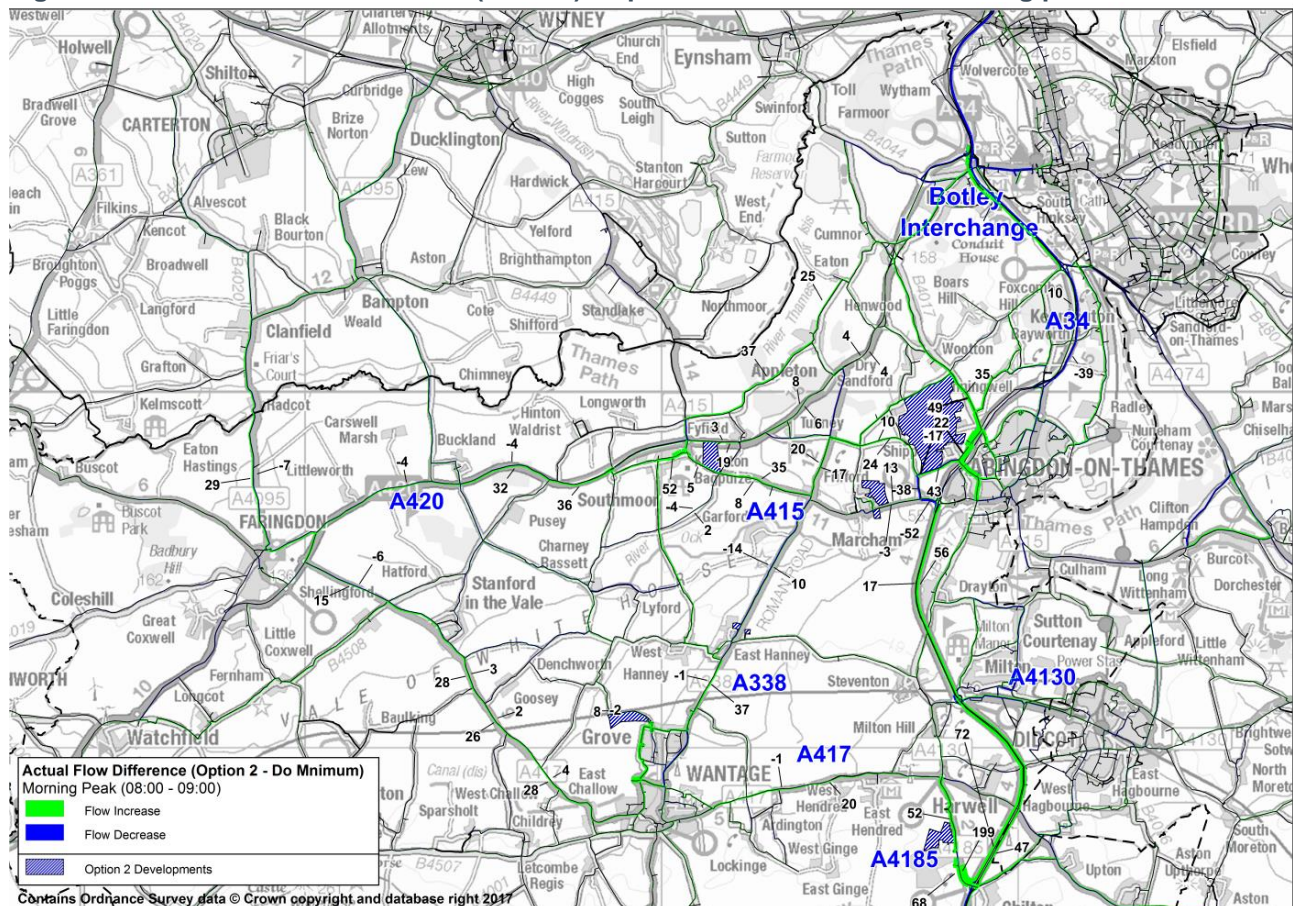


Figure 12 Actual flow difference (PCU/hr) - Option 2 - Do Minimum – evening peak hour

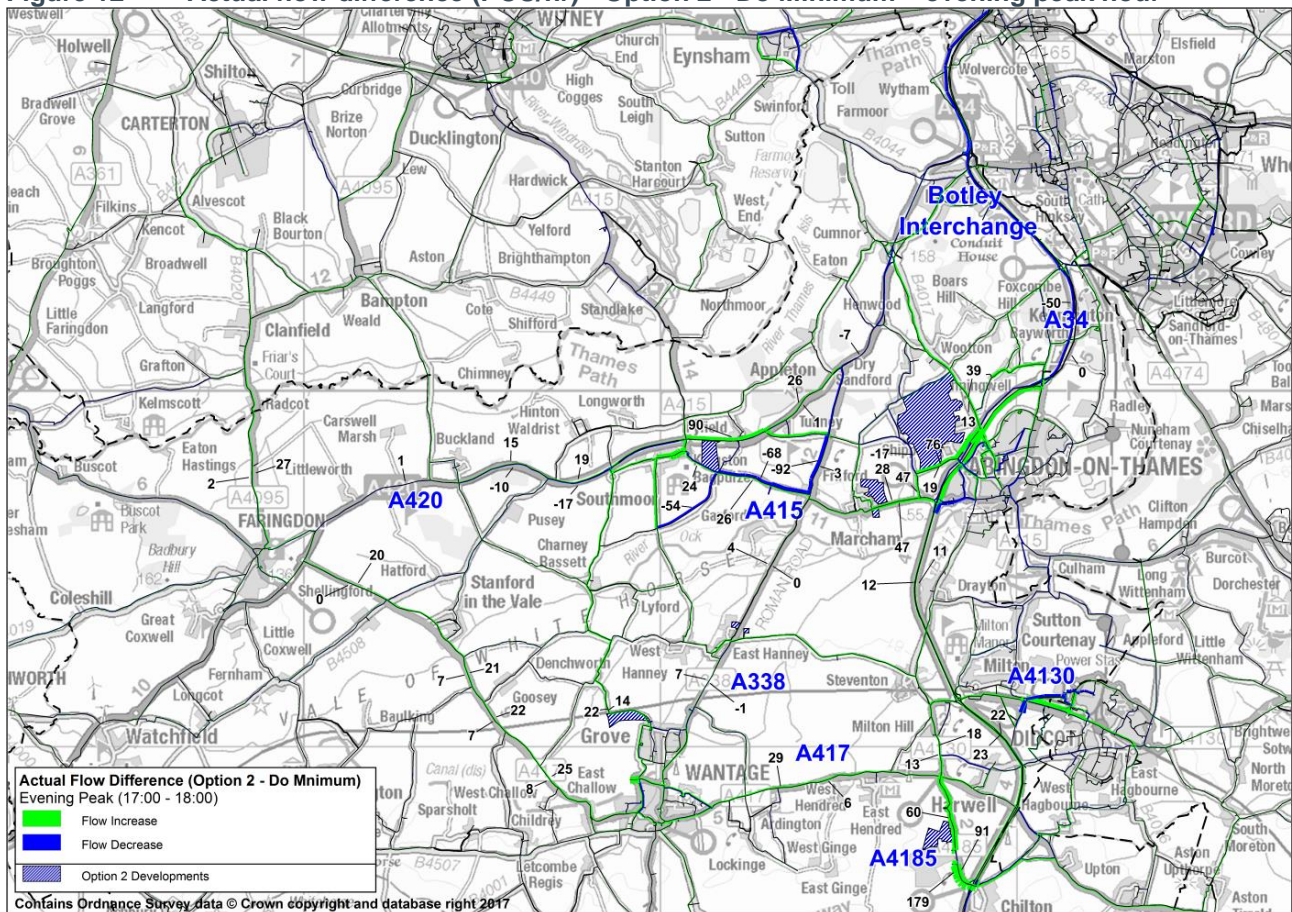


Figure 13 V/C for links and junctions – 2031 Option 2 - morning peak hour

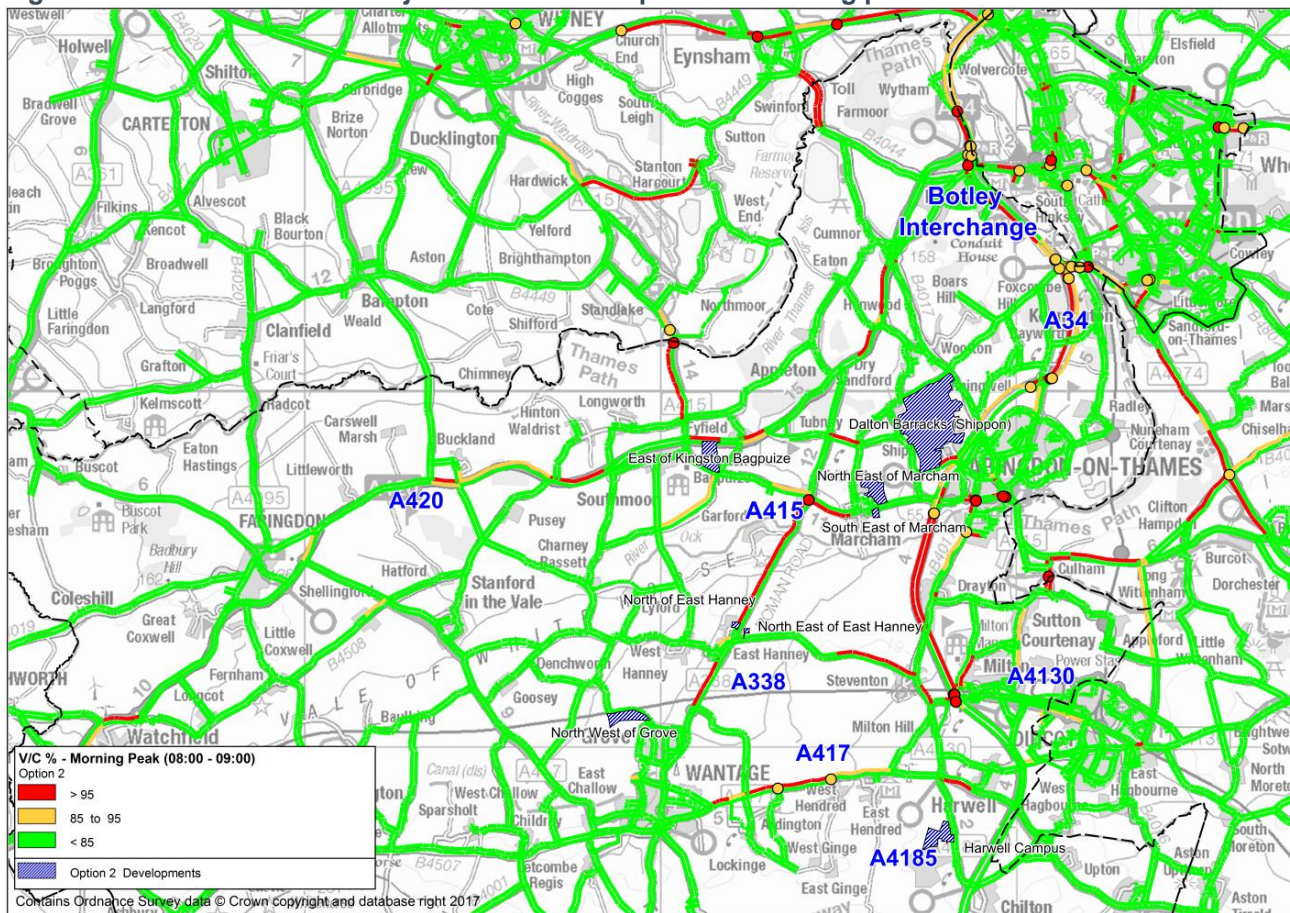
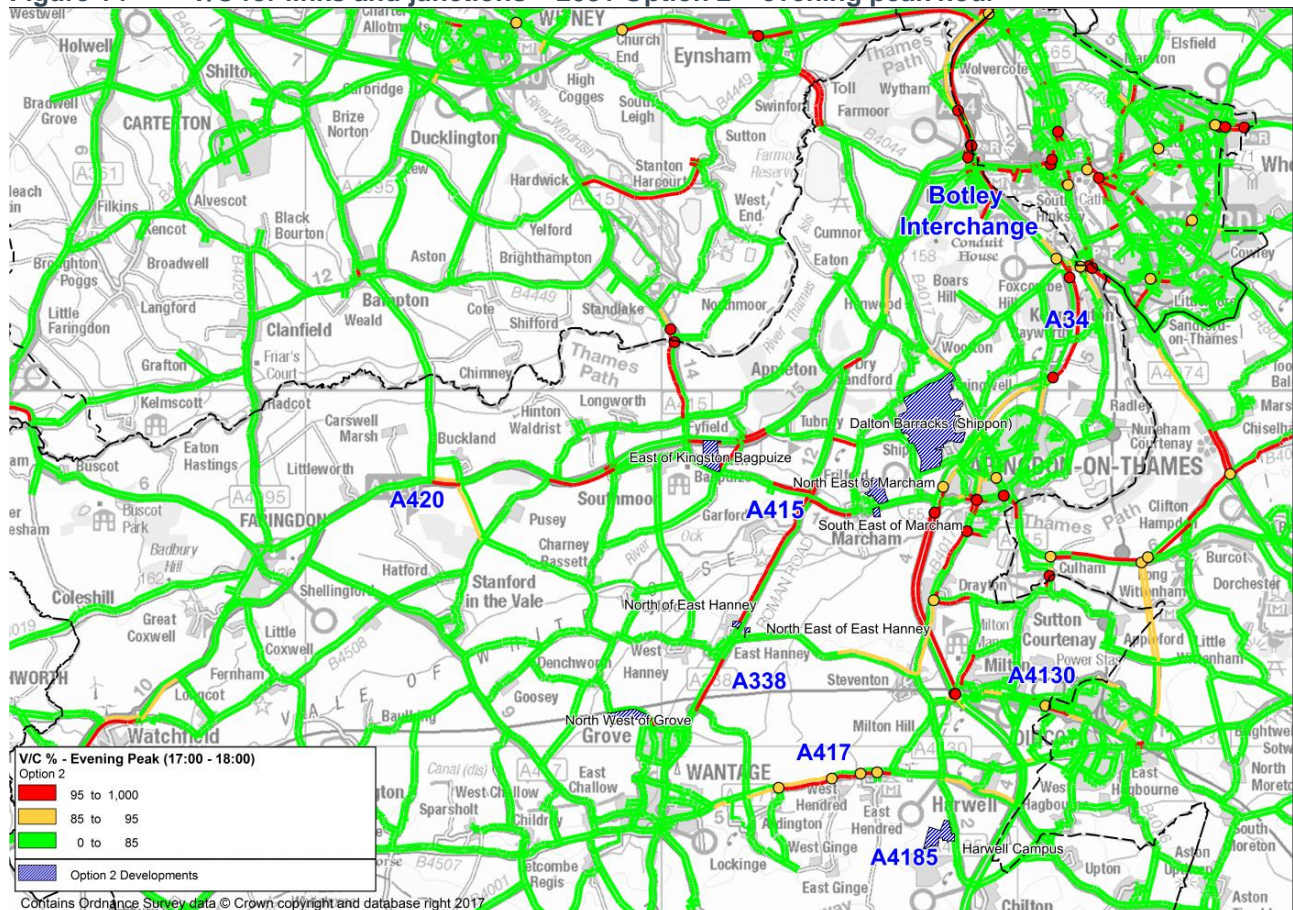


Figure 14 V/C for links and junctions – 2031 Option 2 – evening peak hour



6.3.2.3. Option 3

A34

In the evening peak hour:

At Marcham interchange

- The southbound on-slip to the A34 and the merge is forecast to operate at capacity.

A415

In the evening peak hour:

- The eastbound approach (Frilford Road) towards the junction of A415/A338 is forecast to operate at capacity

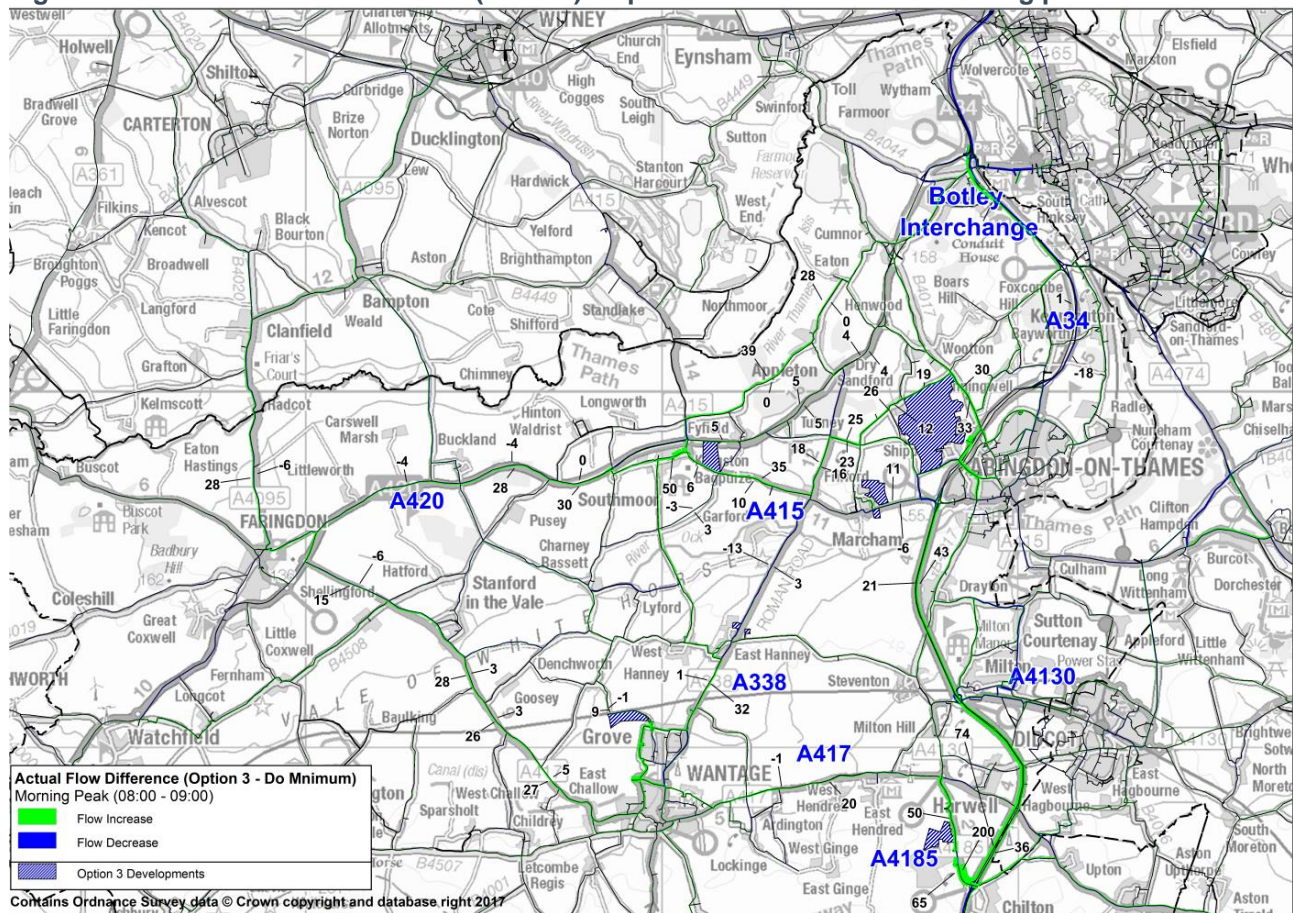
A420

In the evening peak hour:

- The eastbound approach towards the junction of A420/Abingdon Rd is forecast to operate at capacity

Similar to the network performance changes under Option 1 and 2, the changes under Option 3 may be related to the proximity to the proposed development at Dalton Barracks, Marcham and East of Kingston Bagpuize. The flow difference plots for the comparison between Do-Minimum and Local Plan Option 3 are shown in Figure 15 and Figure 16.

Figure 15 Actual flow difference (PCU/hr) - Option 3 - Do Minimum – morning peak hour



Actual Flow Difference (Option 3 - Do Minimum)
Evening Peak (17:00 - 18:00)

- Flow Increase
- Flow Decrease
- Option 3 Developments

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Figure 17 V/C for links and junctions – 2031 Option 3 - morning peak hour

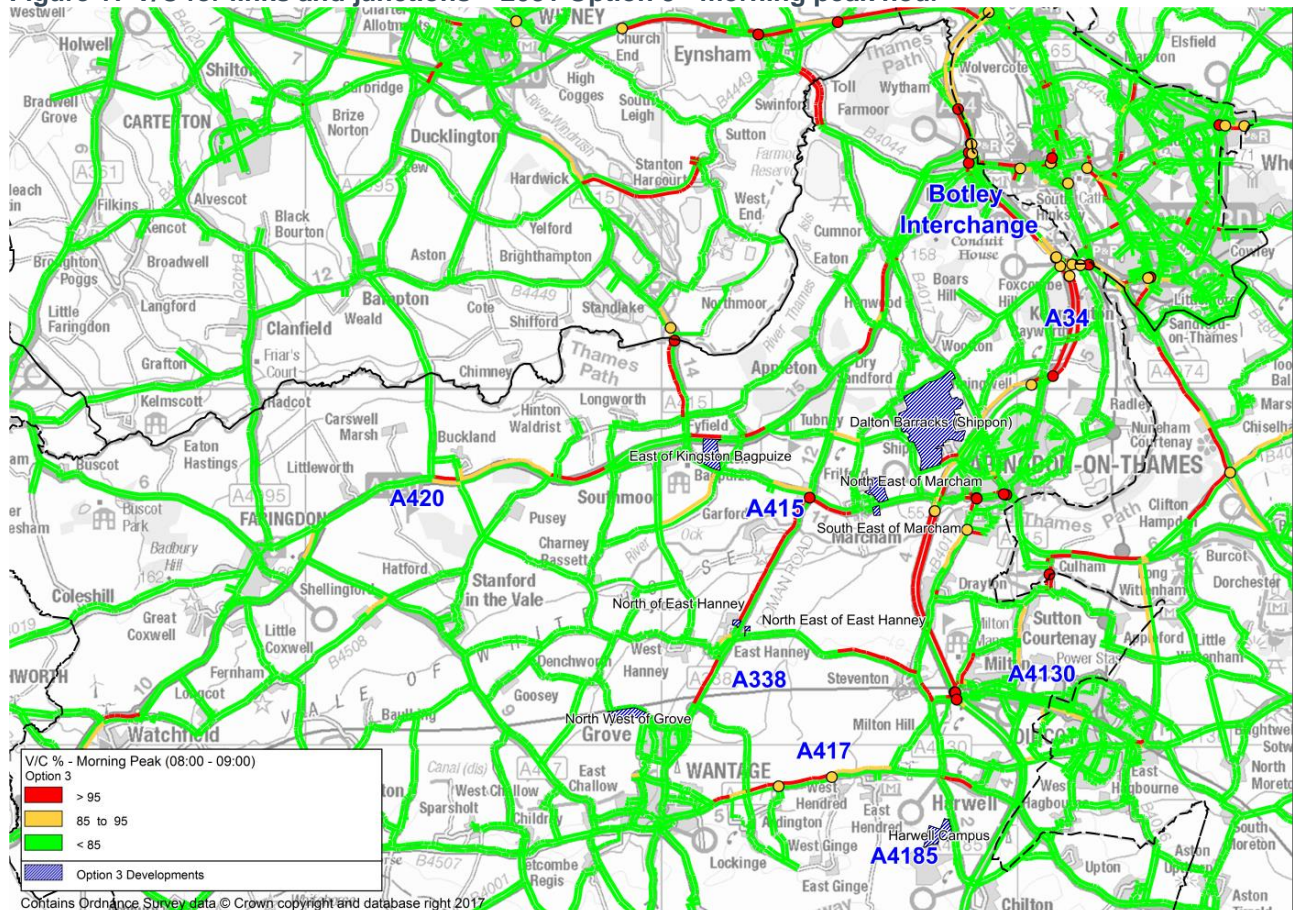
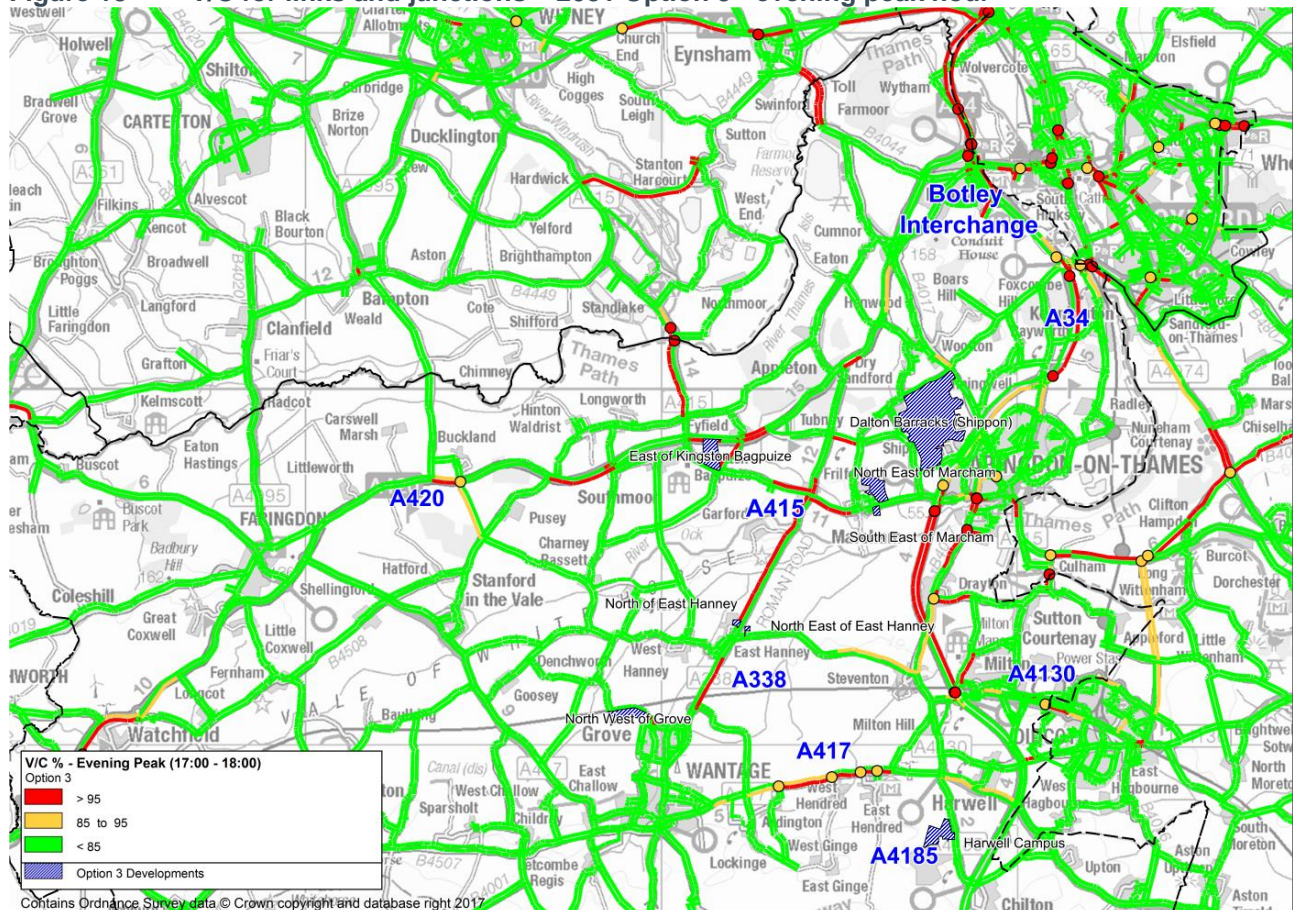


Figure 18 V/C for links and junctions – 2031 Option 3 - evening peak hour



7. Transport Mitigation Performance

7.1. Introduction

A package of transport infrastructure and public transport mitigation measures have been tested in combination with the development growth of Local Plan Option 2. The mitigation measures included are:

- A34 bus lane northbound between Lodge Hill and Hinksey Hill junctions and associated improvements at Hinksey Hill;
- Park and Ride sites at Cumnor and Lodge Hill;
- Bus service frequency improvement between Abingdon and Oxford via Dalton Barracks, and
- New north-facing slips between the A34 and Milton Park to the north of the current Milton Interchange. New slip roads will be added to the network (Figure 19), joining the current priority junction at High Street/Park Drive. Network assumptions are:
 - The current priority junction will become a 5-arm roundabout
 - The new slip roads will be one lane, with flared approach to the roundabout
 - The average link speed will be 40 mph

Additionally, modelled traffic signal timings were optimised.

Figure 19 Proposed slip roads and roundabout



7.2. Network Performance

7.2.1. District Network Performance

The modelled highway network performance within the District for Local Plan Option 2 and the proposed mitigation scenario are shown in Table 35 and Table 36.

At the District level, a forecast reduction of total delay for both the morning and evening peak periods is modelled for the mitigation scenario. In addition, the average speed for the network is predicted to increase marginally for both of the peak periods, suggesting improved network performance with the mitigation in place. The forecasts suggest that the transport mitigation scenario is likely to reduce average delay per vehicle by a small degree.

Table 35 Vale of White Horse District modelled network performance - morning peak hour 2031

		Option 2	Option 2 with mitigation	Difference
Vale of White Horse	Delay (pcu hr)	2229	2203	-26
	Total Time (pcu hr)	11140	11162	22
	Total Distance (pcu km)	538152	541811	3659
	Average Speed (km/h)	48.3	48.5	0.2
	Delay/veh (mm:ss)	2:47	2:45	-0:02

Table 36 Vale of White Horse District modelled network performance - evening peak hour 2031

		Option 2	Option 2 with mitigation	Difference
Vale of White Horse	Delay (pcu hr)	3095	2901	-194
	Total Time (pcu hr)	12507	12388	-119
	Total Distance (pcu km)	564318	568172	3854
	Average Speed (km/h)	45.1	45.9	0.8
	Delay/veh (mm:ss)	3:39	3:23	-0:16

7.2.2. Corridor Network Performance

The corridor network performance can be seen from

Table 37 to Table 48.

A34

The focus of the highway infrastructure mitigation is along the A34 corridor, with the proposed slip roads north of Milton interchange and proposed bus lane between Hinksey Hill and Lodge Hill. The total delay for the morning peak is forecast to increase by 26 pcu-hr which equates to an additional two second delay per vehicle. For the evening peak the model suggests an increase in delay of 25 pcu-hr which relates to an additional one second delay per vehicle.

The proposed northbound slip road allows for egress specifically from the Milton Park site, but do not cater for trips approaching Milton Interchange and the A34 from the west (from Wantage direction) and the east (from Didcot). These movements still access the A34 northbound towards Oxford and conflict with trips from Milton Park using the proposed slip and are likely to cause delay on the slip.

The proposed southbound slip road is likely to cause re-routing of trips accessing Milton Park. Modelled delays are also likely to be experienced at the proposed new roundabout, where vehicles accessing Milton Park via the proposed off-slip are likely to conflict with other trips accessing the business park.

Using this information and model performance the scheme may need to be refined to consider alternative arrangements, possibly including an off-slip only option and/or a larger roundabout design at High Street/Park Drive.

Table 37 A34 corridor performance in the morning peak hour in 2031

		Option 2	Option 2 with mitigation	Difference
A34	Delay (pcu hr)	679	705	26
	Total Time (pcu hr)	3062	3174	112
	Total Distance (pcu km)	192414	197863	5449
	Average Speed (km/h)	62.8	62.3	-0.5

Table 38 A34 corridor performance in the evening peak hour in 2031

		Option 2	Option 2 with mitigation	Difference
A34	Delay (pcu hr)	832	857	25
	Total Time (pcu hr)	3173	3242	69
	Total Distance (pcu km)	192002	194684	2682
	Average Speed (km/h)	60.5	60.1	-0.4

Other Corridors

Along other key corridors, the impact of the transport mitigation is not as obvious, particularly along the A338, A4185, A420 and A417. The re-routing in the mitigation scenario is likely to leads to change in flows along these corridors, hence the change in delay (pcu hr).

A338

Re-routing of the traffic in the wider network away from A338 in the mitigation scenario, may reduce delay slightly.

Table 39 A338 corridor performance in the morning peak hour in 2031

		Option 2	Option 2 with mitigation	Difference
A338	Delay (pcu hr)	114	113	-1
	Total Time (pcu hr)	412	408	-4
	Total Distance (pcu km)	17781	17597	-184
	Average Speed (km/h)	43.1	43.1	0.0

Table 40 A338 corridor performance in the evening peak hour in 2031

		Option 2	Option 2 with mitigation	Difference
A338	Delay (pcu hr)	164	162	-2
	Total Time (pcu hr)	489	485	-4
	Total Distance (pcu km)	18102	17965	-137
	Average Speed (km/h)	37.0	37.1	0.1

A4185

Table 41 A4185 corridor performance in the morning peak hour in 2031

		Option 2	Option 2 with mitigation	Difference
A4185	Delay (pcu hr)	9	9	0
	Total Time (pcu hr)	72	71	-1
	Total Distance (pcu km)	4041	4068	27
	Average Speed (km/h)	56.2	57.0	0.8

Table 42 A4185 corridor performance in the evening peak hour in 2031

		Option 2	Option 2 with mitigation	Difference
A4185	Delay (pcu hr)	9	9	0
	Total Time (pcu hr)	69	69	0
	Total Distance (pcu km)	4014	4021	7
	Average Speed (km/h)	58.3	58.4	0.1

A420

Table 43 A420 corridor performance in the morning peak hour in 2031

		Option 2	Option 2 with mitigation	Difference
A420	Delay (pcu hr)	211	211	0
	Total Time (pcu hr)	1448	1447	-1
	Total Distance (pcu km)	82788	82689	-99
	Average Speed (km/h)	57.2	57.1	-0.1

Table 44 A420 corridor performance in the evening peak hour in 2031

		Option 2	Option 2 with mitigation	Difference
A420	Delay (pcu hr)	288	306	18
	Total Time (pcu hr)	1611	1613	2
	Total Distance (pcu km)	88307	87304	-1003
	Average Speed (km/h)	54.8	54.1	-0.7

A415

Re-routing of the traffic in the wider network away from A415 in the mitigation scenario may reduce delay along the corridor.

Table 45 A415 corridor performance in the morning peak hour in 2031

		Option 2	Option 2 with mitigation	Difference
A415	Delay (pcu hr)	268	240	-28
	Total Time (pcu hr)	592	555	-37
	Total Distance (pcu km)	15880	15546	-334
	Average Speed (km/h)	26.8	28.0	1.2

Table 46 A415 corridor performance in the evening peak hour in 2031

		Option 2	Option 2 with mitigation	Difference
A415	Delay (pcu hr)	378	306	-72
	Total Time (pcu hr)	682	613	-69
	Total Distance (pcu km)	15881	15989	108
	Average Speed (km/h)	23.3	26.1	2.8

A417

Table 47 A417 corridor performance in the morning peak hour in 2031

		Option 2	Option 2 with mitigation	Difference
A417	Delay (pcu hr)	121	120	-1
	Total Time (pcu hr)	519	522	3
	Total Distance (pcu km)	21472	21601	129
	Average Speed (km/h)	41.4	41.4	0.0

Table 48 A417 corridor performance in the evening peak hour in 2031

		Option 2	Option 2 with mitigation	Difference
A417	Delay (pcu hr)	147	159	12
	Total Time (pcu hr)	605	618	13
	Total Distance (pcu km)	23253	23248	-5
	Average Speed (km/h)	38.5	37.6	-0.9

7.3. Capacity and Flow Impacts

The forecast volume to capacity plots for the Mitigation scenario for the District are shown in Figure 20 and Figure 21. The flow difference plots for the comparison between Mitigation scenario and Local Plan Option 2 are shown in Figure 22 and Figure 23.

At Milton interchange, the merge on the northbound A34 is at operational capacity and is modelled to be at operational capacity with the new slip road in place. As most of the traffic using the existing on-slip road in the peak hours does not come from Milton Park, but rather from Didcot (over 50%) in the east and Wantage/Steventon in the west (around 30%), the proposed on-slip junction is likely to be at capacity as traffic levels using the A34 remain at a similar level to the scenario without mitigation. The proposed southbound off-slip is likely to lead to re-routing of trips from the north using the A34 and is likely to be at capacity as the result of this re-routing of trips particularly towards Milton park.

In comparison with Local Plan Option 2, the following approaches and junctions along A34 are forecast to be at capacity in the mitigation model:

In the morning peak hour:

- At Hinksey Hill interchange, the southbound mainline through the junction
- At Marcham interchange, the southbound on-slip to the A34 and the merge

The following approaches and junctions are forecast to be under capacity:

In the morning peak hour:

- At Lodge Hill interchange, the northbound on-slip to the A34 and the merge
- At Milton interchange, the southbound approach towards the interchange

In the evening peak hour:

- At Milton interchange, the southbound approach towards the interchange

Figure 20 V/C for links and junctions – 2031 Mitigation scenario - morning peak hour

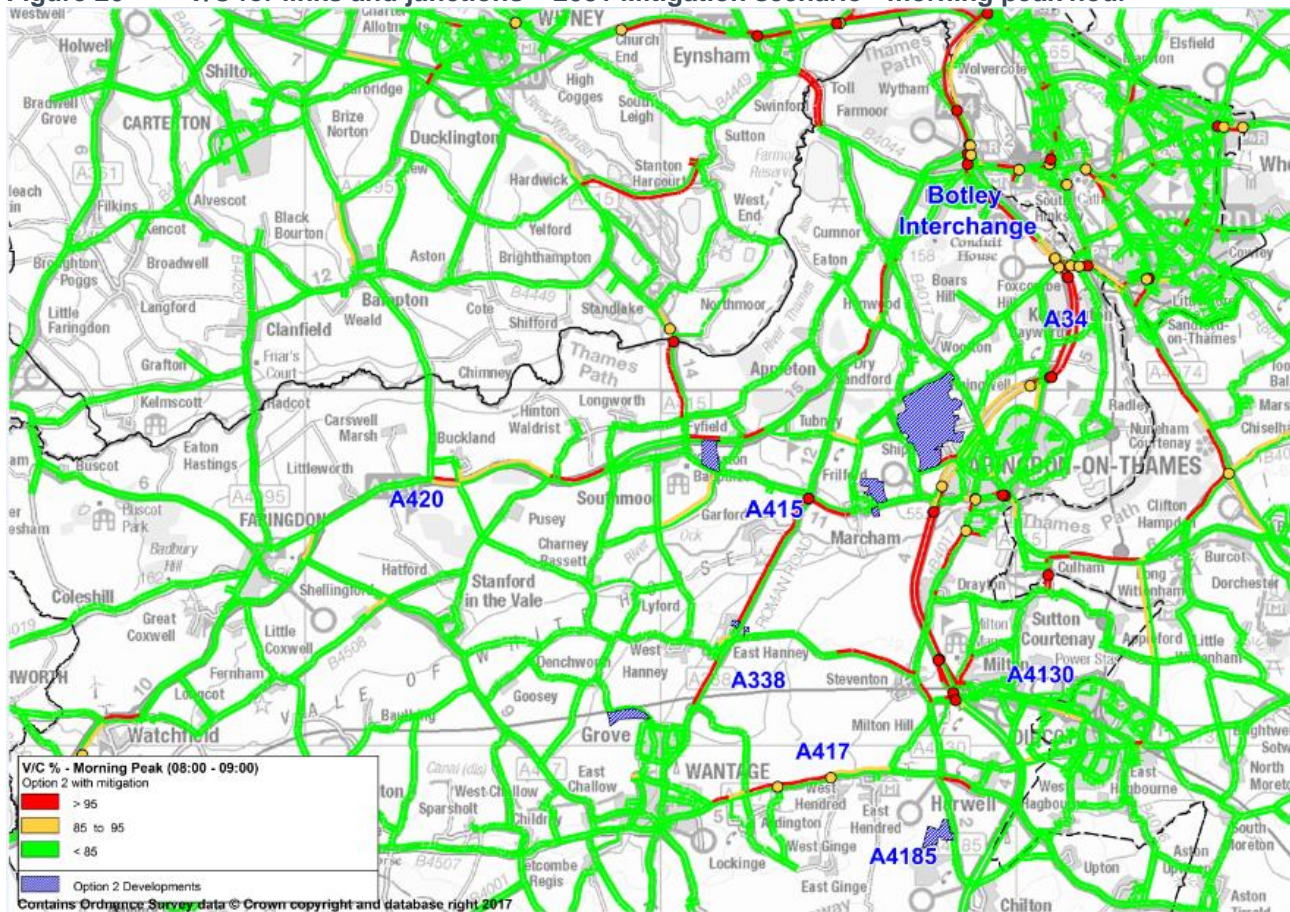


Figure 21 V/C for links and junctions – 2031 Mitigation scenario - evening peak hour

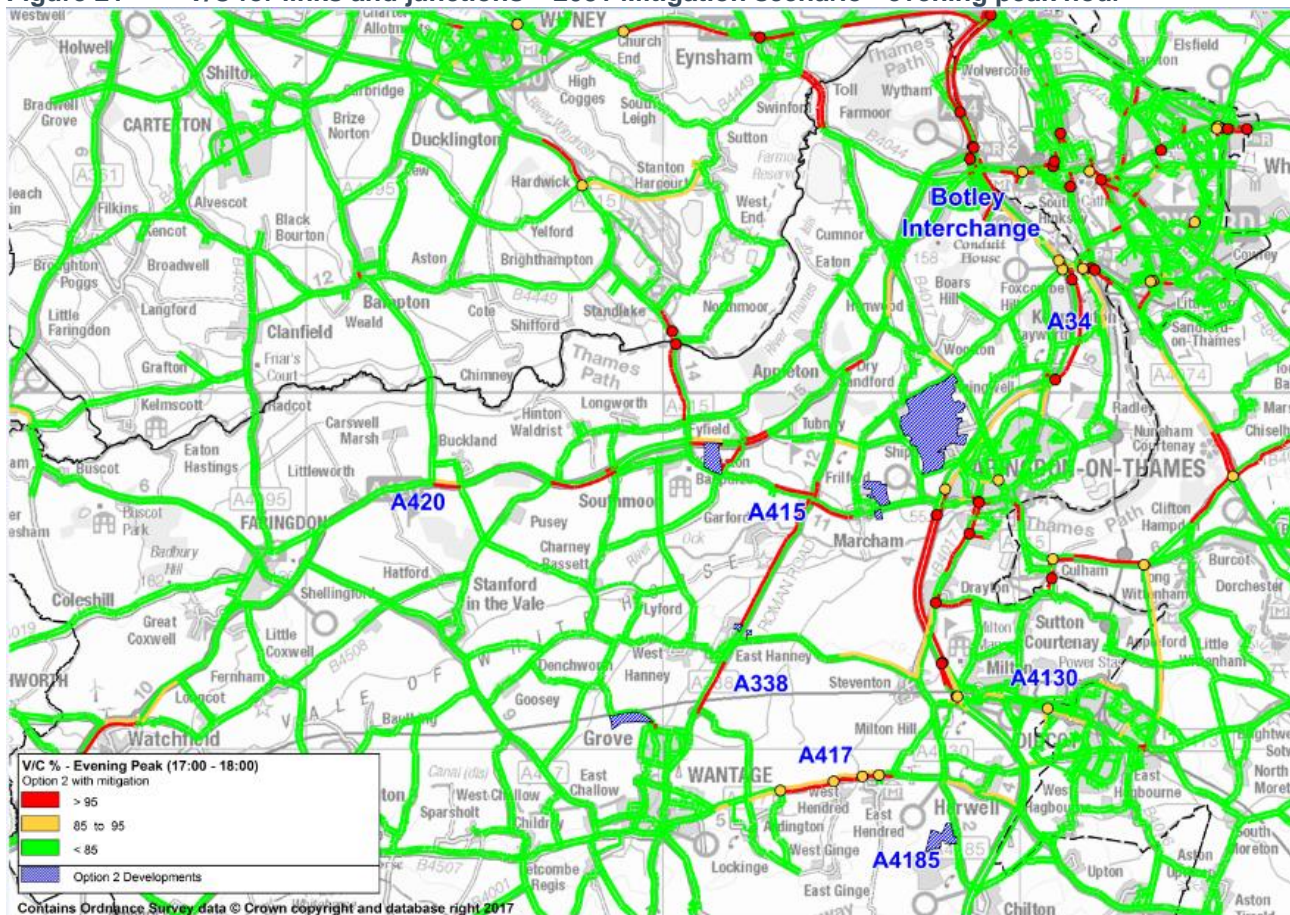


Figure 22 Actual flow difference (PCU/hr) – Mitigation scenario - Do Minimum – morning peak hour

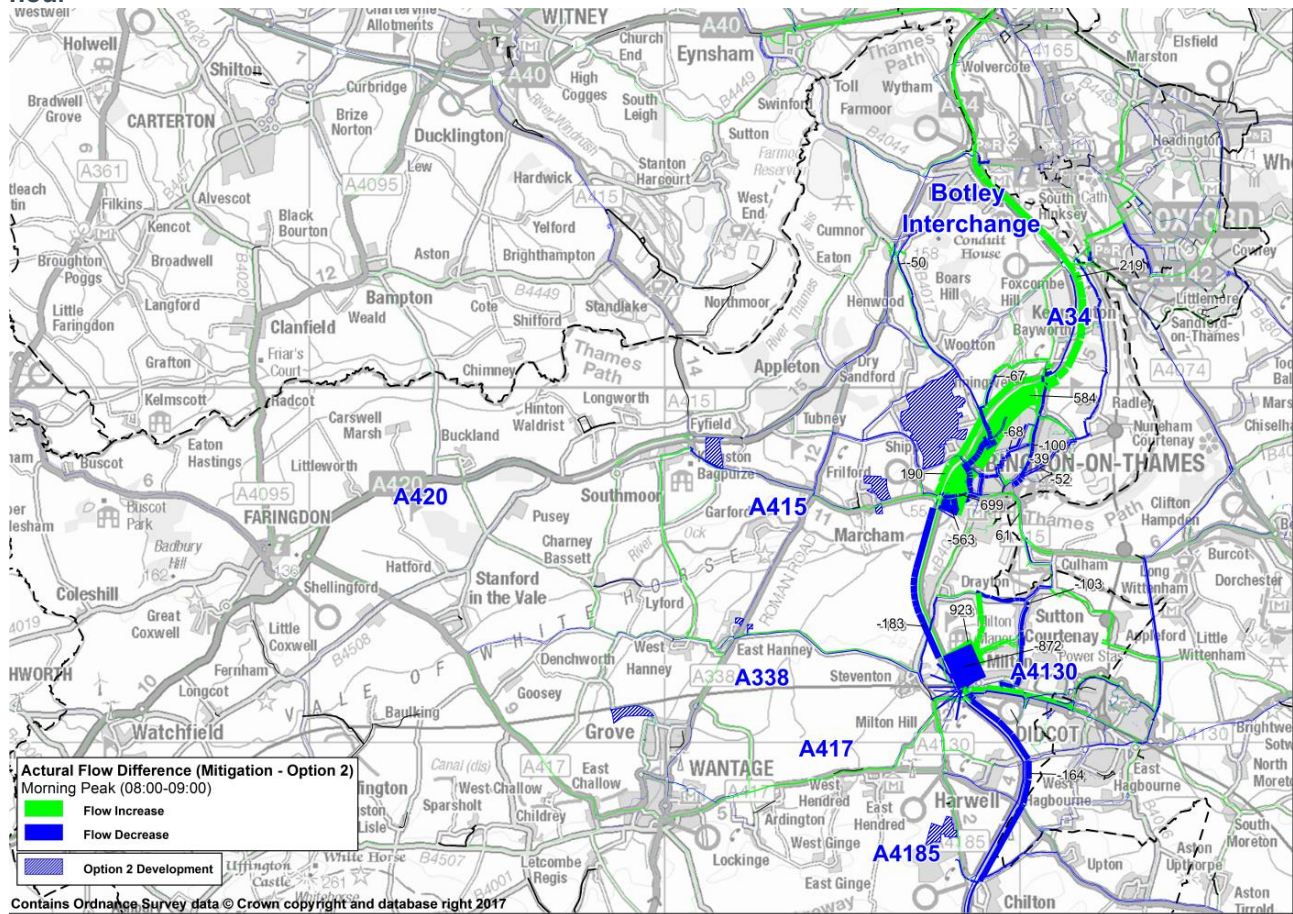
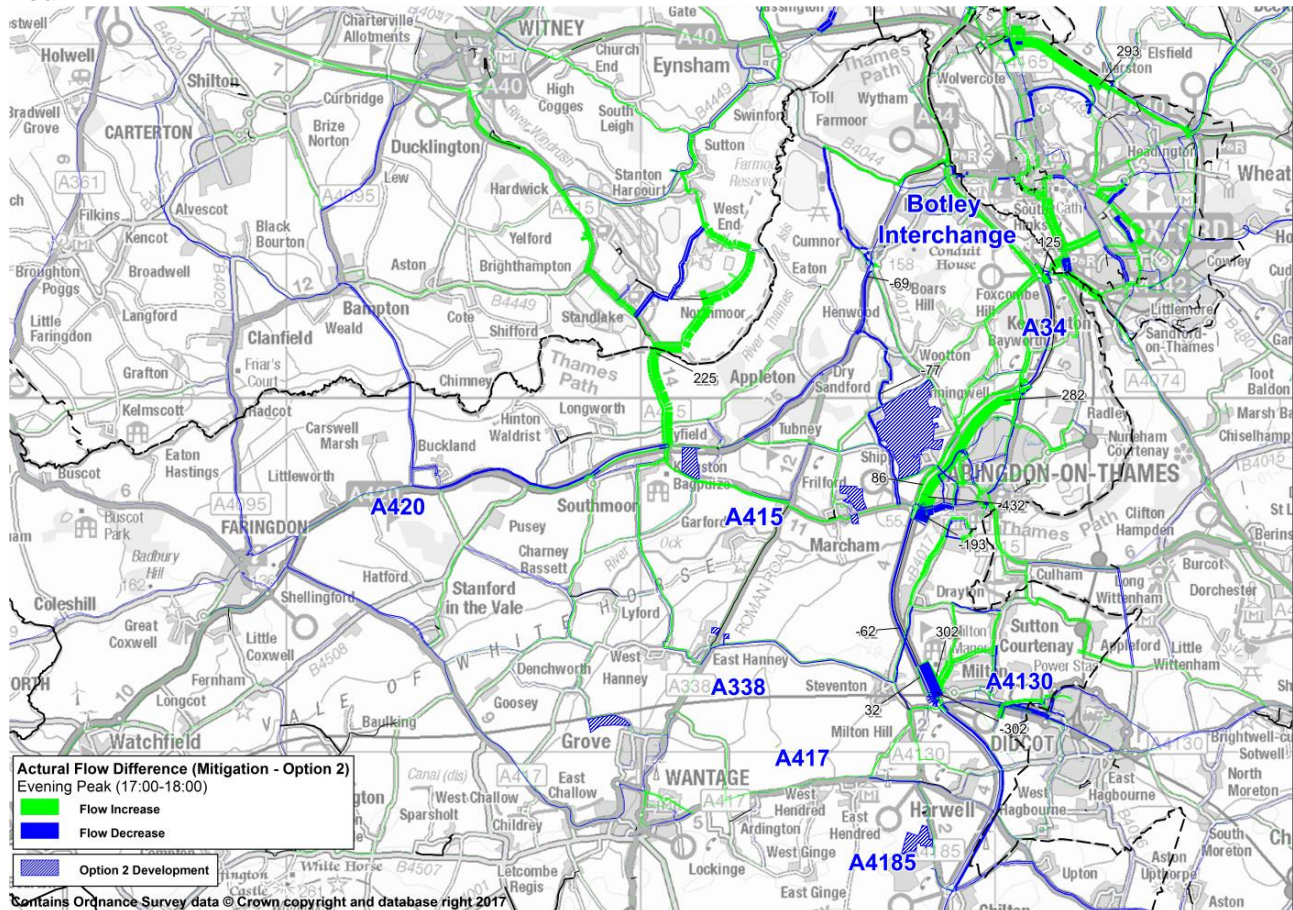


Figure 23 Actual flow difference (PCU/hr) – Mitigation scenario - Do Minimum – evening peak hour



8. Summary

The analysis has considered transport impacts of Local Plan 2031: Part 2 Stage 2 options against the most recent Do-minimum scenario. The Local Plan options, with the greater levels of proposed housing and commercial growth are likely to have the greatest impact on the highway network performance in terms of delay, particularly at the district level (Table 49). The forecasts suggest that the proposed mitigation measures are likely to lead to lower levels of delay and improve network performance at the district level.

Table 49 Vale of White Horse District modelled network performance - Comparison of network statistics across Local Plan options and Local Plan with mitigation - morning and evening peak 2031

			Do- Minimum (DM)	Option1		Option 2		Option 3		Option 2 with Mitigation	
				Value	Diff	Value	Diff	Value	Diff	Value	Diff
Vale of White Horse	AM	Delay (pcu hr)	2098	2248	150	2229	130	2207	109	2203	105
		Total Time (pcu hr)	10867	11177	310	11140	273	11101	234	11162	295
		Total Distance (pcu km)	531428	538916	7488	538152	6724	537414	5986	541811	10383
		Average Speed (km/h)	48.9	48.2	-0.7	48.3	-0.6	48.4	-0.5	48.5	-0.4
			Do- Minimum (DM)	Option1		Option 2		Option 3		Option 2 with Mitigation	
				Value	Diff	Value	Diff	Value	Diff	Value	Diff
Vale of White Horse	PM	Delay (pcu hr)	2961	3126	165	3095	134	3050	89	2901	-60
		Total Time (pcu hr)	12227	12558	331	12507	280	12457	229	12388	160
		Total Distance (pcu km)	557809	565008	7199	564318	6509	564350	6541	568172	10363
		Average Speed (km/h)	45.6	45.0	-0.6	45.1	-0.5	45.3	-0.3	45.9	0.3

Along the A34 corridor (Table 50), the proposed new off-slip configuration serving Milton Park does not serve movements to and from Didcot and Wantage. The northbound A34 is forecast to be over capacity in both the morning and evening peaks, with higher levels of delay forecast at the proposed slip roads. Consideration and testing of alternative mitigation options, such as dedicated southbound off-slips towards Milton Park are suggested.

Table 50 A34 modelled corridor performance - Comparison of network statistics across Local Plan options and Local Plan with mitigation - morning and evening peak 2031

			Do-Minimum (DM)	Option1		Option 2		Option 3		Option 2 with Mitigation	
				Value	Diff	Value	Diff	Value	Diff	Value	Diff
A34	AM	Delay (pcu hr)	633	679	46	679	46	664	31	705	71
		Total Time (pcu hr)	2996	3059	64	3062	66	3047	51	3174	179
		Total Distance (pcu km)	190986	192308	1322	192414	1429	192407	1422	197863	6877
		Average Speed (km/h)	63.8	62.9	-0.9	62.8	-1.0	63.1	-0.7	62.3	-1.5
			Do-Minimum (DM)	Option1		Option 2		Option 3		Option 2 with Mitigation	
				Value	Diff	Value	Diff	Value	Diff	Value	Diff
A34	PM	Delay (pcu hr)	764	840	76	832	68	813	48	857	92
		Total Time (pcu hr)	3089	3180	92	3173	84	3160	71	3242	153
		Total Distance (pcu km)	190705	191935	1230	192002	1297	192415	1711	194684	3979
		Average Speed (km/h)	61.7	60.3	-1.4	60.5	-1.2	60.9	-0.8	60.1	-1.6

Steven.Ward@atkinsglobal.com
+44 (0)20 7121 2378



