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January 2024

London Luton Airport Expansion

Planning Inspectorate Scheme Ref: TR020001

Volume 8 Additional Submissions (Examination)

8.176 Applicant's Response to Comments From the Highway Authorities on the 'Accounting for Covid-19 in Transport Modelling Final Report' (AS-159)

Infrastructure Planning (Examination Procedure) Rules 2010 Application

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The Planning Act 2008

The Infrastructure Planning (Examination Procedure) Rules 2010

London Luton Airport Expansion Development Consent Order 202x

8.176 APPLICANT'S RESPONSE TO COMMENTS FROM THE HIGHWAY AUTHORITIES ON THE 'ACCOUNTING FOR COVID-19 IN TRANSPORT MODELLING FINAL REPORT' [AS-159]

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1 INTRODUCTION

1.1 Purpose of this document

1.1.1 This report has been prepared by Luton Rising (a trading name of London Luton Airport Limited) ('the Applicant') to support the application for a Development Consent Order (DCO) for the expansion of the airport to 32 million passengers per annum (mppa) (the Proposed Development). The type and scale of the airport expansion proposal meets the thresholds to be classified as a Nationally Significant Infrastructure Project (NSIP) for the purposes of the Planning Act 2008. Therefore, an application has been made to the Secretary of State for Transport for development consent.

1.1.2 This report is responding to the Examining Authority's Written Question TT.2.1, as set out in the **Examining Authority's Further Written Questions (ExQ2) [PD-015]** issued on 9 January 2023.

1.1.3 TT.2.1 requested that all relevant Highway Authorities: "*Review the final report summarising the outcome of the accounting for Covid-19 in transport modelling that should be submitted by the Applicant on 15th December 2023 [AS-159]. Provide a summary of any outstanding concerns and what needs to be amended/included in order to satisfactorily address the concern(s) by D7*".

1.1.4 TT.2.1 went on to request of the Applicant: "*If there are outstanding concerns please review and provide details of how they will be resolved during the Examination by D8*".

1.1.5 This report is therefore completing the request of the Applicant in Written Question TT.2.1.

2 LUTON BOROUGH COUNCIL

2.1.1 Luton Borough Council (LBC) responded to the ExQ2 **[PD-015]** at Deadline 7 via **Deadline 7 Submission - Response to the ExA's Further Written Questions (ExQ2) (if required) [REP7-090]**.

2.1.2 LBC stated in its response that the final report submitted by the Applicant on 15 December 2023 was reviewed, and the Council considers the Applicant's transport model to be robust and the proposed mitigation associated with the Proposed Development remain appropriate.

2.1.3 Specifically, LBC stated in response to Written Question BCG.2.13:

- *"LBC has no outstanding concerns with regard to the modelling which broadly shows that the strategic road network has largely recovered, with the slight exception of A1081 between J10 and J10A, providing a good comparison with the 2023 modelled flows. With regard to traffic volumes on the local road network, this has not returned to previous levels, meaning that the model has produced higher flows than is the case post Covid-19. As such, it is considered that the Applicant's model is robust and the mitigation proposed in association with the development remains appropriate."*
- *"Since the Applicant has effectively taken the worst-case scenario in their modelling, LBC has no comment in relation noise or air quality implications either."*

2.1.4 The Applicant welcomes LBC's response and conclusion.

3 CENTRAL BEDFORDSHIRE COUNCIL

3.1.1 Central Bedfordshire Council (CBC) responded to the ExQ2 **[PD-015]** at Deadline 7 via **Deadline 7 Submission - Response to the ExA's Further Written Questions (ExQ2) (if required) [REP7-084]**. CBC's response to ExQ2 referred to comments on Deadline 6 documents which were reported in **Deadline 7 Submission – Comments on any further information / submissions received by Deadline 6 [REP7-083].**

3.1.2 In **[REP7-083]**, Item 7, CBC commented on the Applicant's **Accounting for Covid-19 in Traffic Modelling Final Report [AS-159]**.

3.1.3 The Applicant notes CBC's position on agreeing largely with the Applicant's conclusion with regards to the fact that the traffic flows within the Covid-19 modelling update are generally lower than the previous assessment reported in the **Transport Assessment [APP-203, AS-123, APP-205, APP-206]**, indicating that the modelling update shows that the proposed mitigation remains robust.

3.1.4 Specifically, CBC stated:

- *"CBC had previously raised concerns that, whilst such an approach may be considered robust in terms of the previously considered junctions and mitigation works, the lack of a downward adjustment on the local road network could result in forecast routing being different to that predicted within the current forecast modelling work, due to greater than predicted levels of residual capacity on the Local Road Network. As such, this could result in differing impacts to those predicted, in terms of both scale and location. Notwithstanding the above, wider matter, CBC would largely agree with the applicant's conclusions with regards to the modelled network as assumed within the note. I.e.: that generally flows are lower than in the previous assessment and with the London Road South junction, for example, reported as operating more efficiently in each forecast scenario as a result of these reduced flows*.'

3.1.5 CBC has requested further clarifications from the Applicant in relation to:

a. The junction of Gipsy Lane / A1081;
b. Potential monitoring / mitigation requirement at Chaul End Road / Luton Road junction and Newland Road / Luton Road / Farley Hill Road junction;
c. Traffic Calming within Cadington;
d. West Hyde Road / B563 junction;
e. The impact of not having the dualling of Vauxhall Way in 2027; and
f. Query in relation to traffic flows patterns on the M1, north of Junction 10.

<u>The junction of Gipsy Lane / A1081</u>

3.1.6 The results for the A1081 / Gipsy Lane junction relate to the operation of the network of junctions comprising of the A1081 / Gipsy Lane signal junction; the B653 / Gipsy Lane roundabout and the B653 / Parkway roundabout. Whilst the

overall forecast traffic demand through the junctions has reduced, the demand on the Gipsy Lane approach to the signal junction has increased and this has resulted in a reallocation of the 'green time' at the signals. As such, the flows on the A1081 mainline incur greater delay (as a result of the signals) which is reflected in the increased queue lengths and increased average delays. Notwithstanding this, the overall queue lengths on the A1081 are reduced when compared to the future baseline and the junction continues to operate with an acceptable level of service.

Potential monitoring / mitigation requirement at Chaul End Road / Luton Road junction and Newland Road / Luton Road / Farley Hill Road junction

3.1.7 The Applicant agrees that mitigation at these junctions will not be undertaken via the Transport Related Impacts Monitoring and Mitigation Approach (TRIMMA). Whilst the Applicant acknowledges the potential impact at these locations due to the proposed development, the works were not listed as one of the 'off-site highway works' in Schedule 1 of the DCO. The discussion instead relates to a side agreement which will address this matter.

Traffic Calming within Codington (the Applicant believes CBC are referring to Caddington)

3.1.8 The Applicant agrees that traffic calming at this location will not be undertaken via the TRIMMA. The discussion instead relates to a side agreement which will address this matter. Additional measures over and above those already identified through discussion with CBC and as detailed in the side agreement (unless they are reasonably demonstrated that they relate to the Proposed Development) shall be the responsibility of CBC.

West Hyde Road / B563 junction

3.1.9 The impact at this location will not be monitored through the existing mechanism within the TRIMMA because, whilst the Applicant acknowledges the potential impact at these locations due to the proposed development, the works were not listed as one of the 'off-site highway works' in Schedule 1 of the DCO. Given that the overall traffic volumes are lower in the Covid-19 modelling update than those in the core modelling set out in the DCO Transport Assessment **[APP-205]**, the Applicant considers that this is the most appropriate way forward.

The impact of not having the dualling of Vauxhall Way in 2027

3.1.10 CBC stated that the updated traffic patterns on Local Road Network (LRN) differ in the 2027 scenario within the updated modelling (when compared to the previous modelling undertaken for the **Transport Assessment [APP-203, AS-123, APP-205, APP-206]**) due to the exclusion of the Vauxhall Way dualling.

3.1.11 The Applicant agrees with CBC's observations and would like to emphasise that most of these patterns also occur in the Without Airport Expansion scenario, i.e. this is not a direct impact of the airport expansion forecast traffic. Moreover, this scenario has been included in the Updated modelling due to the delay in the LBC scheme implementation timescales, moving from 2027 to 2028. Therefore, those new patterns, if materialised, would be temporary in nature and would not

sustain, which match CBC's understanding of the impact of delaying the Vauxhall Way dualling.

Query in relation to traffic flows patterns on the M1, north of Junction 10

3.1.12 CBC queried the forecasts in the updated modelling, in particular, for the 2043 PM peak where the forecasts show no increase in traffic flows on the M1 northbound, north of Junction 10.

3.1.13 The Applicant agrees with the observation. The Applicant has reviewed this pattern and compared it with the original modelling forecasts for the **Transport Assessment [APP-203, AS-123, APP-205, APP-206]**. Within the original modelling forecasts, this section was forecast to have an increase of only around 1% (an increase from 8,125 to 8,238 vehicles per hour), whereas the updated modelling shows a slight reduction of around 1% (a reduction from 7,848 to 7,812 vehicles per hour).

3.1.14 Investigations confirmed that this pattern is forecast due to some background traffic choosing to use the LRN for short trips, where perceived to be more viable compared with Junction 10 and the M1. Although, this would still not change the conclusion, which is that the overall traffic demands on the LRN is forecast to have lower levels, compared with the original modelling results.

3.1.15 The Applicant therefore considers this re-routing to be reasonable considering the impact of the overall lower traffic on the network and would not have a significant impact on the assessment, considering the scale of change, and the fact that the overall traffic demands are forecast to be lower on the LRN.

4 DACORUM BOROUGH COUNCIL, HERTFORDSHIRE COUNTY COUNCIL AND NORTH HERTFORDSHIRE DISTRICT COUNCIL

4.1.1 Dacorum Borough Council, Hertfordshire County Council and North Hertfordshire District Council ('the Hertfordshire host authorities') responded to the ExQ2 **[PD-015]** at Deadline 7 via **Deadline 7 Submission - Response to the ExA's Further Written Questions (ExQ2) (if required) [REP7-087]**.

4.1.2 The Hertfordshire host authorities reviewed the **Applicant's Response to Issue Specific Hearing 7 Action 2 - Accounting for Covid-19 in Transport Modelling Final Report [AS-159]** and note that the methodology adopted by the Applicant within the Covid-19 modelling update does not include further adjustments to the LRN, and highlights the concerns that this, and changes in public transport demands might have an impact on the forecasts. However, the Hertfordshire host authorities do not require any further or additional modelling to be undertaken as this would not be considered proportionate at this stage. Although, the Hertfordshire host authorities requesting that the actual effects of the development to be monitored via the TRIMMA.

4.1.3 Specifically, the Hertfordshire host authorities stated in response to Written Question BCG.2.13:

- *'The Hertfordshire Host Authorities, however, are not requesting any additional transport modelling work to be undertaken as it is not proportionate at this stage, but does request that this level of uncertainty and likely consequential effects are fully taken into account in any considerations and need for monitoring and controls should the DCO be consented and implemented to ensure the actual effects of the development are monitored, managed and controlled to ensure required outcomes within the assessed envelope.'*

4.1.4 The Hertfordshire host authorities nonetheless requested further responses to comments mentioned in Appendix 2 of **[REP0-087]**. Those comments, and the Applicant's responses are set out below.

3.3.10, Traffic and Transport, Post Covid-19 Travel

The Applicant provides patronage data for buses on local authority bus services, the Applicant should provide specific information on bus routes serving London Luton Airport and the changes as a result of Covid-19.

4.1.5 The Applicant used the publicly available data, to track the trend of bus usage at both a national level and within Luton. The information related to Luton includes all bus usage, which also includes the bus services serving the airport. Therefore, the Applicant considers the comparison that has been provided is appropriate and proportionate to understand the trends as a result of Covid-19.

4.3.17, Traffic and Transport, Traffic Forecasting

The Applicant states at M1 Junction 9 east there is a 50% reduction in 2027 in flows and VC from the North approach in the PM peak. The Applicant should explain why this reduction is occurring and what scenarios it occurs between.

4.1.6 The Applicant would like to clarify that the tables associated with M1 Junction 9 results were not correct in terms of labelling. Where the title of the tables in Table 4.1, Table 4.5, Table 4.9 referred to M1 Junction 9 (east), these actually refer to M1 Junction 9 (west). And Table 4.2, Table 4.5 and Table 4.10 should refer to M1 Junction 9 (east). The corrected tables are included in Appendix A of this report.

4.1.7 The reference mentioned in paragraph 4.3.17, of **Applicant's Response to Issue Specific Hearing 7 Action 2 - Accounting for Covid-19 in Transport Modelling Final Report [AS-159],** therefore should be read in relation to M1 Junction 9 (west), and the reduction of around 50% in 2027 is for the north arm, Watery Lane, which shows a reduction between the original and updated modelling. This is due to having overall lower background traffic, which resulted in more traffic routing via Junction 10 to access the M1, compared with the previous trends in the original modelling, where greater volumes utilised M1 Junction 9 to access the M1.

4.4.2, Traffic and Transport, Traffic Forecasting

The Applicant should confirm how what the GEH comparison they are using is referring to.

4.1.8 The GEH method is described in paragraphs 4.4.7-4.4.9 in the **Applicant's Response to Issue Specific Hearing 7 Action 2 - Accounting for Covid-19 in Transport Modelling Final Report [AS-159]**. A colour coded method has been adopted to allow for easier visual comparison of each link flow comparison:

a. Links with Updated flow < Original flow are marked as green;

b. Links with Updated flow > Original flow and GEH values less than five are marked as green as the changes are deemed to be less significant; and

c. Links with Updated flow > Original flow and GEH values higher than five are marked as red.

Appendix E, Traffic and Transport, Traffic Forecasting

The 2043 traffic flow difference plots with and without the airport expansion in all peaks and years show significant increases, over 1,00 vehicles, on A602 in Hitchin, see image below. The Applicant should confirm that these flow increases are accurate.

4.1.9 The increase in traffic shown in the flow plot differences is due to the difference in configuration of link structure within the strategic traffic model, as was mentioned in paragraph 4.3.10 in the **Applicant report Applicant's Response to Issue Specific Hearing 7 Action 2 - Accounting for Covid-19 in Transport Modelling Final Report [AS-159]**.

4.1.10 For clarification, the Applicant provides in the following Table 1, the updated modelling results for this link in 2043, for both the With and Without Airport Expansion scenarios. Table 1 shows the actual differences and the small scale of impact.

Table 1 A602 Traffic - With vs Without Airport Expansion - Updated Modelling 2043 (veh/hr)

Direction	Link name	Scenario	AM	PM
Eastbound	A602 Park Way	Core	1,367	1,253
		Expansion	1,272	1,323
		Difference	-95	70
		Diff %	-7%	6%
	A602 Stevenage Rd	Core	1,121	1,166
		Expansion	1,132	1,239
		Difference	11	74
		Diff %	1%	6%
Westbound	A602 Park Way	Core	1,482	1,585
		Expansion	1,323	1,557
		Difference	-159	-27
		Diff %	-11%	-2%
	A602 Stevenage Rd	Core	1,053	1,107
		Expansion	1,071	1,181
		Difference	17	74
		Diff %	2%	7%

In the PM peak 2043 there are decreases in traffic flow when comparing with / without the Proposed Development on Watery Lane and Annables Lane. The Applicant should explain why these decreases are occurring.

4.1.11 The decreases in traffic along Watery Lane and Annables Lane relate to the traffic reassigning to the M1 Junction 10 as a result of the introduced higher capacity, in particular to the east to south movement. This would not only mitigate the airport impact on Junction 10, but would re-attract traffic from the LRN and M1 Junction 9, back onto M1 Junction 10 to access the M1.

Appendix F, Traffic and Transport, Traffic Forecasting

The Applicant should provide V/C plots for 2016 AM, IP and PM peak in the same format as those presented in Appendix F in the Applicant's Response to Issue Specific Hearing 7 Action 2 - Accounting for Covid-19 in Transport Modelling Final Report [AS-159]

4.1.12 The Applicant provided this information previously in Figure E.1, Appendix E of the **Strategic Modelling Forecasting Report (Appendix F of the Transport Assessment [APP-201]**

Appendix F, Traffic and Transport, Traffic Forecasting

The Applicant should provide future year airport demand plots with and without the expansion which clearly show where airport demand (by mode) goes to and from by model zone.

4.1.13 The Applicant considers the information that has been provided so far, before and during the examination, is sufficient to determine the level of impacts for the Proposed Development. Information in relation to flows for all scenarios, flow plot differences, node delays, flows with Volume to Capacity ratio (V/C) plots, daily and peak airport trips distribution have been provided within all the reports submitted so far, including both the **Strategic Modelling Forecasting Report**

(Appendix F of the Transport Assessment [APP-201], and the recently submitted report **Applicant's Response to Issue Specific Hearing 7 Action 2 - Accounting for Covid-19 in Transport Modelling Final Report [AS-159]**.

Appendix F, Traffic and Transport, Traffic Forecasting

The Applicant should provide traffic flows for 2027 and 2043 with and without the Proposed Development for the A505 between the A505–A602 junction and A1 Junction 9 (Letchworth Gate).

4.1.14 The flow plot differences provided in Appendix E of the **Applicant's Response to Issue Specific Hearing 7 Action 2 - Accounting for Covid-19 in Transport Modelling Final Report [AS-159]**, show that the flow changes are minimal.

4.1.15 As requested, the Applicant has provided in Appendix B of this report zoomed-in figures for the area of interest, i.e. the A505 between the A5050-A602 junction and A1 Junction 9. Tables showing the requested flows have also been included.

4.1.16 The values in Appendix B show that the traffic flow changes are either neutral or very minimal. The Applicant, therefore, considers the request of providing all flow information for this corridor to not be proportionate, considering there is no forecast significant impact on the corridor mentioned.

5 NATIONAL HIGHWAYS

5.1 Introduction

5.1.1 National Highways responded to the ExQ2 **[PD-015]** at Deadline 7 via **Deadline 7 Submission - Response to the ExA's Further Written Questions (ExQ2) (if required) [REP7-093]**.

5.1.2 National Highways has split its comments under SATURN modelling and VISSIM modelling, therefore, the response below is in the same order.

5.2 SATURN Modelling

Queues and Delays (REP7-093, Ref 2.2)

5.2.1 National Highways has requested queue and delay results to be included for all the M1 junctions that have been reported by the Applicant, namely Junction 9, Junction 10 and Junction 11.

5.2.2 The Applicant has re-produced Tables 4.1 to 4.2 in the **Applicant's Response to Issue Specific Hearing 7 Action 2 - Accounting for Covid-19 in Transport Modelling Final Report [AS-159]** and included queues and delay information as requested. These can be found in Appendix A of this document.

Strategic Road Network (SRN) Flow Differences (REP7-093, Ref 2.3)

5.2.3 National Highways expressed concerns in relation to the traffic approaching M1 Junction 10 from the east via A10181 in the PM peak for the 2043 forecast year, and requested further information in relation to flows, queues and delays. This, to have a "*more comprehensive understanding of traffic conditions on the approach to Junction 10"*.

5.2.4 The Applicant notes National Highways concerns, and provides further detailed information of the A1081, as shown in Figure 1 and Figure 2.

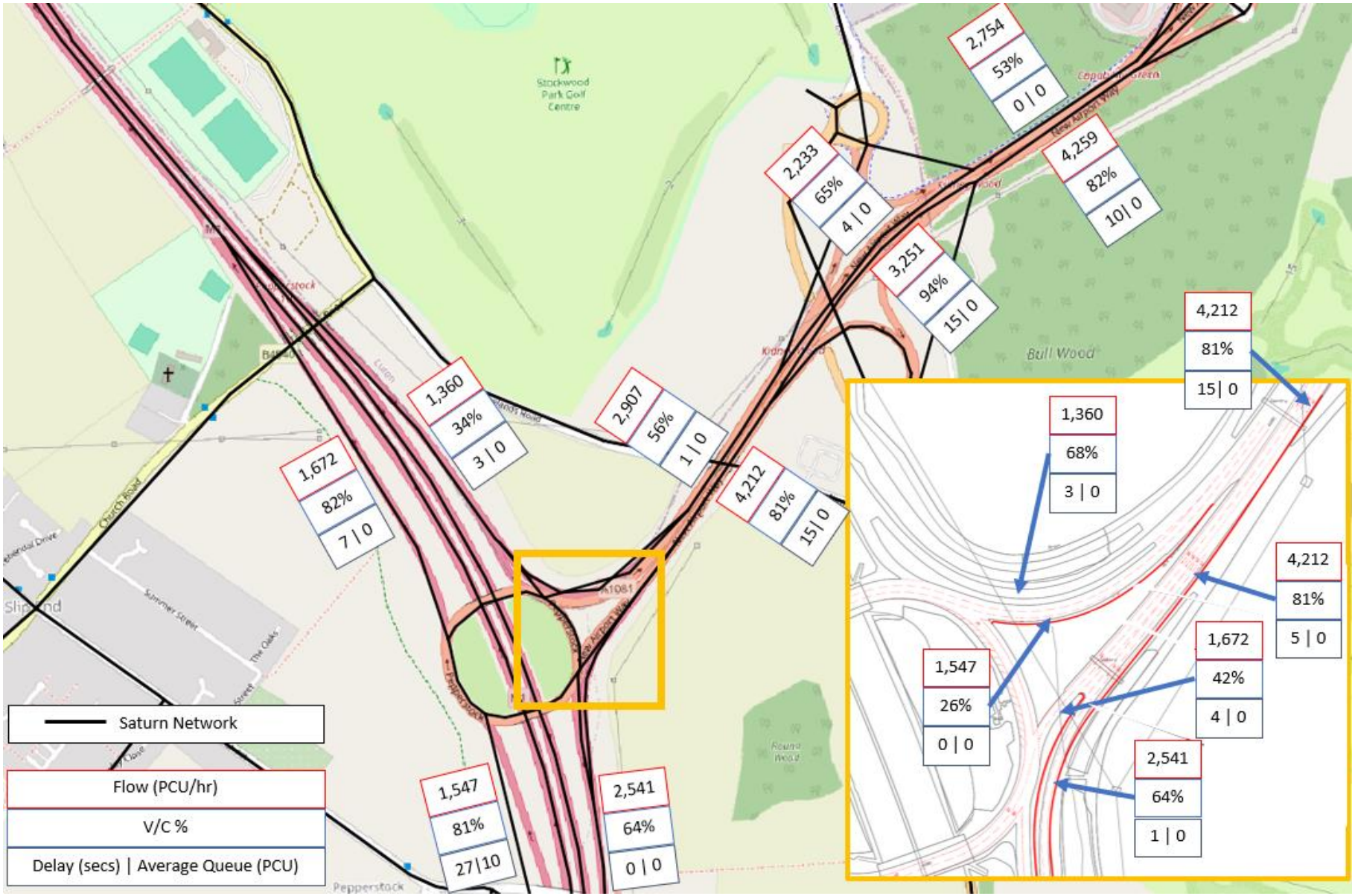
5.2.5 The figures show that the average modelled queues are low in the region surrounding M1 Junction 10. The average queue is zero PCU (Passenger Car Unit) at all locations except for the M1 Junction 10 northbound off slip which reduces from 12 in Core to 10 in Expansion.

5.2.6 In terms of V/C ratios, the highest V/C is through Junction 10a in the With Expansion scenario (94%) which is an increase of around 550 vehicles from the core scenario with a flow of 2,700 PCUs per hour and 78% V/C. The traffic volumes at other locations do reach levels of over 80%, with the largest differences observed on the westbound movement on the A1081 approaching M1 Junction10.

Therefore, no road links approaching M1 Junction 10 from the east are forecast to experience any excessive queuing or delays, and hence would not restrict traffic routing via M1 Junction 10.

Figure 1 2043 PM Without Expansion - Updated

Figure 2 2043 PM With Expansion - Updated



LRN Flow Differences (REP7-093, Ref 2.4)

Trends Analysis

5.2.7 National Highways noted the outputs of the trends analysis on the LRN, although expressed concerns for the absence of the A1081 count site, as this is an important road for traffic travelling to and from M1 Junction 10.

5.2.8 The Applicant would like to highlight, that only the A1081 (New Airport Way) site from LBC count sites was unusable. Whereas the count site for the A1081 between Junction 10 and Junction 10a sourced from the National Highways WebTRIS have been used and informed the trend analysis. This was reported in Section 3.2 of the **Applicant's Response to Issue Specific Hearing 7 Action 2 - Accounting for Covid-19 in Transport Modelling Final Report [AS-159]** under Strategic Road Network analysis, starting from paragraph 3.2.16.

Forecasts Adjustment

5.2.9 National Highways requested further modelling runs to address the concerns associated with not adjusting the forecasts due to the LRN trends analysis patterns.

5.2.10 National Highways has stated that "a *different traffic assignment would be expected, with potentially higher levels of traffic on the SRN*."

5.2.11 The Applicant provided the justification and rationale behind not undertaking any adjustment to traffic forecasts, these can be summarised as:

a. data limitations;

b. the overall risk assessment is considered "*very low due to the slightly reduced traffic flows and the potential of further downward adjustments resulting from the trends analysis*"; and

c. the proposed highway mitigation measures, have been designed for higher traffic flows, hence are considered robust.

Flows on the SRN

5.2.12 In **Applicant's Response to Issue Specific Hearing 7 Action 2 - Accounting for Covid-19 in Transport Modelling Final Report [AS-159]** comparisons have been made between the updated 2023 model forecast flows against the SRN and LRN observed traffic count data. These show a very strong match on the SRN, while showing significantly higher modelled flows, than observed counts, on the LRN.

5.2.13 As the main concerns are related to the proposed mitigation, hence the AM and PM peak are the key peak hours, which have higher flows, to assess the capacity, the Applicant has summarised the tables in Table 2. The summary shows the total sum of all links for both SRN and LRN, which represent the effective weighted average. The summaries have been produced from information provided in in Tables 4-27, 4-28, 4-31 and 4-32 of the **Applicant's**

Response to Issue Specific Hearing 7 Action 2 - Accounting for Covid-19 in Transport Modelling Final Report [AS-159].

Table 2 2023 Observed Versus Modelled Summary

Network	Peak	2023 Observed	2023 Modelled	Difference	Diff %
SRN	AM	57,259	57,525	266	0%
	PM	61,679	61,066	- 613	-1%
LRN	AM	8,685	11,782	3,097	36%
	PM	9,066	11,688	2,622	29%

5.2.14 Table 2 shows that the SRN modelled flow performance against the observed counts is very strong and represents an excellent match. Therefore, it can be considered that the SRN modelled flows will not require any further adjustment.

5.2.15 The table also shows a poor match for the LRN between the modelled flows and observed count data. If any adjustments were to be made to the modelled flows, such adjustment should therefore only be made to the LRN. Therefore, any factoring would have to be made on trips that travel on the LRN only, e.g. trips between Harpenden and Luton, Luton and Hitchin, Coddington and Luton, etc. It would be inappropriate to apply adjustment to traffic using the LRN to then travel on the SRN, and vice versa, as the SRN has an excellent match between the modelled flows and observed counts.

5.2.16 A potential method to implement adjustment on the LRN would therefore be to factor downwards the Origin-Destination (O-D) movements for traffic solely using the LRN. This would be done on a cell by cell basis within the O-D trip matrices and would only affect traffic using the LRN, and for the example the movements mentioned in the paragraph above.

5.2.17 Assuming this can be undertaken, noting the limitations on the available data, the results of the model assignment would likely show slightly lower volumes on the LRN and unchanged volumes on the SRN. This could potentially lead to some spare capacity on the LRN, which would then potentially divert some long distance traffic away from the SRN to the LRN, and not the other way as National Highways has stated. If so, the current good match between the 2023 modelled and observed flows on the SRN may become skewed, requiring a further adjustment to the SRN to bring it back to the same levels of the observed flows.

5.2.18 This will increase the risk on the robustness of the assessment and the proposed highway mitigation measures that have already been designed to accommodate higher levels of forecast traffic. Moreover, the TRIMMA will still be implemented to trigger measures based on a 'need/impact' basis.

5.2.19 The Applicant does not therefore agree with National Highways' view that a further modelling test is required, nor that the adjustment might result in higher flows on the SRN.

5.2.20 It is also worth noting, that all the other relevant Highway Authorities, namely LBC, CBC and the Hertfordshire host authorities do not require any further modelling and have accepted the modelling update as presented in **Applicant's**

Response to Issue Specific Hearing 7 Action 2 - Accounting for Covid-19 in Transport Modelling Final Report [AS-159].

M1 Junction 9 (REP7-093, Ref 2.5)

5.2.21 National Highways queried the flows on the M1 Junction 9 (east) west arm, where the flows stay at 1,640 PCUs/hr with a V/C of 100% for all years and scenarios, indicating that the arm will be at capacity.

5.2.22 The Applicant would like to clarify that the tables associated with the M1 Junction 9 results were not correct in terms of labelling. Where the title of the tables in Table 4.1, Table 4.5, Table 4.9 referred to M1 Junction 9 (east), these actually refer to M1 Junction 9 (west). And Table 4.2, Table 4.5 and Table 4.10 should refer to M1 Junction 9 (east). The corrected tables are now included in Appendix A of this Report. The Appendix A also includes the requested queues and delays results.

5.2.23 Therefore, the approach that is in question is the west arm for the Junction 9 western roundabout, namely the approach from the A5183. Therefore, should there be any queuing on this approach arm, it would not block back onto the M1 and instead queue along the A5183, which is on the LRN.

5.2.24 The Applicant has investigated the strategic traffic model to further understand why the forecast flow is 1,640 PCUs/hr with a V/C of 100%. The investigation has revealed that this approach does not reach its capacity at the roundabout, rather the flow and underlying capacity is constrained to 1,640 PCUs/hr due to the capacity of the single lane of the A5183, rather than roundabout junction approach arm capacity. The investigation has showed that the A5183 reaches its road link capacity in the calibrated / validated 2016 base year, and stays at that level in all future forecast years. The road link capacity within the model therefore constrains the forecast traffic flows to this value in all future years and scenarios.

5.2.25 The Applicant has also tested the operation of the Junction 9 western roundabout junction using ARCADY with the 2043 forecast traffic flows with the Proposed Development. The results are summarised in Table 3 and Table 4.

5.2.26 ARCADY was run using the 'demand' flows from the strategic model, using a standard 'One Hour' setting with a synthesised demand profile, which models the one hour flows over six quarter hour (15-minute) time periods, and therefore for 1½ hours, with 10% higher flows in the quarter hours in middle of the model period. To address the marked lane allocations, ARCADY was modelled using Lane Simulation mode. The results presented in Table 3 are an average over five runs, as recommended by the ARCADY manual when using Lane Simulation mode.

5.2.27 The results of the junction capacity have been summarised in terms of:

a. Ratio of Flow to Capacity (RFC) and Level of Service (LOS);
b. Average queue length in PCU; and
c. Delay in seconds.

5.2.28 ARCADY software provides outputs in the form of RFC and queue length (Q). For a new roundabout, a worst-arm target RFC value of 0.85 during a single time segment is preferred as this minimises the chance that queuing will occur at a new junction on opening. For existing junctions, RFC values above 0.85 are likely to produce queues which increase slowly. A junction is considered to be at operational capacity (with resulting larger increases in queue length) when the RFC value reaches 1.0.

5.2.29 For the LOS, it results indicates, LoS (A): free flow; (B): stable flow. slight delays; (C): stable flow. acceptable delays; (D): approaching unstable flow. tolerable delays; (E): unstable flow. intolerable delay and long queues; (F): congested. long delays and queues fail to clear.

Table 3 M1 Junction 9 (west) ARCADY Summary Results – 2043 With Expansion AM

Arm	Lane	Queue (PCU)	Delay (seconds)	RFC	LOS
A5138 East	1	6	23	0.84	C
	2	0	4	0.08	A
M1 J9 NB off-slip	1	1	6	0.35	A
	2	1	5	0.33	A
A5138 West	1	3	9	0.78	A
	2	2	9	0.78	A
Watery Lane North	1	6	44	0.84	E

Table 4 M1 Junction 9 (west) ARCADY Summary Results – 2043 With Expansion PM

Arm	Lane	Queue (PCU)	Delay (seconds)	RFC	LOS
A5138 East	1	4	19	0.79	C
	2	0	5	0.27	A
M1 J9 NB off-slip	1	6	25	0.85	D
	2	0	4	0.17	A
A5138 West	1	1	4	0.41	A
	2	1	5	0.51	A
Watery Lane North	1	1	7	0.37	A

5.2.30 Using the demand flows from the strategic traffic model, and the synthesised demand profile (by quarter hour) and Lane Simulation mode (for marked lane allocations) within ARCADY, the results show that the junction would perform within its capacity with a highest ratio of flow to capacity (RFC) of 0.84. The approach from the A5138 has a highest RFC of 0.78 and would therefore

operate well within capacity. The results also indicate that as the roundabout would be within capacity, there would be no significant queuing on the M1 northbound off-slip.

5.2.31 It is concluded that there would be no future forecast issues at M1 Junction 9 affecting the operation of the SRN.

Model Convergence (REP7-093, Ref 2.6)

5.2.32 National Highways requested information on the model convergence.

5.2.33 For the original modelling runs, the convergence was reported in Section 4.4 for the Without Expansion scenario, and in Section 5.2 for the With Expansion scenario in **Strategic Modelling Forecasting Report (Appendix F of the Transport Assessment [APP-201]**, where these were reported in Table 4.14 and Figure 4.11 for the demand model convergence, and Table 4.15 for the highway assignment model. Whereas for the Without Expansion scenario, these were reported in Table 5.1, Figure 5.1 and Table 5.2.

5.2.34 For the updated runs, these are reported in this document below as Table 5, Figure 3 and Table 6 for the Without Expansion scenario, whereas Table 7, Figure 4 and Table 8 showing the Without Expansion scenario.

Table 5 Without Expansion Demand Model Convergence (%Gap)

Iteration	2023	2027	2039	2043
2	1.770	2.850	6.300	7.316
3	0.282	0.300	0.774	0.919
4	0.115	0.129	0.168	0.183
5	0.162	0.110	0.111	0.133
6	0.102	0.105	0.101	0.145
7	0.096	0.082	0.110	0.116
8	*Converged*	*Converged*	0.084	0.095

Figure 3 Without Expansion Demand Model Convergence

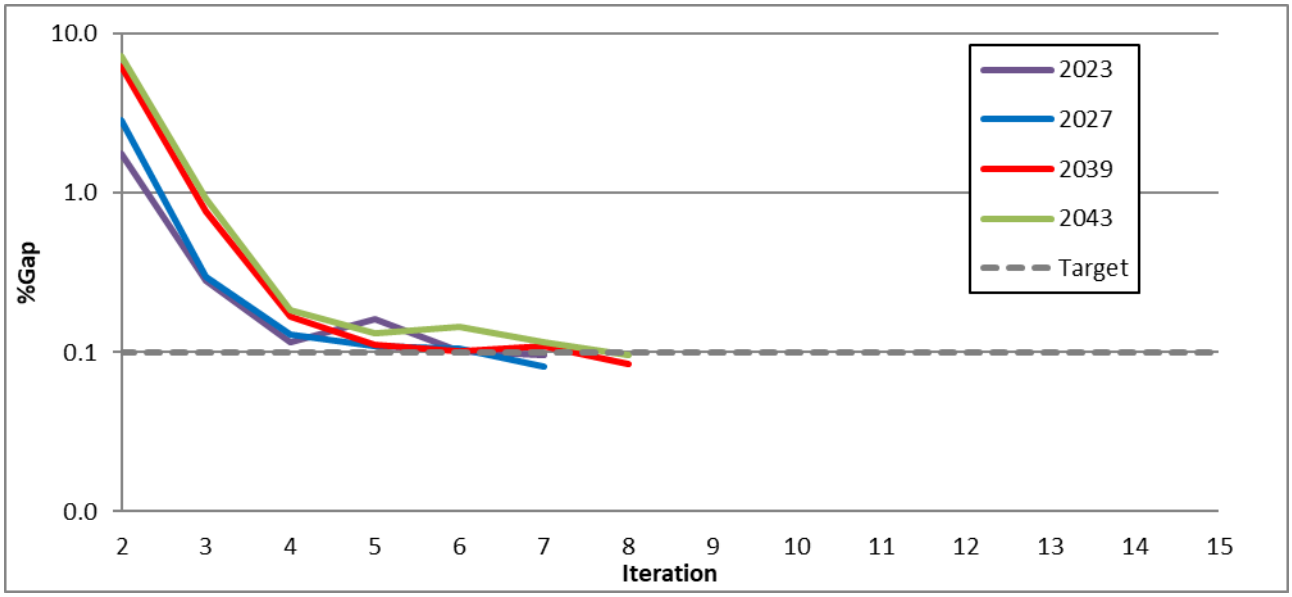


Table 6 Without Expansion Highway Model Convergence

Forecast Year	AM Peak Hour 0800-0900		Interpeak Hour Average (1000-1600)		PM Peak Hour 1700-1800	
	Iterations	%Gap	Iterations	%Gap	Iterations	%Gap
2023	11	0.0067	7	0.0042	11	0.0071
2027	18	0.0055	8	0.0037	11	0.0082
2039	18	0.008	9	0.005	15	0.0076
2043	23	0.0081	9	0.0034	15	0.0078

Table 7 With Expansion Demand Model Convergence (%Gap)

Iteration	2027	2039	2043
2	2.863	6.047	7.018
3	0.312	0.729	0.879
4	0.122	0.188	0.257
5	0.131	0.112	0.166
6	0.137	0.093	0.106
7	0.085	*Converged*	0.101
8	*Converged*	*Converged*	0.089

Figure 4 With Expansion Demand Model Convergence

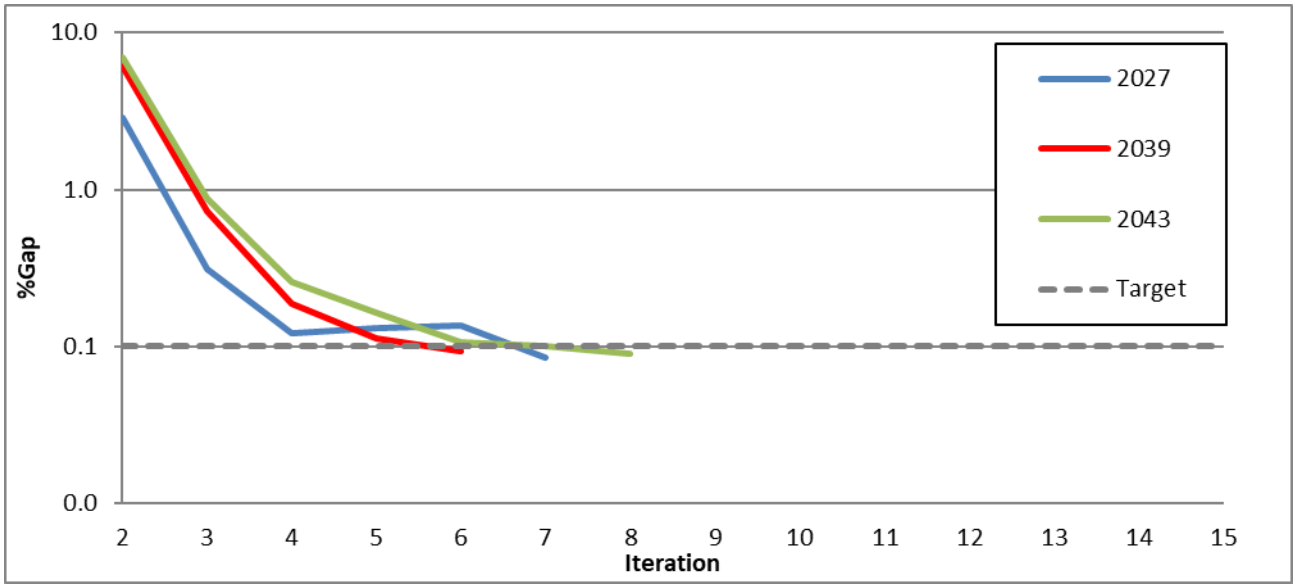


Table 8 With Expansion Highway Model Convergence

Forecast Year	AM Peak Hour 0800-0900		Interpeak Hour Average (1000-1600)		PM Peak Hour 1700-1800	
	Iterations	%Gap	Iterations	%Gap	Iterations	%Gap
2027	11	0.0076	8	0.0032	12	0.0074
2039	19	0.0054	8	0.0061	16	0.0059
2043	22	0.0072	8	0.0074	17	0.0058

5.3 VISSIM modelling

5.3.1 National Highways have undertaken a review of the VISSIM modelling and the **Applicant's Response to Issue Specific Hearing 7 Action 2 - Accounting for Covid-19 in Transport Modelling Final Report [AS-159**], and have raised queries in relation to several points, as mentioned below.

Transfer of Vehicle Trips from SATURN to VISSIM (REP7-093, Ref 3.2)

5.3.2 National Highways requested a comparison to be undertaken for the Demand and Actual SATURN development trips included in the VISSIM model.

Demand vs Actual SATURN flows

5.3.3 The Applicant considers using the actual flows for the operational assessments undertaken in the VISSIM model to be appropriate as this will represent the more realistic flows set, without including 'queued-up' demands which would be held back elsewhere in the model.

5.3.4 To address National Highways concern, the Applicant provides below a comparison between the Demand and Actual flows for the 2043 With Expansion scenario, for total matrices and for the A1081 which controls traffic travelling via M1 Junction 10. Table 9 shows the total matrices comparison, whereas Table 10 shows the comparison for the A1081 east of M1 Junction 10.

Table 9 Total Cordon Matrices Demand vs Actual Flow comparison - 2043 With Expansion

	Demand	Actual	Difference	Diff %
AM				
AM	31,480	31,283	197	0.63%
PM	31,461	31,089	372	1.18%

Table 10 A1081 Demand vs Actual Flow comparison - 2043 With Expansion

Direction	Demand	Actual	Difference	Diff %
AM				
Eastbound	3,884	3,857	27	0.7%
West Bound	2,914	2,902	12	0.4%
PM				
Eastbound	2,961	2,907	54	1.8%
West Bound	4,232	4,212	20	0.5%

5.3.5 Both Table 9 and Table 10 show that the differences between the Demand and Actual flows are minimal and would not have an impact on the assessment. Moreover, the Applicant is still with the view that using the Actual flows is more

appropriate to transfer traffic flows from the strategic into the micro-simulation model.

Development Trips included in VISSIM

5.3.6 The development trips, incorporated into both the VISSIM and SATURN models are the same, and result from an analysis of future-year passenger forecasts, flight schedules, and mode share assumptions outlined in the **Transport Assessment [APP-203, AS-123, APP-205, APP-206]**.

5.3.7 The SATURN model provides trip distribution and assignment information for distribution of trips in the VISSIM model, taking into consideration the wider traffic redistribution occurring within the strategic network.

Demand- Supply Convergence (REP7-093, Ref 3.3)

5.3.8 National Highways considers the Strategic SATURN and the micro-simulation VISSIM models as "tiered" model and therefore are requesting further analysis to address TAG Unit M3.1 guidance, Appendix E (Ref 1) in relation to demand-supply convergence.

5.3.9 TAG unit M3.1 defines the "Tiered Model system" in Appendix A as:

"A model in which a simplified highway assignment model (upper tier) is created for the whole of the Fully Modelled and External Areas from a detailed highway assignment model (lower tier) for the same area, and in which demand/supply equilibrium is sought by iterating between the demand model and the upper tier assignment model, with the resultant demands being fed down to the lower tier assignment model."

5.3.10 The tiered modelling approach specified in Appendix E of TAG Unit M3.1 refers to a model in which a simplified highway assignment model (upper tier) is created from a detailed highway assignment model. In such a case, both models would have the same network link and node structure and the same zone system (i.e., there is no spatial simplification within the process).

5.3.11 Both the VISSIM micro-simulation model, and the SATURN strategic highway model are highway assignment models, with different network and zoning structure. The interrelation between the two highway assignment models, in particular in the Covid-19 modelling update is related to the growth in background traffic, where the strategic highway assignment model, SATURN, feeds the future forecast growth into the micro-simulation model. Therefore, the micro-simulation model is not a "simplified" highway assignment model and is not a "lower tier" model.

5.3.12 In addition, both models were calibrated and validated for different base years using different set of data and parameters.

5.3.13 The Applicant therefore considers that the TAG Unit M3.1 Appendix E is related to demand modelling, which CBLTM-LTN represents. The CBLTM-LTN demand model has been produced as per TAG guidance as was reported in the Transport Assessment package. The demand-supply convergence was

measured via the %Gap function as recommended by TAG Unit M2.1 (Ref 2), and by TAG Unit M3.1 Appendix E.

5.3.14 The Applicant does not therefore agree with National Highways interpretation of the TAG guidance and considering the strategic and micro-simulation models as being "tiered" models.

Isolation of Development Trip Impact (REP7-093, Ref 3.4)

As set out in National Highways submission at deadline 4 (REP4-197), National Highways requires that DM VISSIM models are presented that include development trips without uncommitted network changes (including the mitigations proposed in the draft DCO), in order that it doesn't impede the ability to confirm the impact of the development trips on the SRN without mitigation. This is required to enable an understanding of the impact of the development on the SRN.

5.3.1 The methodology for development of modelling scenarios for each assessment phase was established and agreed upon during the initial scoping phase of the application for development consent. Given the involved timescales, introducing additional scenarios at this stage of study is deemed unnecessary and disproportionate.

5.3.2 Additionally, in the requested scenario, incorporating development trips without the proposed mitigations would likely result in a significantly poorer performance, in the overall network and particularly at M1 J10 and the mainline, compared to the Future Baseline scenarios.

5.3.3 The outcomes of the Covid-19 modelling update demonstrate that the capacity upgrade at M1 Junction 10 and its slip roads continue to mitigate the development impacts throughout each assessment phase. This is clearly illustrated through analysis of journey times and variability for trips on the M1 mainline and between M1 mainline and A1081 which indicates no significant adverse impact on junction operation. Moreover, the proposed mitigation measures not only maintain but also enhance junction operation beyond the expected Future Baseline performance.

5.3.4 Therefore, development of additional scenarios, likely presenting a network performance worse than the Future Baseline, is deemed entirely unnecessary and disproportionate. In particular when the With Development (with Airport Expansion) model clearly illustrates that the proposed mitigation measures enhance network and junction operation beyond the anticipated Future Baseline performance.

Assignment and Convergence (REP7-093, Ref 3.5.1)

Demonstrating that the VISSIM model has achieved an appropriate level of convergence and stability will be necessary for National Highways to have confidence in the model outputs.

5.3.5 The convergence criteria proposed in TAG guidance (TAG Unit M3.1 Highway Assignment Modelling) is oriented to strategic modelling and is of limited use in VISSIM.

5.3.6 This is primarily because the assignment algorithm used in VISSIM, known as Stochastic User Equilibrium (SUE), typically exhibits slower convergence compared to other algorithms used in strategic modelling converges more slowly than the other algorithms used for strategic modelling. The process in VISSIM therefore, must converge with respect to the effects of congestion plus the effects of the additional randomness introduced by variable signal operation, amplifying model noise and randomness between iterations and thus making it even more difficult for a model to achieve convergence.

5.3.7 TAG therefore states that for the microsimulation model – the concepts of equilibrium and convergence are difficult under such conditions and stability more crucial for microsimulation-based assignments, particularly for models of large areas.

5.3.8 Therefore, in line with TAG guidance the Applicant has provided National Highways with information on stability convergence checks with regards to traffic volumes.

5.3.9 The stability convergence checks clearly indicated that nine out of 12 modelled scenarios, including all 'With Development' scenarios, achieved the set convergence criteria i.e., 95% of all path traffic volumes change by less than 15 vehicles for at least four consecutive iterations. Only the three Future Baseline PM peak scenarios couldn't achieve the set convergence criteria. This was primarily due to the randomness in the model caused by congestion in the Future Baseline network in PM peak. Nevertheless, these three models showed signs of stability as more than 80% of all path traffic volumes changed by less than 15 vehicles for at least four consecutive iterations.

5.3.10 The stability of the assignment is further evident in the consistency and lower variability of Vehicle Network Performance Indicators across 20 runs with different random seeds in each of the 12 scenarios.

5.3.11 Furthermore, for M1 J10 and the mainline, the Accounting for Covid-19 in Transport Modelling Final Report **[AS-159]** provides outcomes of the journey time variability analysis conducted for traffic on the M1 mainline and for traffic entering and exiting the M1 from the A108. The analysis reveals overlapping upper and lower limit journey times in "With development" phase. While variability is observed in "Without development" scenarios, it is primarily due to congestion at the junction due to the existing capacity constraints at J10.

5.3.12 Therefore, taking into account the information provided on the stability checks and the consistency in the network performance across different random seeds, there is substantial evidence demonstrating the stability of the network in line with the TAG guidance.

Slip Road Coding (REP7-093, Ref 3.5.2)

National Highways requests that the desired speed markers in the model are updated such that vehicles on the southbound parallel merge lane are not able to travel at much faster speeds than the M1 mainline carriageway.

5.3.13 The issue was addressed by conducting a sensitivity test, which involved adjusting the required on-slip speed decision markers to be in line with those on

the mainline. The results of the sensitivity test indicated that the changes did not have a substantial impact on network performance or the outcomes at M1 J10.

5.3.14 When compared to the original models, no significant differences were observed in network-wide performance and operations at M1 J10. Journey times for M1 mainline traffic, as well as traffic entering and exiting from the A1081 to M1 south and M1 north, remained unchanged.

5.3.15 Therefore, based on the outcomes of the sensitivity test, National Highways deemed the issue to be resolved, as communicated in the email dated 11 January 2024.

VISSIM Model Outputs (REP7-093, Ref 3.5.3) – Part 1

2043 DM AM: The southbound merge starts backing up from 8am but doesn't encroach into the roundabout and is clear again by 9am. The northbound lane drop (north of J9 where the number of lanes drop from 5 to 4) has some intermittent queuing and slow moving traffic;

M1 southbound merge

5.3.16 The Applicant agrees with the observation regarding the performance of the southbound merge in 2043 DM AM. In the Future Baseline scenario, observable queues are evident during AM peak hours at the southbound merge. This congestion primarily results from the existing junction capacity limitations, specifically at the signal-controlled node of the northbound off-slip with the southern circulatory at M1 Junction 10. This bottleneck leads to flow breakdown, affecting the movement from A1081 to M1 South.

M1 northbound lane drop

5.3.17 The Applicant agrees that in the future baseline scenario that there are intermittent queues and slow-moving traffic at the northbound lane drop (north of J9). However, it does not negatively impact vehicle entry to the network or the operation of the mainline and M1 J10.

5.3.18 The applicant has looked into the traffic demand (matrix demand) at the M1 northbound entry and compared it with the supply (actual volume) in the network during the peak hours. The analysis revealed that over 99% of the expected demand is able to enter the network in the Future Baseline scenario.

5.3.19 The Applicant can therefore confirm that whilst there are intermittent queues formed at the northbound lane drop location, this does not result in any significant breakdown of flow or have any material impact on the traffic volume that is able to enter the M1 northbound mainline.

VISSIM Model Outputs (REP7-093, Ref 3.5.3) – Part 2

2043 DS AM: The southbound merge starts backing up from 8am but doesn't actually cause any queuing on the slip road. The northbound lane drop has some queued traffic, more than the DM. This is an issue that is worsened by the development traffic given that the congestion increases in the DS scenario. Therefore, National Highways' position is that mitigation on the southbound

merge is still required as set out in National Highways submission at deadline 5 (REP5-093);

M1 southbound merge

5.3.20 The Applicant agrees with the observation regarding the performance of the southbound merge in 2043 DS AM. There is slow moving traffic at the merge, however, it does not cause any queuing on the slip road or in any way adversely impact the operation of M1 southbound mainline. This primarily due to the capacity improvement works at M1 J10 and the improvements to the southbound merge including a lengthening of 150m to the south as proposed in Assessment Phase 2a and Phase 2b.

5.3.21 To better understand the southbound merge's operation, the Applicant analysed the demand merging from A1081 to M1 southbound mainline and compared it with the supply (actual volume from simulation) for the peak hour for both Future Baseline and With Development Scenario in Assessment Phase 2b.

5.3.22 The analysis indicated that in the Future Baseline scenario, approximately 80% of the southbound merge traffic demand is expected to merge with the mainline. This is primarily due to congestion resulting from the capacity constraints of the existing junction.

5.3.23 However, in the 'With Development' scenario, the mitigation measures implemented are expected to improve the performance of the junction. This is despite the 20% increase in demand due to the additional development-related traffic. The analysis confirms that despite the increased demand, around 93% of the demand is expected to merge with the mainline.

5.3.24 This highlights the effectiveness of the capacity improvement works implemented at M1 J10 circulatory as well as on to the M1 southbound on slip in ensuring increased vehicle throughput. Furthermore, the M1 J10 journey times variability for Assessment Phase 2b presented in the Accounting for Covid-19 in Transport Modelling Final Report **[AS-159]** confirms that despite the increased throughput, there is only slight increase (less than one minute) in the peak hour journey times for vehicles on the M1 southbound mainline. This marginal increase is not considered significant in overall journey times and journey times revert to pre-peak hour levels or better after the peak hour, suggesting no residual impact.

M1 northbound lane drop

5.3.25 With regards to the operation at the M1 northbound lane drop, the Applicant acknowledges some queueing in the 'With Development' scenario however, it is noted that this does not impact the operation of M1 northbound.

5.3.26 The Applicant has investigated the traffic demand (matrix demand) at the M1 northbound entry and compared it with the supply (actual volume) in the network in the With Development scenarios.

5.3.27 The analysis reveals that over 99% of traffic demand is expected to enter the network in With Development scenarios despite the increased demand, with the

total number of unreleased vehicles at the M1 northbound entry being only around 50 vehicles per hour. As with the 'do-minimum' scenarios, whilst there are intermittent queues formed at the northbound lane drop location, this does not result in any significant breakdown of flow or have any material impact on the traffic volume that is able to enter the M1 northbound mainline.

5.3.28 Based on the additional analysis discussed above and the outcomes of the Covid-19 modelling, the Applicant can confidently state that the Proposed Development has no adverse impact on the operation at Junction 10 or the operation of the M1 mainline. In fact, the mitigation measures incorporated as part of the Proposed Development, in conjunction with the overall lower demand in the updated Covid-19 models ensures that the impact of the Proposed Development on M1 Junction 10 and the M1 mainline is mitigated.

VISSIM Model Outputs (REP7-093, Ref 3.5.3) – Part 3

2043 DM PM: The southbound merge has no issues during the PM peak (although not a lot of traffic can get through to it). The signals on the roundabout back up into A1081 and eventually back in other direction, affecting the whole roundabout and slip roads. The northbound lane drop has queuing;

M1 southbound merge

5.3.1 The Applicant agrees with the above observation that the southbound merge has no issues during the PM peak. This is primarily due to capacity constraints of the existing junction, specifically the signal-controlled node of the northbound off-slip with the southern circulatory at M1 Junction 10, which results in flow breakdown on A1081, and vehicles are unable to reach southbound on-slips.

M1 northbound lane drop

5.3.2 In the Future Baseline, there is noticeable queuing and slow-moving traffic at the northbound lane drop (north of J9). However, it does not have an adverse impact on the entry of vehicles into the network or the operation of the mainline and M1 J10. As in the AM peak period, the majority of vehicles are able to enter the network.

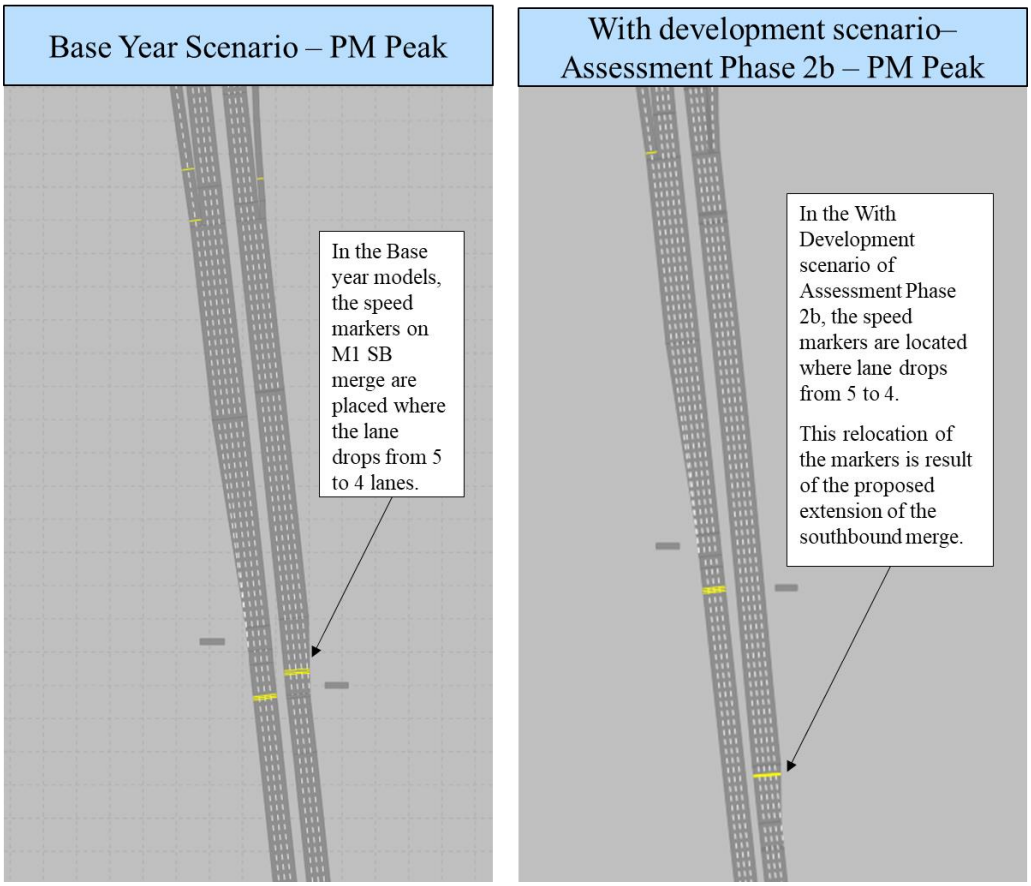
VISSIM Model Outputs (REP7-093, Ref 3.5.3) – Part 4

2043 DS PM: On the southbound merge, the desired speed decisions are moved approximately 100m downstream compared to the DM. National Highways request that these are moved location back to the same location as the DM scenario. The merge has no congestion issues. The northbound lane drop has queuing back to the edge of the modelled area. The southbound on-slip also has queuing back from the point at which the two lanes drop to one lane, back onto the roundabout and on to the A1081.

M1 southbound merge

5.3.3 The location of the desired speed decision on the southbound merge in the With Development scenario is consistent with the location in the validated Base year model. As depicted in the figure below, the decision speed markers in the Base year model are positioned where the number of lanes drops from 5 to 4.

Figure 5 Location of southbound merge markers



5.3.4 In the With Development scenario, the southbound merge is improved and extended 150m to the south, and as result shifting the lane drop location by the same distance. Therefore, the desired speed decision markers are also relocated southward.

5.3.5 Furthermore, there is only a slight difference in the speed of the markers on M1 mainline upstream of J10 (55 mph in peak hour) and the speed markers on the southbound merge (53 mph in peak hour). Therefore, the Applicant expects that any change in the position of speed markers is anticipated to have minimal or no impact on the performance of the southbound merge.

5.3.6 With regards to operation at the southbound merge, the Applicant agrees with National Highways' observation that the southbound merge experiences no congestion issues. Nevertheless, similar to the AM peak, the Applicant analysed the peak hour demand of traffic merging from A1081 to M1 southbound mainline and compared it with actual supply from the model simulation in both Future Baseline and With Development scenarios.

5.3.7 The analysis reveals that in the Future Baseline scenario, approximately 70% of the demand from the southbound merge traffic is expected to successfully merge with the mainline.

5.3.8 However, in the 'With Development' scenario, the mitigation measures implemented are expected to improve the performance of the junction. This is

despite the 40% increase in demand due to the additional development-related traffic. The analysis confirms that despite the increased demand, around 93% of the demand is expected to merge with the mainline.

5.3.9 This highlights the effectiveness of the capacity improvement works implemented at M1 J10 circulatory as well as on to the M1 southbound on slip in ensuring increased vehicle throughput. Furthermore, the journey times variability presented in Accounting for Covid-19 in Transport Modelling Final Report **[AS-159]**, shows a substantial improvement in journey time reliability for travel along the M1 mainline in and between A1081 and M1. The implementation of mitigation measures in Assessment Phase 2a ensures an improved merging of traffic to the M1 mainline even with the additional development traffic, without adversely affecting mainline journeys throughout the three-hour peak period. As such, the Applicant remains of the view that the Proposed Development does not have a material residual adverse impact on the M1 southbound.

M1 northbound lane drop

5.3.10 With regards to the operation at the M1 northbound lane drop, the Applicant acknowledges some queueing in the 'With Development' scenario.

5.3.11 The Applicant investigated the traffic demand (matrix demand) at the M1 northbound entry and compared it with the supply (actual volume) in the network in the With Development scenarios.

5.3.12 The analysis confirmed that over 99% of traffic demand is anticipated to enter the network in With Development scenarios. Additionally, the journey times for the M1 northbound mainline presented in the Accounting for Covid-19 in Transport Modelling Final Report **[AS-159]**, further demonstrates that the temporary queueing at the northbound lane drop has no significant impact on the operation of the M1 mainline. As such, the Applicant remains of the view that the Proposed Development does not have a material residual adverse impact on the M1 northbound.

Conclusion (REP7-093, Ref 3.4)

5.3.13 As highlighted in the **Transport Assessment [APP-203, AS-123, APP-205, APP-206]**, the Applicant has proposed a series of mitigation measures at several off-site locations taking into consideration the performance of the Future Baseline network and impact of the development-generated trips on the strategic as well as the local road network.

5.3.14 In particular, for M1 J10, following set of improvement works have been proposed in Assessment Phase 2a and Phase 2b to enhance the capacity of the circulatory and the slip roads:

d. Amendments to the northbound off-slip white lining to provide two merging lanes.

e. Further widening to western circulatory to five lanes, to completely separate eastbound movements onto the A1081 from northbound off-slip, and movements from southern circulatory onto northbound on-slip.

f. Removal of the segregated left turn from the southbound off-slip to A1081, to enable three lanes to enter A1081 from circulatory without subsequent merge.

g. Signalisation of the reconfigured junction between the southbound off-slip / northern roundabout circulatory.

h. Amendments to white lining to move the extent of the existing merge nosing north by approx. 25m increasing the overall length of the southbound merge.

i. Extension of the southbound merge by approx. 150m through amendments to white lining.

5.3.15 The Accounting for Covid-19 in Transport Modelling Final Report **[AS-159]** presents a comprehensive impact assessment of the Proposed Development on the M1 J10. Overall, an improvement in the network performance is anticipated throughout each of the assessment phases when contrasted with the Future Baseline performance. In particular, an assessment of the journey times for trips on the M1 mainline and trips between M1 and A1018 clearly demonstrates no significant adverse impact on junction operation. Moreover, proposed mitigation measures enhance junction operation beyond the anticipated Future Baseline performance. These measures ensure smooth traffic merging and diverging from the M1 mainline to the slip lanes, sustaining mainline performance throughout the assessed period.

5.3.16 The Applicant therefore concludes that the Proposed Development will not have any material residual adverse impacts on the operation of the M1 mainline or the south facing slips.

REFERENCES

Ref 1 https://www.gov.uk/government/publications/webtag-tag-unit-m3-1-highway-assignment-modelling

Ref 2 https://www.gov.uk/government/publications/tag-unit-m2-1-variable-demand-modelling

Appendix A: M1 Junctions Results Tables

Peak	Approach	Without Expansion Original				With Expansion Original				Without Expansion Updated				With Expansion Updated			
		Flow	V/C	Delay	Queue	Flow	V/C	Delay	Queue	Flow	V/C	Delay	Queue	Flow	V/C	Delay	Queue
AM	North	372	23	13	0	374	23	13	0	385	23	13	0	394	24	13	0
	East	917	43	8	0	929	44	8	0	909	43	8	0	919	43	8	0
	South	503	24	9	0	509	24	9	0	530	25	9	0	537	25	9	0
	West	1,640	100	71	5	1,640	100	71	5	1,640	100	71	5	1,640	100	71	5
PM	North	534	33	13	0	593	36	14	0	307	19	11	0	345	21	12	0
	East	1,005	50	9	0	1,008	50	9	0	994	49	9	0	1,000	50	9	0
	South	837	42	8	0	840	42	8	0	819	41	8	0	775	39	8	0
	West	857	52	13	0	866	53	13	0	844	51	12	0	890	54	13	0

M1 Junction 9 (west) Flows (PCUs), VC ratio, Delays (secs) and Average Queues – 2027

Peak	Approach	Without Expansion Original				With Expansion Original				Without Expansion Updated				With Expansion Updated			
		Flow	V/C	Delay	Queue	Flow	V/C	Delay	Queue	Flow	V/C	Delay	Queue	Flow	V/C	Delay	Queue
AM	North	665	49	8	0	654	48	8	0	666	49	8	0	654	48	8	0
	East	1,074	65	61	1	1,082	66	68	1	1,070	65	59	1	1,085	66	71	2
	West	319	16	12	0	317	16	12	0	333	17	12	0	324	16	12	0
PM	North	745	51	8	0	749	51	8	0	751	51	8	0	731	50	8	0
	East	1,054	64	93	11	1,053	64	94	11	1,048	64	93	11	1,054	64	99	12
	West	203	10	12	0	201	10	12	0	203	10	12	0	209	10	12	0

M1 Junction 9 (east) Flows (PCUs), VC ratio, Delays (secs) and Average Queues – 2027

Peak	Approach	Turn	Without Expansion Original				With Expansion Original				Without Expansion Updated				With Expansion Updated			
			Flow	V/C	Delay	Queue	Flow	V/C	Delay	Queue	Flow	V/C	Delay	Queue	Flow	V/C	Delay	Queue
AM	North	LT - FF	1,708	85	6	0	1,732	87	7	0	1,621	81	5	0	1,655	83	5	0
		LT - Gyratory	0	0	8	0	0	0	7	0	0	0	7	0	0	0	7	0
	East	RT	1081	27	4	0	1105	28	4	0	1123	29	4	0	1138	29	4	0
		LT-FF	1,278	68	6	0	1,275	68	6	0	1,277	68	6	0	1,280	68	6	0
		LT - Gyratory	233	32	4	0	243	34	4	0	229	32	4	0	230	32	4	0
	South	RT	1,604	65	17	7	1,657	45	13	6	1,520	62	17	6	1,590	43	13	5
PM	North	LT - FF	1,189	59	2	0	1,207	60	2	0	1,167	58	2	0	1,218	61	2	0
		LT - Gyratory	0	0	7	0	0	0	7	0	0	0	7	0	0	0	7	0
	East	RT	1,751	44	4	0	1,760	45	4	0	1,727	44	4	0	1,768	45	4	0
		LT-FF	1,387	76	7	0	1,395	76	7	0	1,435	79	7	0	1,440	79	7	0
		LT - Gyratory	286	47	5	0	276	46	5	0	301	53	7	0	299	53	7	0
	South	RT	1,501	75	28	10	1,537	51	22	9	1,405	70	27	9	1,447	48	21	8

M1 Junction 10 Flows (PCUs), VC ratio, Delays (secs) and Average Queues – 2027

Peak	Approach	Without Expansion Original				With Expansion Original				Without Expansion Updated				With Expansion Updated			
		Flow	V/C	Delay	Queue	Flow	V/C	Delay	Queue	Flow	V/C	Delay	Queue	Flow	V/C	Delay	Queue
AM	North	741	36	19	4	750	37	19	4	692	35	18	3	715	35	18	3
	East	1,422	31	7	3	1,441	32	7	3	1,405	31	7	3	1,449	32	7	3
	South	1,072	43	13	4	1,065	43	13	4	1,081	43	13	4	1,084	43	13	4
	West	969	24	14	3	975	25	14	3	948	24	14	3	957	24	14	3
PM	North	612	33	17	3	621	33	17	3	636	34	17	3	639	34	17	3
	East	1,161	50	19	6	1,182	51	19	6	1,108	48	19	5	1,103	47	19	5
	South	1,506	48	9	4	1,509	48	10	4	1,437	47	9	3	1,526	48	9	4
	West	1,093	37	23	6	1,096	38	23	6	1,062	36	22	6	1,051	36	22	6

M1 Junction 11 Flows (PCUs), VC ratio, Delays (secs) and Average Queues – 2027

Peak	Approach	Without Expansion Original				With Expansion Original				Without Expansion Updated				With Expansion Updated			
		Flow	V/C	Delay	Queue	Flow	V/C	Delay	Queue	Flow	V/C	Delay	Queue	Flow	V/C	Delay	Queue
AM	North	444	27	14	1	425	26	14	1	435	27	14	1	433	26	14	1
	East	901	43	8	0	907	43	8	0	900	43	8	0	921	44	8	0
	South	625	30	9	0	623	30	9	0	641	30	9	0	632	30	9	0
	West	1,640	100	72	5	1,640	100	72	5	1,640	100	72	5	1,640	100	72	5
PM	North	593	36	14	1	298	18	19	0	345	21	12	0	246	15	12	0
	East	1,008	50	9	0	1,006	52	9	0	1,000	50	9	0	994	50	9	0
	South	840	42	8	0	920	47	8	0	775	39	8	0	912	46	8	0
	West	866	53	13	0	1,066	65	15	0	890	54	13	0	968	59	14	0

M1 Junction 9 (west) Flows (PCUs), VC ratio, Delays (secs) and Average Queues – 2039

Peak	Approach	Without Expansion Original				With Expansion Original				Without Expansion Updated				With Expansion Updated			
		Flow	V/C	Delay	Queue	Flow	V/C	Delay	Queue	Flow	V/C	Delay	Queue	Flow	V/C	Delay	Queue
AM	North	717	50	8	0	747	52	8	0	664	47	8	0	720	51	8	0
	East	1,052	64	53	1	1,055	64	54	1	1,061	65	54	1	1,076	66	65	1
	West	249	13	12	0	247	13	12	0	275	14	12	0	271	14	12	0
PM	North	749	51	8	0	744	50	8	0	731	50	8	0	791	54	8	0
	East	1,053	64	94	4	1,014	62	61	8	1,054	64	99	3	1,018	62	57	7
	West	201	10	12	0	194	9	12	0	209	10	12	0	196	10	12	0

M1 Junction 9 (east) Flows (PCUs), VC ratio, Delays (secs) and Average Queues - 2039

Peak	Approach	Turn	Without Expansion Original				With Expansion Original				Without Expansion Updated				With Expansion Updated			
			Flow	V/C	Delay	Queue	Flow	V/C	Delay	Queue	Flow	V/C	Delay	Queue	Flow	V/C	Delay	Queue
AM	North	LT - FF	1,897	95	15	0	1,921	96	18	0	1,756	88	7	0	1,793	90	8	0
		LT - Gyratory	0	0	9	0	0	0	8	0	0	0	8	0	0	0	8	0
	East	RT	1186	30	4	0	1049	26	4	0	1240	31	4	0	1103	28	4	0
		LT-FF	1,284	69	6	0	1,632	41	1	0	1,291	69	6	0	1,669	42	1	0
		LT - Gyratory	238	33	4	0	0	0	5	0	239	34	4	0	0	0	5	0
	South	RT	1,765	72	19	8	1,875	68	17	8	1,652	74	23	9	1,798	65	17	8
PM	North	LT - FF	1,207	60	2	0	1,377	69	3	0	1,218	61	2	0	1,333	67	2	0
		LT - Gyratory	0	0	7	0	0	0	7	0	0	0	7	0	0	0	7	0
	East	RT	1,760	45	4	0	1,693	42	4	0	1,768	45	4	0	1,641	41	4	0
		LT-FF	1,395	76	7	0	2,601	65	7	0	1,440	79	7	0	2,413	60	7	0
		LT - Gyratory	276	46	5	0	0	0	6	0	299	53	7	0	0	0	6	0
	South	RT	1,537	51	22	10	1,567	82	28	10	1,447	48	21	12	1,486	78	37	9

M1 Junction 10 Flows (PCUs), VC ratio, Delays (secs) and Average Queues – 2039

Peak	Approach	Without Expansion Original				With Expansion Original				Without Expansion Updated				With Expansion Updated			
		Flow	V/C	Delay	Queue	Flow	V/C	Delay	Queue	Flow	V/C	Delay	Queue	Flow	V/C	Delay	Queue
AM	North	807	39	19	4	820	40	20	4	780	38	19	4	786	38	19	4
	East	1,523	34	7	3	1,549	34	7	3	1,461	32	7	3	1,480	33	7	3
	South	1,139	44	13	4	1,156	45	13	4	1,171	45	13	4	1,159	45	13	4
	West	1,020	26	14	4	997	25	14	3	985	25	14	3	946	24	14	3
PM	North	621	33	17	3	697	35	17	3	639	34	17	3	701	36	17	3
	East	1,182	51	19	6	1,231	53	19	6	1,103	47	19	6	1,144	49	19	6
	South	1,509	48	10	3	1,565	49	10	4	1,526	48	9	3	1,478	47	9	3
	West	1,096	38	23	7	1,121	38	23	6	1,051	36	22	6	1,087	37	23	6

M1 Junction 11 Flows (PCUs), VC ratio, Delays (secs) and Average Queues – 2039

Peak	Approach	Without Expansion Original				With Expansion Original				Without Expansion Updated				With Expansion Updated			
		Flow	V/C	Delay	Queue	Flow	V/C	Delay	Queue	Flow	V/C	Delay	Queue	Flow	V/C	Delay	Queue
AM	North	470	29	15	1	471	29	15	1	439	27	14	1	434	26	14	1
	East	900	43	8	0	902	43	8	0	893	42	8	0	907	43	8	0
	South	646	31	9	0	638	31	9	0	671	32	9	0	658	31	9	0
	West	1,640	100	72	5	1,640	100	72	5	1,640	100	72	5	1,640	100	72	5
PM	North	731	45	20	1	403	25	13	0	508	31	13	0	290	18	11	0
	East	980	51	9	0	985	52	9	0	939	48	9	0	992	50	9	0
	South	1,001	50	8	0	990	50	8	0	926	47	8	0	913	46	8	0
	West	1,118	68	15	0	1,098	67	15	0	1,015	62	14	0	1,008	61	14	0

M1 Junction 9 (west) Flows (PCUs), VC ratio, Delays (secs) and Average Queues - 2043

Peak	Approach	Without Expansion Original				With Expansion Original				Without Expansion Updated				With Expansion Updated			
		Flow	V/C	Delay	Queue	Flow	V/C	Delay	Queue	Flow	V/C	Delay	Queue	Flow	V/C	Delay	Queue
AM	North	751	51	8	0	798	55	8	0	683	48	8	0	768	54	9	0
	East	1,044	64	50	1	1,040	63	48	1	1,050	64	51	1	1,056	64	56	2
	West	211	11	12	0	207	11	12	0	260	13	12	0	258	13	12	0
PM	North	696	48	8	0	708	48	8	0	719	49	8	0	769	52	8	0
	East	1,046	64	67	5	1,031	63	62	5	1,033	63	52	2	1,015	62	60	5
	West	217	11	12	0	206	10	12	0	189	9	12	0	184	9	12	0

M1 Junction 9 (east) Flows (PCUs), VC ratio, Delays (secs) and Average Queues – 2043

Peak	Approach	Turn	Without Expansion Original				With Expansion Original				Without Expansion Updated				With Expansion Updated			
			Flow	V/C	Delay	Queue	Flow	V/C	Delay	Queue	Flow	V/C	Delay	Queue	Flow	V/C	Delay	Queue
AM	North	LT - FF	1,934	97	20	0	1,971	99	29	0	1,807	90	9	0	1,873	94	13	0
		LT - Gyratory	0	0	9	0	1	0	9	0	0	0	8	0	0	0	9	0
	East	RT	1213	31	4	0	1146	29	4	0	1264	32	4	0	1166	29	4	0
		LT-FF	1,285	69	6	0	1,666	42	1	0	1,296	70	6	0	1,735	43	1	0
		LT - Gyratory	238	33	4	0	0	0	5	0	243	34	4	0	0	0	5	0
	South	RT	1,786	73	19	8	2,070	75	19	9	1,686	76	24	10	1,984	72	18	9
PM	North	LT - FF	1,330	66	3	0	1,398	70	3	0	1,292	65	3	0	1,360	68	3	0
		LT - Gyratory	0	0	7	0	0	0	7	0	0	0	7	0	0	0	7	0
	East	RT	1,797	45	4	0	1,774	44	4	0	1,951	49	4	0	1,672	42	4	0
		LT-FF	1,416	77	7	0	2,608	65	1	0	1,415	77	7	0	2,541	64	1	0
		LT - Gyratory	277	47	6	0	0	0	5	0	289	49	6	0	0	0	5	0
	South	RT	1,500	75	28	10	1,610	84	29	10	1,415	83	37	12	1,547	81	27	10

M1 Junction 10 Flows (PCUs), VC ratio, Delays (secs) and Average Queues - 2043

Peak	Approach	Without Expansion Original				With Expansion Original				Without Expansion Updated				With Expansion Updated			
		Flow	V/C	Delay	Queue	Flow	V/C	Delay	Queue	Flow	V/C	Delay	Queue	Flow	V/C	Delay	Queue
AM	North	827	40	20	4	839	41	28	6	792	39	19	4	809	40	20	4
	East	1,569	35	7	3	1,590	35	7	3	1,471	33	7	3	1,506	33	7	3
	South	1,144	45	13	4	1,173	45	13	4	1,177	46	13	4	1,184	46	13	4
	West	1,039	26	14	4	1,027	26	14	4	993	25	14	3	981	25	14	3
PM	North	702	36	17	3	729	37	18	3	708	36	18	3	716	36	18	3
	East	1,288	55	19	6	1,255	54	19	6	1,219	52	19	6	1,176	50	19	6
	South	1,493	47	10	4	1,584	50	10	4	1,486	47	9	3	1,427	45	9	3
	West	1,169	40	23	7	1,124	39	23	6	1,135	39	23	7	1,084	37	23	6

M1 Junction 11 Flows (PCUs), VC ratio, Delays (secs) and Average Queues – 2043

Appendix B: Hitchin Additional Flow Information

2027 Flow Comparison (veh/hr) – A505 Eastbound

Link	Section Start	Section Finish	Dir	AM Peak			Interpeak			PM Peak		
				"Without" Expansion	"With" Expansion	Diff	"Without" Expansion	"With" Expansion	Diff	"Without" Expansion	"With" Expansion	Diff
A505	Uppertilehouse / A505 Roundabout	Nun's Close	NB	1131	1139	8	815	817	2	1304	1313	9
A505	Nun's Close	West Hill	NB	1105	1112	8	796	798	2	1279	1288	9
A505	West Hill	Bedford Road Junction	NB	1129	1137	8	814	817	2	1304	1313	9
A505 Bedford Road	Bedford Road Junction	Bedford Road/ Fishponds Road Roundabout	NB	432	438	5	441	442	1	763	770	7
A505 Fishponds Road	Bedford Road/ Fishponds Road Roundabout	A505 / IcklefoRoad Road Roundabout	EB	90	89	0	37	37	0	49	49	0
A505 Nightingale Road	A505 / IcklefoRoad Road Roundabout	A505 / Grove Road Roundabout	EB	476	475	-1	305	306	1	453	455	2
A505 Nightingale Road	A505 / Grove Road Roundabout	A505 / Verulam Road Roundabout	EB	797	801	4	464	464	0	731	738	7
A505 Nightingale Road	A505 / Verulam Road Roundabout	A505 / Dacre Road Junction	EB	551	550	-1	287	288	0	434	438	5
A505 Nightingale Road	A505 / Dacre Road Junction	A505 / B656 Roundabout	EB	571	570	-1	274	274	0	437	440	3
A505 Cambridge Road	A505 / B656 Roundabout	A505 / Common Rise Junction	EB	735	738	3	437	438	0	645	648	3
A505 Cambridge Road	A505 / Common Rise Junction	A505 / St Michael Road Roundabout	EB	764	767	3	444	445	0	657	659	3
A505 Cambridge Road	A505 / St Michael Road Roundabout	A505 / Willian Road Junction	EB	580	579	-1	444	444	0	674	676	2
A505 Cambridge Road	A505 / Willian Road Junction	A505 / Stotfold Road Roundabout	EB	644	645	2	508	508	0	726	727	1
A505 Hitchin Road	A505 / Stotfold Road Roundabout	A505 / Highfield Junction	EB	501	504	2	346	346	0	509	511	2
A505 Hitchin Road	A505 / Highfield Junction	A505 / Broadway Junction	EB	506	509	2	342	342	0	504	506	2
A505 Hitchin Road	A505 / Broadway Junction	A505 / Letchworth Lane Junction	EB	305	307	2	239	239	0	374	376	2
A505 Hitchin Road	A505 / Letchworth Lane Junction	A505 / Spring Road Junction	EB	424	433	9	296	295	0	753	754	1
A505 Baldock Road	A505 / Spring Road Junction	A505 / Sollershott E Junction	EB	284	287	3	228	228	0	484	486	2
A505 Baldock Road	A505 / Sollershott E Junction	A505 / Norton Way S Junction	EB	350	350	-1	307	307	0	529	531	2
A505 Baldock Road	A505 / Norton Way S Junction	A505 / Pixmore Way Roundabout	EB	216	213	-3	228	228	0	321	322	1
A505 Letchworth Gate Roundabout Approach			SB	636	629	-7	740	740	0	828	828	0
A505 Letchworth Gate Roundabout Gyratory			SB	1008	1005	-3	1012	1012	0	1226	1226	0
A505 Letchworth Gate Roundabout Exit			SB	1068	1064	-3	1016	1016	0	1173	1173	0

Link	Section Start	Section Finish	Dir	AM Peak			Interpeak			PM Peak		
				"Without" Expansion	"With" Expansion	Diff	"Without" Expansion	"With" Expansion	Diff	"Without" Expansion	"With" Expansion	Diff
A505 Letchworth Gate	A505 Letchworth Gate Roundabout	A505 / Baldock Ln Roundabout	SB	965	961	-5	925	924	0	1043	1043	0
A505 Letchworth Gate Roundabout Approach			SB	923	911	-12	917	916	0	936	936	0
A505 Letchworth Gate Roundabout Approach			SB	923	912	-12	917	916	0	936	935	-1

2027 Flow Comparison (veh/hr) – A505 Westbound

Link	Section Start	Section Finish	Dir	AM Peak			Interpeak			PM Peak		
				"Without" Expansion	"With" Expansion	Diff	"Without" Expansion	"With" Expansion	Diff	"Without" Expansion	"With" Expansion	Diff
A505 Letchworth Gate Roundabout Exit			NB	1517	1522	5	1340	1336	-4	1579	1581	2
A505 Letchworth Gate Roundabout Exit			NB	1517	1522	5	1340	1336	-4	1579	1581	2
A505 Letchworth Gate	A505 / Baldock Ln Roundabout	A505 Letchworth Gate Roundabout	NB	1346	1355	9	911	911	0	1194	1192	-2
A505 Letchworth Gate Roundabout Approach			NB	1448	1459	10	1002	1002	0	1324	1322	-3
A505 Letchworth Gate Roundabout Gyratory			NB	1498	1508	10	993	993	0	1295	1293	-2
A505 Letchworth Gate Roundabout Exit			NB	1584	1591	7	992	992	0	1273	1270	-3
A505 Letchworth Gate	A505 Letchworth Gate Roundabout	A505 / Pixmore Way Roundabout	NB	1212	1215	2	720	720	0	874	871	-3
A505 Baldock Road	A505 / Pixmore Way Roundabout	A505 / Norton Way S Junction	WB	289	286	-3	206	207	0	297	297	0
A505 Baldock Road	A505 / Norton Way S Junction	A505 / Sollershott E Junction	WB	369	377	7	236	236	0	334	334	0
A505 Baldock Road	A505 / Sollershott E Junction	A505 / Spring Road Junction	WB	330	338	7	182	182	0	275	275	0
A505 Hitchin Road	A505 / Spring Road Junction	A505 / Letchworth Lane Junction	WB	619	627	9	231	232	0	449	449	0
A505 Hitchin Road	A505 / Letchworth Lane Junction	A505 / Broadway Junction	WB	290	291	1	204	204	0	296	297	0
A505 Hitchin Road	A505 / Broadway Junction	A505 / Highfield Junction	WB	459	458	-1	339	339	0	479	479	0
A505 Hitchin Road	A505 / Highfield Junction	A505 / Stotfold Road Roundabout	WB	458	457	-1	336	336	0	465	465	0
A505 Cambridge Road	A505 / Stotfold Road Roundabout	A505 / Willian Road Junction	WB	686	685	-1	463	463	1	600	600	0
A505 Cambridge Road	A505 / Willian Road Junction	A505 / St Michael Road Roundabout	WB	745	742	-3	521	522	1	667	665	-2
A505 Cambridge Road	A505 / St Michael Road Roundabout	A505 / Common Rise Junction	WB	707	702	-4	507	508	1	726	726	0
A505 Cambridge Road	A505 / Common Rise Junction	A505 / B656 Roundabout	WB	695	691	-5	498	500	1	702	701	0
A505 Nightingale Road	A505 / B656 Roundabout	A505 / Dacre Road Junction	WB	389	387	-1	360	361	1	436	438	2
A505 Nightingale Road	A505 / Dacre Road Junction	A505 / Verulam Road Roundabout	WB	376	375	-2	374	374	1	428	432	4
A505 Nightingale Road	A505 / Verulam Road Roundabout	A505 / Grove Road Roundabout	WB	686	688	2	539	540	1	732	735	3
A505 Nightingale Road	A505 / Grove Road Roundabout	A505 / IcklefoRoad Road Roundabout	WB	487	484	-3	394	395	1	436	435	-1
A505 Fishponds Road	A505 / IcklefoRoad Road Roundabout	Bedford Road/ Fishponds Road Roundabout	WB	248	249	1	135	135	0	254	255	0

Link	Section Start	Section Finish	Dir	AM Peak			Interpeak			PM Peak		
				"Without" Expansion	"With" Expansion	Diff	"Without" Expansion	"With" Expansion	Diff	"Without" Expansion	"With" Expansion	Diff
A505 Bedford Road	Bedford Road/ Fishponds Road Roundabout	Bedford Road junction	SB	767	758	-9	464	465	1	590	591	1
A505 Bedford Road	Bedford Road junction	Brand Str Junction	SB	1477	1469	-8	833	834	1	1103	1106	3
A505 Bedford Road	Brand Str Junction	Uppertilehouse/ A505 Roundabout	SB	906	889	-17	795	797	2	978	979	1

2043 Flow Comparison (veh/hr) – A505 Eastbound

Link	Section Start	Section Finish	Dir	AM Peak			Interpeak			PM Peak		
				"Without" Expansion	"With" Expansion	Diff	"Without" Expansion	"With" Expansion	Diff	"Without" Expansion	"With" Expansion	Diff
A505	Uppertilehouse / A505 Roundabout	Nun's Close	NB	1180	1415	235	877	918	41	1305	1437	132
A505	Nun's Close	West Hill	NB	1151	1386	234	856	897	41	1280	1411	132
A505	West Hill	Bedford Road Junction	NB	1176	1411	235	876	917	41	1306	1438	132
A505 Bedford Road	Bedford Road Junction	Bedford Road/ Fishponds Road Roundabout	NB	470	632	162	459	477	17	735	819	85
A505 Fishponds Road	Bedford Road/ Fishponds Road Roundabout	A505 / IcklefoRoad Road Roundabout	EB	135	226	91	39	40	1	44	47	3
A505 Nightingale Road	A505 / IcklefoRoad Road Roundabout	A505 / Grove Road Roundabout	EB	529	567	38	331	350	19	473	496	23
A505 Nightingale Road	A505 / Grove Road Roundabout	A505 / Verulam Road Roundabout	EB	816	847	31	496	513	18	761	751	-10
A505 Nightingale Road	A505 / Verulam Road Roundabout	A505 / Dacre Road Junction	EB	536	564	27	309	329	20	461	468	6
A505 Nightingale Road	A505 / Dacre Road Junction	A505 / B656 Roundabout	EB	556	583	27	295	315	20	481	484	3
A505 Cambridge Road	A505 / B656 Roundabout	A505 / Common Rise Junction	EB	701	720	19	461	467	6	707	712	5
A505 Cambridge Road	A505 / Common Rise Junction	A505 / St Michael Road Roundabout	EB	729	746	17	468	474	6	720	725	4
A505 Cambridge Road	A505 / St Michael Road Roundabout	A505 / Willian Road Junction	EB	602	603	1	467	471	4	723	738	15
A505 Cambridge Road	A505 / Willian Road Junction	A505 / Stotfold Road Roundabout	EB	663	684	21	540	543	3	760	767	7
A505 Hitchin Road	A505 / Stotfold Road Roundabout	A505 / Highfield Junction	EB	516	545	29	374	378	3	543	551	8
A505 Hitchin Road	A505 / Highfield Junction	A505 / Broadway Junction	EB	518	548	30	368	371	3	537	545	8
A505 Hitchin Road	A505 / Broadway Junction	A505 / Letchworth Lane Junction	EB	315	338	22	259	262	3	394	399	5
A505 Hitchin Road	A505 / Letchworth Lane Junction	A505 / Spring Road Junction	EB	485	521	36	321	324	3	796	796	0
A505 Baldock Road	A505 / Spring Road Junction	A505 / Sollershott E Junction	EB	304	330	26	246	249	3	519	521	2
A505 Baldock Road	A505 / Sollershott E Junction	A505 / Norton Way S Junction	EB	340	359	19	319	322	3	565	568	3
A505 Baldock Road	A505 / Norton Way S Junction	A505 / Pixmore Way Roundabout	EB	196	215	19	233	236	3	333	340	7
A505 Letchworth Gate Roundabout Approach			SB	621	619	-1	799	799	-1	795	798	3
A505 Letchworth Gate Roundabout Gyratory			SB	1062	1052	-11	1104	1101	-2	1228	1235	8
A505 Letchworth Gate Roundabout Exit			SB	1136	1123	-13	1099	1098	-2	1180	1189	9

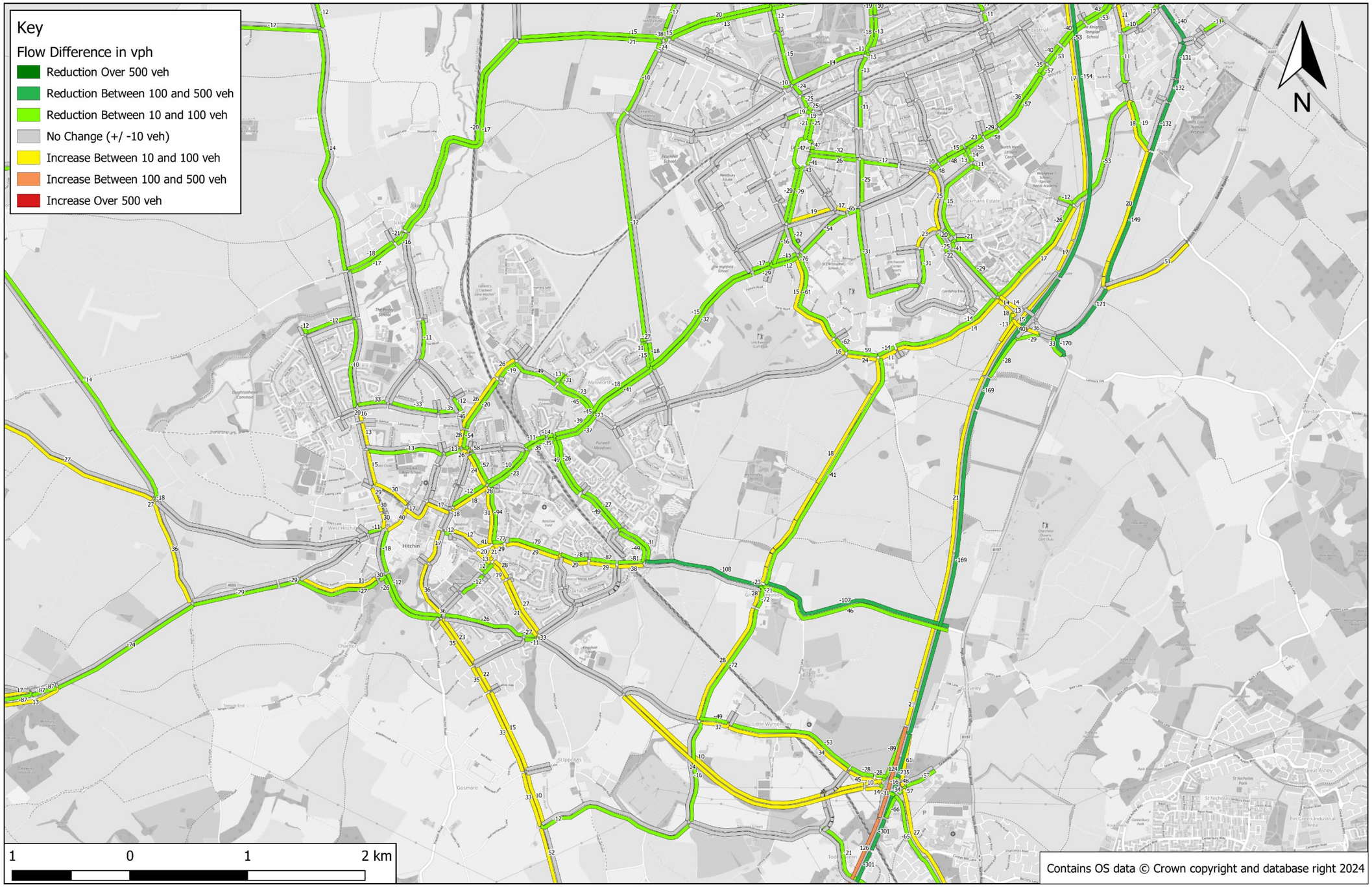
Link	Section Start	Section Finish	Dir	AM Peak			Interpeak			PM Peak		
				"Without" Expansion	"With" Expansion	Diff	"Without" Expansion	"With" Expansion	Diff	"Without" Expansion	"With" Expansion	Diff
A505 Letchworth Gate	A505 Letchworth Gate Roundabout	A505 / Baldock Ln Roundabout	SB	1038	1022	-16	1008	1005	-3	1056	1064	9
A505 Letchworth Gate Roundabout Approach			SB	928	933	4	1002	998	-3	935	938	3
A505 Letchworth Gate Roundabout Approach			SB	928	933	4	1002	998	-4	935	938	3

2043 Flow Comparison (veh/hr) – A505 Westbound

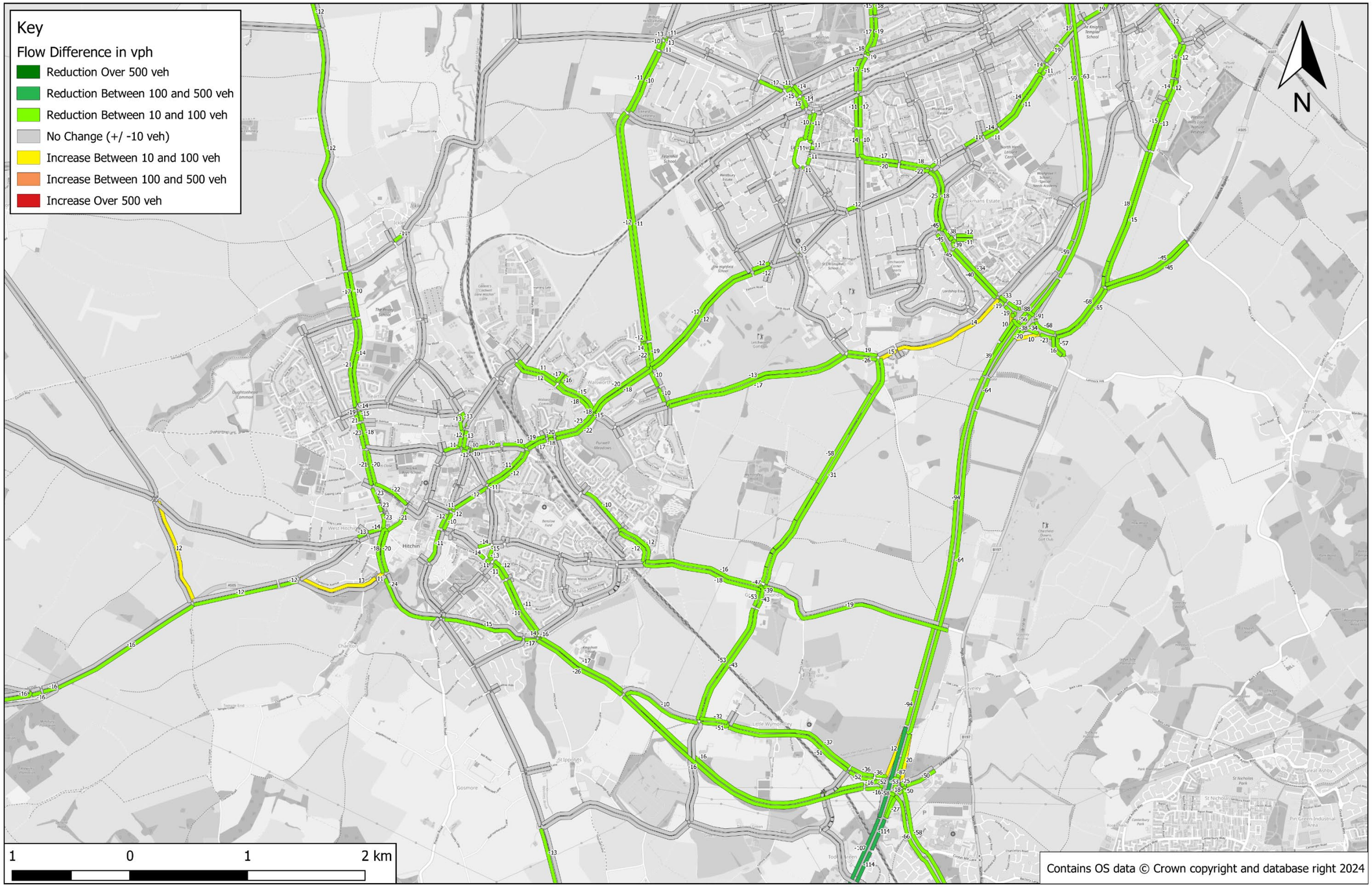
Link	Section Start	Section Finish	Dir	AM Peak			Interpeak			PM Peak		
				"Without" Expansion	"With" Expansion	Diff	"Without" Expansion	"With" Expansion	Diff	"Without" Expansion	"With" Expansion	Diff
A505 Letchworth Gate Roundabout Exit			NB	1535	1569	33	1387	1389	1	1553	1562	9
A505 Letchworth Gate Roundabout Exit			NB	1535	1569	33	1387	1389	1	1553	1562	9
A505 Letchworth Gate	A505 / Baldock Ln Roundabout	A505 Letchworth Gate Roundabout	NB	1441	1410	-32	1004	993	-11	1262	1264	2
A505 Letchworth Gate Roundabout Approach			NB	1539	1511	-28	1095	1086	-9	1386	1389	2
A505 Letchworth Gate Roundabout Gyratory			NB	1584	1556	-28	1086	1077	-9	1358	1360	2
A505 Letchworth Gate Roundabout Exit			NB	1641	1611	-30	1085	1076	-9	1336	1338	2
A505 Letchworth Gate	A505 Letchworth Gate Roundabout	A505 / Pixmore Way Roundabout	NB	1199	1179	-20	781	774	-7	903	900	-3
A505 Baldock Road	A505 / Pixmore Way Roundabout	A505 / Norton Way S Junction	WB	292	320	28	211	210	0	302	307	5
A505 Baldock Road	A505 / Norton Way S Junction	A505 / Sollershott E Junction	WB	413	436	23	242	241	0	329	335	6
A505 Baldock Road	A505 / Sollershott E Junction	A505 / Spring Road Junction	WB	366	393	27	190	190	0	267	274	7
A505 Hitchin Road	A505 / Spring Road Junction	A505 / Letchworth Lane Junction	WB	658	684	26	250	249	-1	491	495	4
A505 Hitchin Road	A505 / Letchworth Lane Junction	A505 / Broadway Junction	WB	304	339	34	212	211	0	288	295	7
A505 Hitchin Road	A505 / Broadway Junction	A505 / Highfield Junction	WB	485	536	50	358	359	1	480	506	26
A505 Hitchin Road	A505 / Highfield Junction	A505 / Stotfold Road Roundabout	WB	486	536	50	353	354	1	470	495	25
A505 Cambridge Road	A505 / Stotfold Road Roundabout	A505 / Willian Road Junction	WB	740	772	33	468	470	2	597	672	74
A505 Cambridge Road	A505 / Willian Road Junction	A505 / St Michael Road Roundabout	WB	776	826	50	537	539	2	653	698	45
A505 Cambridge Road	A505 / St Michael Road Roundabout	A505 / Common Rise Junction	WB	761	814	53	521	526	5	765	806	41
A505 Cambridge Road	A505 / Common Rise Junction	A505 / B656 Roundabout	WB	747	803	56	511	516	5	740	783	42
A505 Nightingale Road	A505 / B656 Roundabout	A505 / Dacre Road Junction	WB	399	464	65	362	367	5	477	518	41
A505 Nightingale Road	A505 / Dacre Road Junction	A505 / Verulam Road Roundabout	WB	383	449	66	375	380	5	456	501	45
A505 Nightingale Road	A505 / Verulam Road Roundabout	A505 / Grove Road Roundabout	WB	623	730	107	549	553	4	781	789	8
A505 Nightingale Road	A505 / Grove Road Roundabout	A505 / IcklefoRoad Road Roundabout	WB	515	619	105	424	435	12	426	526	99
A505 Fishponds Road	A505 / IcklefoRoad Road Roundabout	Bedford Road/ Fishponds Road Roundabout	WB	264	212	-52	143	141	-2	284	252	-32

Link	Section Start	Section Finish	Dir	AM Peak			Interpeak			PM Peak		
				"Without" Expansion	"With" Expansion	Diff	"Without" Expansion	"With" Expansion	Diff	"Without" Expansion	"With" Expansion	Diff
A505 Bedford Road	Bedford Road/ Fishponds Road Roundabout	Bedford Road junction	SB	702	753	52	492	508	16	580	668	88
A505 Bedford Road	Bedford Road junction	Brand Str Junction	SB	1414	1539	125	904	943	39	1124	1258	134
A505 Bedford Road	Brand Str Junction	Uppertilehouse/ A505 Roundabout	SB	796	1294	498	867	924	57	944	1314	370

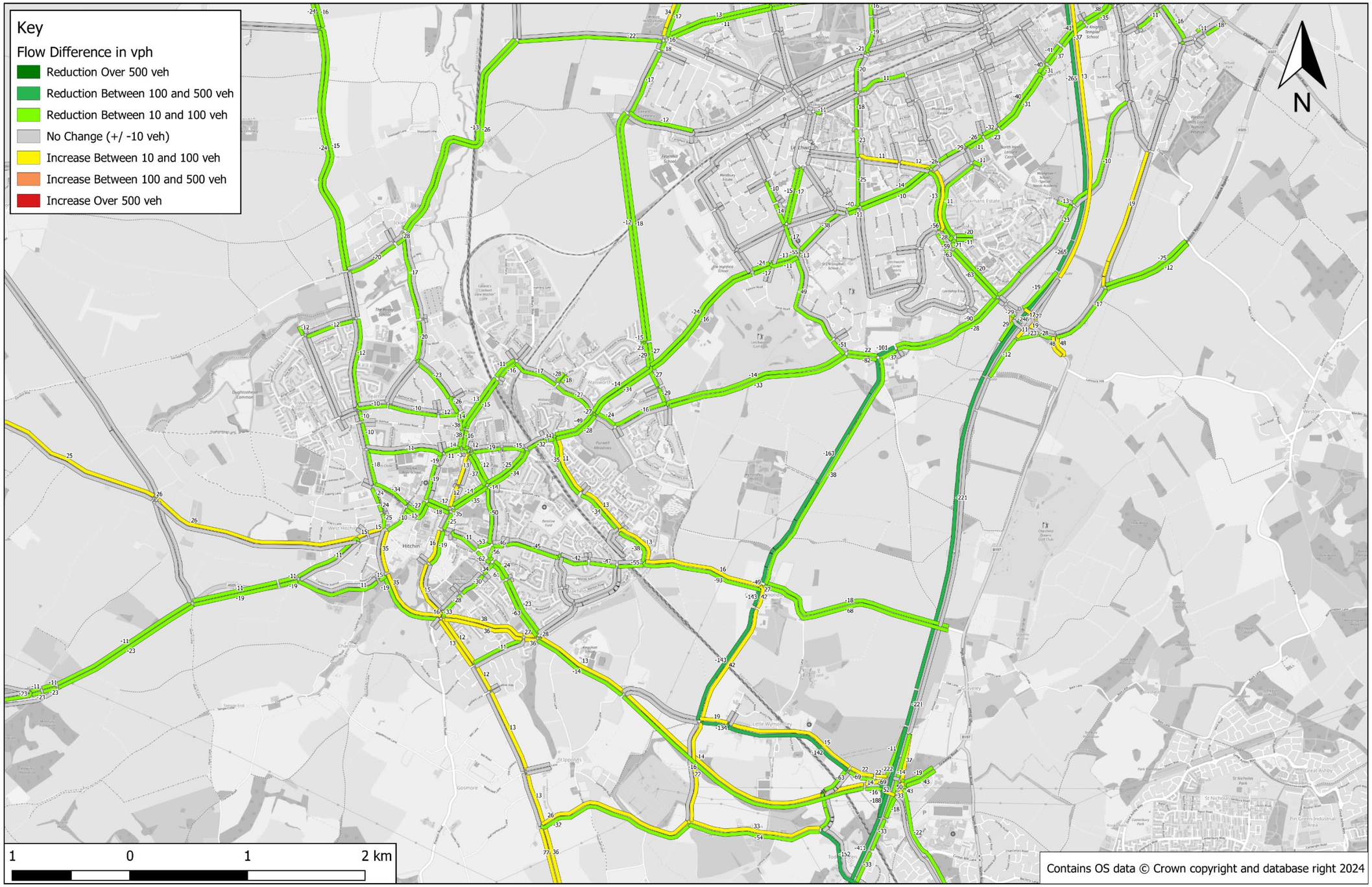
2027 "Without" Expansion – Updated vs Original runs – AM Peak



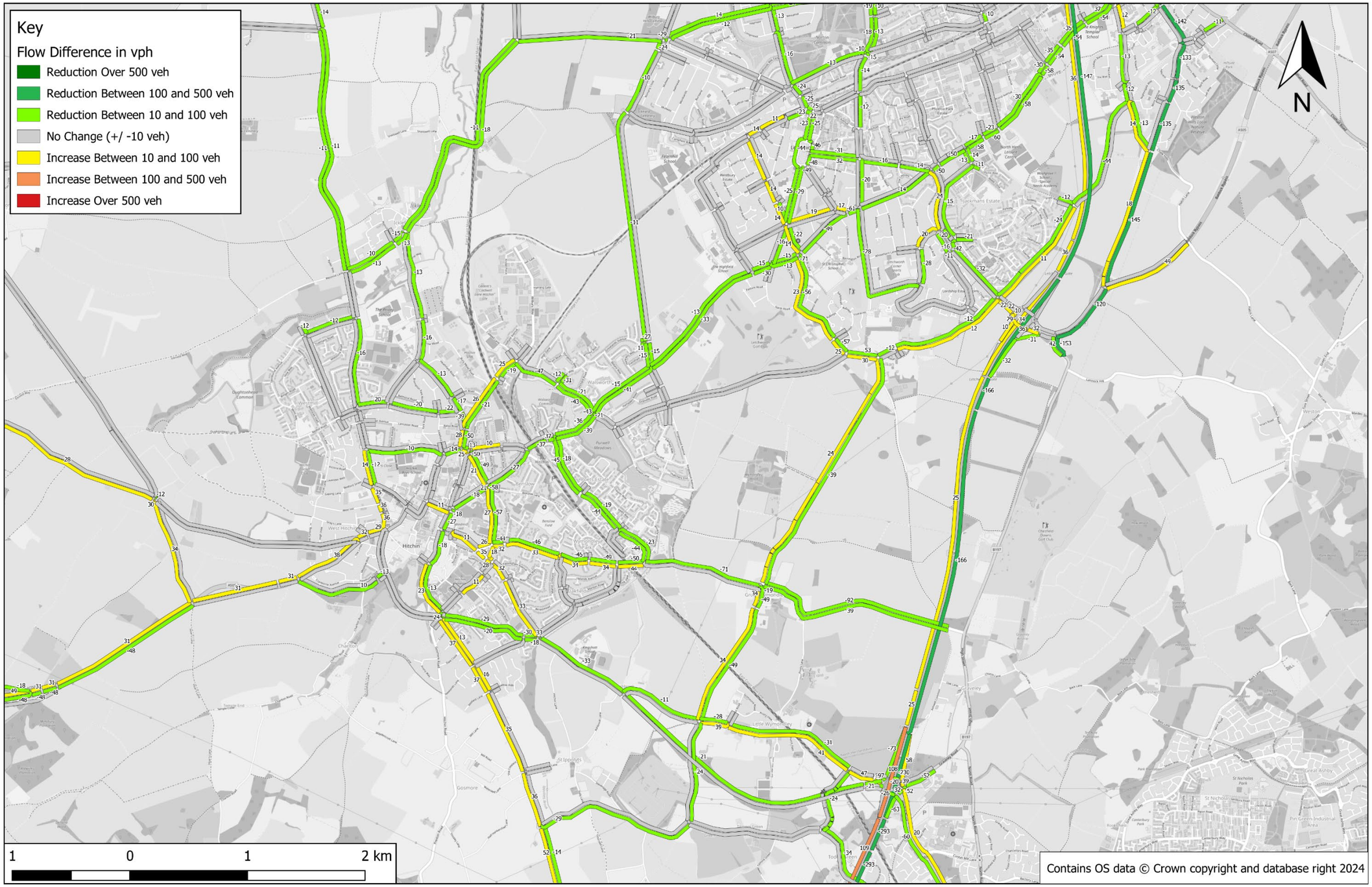
2027 "Without" Expansion – Updated vs Original runs – Interpeak



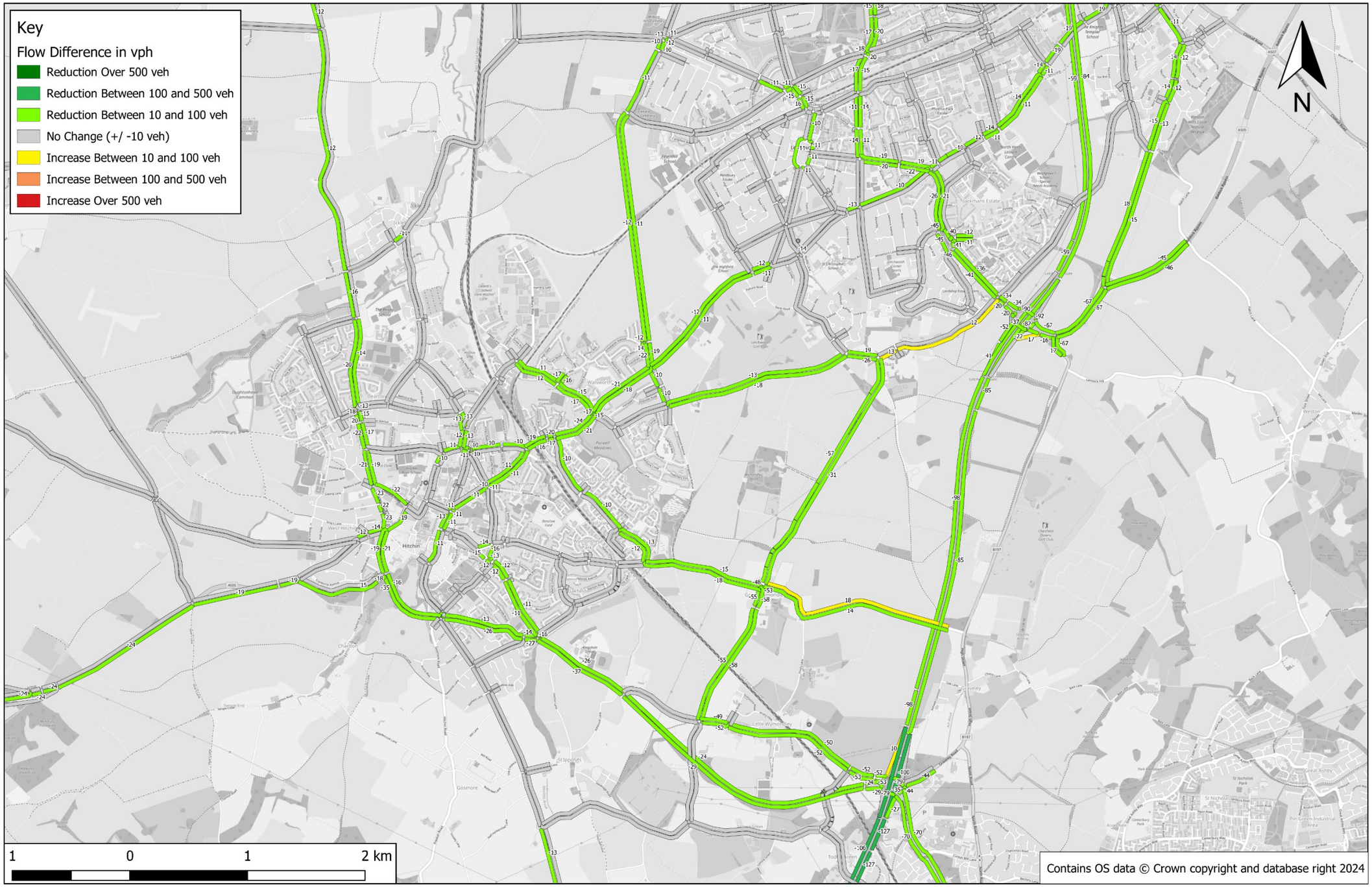
2027 "Without" Expansion – Updated vs Original runs – PM Peak



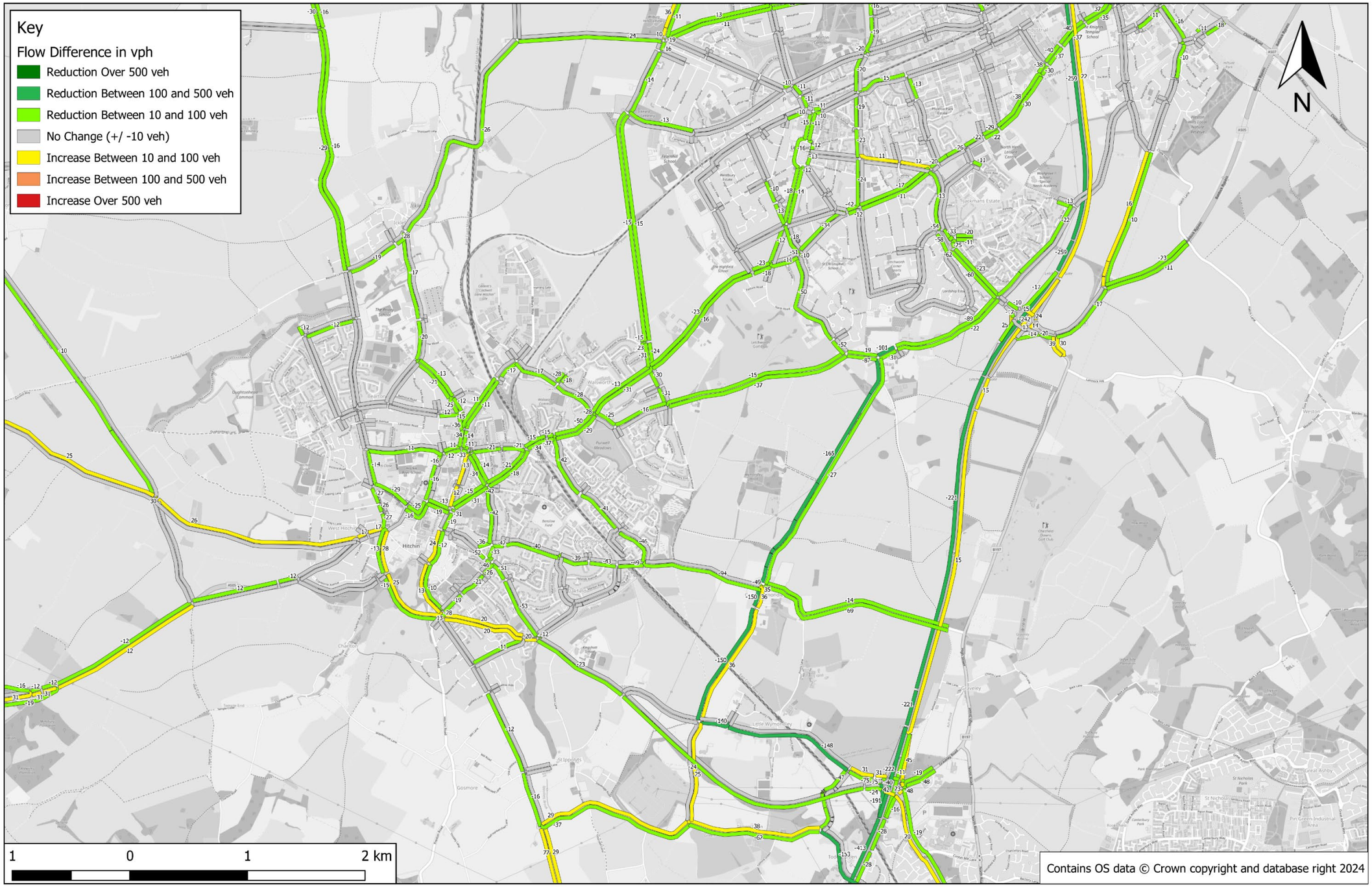
2027 "With" Expansion – Updated vs Original runs – AM Peak



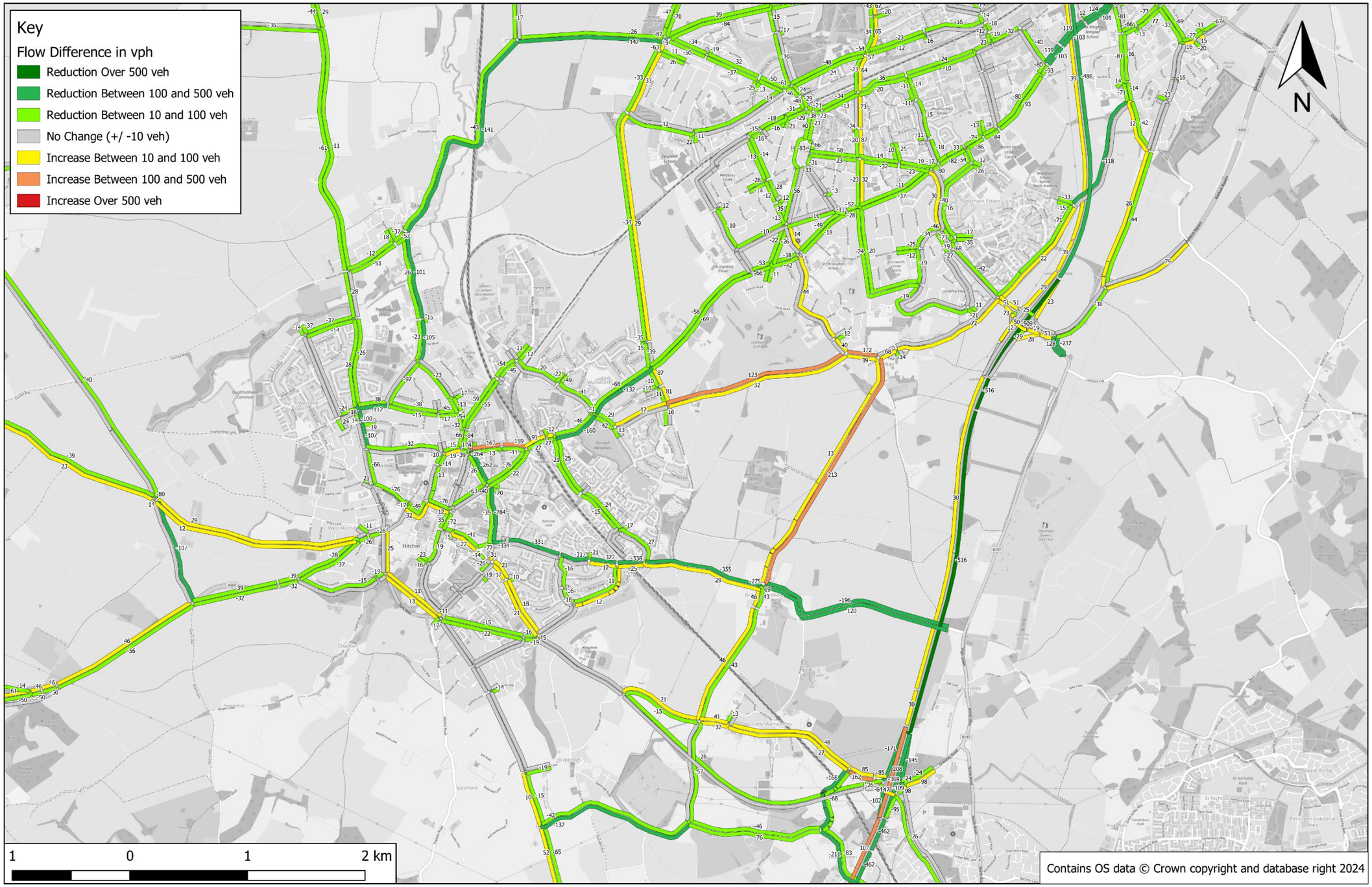
2027 "With" Expansion – Updated vs Original runs – Interpeak



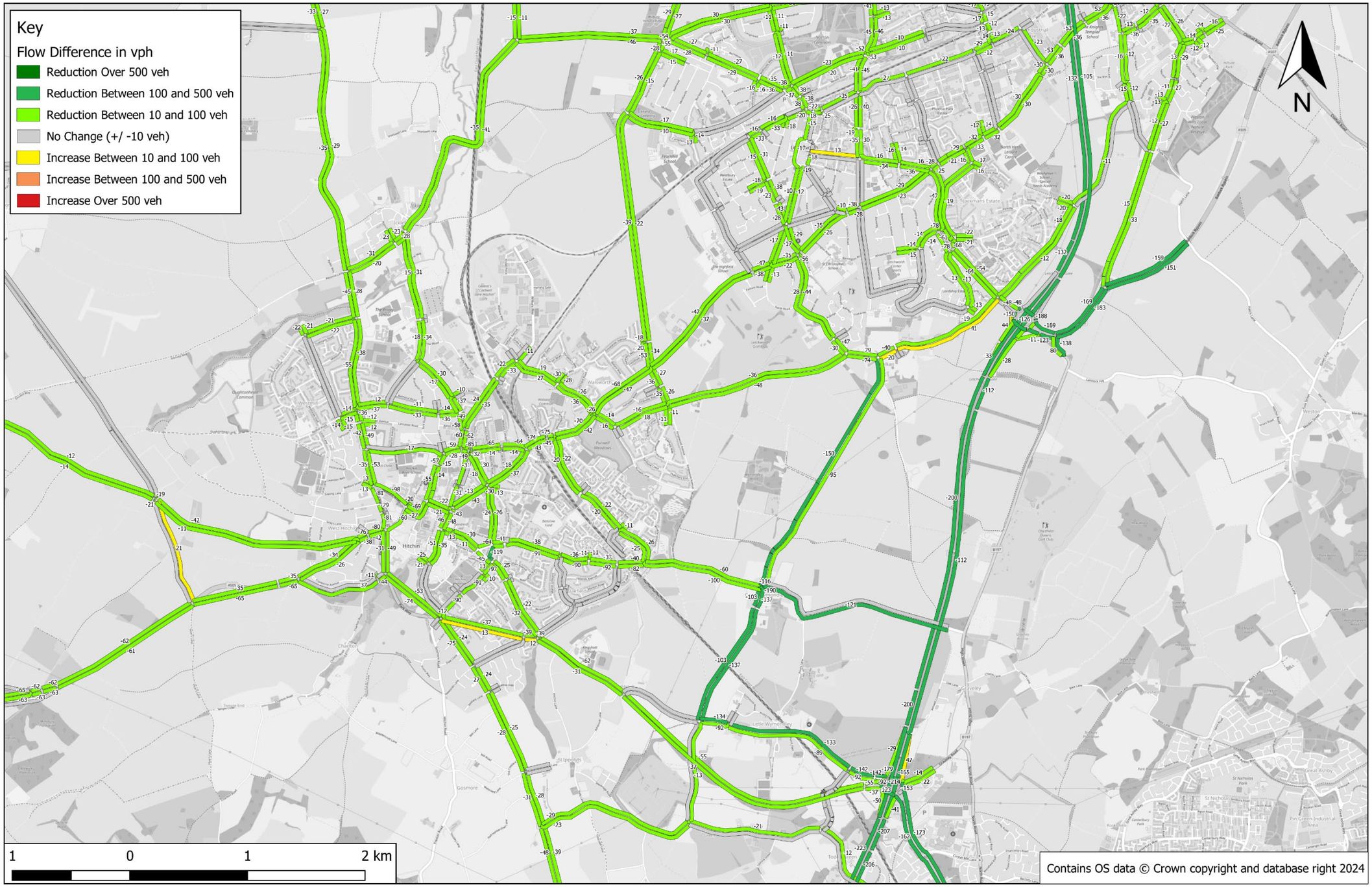
2027 "With" Expansion – Updated vs Original runs – PM Peak



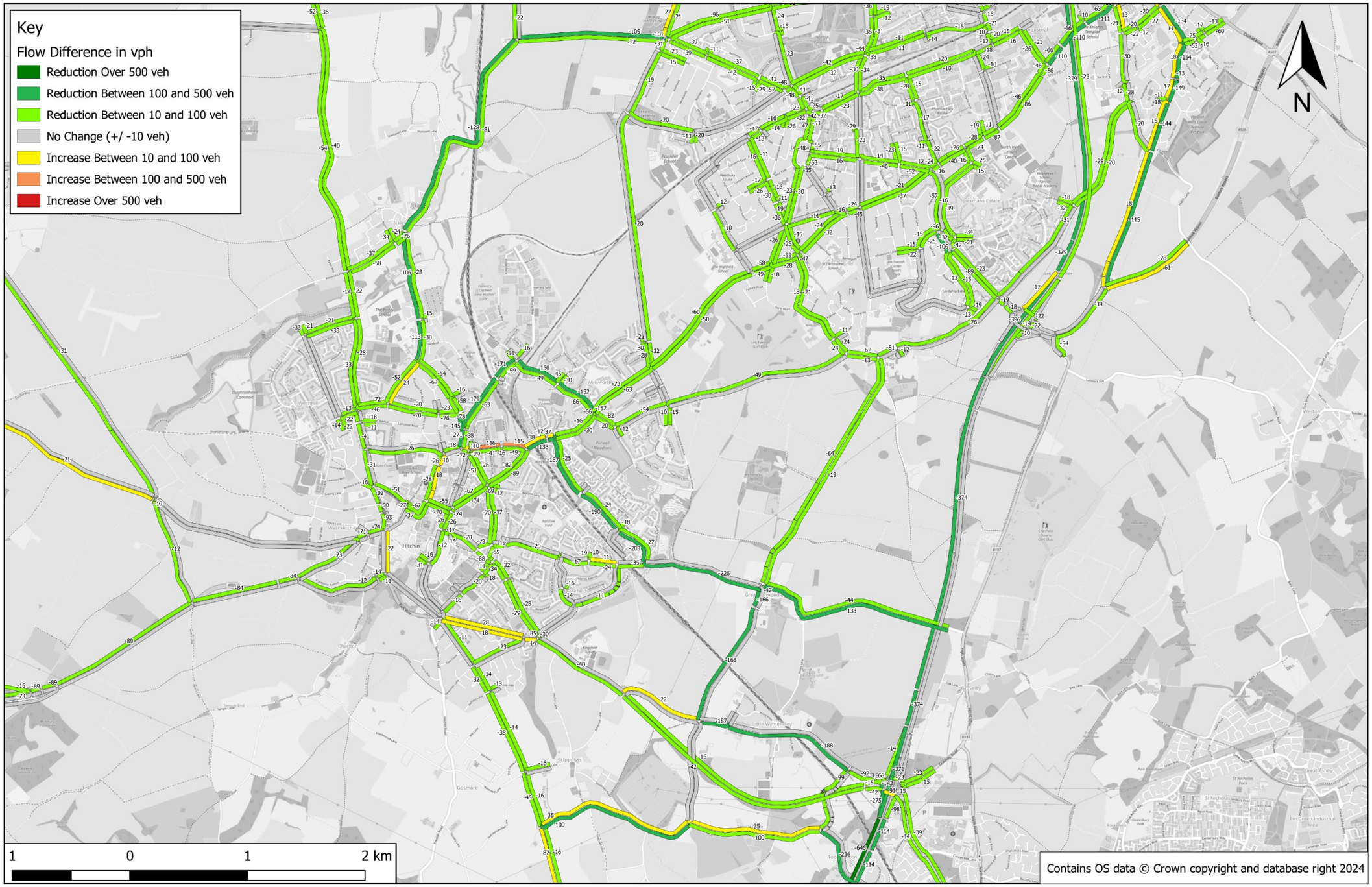
2043 "Without" Expansion – Updated vs Original runs – AM Peak



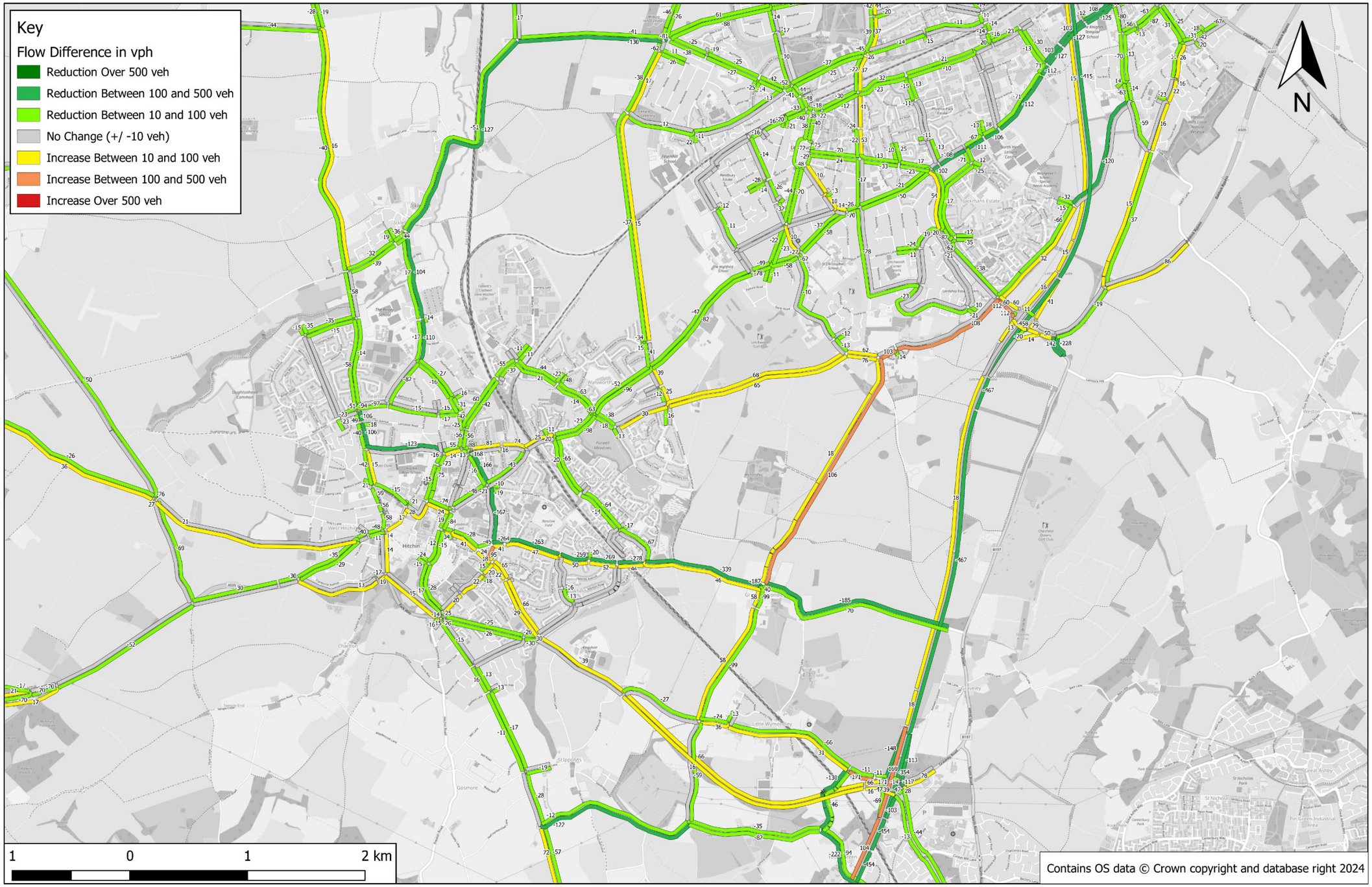
2043 "Without" Expansion – Updated vs Original runs – Interpeak



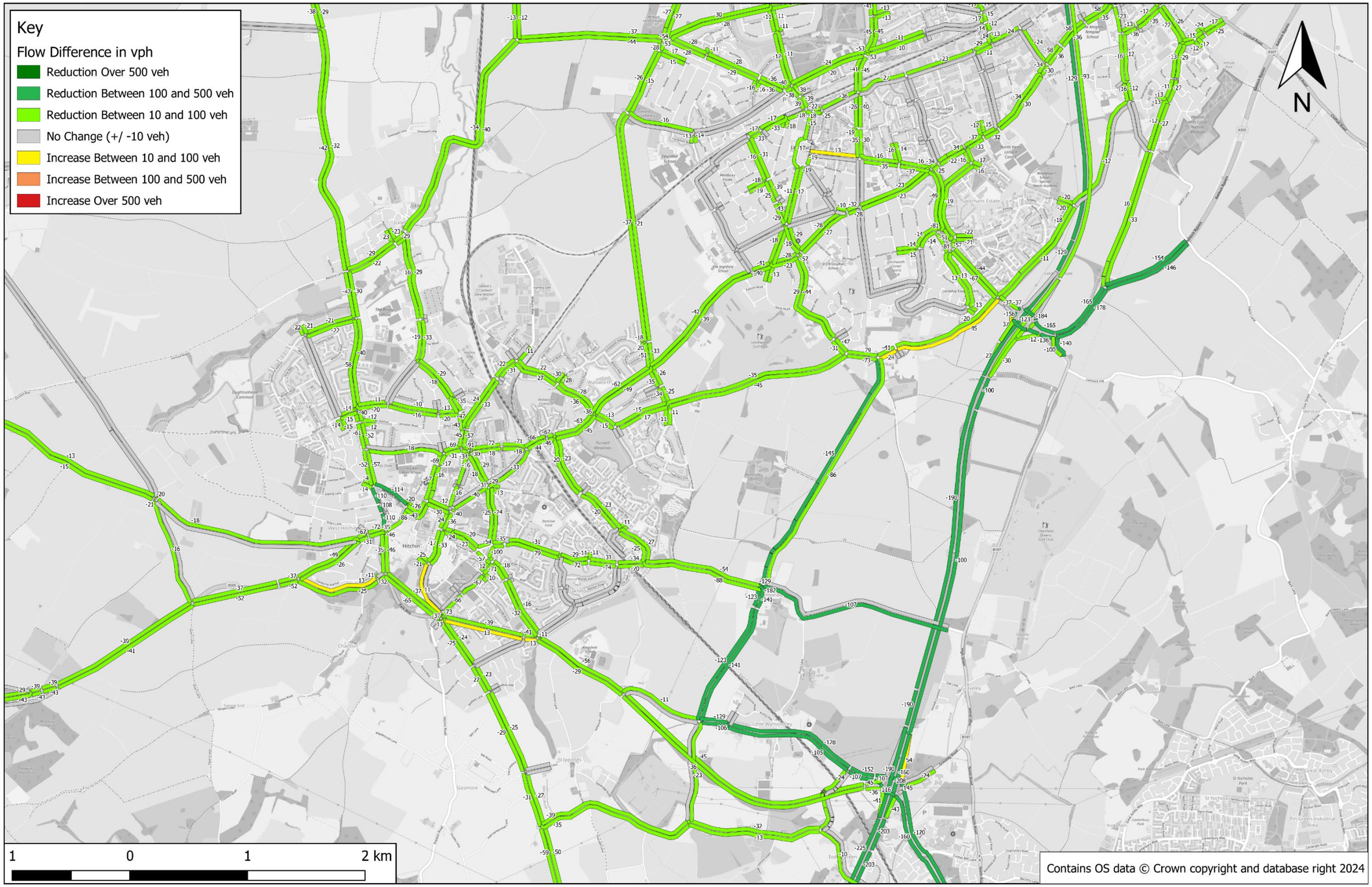
2043 "Without" Expansion – Updated vs Original runs – PM Peak



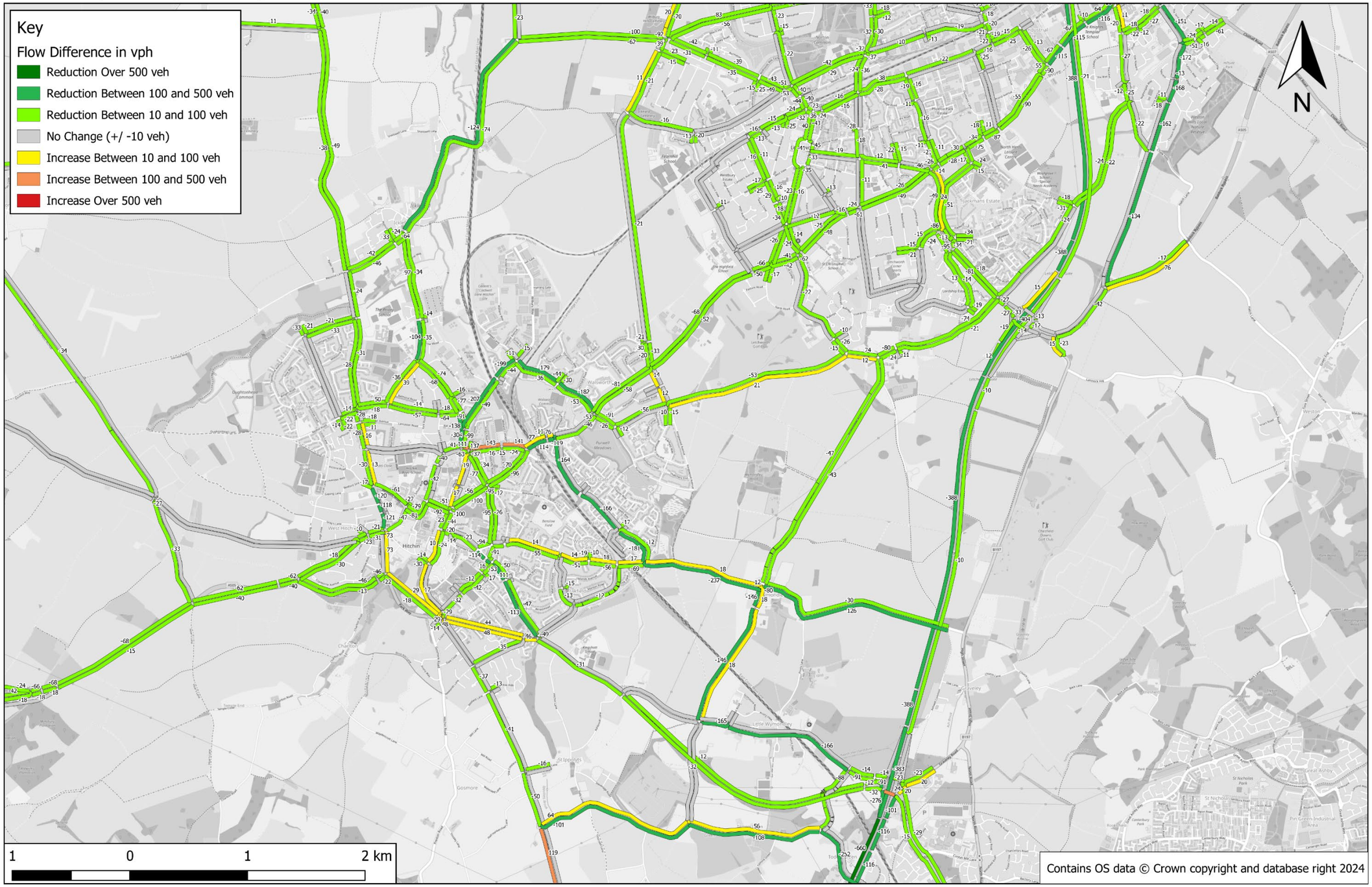
2043 "With" Expansion – Updated vs Original runs – AM Peak



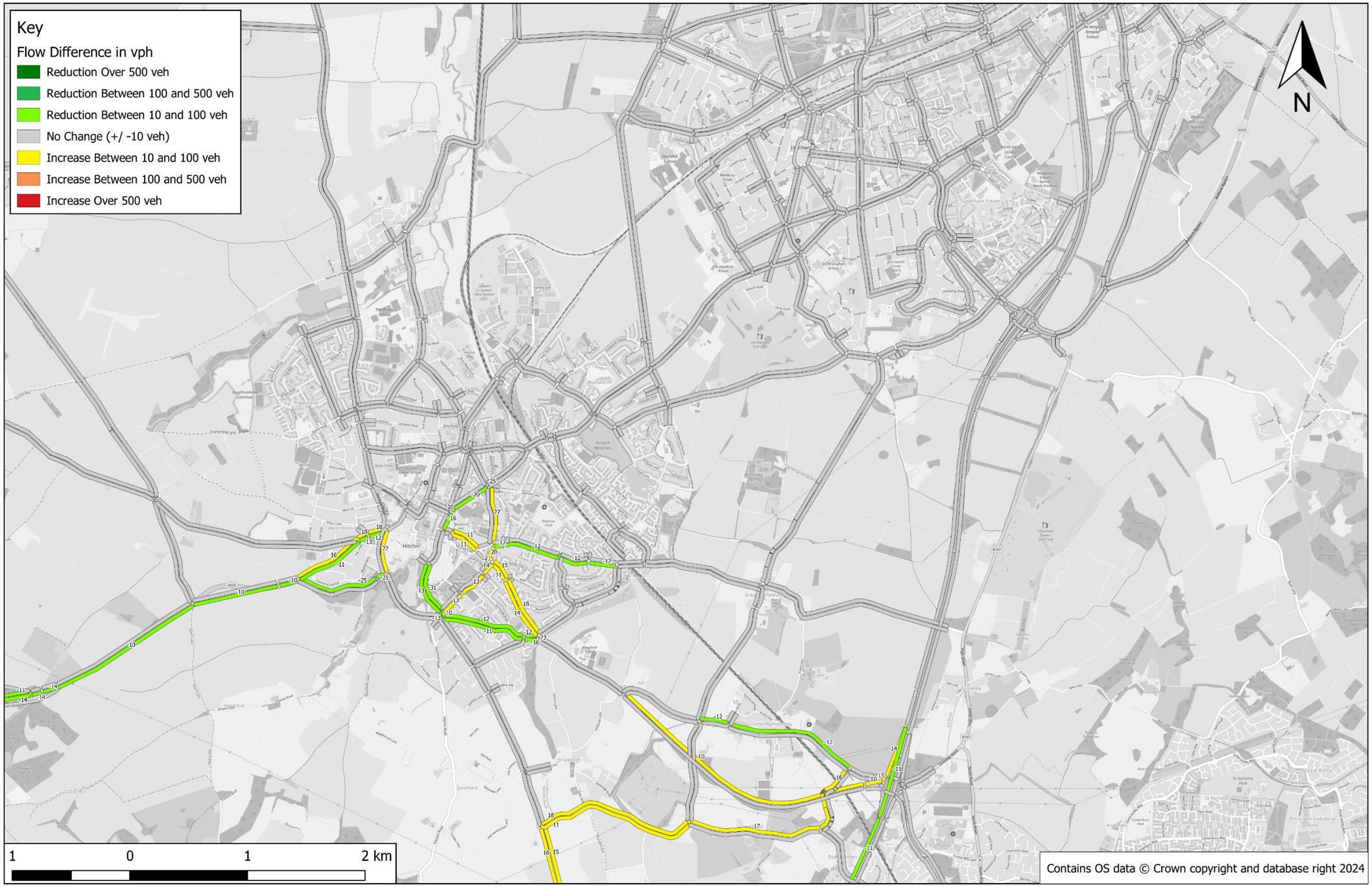
2043 "With" Expansion – Updated vs Original runs – Interpeak



2043 "With" Expansion – Updated vs Original runs – PM Peak



2027 Original runs – "With" vs "Without" Expansion – AM Peak



2027 Original runs – "With" vs "Without" Expansion – Interpeak

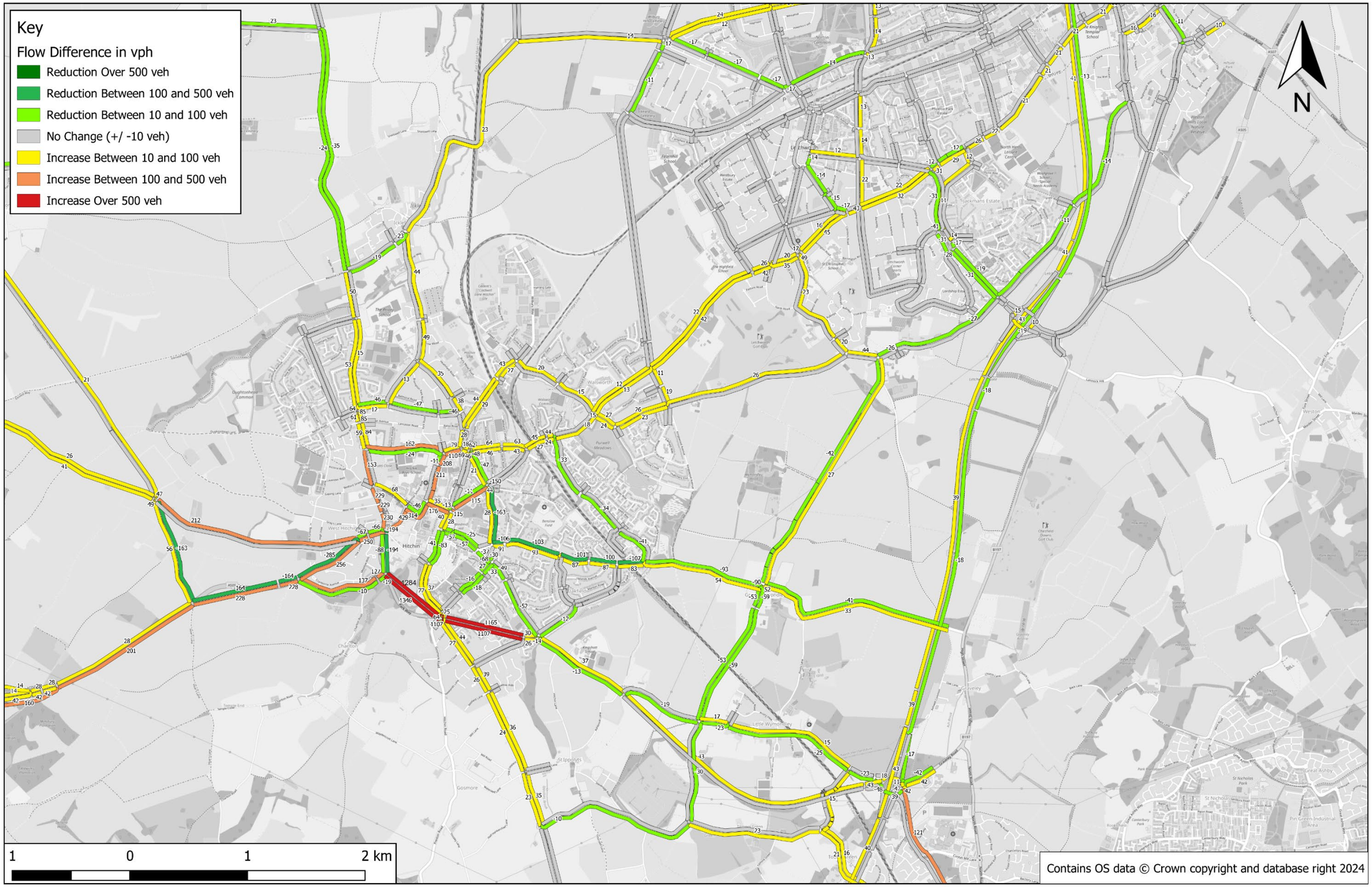
2027 Original runs – "With" vs "Without" Expansion – PM Peak

2027 Updated runs – "With" vs "Without" Expansion – AM Peak

2027 Updated runs – "With" vs "Without" Expansion – Interpeak

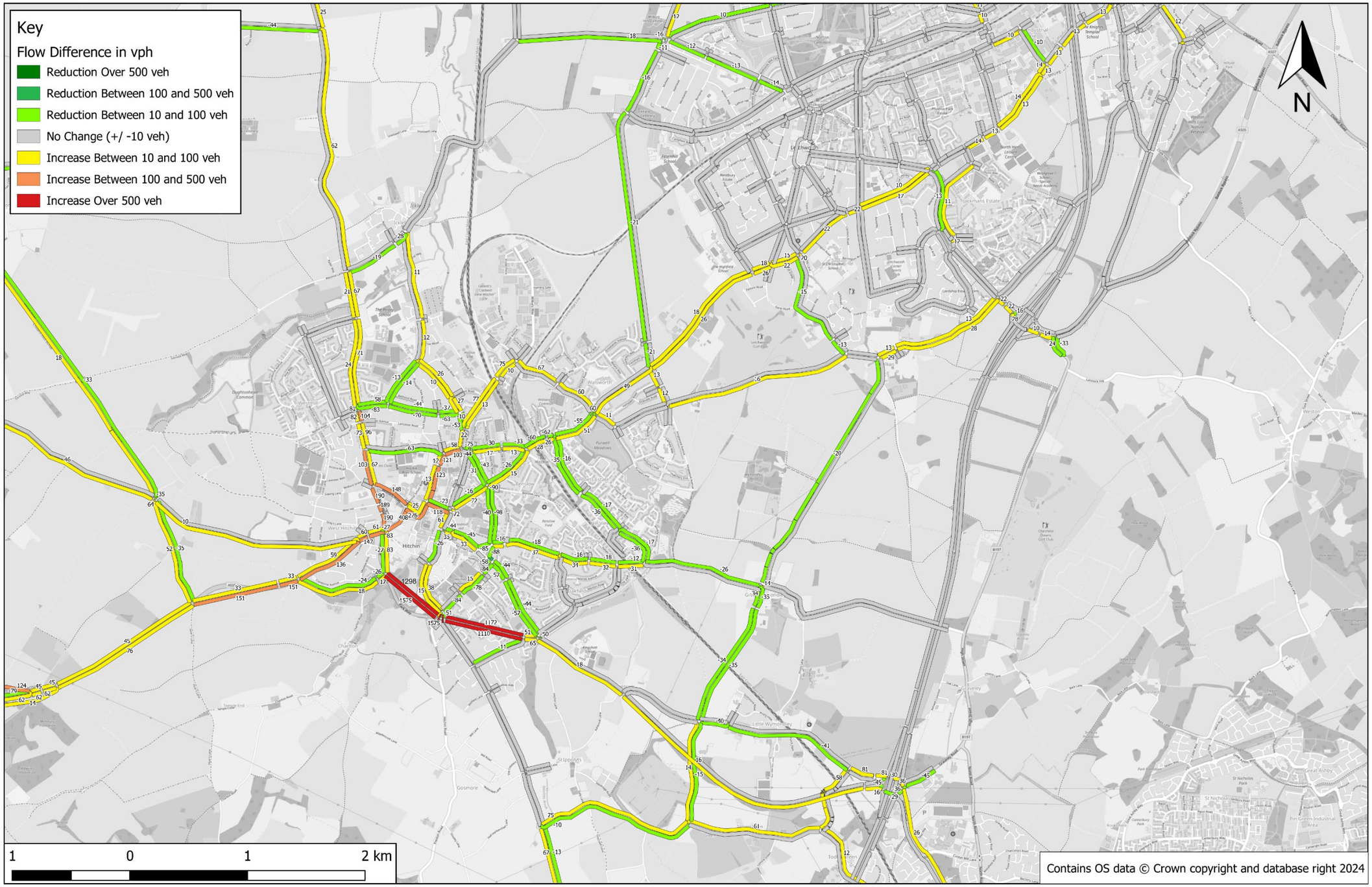
2027 Updated runs – "With" vs "Without" Expansion – PM Peak

2043 Original runs – "With" vs "Without" Expansion – AM Peak

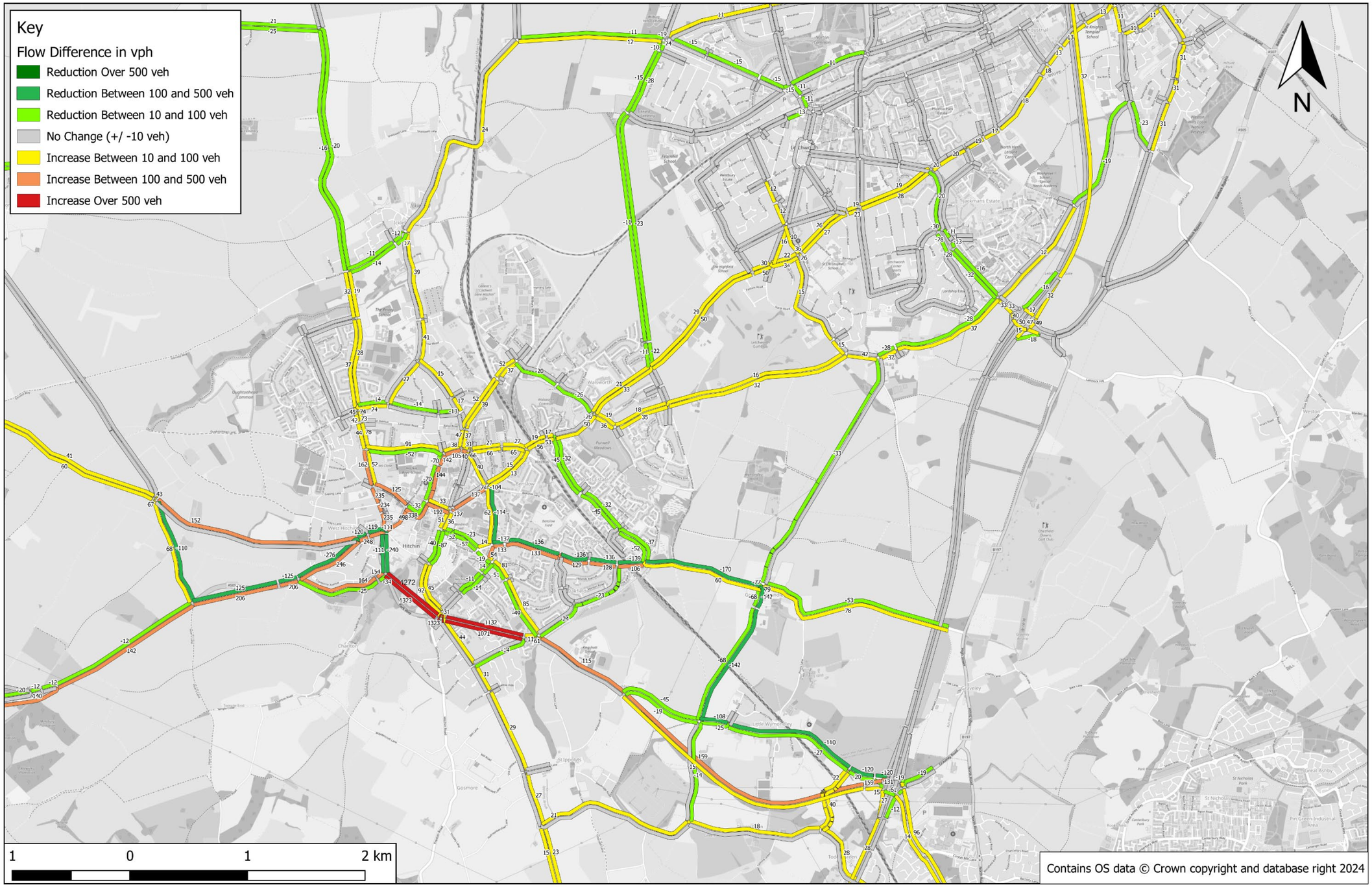


2043 Original runs – "With" vs "Without" Expansion – Interpeak

2043 Original runs – "With" vs "Without" Expansion – PM Peak



2043 Updated runs – "With" vs "Without" Expansion – AM Peak



2043 Updated runs – "With" vs "Without" Expansion – Interpeak

2043 Updated runs – "With" vs "Without" Expansion – PM Peak