Housing Site Allocations Development Plan Document (HSA DPD)

Transport Assessments Summary

1 Introduction

Transport Assessments form an important part of the background evidence for the selection of sites for allocation. Different levels of assessment have been carried out on the sites under consideration for allocation through the DPD.

a) Shortlisted Sites – all shortlisted sites[1] were subject to an initial screening by the Council's Highways Development Control Service. This provided a high level indication of the likely traffic generation[2] from each shortlisted site and highlighted potential highway issues that could impact on deliverability of the site.
b) Preferred Options sites –Transport modelling, or other suitable assessment of the traffic impact for the short listed sites has been carried out. The Council's existing transport models have been used for sites that fall within their area of coverage but not all sites included in the Preferred Options DPD are covered by a transport model and different approaches have therefore, been adopted for these sites. The modelling does not cover the AONB but, given the small scale nature of these sites, the impacts are likely to be very localised and are therefore more appropriately dealt with at the planning application stage if the sites are allocated.

The table in appendix A shows all the preferred options sites and the level of transport assessment that has been carried out. For sites where transport models have been used the modelling work provides an indication of the likely impacts of development. As the modelling does not take into account future transport schemes or interventions to encourage modal shift that could be used to help to mitigate the developments, the outcomes of the modelling are considered to represent a worst case scenario.

A summary of the Preferred Options sites Transport Assessments is set out in the rest of this document.

2 Transport Modelling

2.1 The West Berkshire Transport Model (WBTM)

The WBTM is a strategic model which covers most of West Berkshire but has the greatest amount of detail and modelling capability in the Newbury and Thatcham areas with some detail in the area around Theale. The model is a traffic distribution model which has been used to assess all the preferred options sites in Newbury, Thatcham and Theale, and includes one of the sites in Cold Ash and one site in Woolhampton.

The model area only covers the one site in Cold Ash in enough relevant detail to be included. For Woolhampton, the two preferred option sites are considered to have a similar

[1] Sites assessed as potentially developable in the SHLAA, and not automatically excluded through the site selection process (details included in the SA/SEA).
[2] The vehicle movements used in these assessments are taken from the Trip Rate Information Computer System (TRICS), which is a UK database of traffic surveys from different land uses, including residential. Evidence from local residential planning application indicates that a 3 bedroom house will generate approximately six vehicle movements per day, with about 10% occurring during peak travel periods.

impact on the highway network, therefore, because at this stage, it is proposed that only one of these sites will be selected, the slightly larger site has been modelled to provide a worst case scenario.

The model looks at the forecast for 2026 in the am peak (08:00 – 09:00) and pm peak (17:00 – 18:00). Different scenarios have been modelled.

- Scenario 1 is a baseline scenario that takes into account predicted traffic growth plus existing committed development (development with planning permission, or already allocated) without the Preferred Options Housing Sites.
- Scenario 2 includes all the Preferred Options sites in addition to growth and committed development.

Scenario 2 takes a strategic look at the impact that the Preferred Options sites would collectively have on the road network. Detailed work has not been done for each site as this would be carried out as part of a planning application for the sites that are allocated. The model results provide a worst case scenario, not all the sites considered are likely to be allocated within the Housing Site Allocations DPD as some of them represent options from which choices have to be made.

Overall there is a 1% increase in trips across the highway network, compared to the general background traffic growth. This does not represent a significant impact on the highway network and, therefore, is not in itself a cause for concern.

The biggest impact of the housing sites is likely to be on individual junction performance, with a small amount of increased congestion on the local roads nearest to the sites. Further detailed modelling of the junctions themselves would be required to accompany a planning application for any site that is allocated.

Overall junction performance and network congestion is not significantly affected by the Preferred Option sites. In the modelling results the junctions and links within the network are assessed under Scenario 1 and then again for Scenario 2. The majority of junctions and links remain within the same Volume over Capacity (VoC) percentage category in both scenarios.

Two additional scenarios have been considered for Theale to assess potential options for allocation.

- Scenario 3 considers the western sites only (THE003, THE009)
- Scenario 4 the eastern sites only (THE005, THE001).

The outcome of the modelling does not show a significant difference between the two scenarios. However, the modelling only looks at the impact on the strategic road network, not on the very local network where there could be localised traffic impacts that would impact on the deliverability of a site. This will be assessed and mitigated through the planning application process for any sites that are allocated.

The West Berkshire Transport Model report is available in appendix B

2.2 Calcot VISSIM Modelling

The VISSIM model is a very local model which considers traffic along the A4 between Junction 12 of the M4 and the junction with Langley Hill. It is a visual simulation model which covers the network in this area and models the behaviour of traffic on this main route and its junctions and routes that feed into it. The model is therefore, specifically able to model the traffic impact of EUA025, 026 and 007. The modelled outputs from the WBTM for traffic travelling east, from Theale towards Reading, along the A4 have been included, as have an estimation of traffic generated from the other Preferred Options sites to the north of the A4 (EUA003, 008, 031 and 033) taken from the Transport Statements submitted by the site promoter.

The modelling in this area has assumed that all sites will be allocated for development, which is unlikely to be the case in reality as some of them represent options from which choices will be made. It therefore, provides a worst case scenario. As with the WBTM two scenarios have been modelled:

- Scenario 1 (2026 Reference Case) - a baseline scenario showing general background growth and committed development without the allocation of new housing sites
- Scenario 2 (2026 Assessment Options) - assessing the impact of allocation of all the preferred options sites on top of the baseline scenario

Both scenarios include the development of IKEA at Pincents Lane as a committed development scheme.

The modelling shows that queuing and delays in 2026 occur whether or not the Preferred Options sites are developed. The Preferred Options sites are shown to have a marginal effect on the AM peak and PM peak traffic. During the AM peak average delay time per vehicle is shown to increase from 47 seconds to 50 seconds, with average speeds reducing from 40mph to 39mph. During the PM peak average delay time per vehicle is shown to increase from 54 seconds to 61 seconds, with average speed reducing from 39mph to 37mph.

IKEA

The modelling in the A4 Calcot area takes account of the approved IKEA store. The modelling is based on the details of the original planning approval (ref: 11/00218/COMIND) and its associated transport impacts. Subsequently there has been approval of a slight reduction in store size.

Significant modelling work was carried out to assess the planning application. LinSig modelling work undertaken for the A4 Bath Road/Dorking Way/Pincents Lane junction revealed much sensitivity north of the A4 due to the multiple accesses and activities in this location. A number of different iterations have been undertaken to consider what mitigation will be required to avoid excess traffic queues affecting the existing retail area. Significant mitigation, including queue detector loops within Pincents Lane and longer green time to those existing the existing retail area, may need to be provided to alleviate queuing.

The VISSIM modelling shows a significant amount of additional traffic queuing back into the exiting retail area in the 2026 Assessment option compared to the 2026 base line (reference case).

The modelling therefore, looks at a worse case scenario as it is based on the larger store and potentially greater transport impacts. With such a significant development in this area and the ability to only 'model' the expected impacts, the Council will be closely assessing the actual impacts of the IKEA store once it is open. It is not considered appropriate to allocate additional development in this area until the actual traffic situation is known.

The Calcot VISSIM Model Report is in Appendix C

3 Site Promoter Transport Assessments

3.1 Eastern Urban Area - Sulham Lane/Long Lane and Stonehams Farm (EAU008, 031, 033)

The site promoter for the above sites submitted a Transport Statement (TS) for each site as part of the Preferred Options consultation. These TS's have been reviewed and verified by the Council's Highways Development Control Service and they are considered to be a reasonable assessment of the impact of these sites.

The Council has raised concern regarding the impact on Long Lane and the junction of Long Lane with Sulham Hill as a result of traffic generated from the development of EUA003/008 and EUA033). Manual for Streets sets out required visibility splays based upon sight stopping distances (SSD) in Table 7.1. Based on recent vehicle speed surveys, the required visibility splays at the Long Lane / Sulham Hill junction are 2.4 x 54.0 metres to the west and 2.4 x 52.0 metres to the east. Measurements taken on site reveal sight lines of only 2.4 x 44.0 metres to the west and only 2,4 x 38.0 metres to the east. The existing sight lines are therefore sub-standard. Long Lane is narrow and winding along some stretches with poor forward visibility. Figure 7.1 of Manual for Streets indicates street geometry required for different sized vehicles to pass. To permit a large and small vehicle to pass a minimum carriageway width of 4.8m is required. Consideration of the widths needed for waste collection and emergency vehicles in also required. Paragraph 6.8.7 of Manual for Streets refers to BS 5906: 2005 and recommends a minimum street width of 5m for waste collection. Improvements to widen parts of Long Lane, and improve the sight lines at the junction with Sulham Hill would be required. No improvements have ever been suggested to the Council to accommodate any additional traffic.

3.2 Pangbourne - Pangbourne Hill (PAN002)

A planning application has been refused by the Council for the site at Pangbourne Hill (14/03135/OUTMAJ). This site was included as a preferred option within the HSA DPD and so the Transport Statement submitted as part of the planning application has been used to assess the traffic impact of this site. The Transport Statement has been reviewed and accepted by the Council's Highways Development Control service. Whilst the application was refused, the traffic impact related to the development of this site was not one of the reasons for refusal and therefore, development on the site is considered to be acceptable in highway terms.

4 Transport Impact Review

4.1 Burghfield Common

No specific transport model is available for Burghfield Common so an alternative means of assessing the likely impacts of the two preferred sites has been used. Two planning

applications for other sites in Burghfield have been received and as these have been assessed as acceptable by the Council's Highways Development Control Service, the details within their Transport Assessments/Statements have been used as an alternative, to provide an indication of whether the highway network in Burghfield would be able to cope with the level of development proposed through the Housing Site Allocations DPD.

The Transport Assessments and additional work carried out show that even if both Preferred Options sites were to be allocated for development the highway network would operate within capacity.

Traffic Impact Review in appendix D

4.2 Hungerford

Two sites were put forward within the Preferred Options DPD as options for development, , one to the north and one to the south. No specific transport model is available for Hungerford, so an alternative assessment method has been used. The transport impact from each site has been considered to see which site is likely to be preferable in terms of minimal impact on the highway network.

The assessment of the two sites indicates that the northern site (Eddington Sites) would be likely to generate more car trips than the southern site (Salisbury Road). This is primarily due to the location of the site in relation to services, such as the primary and secondary schools, and the limited scope for improvements to walking/cycling routes from the northern sites to these services.

The difference in the transport impacts between housing development to the north and housing to the south is not significant but the southern housing is marginally preferable from a transport point of view.

Traffic Impact Review in appendix E

5 Conclusions

The transport modelling work carried out indicates that the direct impact of the Preferred Options sites on the highway network is minimal. It highlights that background traffic growth is likely to be the main cause of queuing and delays on the highway network in 2026. It is considered unlikely that all of this growth will occur in reality, due to network constraints, highway schemes and the implementation of other transport interventions that encourage modal shift away from the car to more sustainable modes. Therefore, the modelled scenarios provide a worst case scenario in terms of traffic impact.

Appendix A – Preferred Options Housing Sites and Transport Assessment Methods

Appendix B – West Berkshire Transport Model (WBTM) Report

Appendix C – Calcot VISSIM Model Report

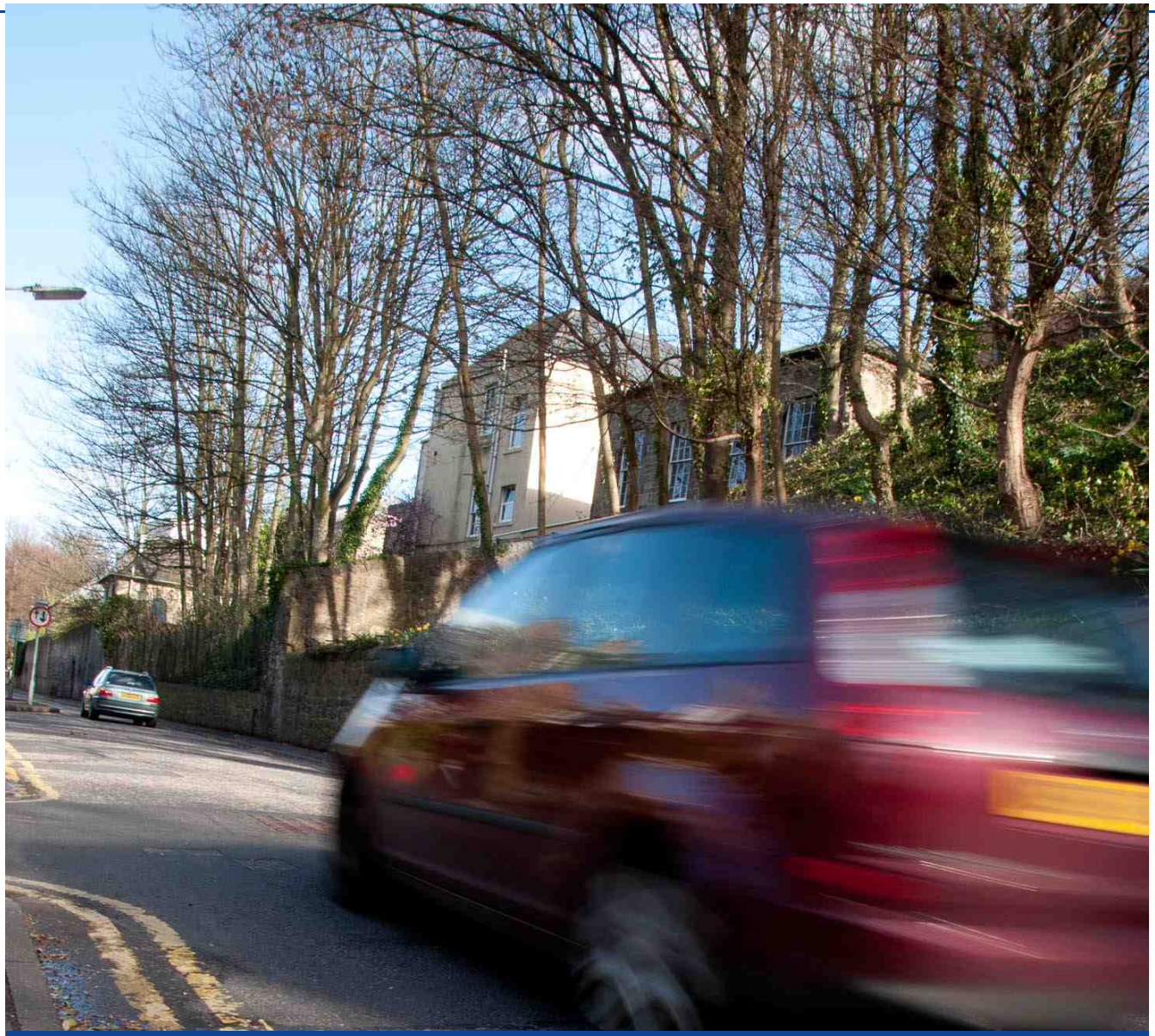
Appendix D – Traffic Impact Review – Burghfield Common

Appendix E – Traffic Impact Review – Hungerford

Appendix A
Shortlisted Sites and Transport Assessment Methods

Site ID	Site Address	Dev. Potential	Transport Assessment Method
NEW012	Land north of Newbury College	23	Include in SATURN assessment
NEW042	Land at Bath Road, Speen	100	
NEW045	Land at Coley Farm, Stoney Lane	75	
NEW047D	South East Newbury	120	
NEW104	South of Warren Road	5	
NEW106	Moor Lane Depot	40	
THA025	Lower Way	87	
COL002	Land at Poplar Farm	20	
COL006	St Gabriels Farm	6	No modelling tool available in this area. Delete from assessment as impact not a great concern and local issues will be highlighted at planning application stage.
COL011	Land at Cold ash Hill	6	
BUR002/2A/4	Land to the rear of The Hollies Nursing Home	85	Assess LINSIG models of junctions and use to assess the impacts of the Burghfield sites. Based on Mans Hill/Firlands LINSIG models - combined assessment carried out
BUR015	Pondhouse Farm	105	
MOR005	Land adjoining West End Road	47	Delete as it is likely that Mortimer will consider where housing goes through their Neighbourhood Development Plan.
MOR006	Land to the south of St Johns School	100	
WOOL001	Land north of Bath Road	20	Delete as only one site in Woolhampton will go forward
WOOL006	Land to the north of A4	30	Include in SATURN assessment as the largest of the Woolhampton sites indicating the larger transport impact in this area.
HUN007	Land east of Sailsbury Road	100	WBC to consider these two options for Hungerford and come up with a recommendation. No modelling tool to help with this decision. Completed by NT
HUN003/5/6/15/20	Eddington Sites	87	
LAM005	Land adjoining Lynch Lane	56	No modelling tool available in this area. Delete from assessment as impact not a great concern and local issues will be highlighted at planning application stage.
LAM007	Land between Folly Road, Rockfel Road and Stork House Drive	24	
PAN001	Land at Green Lane	36	No modelling tool available in this area. Delete from assessment as impacts are at the local level and will need to be highlighted at planning application stage.
PAN002	Land north of Pangbourne Hill	35	
BRS004	Land off Stretton Close	12	Small site, no modelling tool available. Delete from assessment.
CHI010	Land adjacent to Coomb Cottage	7	Small site, no modelling tool available. Delete from assessment.
COM004	Pirbright Institute Site	140	No modelling tool available. Impact of housing likely to be less than existing permitted uses. Delete from assessment.
HER001	Land off Charlotte Close	16	Small site, no modelling tool available. Delete from assessment.
KIN006/7	Land east of Layland Green	13	Small site, no modelling tool available. Delete from assessment.
EUA007	Turnhams Farm (Pincents Lane)	285	Use updated VISSIM moel to assess impacts. Will inlcude input from traffic generated by Theale sites.
EUA025	Land adajcent to Junction 12 M4	up to 100	
EUA026	Land adjacent to Bath Road and Dorking Way	24	
EUA008/3	Stonehams Farm	44	No modelling tool available in this area. Transport Assessments submitte dby site promoters will be assessed.
EUA031	Land east of Sulham Hill	29	
EUA033	Land east of Long Lane and south of Blackthorn Close	30	
THE003	North Lakeside	50	Use SATURN model to assess impacts on key junctions in this area. The SATURN model network around Theale is considered detailed enough to provide this assessment. Three scenarios tested, 1: all sites, 2: western sites only, 3: eastern sites only. Does not include input from EUA sites.
THE009	Land between A340 and The Green	125	
THE005	Land at Junciton 12	50	
THE001	Former Sewage Works	88	

To be assessed by WBC separately
Assess using SATURN model
Assess using updated VISSIM model
Assess using LINSIG junction models



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WSP

TRAFFIC ASSESSMENT OF WEST BERKSHIRE HSA DPD SITES USING WBTM

West Berkshire Council

29/03/2015

Quality Management

Issue/revision	Issue 1	Revision 1	Revision 2	Revision 3
Remarks	Draft for client comments	Final – updated with client comments		
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Prepared by	Lucy Burton-Brown	Lucy Burton-Brown		
Signature				
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TRAFFIC ASSESSMENT OF WEST BERKSHIRE HSA DPD SITES USING WBTM

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29/03/2015

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Table of Contents

1 Introduction

1.1.1 The 'West Berkshire Housing Site Allocations Development Plan Document – Preferred Options Consultation July 2014' sets out the preferred sites across West Berkshire for delivering the remaining homes needed to meet the 10,500 allocation for the District from 2006 – 2026.

1.1.2 West Berkshire Council (WBC) has asked for assistance with transport assessment work for the currently preferred sites in order to:

- be satisfied that they are deliverable
- be aware of the impact they will have on the transport network
- highlight the likely areas of facilitation and mitigation that will be required
- help inform final decisions regarding which sites are acceptable to go forward for allocation in the DPD

1.1.3 The main focus of this report is the impact on the existing highway network of the development sites outlined in the West Berkshire Housing Site Allocations Development Plan Document (Local Plan) (HSA DPD). This document will help the Council to understand and mitigate where appropriate the traffic implications of the proposed sites.

1.1.4 The methodology adopted in this study considers network stress when the HSA developments are included. The study is not intended to provide a detailed review of each development. As such it does not consider design issues, economic benefits, environmental impacts or safety issues. It must be stressed that we have not looked at any different combinations of developments within this study. Additional scenarios looking at different combinations of the four HSA developments in the Theale area have been assessed.

1.1.5 The junction performance assessment highlights junctions that are predicted to operate above 85% capacity. It should be noted that this assessment is based on a strategic model, which has not been validated at every single junction. It should be noted that the junction operation assessment undertaken as part of this study intends to provide a high level assessment and a further junction assessment using more localised modelling and specialised software (LinSig, Arcady, Picady) may be required. Where appropriate these detailed assessments would accompany a planning application.

1.1.6 The study can be used to inform considerations of potential highway mitigation associated with the impacts of the developments. However, the analysis is not exhaustive and requirements should be reviewed on a case-by-case basis as part of the planning process.

1.1.7 This report sets out the inputs, methodology and results of the forecasting. The report is structured as follows:

- **Section 2** provides an overview of the base and forecast models
- **Section 3** provides details on the development of the model scenario which includes the HSA sites
- **Section 4** provides details on the network wide assessment impacts
- **Section 5** provides an assessment of the impact on the Newbury, Thatcham, Cold Ash and Woolhampton area
- **Section 6** provides an assessment of the impact on the Theale area (All sites)
- **Section 7** provides an assessment of the impact on the Theale area (Western sites)
- **Section 8** provides an assessment of the impact on the Theale area (Eastern sites)
- **Section 9** provides the conclusions to the assessment

2 Base and forecast modelling

2.1 2013 base year model

2.1.1 WSP were commissioned to update the West Berkshire Transport Model (WBTM) based on 2013 transport data for the following time periods:

- AM peak hour: 08:00-09:00
- Inter peak (average hour): 10:00-16:00
- PM peak hour: 17:00-18:00

2.1.2 The model development involved a comprehensive and extensive data collection exercise, including, manual and automatic traffic counts, automatic number plate recognition surveys and journey time surveys. To ensure compliance with modelling guidance the models have been developed in accordance with the Department for Transport (DfT) Web based Transport Analysis Guidance (WebTAG) on http://www.dft.gov.uk/webtag/. This provides detailed guidance on appraisal of transport projects and wider advice on scoping and carrying out transport studies.

2.1.3 The SATURN (Simulation and Assignment of Traffic in Urban Road Networks) Version 11.2.05 program was used as the highway modelling software package. The chosen modelling software package provides:

- WebTAG and DMRB compliance in terms of structure and convergence in SATURN
- Acceptability by local authorities, Department for Transport (DfT), Highways Agency (HA) and developers of model inputs and outputs
- Detailed WebTAG compliant convergence statistics that can be used later to estimate whether scheme benefits are robust

2.1.4 The model includes six user classes as follows:

- Car: Commuting
- Car: Employers Business
- Car: Other
- Light Goods Vehicle (LGV)
- Heavy Goods Vehicle (OGV1)
- Heavy Goods Vehicle (OGV2)

2.1.5 Appendix A includes a description of the user classes (Car, LGV, OGV1 and OGV2) as taken from the Design Manual for Roads and Bridges (DMRB) Volume 13. Public Service Vehicles (PSVs), i.e. buses, have not been included in the model as a distinct user class. Instead they have been represented on the network as fixed flows along a defined route with a peak hour frequency relevant to the respective peak hour modelled. Defining buses in this manner means their impact in terms of congestion and subsequently journey times around the model is captured and their routing realistic in terms of current bus provision when traffic surveys were undertaken.

2.1.6 The study area covers all key highway links and junctions extending from junction 14 of the M4 in the west to junction 12 in the east, north to junction 13 of the M4 and south to Kingsclere on the A339. This area covers the entire urban area of Newbury and Thatcham.

2.1.7 The transport model area is shown in figure 2.1. The transport model covers a sufficient area to accurately model the distribution and assignment of traffic in the areas surrounding Newbury and Thatcham as well as the town centres.

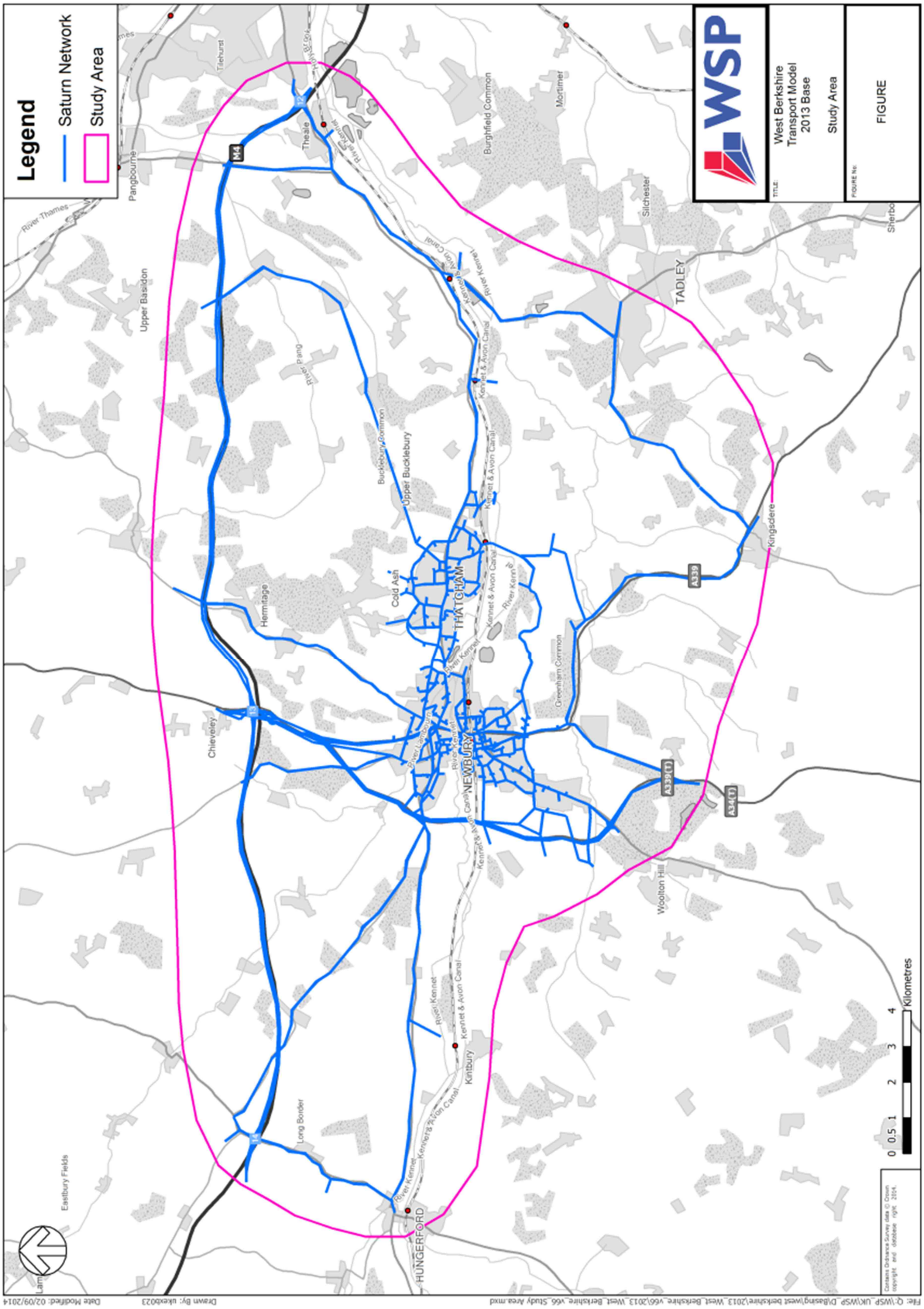

Figure 2.1: Transport model study area

2.1.8 The highway model calibration process was undertaken successfully and has produced a high standard and quality of results for all time periods. It has been shown that the prior trip matrices were improved by the use of matrix estimation techniques and that this process did not significantly alter the integrity of the prior trip matrices.

2.1.9 The calibration and validation levels achieved coupled with the quantity of traffic data included in the model for each time period meet the WebTAG criteria. It can be concluded that overall the WBTM is considered to be a robust tool and is suitable to be used for traffic forecasting, development and scheme appraisal, and hence is considered to be fit for purpose.

2.2 2019 and 2026 forecast year model

2.2.1 The WBTM base year is 2013 and the WBTM forecast years are 2019 and 2026 which are used to assess proposed developments and infrastructure. WebTAG Unit M4.3 stipulates that a "Core Scenario" should be defined which is based on the most "unbiased and realistic set of assumptions" that will form the central case for appraising a scheme. Alternative scenarios are also required which have different supply and/or demand assumptions from the core scenario. The differences in the alternative scenarios will reflect the uncertainties in assumptions made within the core scenario.

2.2.2 The Core Scenario has been defined as containing all developments and schemes deemed "near certain" and "more than likely." The low growth scenario only includes developments and schemes classified as "near certain", whilst the high growth scenario includes all the identified local developments and schemes.

2.2.3 In order to determine the core and alternative scenarios an uncertainty log was created following direct liaison with West Berkshire Council. Uncertainty was defined in terms of probability of a scheme or development going ahead as outlined in table 2.1.

Table 2.1: Uncertainty classifications

Probability	Description	Status
Near certain	The outcome will happen, or there is a high probability that it will happen	■ Intent announced by proponent to regulatory agencies ■ Approved development proposals ■ Projects under construction
More than likely	The outcome is likely to happen, but there is some uncertainty	■ Submission of planning or consent application imminent ■ Development application within the consent process ■ Politically and Corporately supported and being progressed with development partners
Reasonably foreseeable	The outcome may happen, but there is significant uncertainty	■ Identified within a development plan ■ Not directly associated with the transport strategy/scheme, but may occur if the transport strategy/scheme is implemented ■ Development conditional on the transport strategy/scheme proceeding ■ A committed policy goal, subject to tests (e.g. of deliverability) whose outcomes are subject to significant uncertainty
Hypothetical	There is considerable uncertainty whether the outcome will ever happen	■ Conjecture based on currently available information ■ Discussed on a conceptual basis ■ One of a number of possible inputs in an initial consultation process ■ A policy aspiration

2.2.4 In reviewing future developments, only those considered likely to have a significant local impact on the model study area were considered. Smaller developments are assumed to be accounted for in overall TEMPRO growth. The developments identified as having a notable impact within the study area and explicitly modelled within the forecast models are classified in table 2.2. West Berkshire Council was consulted directly in order to devise the list of committed developments included within the WBTM forecasts.

Table 2.2: Future developments

Area	ID	Development	Authority	Uncertainty
	Individual development sites			
Eastern Area	1	Ikea, Calcot	West Berks	**Near certain**
Newbury	2	Sandleford Park	West Berks	**More than likely**
Newbury	3	Kings Road Link Road	West Berks	**More than likely**
Newbury	4	Racecourse	West Berks	**Near certain**
Newbury	5	London Road Industrial Estate	West Berks	**More than likely**
Newbury	6	Market Street Redevelopment	West Berks	**More than likely**
	Infrastructure schemes			
	7	A4 Calcot capacity improvement scheme	West Berks	**Near certain**

2.2.5 Based on the information shown in table 2.2 it was decided that a single Core Scenario would be created for forecasting purposes.

2.2.6 Matrices are developed from a number of components and data sources, including:

- National Trip End Model (NTEM) dataset version 6.2 which provide growth factors for car and public transport trips
- information on significant developments (trip rates, trip distribution, trip internalisation) are included in the model explicitly
- Road Traffic Forecasts (RF13) which provide growth factors for LGV and HGV trips
- fuel and income adjustment factors applied to car trips

2.2.7 Figure 2.2 shows the process for the production of the forecast demand matrices.

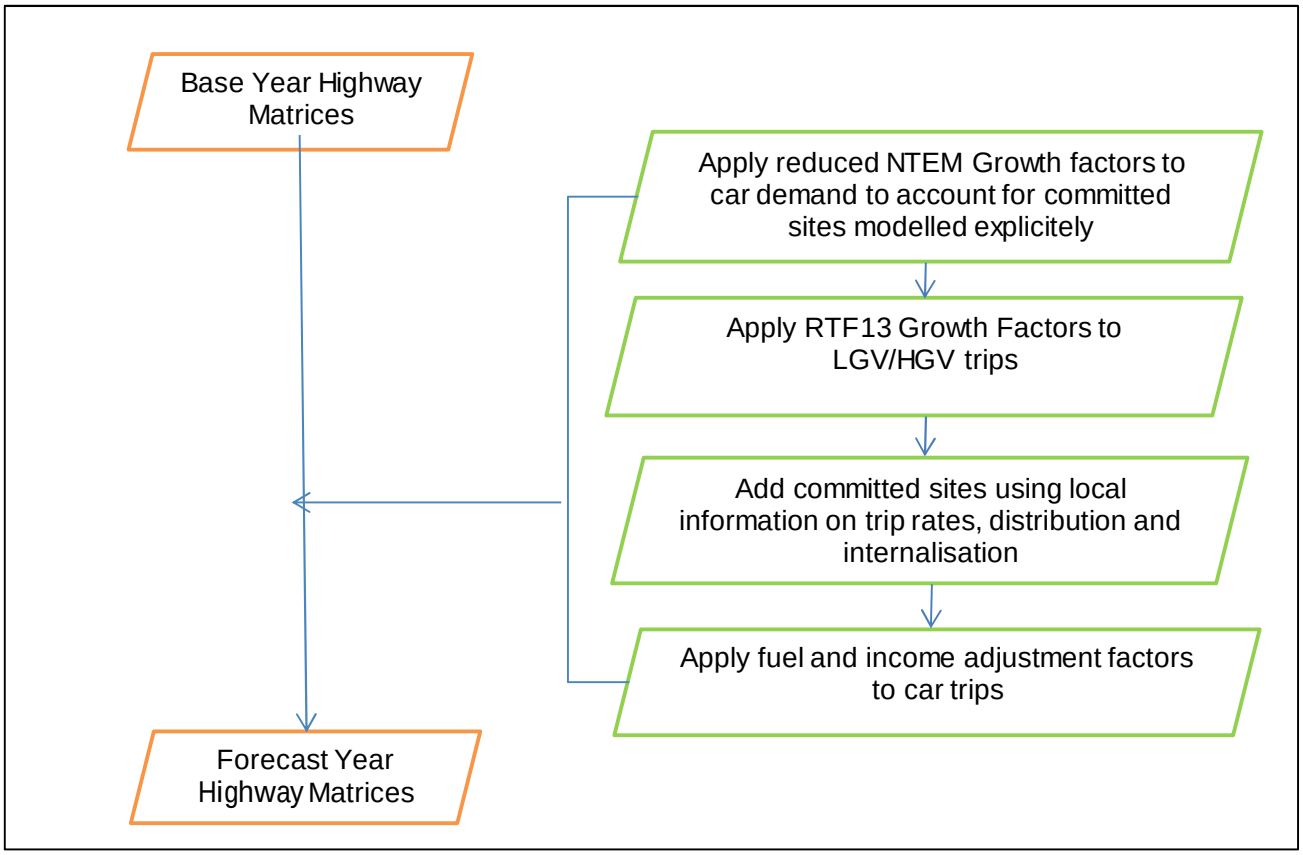

Figure 2.2: Forecast matrix development process

2.2.8 Table 2.3 shows the 2013 base year origin and destination trip matrix totals.

Table 2.3: 2013 base year matrix trip totals

User Class	AM peak hour (08:00-09:00)	Inter peak average hour (10:00-16:00)	PM peak hour (17:00-18:00)
Car	30,000	17,483	30,346
LGV	1,664	1,885	2,850
OGV1	1,932	2,070	2,574
OGV2	1,143	1,254	1,207
Total	**34,739**	**22,692**	**36,977**

2.2.9 The Trip End Model Presentation Program (TEMPRO) is a software tool that provides projections of growth over time for use in transport models, based on outputs from the National Trip End Model (NTEM) which is a nationally-consistent benchmark of growth. Following current guidance the forecast growth has remained consistent with forecasts obtained from the NTEM version 6.2 datasets accessed through the TEMPRO version 6.2 program.

2.2.10 The Core Scenario forecast growth was obtained directly from TEMPRO using the NTEM version 6.2 datasets. The Alternative Planning Assumptions facility within TEMPRO was used to remove the effect of explicitly modelled committed developments by adjusting the planning assumptions on which the forecasts were based. This involved removing totals associated with the explicitly modelled developments (shown in table 2.2) from the overall total with the resultant growth factors therefore representing background growth in traffic.

2.2.11 Employment density information contained within the 2nd Edition of the Homes and Communities Agency's *"Employment Densities Guide" (2010)* report (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/378203/employ-den.pdf) were applied to the developments in table 2.2 to give the total number of household and jobs forecast for Newbury and Thatcham for 2019 and 2026. Table 2.4 and table 2.5 show the adjusted TEMPRO household and jobs numbers forecasts for each district and each time period for the 2019 and 2026 forecast years.

Table 2.4: Adjusted TEMPRO household and jobs in 2019

Area	2013		2019		Alternative 2019	
	Households	Jobs	Households	Jobs	Households	Jobs
Eastern Area	11,199	7,025	11,682	7,454	11,682	7,320
Newbury	35,336	70,274	36,771	74,478	36,123	73,933

Table 2.5: Adjusted TEMPRO household and jobs in 2026

Area	2013		2026		Alternative 2026	
	Households	Jobs	Households	Jobs	Households	Jobs
Eastern Area	11,199	7,025	12,061	7,651	12,061	7,515
Newbury	35,336	70,274	37,895	76,350	36,686	75,773

2.2.12 Information obtained from TEMPRO provides forecast growth assumptions for car user classes. In accordance with current guidance (WebTAG Unit M4, November 2014) and to take into account uncertainties in fuel price, government policy and changes in income the forecast demand car matrices have been adjusted by fuel and income adjustment factors. The factors calculated and used in the forecasts are shown in table 2.6.

Table 2.6: Fuel and income adjustment factors

Year	Fuel	Income	Combined
2019	1.027	1.014	1.042
2026	1.065	1.032	1.099

2.2.13 The growth rate for the car user class is included within table 2.7. Growth factors for other user classes were obtained from the Regional Traffic Forecasts (2013) published by the DfT and are included within table 2.7. Growth rates for South East England were derived, and are applied equally across all time periods.

Table 2.7: Growth factors

User Class		2019			2026		
		AM peak	Inter peak	PM peak	AM peak	Inter peak	PM peak
Car	No Fuel and Income factors	4.17%	5.35%	5.11%	7.53%	11.03%	9.50%
	With Fuel and Income factors	8.53%	9.76%	9.51%	18.15%	21.99%	20.32%
LGV		14.54%			35.7%		
OGV1		-1.71%			3.47%		
OGV2		7.26%			23.10%		

2.2.14 The application of the fuel and income adjustment factors shown in table 2.6 affect the numbers of trips in the origin and destination matrix meaning more cars on the road network in the future as a direct result of changes to both income and fuel prices.

2.2.15 The 2013 origin and destination trip shown in table 2.3 have been factored using the information contained within table 2.6 and table 2.7 to produce the 2019 and 2026 background growth trip totals shown in table 2.8, table 2.9 and table 2.10 for the AM peak, Inter peak and PM peak respectively.

Table 2.8 AM peak – 2019 and 2026 background growth trip totals

AM peak hour (08:00-09:00)									
User Class	**2013**	**2019: No Fuel and Income factors**		**2019: incl Fuel and Income factors**		**2026: No Fuel and Income factors**		**2026: incl Fuel and Income factors**	
Car	30,000	31,250	4.17%	32,559	8.53%	32,260	7.53%	35,444	18.15%
LGV	1,664	1,906	14.54%	1,906	14.54%	2,257	35.7%	2,257	35.7%
OGV1	1,932	1,899	-1.71%	1,899	-1.71%	1,999	3.47%	1,999	3.47%
OGV2	1,143	1,226	7.26%	1,226	7.26%	1,407	23.10%	1,407	23.10%
Total	**34,739**	**36,281**	**4.4%**	**37,590**	**8.21%**	**37,923**	**9.2%**	**41,107**	**18.33%**

Table 2.9: Inter peak – 2019 and 2026 background growth trip totals

Inter peak average hour (10:00-16:00)									
User Class	**2013**	**2019: No Fuel and Income factors**		**2019: incl Fuel and Income factors**		**2026: No Fuel and Income factors**		**2026: incl Fuel and Income factors**	
Car	17,483	18,418	5.35%	19,189	9.76%	19,412	11.03%	21,327	21.99%
LGV	1,885	2,159	14.54%	2,159	14.54%	2,558	35.7%	2,558	35.7%
OGV1	2,070	2,035	-1.71%	2,035	-1.71%	2,142	3.47%	2,142	3.47%
OGV2	1,254	1,344	7.26%	1,344	7.26%	1,543	23.10%	1,543	23.10%
Total	**22,692**	**23,956**	**5.5%**	**24,727**	**8.97%**	**25,654**	**13.1%**	**27,570**	**21.50%**

Table 2.10: PM peak – 2019 and 2026 background growth trip totals

PM peak hour (17:00-18:00)									
User Class	**2013**	**2019: No Fuel and Income factors**		**2019: incl Fuel and Income factors**		**2026: No Fuel and Income factors**		**2026: incl Fuel and Income factors**	
Car	30,346	31,897	5.11%	33,232	9.51%	33,230	9.50%	36,511	20.32%
LGV	2,850	3,264	14.54%	3,264	14.54%	3,866	35.7%	3,866	35.7%
OGV1	2,574	2,530	-1.71%	2,530	-1.71%	2,663	3.47%	2,663	3.47%
OGV2	1,207	1,295	7.26%	1,295	7.26%	1,486	23.10%	1,486	23.10%
Total	**36,977**	**38,986**	**5.4%**	**40,321**	**9.04%**	**41,246**	**11.5%**	**44,526**	**20.41%**

2.2.16 The information contained in table 2.8, table 2.9 and table 2.10 shows the overall increase in the trip total from the 2013 base year to the 2019 and 2026 forecast year with the:

- AM peak increasing from 2013 to 2019 by 8.21% and from 2013 to 2026 by 18.33%
- Inter peak increasing from 2013 to 2019 by 8.97% and from 2013 to 2026 by 21.50%
- PM peak increasing from 2013 to 2019 by 9.04% and from 2013 to 2026 by 20.41%

2.2.17 There has been a further stage in the process for producing the 2019 and 2026 forecast matrices as within Newbury there are committed developments where there are existing land uses which generate trips. These are listed in table 2.2 and have been removed from the forecast 2019 and 2026 trip matrices to give the trip totals shown in table 2.11.

Table 2.11: 2019 and 2026 forecast matrices with trips removed

User Class	AM peak		Inter peak		PM peak	
	2019	2026	2019	2026	2019	2026
Car	32,014	34,715	18,869	20,963	32,655	35,638
LGV	1,874	2,210	2,128	2,505	3,201	3,774
OGV1	1,806	1,901	1,943	2,045	2,429	2,557
OGV2	1,222	1,402	1,344	1,542	1,284	1,474
Total	**36,916**	**40,228**	**24,283**	**27,055**	**39,570**	**43,442**

2.2.18 The committed development trips (from developments listed in table 2.2) are shown in table 2.12 for the AM peak, Inter peak and PM peak.

Table 2.12: 2019 and 2026 committed development trip totals

User Class	AM peak		Inter peak		PM peak	
	2019	2026	2019	2026	2019	2026
Car	925	2,024	1,791	2,475	1,703	2,798
LGV	59	111	155	186	171	237
OGV1	20	20	8	9	8	8
OGV2	11	14	13	18	10	12
Total	**1,015**	**2,170**	**1,967**	**2,689**	**1,893**	**3,055**

2.2.19 The committed development trip totals shown in table 2.12 are added to the 2019 and 2026 forecast background trip totals shown in table 2.11. Table 2.13 shows the total background plus committed trip matrix totals for 2019 and 2026

Table 2.13: Core scenario matrix total comparison

User Class	AM peak		Inter peak		PM peak	
	2019	2026	2019	2026	2019	2026
Car	32,939	36,739	20,660	23,438	34,358	38,436
LGV	1,933	2,321	2,283	2,691	3,372	4,011
OGV1	1,826	1,921	1,951	2,054	2,437	2,565
OGV2	1,233	1,416	1,357	1,560	1,294	1,486
Total	**37,931**	**42,398**	**26,250**	**29,744**	**41,463**	**46,497**

2.2.20 Table 2.14 compares the matrix totals between the 2013 base year model, 2019 forecast year model and 2026 forecast year model for each peak period.

Table 2.14: Core scenario matrix total comparison

	2013 base year matrix total	2019		2026	
		Matrix total	% increase 2019 vs BY	Matrix total	% increase 2026 vs BY
AM peak hour (08:00-09:00)	34,738	37,931	9.19%	42,396	22.05%
Inter peak average hour (10:00-16:00)	22,692	26,250	15.68%	29,744	31.08%
PM peak hour (17:00-18:00)	36,977	41,463	12.13%	46,497	25.75%

2.2.21 The resultant all vehicle highway growth between 2013 and 2019 is 9.19% in the AM peak, 15.68% in the inter peak and 12.13% in the PM peak. The growth between 2013 and 2026 is 22.05% in the AM peak, 31.08% in the inter peak and 25.75% in the PM peak.

2.2.22 It is unlikely that all of this growth will occur in reality, due to network constraints, highway schemes and other transport interventions that encourage modal shift away from the car to more sustainable modes. The forecast demand matrices have been produced using current Department for Transport WebTAG guidance and represent a worst case scenario.

3 Model scenario development

3.1 Introduction

3.1.1 This section presents the assessment of HSA sites undertaken by comparing Scenario 1 (without HSA sites) and Scenario 2 (with HSA sites) models. The assessment reported in this document focuses on changes in traffic flows and junction performance between the two scenarios.

3.1.2 The HSA modelling work has been based on the latest version of the 2026 AM peak and PM peak hour forecast traffic models. The HSA assessment has not been carried out for the Inter peak.

3.1.3 To assess the HSA development two scenarios were considered:

- **Scenario 1**: without the HSA development but including the committed developments contained in table 2.2
- **Scenario 2**: Scenario 1 plus all HSA development[1] (sites 1 to 12)

3.1.4 Additional scenarios have been assessed for combinations of the four HSA sites in Theale which are:

- **Scenario 3**: Scenario 1 plus HSA development (Sites 1 to 10)
- **Scenario 4**: Scenario 1 plus HSA development (Sites 1 to 8, 11 and 12)

3.1.5 The HSA residential sites considered in this assessment are listed in table 3.1 and shown graphically figure 3.1. It is assumed that the HSA residential sites will be implemented in full by 2026.

Table 3.1: Residential HSA Sites

DPD site reference	ID	Description	Total Size, dwellings
	Sites used in Scenarios 2 to 4		
NEW012	1	Land north of Newbury College	23
NEW042	2	Land at Bath Road, Speen	100
NEW042	3	Land at Coley Farm, Stoney Lane	75
NEW047D	4	Land to the north of Haysoms Drive and land adjoining Equine Way, SE Newbury	120
NEW106	5	Land at Moor Lane Depot, Newbury	40
THA025	6	Lower Way, Thatcham	87
COL002	7	Land at Poplar Farm, Cold Ash	20
WOOL006	8	Land to the north of the A4, Woolhampton	30
THE003	9	North Lakeside, Theale	50
THE009	10	Land between the A340 and The Green, Theale	125
THE005	11	Land at Junction 12, Theale	50
THE001	12	Former Sewage Works, Theale	88
Total			**808**

[1] Sites as set out in the Housing site Allocations Development Plan Document Preferred Options Consultation (July 2014)

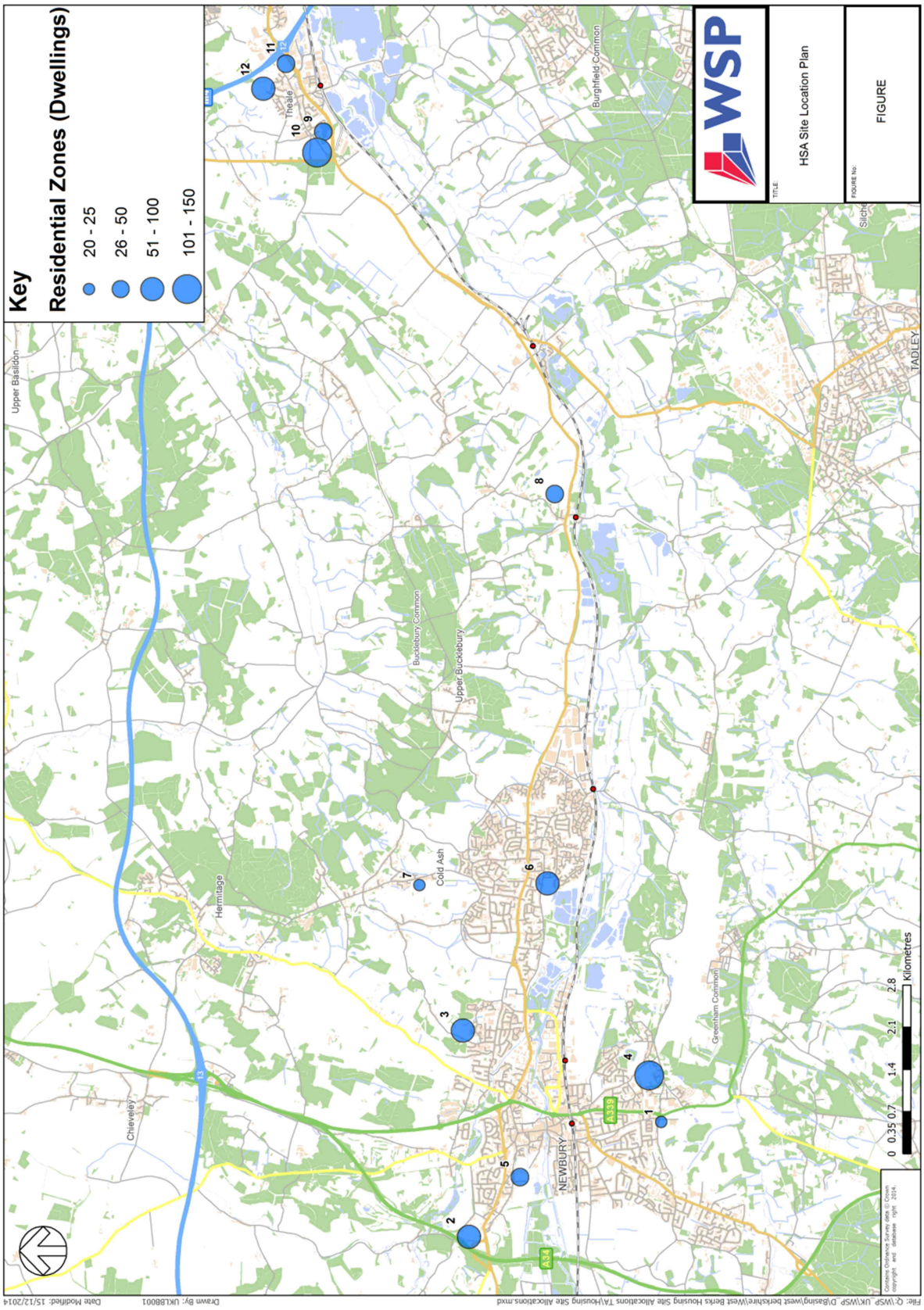

Figure 3.1 Location of HSA Sites

3.1.6 The trip rates were produced by interrogating the TRICS database with development type C3 (residential) used for the assessment of the HSA developments as shown in table 3.2.

Table 3.2: AM Peak and PM Peak hour trip rates

		Trip Rate, vehicle / dwellings[2]		
		Arrival	Departure	Total
AM peak hour (08:00-09:00)	Car	0.13	0.40	0.53
	HGV	0.00	0.00	0.01
PM peak hour (17:00-18:00)	Car	0.33	0.20	0.53
	HGV	0.00	0.00	0.01

3.1.7 The trip rates have been applied to the number of dwellings; the resultant trip generation is reproduced in table 3.3.

Table 3.3: 2026 modelled AM peak and PM peak hour trip generation (vehicles)

ID	2026 forecast year							
	AM peak				PM peak			
	Arrival		Departure		Arrival		Departure	
	Car/LGV	HGV	Car/LGV	HGV	Car/LGV	HGV	Car/LGV	HGV
1	3	0	9	0	8	0	5	0
2	13	1	40	1	33	1	20	1
3	10	1	30	0	25	0	15	0
4	15	1	48	1	40	1	24	0
5	5	0	16	0	13	0	8	0
6	12	1	35	0	29	1	18	0
7	3	0	8	0	7	0	4	0
8	4	0	12	0	10	0	6	0
9	7	1	20	0	17	0	10	0
10	16	1	49	1	42	1	26	1
11	7	1	20	0	17	0	10	0
12	12	1	35	1	29	0	18	0
Total	**107**	**8**	**322**	**4**	**270**	**4**	**164**	**2**
	441				**440**			

3.1.8 It is predicted that the HSA sites are likely to result in an additional 441 vehicle trips in the AM peak and 440 vehicle trips in the PM peak hours loaded onto the district's transport network. The total trip numbers for the base year and the 2026 Scenario 1 forecast year are shown in table 3.4, together with the number of trips generated by the HSA sites, and the final 2026 Scenario 2 trip numbers.

[2] Totals may not add up due to rounding of trip rates

Table 3.4: Modelled AM peak and PM peak hour trip numbers[3]

	Scenario 1		Scenario 2 HSA sites		Scenario 2 - total		Scenario 2 % change	
	AM	PM	AM	PM	AM	PM	AM	PM
Car/LGV	39,060	42,446	429	434	39,489	42,880	1%	1%
HGV	3,337	4,050	12	6	3,349	4,056	0.03%	0.01%
Total	42,397	46,496	441	440	42,838	46,936	1%	0.9%

3.1.9 Table 3.4 shows that all the preferred options housing sites increase trips across the network by approximately 1%. This small increase does not represent a significant impact on the highway network given that Scenario 2 is a worst case scenario and is therefore not a cause for concern in terms of increased congestion.

3.1.10 However, even though it is unlikely that all of the traffic growth summarised in Table 2.14 will occur in reality, due to network constraints, highway schemes and other transport interventions, any increase in traffic growth needs to be planned for in terms of future highway schemes and transport interventions to encourage modal shift.

[3] Totals may not add up due to rounding of trip rates

4 Network wide assessment impacts

4.1.1 The following sections present information network wide results for the modelled scenarios identified in paragraph 3.1.3 for the AM peak and PM peak. The highway network has been examined using key network indicators summarised below:

- Network wide statistics
- Actual flow
- Junction Volume over Capacity
- Link Volume over Capacity

4.1.2 The transport model information in the following sections is presented as the impact of traffic flows in terms of passenger car units (pcu). These are frequently used in traffic assessment work and are based on the principal of translating all vehicles into one common traffic currency. A pcu equivalent is essentially the impact that a mode of transport has on traffic variables (such as headway, speed, density) compared to a single car. This is achieved by apportioning different pcu values to different types of traffic.

4.1.3 Standard factors to convert each vehicle type into pcu have been taken from Table A7 in WebTAG Unit A5.4 “Marginal External Costs” (January 2014). These are:

- Cars: 1.0
- LGV: 1.0
- OGV1: 1.9
- OGV2: 2.9

4.1.4 Appendix A includes a description of the user classes as taken from the Design Manual for Roads and Bridges (DMRB) Volume 13.

4.2 2026: network wide statistics

4.2.1 The network wide model statistics for the 2026 modelled scenario are detailed below to establish how network performance is affected for each of the modelled scenarios. This is assessed through the travel time, total delay, distance travelled, queuing and fuel consumption. These give an indication of overall network performance, taking into account the aggregate impact of small changes in driver behaviour as a result of a particular development or scheme.

4.2.2 The 2026 network statistics are detailed in table 4.1 for the AM peak and table 4.2 for the PM peak.

Table 4.1: AM peak network statistics: Scenario 2 (with HSA Development) vs Scenario 1

	Scenario 1	Scenario 2	Absolute Difference (S2 v S1)	% (S2 v S1)
Over-Capacity Queues (PCU-Hrs)	1,182	1,304	122	10.3%
Total Travel Time (PCU-Hrs)	12,451	12,771	320	2.6%
Travel Distance (PCU-kms)	643,895	650,129	6,234	1.0%
Overall Average Speed (kph)	52	51	-1	-1.9%
Total Trips Loaded (PCU)	42,197	42,637	440	1.0%
Journey Time/Vehicle	17.70	17.97	0.27	1.5%

Table 4.2: PM peak network statistics: Scenario 2 (with HSA Development) vs Scenario 1

	Scenario 1	Scenario 2	Absolute Difference (S2 v S1)	% (S2 v S1)
Over-Capacity Queues (PCU-Hrs)	2,174	2,328	154	7.08%
Total Travel Time (PCU-Hrs)	14,331	14,628	297	2.07%
Travel Distance (PCU-kms)	699,759	705,645	5,886	0.84%
Overall Average Speed (kph)	49	48	-1	-2.04%
Total Trips Loaded (PCU)	46,283	46,738	455	0.98%
Journey Time/Vehicle	18.58	18.78	0.20	1.08%

4.2.3 The over-capacity queue relates to the time spent in queues at a junction where the traffic flow exceeds the capacity of the junction. The results show that with the increased number of trips on the network in all peak hours the over-capacity queues, total travel time and travel distance increases with a corresponding decrease in the overall average speed across the modelled network. In all peaks the journey time per vehicle increases due to the additional trips on the network and the increase in the total travel time. The information contained in table 4.1 and table 4.2 shows only slight increases which are not considered to be significant.

5 Newbury, Thatcham, Cold Ash and Woolhampton – Site 1 to Site 8

5.1 AM peak (08:00-09:00)

2026 traffic flows

5.1.1 Figure 5.1 show the impact of HSA sites on flow levels by presenting the absolute difference in directional flow on key links between the Scenario 1 and Scenario 2 for the AM peak. The difference in flows is shown in passenger car units (pcu) and any difference less than 10 pcu is not shown in order to highlight the larger differences only and not overcrowd the figures. The red bands represent an increase in traffic in Scenario 2 (with HSA sites) when compared to Scenario 1 (without HSA sites) whilst the blue bands indicate a decrease in traffic.

5.1.2 The additional trips due to the HSA developments are spread across the district's transport network rather than concentrated at one location which echoes the dispersed nature of the HSA site locations.

5.1.3 The increase in the directional flow on the majority of the roads is not predicted to exceed 50 pcu. The highest increases are on the M4. The addition of the HSA development sites switches traffic from the B3421 Hambridge Road onto alternative routes.

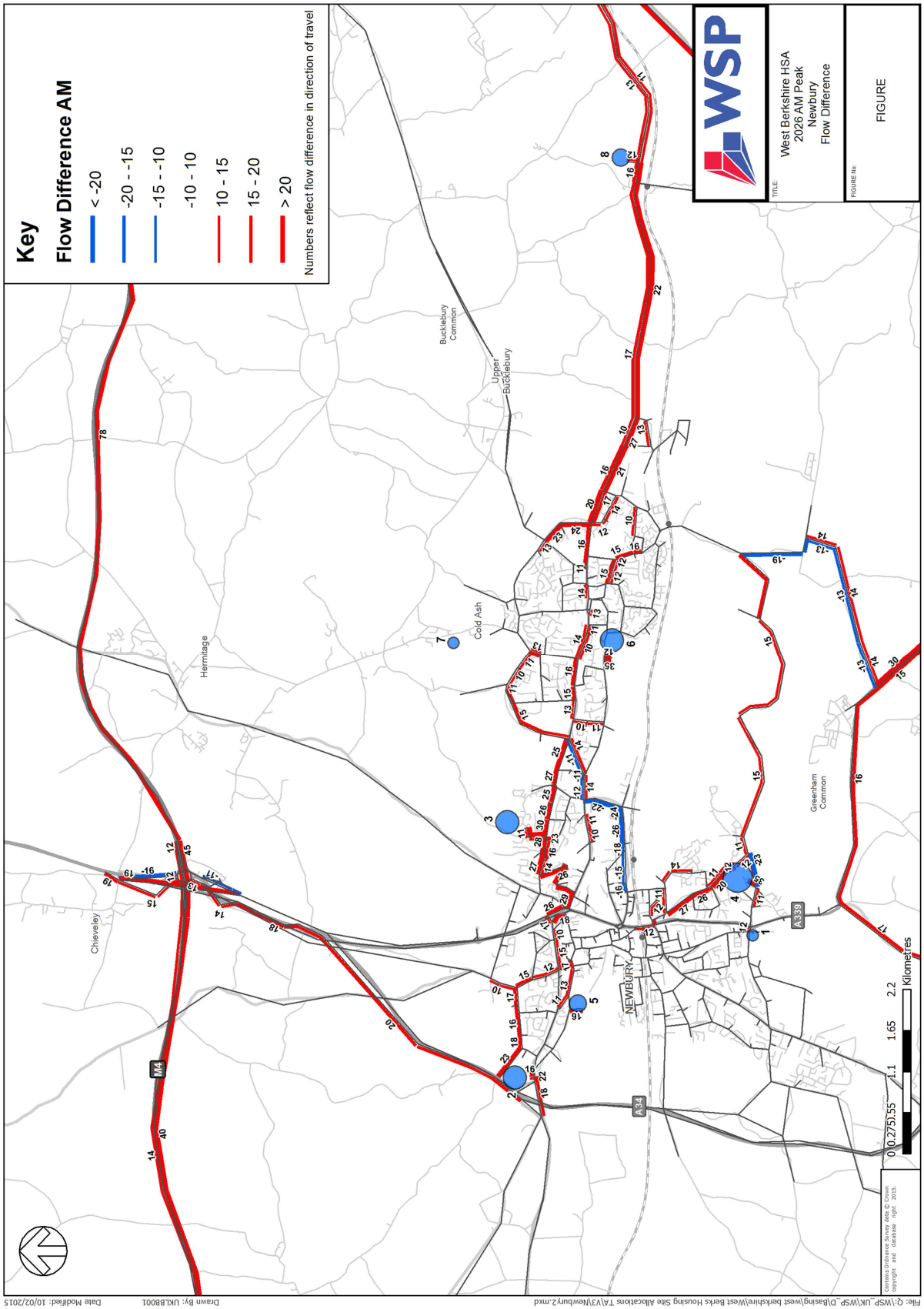

Figure 5.1 2026 traffic flow difference between Scenario 2 and Scenario 1 – AM peak

Junction performance

5.1.4 The junction performance assessment highlights junctions that are predicted to operate above 85% capacity. It should be noted that this assessment is based on a strategic model, which has not been validated at every single junction. It should be noted that the junction operation assessment undertaken as part of this study intends to provide a high level assessment and further junction assessment using more localised modelling and specialised software (LinSig, Arcady, Picady) may be required.

5.1.5 To present the junction performance assessment results, the worst performing junction turning movements in terms of the Volume over Capacity (VoC) statistics were selected for every single junction and compared between Scenario 1 (without HSA sites) and Scenario 2 (with HSA sites) undertaken. Figure 5.2 shows an example of VoC information for each turning movement at a roundabout.

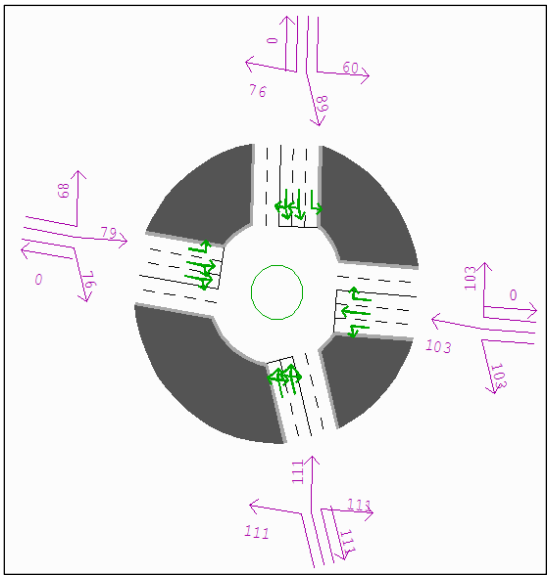

Figure 5.2 Example of VoC on individual turns

5.1.6 In general a VoC value of 85% and below indicates that a junction operates within capacity and with spare capacity. A VoC value of between 85% and 100% means that a junction operates within, but approaching, capacity with signs of queuing and delays whereas a VoC value of 100% and above indicates that the junction operates above capacity, resulting in queues and delays.

5.1.7 Figure 5.3 illustrate the junctions which are forecast to operate at 85% capacity or above in Scenario 1 and Scenario 2 respectively. Junctions that are predicted to operate under 85% capacity are excluded from the assessment.

5.1.8 The effect of adding additional trips associated with HSA sites on the overall junction performance is minimal with the majority of junctions remaining in the same category in both scenarios. Overall, the absolute changes in VoC statistics between the two scenarios are not extensive.

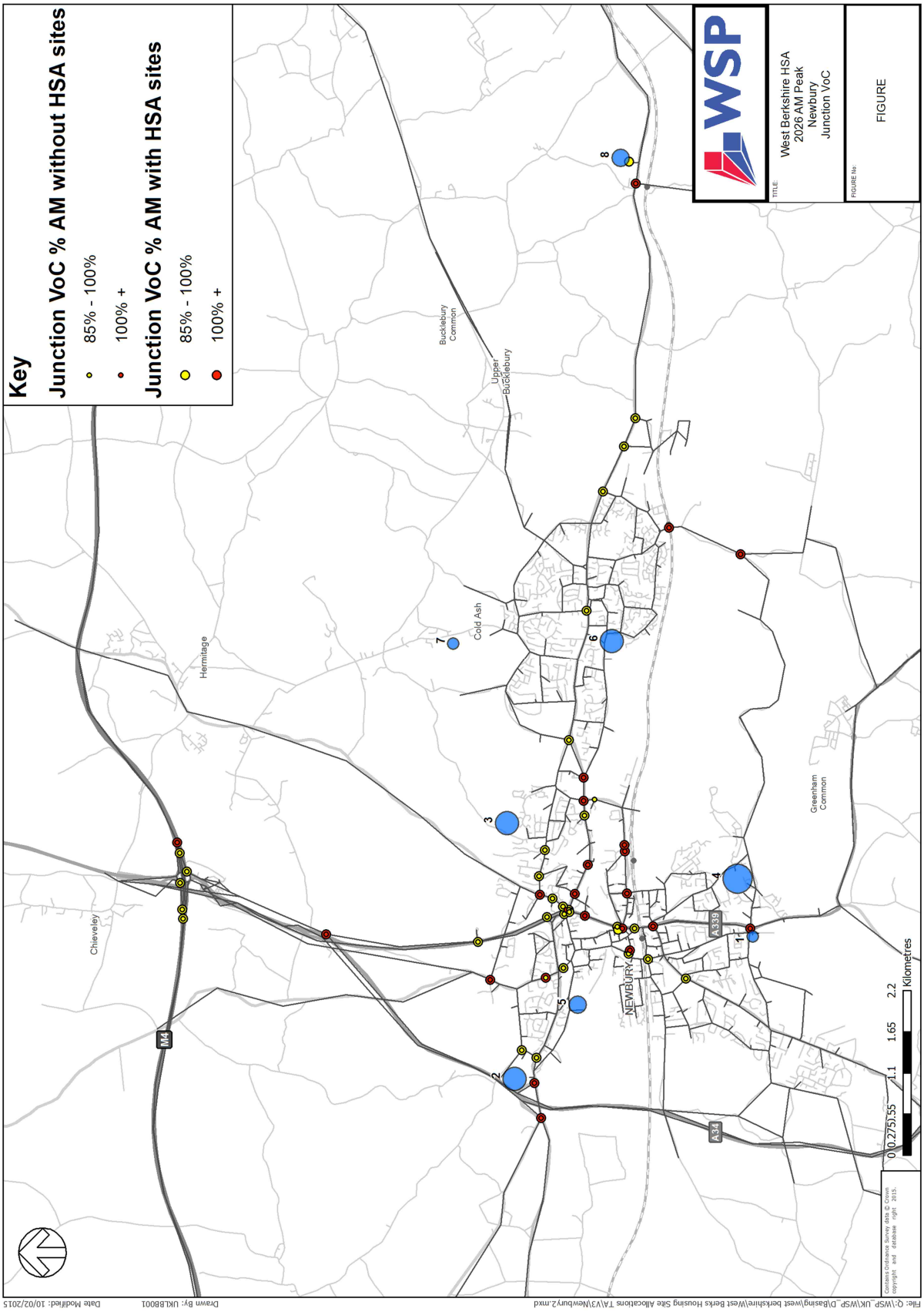

Figure 5.3 2026 junction VoC difference between Scenario 2 and Scenario 1 – AM peak

Link performance

5.1.9 The link performance assessment highlights those links that are predicted to operate above 85% capacity. It should be noted that this assessment is based on a strategic model, which has not been validated at every single link.

5.1.10 To present the junction performance assessment results, the worst performing links of the Volume over Capacity (VoC) statistics were selected and compared between Scenario 1 (without HSA sites) and Scenario 2 (with HSA sites). In general a VoC value of 85% and below indicates that a link operates within capacity and with spare capacity. A VoC value of between 85% and 100% means that a link operates within, but approaching, capacity with signs of queuing and delays whereas a VoC value of 100% and above indicates that the link operates above capacity, resulting in queues and delays.

5.1.11 Figure 5.4 and figure 5.5 illustrate the links which are forecast to operate at 85% capacity or above in Scenario 1 and Scenario 2 in the Newbury area. Those links that are predicted to operate under 85% capacity are excluded from the assessment. There are minor increases in the link VoC on the A339 through Newbury and on the A4 Bath Road between the A4 Bath Road/Piper Way junction and the A4 Bath Road/A340 junction when the development is included. These are only small increases and are already over-capacity without the HSA developments.

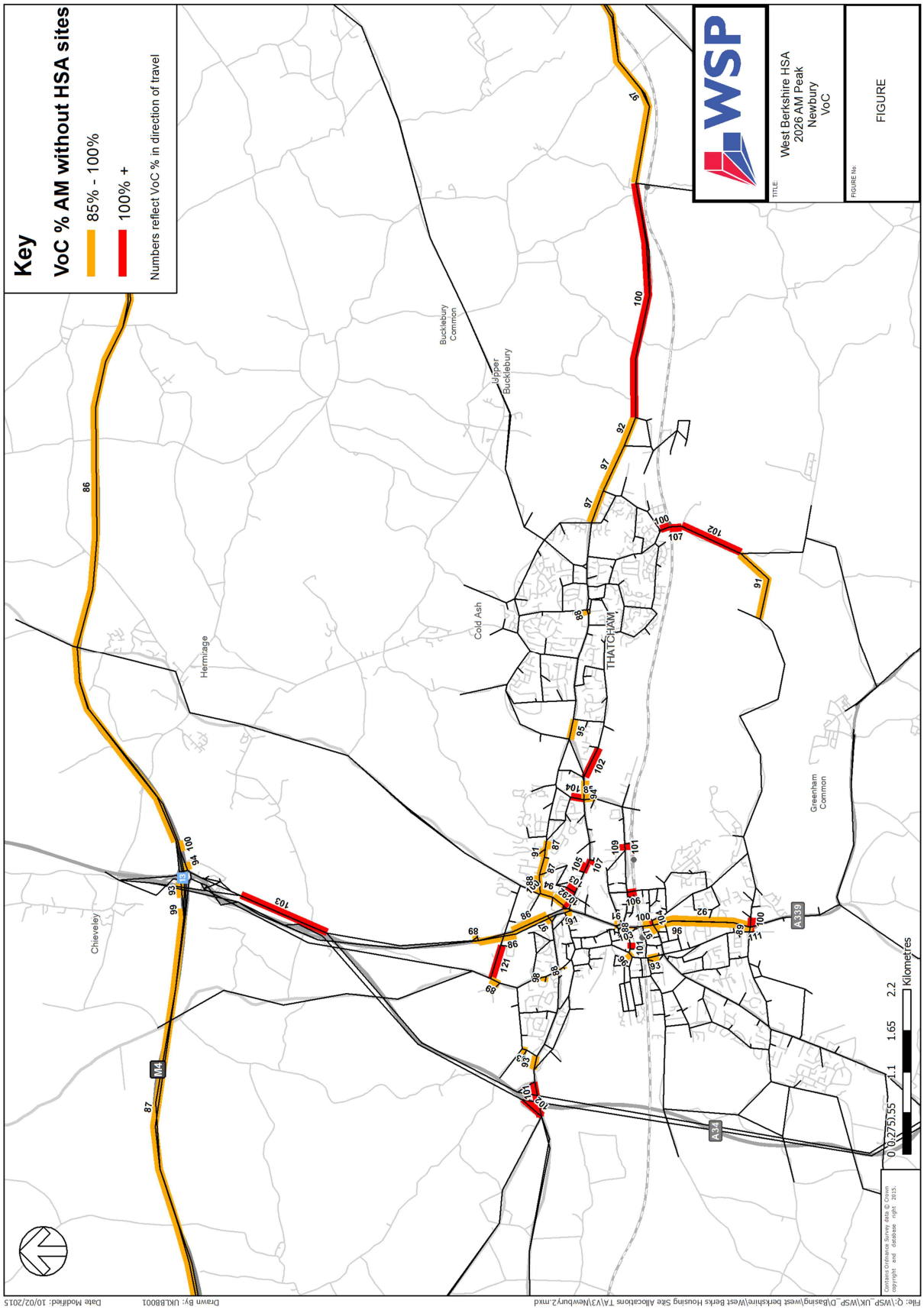

Figure 5.4 2026 link VoC for Scenario 1 – AM peak

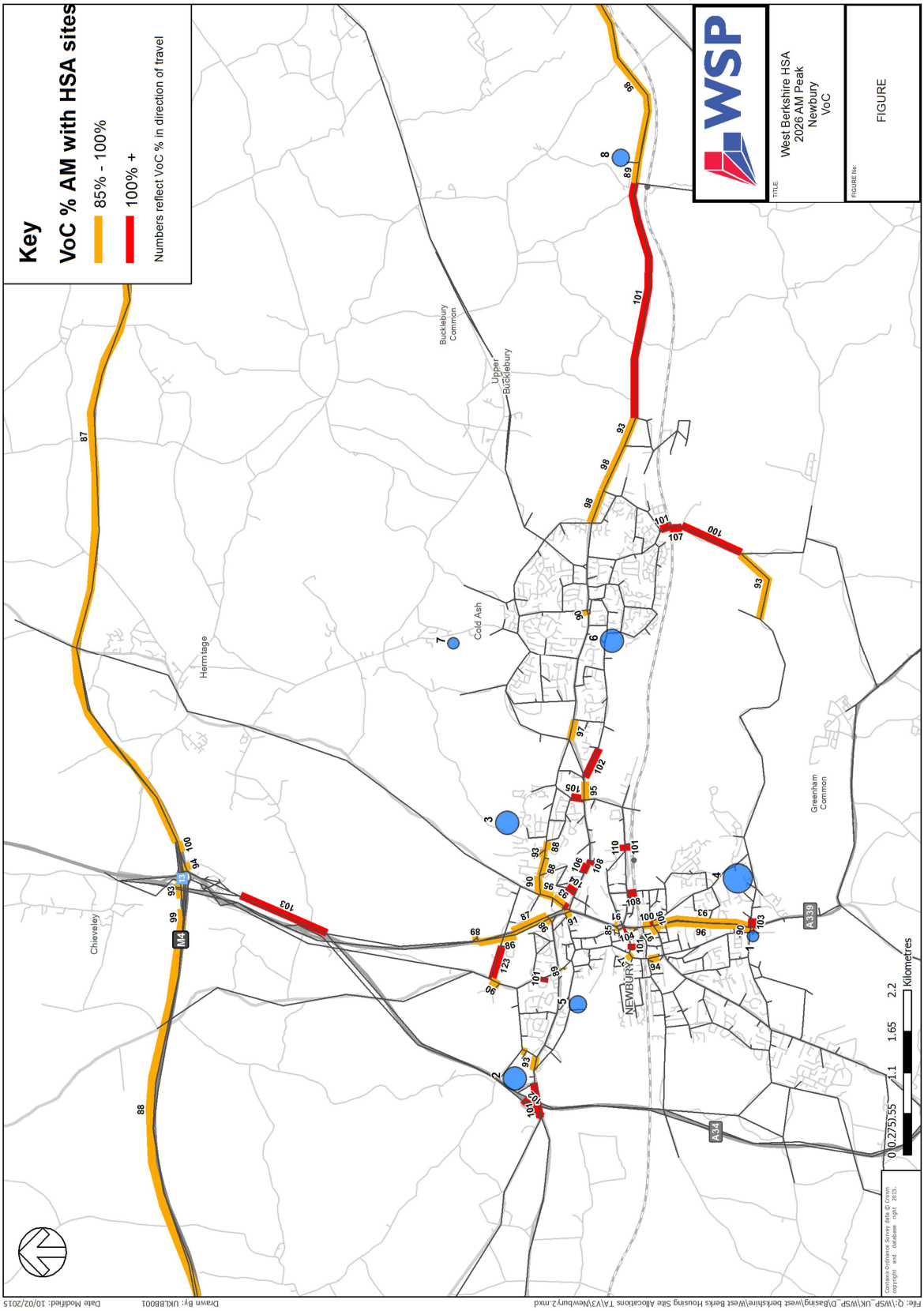

Figure 5.5 2026 link VoC for Scenario 2 – AM peak

5.2 PM peak (17:00-18:00)

2026 traffic flows

5.2.1 Figure 5.6 show the impact of HSA sites on flow levels by presenting the absolute difference in flows on key links between the Scenario 1 and Scenario 2 for the PM peak. The difference in flows is shown in passenger car units (pcu). The red bands represent an increase in traffic in Scenario 2 (with HSA sites) when compared to Scenario 1 whilst the blue bands indicate a decrease in traffic.

5.2.2 The additional trips due to the HSA are spread across the district's transport network rather than concentrated at one location which echoes the dispersed nature of the HSA site locations.

5.2.3 The increase in the directional flow on the majority of the roads is not predicted to exceed 60 pcu. There is a decrease on the A339 in the southbound direction due to traffic switching onto alternative routes such as the A34.

5.2.4 There is a localised switch of traffic from the B4494 Oxford Road approach to the A4 Bath Road/B4494 junction onto Castle Grove. This is due to reduction in the delay at the Dolman Road/A4 Bath Road junction. It must be stressed that this is a traffic modelling exercise and is unlikely to occur in reality given the nature of Castle Grove and the flows are relatively low in any case.

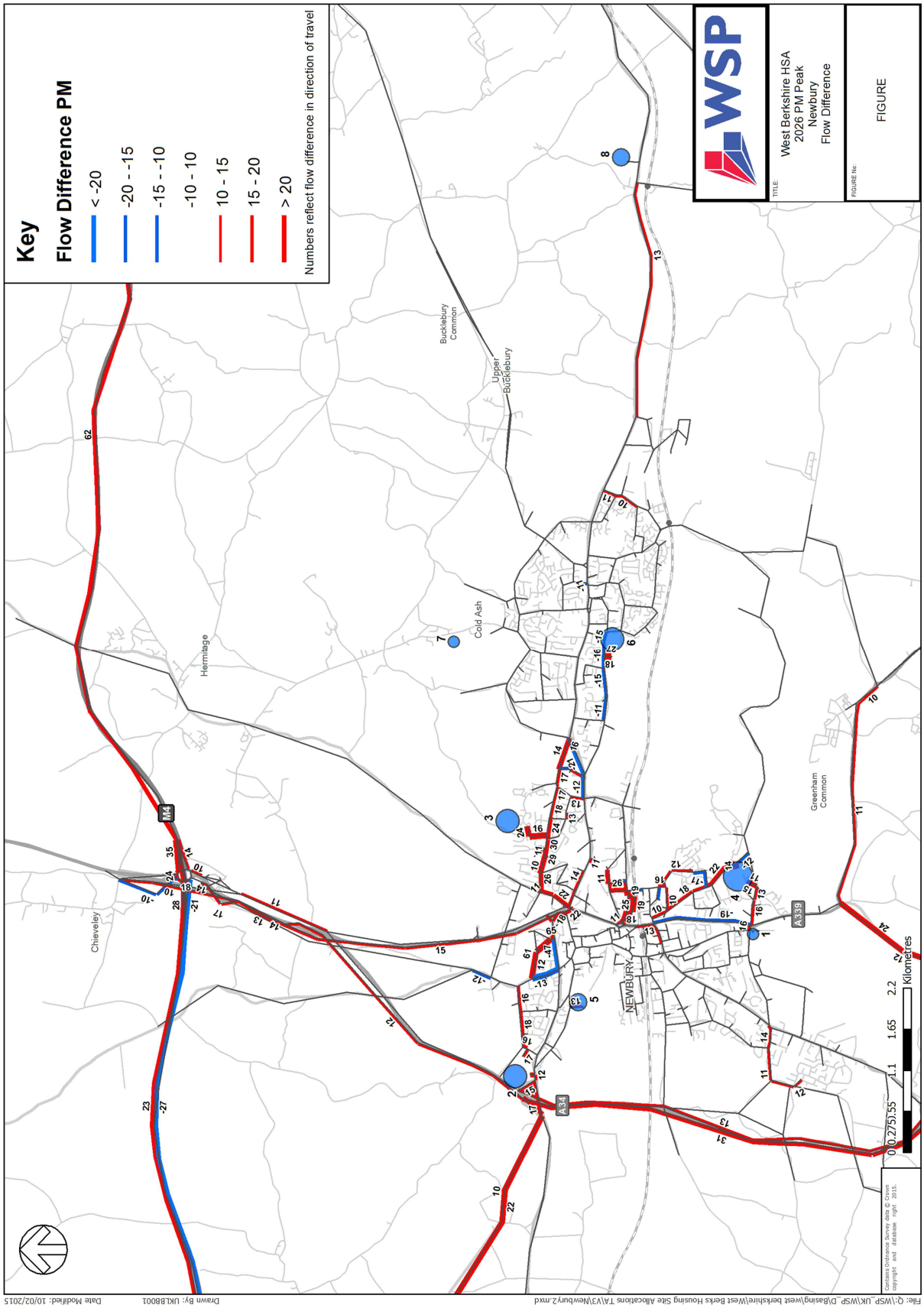

Figure 5.6 2026 traffic flow difference between Scenario 2 and Scenario 1 – PM peak

Junction performance

5.2.5 The junction performance assessment highlights junctions that are predicted to operate above 85% capacity. It should be noted that this assessment is based on a strategic model, which has not been validated at every single junction. It should be noted that the junction operation assessment undertaken as part of this study intends to provide a high level assessment and further junction assessment using more localised modelling and specialised software (LinSig, Arcady, Picady) may be required.

5.2.6 To present the junction performance assessment results, the worst performing junction turning movements in terms of the Volume over Capacity (VoC) statistics were selected for every single junction and compared between Scenario 1 (without HSA sites) and Scenario 2 (with HSA sites) undertaken.

5.2.7 In general a VoC value of 85% and below indicates that a junction operates within capacity and with spare capacity. A VoC value of between 85% and 100% means that a junction operates within, but approaching, capacity with signs of queuing and delays whereas a VoC value of 100% and above indicates that the junction operates above capacity, resulting in queues and delays.

5.2.8 Figure 5.7 illustrates the junctions which are forecast to operate at 85% capacity or above in Scenario 1 and Scenario 2 respectively. Junctions that are predicted to operate under 85% capacity are excluded from the assessment.

5.2.9 The effect of adding additional trips associated with HSA sites on the overall junction performance is minimal with the majority of junctions remaining in the same category in both scenarios. The most noticeable changes in junction performance are predicted to be in areas with the highest flow differences as described in the 2026 traffic flows section.

5.2.10 Overall, the absolute changes in VoC statistics between the two scenarios are not extensive. Within the centre of Newbury there are no significant changes in the VoC values with those junction turning movements showing a VoC greater than 85% still showing VoC values greater than 85%.

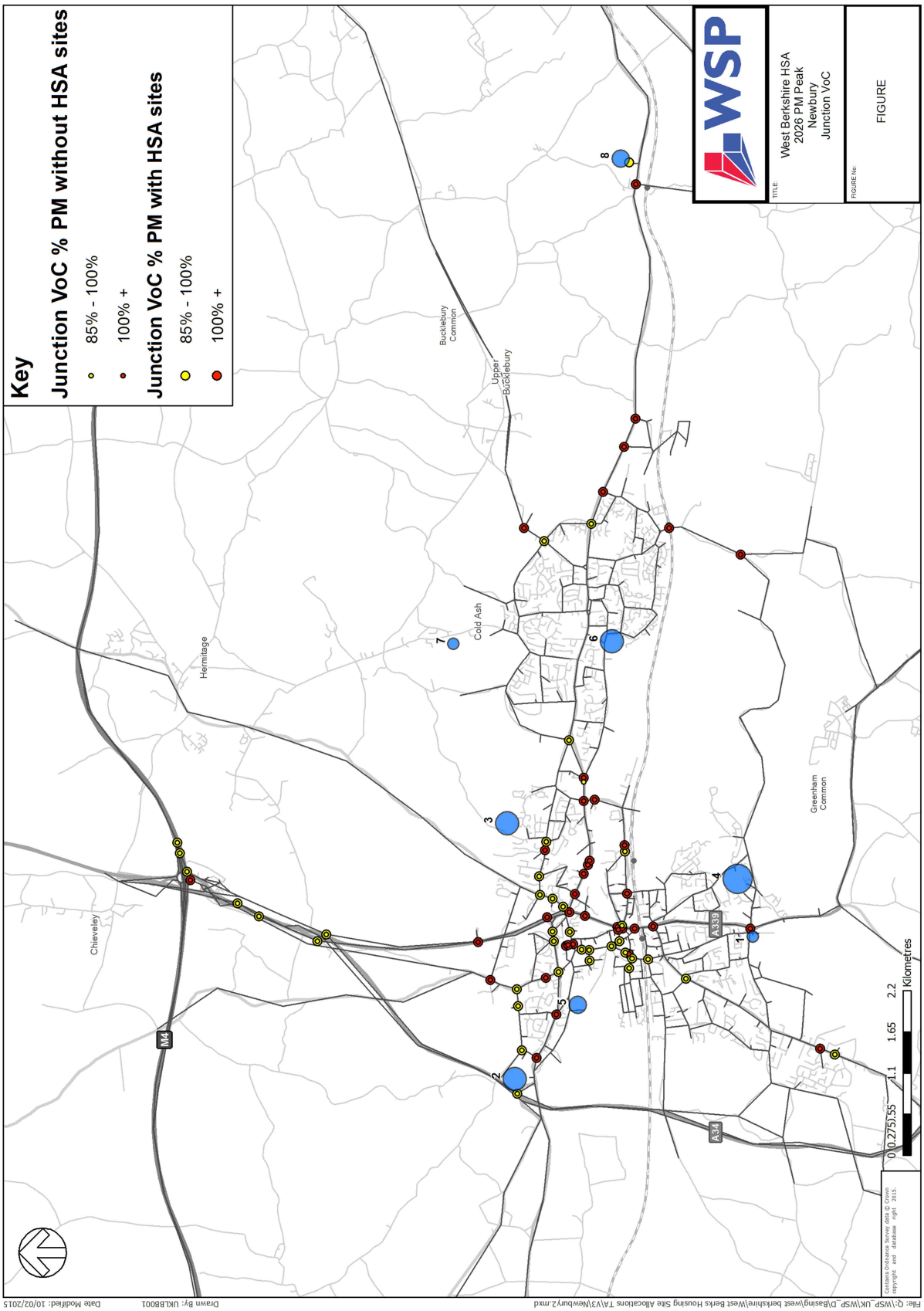

Figure 5.7 2026 junction VoC difference between Scenario 2 and Scenario 1 – PM peak

Link performance

5.2.11 The link performance assessment highlights those links that are predicted to operate above 85% capacity. It should be noted that this assessment is based on a strategic model, which has not been validated at every single link.

5.2.12 To present the junction performance assessment results, the worst performing links of the Volume over Capacity (VoC) statistics were selected and compared between Scenario 1 (without HSA sites) and Scenario 2 (with HSA sites). In general a VoC value of 85% and below indicates that a link operates within capacity and with spare capacity. A VoC value of between 85% and 100% means that a link operates within, but approaching, capacity with signs of queuing and delays whereas a VoC value of 100% and above indicates that the link operates above capacity, resulting in queues and delays.

5.2.13 Figure 5.8 and figure 5.9 illustrate the links which are forecast to operate at 85% capacity or above in Scenario 1 and Scenario 2 in the Newbury area for the PM peak. Those links that are predicted to operate under 85% capacity are excluded from the assessment.

5.2.14 There are increases in the link VoC on the A339 through Newbury and on the A4 Bath Road between the A4 Bath Road/Piper Way junction and the A4 Bath Road/A340 junction when the development is included. These are only small increases and are already over-capacity without the HSA developments.

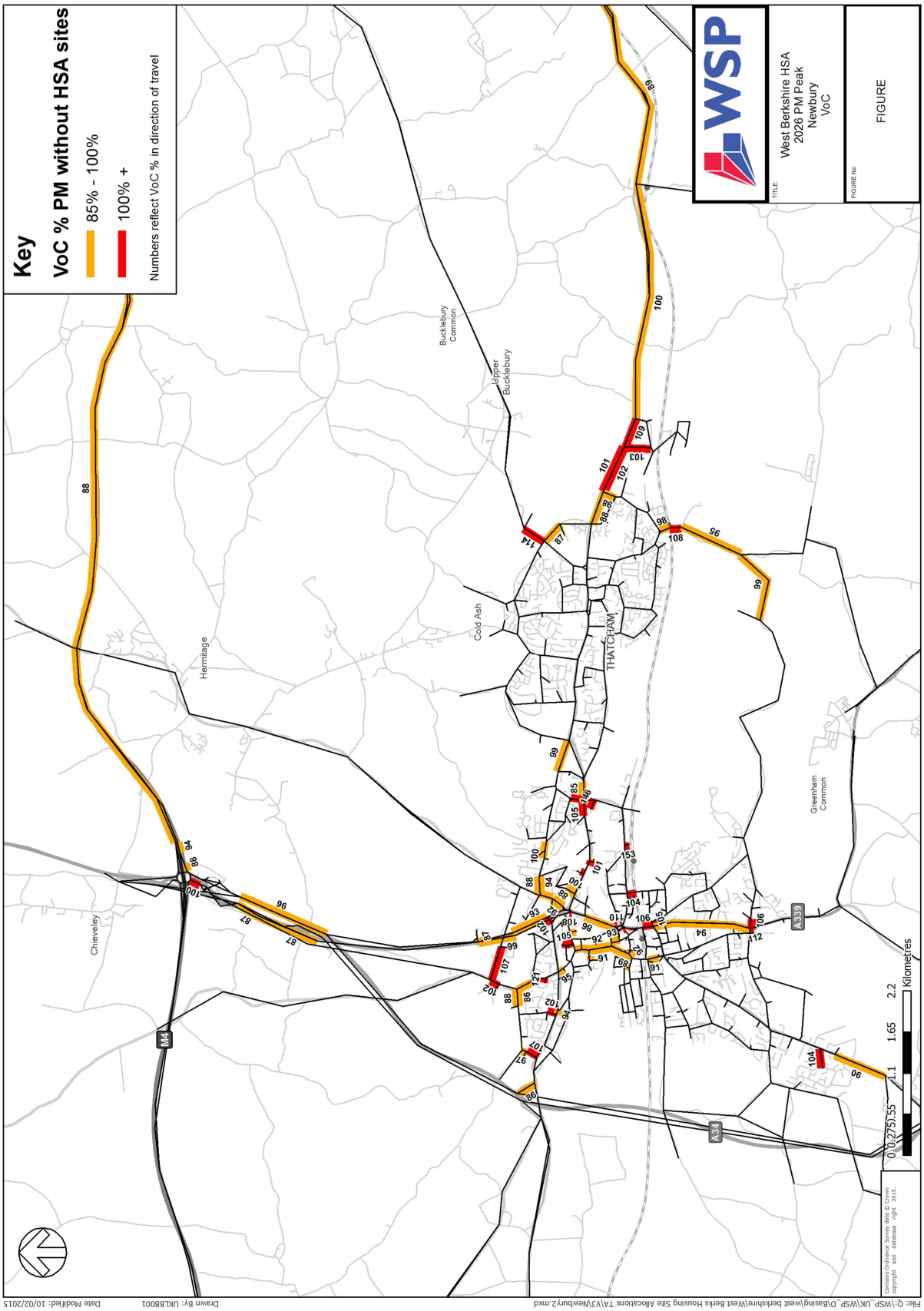

Figure 5.8 2026 link VoC for Scenario 1 – PM peak

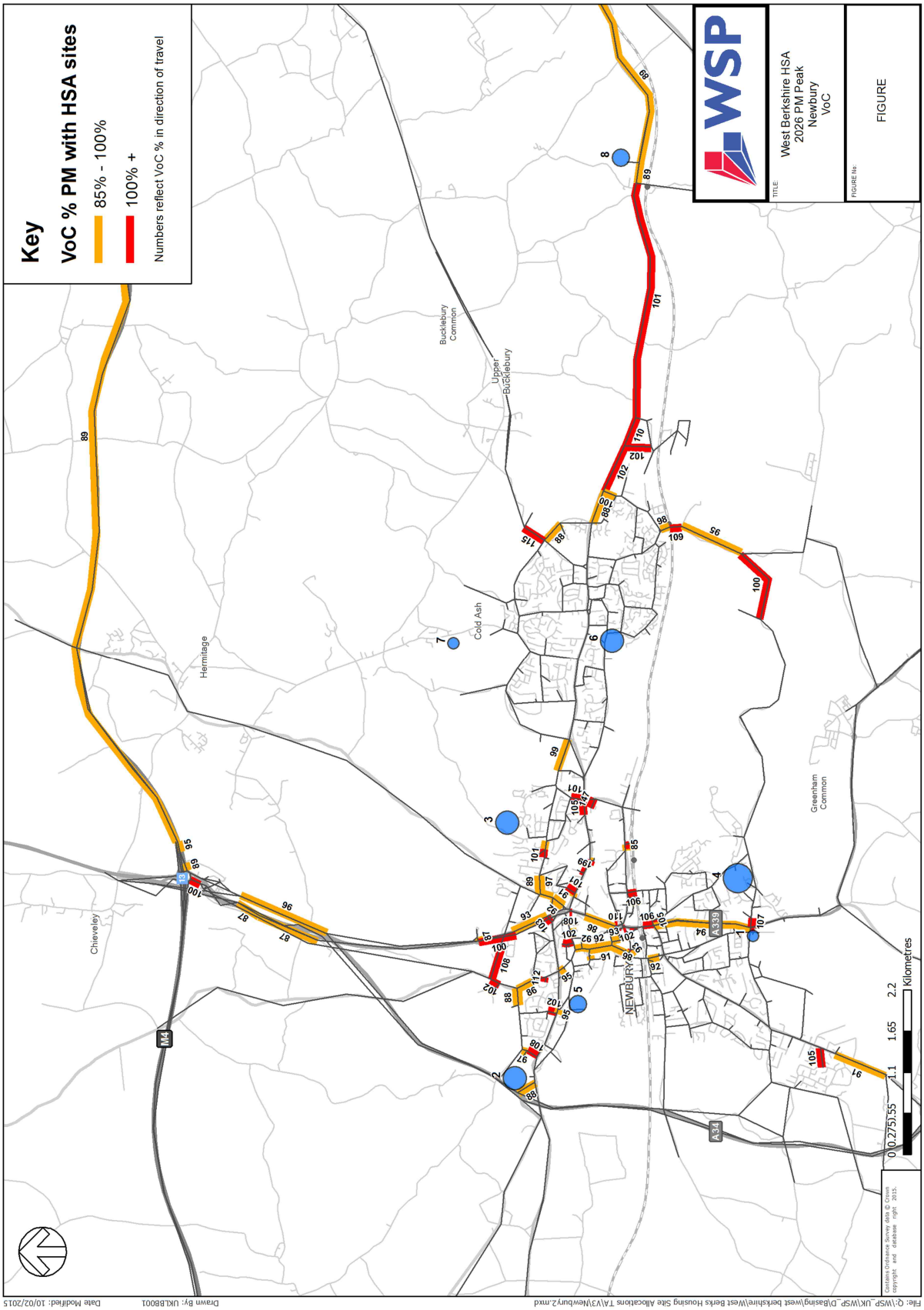

Figure 5.9 2026 link VoC for Scenario 2 – PM peak

6 Theale – Site 9 to Site 12 (All sites)

6.1 AM peak (08:00-09:00)

2026 traffic flows

6.1.1 Figure 6.1 show the impact of HSA sites on flow levels by presenting the absolute difference in flows on key links between the Scenario 1 and Scenario 2 for the AM peak. The difference in flows is shown in passenger car units (pcu) and any difference less than 10 pcu is not shown. The red bands represent an increase in traffic in Scenario 2 (with HSA sites) when compared to Scenario 1 whilst the blue bands indicate a decrease in traffic.

6.1.2 The additional trips due to the HSA are based on the worst case scenario as all four HSA developments in the Theale area have been included.

6.1.3 The highest flow increase in the district occurs in the Theale area as shown on figure 6.1 where due to the concentration of the four HSA developments increases of up to 80 pcu are seen on the approach to the M4 Junction 12.

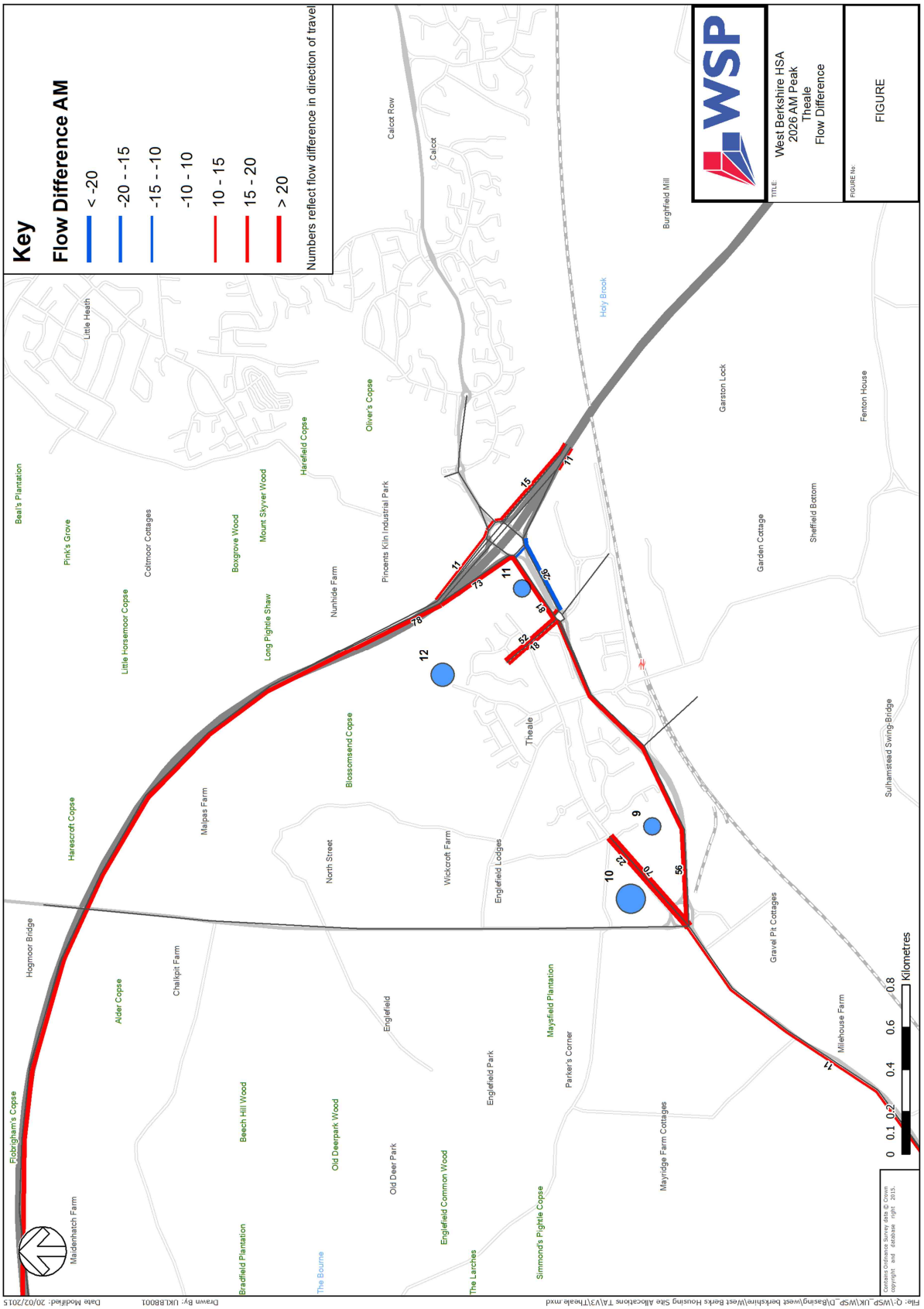

Figure 6.1 2026 traffic flow difference between Scenario 2 and Scenario 1 – AM peak

Junction performance

6.1.4 The junction performance assessment highlights junctions that are predicted to operate above 85% capacity. It should be noted that this assessment is based on a strategic model, which has not been validated at every single junction. It should be noted that the junction operation assessment undertaken as part of this study intends to provide a high level assessment and further junction assessment using more localised modelling and specialised software (LinSig, Arcady, Picady) may be required.

6.1.5 To present the junction performance assessment results, the worst performing junction turning movements in terms of the Volume over Capacity (VoC) statistics were selected for every single junction and compared between Scenario 1 (without HSA sites) and Scenario 2 (with HSA sites) undertaken.

6.1.6 In general a VoC value of 85% and below indicates that a junction operates within capacity and with spare capacity. A VoC value of between 85% and 100% means that a junction operates within, but approaching, capacity with signs of queuing and delays whereas a VoC value of 100% and above indicates that the junction operates above capacity, resulting in queues and delays.

6.1.7 Figure 6.2 illustrate the junctions which are forecast to operate at 85% capacity or above in Scenario 1 and Scenario 2 respectively. Junctions that are predicted to operate under 85% capacity are excluded from the assessment.

6.1.8 The effect of adding additional trips associated with HSA sites on the overall junction performance is minimal with the majority of junctions remaining in the same category in both scenarios.

6.1.9 Overall, the absolute changes in VoC statistics between the two scenarios are not extensive. There is blocking back on the circulatory arm of the M4 Junction 12 which accounts for the increase in the VoC shown on figure 6.2 however adjustments to the signal timings at the junction could be made which would potentially remove this. The Theale area shows an increase in the VoC from 82% to 86% on the A4 Bath Road eastbound approach to the A4 Bath Road/Arlington Business Park roundabout as shown on figure 6.2.

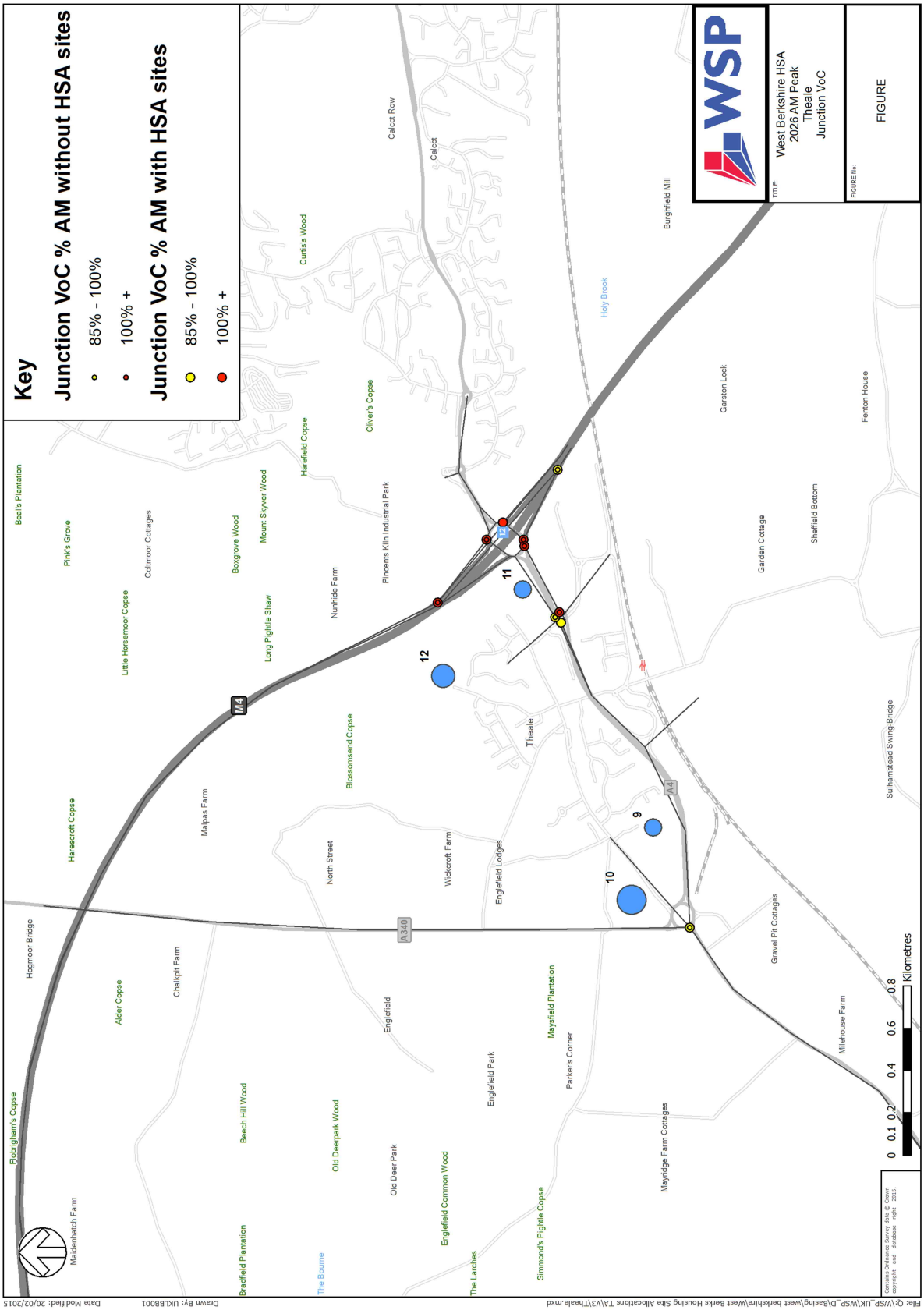

Figure 6.2 2026 junction VoC difference between Scenario 2 and Scenario 1 – AM peak

Link performance

6.1.10 The link performance assessment highlights those links that are predicted to operate above 85% capacity. It should be noted that this assessment is based on a strategic model, which has not been validated at every single link.

6.1.11 To present the junction performance assessment results, the worst performing links of the Volume over Capacity (VoC) statistics were selected and compared between Scenario 1 (without HSA sites) and Scenario 2 (with HSA sites). In general a VoC value of 85% and below indicates that a link operates within capacity and with spare capacity. A VoC value of between 85% and 100% means that a link operates within, but approaching, capacity with signs of queuing and delays whereas a VoC value of 100% and above indicates that the link operates above capacity, resulting in queues and delays.

6.1.12 Figure 6.3 and figure 6.4 illustrate the links which are forecast to operate at 85% capacity or above in Scenario 1 and Scenario 2 in the Theale area for the AM peak. Those links that are predicted to operate under 85% capacity are excluded from the assessment. These are minor increases and the links that are shown to be over-capacity are already over-capacity without the HSA developments.

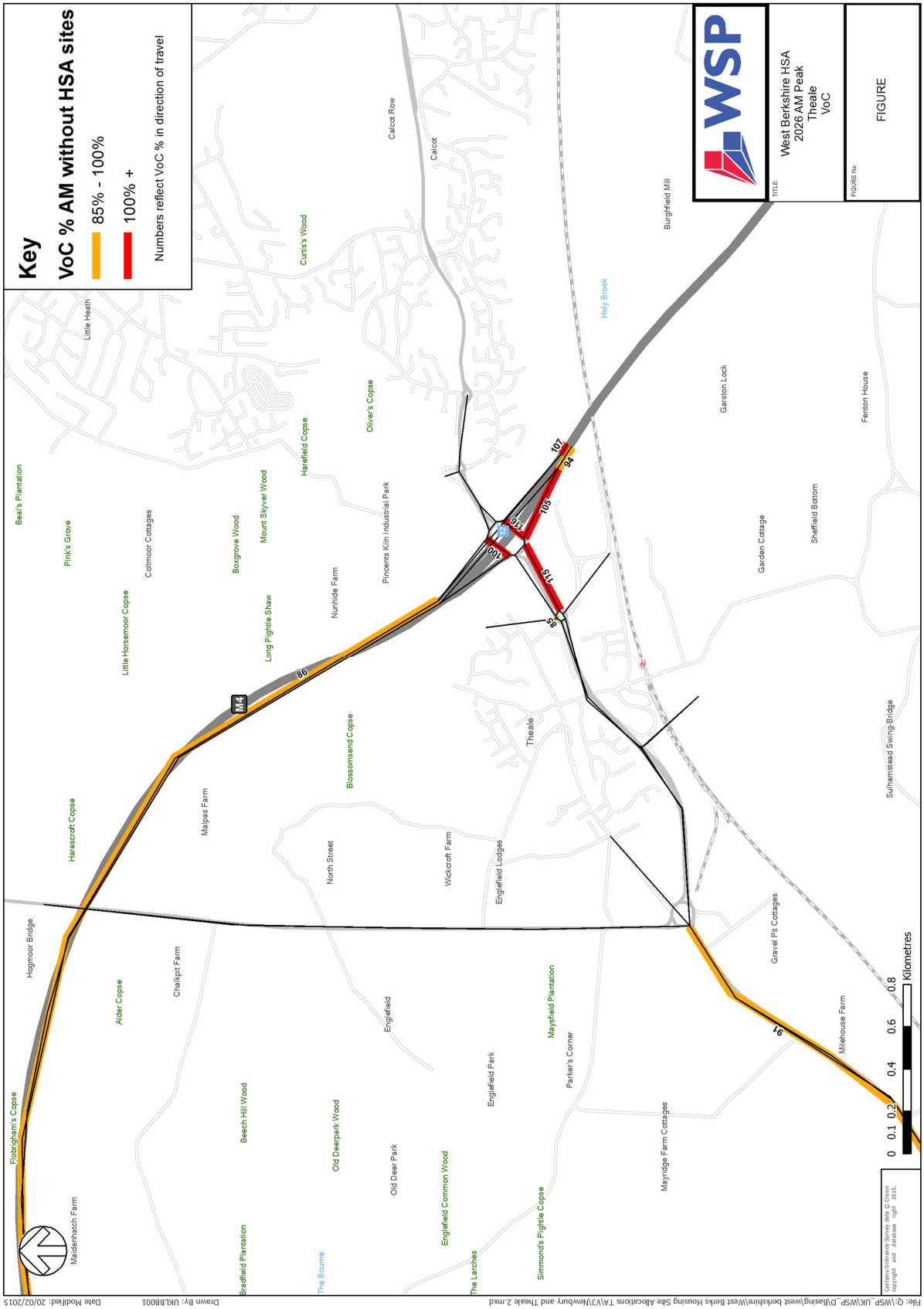

Figure 6.3 2026 link VoC for Scenario 1 – AM peak

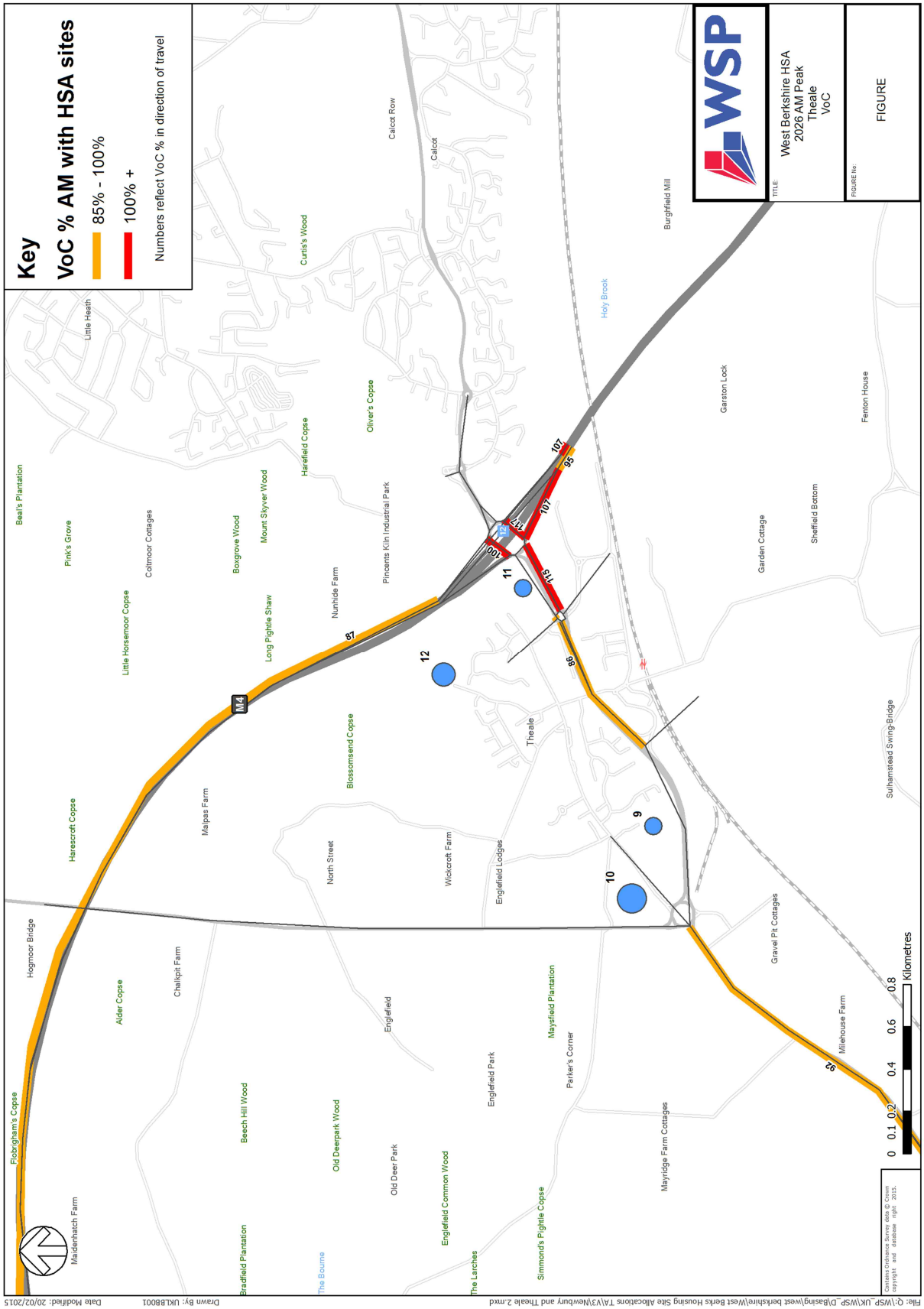

Figure 6.4 2026 link VoC for Scenario 2 – AM peak

6.2 PM peak (17:00-18:00)

2026 traffic flows

6.2.1 Figure 6.5 show the impact of HSA sites on flow levels by presenting the absolute difference in flows on key links between the Scenario 1 and Scenario 2 for the PM peak. The difference in flows is shown in passenger car units (pcu). The red bands represent an increase in traffic in Scenario 2 (with HSA sites) when compared to Scenario 1 whilst the blue bands indicate a decrease in traffic.

6.2.2 The increase in the directional flow on the majority of the roads is not predicted to exceed 60 pcu. Due to the concentration of four HSA development sites in a relatively small area Theale is likely to see the biggest increase in flow as shown on figure 6.5.

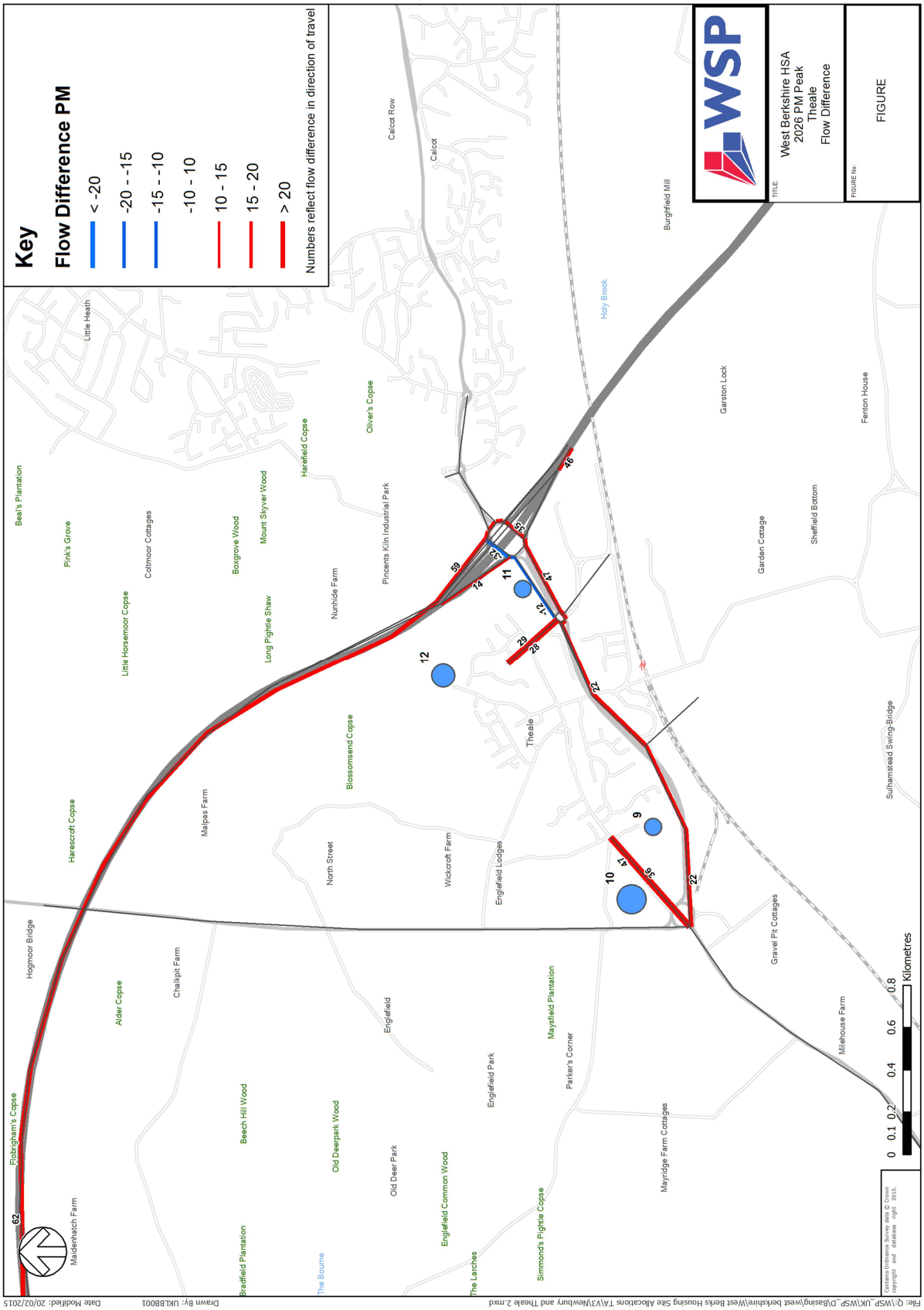

Figure 6.5 2026 traffic flow difference between Scenario 2 and Scenario 1 – PM peak

Junction performance

6.2.3 The junction performance assessment highlights junctions that are predicted to operate above 85% capacity. It should be noted that this assessment is based on a strategic model, which has not been validated at every single junction. It should be noted that the junction operation assessment undertaken as part of this study intends to provide a high level assessment and a further junction assessment using more localised modelling and specialised software (LinSig, Arcady, Picady) may be required.

6.2.4 To present the junction performance assessment results, the worst performing junction turning movements in terms of the Volume over Capacity (VoC) statistics were selected for every single junction and compared between Scenario 1 (without HSA sites) and Scenario 2 (with HSA sites) undertaken.

6.2.5 In general a VoC value of 85% and below indicates that a junction operates within capacity and with spare capacity. A VoC value of between 85% and 100% means that a junction operates within, but approaching, capacity with signs of queuing and delays whereas a VoC value of 100% and above indicates that the junction operates above capacity, resulting in queues and delays.

6.2.6 Figure 6.6 illustrate the junctions which are forecast to operate at 85% capacity or above in Scenario 1 and Scenario 2 respectively. Junctions that are predicted to operate under 85% capacity are excluded from the assessment.

6.2.7 The effect of adding additional trips associated with HSA sites on the overall junction performance is minimal with the majority of junctions remaining in the same category in both scenarios. The most noticeable changes in junction performance are predicted to be in areas with the highest flow differences as described in the 2026 traffic flows section.

6.2.8 Overall, the absolute changes in VoC statistics between the two scenarios are not extensive. The Theale area shows an increase in the VoC from 84% to 86% on the A4 Bath Road westbound approach to the A4 Bath Road/Arlington Business Park roundabout.

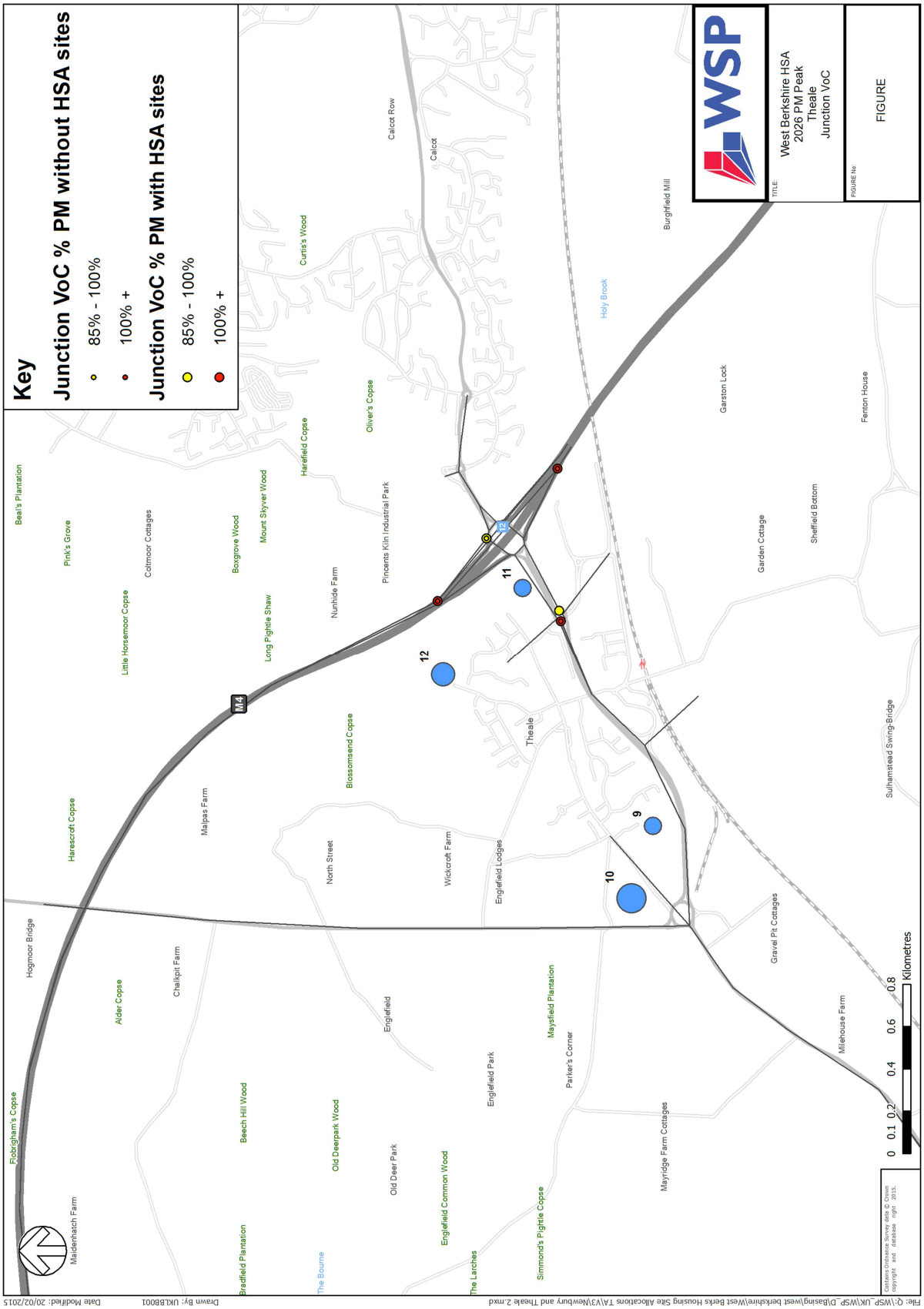

Figure 6.6 2026 junction VoC difference between Scenario 2 and Scenario 1 – PM peak

Link performance

6.2.9 The link performance assessment highlights those links that are predicted to operate above 85% capacity. It should be noted that this assessment is based on a strategic model, which has not been validated at every single link.

6.2.10 To present the junction performance assessment results, the worst performing links of the Volume over Capacity (VoC) statistics were selected and compared between Scenario 1 (without HSA sites) and Scenario 2 (with HSA sites). In general a VoC value of 85% and below indicates that a link operates within capacity and with spare capacity. A VoC value of between 85% and 100% means that a link operates within, but approaching, capacity with signs of queuing and delays whereas a VoC value of 100% and above indicates that the link operates above capacity, resulting in queues and delays.

6.2.11 Figure 6.7 and figure 6.8 illustrate the links which are forecast to operate at 85% capacity or above in Scenario 1 and Scenario 2 in the Theale area for the PM peak. Those links that are predicted to operate under 85% capacity are excluded from the assessment.

6.2.12 The Theale area shows an increase in the VoC from 84% to 86% on the A4 Bath Road westbound approach to the A4 Bath Road/Arlington Business Park roundabout. There is an increase in the VoC from 121% to 126% on the A4 Bath Road eastbound approach to the A4 Bath Road/Arlington Business Park roundabout. This is due to increased right-turning traffic into Hoad Way to access HSA site 11 and site 12.

6.2.13 These are minor increases and the links that are shown to be over-capacity are already over-capacity without the HSA developments.

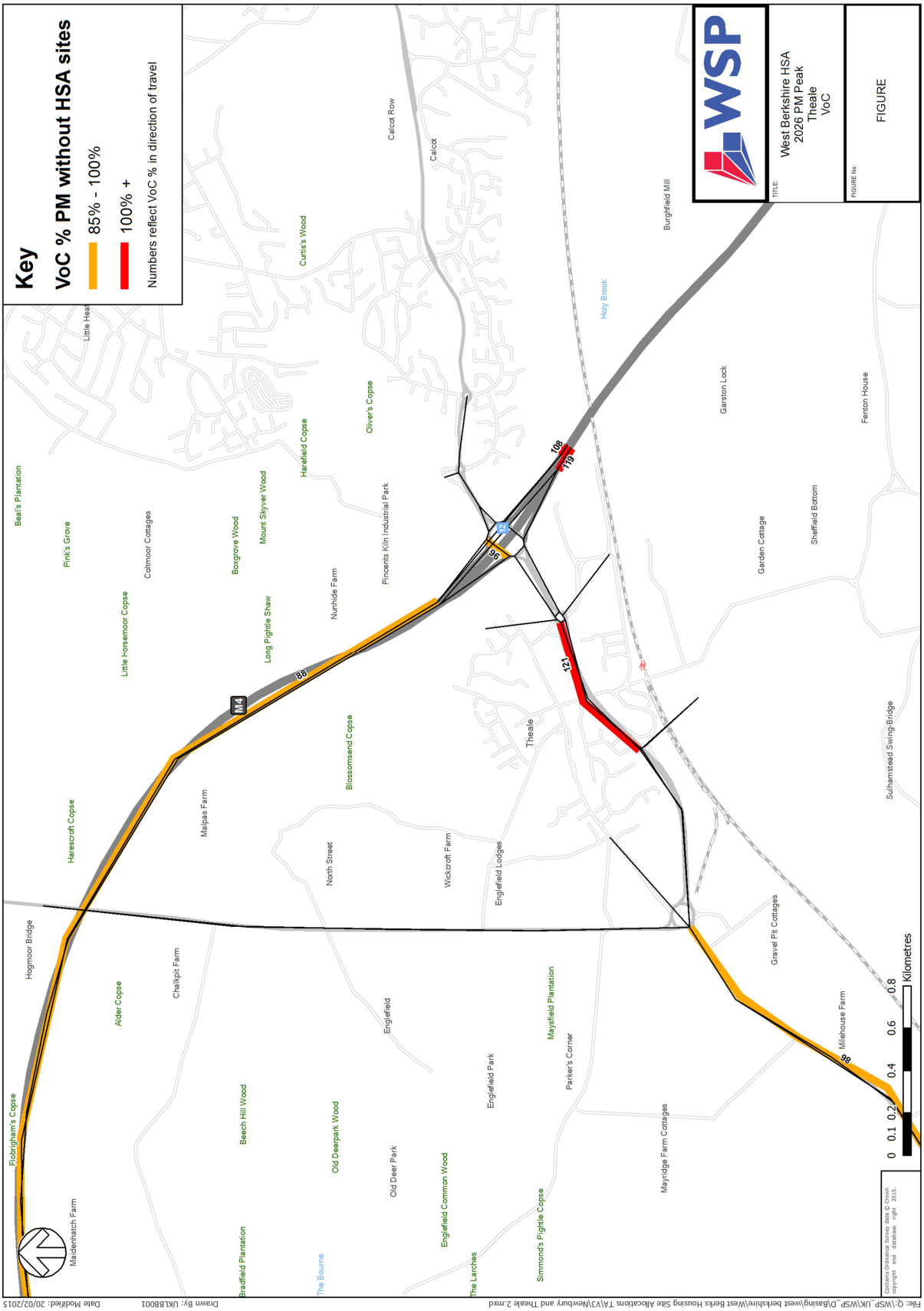

Figure 6.7 2026 link VoC for Scenario 1 – PM peak

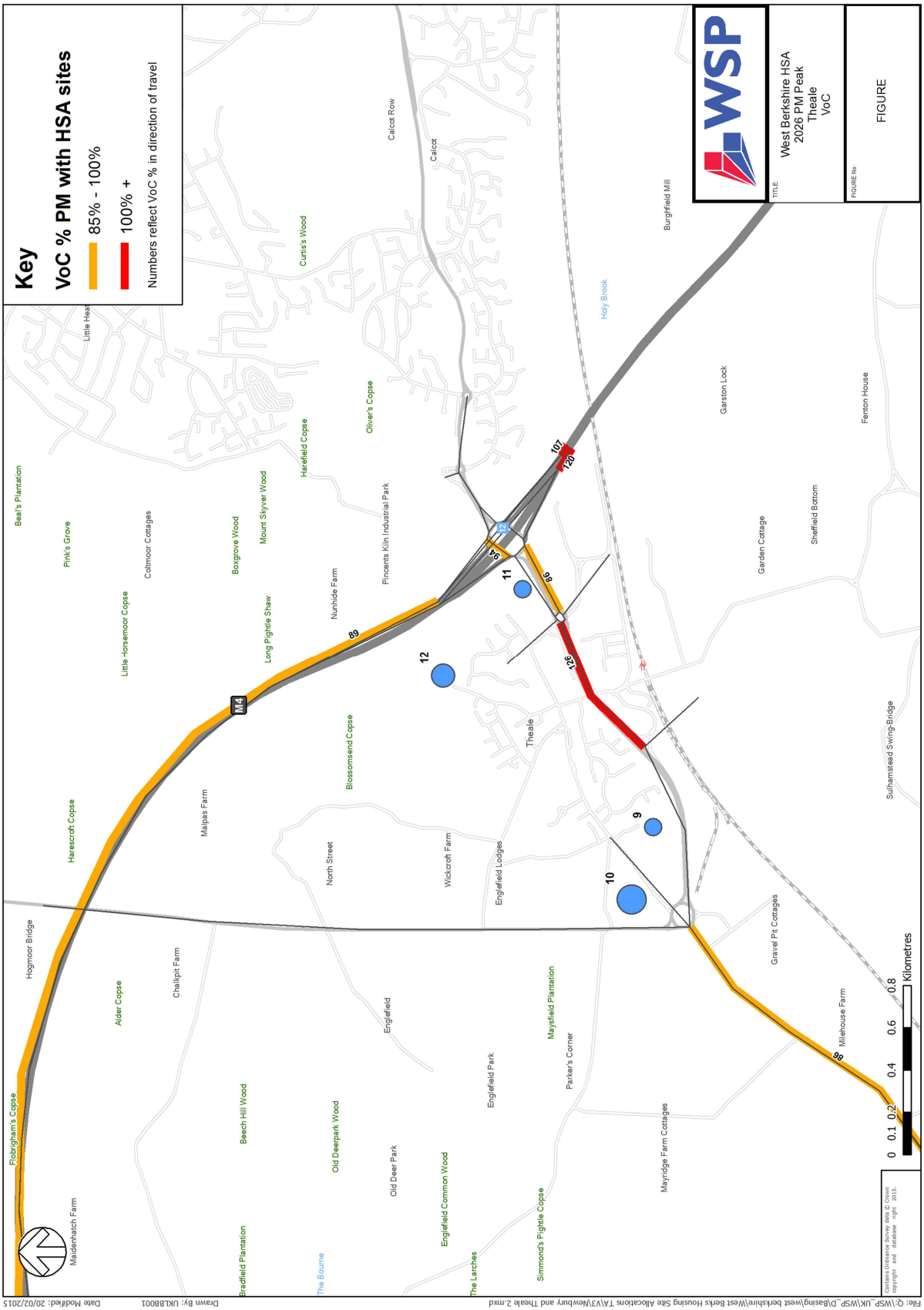

Figure 6.8 2026 link VoC for Scenario 2 – PM peak

7 Scenario 3: Theale – Site 9 and Site 10 (Western sites)

7.1 AM peak (08:00-09:00)

2026 traffic flows

7.1.1 Figure 7.1 show the impact of HSA site 9 and site 10 on flow levels by presenting the absolute difference in flows on key links between the Scenario 1 and Scenario 3 for the AM peak. The difference in flows is shown in passenger car units (pcu) and any difference less than 10 pcu is not shown. The red bands represent an increase in traffic in Scenario 3 (with HSA site 9 and site 10) when compared to Scenario 1 whilst the blue bands indicate a decrease in traffic.

7.1.2 There are flow increases of up to 70 pcu with the addition of HSA site 9 and site 10 which are accessed from The Green at the A340 /A4 Bath Road roundabout. There are increases in flow of up to 60 pcu on the eastbound approach to the M4 Junction.

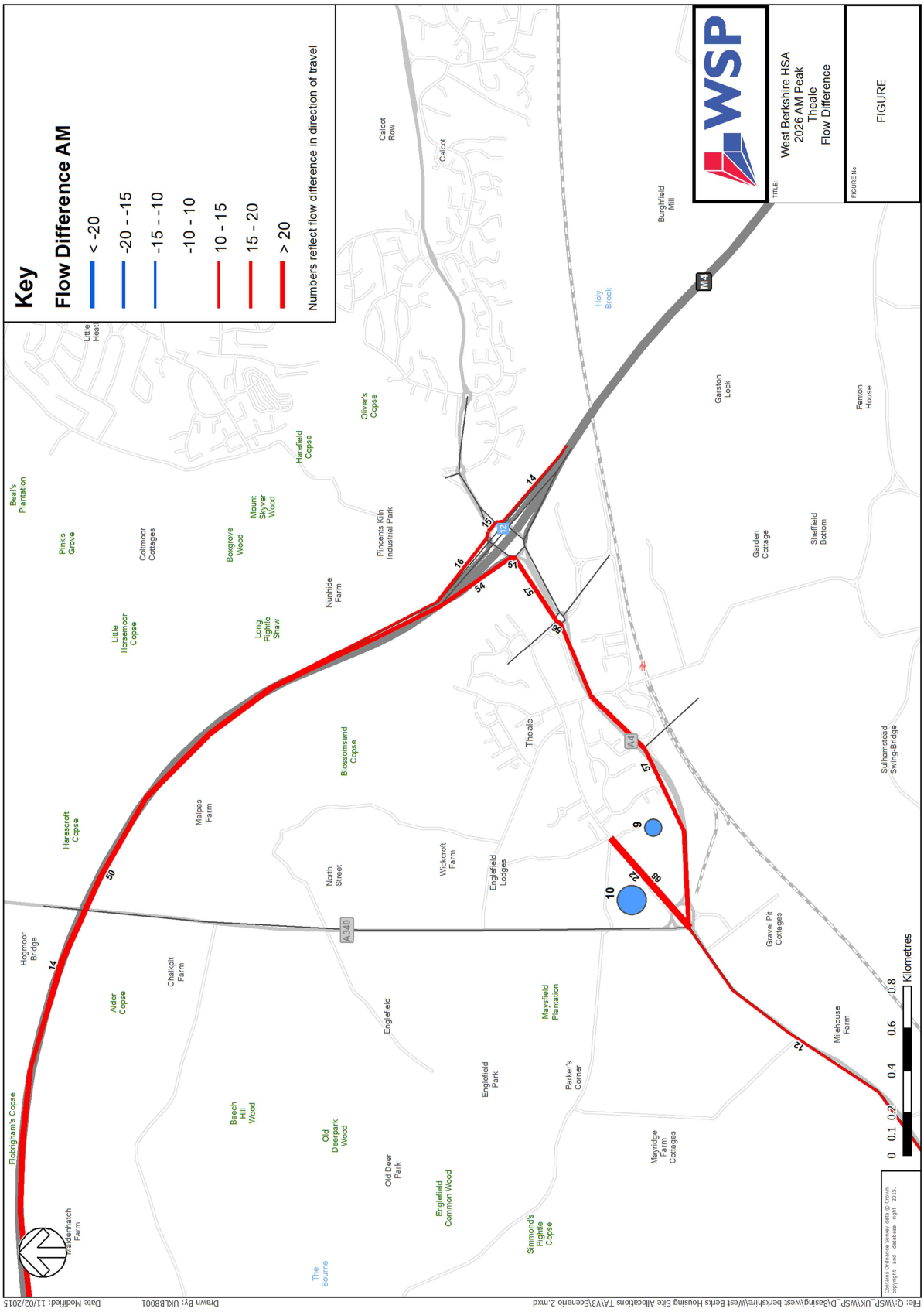

Figure 7.1 2026 traffic flow difference between Scenario 3 and Scenario 1 – AM peak

Junction performance

7.1.3 The junction performance assessment highlights junctions that are predicted to operate above 85% capacity. It should be noted that this assessment is based on a strategic model, which has not been validated at every single junction. It should be noted that the junction operation assessment undertaken as part of this study intends to provide a high level assessment and a further junction assessment using more localised modelling and specialised software (LinSig, Arcady, Picady) may be required.

7.1.4 To present the junction performance assessment results, the worst performing junction turning movements in terms of the Volume over Capacity (VoC) statistics were selected for every single junction and compared between Scenario 1 (without HSA sites) and Scenario 2 (with HSA sites) undertaken.

7.1.5 In general a VoC value of 85% and below indicates that a junction operates within capacity and with spare capacity. A VoC value of between 85% and 100% means that a junction operates within, but approaching, capacity with signs of queuing and delays whereas a VoC value of 100% and above indicates that the junction operates above capacity, resulting in queues and delays.

7.1.6 Figure 7.2 illustrate the junctions which are forecast to operate at 85% capacity or above in Scenario 1 and Scenario 3 respectively. Junctions that are predicted to operate under 85% capacity are excluded from the assessment.

7.1.7 The effect of adding additional trips associated with HSA sites on the overall junction performance is minimal with the majority of junctions remaining in the same category in both scenarios.

7.1.8 Overall, the absolute changes in VoC statistics between the two scenarios are not extensive. There is blocking back on the circulatory arm of the M4 Junction 12 which accounts for the increase in the VoC shown on figure 6.2 however adjustments to the signal timings at the junction could be made which would potentially remove this. The Theale area shows an increase in the VoC from 82% to 85% on the A4 Bath Road eastbound approach to the A4 Bath Road/Arlington Business Park roundabout as shown on figure 7.2.

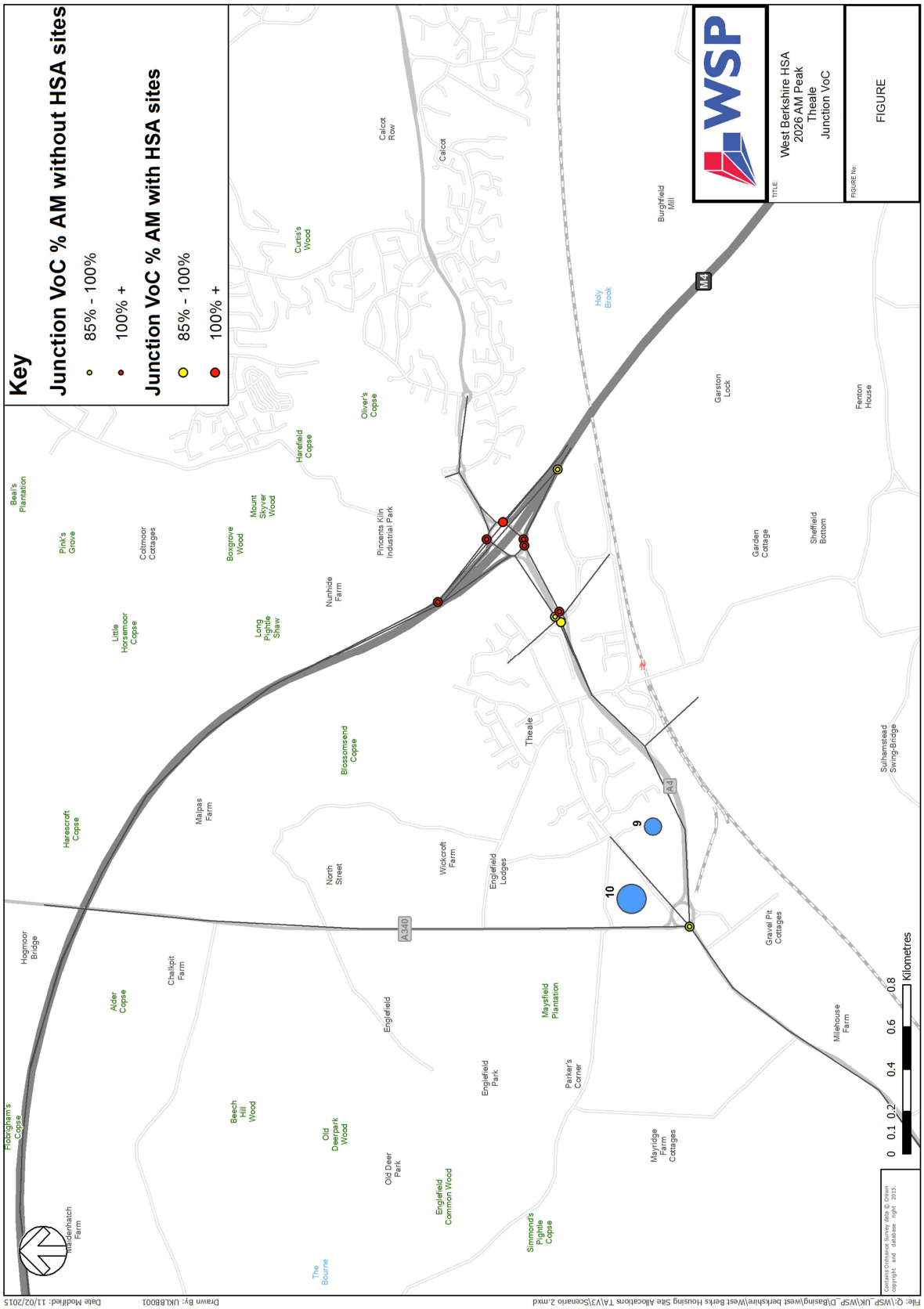

Figure 7.2 2026 junction VoC difference between Scenario 3 and Scenario 1 – AM peak

Link performance

7.1.9 The link performance assessment highlights those links that are predicted to operate above 85% capacity. It should be noted that this assessment is based on a strategic model, which has not been validated at every single link.

7.1.10 To present the junction performance assessment results, the worst performing links of the Volume over Capacity (VoC) statistics were selected and compared between Scenario 1 (without HSA sites) and Scenario 3 (with HSA site 9 and site 10). In general a VoC value of 85% and below indicates that a link operates within capacity and with spare capacity. A VoC value of between 85% and 100% means that a link operates within, but approaching, capacity with signs of queuing and delays whereas a VoC value of 100% and above indicates that the link operates above capacity, resulting in queues and delays.

7.1.11 Figure 7.3 and figure 7.4 illustrate the links which are forecast to operate at 85% capacity or above in Scenario 1 and Scenario 3 in the Theale area for the AM peak. Those links that are predicted to operate under 85% capacity are excluded from the assessment. These are minor increases and the links that are shown to be over-capacity are already over-capacity without the HSA developments.

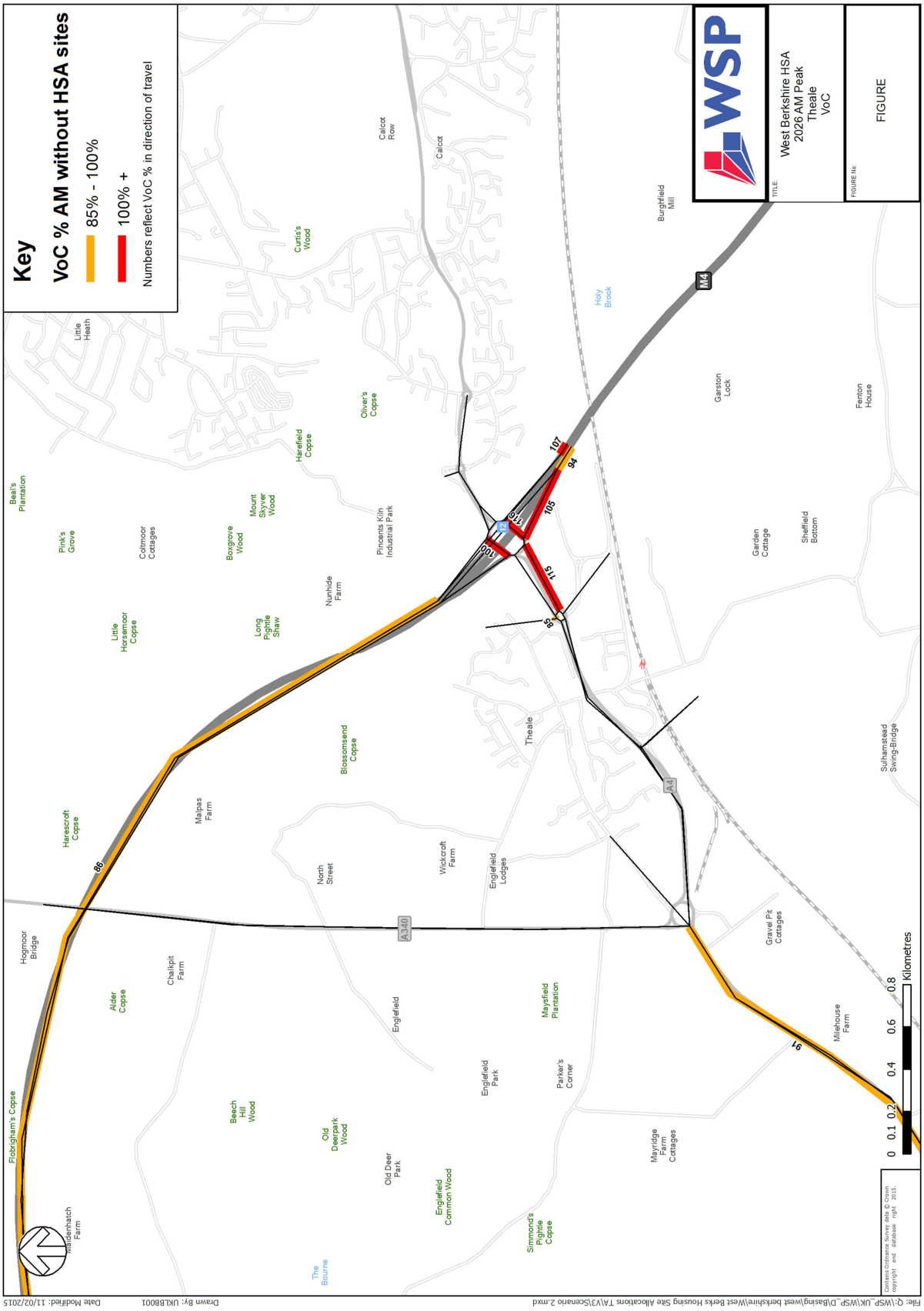

Figure 7.3 2026 link VoC for Scenario 1 – AM peak

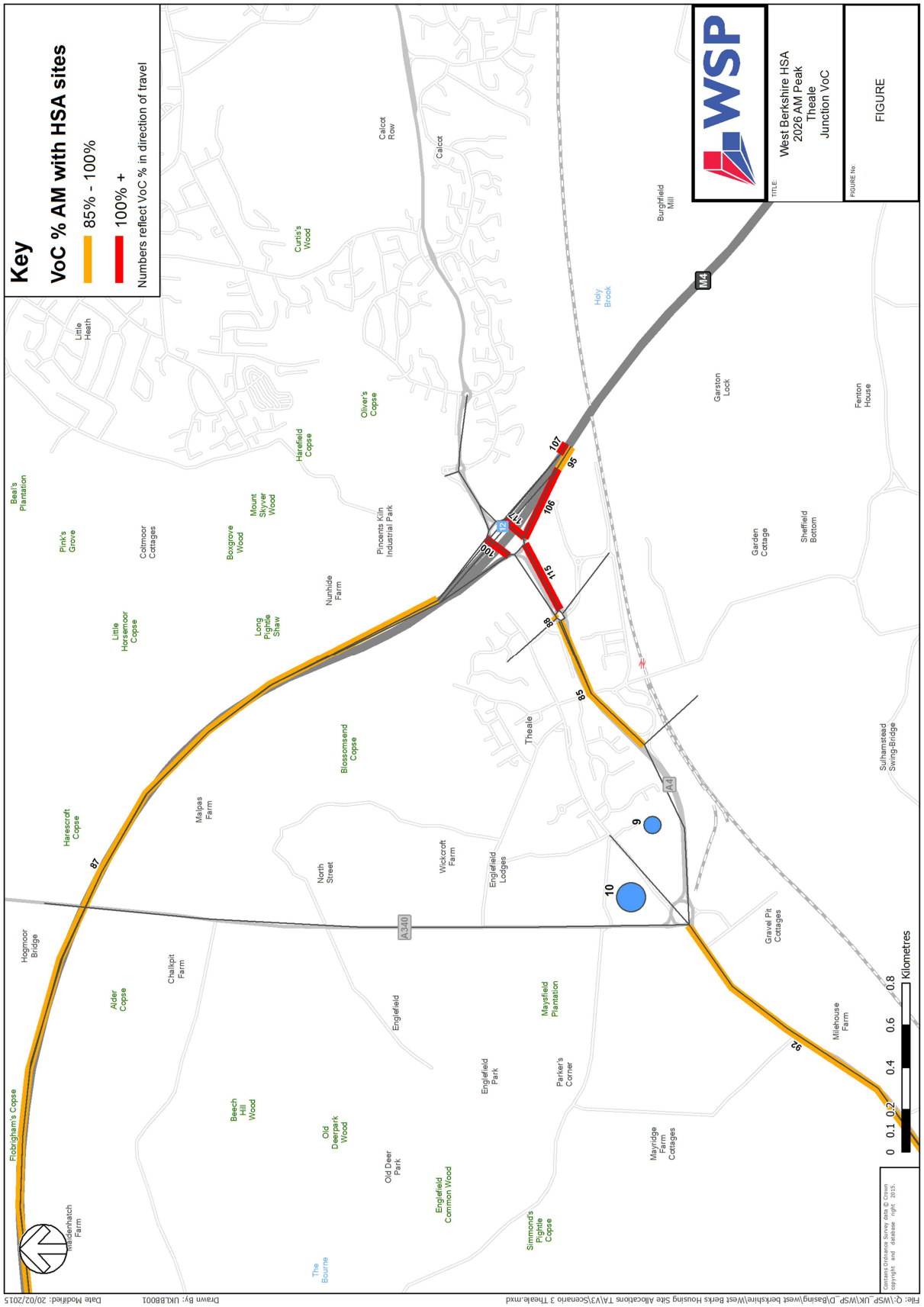

Figure 7.4 2026 link VoC for Scenario 3 – AM peak

7.2 PM peak (17:00-18:00)

2026 traffic flows

7.2.1 Figure 7.5 show the impact of HSA sites on flow levels by presenting the absolute difference in flows on key links between the Scenario 1 and Scenario 3 for the PM peak. The difference in flows is shown in passenger car units (pcu). The red bands represent an increase in traffic in Scenario 3 (with HSA site 9 and site 10) when compared to Scenario 1 whilst the blue bands indicate a decrease in traffic.

7.2.2 There are flow increases of up to 40 pcu with the addition of HSA site 9 and site 10 which are accessed from The Green at the A340 /A4 Bath Road roundabout. There are increases in flow of up to 35 pcu on the eastbound approach to the M4 Junction.

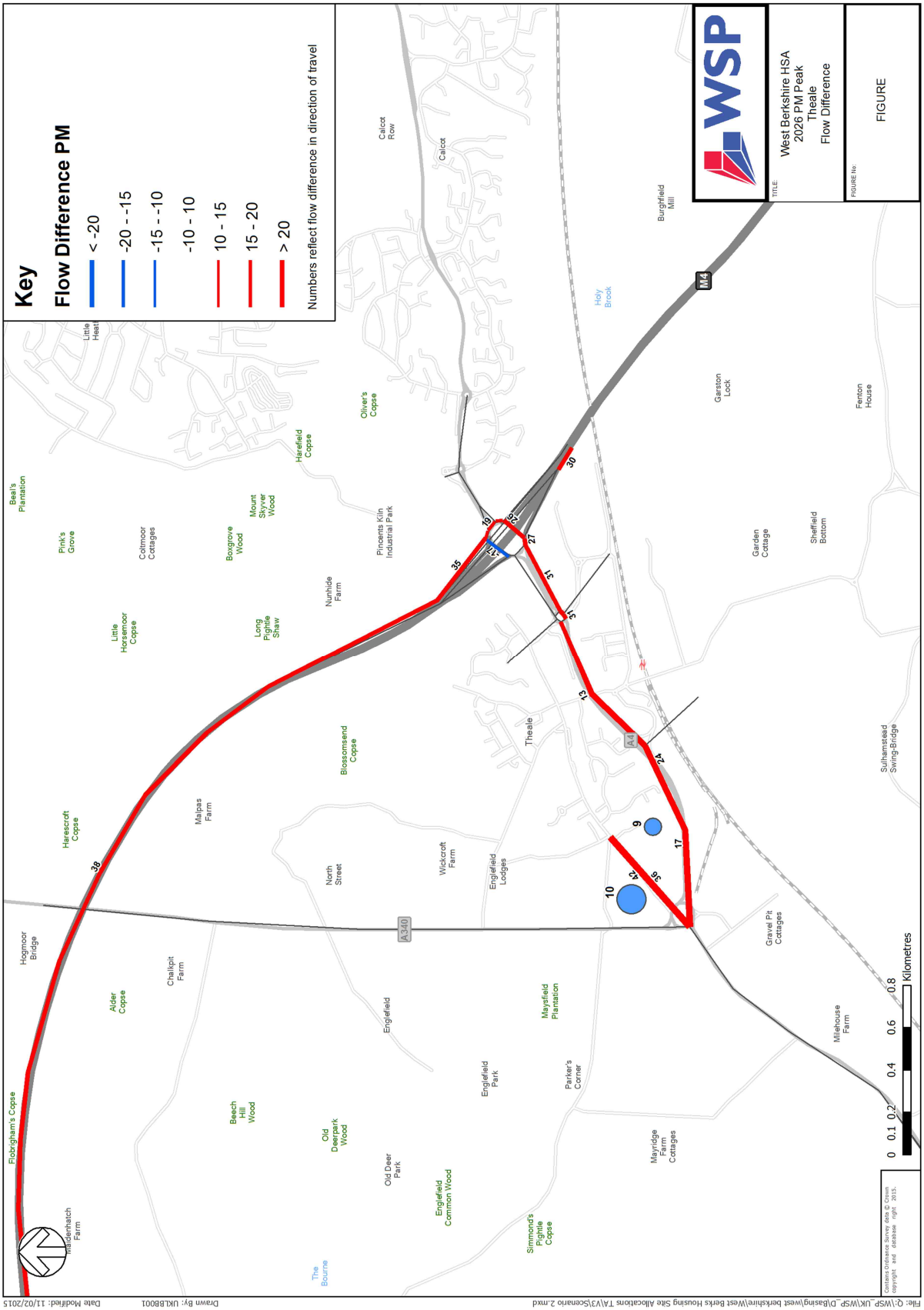

Figure 7.5 2026 traffic flow difference between Scenario 3 and Scenario 1 – PM peak

Junction performance

7.2.3 The junction performance assessment highlights junctions that are predicted to operate above 85% capacity. It should be noted that this assessment is based on a strategic model, which has not been validated at every single junction. It should be noted that the junction operation assessment undertaken as part of this study intends to provide a high level assessment and a further junction assessment using more localised modelling and specialised software (LinSig, Arcady, Picady) may be required.

7.2.4 To present the junction performance assessment results, the worst performing junction turning movements in terms of the Volume over Capacity (VoC) statistics were selected for every single junction and compared between Scenario 1 (without HSA sites) and Scenario 3 (with HSA site 9 and site 10) undertaken.

7.2.5 In general a VoC value of 85% and below indicates that a junction operates within capacity and with spare capacity. A VoC value of between 85% and 100% means that a junction operates within, but approaching, capacity with signs of queuing and delays whereas a VoC value of 100% and above indicates that the junction operates above capacity, resulting in queues and delays.

7.2.6 Figure 7.6 illustrate the junctions which are forecast to operate at 85% capacity or above in Scenario 1 and Scenario 3 respectively. Junctions that are predicted to operate under 85% capacity are excluded from the assessment.

7.2.7 The effect of adding additional trips associated with HSA sites on the overall junction performance is minimal with the majority of junctions remaining in the same category in both scenarios. The most noticeable changes in junction performance are predicted to be in areas with the highest flow differences as described in the 2026 traffic flows section.

7.2.8 Overall, the absolute changes in VoC statistics between the Scenario 1 and Scenario 3 are not extensive. The Theale area shows an increase in the VoC from 84% to 86% on the A4 Bath Road westbound approach to the A4 Bath Road/Arlington Business Park roundabout.

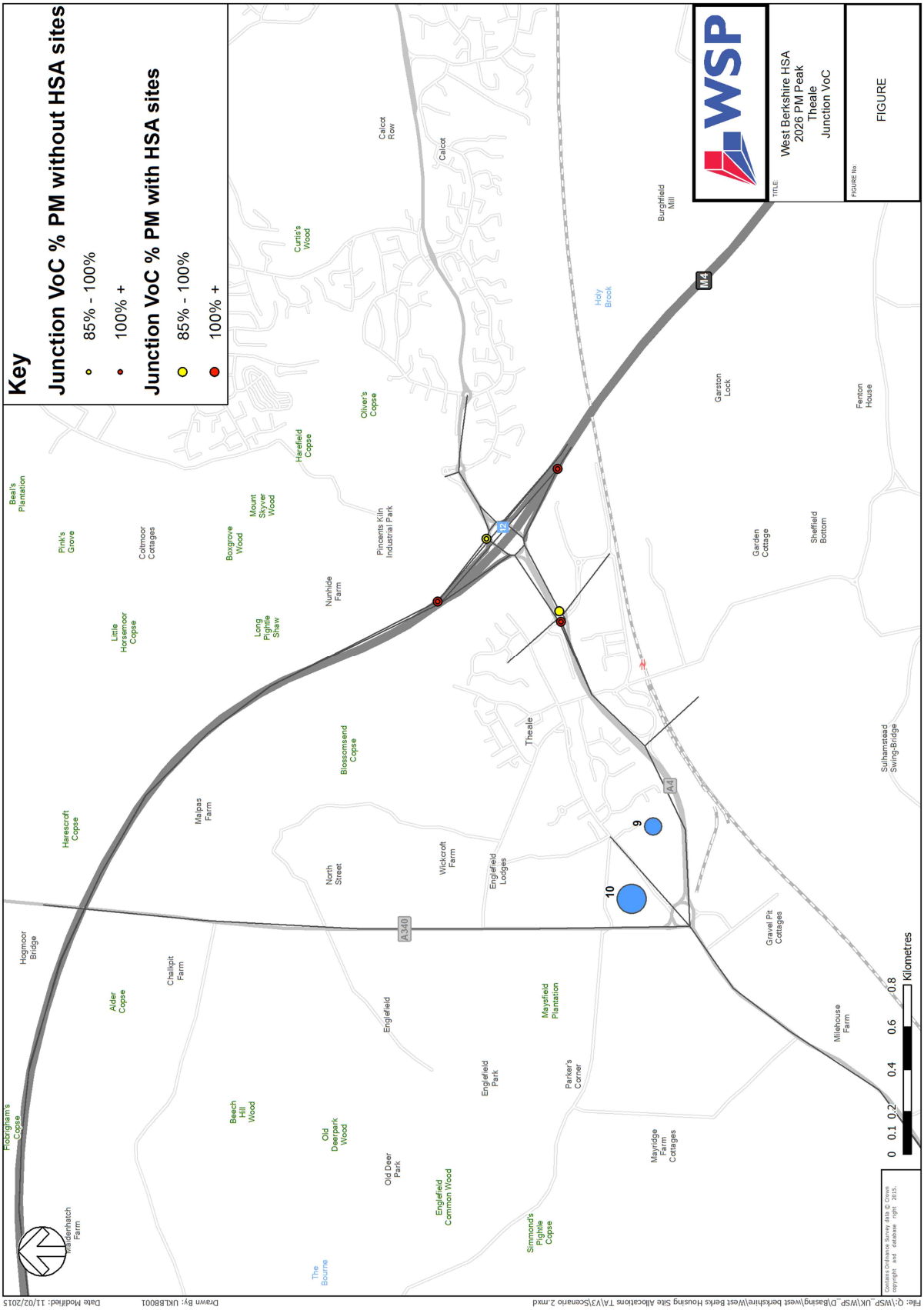

Figure 7.6 2026 junction VoC difference between Scenario 3 and Scenario 1 – PM peak

Link performance

7.2.9 The link performance assessment highlights those links that are predicted to operate above 85% capacity. It should be noted that this assessment is based on a strategic model, which has not been validated at every single link.

7.2.10 To present the junction performance assessment results, the worst performing links of the Volume over Capacity (VoC) statistics were selected and compared between Scenario 1 (without HSA sites) and Scenario 3 (with HSA site 9 and site 10). In general a VoC value of 85% and below indicates that a link operates within capacity and with spare capacity. A VoC value of between 85% and 100% means that a link operates within, but approaching, capacity with signs of queuing and delays whereas a VoC value of 100% and above indicates that the link operates above capacity, resulting in queues and delays.

7.2.11 Figure 7.7 and figure 7.8 illustrate the links which are forecast to operate at 85% capacity or above in Scenario 1 and Scenario 3 in the Theale area for the PM peak.. Those links that are predicted to operate under 85% capacity are excluded from the assessment.

7.2.12 The Theale area shows an increase in the VoC from 84% to 86% on the A4 Bath Road westbound approach to the A4 Bath Road/Arlington Business Park roundabout. There is an increase in the VoC from 121% to 123% on the A4 Bath Road eastbound approach to the A4 Bath Road/Arlington Business Park roundabout.

7.2.13 These are only small increases and are already over-capacity without the HSA developments.

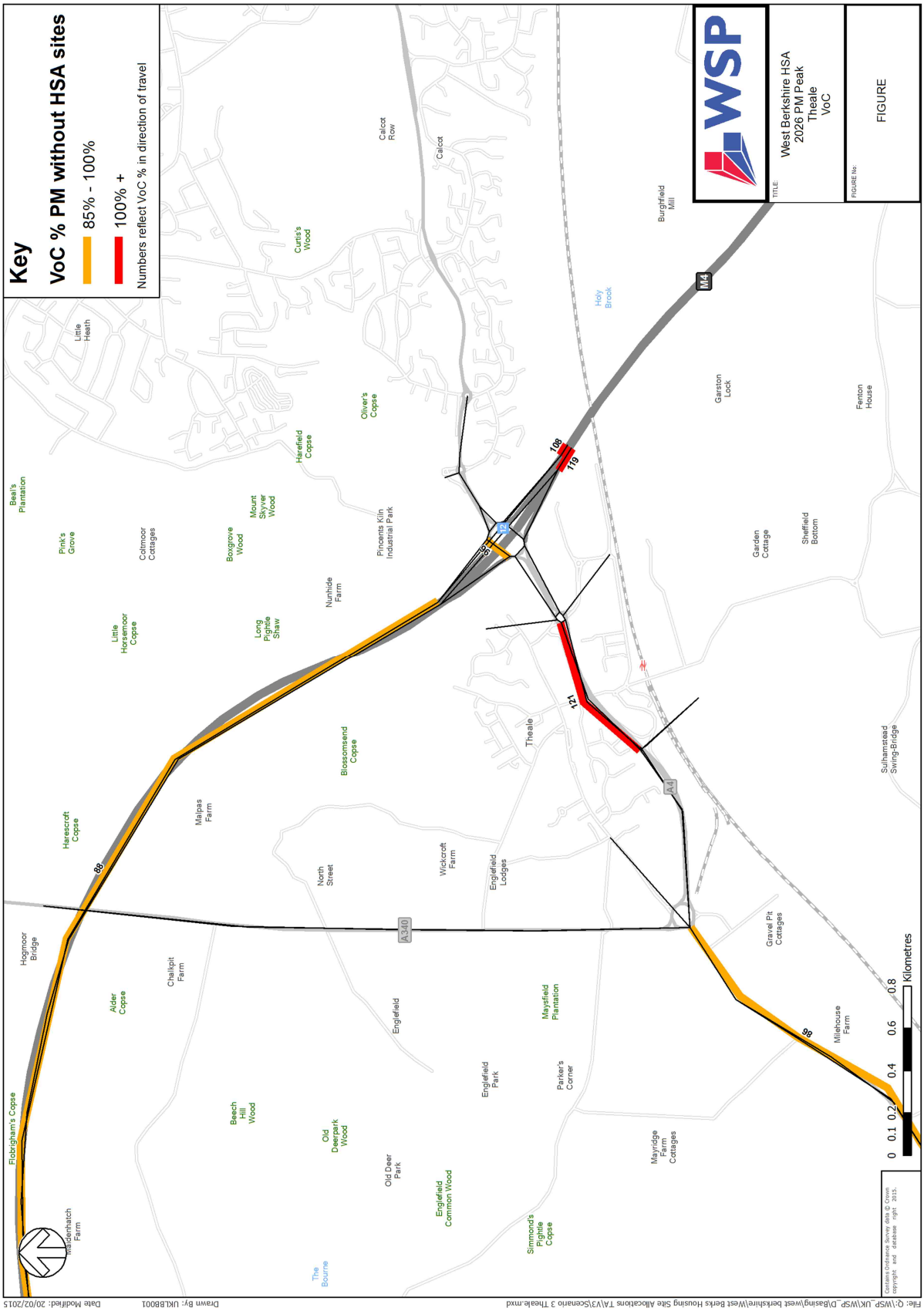

Figure 7.7 2026 link VoC for Scenario 1 – PM peak

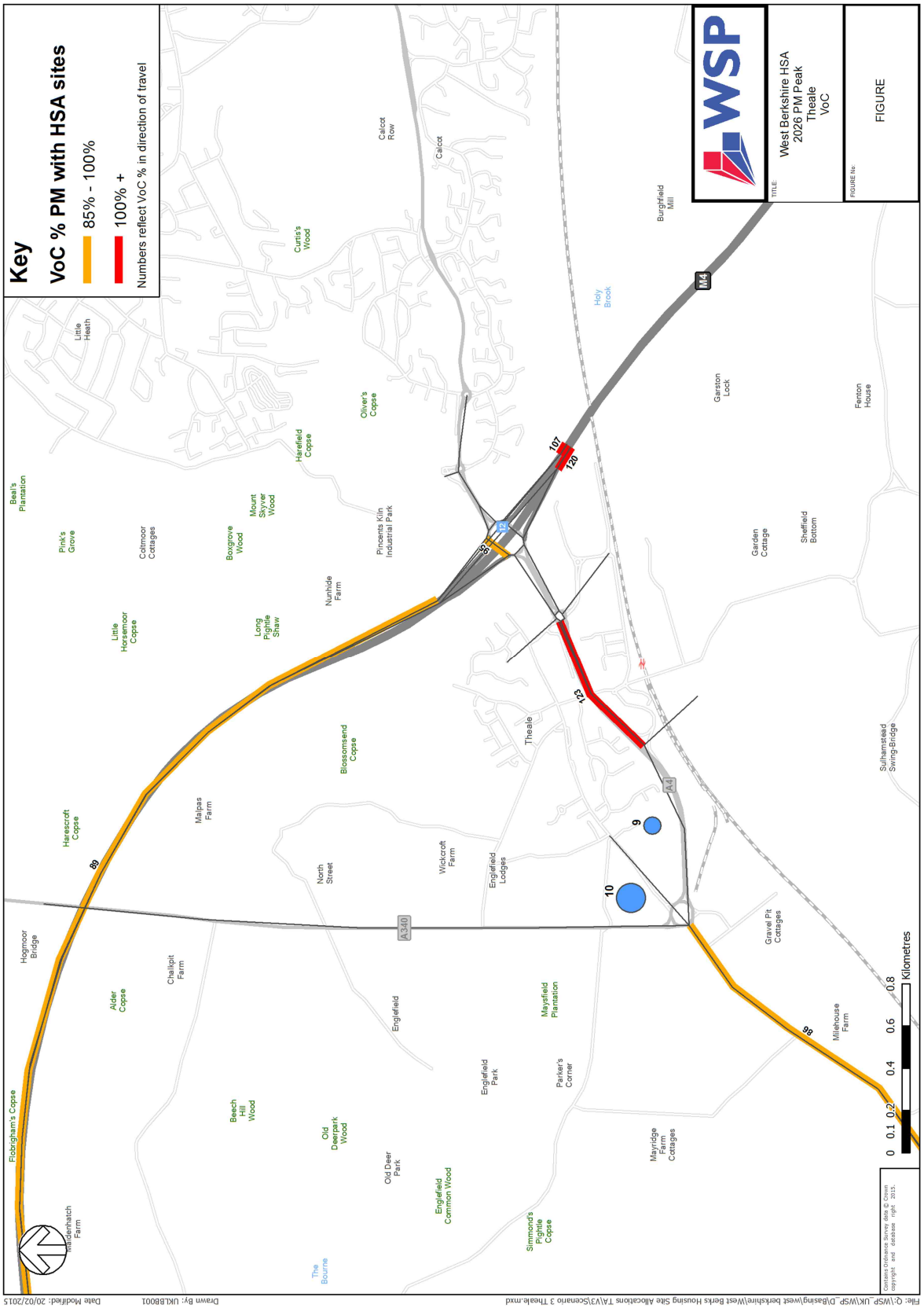

Figure 7.8 2026 link VoC for Scenario 3 – PM peak

8 Scenario 4: Theale – Site 11 and Site 12 (Eastern sites)

8.1 AM peak (08:00-09:00)

2026 traffic flows

8.1.1 Figure 8.1 show the impact of HSA site 11 and site 12 on flow levels by presenting the absolute difference in flows on key links between the Scenario 1 and Scenario 4 for the AM peak. The difference in flows is shown in passenger car units (pcu) and any difference less than 10 pcu is not shown. The red bands represent an increase in traffic in Scenario 4 (with HSA site 11 and site 12) when compared to Scenario 1 whilst the blue bands indicate a decrease in traffic.

8.1.2 There are flow increases of up to 50 pcu with the addition of HSA site 11 and site 12 which are accessed from Hoad Way at the A4 Bath Raod/Arlington Business Park roundabout. There are increases in flow of up to 40 pcu on the eastbound approach to the M4 Junction.

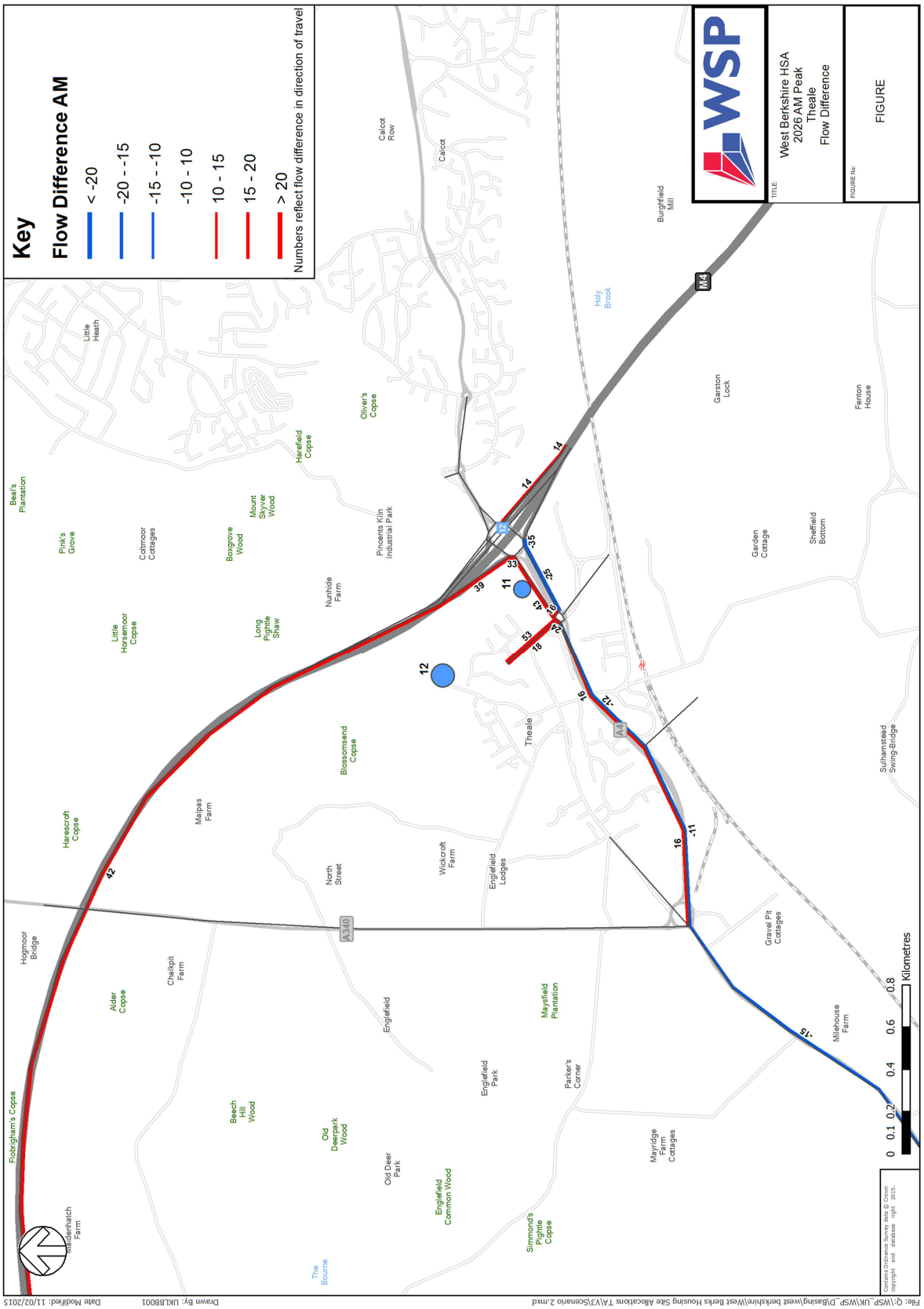

Figure 8.1 2026 traffic flow difference between Scenario 4 and Scenario 1 – AM peak

Junction performance

8.1.3 The junction performance assessment highlights junctions that are predicted to operate above 85% capacity. It should be noted that this assessment is based on a strategic model, which has not been validated at every single junction. It should be noted that the junction operation assessment undertaken as part of this study intends to provide a high level assessment and a further junction assessment using more localised modelling and specialised software (LinSig, Arcady, Picady) may be required.

8.1.4 To present the junction performance assessment results, the worst performing junction turning movements in terms of the Volume over Capacity (VoC) statistics were selected for every single junction and compared between Scenario 1 (without HSA sites) and Scenario 4 (with HSA site 11 and site 12) undertaken.

8.1.5 In general a VoC value of 85% and below indicates that a junction operates within capacity and with spare capacity. A VoC value of between 85% and 100% means that a junction operates within, but approaching, capacity with signs of queuing and delays whereas a VoC value of 100% and above indicates that the junction operates above capacity, resulting in queues and delays.

8.1.6 Figure 8.2 illustrate the junctions which are forecast to operate at 85% capacity or above in Scenario 1 and Scenario 4 respectively. Junctions that are predicted to operate under 85% capacity are excluded from the assessment.

8.1.7 The effect of adding additional trips associated with HSA sites on the overall junction performance shows that those junctions where the VoC is over 85% without the HSA developments remain in the same category in both scenarios.

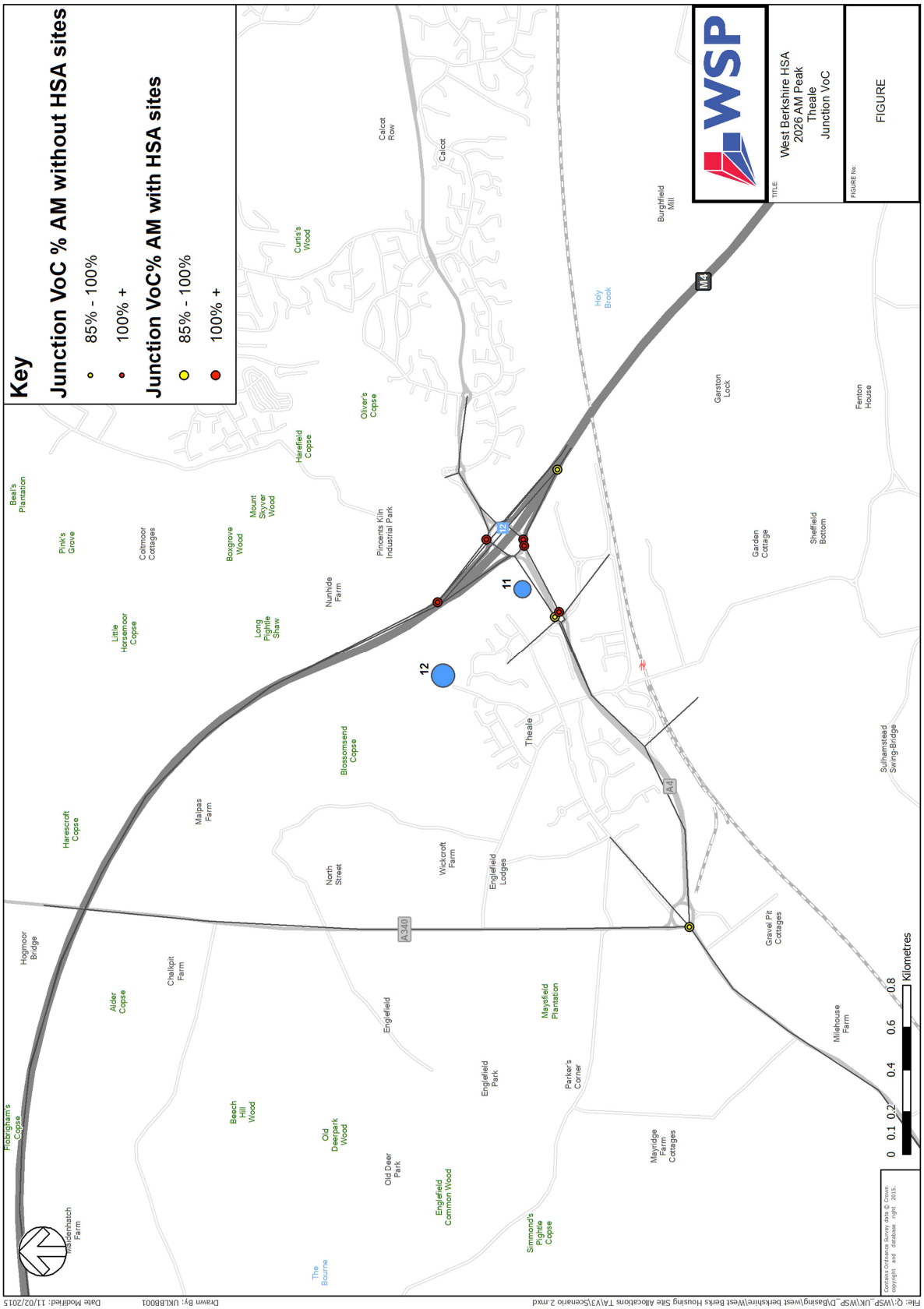

Figure 8.2 2026 junction VoC difference between Scenario 4 and Scenario 1 – AM peak

Link performance

8.1.8 The link performance assessment highlights those links that are predicted to operate above 85% capacity. It should be noted that this assessment is based on a strategic model, which has not been validated at every single link.

8.1.9 To present the junction performance assessment results, the worst performing links of the Volume over Capacity (VoC) statistics were selected and compared between Scenario 1 (without HSA sites) and Scenario 4 (with HSA site 11 and site 12). In general a VoC value of 85% and below indicates that a link operates within capacity and with spare capacity. A VoC value of between 85% and 100% means that a link operates within, but approaching, capacity with signs of queuing and delays whereas a VoC value of 100% and above indicates that the link operates above capacity, resulting in queues and delays.

8.1.10 Figure 8.3 and figure 8.4 illustrate the links which are forecast to operate at 85% capacity or above in Scenario 1 and Scenario 4 in the Theale area for the AM peak. Those links that are predicted to operate under 85% capacity are excluded from the assessment. These are minor increases and the links that are shown to be over-capacity are already over-capacity without the HSA developments.

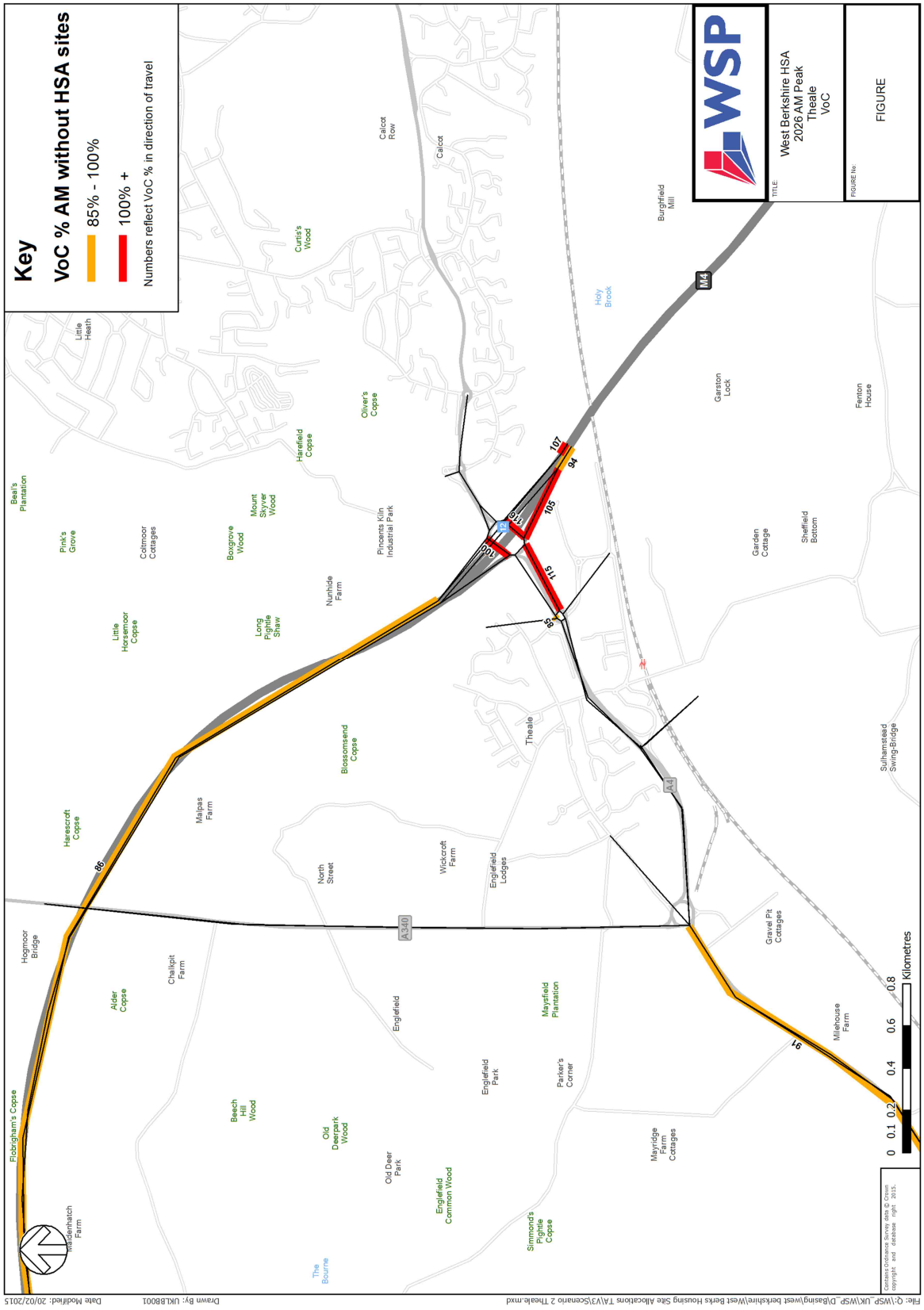

Figure 8.3 2026 link VoC for Scenario 1 – AM peak

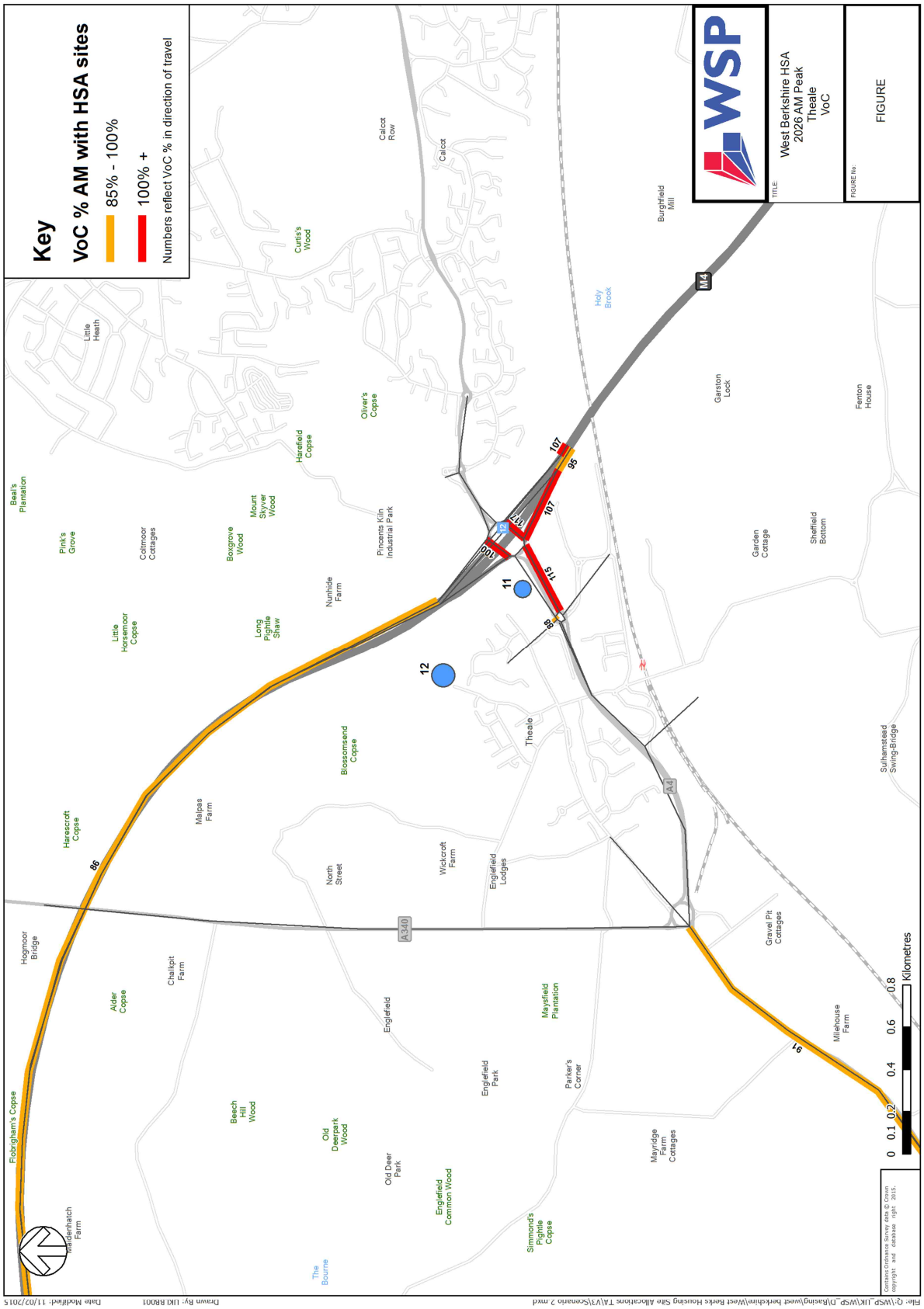

Figure 8.4 2026 link VoC for Scenario 4 – AM peak

8.2 PM peak (17:00-18:00)

2026 traffic flows

8.2.1 Figure 8.5 show the impact of HSA sites on flow levels by presenting the absolute difference in flows on key links between the Scenario 1 and Scenario 4 for the PM peak. The difference in flows is shown in passenger car units (pcu). The red bands represent an increase in traffic in Scenario 3 (with HSA site 11 and site 12) when compared to Scenario 1 whilst the blue bands indicate a decrease in traffic.

8.2.2 There are flow increases of up to 30 pcu with the addition of HSA site 11 and site 12 which are accessed from Hoad Way at the A4 Bath Road/Arlington Business Park roundabout. The largest increase in flow is 36 pcu on the eastbound approach to the M4 Junction.

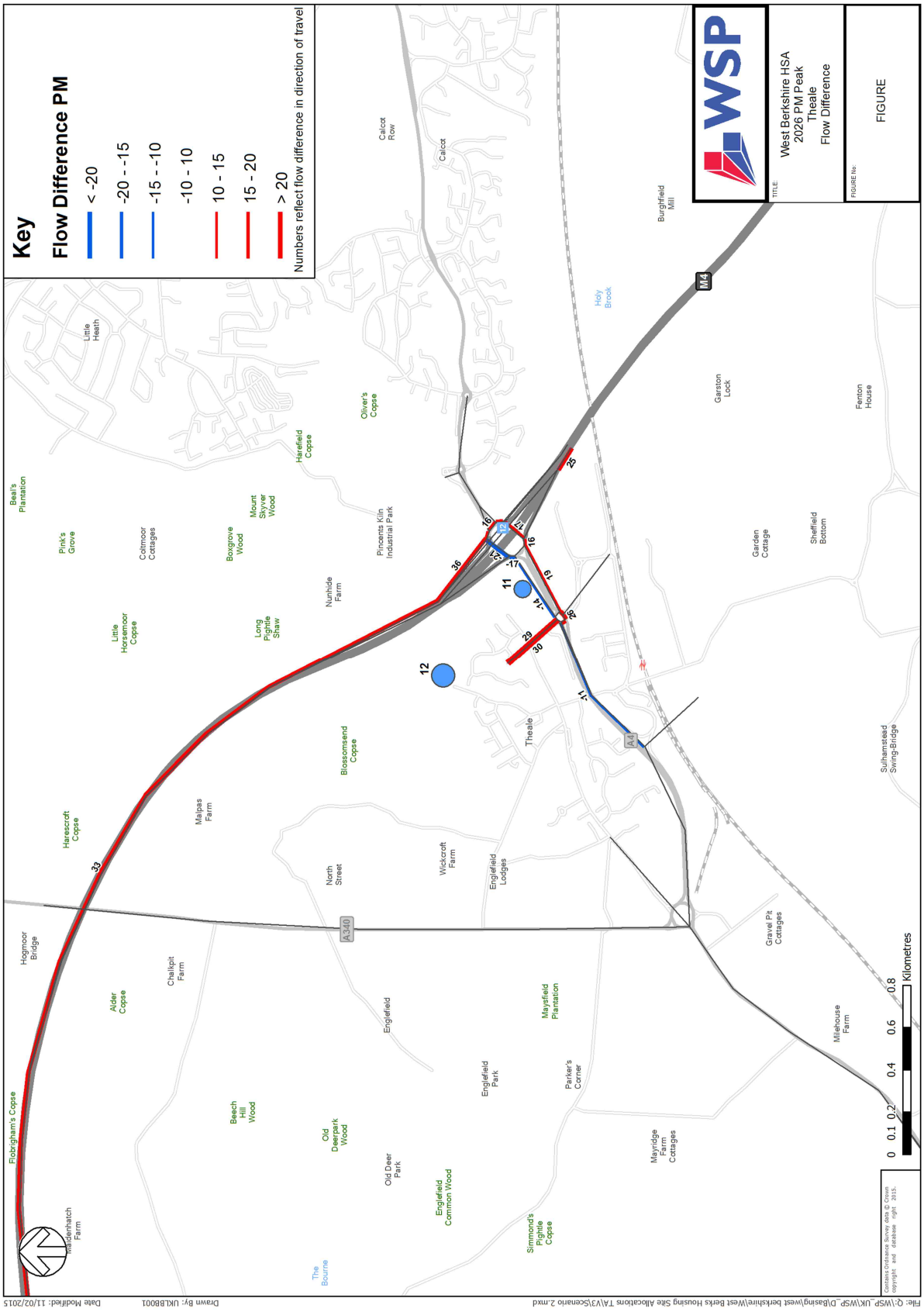

Figure 8.5 2026 traffic flow difference between Scenario 4 and Scenario 1 – PM peak

Junction performance

8.2.3 The junction performance assessment highlights junctions that are predicted to operate above 85% capacity. It should be noted that this assessment is based on a strategic model, which has not been validated at every single junction. It should be noted that the junction operation assessment undertaken as part of this study intends to provide a high level assessment and further junction assessment using more localised modelling and specialised software (LinSig, Arcady, Picady) may be required.

8.2.4 To present the junction performance assessment results, the worst performing junction turning movements in terms of the Volume over Capacity (VoC) statistics were selected for every single junction and compared between Scenario 1 (without HSA sites) and Scenario 4 (with HSA site 11 and site 12) undertaken.

8.2.5 In general a VoC value of 85% and below indicates that a junction operates within capacity and with spare capacity. A VoC value of between 85% and 100% means that a junction operates within, but approaching, capacity with signs of queuing and delays whereas a VoC value of 100% and above indicates that the junction operates above capacity, resulting in queues and delays.

8.2.6 Figure 8.6 illustrate the junctions which are forecast to operate at 85% capacity or above in Scenario 1 and Scenario 4 respectively. Junctions that are predicted to operate under 85% capacity are excluded from the assessment.

8.2.7 The effect of adding additional trips associated with HSA sites on the overall junction performance is minimal with the majority of junctions remaining in the same category in both scenarios. The most noticeable changes in junction performance are predicted to be in areas with the highest flow differences as described in the 2026 traffic flows section.

8.2.8 Overall, the absolute changes in VoC statistics between Scenario 1 and Scenario 4 are not extensive. The Theale area shows an increase in the VoC from 84% to 85% on the A4 Bath Road westbound approach to the A4 Bath Road/Arlington Business Park roundabout.

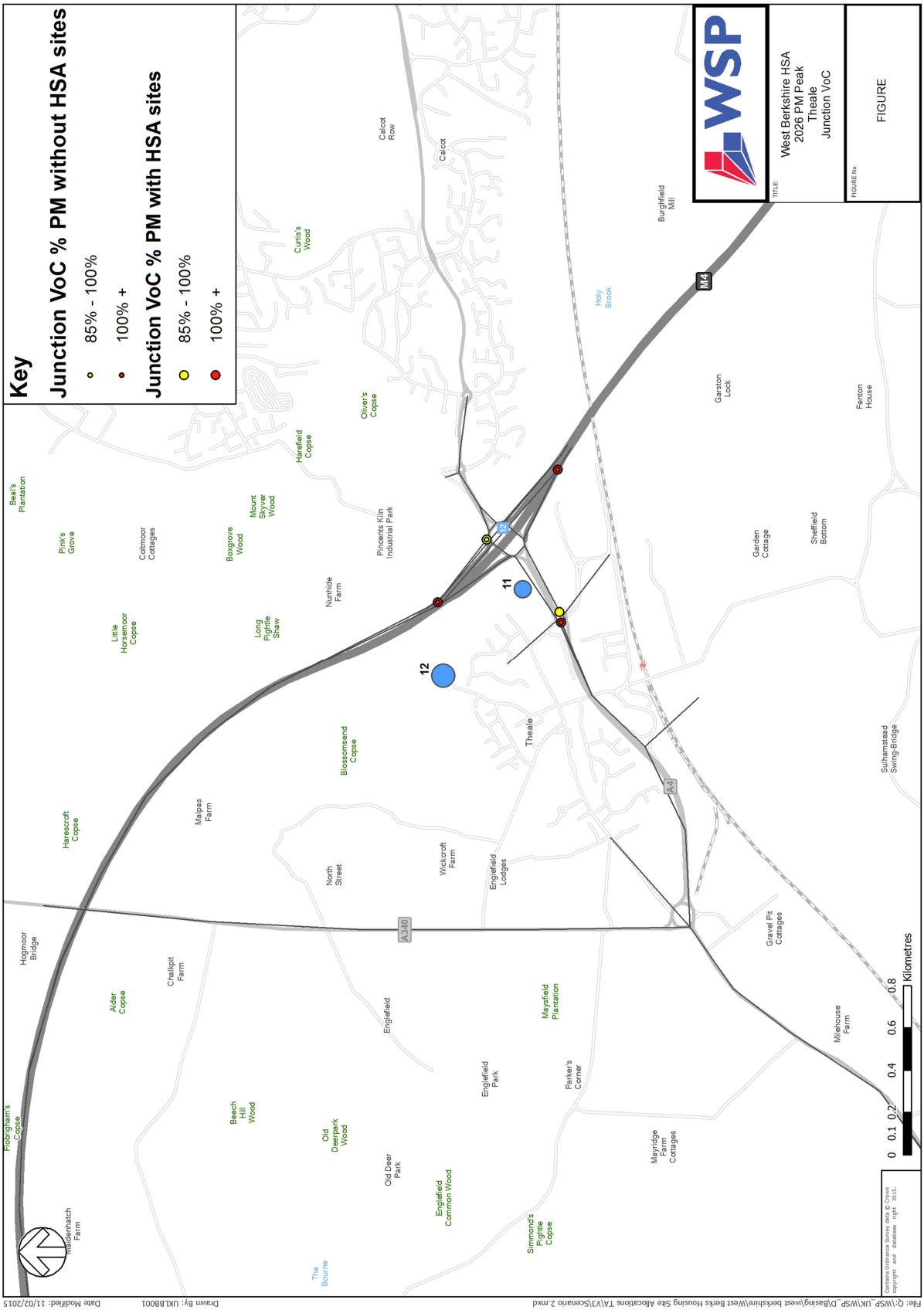

Figure 8.6 2026 junction VoC difference between Scenario 4 and Scenario 1 – PM peak

Link performance

8.2.9 The link performance assessment highlights those links that are predicted to operate above 85% capacity. It should be noted that this assessment is based on a strategic model, which has not been validated at every single link.

8.2.10 To present the junction performance assessment results, the worst performing links of the Volume over Capacity (VoC) statistics were selected and compared between Scenario 1 (without HSA sites) and Scenario 4 (with HSA site 11 and site 12). In general a VoC value of 85% and below indicates that a link operates within capacity and with spare capacity. A VoC value of between 85% and 100% means that a link operates within, but approaching, capacity with signs of queuing and delays whereas a VoC value of 100% and above indicates that the link operates above capacity, resulting in queues and delays.

8.2.11 Figure 8.7 and figure 8.8 illustrate the links which are forecast to operate at 85% capacity or above in Scenario 1 and Scenario 4 in the Theale area for the PM peak. Those links that are predicted to operate under 85% capacity are excluded from the assessment.

8.2.12 The Theale area shows an increase in the VoC from 84% to 86% on the A4 Bath Road westbound approach to the A4 Bath Road/Arlington Business Park roundabout. There is an increase in the VoC from 121% to 125% on the A4 Bath Road eastbound approach to the A4 Bath Road/Arlington Business Park roundabout.

8.2.13 These are only small increases and are already over-capacity without the HSA developments.

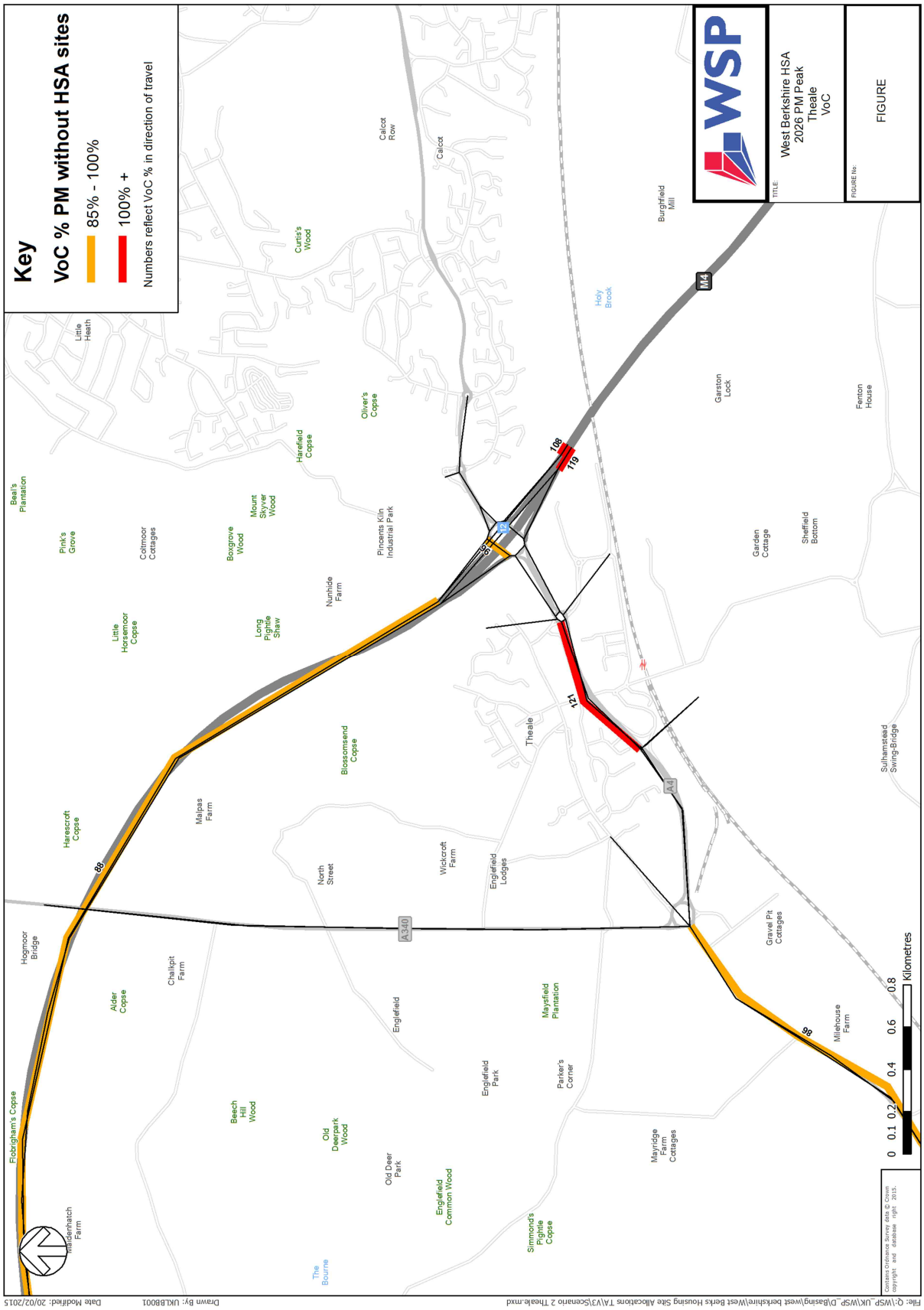

Figure 8.7 2026 link VoC for Scenario 1 – PM peak

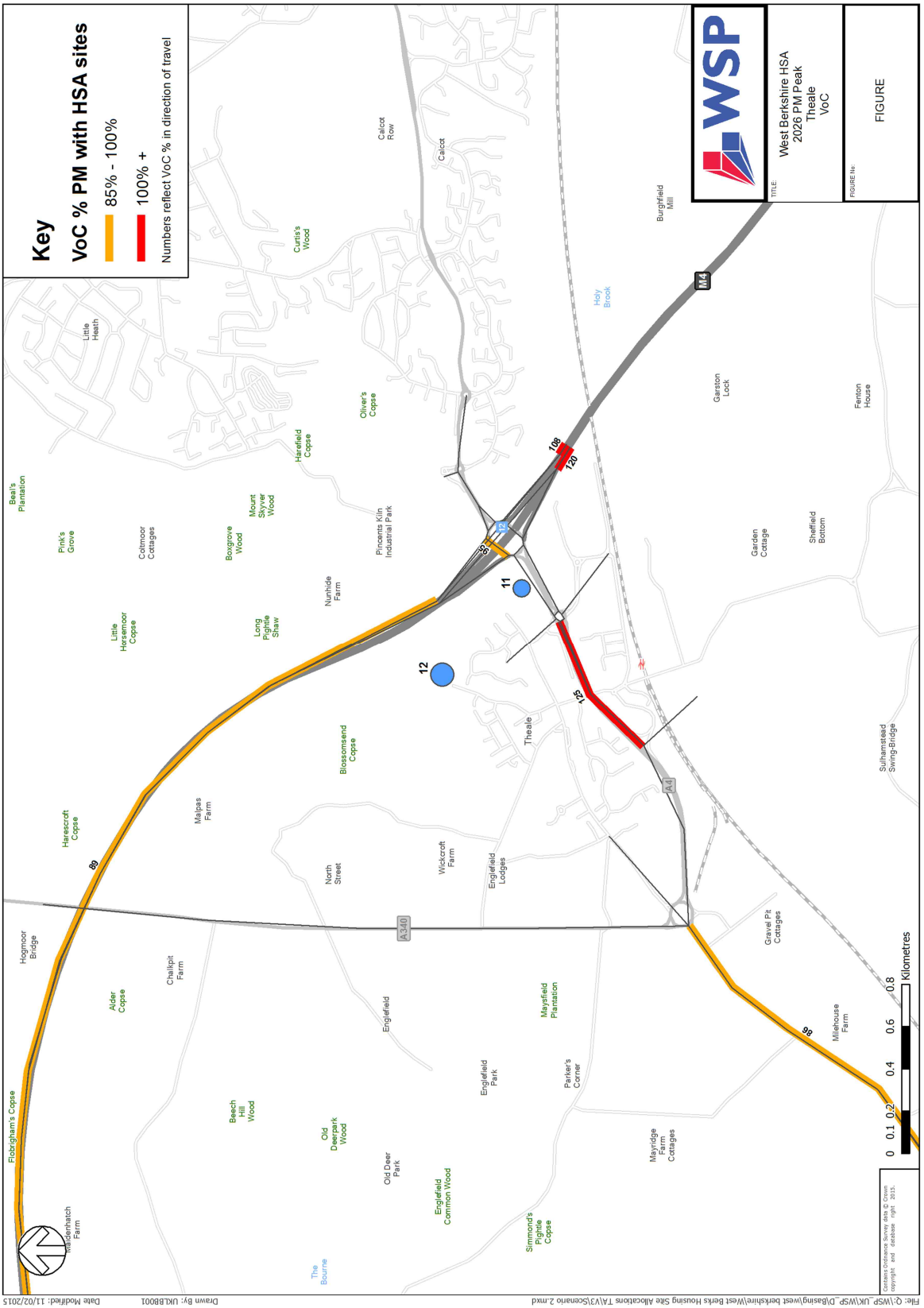

Figure 8.8 2026 link VoC for Scenario 4 – PM peak

9 Conclusions

9.1.1 The main focus of this report is the impact on the existing highway network of the development sites outlined in the West Berkshire Housing Site Allocations Development Plan Document (Local Plan) (HSA DPD).

9.1.2 The assessment has been undertaken using the latest available 2026 AM peak and PM peak forecasts of the West Berkshire Transport Model (WBTM). The methodology adopted in this study considers network stress when the HSA developments are included. The study is not intended to provide a detailed review of each development. As such it does not consider design issues, economic benefits, environmental impacts or safety issues.

9.1.3 The assessment has been undertaken by comparing traffic flows and Volume over Capacity statistics for the following scenarios:

- **Scenario 1**: without the HSA development
- **Scenario 2**: with the HSA development (Site 1 to 12)
- **Scenario 3:** with the HSA development (Site 1 to 10)
- **Scenario 4**: with the HSA development (Site 1 to 8, site 11 and site 12)

9.1.4 It is predicted that the HSA sites are likely to result in an additional 440 pcu trips loaded onto the district's transport network in the AM peak and PM peak hours. This is an increase of about 1% and is not considered to be a significant increase in the trip numbers predicted to be on the network. The additional trips are spread across the district's transport network rather than concentrated at one location which echoes the dispersed nature of the HSA site locations.

9.1.5 The increase in the directional flow on the majority of roads is not predicted to exceed 50 pcu apart from in the vicinity of M4 Junction 12 where the flow increases are predicted to by up to 80 pcu's due to the concentration of Theale sites (site 9 to site 12)

9.1.6 The increased traffic flows associated with the developments listed above are most likely to result in a slight worsening of the junction performance, and an increase in congestion along some roads near the HSA sites. It should however be noted that the assessment is based on a strategic model, which has not been validated at every single link and junction and further assessment using a more localised model and specialised software (LinSig, Arcady, Picady) may be required. Where appropriate these detailed assessments would accompany a planning application.

9.1.7 The effect of adding additional trips associated with HSA sites on overall junction performance and network congestion is minimal with the majority of junctions and links remaining in the same VoC percentage category in both scenarios.

9.1.8 The study can be used to inform considerations of potential highway mitigation associated with the impacts of the developments. However, the analysis is not exhaustive and requirements should be reviewed on a case-by-case basis as part of the planning process.

Appendices

Appendix A
Description of user classes

8. VEHICLE CATEGORIES

Definition of Categories

8.1 The various components of traffic have different characteristics in terms of operating costs, growth and occupancy. Figure 8/1 illustrates the most common categories into which the traffic is split in COBA. These are defined as:

Cars	**(CARS)** including taxis, estate cars, 'people carriers' and other passenger vehicles (for example, minibuses and camper vans) with a gross vehicle weight of less than 3.5 tonnes, normally ones which can accommodate not more than 15 seats. Three-wheeled cars, motor invalid carriages, Land Rovers, Range Rovers and Jeeps and smaller ambulances are included. Cars towing caravans or trailers are counted as one vehicle unless included as a separate class (see User Specified Category below);
Light Goods Vehicles	**(LGV)** Includes all goods vehicles up to 3.5 tonnes gross vehicle weight (goods vehicles over 3.5 tonnes have sideguards fitted between axles), including those towing a trailer or caravan. This includes all car delivery vans and those of the next larger carrying capacity such as transit vans. Included here are small pickup vans, three-wheeled goods vehicles, milk floats and pedestrian controlled motor vehicles. Most of this group are delivery vans of one type or another;
Other Goods Vehicles	**(OGV 1)** Includes all rigid vehicles over 3.5 tonnes gross vehicle weight with two or three axles Includes larger ambulances, tractors (without trailers), road rollers for tarmac pressing, box vans and similar large vans. A two or three axle motor tractive unit without a trailer is also included; **(OGV 2)** Includes all rigid vehicles with four or more axles and all articulated vehicles. Also included in this class are OGV1 goods vehicles towing a caravan or trailer;
Buses and Coaches	**(PSV)** Includes all public service vehicles and works buses with a gross vehicle weight of 3.5 tonnes or more, usually vehicles with more than 16 seats;
User Specified	There is a facility within the program for the user to input an additional vehicle category, however its use will be a rare occurrence. It can only be used if the appropriate values of time, occupancy, vehicle operating costs and vehicle proportions by flow group are available for the input category. An example of its use could be to test the sensitivity of a high proportion of cars with trailers in the traffic mix.

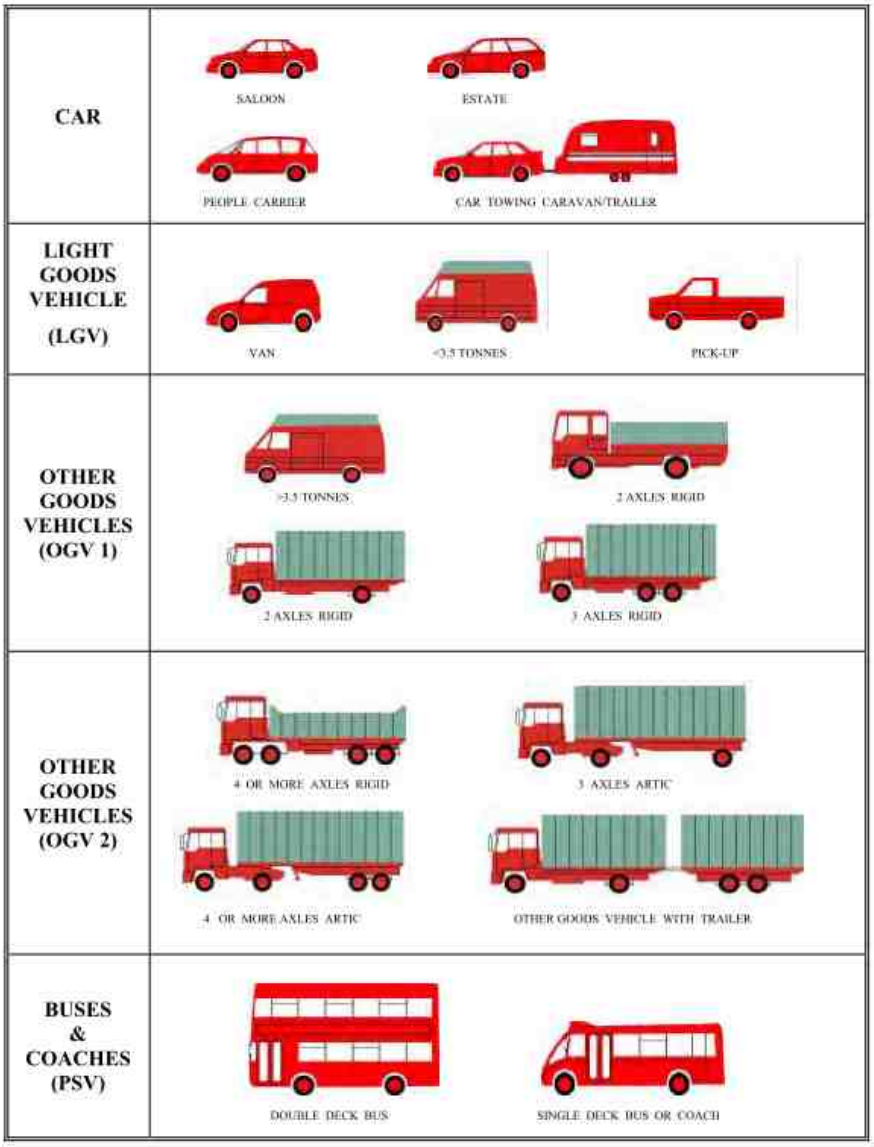

Figure 8/1: COBA Vehicle Categories

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UNITED BY OUR DIFFERENCE

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WEST BERKSHIRE COUNCIL - HOUSING ALLOCATION SITES, CALCOT VISSIM ASSIGNMENT

Traffic Assessment

20/10/2015

Quality Management

Issue/revision	Issue 1	Revision 1	Revision 2	Revision 3
Remarks	Draft for client comments	FINAL – updated with comments	FINAL – updated with minor comments	
Date	4 March 2015	5 May 2015	20 October 2015	
Prepared by	Zoltan Tosaki	Zoltan Tosaki	Zoltan Tosaki	
Signature				
Checked by	Craig Drennan	Craig Drennan	Craig Drennan	
Signature				
Authorised by	Craig Drennan	Craig Drennan	Craig Drennan	
Signature				
Project number	70009190	70009190	70009190	
Report number				
File reference	\\ser01bas1uk.uk.wspgroup.com\projects\70009190 - W Berks Housing Site Allocations TA work\C Documents\Reports\West Berkshire Housing Site Allocations VISSIM FINAL_20151020.docx			

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The transport modelling that has been carried out under the terms of our appointment and described in this report has been carried out using VISSIM (version 5.40). Transport modelling software of this type provides predictions of transport flows on the basis of a number of assumptions. The assumptions made in developing the transport model have been identified within this report.

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WEST Berkshire Council - Housing Allocation Sites, Calcot VISSIM assignment

Traffic Assessment

20/10/2015

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Table of Contents

1 Introduction

1.1.1 The 'West Berkshire Housing Site Allocations Development Plan Document – Preferred Options Consultation July 2014' sets out the preferred sites across West Berkshire for delivering the remaining homes needed to meet the 10,500 allocation for the District from 2006 – 2026.

1.1.2 West Berkshire Council (WBC) has asked for assistance with transport assessment work for the currently preferred sites in order to:

- be satisfied that they are deliverable
- be aware of the impact they will have on the transport network
- highlight the likely areas of facilitation and mitigation that will be required
- help inform final decisions regarding which sites are acceptable to go forward for allocation in the DPD

1.1.3 The main focus of this report is the impact on the existing highway network of the development sites outlined in the West Berkshire Housing Site Allocations Development Plan Document (HSA DPD). This document will help the Council to understand and mitigate where appropriate the traffic implications of the proposed sites.

1.1.4 This forms the second of two assessments. The first has been carried out using the West Berkshire Transport Model, covering Newbury, Thatcham, Woolhampton and Theale.

1.1.5 This second report has been produced to assess the effect of the generated HSA development traffic on the A4 corridor in the Calcot area. Micro-simulation modelling using VISSIM has been used as the basis to provide transportation advice on the impacts of the proposed HSA housing allocations in the west of Reading, around M4 Junction 12.

1.1.6 This report sets out the inputs, methodology and results of the forecasting. The report is structured as follows:

- **Section 2** provides an overview of the base and forecast models
- **Section 3** provides details on the development of the model scenario which includes the HSA sites
- **Section 4** provides the conclusions to the assessment

2 VISSIM modelling

2.1 Introduction

2.1.1 A VISSIM micro-simulation model of the A4 corridor at Calcot was developed by WSP on behalf of WBC in 2008. The model was calibrated and validated to 2008 observed traffic data for both time periods and was subsequently used to assess various highway schemes and developer proposals. The results demonstrated that the 2008 AM peak and PM peak models are suitable for the purpose of testing highway schemes and forecast traffic levels on the local highway network.

2.1.2 Each peak period model represents the peak hour itself, during which the above traffic levels are loaded onto the network and the model outputs are analysed. This also includes a 15-minute 'warm-up' period, during which a small amount of traffic loaded in order to ensure the VISSIM network is populated by the start of the peak hour. The impacts of the proposed developments have been assessed for the AM peak and PM peak periods:

- 07:45-08:45 for the AM peak
- 17:15-18:15 for the PM peak

2.1.3 The model covers the A4 corridor from M4 Junction 12 in the west to the junction with Langley Hill in the east as shown in figure 2.1.

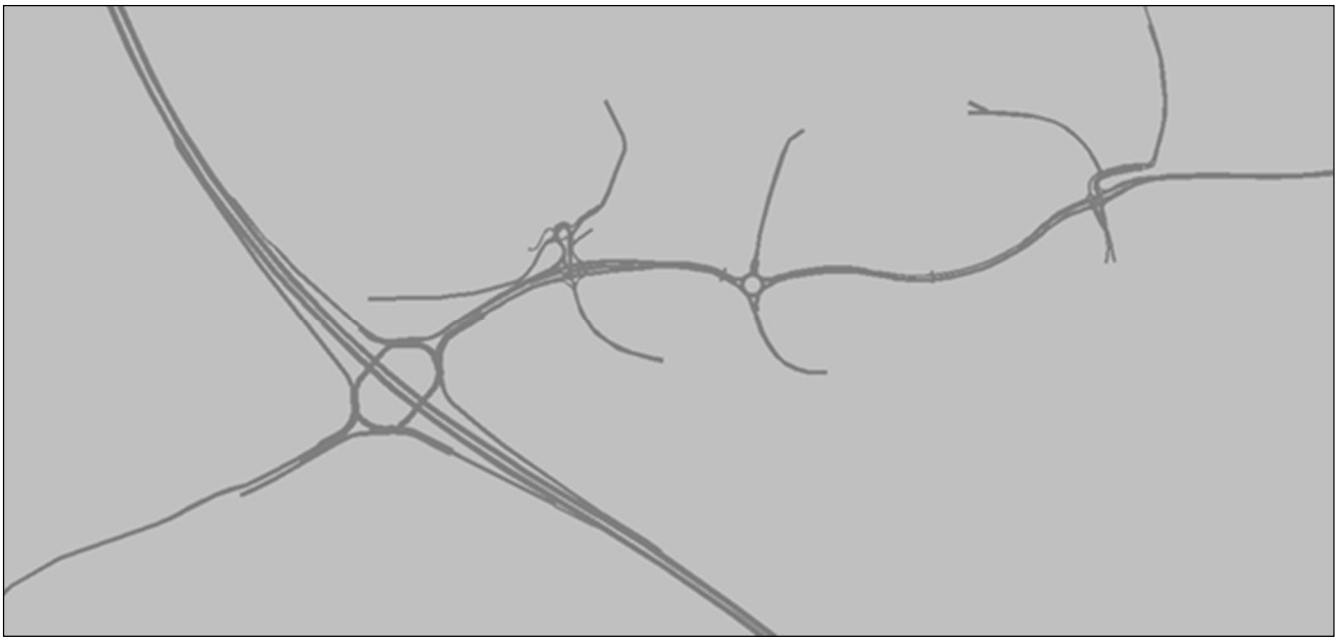

Figure 2.1: VISSIM model extent

2.2 Forecast traffic growth

2026 Reference Case

2.2.1 The Trip End Model Presentation Program (TEMPRO) is a software tool that provides projections of growth over time for use in transport models, based on outputs from the National Trip End Model (NTEM) which is a nationally-consistent benchmark of growth. Traffic growth factors for cars are obtained from the NTEM version 6.2 datasets accessed through the TEMPRO version 6.2 program.

2.2.2 To calculate goods vehicle growth, the Regional Traffic Forecast model (RTF 13) is used, which is based on the National Transport Model and provides vehicle kilometres for each vehicle types for each regions and road types. The latest data is from 2013, and it contains historic and forecast data between 2003 and 2040.

2.2.3 The VISSIM model has a base year of 2008 therefore traffic growth between 2008 and 2013 has been calculated using the TEMPRO program for cars and RTF 13 tables for light and heavy good vehicles.. This allows the base year VISSIM model to have the same base year as the West Berkshire Traffic Model (WBTM) strategic model.

2.2.4 The methodology used to calculate forecast growth is that used in the WBTM. For the growth within the VISSIM model the WBTM has been used to calculate traffic growth between the base year of 2013 and the forecast year of 2026. Growth within the WBTM has been calculated using the TEMPRO program and RTF13 database and the methodology is described in the *'Traffic Assessment of West Berkshire HSA DPD Sites using WBM.pdf'* (March 2015) report.

2.2.5 This growth does not include the trips generated by the HSA developments and the committed development .

2.2.6 Traffic growth factors between 2008 and 2026 were calculated by combining traffic rates between 2008-2013 and 2013-2026. Table 2.1 shows traffic growth factors for both the AM peak and PM peak periods.

Table 2.1: Background traffic growth rates

AM		PM	
Lights	Heavies	Lights	Heavies
109%	111%	112%	110%

2.2.7 One committed development has been included within the 2026 Reference Case model (IKEA development - Application number: 11/00218/COMID). The calculated and applied figures consider the December 2014 application which includes for a 18% reduction in arrival and departure trips. The committed development trips which have been included within the 2026 forecast year VISSIM are summarised in table 2.2.

Table 2.2: Considered committed development trips in the model

	AM		PM	
Site ID	Arrival	Departure	Arrival	Departure
IKEA	0	0	290	255
Total	0	0	290	255

Adjustment in background traffic

2.2.8 The initial 2026 Reference Case VISSIM model showed that the AM peak model performed well in terms of the level of traffic on the A4 and other roads. However the 2026 Reference Case PM peak model showed significant right turning traffic at the A4 Bath Rd / Dorking Way junction from A4 Bath EB which exceeded the capacity of the right turn in the VISSIM model. This caused continuous traffic build up in the area which considering the availability of parallel routes to the A4 eastbound deemed to be unrealistic. This is mainly due to the fact that the existing 2008 calibrated and built VISSIM models use static assignment, which does not allow much flexibility for route choices.

2.2.9 Figure 2.1 shows that the model network does not allow for route choice as the routes north and south of the A4 Bath Road are not connected.

2.2.10 A manual origin and destination survey was undertaken by WBC in November 2013 in the Calcot area and it was agreed with WBC that this survey should be used to adjust the 2026 Reference Case origin and destination AM peak and PM peak matrices. This survey showed that of the traffic which turns right from the A4 into Dorking Way, 30 per cent rejoins the A4 further east, having used Dorking Way/Charrington Road as a rat-run. This traffic re-joins the A4 Bath Road either at the A4 Bath Rd / Charrington Road roundabout or the A4 Bath Road / Langley Hill signalised junction.

2.2.11 The A4 widening scheme will reduce 'rat running' traffic, due to the capacity it adds to the A4. The effect of this will be more traffic on the A4, but fewer turning movement to/from Dorking Way and Charrington Road, which would further reduce conflicting movements at A4 Bath Rd / Dorking Way junction and A4 Bath Rd / Charrington Road roundabout.

2.2.12 It was agreed with WBC that a proportion of that traffic uses the Dorking Way/Charrington Road route as a rat run in favour of bypassing congestion on the A4 eastbound. It was not thought to be realistic that traffic would use local roads in favour of the A4 route.

2.2.13 Additionally it is assumed that part of the traffic from the A4 Bath Road eastbound wanting to access Charrington Road use Dorking Way instead thus avoiding the A4 Bath Road. As a result the 2026 Reference Case PM peak background traffic demand matrices were updated using the information from the 2014 origin and destination survey, and 30% of traffic from the east of the model was moved to access Charrington Road via the A4 Bath Road / Charrington Road junction rather than turn right at the A4 Bath Road / Dorking Way junction.

2.2.14 Further adjustments to the 2026 Reference Case were made to the AM peak and PM peak trip matrices as the right turn from Dorking Way northbound at the A4 Bath Road / Dorking Way junction is not available. Trips from this zone to eastern zones of the model now use the A4 Bath Road / Charrington Road roundabout to access the network.

2.3 Network updates

2026 Reference Case

2.3.1 The 2026 Reference Case scenario includes the following highway improvements:

- As-built improvement at A4 / Langley Hill junction
- As-built improvement at M4 J12
- IKEA proposed improvement at the A4 / Dorking Way junction
- A4 widening between A4 / Langley Hill junction and A4 / Charrington Rd roundabout

2.3.2 The drawings of the junctions are included in Appendix A. Signal timings as developed for the assessment of the A4 widening which were derived from LINSIG optimisation for both the A4 Bath Road / Dorking Way junction and the M4 Junction 12. Whilst the latter is controlled by MOVA and a dataset was extracted to enable average observed timings to be calculated, the internal clock was incorrect and so the dataset was meaningless.

2.3.3 An existing LINSIG model previously produced for the assessment of the new design was utilised to provide signal timings. The A4 / Langley Hill junction also operates under MOVA signal control and average timings were obtained from on-site observations during the peak hours on a mid-week day in January 2015.

2.3.4 While these signals were optimised for 2014 traffic, it was assumed that the 2026 Reference Case and the Assessment scenarios would operate well with these signals and in case of unacceptable queuing, mitigation measures can be undertaken to improve the operation of these traffic signal junctions.

2.3.5 The 2026 Assessment Option scenarios and 2026 Reference Case scenarios are identical regarding network improvements.

2026 Assessment Options

2.3.6 The same background- and committed development traffic were considered for the 2026 Assessment Option scenarios as for the 2026 Reference Case models. Additionally for background and committed development traffic, development traffic for the assessed housing allocations has been derived.

2.3.7 Table 2.3 shows which housing allocation sites were considered for the 2026 Assessment Options. The development traffic for site 1 to site 12 in table 2.3 has derived from the WBTM strategic SATURN model with the impacts reported on in the *Traffic Assessment of West Berkshire HSA DPD Sites using WBM.pdf*' (March 2015) report

2.3.8 The associated Transport Assessments (TA) for site 14 to site 16 shown in table 2.3 have been used to derive the development traffic for the 2026 Assessment Option VISSIM model. These three sites are not specifically included in the model, but the generated traffic from these sites to South Reading (16% of traffic generation) is considered in the model.

2.3.9 Traffic information for sites 13, 17 and 18 were used from 'Housing Allocations DPD Preferred Options - West Berkshire Council July 2014' (HA DPD)

Table 2.3: Housing Site Allocations

DPD site reference	Site	Description	Total Size Dwellings	Source
NEW012	1	Land north of Newbury College	23	WBTM
NEW042	2	Land at Bath Road, Speen	100	WBTM
NEW042	3	Land at Coley Farm, Stoney Lane	75	WBTM
NEW047D	4	Land to the north of Haysoms Drive and land adjoining Equine Way, SE Newbury	120	WBTM
NEW106	5	Land at Moor Lane Depot, Newbury	40	WBTM
THA025	6	Lower Way, Thatcham	87	WBTM
COL002	7	Land at Poplar Farm, Cold Ash	20	WBTM
WOOL006	8	Land to the north of the A4, Woolhampton	30	WBTM
THE003	9	North Lakeside, Theale	50	WBTM
THE009	10	Land between the A340 and The Green, Theale	125	WBTM
THE005	11	Land at Junction 12, Theale	50	WBTM
THE001	12	Former Sewage Works, Theale	88	WBTM
EUA007	13	Tunhams Farm (Pincents Lane)	285	HA DPD
EUA008/3	14	Stonehams Farm	44	TA
EUA031	15	Land east of Sulham Hill	29	TA
EUA033	16	Land east of Long Lane and south of Blackthorn Close	30	TA
EUA025	17	Land adjacent to M4 Jcn12	Up to 100	HA DPD
EUA026	18	Land adjacent to Bath Road and Dorking Way	24	HA DPD

3 Assessment results

3.1 2026 AM peak forecast scenarios

3.1.1 Table 3.1 shows the network performance indicators for the AM peak and show little difference between the 2026 Reference Case (RC) (without Housing Site Allocations) and the Assessment Option (HSA) (with Housing Site Allocations) in the AM peak period. The average delay time per vehicle increases from 47 seconds to 50 seconds which is a 6% increase. The average speed of the vehicles decrease by 3%.

Table 3.1: Network Performance Indicators – AM peak

	AM Peak			
Parameter	RC	HSA	Diff	% Diff
Average delay time [s]	47	50	3	6%
Average speed [mph]	40	39	-1	-3%
Total travel time [h]	1046	1083	37	4%

3.1.2 Table 3.2 shows the journey time results for the AM peak. The journey time sections include delays along A4 in the model the approaches4 J12, and at the approaches of A4 Bath Rd / Langley Hill junction. Due to the additional traffic generated by the HSA developments journey times on the A4 Bath Road between the A4 Bath Road / Langley Hill junction and M4 Junction 12 do not change much in the eastbound direction, however it an increases in the westbound direction from 4 minutes 4 seconds to 4 minutes 24 seconds which is a 8.3% increase. This increment is mainly accumulated on the westbound approach to A4 / Dorking Way junction.

Table 3.2: Journey time results – AM peak

			AM Peak			
Route	From	To	Ref Case [mm:ss]	HSA [mm:ss]	Diff [mm:ss]	Diff [%]
A4 EB	M4 J12	Langley Hill Jcn	04:20	04:22	00:02	1.0%
A4 WB	Langley Hill jcn	M4 J12	04:04	04:24	00:20	8.3%

3.1.3 Table 3.3 shows the average queue lengths at key junctions and show little difference between the 2026 Reference Case and 2026 Assessment Option models for the AM peak period. The average queue lengths generally increase for the 2026 Assessment Option but in most cases the difference is minimal.

3.1.4 Passenger car units (pcu) are frequently used in traffic assessment work and are based on the principal of translating all vehicles into one common traffic currency. A pcu equivalent is essentially the impact that a mode of transport has on traffic variables (such as headway, speed, density) compared to a single car. This is achieved by apportioning different pcu values to different types of traffic.

3.1.5 The biggest queue increase is at A4 Bath Rd / Dorking Way, where queue length increases from 4 pcu (25metres) to 9 pcu (50 metres) on the westbound approach.

Table 3.3: Average queue lengths – AM peak

		Average queue length [m]		
Junction	Arm	Ref Case	HSA	Diff
A4 Bath Rd / Langley Hill	A4 (EB)	19	20	1
	A4 (WB)	14	14	0
	A4 RT (WB)	7	6	-1
	Old Bath Rd (SB)	99	110	11
	Pollards Way (NB)	15	15	0
	A4 LT (EB)	8	8	0
A4 Bath Rd / Charrington Rd	A4 (EB)	1	1	0
	Royal Avenue (SB)	1	1	0
	A4 (WB)	1	4	3
	Charrington Road (NB) LT	4	5	1
	Charrington Road (NB) RT	1	2	1
A4 Bath Rd / Dorking Way	A4 LT (EB)	2	2	0
	A4 Ah (EB)	11	11	0
	A4 RT (EB)	3	3	0
	Sainsbury LT (SB)	4	5	1
	Sainsbury Ah/RT (SB)	17	21	4
	A4 RT (WB)	16	18	2
	A4 Ah (WB)	25	50	25
M4 Junction 12	M4 (SB)	31	31	0
	A4 LT (EB)	1	2	1
	A4 Ah/RT (EB)	6	7	1
	M4 (NB)	19	19	0
	A4 (WB)	44	59	15

3.1.6 The 2026 forecast network is not congested in general, and the network can cope well with the increased traffic level. In general the westbound traffic is heavier in the HSA scenario option.

3.1.7 Figure 3.1 and figure 3.2 show vehicle speeds for a 5 minutes period, between 08:10 and 08:15 for the AM Reference Case and the HSA Scenario options.

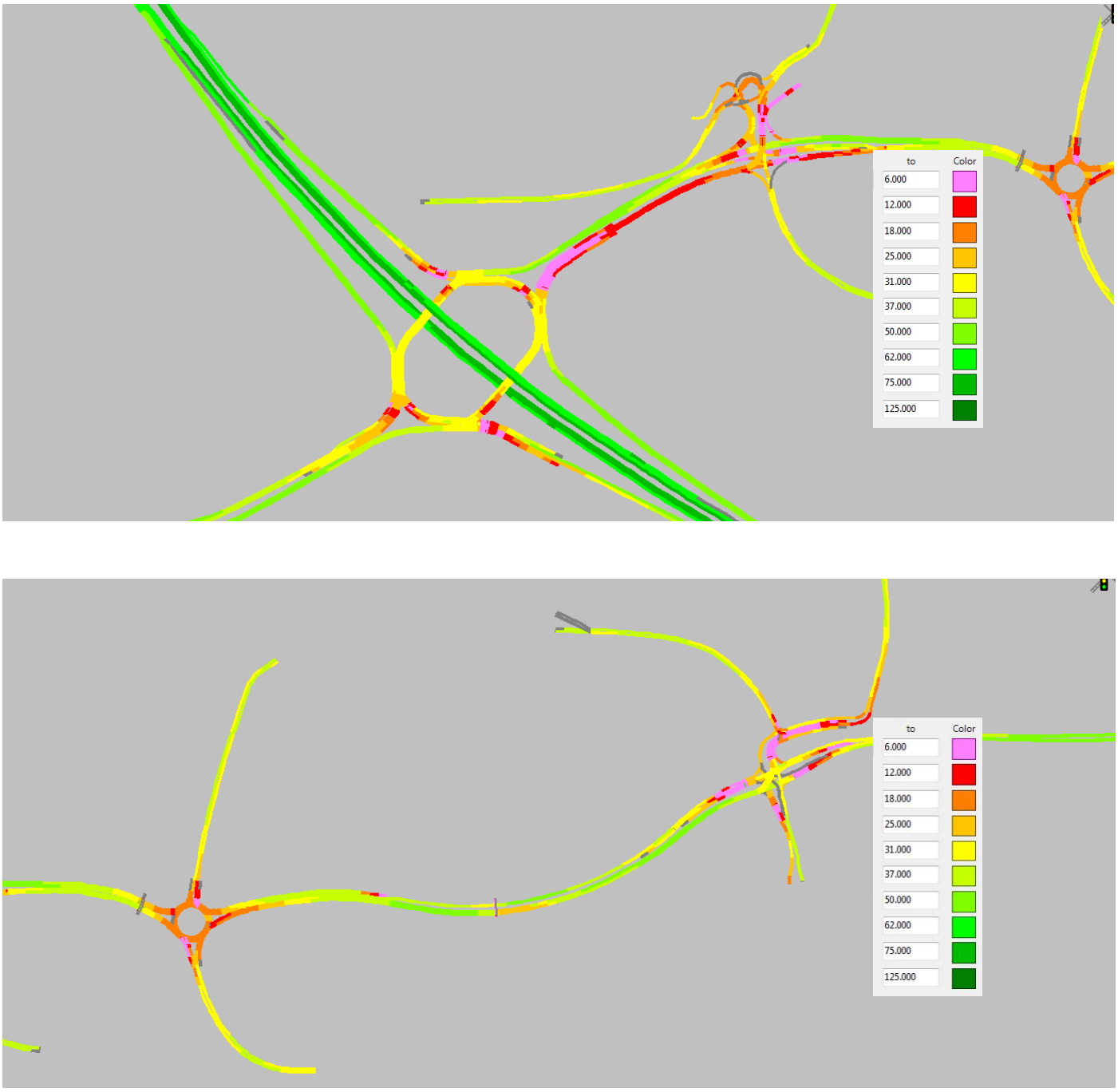

Figure 3.1: 2026 Reference Case - Average speed (08:10-08:15)

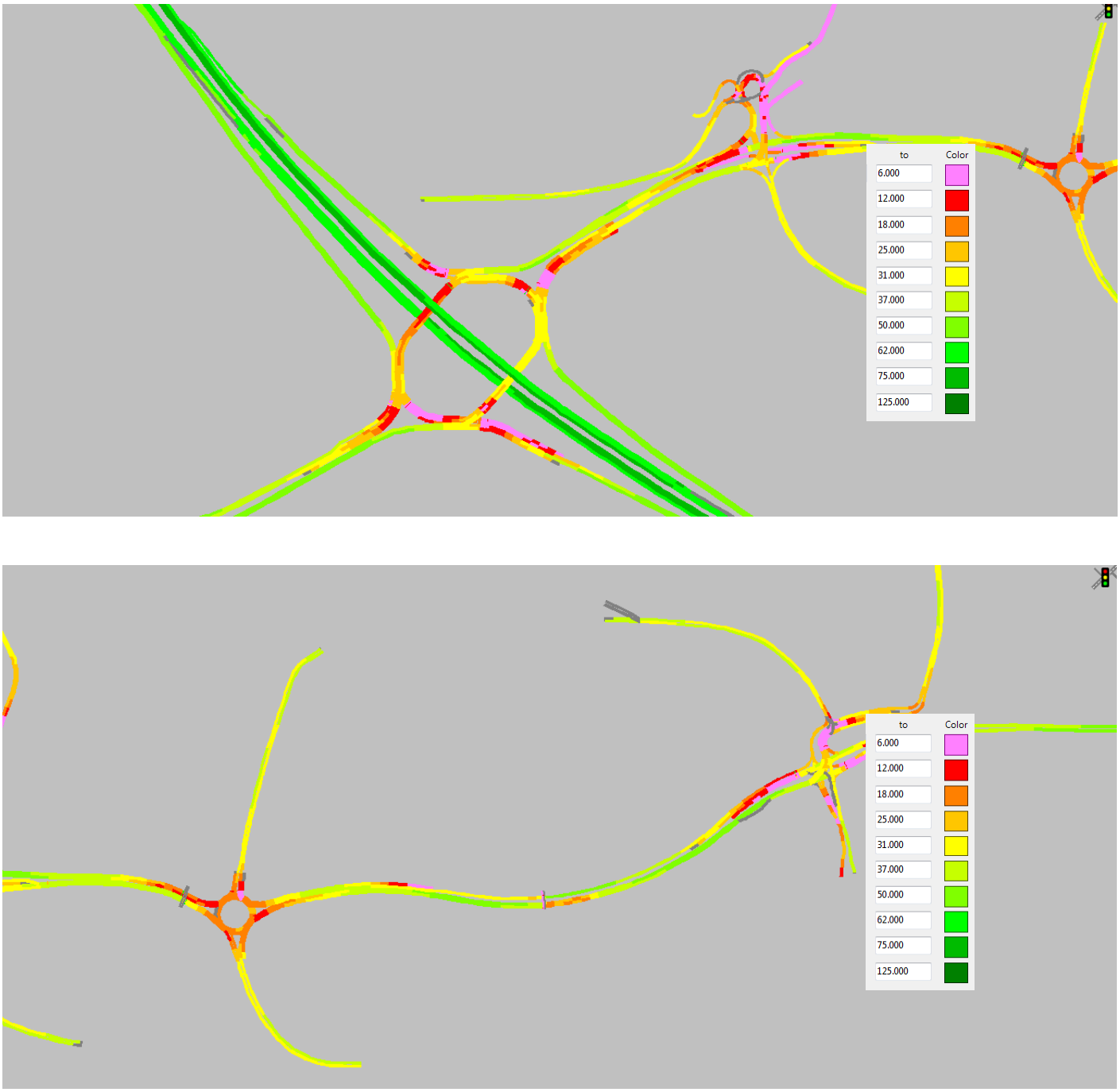

Figure 3.2: 2026 Assessment Option - Average speed (08:10-08:15)

3.2 2026 PM peak forecast scenarios

3.2.1 Table 3.4 shows the network performance indicators for the AM peak and show greater differences between the 2026 Reference Case (RC) and the Assessment Option (HA) in the PM peak period. The average delay time per vehicle increases from 54 seconds to 61seconds which is a 14% increase.

3.2.2 The increased delays reduce the average speed in the network which is changes from 39mph to 37mph which is a 3% reduction.

Table 3.4: Network Performance indicators - PM peak

	PM Peak			
Parameter	RC	HSA	Diff	% Diff
Average delay time [s]	54	61	7	14%
Average speed [mph]	39	37	-1	-3%
Total travel time [h]	1136	1194	58	5%

3.2.3 Table 3.5 shows the journey time results for the PM peak. Due to the additional traffic generated by the HSA developments journey times on the A4 Bath Road between the A4 Bath Road / Langley Hill junction and M4 Junction 12 do not increase significantly.

Table 3.5: Journey time results - PM peak

			PM Peak			
Route	From	To	Ref Case [mm:ss]	HSA [mm:ss]	Diff [mm:ss]	Diff [%]
A4 EB	M4 J12	Langley Hill Jcn	04:57	05:09	00:11	3.8%
A4 WB	Langley Hill jcn	M4 J12	03:44	03:46	00:03	1.1%

3.2.4 Table 3.6 shows the average queue lengths at key junctions and show little difference at A4 Bath Rd / Langley Hill and A4 Bath Rd / Charrington Rd junctions between the 2026 Reference Case and 2026 Assessment Option models for the PM peak period. Queue lengths increases at A4 Bath Rd / Dorking Way junction by 2 pcu on the southbound and on the westbound approach.

Table 3.6: Average queue lengths - PM peak

		Average queue length [m]		
Junction	Arm	Ref Case	HSA	Diff
A4 Bath Rd / Langley Hill	A4 (EB)	20	20	0
	A4 (WB)	14	14	0
	A4 RT (WB)	6	6	0
	Old Bath Rd (SB)	30	31	1
	Pollards Way (NB)	57	59	2
	A4 LT (EB)	18	17	-1
A4 Bath Rd / Charrington Rd	A4 (EB)	12	14	2
	Royal Avenue (SB)	1	1	0
	A4 (WB)	3	3	0
	Charrington Road (NB) LT	0	1	1
	Charrington Road (NB) RT	1	1	0
A4 Bath Rd / Dorking Way	A4 LT (EB)	2	4	2
	A4 Ah (EB)	20	21	1
	A4 RT (EB)	15	22	7
	Sainsbury LT (SB)	67	77	10
	Sainsbury Ah/RT (SB)	73	81	8
	A4 RT (WB)	21	33	12
	A4 Ah (WB)	12	12	0
M4 Junction 12	M4 (SB)	6	7	1
	A4 LT (EB)	2	2	0
	A4 Ah/RT (EB)	11	11	0
	M4 (NB)	16	26	10
	A4 (WB)	15	15	0

3.2.5 Figure 3.3 and figure 3.4 shows average vehicle speeds for 5 minute period between 17:40-17:45.

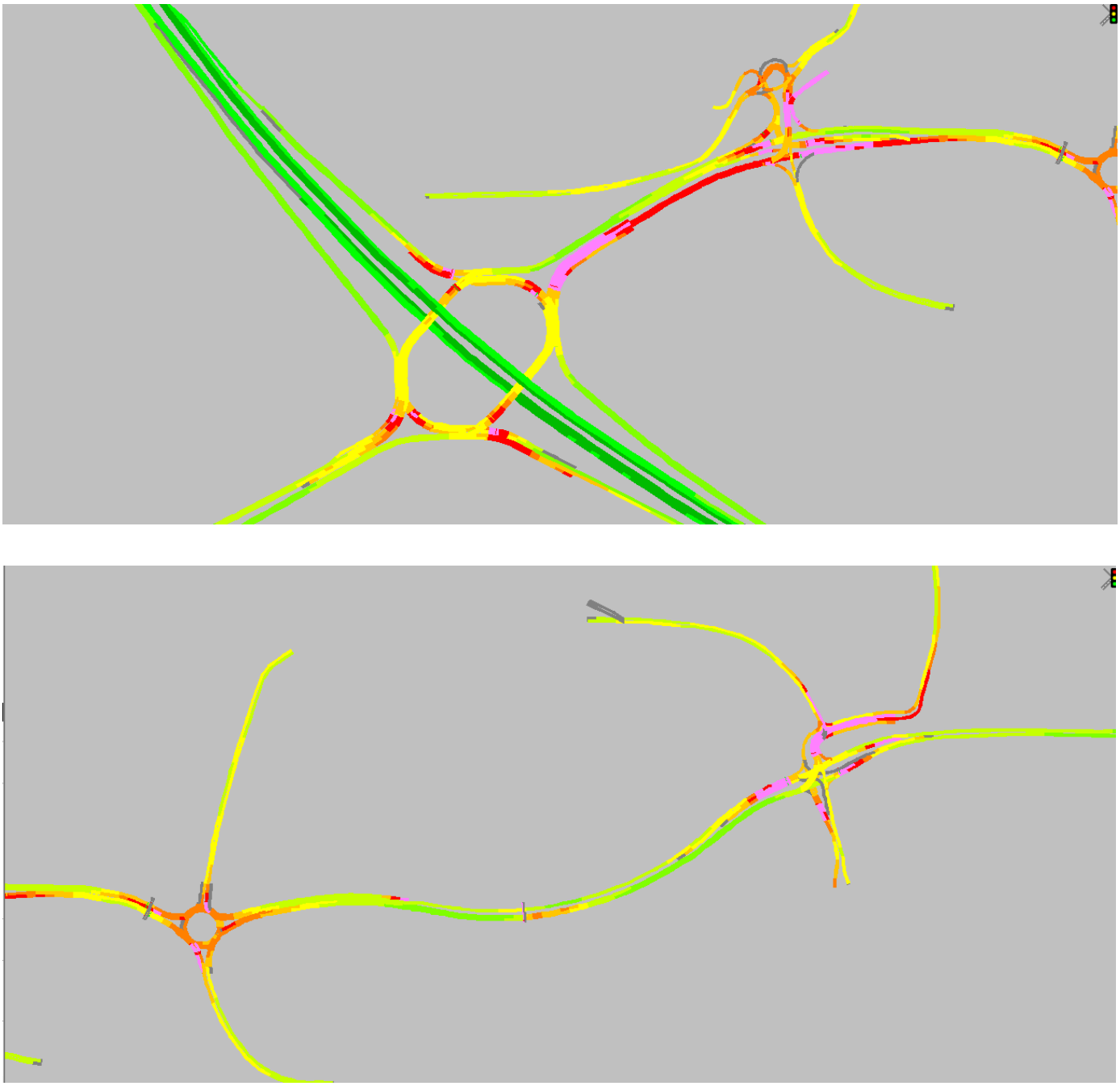

Figure 3.3: 2026 Reference Case - Average speed (17:40-17:45)

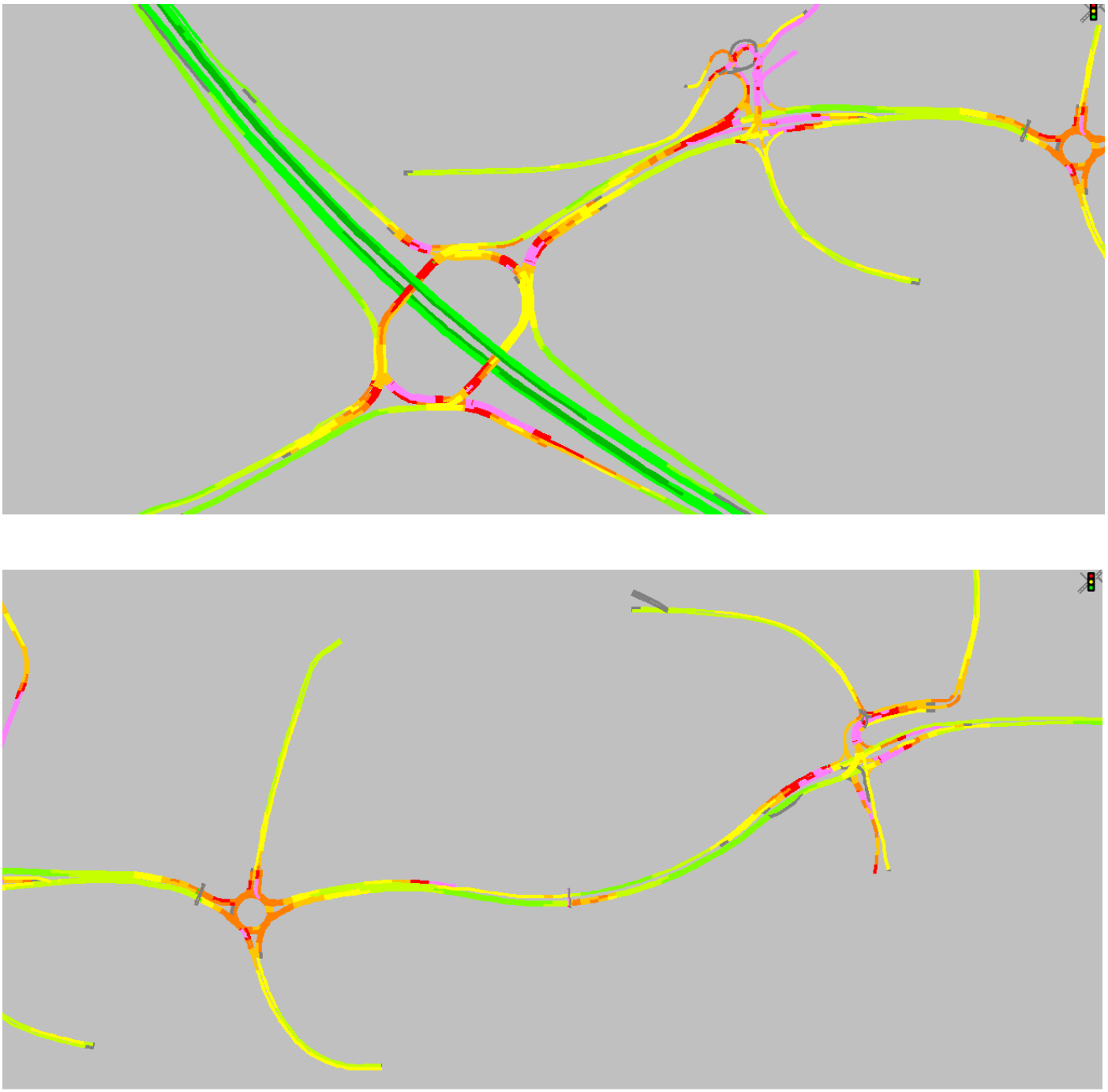

Figure 3.4: 2026 Assessment Option - Average speed (17:40-17:45)

4 Conclusions

4.1.1 The HSA development sites that have been assessed represent a worst case scenario for modelling, as all sites are considered at their maximum size and fully developed state.

4.1.2 Queuing and delays appear in both the 2026 Reference Case and 2026 Assessment Option models, and would appear to be created by general increase in traffic rather than as a direct result of the addition of the development traffic.

4.1.3 The VISSIM model results show that the proposed HSA development has only a marginal effect in the 2026 forecast year AM peak period where the queue length, delays and journey times increase only slightly due to the addition of the HSA development traffic.

4.1.4 In the PM peak period queue lengths are generally very similar in both the 2026 Reference Case and the 2026 Assessment Option. However there is concern in the vicinity of Pincents Lane and the vicinity of the Sainsbury superstore. Table 3.6 shows some of the biggest increases in traffic queues in this location during the PM peak. This location is characterised by much activity including access to Pincents Lane, Sainsbury's, McDonald's, a filling station and a bus interchange.

4.1.5 Overall the HSA developments have a marginal impact on the operation of the A4 Bath Road corridor in the Calcot area.

Appendices

Appendix A

As built drawings

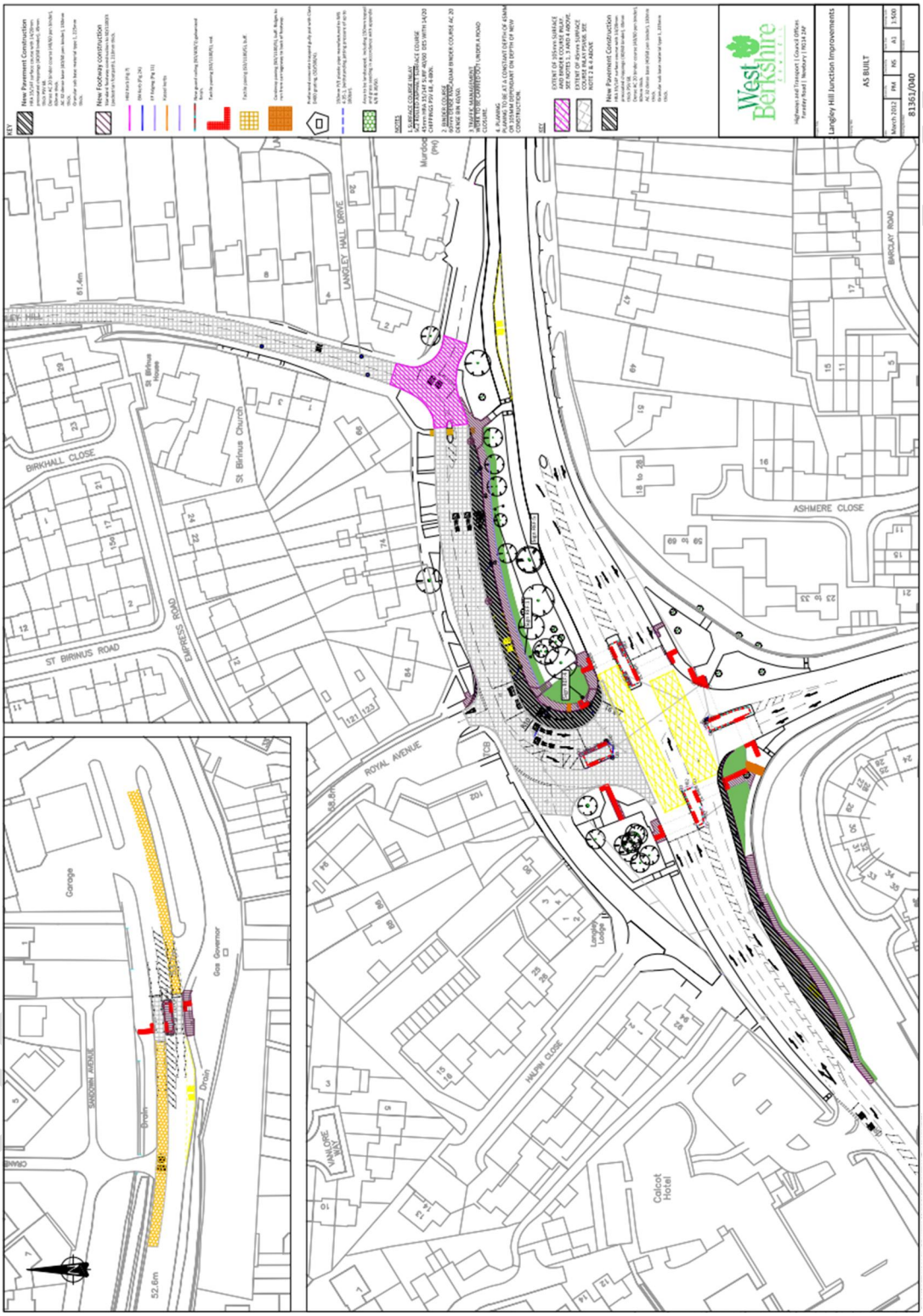

Figure A.1: Langley Hill junction improvements

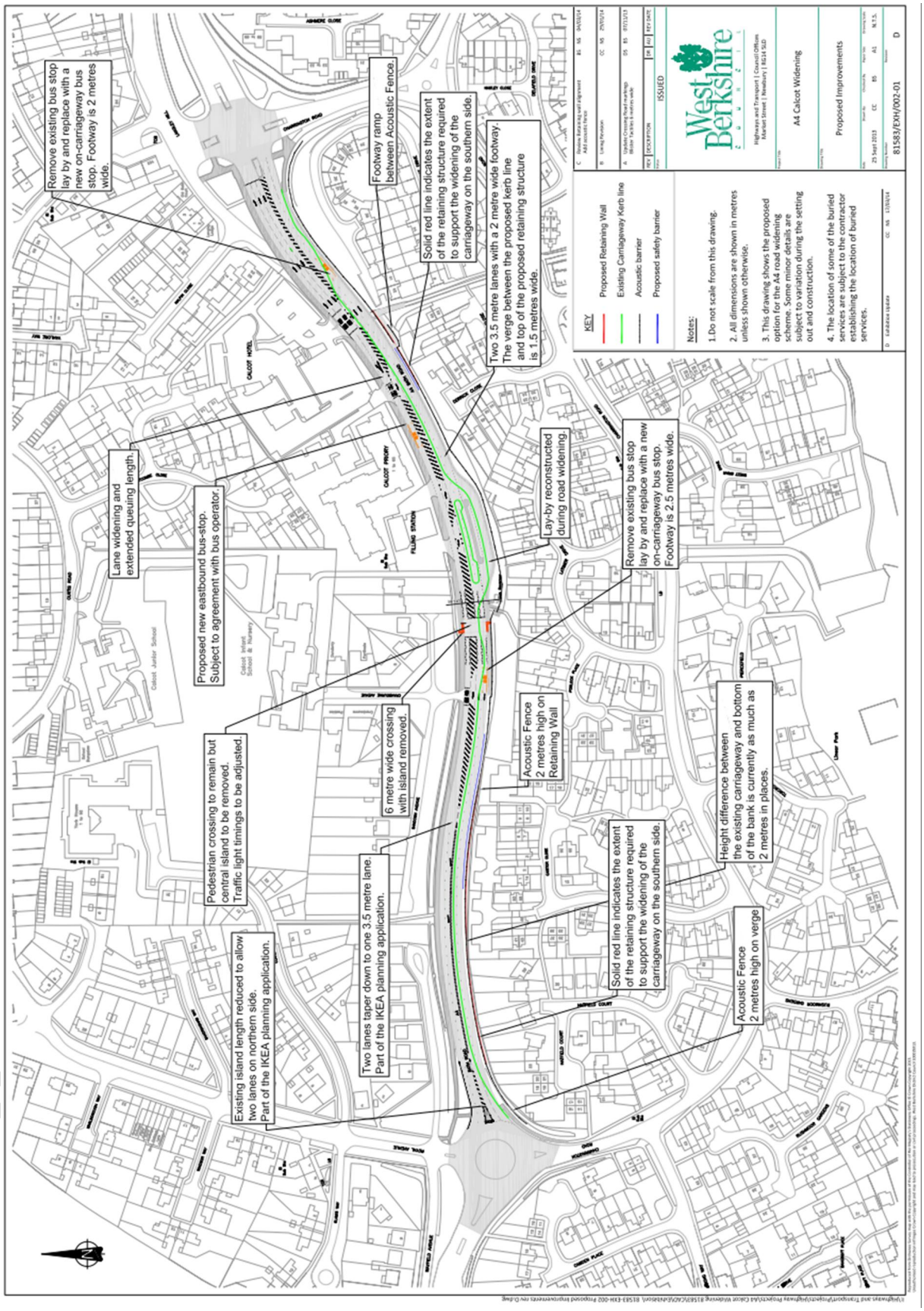

Figure A.2: A4 Calcot Widening

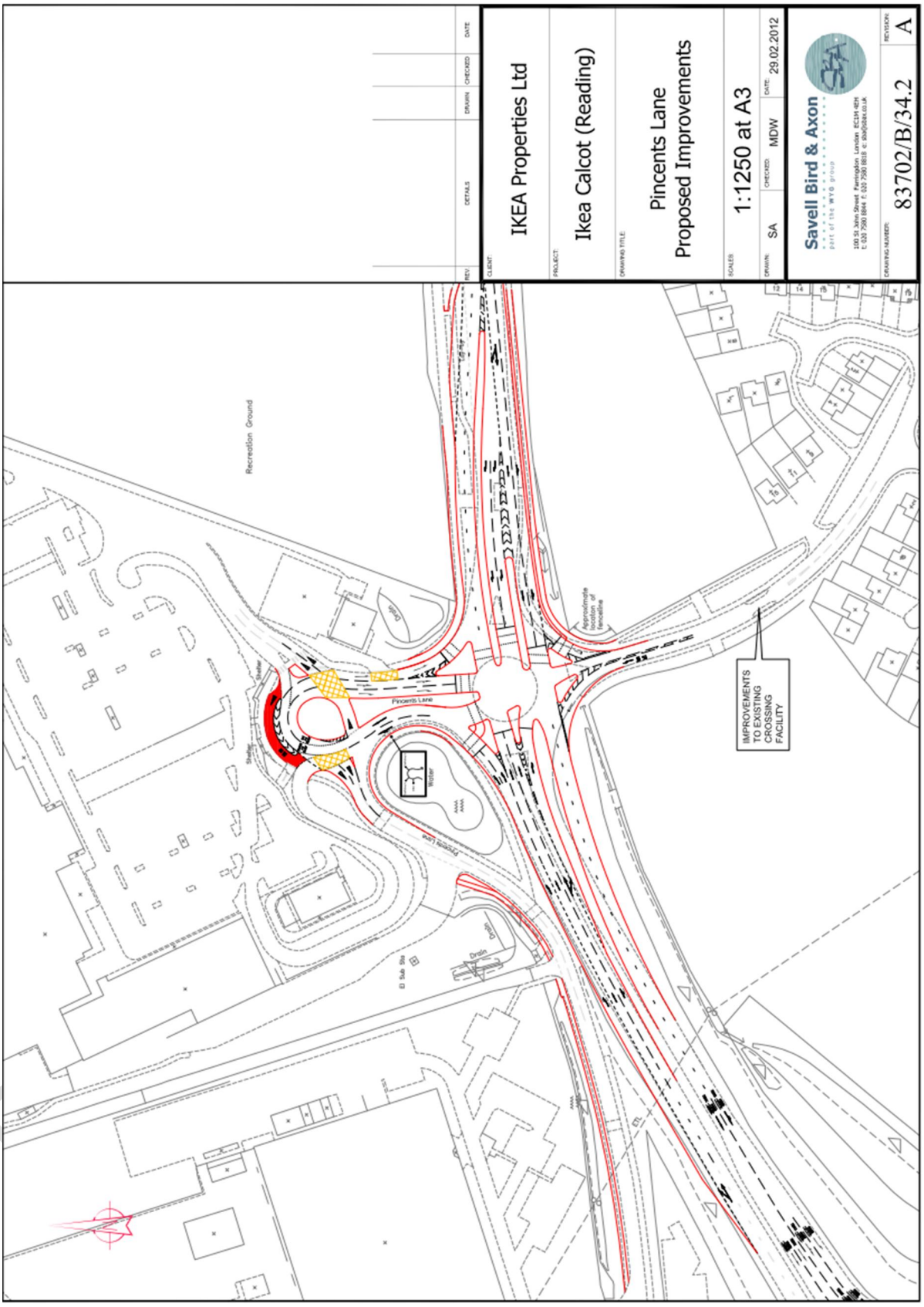

Figure A.3: Pincents Lane Proposed Improvements

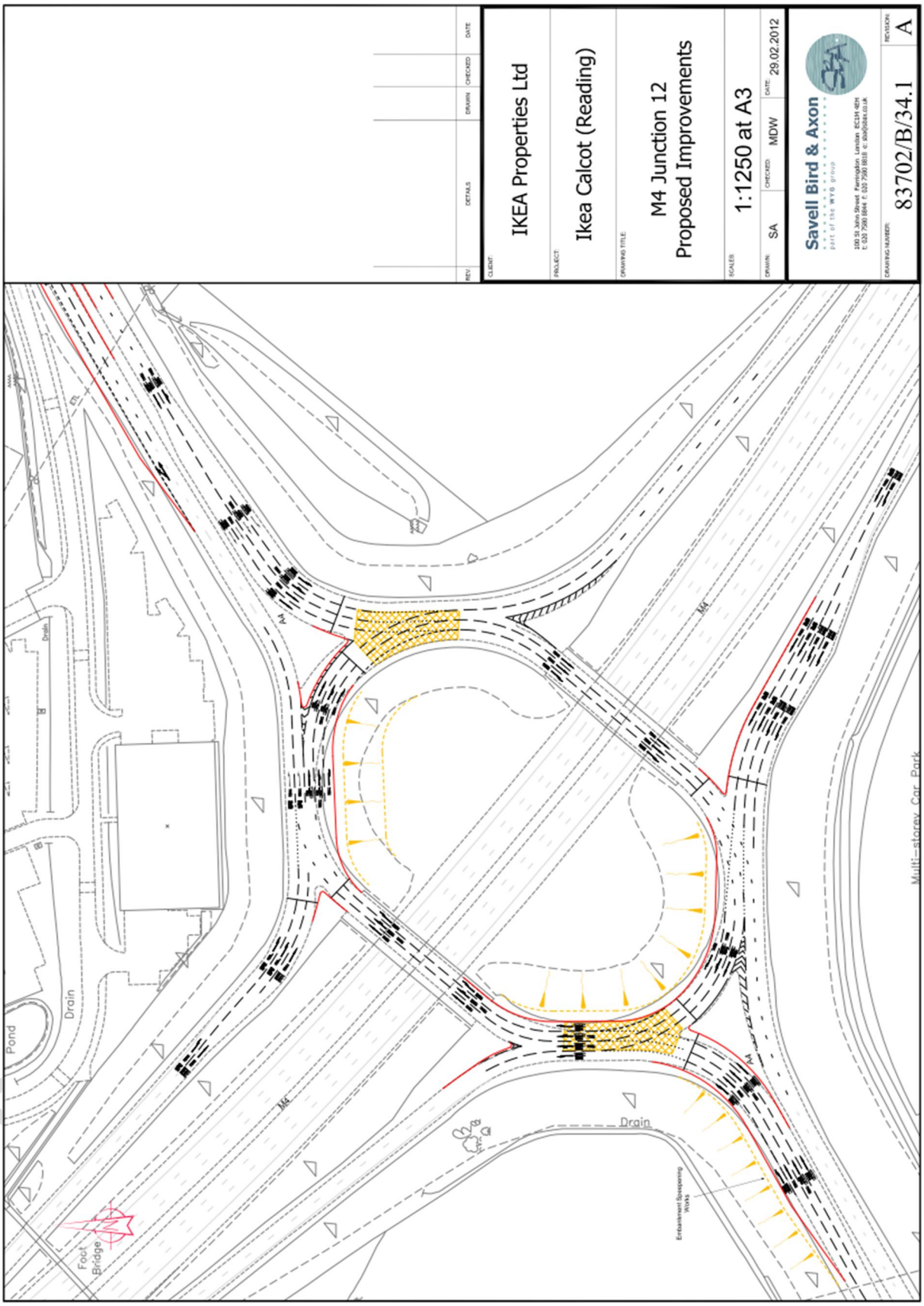

Figure A.4: M4 Junction 12 Proposed Improvements

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Burghfield Common Preferred Options Housing Sites:
Broad assessment of transport impact

Introduction

This note sets out the approach taken to considering the transport impacts of possible future housing development in Burghfield Common.

Background

Burghfield Common is one of two Rural Service Centres in the East Kennet Valley area of West Berkshire. As such it has a range of services and facilities for residents and will be a focus for development in this area.

The Preferred Options Housing Site Allocations Development Plan Document (HSA DPD) highlights two sites as being the preference for Burghfield Common. These sites are:

- Preferred Option 11 – Land to the rear of The Hollies Nursing Home and Land opposite 44 Lamden Way (a combination of SHLAA sites ref: BUR002, BUR002A and BUR004). This site would accommodate approximately 85 dwellings.
- Preferred Option 12 – Land adjoining Pondhouse Farm, Clayhill Road (SHLAA site ref: BUR15). This site would accommodate approximately 105 dwellings.

Further details relating to these sites can be found on pages 25 and 26 of the Preferred Options HSA DPD.

In addition to the sites outlined above, two planning applications for residential developments in Burghfield Common have been received by the Council. These applications are:

- Mans Hill: Planning ref: 14/00962/OUTMAJ (210 dwellings)
- Firlands Farm: Planning ref: 14/01730/OUTMAJ (129 dwellings)

The above planning applications were both refused (not on highways grounds) and the applicant in both cases lodged an appeal to the Planning Inspectorate.

Approach to transport assessment of Burghfield Common sites

Although the road network operates well in Burghfield Common, it is important to consider the transport impacts of the preferred sites. An initial view from the Council's Highways Development Control Service in relation to these sites was that the additional impact may be limited as traffic may disperse fairly equally east and west to and from the sites.

When considering the potential outcomes of the two appeals on the refused planning applications for Burghfield Common, the impact on the signal controlled Reading Road / Hollybush Lane junction was the main area of concern which needed greater investigation.

The Council does not have a transport model that covers this area of the District but as part of the Transport Assessments for the two refused planning applications, LINSIG models of the Reading Road / Hollybush Lane junction were submitted. A LINSIG model is the appropriate tool for modelling a signal controlled junction and determining how well it will operate under different modelled scenarios.

The LINSIG model was used to determine the combined impact of both residential developments (Mans Hill and Firlands Farm) for this junction. The AM and PM peak periods were modelled for a forecast year of 2020 which gave the following results:

- AM peak with Mans Hill and Firlands development flows: Practical Reserve Capacity is 6.2
- PM peak with Mans Hill and Firlands development flows: Practical Reserve Capacity is 7.5

In traffic engineering, the **practical reserve capacity (PRC)** of a traffic signal junction is a commonly used measure of its available spare capacity.

The practical reserve capacity is related to the degree of saturation of a traffic signal junction. A positive PRC indicates that a junction has spare capacity and may be able to accept more traffic. A negative PRC indicates that the junction is over capacity and is suffering from traffic congestion.

The results show a reduction in the PRC for the Reading Road / Hollybush Lane junction but even with flows from both developments (totalling 339 dwellings) the junction operates reasonably and with spare capacity.

Returning to the Preferred Options for Burghfield Common housing sites within the HSA DPD, it is considered that the impact on this traffic signal junction of both these preferred sites (totalling 190 dwellings) will not be as great as both the appeal sites. Therefore if both sites came forward as proposed this junction would continue to operate within capacity as it has been modelled to work with a higher number of dwellings.

Conclusion

The two preferred options for housing sites for Burghfield Common are not considered to have a significant impact on the highway network in the area. The modelling work that has taken place demonstrates that this growth can be accommodated without causing the junction of most concern to operate over capacity.

Each of the developments would, however, require a detailed Transport Assessment and Travel Plan to be submitted to demonstrate further how they can be accommodated without adversely affecting the local transport network.

Hungerford Preferred Options Housing Site Allocations:
Broad assessment of transprot impact

The West Berkshire Council Housing Sites Allocations DPD July 2014 put forward two sites as preferred options for new housing within Hungerford. Each of the two sites are located at opposite ends of the town, one in the North of Hungerford (Preferred Option 18), and the other at the southern end of the town (Preferred Option 17). Both sites were selected from a number of options due to the minimised impact that would occur following their potential development.

From these two options, there is a need to help prioritise one site to put forward as a housing site within Hungerford. In order to achieve this, a basic analysis of potential transport impacts on the local community has been undertaken using 2011 census data.

Methodology

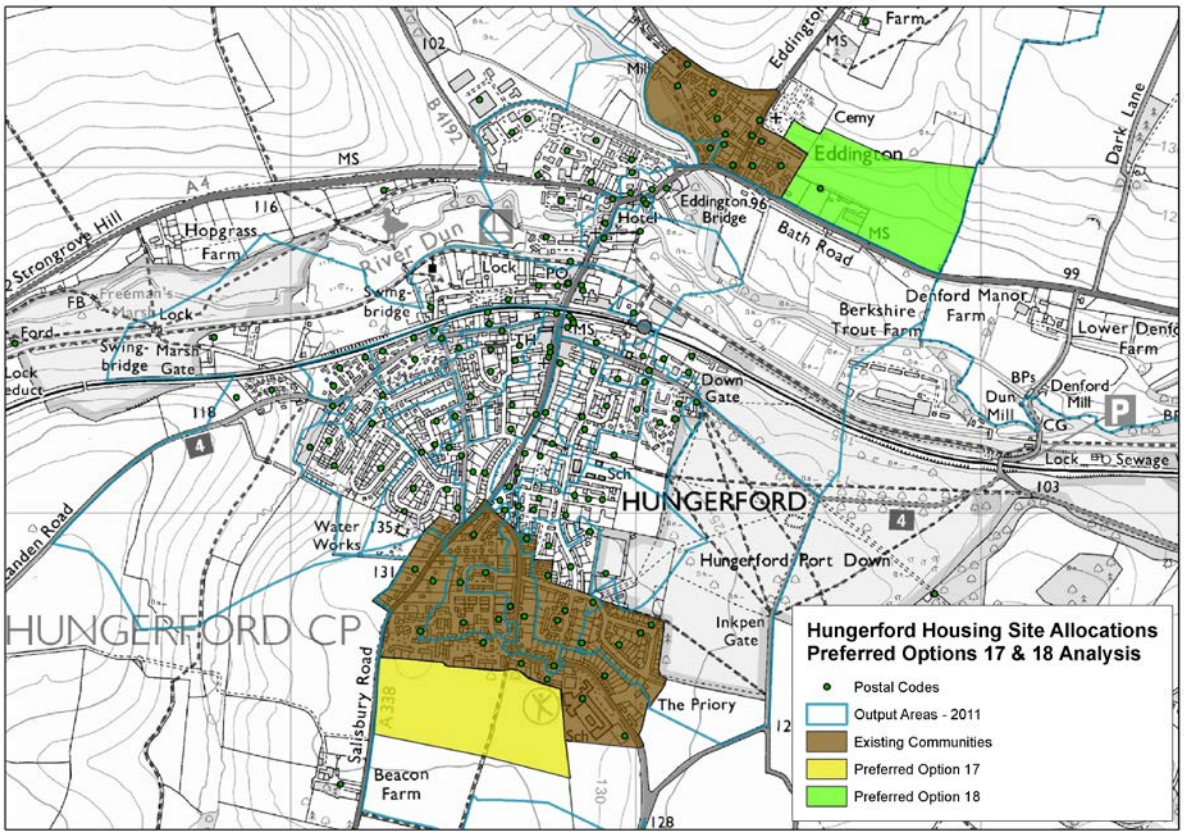
The impact of any new housing at the preferred housing options is achieved through a process of factoring 2011 census data taken from the surrounding communities to the proposed number of homes each site is potentially seen as accommodating. This requires assembling data for each Output Area (OA), and existing postcode locations.

Data covering a range of topics were assembled, including resident population, the number of dwellings, car ownership, and travel to work data. Output Areas display information for small groups of populations between 100 to 625 people, or between 40 and 250 households. These are the lowest geographical level for which census data is provided. However, the boundaries for OA's do not sit neatly in regards to the urban layout, and in some circumstances, the OA's are larger than the area required for analysis. Therefore, data from each OA is factored down to localised postal code points. This is achieved by counting the number of postcodes within each OA, and dividing the census data equally amongst each point. Using this methodology can then help to determine a more realistic picture of the local community which may be spread across multiple OA's.

Following this process of factoring down data from output areas to postcodes, boundaries were developed to determine the extent of the local community. Each of the postcodes within this boundary were combined to determine a picture of the local community. Upon the completion of this process, the data for the local community was factored-up to take account of the proposed housing numbers for each preferred option. The data then output from this process helps to determine the potential impact the new development may have on the existing communities and infrastructure within Hungerford.

Picture 1 shows the location of both preferred options, and the local communities used to factor the census data. The image also shows each postcode point, and outlines for the OA's.

Picture 1 – Hungerford Housing Site Allocations – Preferred Options 17 & 18



Preferred Option 17
The site is located adjacent to the southern settlement boundary of Hungerford, east of Salisbury Road (see Picture 1 – Yellow Box). While covering an area of 13 hectares, only five would be allocated for development, in the area between Salisbury Road and John O'Gaunt School. The allocated space for development could accommodate approximately 100 dwellings. Due to the sites location, and with easy access to services, facilities and the open countryside, there is good potential to encourage walking and cycling.

Any development on this site would allow for low to medium density development with a mix of sizes and types of dwellings. The site could also potentially support a new primary school, on land adjacent to the existing secondary school at John O' Gaunt as part of the scheme.

Community Boundary
The selected boundary used to establish the baseline values for the local community were as follows:

- All residences within the triangle bounded by Salisbury Road, Priory Road and the Boundary Settlement (RG17 0LR; RG17 0LH; RG17 0LJ; RG17 0AH; RG17 0DE; RG17 0AQ; RG17 0DQ; RG17 0DF; RG17 0AJ; RG17 0BW; RG17 0DG; RG17 0BZ; RG17 0AL; RG17 0AN; RG17 0AR);
- All homes on the western edge of Salisbury Road between the Roundabout with Kennedy Meadow and Church Way (RG17 0LG);

- All homes south of Bulpit Lane, including all homes on Park Way and Coldharbour Road (RG17 0AW; RG17 0AS; RG17 0AT; RG17 0AX; RG17 0DB; RG17 0AP; RG17 0BB; RG17 0BD; RG17 0AZ);
- A selection of residences between Bulpit Lane and Hillside Road (RG17 0AG; RG17 0AU).

Table 1 – Community Data for Preferred Option 17

Data Set	Existing Community	Preferred Option 17	Total
Dwellings	526	100	626
FACTOR	**0.19011407**		
Population	1211	230.228	1441.228
Persons per Dwelling	2.302		
Cars and Vans	696.191	132.356	828.547
Vehicles per Dwelling	1.324		
No Car Households	81.062	15.411	96.503
One Car Households	198.638	37.764	236.402
Two Car Households	157.824	30.005	187.829
Three Car Households	31.891	6.067	37.958
Four+ Car Households	20.529	3.903	24.432
Travel to Work – Drive	392.976	74.710	467.69
T2W – All Car Journeys	429.114	81.581	510.7
T2W – Rail	30.005	5.704	35.709
Children aged under five	68.652	13.0517	81.704
Children aged five to six	29.21	5.553	34.763
Children aged seven to ten	68.081	13.133	82.214
Children aged 11 to 18	119.05	22.633	141.68
Distance to Railway Station		1.42km	
Distance to Hungerford Primary School		0.98km	
Distance to John O'Gaunt School		0.5km	
Distance to High Street		1.05km	

Preferred Option 18

This site is nominated as an alternative to Preferred Option 17. The site is assembled from a collection of sites put forward within the SHLAA, and is collectively referred to as the Eddington Sites, comprising Hungerford Veterinary Centre, Folly Dog Leg Field (part of), and land at Eddington and Hungerford Garden Centre. Collectively put forward as one site, any development put forward here could accommodate approximately 87 dwellings.

This site lays to the north of Hungerford, adjacent to the settlement boundary of Eddington (see Picture 1 – green box). Dwellings here would have easy access to the countryside, with opportunities for walking and cycling, but are less accessible to local services and facilities than the site put forward at the southern site. Again, this site would accommodate low to medium density developments with dwellings in a mix of sizes and types. The site is located within a groundwater emergence zone, and could potentially suffer from flooding unless mitigation measures are undertaken.

Community Boundary
The selected boundary used to establish the baseline values for the local community were as follows:

- All dwellings between Bath Road and Upper Eddington, and between the Mill on the River Kennet up to the Veterinary Centre (RG17 0DZ; RG17 0ET; RG17 0EU; RG17 0EZ; RG17 0HA; RG17 0HD; RG17 0HF; RG17 0HG; RG17 0HH; RG17 0HJ; RG17 0HL; RG17 0HQ; RG17 0EX).

Table 2 – Community Data for Preferred Option 18

Data Set	Existing Community	Preferred Option 18	Total
Dwellings	156	87	243
FACTOR	**0.557692308**		
Population	309	172.327	481.327
Persons per Dwelling	1.981		
Cars and Vans	226.610	126.379	352.989
Vehicles per Dwelling	1.453		
No Car Households	11.299	6.301	17.6
One Car Households	63.338	35.323	98.661
Two Car Households	45.987	25.647	71.634
Three Car Households	14.623	8.155	22.778
Four+ Car Households	6	3.346	9.346
Travel to Work – Drive	128.935	71.906	200.841
T2W – All Car Journeys	141.078	78.678	219.756
T2W – Rail	13.091	7.301	20.392
Children aged under five	31.545	17.592	49.137
Children aged five to six	6.091	3.397	9.488
Children aged seven to ten	8.169	4.556	12.725
Children aged 11 to 18	26.442	14.747	41.189
Distance to Railway Station		1.43km	
Distance to Hungerford Primary School		1.6km	
Distance to John O'Gaunt School		2.36km	
Distance to High Street		1.17km	

Outcomes
Following a review of the data, the following outcomes for the two preferred options can be identified. 100 new dwellings in the south of Hungerford would see approximately 230 new residents into the town. Of these approximately 54 would be aged 18 and under, requiring an extra 19 primary, and 23 secondary school places. The existing local community generate approximately 429 passenger trips by car each day as journeys to work. Inclusive of 100 new homes, this would rise to approximately 511, a growth of 82 work trips. Furthermore, there are already 30 daily rail journeys to work generated in this community, rising to 36 after the development. Taking into consideration the distance of 1.4km and the likely route to the station, it is assumed many of these journeys between the home and the station would be undertaken by car. Combining these travel to work journeys and the extra primary school places, the new development could generate an extra 106 passenger journeys during the morning peak.

The 526 households within the local community own approximately 696 cars and vans, at a rate of 1.32 vehicles per home. With 100 new dwellings, this would see a rise of 132 new cars at the development. The breakdown of car ownership in this area is approximately 81 (15%) of all homes do not own any car, 199 (38%) have one car, 158 (30%) have two cars, and 52 (10%) have three or more vehicles. Factored up, of the 100 new homes, 15 would be without a vehicle, 38 would be one car households, 30 would have two cars, and ten would have more than 2 cars.

In regards to the location of the site, and assuming no other changes are made to the road network connecting to the area, Preferred Option 17 sits 1.42km from the Railway Station and 1.05km from the main retail area via Priory Road and Salisbury Road, 1km from Hungerford Primary via Priory Avenue, and 0.5km to John O'Gaunt school via Priory Road. All journey measurements commenced from the north-south footpath marked through the centre of the site.

Preferred Option 18, located in the north of Hungerford potentially offers a smaller number of dwellings. The boundary chosen for the local community in this area was approximately 25% the size of the community used to factor numbers for Preferred Site 17, with only 156 dwellings and 309 residents. Of these 309 people, 72 are aged 18 and under, and within this subgroup, 32 were below the age of five years old. Therefore, if this scenario were to be translated into the 87 new residential dwellings, then there would be a need for 8 new primary spaces, and 15 secondary places, with an extra 18 children looking to enter the education system in the coming years. The location of the site means the distance to both Hungerford Primary and John O'Gaunt schools is 1.6km and 2.4km respectively. There is a likelihood many of these trips to school would be made via car.

Travel to work data for the local community shows there 141 car passenger journeys made daily, and this would grow by approximately 79 daily work passenger trips through the new housing. In addition, this would generate a further 7 rail journeys alongside the existing 13 undertaken by the local community. Again, the distance from the site to the station is 1.4km, and it is assumed most of these journeys to Hungerford Station are made by car, with no obvious shorter walking route visible on the map. Assuming all journeys to the schools and station are made by car, in addition to the projected journeys to work made by car, the network would see an additional 108 passenger journeys during the morning peak.

In regards to car ownership, there are approximately 227 vehicles owned by residents at the 156 dwellings within the local community, equating to 1.453 cars per dwelling. Of these, 11 households (7%) own no car, 63 (41%) have one vehicle, 46 have two cars (29%), and 21 have three cars or more (13%). In regards to the new development, this would lead to approximately 6 households with no cars, 35 dwellings with one vehicle, 26 with two vehicles, and 12 with three cars or more.

Conclusion

When considering each of the sites, using existing communities within the vicinity of the preferred options as a baseline show both will increase car ownership by between 126 and 132 vehicles, and population by between 170 and 230 people.

Each site would also require between 22 and 42 extra classroom spaces to accommodate the growth in the number of school aged children.

Taking into consideration the impact each site would have on the road traffic network, working with an assumption that any journey at 1km or more would be made by car, dwellings at Preferred Site 18 would generate more car trips during the peak hours than those at Preferred Site 17, despite comprising 13 less homes. This is primarily due to the location of the sites in relation to services. With John O'Gaunt school being located on the edge Preferred Option 17, and measured as 500 metres via Priory Road, it is assumed the 23 children would travel via walking and cycling. Generated trips from this area may also decrease if the site were to see a new primary school located on the land adjacent to the secondary school. The rather more remote location at Preferred Site 18 means there are no obvious walking routes which can be developed to promote more sustainable travel journeys to key services and facilities. These journeys generated at the northern site may exacerbate congestion further, if passengers are dropped off at both schools or the station, before travelling out of Hungerford on the A4.