

Appraisal Framework Module 4.
Surface Access: Local and Strategic Roads
Modelling Study
Heathrow Airport North West Runway

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1. Introduction

1.1 Background

- 1.1.1 The Airports Commission (AC) was established in 2012 by the UK Government to examine the need for additional UK airport capacity and to recommend how any additional capacity requirements can be met in the short, medium, and long-term. The AC is due to submit a Final Report to the UK Government by the summer of 2015, assessing the environmental, economic and social costs and benefits of various solutions to increase airport capacity, considering operational, commercial and technical viability.
- 1.1.2 Shortly after its inception, the AC issued tenders for support contracts to engage independent technical advice on a range of aspects of the AC's work. Jacobs, together with sub-consultants Leigh Fisher and Bickerdike Allen Partners were appointed as the sole supplier on the Airport Operations, Logistics and Engineering Support Contract (ref: RM1082), which runs throughout the AC's lifespan up until the summer of 2015.
- 1.1.3 A key milestone in the AC's operational life was the delivery in December 2013 of an Interim Report. Following a general call for evidence, the Interim Report detailed the results of analysis of the capacity implications of forecast growth in UK aviation demand and a preliminary appraisal on a long-list of proposals put forward by scheme promoters to address the UK's long-term aviation connectivity and capacity needs. The associated appraisal process identified three short-listed options, two focussed on expanding Heathrow Airport and one on expanding Gatwick. These options were then subsequently further developed and appraised as part of an assessment that was published for consultation in November 2014.
- 1.1.4 The pre-consultation assessment of surface access constituted a static appraisal using spreadsheet-based demand forecasting models, which were developed primarily to assess the surface transport capacity implications of each expansion option. Following feedback from the AC's surface access stakeholders (the Department for Transport (DfT), the Highways Agency (HA), Network Rail (NR), and Transport for London (TfL)), further assessment of the surface access implications of the three expansion options was undertaken during the consultation period from November 2014 to January 2015.
- 1.1.5 This assessment focussed specifically on three key aims:
- Undertaking further sensitivity-testing of the spreadsheet-based models to determine the impact of key variables on airport-related surface access demand, notably incorporating trip distribution forecasts from the DfT's National Air Passenger Allocation Model (NAPAM);
 - Providing a more detailed dynamic assessment using network-based models of the capacity and level-of-service implications of airport expansion associated with each short-listed option; and
 - Providing traffic forecasts compatible with the requirements of the air quality assessment that will be undertaken as a part of a separate environmental work-stream.
- 1.1.6 The ultimate aim of the study was to provide further guidance to the AC on the feasibility of, and likely surface transport issues associated with each expansion option. The findings of this analysis were reported to the AC at the end of January 2015.

1.2 Public Consultation

- 1.2.1 On the 3rd February 2015 the AC's consultation ended after a period of 12 weeks. In this time the AC received approximately 75,000 responses on the three short-listed options for expansion at Heathrow and Gatwick. The sources of the responses were wide-ranging and included (but were not limited to) members of the public, businesses, scheme promoters, local government and campaign groups. The

consultation covered a broad spectrum of issues relating to potential expansion at Heathrow and Gatwick, including surface access provision.

- 1.2.2 Following an initial review of the consultation responses by the AC, Jacobs were provided with responses from the consultees listed in **Table 1-1**. The AC's Secretariat considered that these responses raised issues whose technical complexity did not allow all of their points to be addressed without support from Jacobs. A review of the responses by Jacobs identified approximately 600 comments relating to surface access.

Table 1-1: Reviewed Consultee Responses

Consultee
Buckinghamshire County Council
Charlwood Parish Council
Crawley Borough Council
East Sussex County Council
EasyJet
Fiona Mactaggart MP
Gatwick Area Conservation Campaign
Gatwick Airport Limited
Haywards Heath Town Council
Heathrow Airport Limited
Heathrow Hub Limited
Horsham District Council
Hounslow Council
Independent Transport Commission
Kent County Council
Mid Sussex District Council
Network Rail
Reigate & Banstead Borough Council
Richmond Heathrow Campaign
Royal Borough of Kensington & Chelsea
Royal Borough of Windsor & Maidenhead
Slough Borough Council
Surrey County Council
Tandridge District Council
Transport for London
Virgin Atlantic
West Sussex County Council

- 1.2.3 Each of the comments were recorded and categorised by their content. This approach allowed for the identification of recurring themes within the comments and made it possible to understand some of the key areas of concern held by the consultees. The approach informed the need for any additional analysis that would be required to support earlier phases of work such that the issues raised by the consultees could be suitably addressed.

1.2.4 Following an initial review of the surface access comments the AC identified four areas of additional analysis. These were as follows:

1. Road Freight Impacts;
2. Network Resilience;
3. Demand Management; and
4. **Strategic & Local Road Impacts.**

1.2.5 This report focuses on the fourth area of additional analysis and provides advice to the AC on whether any of the responses would materially impact upon the appraisal of any of the Heathrow North West Runway (HNWR) option promoted by Heathrow Airport Limited. In particular, it will provide advice on the impacts of expansion upon specific road links and junctions surrounding the airport.

1.3 Report Purpose

1.3.1 The purpose of this report is two-fold:

1. To identify and summarise the comments that have been made by consultees regarding the impacts of expansion on the strategic and local road networks surrounding Heathrow; and
2. To assess whether any of these comments would materially affect the AC's understanding of the feasibility of the HNWR option or the level of associated mitigation that would be required to deliver it.

1.4 Report Structure

1.4.1 The remainder of this report is structured as follows:

- Chapter 2 provides a summary of the comments made by the consultees with respect to the impact of expansion at Heathrow Airport on surrounding strategic and local roads;
- Chapter 3 outlines the methodology applied to assess the strategic and local roads impacts;
- Chapter 4 presents this analysis, and discusses the anticipated impacts of the HNWR option on the strategic and local road network;
- Chapter 5 provides a summary to the above and provides direct responses to the consultee comments listed in Chapter 2.

2. Consultee Comments

2.1 Heathrow Options

2.1.1 The comments received with respect to the strategic and local road impacts of the HNWR and Heathrow Extended Northern Runway (HENR) are summarised in **Table 2-1** below. The comments for the two short-listed Heathrow options have been presented together since many of the issues raised by the consultees are of relevance to both options. The assessment of the strategic and local road impacts of the HENR option is presented separately in its own report.

Table 2-1: Heathrow Strategic & Local Road Comments

Consultee(s)	Summary of Issue Raised	Road / Location
Heathrow Airport Limited	Recommend incorporating HA modelling for M4 J3-12 SMART motorway into assessment. Remove the need to widen the M4 and the associated costs from the NWR business case.	M4 including J3-12
Heathrow Airport Limited Heathrow Hub Limited	Heathrow Airport Limited disagree with conclusions of M4 into London and M4 Spur analysis. Costs of improvements and property impacts should be removed from the NWR assessment. Heathrow Hub Limited argue that the suggested works required on the M4 J2-3 is due to Jacobs using an inaccurate, lower capacity in their assessment of this link.	M4 into London (including J2-J3) and M4 Spur
Heathrow Airport Limited Heathrow Hub Limited	Heathrow Airport Limited disagree that widening is required due to uncertainty in forecasting and the crude strategic modelling approach adopted. Furthermore, argue that widening is not the correct solution in marginal cases of roads operating above capacity, where induced traffic can cause wider network impacts. The costs added to the surface access costs for the NWR are not considered justified or commensurate. Heathrow Hub Limited argue that it is not justifiable for the airport to pay £274m when the existing scenario is only 1% away from 85% V/C.	M4 between J3 and J4
Heathrow Airport Limited	Believe that a two-lane capacity has been assumed for the assessment, when in reality the M4 Spur has three lanes plus a bus lane. Using the correct capacity would suggest that widening is not necessary and that the costs should be removed from NWR.	M4 Spur
Heathrow Airport Limited	Based on flows provided in the Surface Access Appraisal Report, it is unclear why capacity improvements to the main airport tunnel are recommended. The tunnel has 2 lanes in either direction and so would be able to accommodate the arrivals / departures stated. Furthermore, additional capacity will be provided by the southern road tunnel. This should be removed from the NWR appraisal.	M4 and existing Airport tunnel
Heathrow Airport Limited Heathrow Hub Limited	Heathrow Airport Limited argue that no methodology or justification is provided for the suggested improvements needed to M4 J4 and J4B. Would expect these infrastructure improvements and their associated costs to be avoidable. Heathrow Hub Limited argue that it does not seem defensible to add such a significant cost to the Heathrow proposals (£338m) due to a very small increase in traffic. Suggest the same criteria has not been applied to the Gatwick analysis and that the process needs to be revisited to provide like for like comparisons.	M4 J4 and J4B
Virgin Atlantic	Would like to see proposals to widen M4 reviewed, as current analysis does not fully consider modal shifts, particularly to Crossrail.	M4
Royal Borough of Windsor and Maidenhead	Concerned about the impact of M4 widening on adjacent communities and would like to see greater certainty sought on this issue.	M4
Slough Borough Council	Significant measures needed to alleviate congestion and poor air quality around M4 J5 / Brands Hill. Suggest that the composition of traffic here should be studied. The introduction of a low emission zone is raised.	M4 J5 / Brands Hill

Consultee(s)	Summary of Issue Raised	Road / Location
Slough Borough Council	Recommend that more is done to promote, fund and construct more sustainable transport links along the A4 and M4 corridors.	M4 A4
Royal Borough of Kensington and Chelsea	Suggest that without a substantial shift from road to rail, congestion on major roads will increase. Concerned that no detailed modelling of local roads or the strategic road network (such as the A4) has been carried out. No forecast of Heathrow-related HGV traffic along the A4.	A4 Local roads (unspecified)
Slough Borough Council	Concerned about further congestion generated by disruption on the strategic road network due to the A4 being used as an alternative route.	A4 via Slough Town Centre
Hounslow Council	Suggests there are serious issues around proposed surface access improvements which are unfunded, not fully planned and do not have parliamentary approval. Concerned about the impact of Heathrow expansion on local roads, the public transport network and key roads such as the A4. Specifically interested in the new Southern Link Road in the NWR proposal. Also interested in mitigation measures for all three options and suggest the assessment year should be 2050.	A4 New Southern Link Road Local roads (unspecified)
Buckinghamshire County Council	Would like to see a more detailed assessment of the impact of a new access road from the diverted A4 on the local Buckinghamshire road network, particularly in southern Buckinghamshire which has existing HGV issues. Also concerned about potential for increased local congestion from the A4 works and M25 tunnelling works.	A4 nr Colnbrook M25 Tunnelling
Heathrow Airport Limited	Recommend improvements to M25 junctions 10-16 (from 2014 autumn statement) are incorporated into appraisal. Reconsider distribution of costs of M25 works related to Heathrow expansion.	M25 J10-16
Kent County Council	Recommend a capacity upgrade to western section of M25 when it is diverted into tunnel. Junctions 10 to 15 of the M25 exceed 100% VCR from background growth only in 2030, therefore capacity issues need to be addressed to facilitate airport growth.	M25 J10-16
Royal Borough of Windsor and Maidenhead	Concerned that impacts on local congestion and air quality cannot be addressed as the AC has yet to receive appropriate information with regard to surface access pressures (in particular to local roads and key congestion areas, such as M25 J13)	M25 J13
Royal Borough of Windsor and Maidenhead	Concerned that local roads will be overwhelmed if modal shift aspirations are not realised. A308 is mentioned as a specific concern, as is the potential for additional freight traffic.	A308 Local roads (unspecified)
Royal Borough of Windsor and Maidenhead	Concerned about the volume of additional HGV / freight traffic associated with the airport exacerbating existing concerns about HGV movements on local A-roads. Would like to see further modelling work to understand impacts and mitigation measures required.	A308 A330 Local roads (unspecified)
Royal Borough of Windsor and Maidenhead	Concerned that during times of congestion on the strategic road network, already congested local roads (such as the A308) will be used, causing reduced air quality. AQMAs in Bray and Windsor are mentioned specifically.	A308 Local roads, notably in Bray & Windsor
Heathrow Airport Limited	Recommend A3044 is re-routed to avoid Poyle village centre.	A3044, Poyle Village Centre
Slough Borough Council	The new road to replace the Colnbrook Bypass would divert traffic south to the High Street / Old Bath Road and disturb that community. The alignment is considered unsuitable and an under provision. An alternative should be provided that skirts Colnbrook.	Colnbrook Bypass High Street / Old Bath Road
Slough Borough Council	To provide a connection to Colnbrook Bypass from the south would require the removal of Galleymead Road and loss of business rates. Alternative solution would be to provide a tunnelled southern access road alongside M25.	Colnbrook Bypass
Slough Borough Council	Concerned that proposals for a southern branch of the Colnbrook Bypass / replacement of the A3044 will encourage rat running between M25 J14 and the M4 J5. Would favour a new tunnelled road, parallel to the tunnelled M25 which reconnects with the new A4 diversion west of the M25. A similar measure has been suggested for the Heathrow Hub ENR.	A3044 / Colnbrook Bypass

Consultee(s)	Summary of Issue Raised	Road / Location
Gatwick Airport Limited	Argue there has not been a complete and consistent assessment of local roads in the vicinity of each airport. It is recommended that the AC undertake independent modelling of roads in the vicinity of all three airports. This should include freight, demand management and congestion charging proposals.	Local roads (unspecified)
Buckinghamshire County Council	Note that the assumption seems to be that the impact on the local network within Buckinghamshire will be reasonably small during operation. This needs to be assessed with appropriate mitigation identified and discussed with the council. Also concerned if modal shift targets are not realised.	Local roads in Buckinghamshire (unspecified)
Slough Borough Council	The Slough transport network is heavily impacted by Heathrow - the network is susceptible to congestion if the M4 or M25 are congested. Suggest technical work needs to be carried out to ensure that the local network will be able to cater for future demand (Airport and non-Airport). Account also needs to be given to any associated air quality impacts.	Local roads in Slough (unspecified)

2.1.2 **Table 2-1** indicates that consultees are concerned about the impact expansion will have on the following roads:

- M4;
- A4;
- New Southern Link Road;
- M25;
- A308;
- A330;
- A3044; and
- Colnbrook Bypass.

2.1.3 Some of the consultees also expressed concern regarding unspecified local roads, often within their own administrative boundaries.

3. Approach

3.1 Dynamic Highway Modelling

3.1.1 Further assessment of the surface access implications of the three short-listed expansion options was undertaken during the consultation period. This included the following:

- Enhanced distribution/mode-share modelling – this involved enhancements to the pre-consultation spreadsheet models. The air passenger and on-airport employee surface access forecasts from these enhanced models provided inputs for the two items discussed below;
- Heathrow dynamic highway modelling – highway surface access forecasts from the spreadsheet models were input into Transport for London’s (TfL) West London Highway Assignment Model (WeLHAM) to assess the dynamic impacts of increasing airport-related road trips on network performance in London and the South-East. WeLHAM was chosen as it is a detailed network-based highway capacity model of the South-West London covering the Heathrow Study area. It has been validated to a 2009 base year and is used by TfL to assess road schemes within London. An alternative approach of using the HA’s “M25 model” was investigated, but was rejected for this purpose due to the lack of local network detail around Heathrow and age of model development and validation in our study area; and
- Gatwick dynamic highway modelling - highway surface access forecasts from the spreadsheet models were also input into an adapted version of TfL’s South London Highway Assignment Model (SoLHAM) to assess the dynamic impacts of increasing airport-related road trips on network performance in London and the South-East – SoLHAM was chosen as a starting point as it is a detailed network-based highway capacity model of South London, which was validated to a 2009 base year and is used by TfL to assess road schemes in South London.

3.1.2 The methodology adopted for these assessments differed from those undertaken before the consultation in the following ways:

- While the pre-consultation assessments focussed on a single AM peak-hour demand forecast for each of the airport expansion options in 2030, the dynamic highway modelling assessments covered a range of time periods, driven by the requirements of the dynamic modelling work-streams. For the highway modelling, an AM peak hour (0800-0900) and a PM peak-hour (1700-1800) was required to be consistent with the WeLHAM and SoLHAM modelled time periods, along with an average Inter Peak (IP) hour covering the period 1000-1600;
- The capacity analysis undertaken pre-consultation was static in nature – demand associated with airport expansion was added to estimates of background demand in the spreadsheet model and the capacity implications were assessed without consideration of the impacts of crowding and congestion on route choice and journey timing. The dynamic nature of the capacity assessments undertaken in this assessment means that the resulting forecasts do account for these elements and are consequently different from those reported pre-consultation; and
- The forecast passenger numbers were different between the pre-consultation assessment (multiple sources including from promoters) and the dynamic highway modelling assessments carried out during the consultation (which adopted the AC’s “Carbon-Traded Global Growth” forecasts). Estimates of the number of airport employees were also adjusted.

3.1.3 Both assessments were undertaken with reference to a Core and an Extended Baseline, which together listed transport infrastructure and services expected or likely to be in place by 2030 regardless of any airport expansion that may be delivered in the UK. The Core Baseline only included those schemes that were fully committed and funded when the pre-consultation assessment commenced.

3.1.4 The primary focus of all the analysis was on the Extended Baseline, as by 2030 it was judged very likely that further enhancements to the UK transport network would have been delivered above and beyond the works that were fully committed when the pre-consultation assessment commenced.

- 3.1.5 Constructing an appropriate Extended Baseline for a 2030 assessment involved making significant assumptions about the likely state of the transport network by that time, and this was a central factor in the decision not to extend the scope of the surface access assessment to include later years.
- 3.1.6 There is currently a high degree of uncertainty surrounding some of the included schemes, not just in terms of their delivery but also their final form and characteristics, which in some cases are continually evolving as development work is progressed. The assessment was based on the best assumptions on the state of the 2030 transport network at the time, and was informed by discussions with the AC's stakeholders before the pre-consultation assessments were published, and some limited technical meetings between the report authors and the stakeholders, mainly related to modelling issues and clarifications on feedback received during the pre-consultation work.
- 3.1.7 Further details regarding the dynamic highway modelling methodologies and the transport schemes included in the assessments are contained within the Surface Access Appraisal Reports for each of the three short-listed options. In summary, the transport schemes included in the Extended Baseline are as follows:
- M23 Junction 8-10 Smart Motorway;
 - M25 Junction 23-27 Smart Motorway;
 - M25 Junction 5-6/7 Smart Motorway;
 - M3 J2-4a Smart Motorway; and
 - M4 Junction 3-12 Smart Motorway.
- 3.1.8 These dynamic highway models and their associated traffic forecasts have been used to produce the assessment of strategic and local road impacts presented in this report. These models:
- Offer a sufficient level of strategic and local network coverage and detail for the purposes of this assessment;
 - Have been developed to reflect peak periods of the day;
 - Are dynamic; accounting for how changing costs of travel affect route choice;
 - Use the latest AC "Carbon-Traded Global Growth" demand projections; and
 - Include an Extended Baseline scenario that can be compared with the three short-listed options to isolate the additional impact of expansion.

3.2 Methodology

- 3.2.1 In order to ascertain whether the specific concerns expressed by the consultees regarding the impact on strategic and local roads will materially affect the AC's understanding of the feasibility of a particular option, the Volume over Capacity (V/C) on the roads identified by the consultees have been examined.
- 3.2.2 V/C provides a measure of how close to capacity a road is operating. It is expressed as either a ratio or percentage (as is the case in this analysis) representing the degree of saturation of a particular stretch of road, with values closer to 0 representing free-flow conditions and values approaching or greater than 100% indicating high levels of congestion. Observations on many roads have shown that delay rises steeply at above 85% capacity, and that severe delays occur at above 100%.
- 3.2.3 As part of this analysis demand flow has been used as the volume input into the V/C calculations. 'Demand flow' is the total unconstrained volume of traffic wanting to travel through a particular location; representing total desire for road travel at the location. It is also possible to derive 'Actual flow' from the traffic model, which represents the volume of traffic based on detailed simulation that takes into account real world metering of traffic through intersection capacity constraints and subsequent bottlenecks and queueing of traffic. It represents the volume of traffic feasibly able to travel through a location.

- 3.2.4 The reason that demand, rather than actual flow has been used in the V/C calculations is that actual flow can fail to represent the full desire for travel at a particular location on the road network. It is considered more appropriate to assess the impacts on the network should all traffic that wants to use a particular part of the network be able to do so, rather than exclude traffic that is deemed to be delayed further upstream.
- 3.2.5 The V/Cs on the roads highlighted by consultees have been examined for the HNWR option and compared against the Extended Baseline scenario. For each of the roads identified, the following questions have been addressed:
- What will be the V/C of the road if airport expansion takes place?
 - How does this compare if expansion does not take place (ie. the Extended Baseline scenario)?
 - Are the answers to either of the above questions different to any of the conclusions that were drawn in earlier stages of the AC's work, or being reported for the first time?
- 3.2.6 This methodology has been developed to support the AC in identifying which roads or corridors (and which sections of the roads or corridors) will be adversely impacted by expansion and the implications that this will have with regards to mitigation and ultimately the viability of a particular option, in this case the HNWR.
- 3.2.7 The V/C of the roads are presented separately for each road / corridor in tabular format to allow each of the short-listed options to be easily compared against the Extended Baseline. The tables include columns indicating whether the V/C has increased above a threshold of 85% (approaching capacity) or 100% (at capacity) in the HNWR scenario, and will also indicate if the V/C of a road that is already over capacity in the Extended Baseline is further exacerbated by the introduction of the HNWR.
- 3.2.8 As a result of the way the traffic models were developed, many of the road sections are comprised of multiple model links. In such circumstances the following rules have been applied (in the order given) to determine which link should be presented in the table:
1. If a link along a section exceeds the 100% V/C threshold as a result of airport expansion then traffic data for this link is presented;
 2. If a link along a section already has a V/C in excess of 100% in the Extended Baseline and the V/C increases as a result of airport expansion then traffic data for this link is presented;
 3. If a link along a section exceeds the 85% V/C threshold as a result of airport expansion then traffic data for this link is presented; and
 4. If none of the above rules apply, traffic data for the link that has the highest V/C with airport expansion is presented.
- 3.2.9 This approach ensures that areas of the road network that suffer the most significant impacts as a result of airport expansion are reflected in the reporting.
- 3.2.10 The tabular summaries are supplemented by a series of map-based plots. The plots present the V/C impacts of the HNWR spatially, allowing the identification of particular sections of the network that experience capacity problems.
- 3.2.11 The following strategic and local roads have been included in the analysis of the HNWR option:
- M3;
 - M4;
 - M25;
 - M40;
 - A4 (including Colnbrook Bypass);
 - A40;

- A30;
- A312;
- A408;
- A308; and
- A3044.

- 3.2.12 The list reflects the roads raised in the consultee comments described in Chapter 2, as well as a small number of additional roads that are considered relevant to the assessment.
- 3.2.13 The results are presented for the AM peak period (0800-0900) and the PM peak period (1700-1800) which is when the impact on strategic and local roads is likely to be the greatest.
- 3.2.14 Whilst the analysis presented in this report is derived from the same traffic models as those used to produce the Surface Access Appraisal Reports (which were produced during the consultation period), the road sections highlighted in each report differ. There are two reasons for this. Firstly, the analysis presented in this report includes road sections that operate above both 85% and 100% capacity, whereas the Surface Access Appraisal Reports focussed only on those operating above 100% capacity. Secondly, the Surface Access Appraisal Reports also applied a condition that meant that only roads that experienced an increase of at least 50 airport-related PCUs (compared to the Extended Baseline) were presented. This condition has not been applied in the analysis in this report.
- 3.2.15 This approach allows sections of road that exceed capacity in the HNWR scenario but do not carry additional airport-related traffic to still be highlighted. In such cases, whilst airport expansion might not be having a direct impact on a particular corridor, it is quite possible that airport trips are causing the rerouting of non-airport traffic onto the corridor, leading to capacity issues.

4. Capacity Impacts

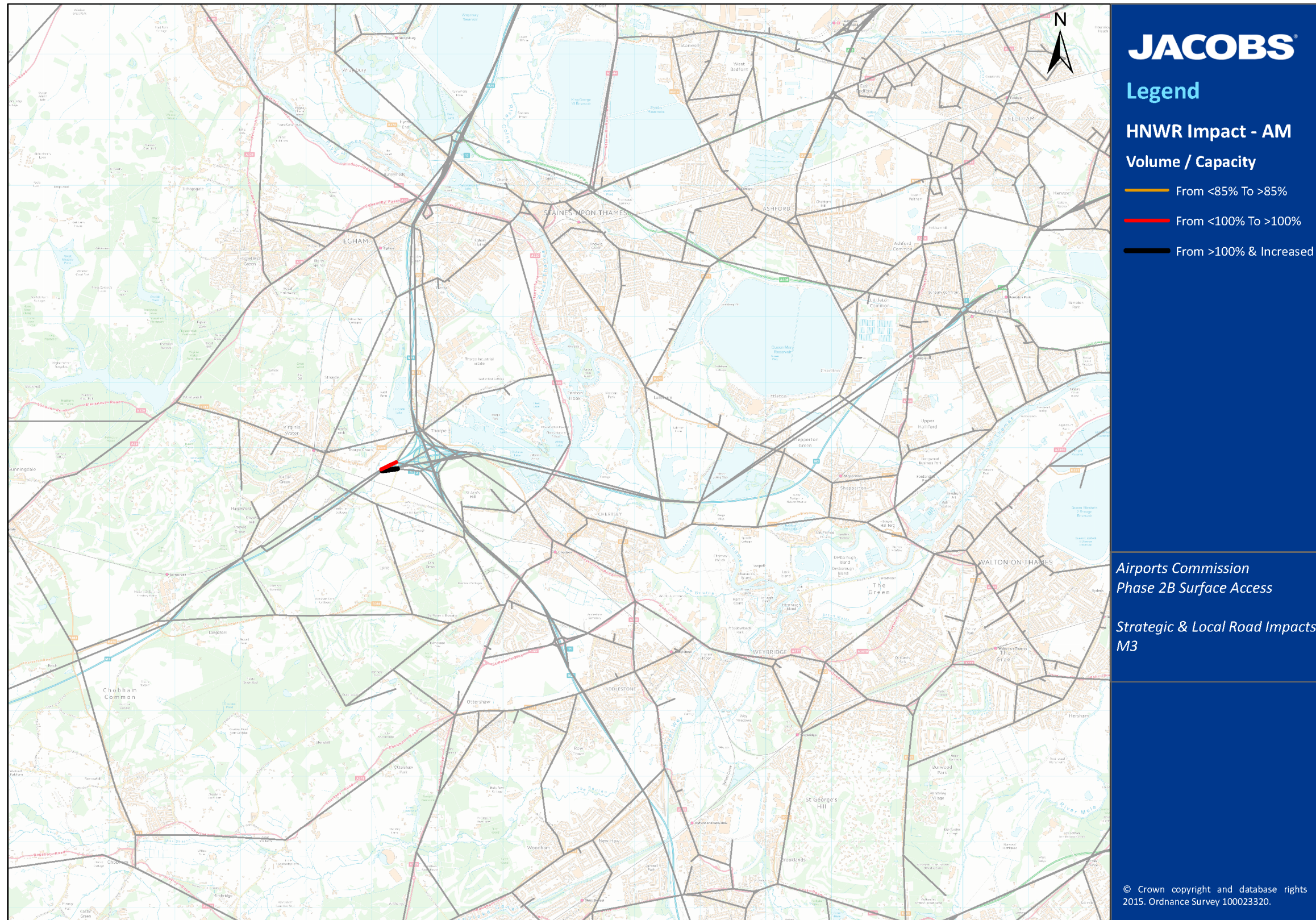
4.1 M3

- 4.1.1 The M3 motorway is located to the south of Heathrow Airport. It connects much of Hampshire with West London, and beyond its most westerly junction at Sunbury-on-Thames, provides access to the A316 and A4 into central London. The motorway also intersects the M25 at Junction 12, providing free-flow slip road access to the M25 northbound and southbound.
- 4.1.2 The proximity of the motorway to Heathrow Airport, as well as its connections to roads such as the M25 and A308, mean that any increase in the number of trips at Heathrow Airport is likely to have an impact on the motorway.
- 4.1.3 Junctions 1 to 3 of the motorway have been modelled within the detailed simulation area of the traffic model. The remainder of the motorway is located outside the simulation area, and as is typically the case in traffic models, the coding here is less detailed. For this reason, any road that falls outside the simulation area has not been included in this assessment. However, since the impact of any additional demand for Heathrow Airport is likely to be most significant between junctions 1 to 3 of the M3, it is considered that sufficient information is available to provide an understanding of the key impacts on the motorway.
- 4.1.4 Modelled traffic flow data for the Extended Baseline and HNWR is presented in **Table 4-1** for the AM peak period. The data presented in the table is explained in more detail below:
- **Total Demand** – the demand flow (this includes cars and goods vehicles, expressed in passenger car units (PCUs));
 - **Airport Demand** - the demand flow travelling either to or from Heathrow Airport only (cars and goods vehicles in PCUs); and
 - **V/C** – demand flow (in PCUs) divided by the capacity (in PCUs) as calculated by the simulation within the traffic model (expressed as a percentage).
- 4.1.5 The final three columns are used to summarise the impact of the HNWR, as follows:
- **> 85%** - a tick in this column indicates a road is forecast to experience a V/C percentage of less than 85% in the Extended Baseline and a V/C in excess of 85% following the introduction of the HNWR;
 - **> 100%** - a tick in this column indicates a road is forecast to experience a V/C percentage of less than 100% in the Extended Baseline and a V/C in excess of 100% following the introduction of the HNWR; and
 - **>100% +** - a tick in this column indicates a road that is forecast to be over capacity in the Extended Baseline and is further exacerbated by the introduction of the HNWR.
- 4.1.6 **Figure 4-1** is presented below Table 4-1 and shows the impact of the HNWR in the AM peak period spatially. Roads that are predicted to exceed 85% V/C following the introduction of the HNWR are shown in amber, whilst those that are predicted to exceed 100% V/C following its introduction are shown in red. Roads already forecast to exceed 100% in the Extended Baseline but expected to be further exacerbated by the introduction of the HNWR are shown in black.
- 4.1.7 Further figures showing the V/C of *all* links (and not just those exceeding a threshold in the HNWR scenario) along the M3 corridor in both the Extended Baseline and HNWR are provided in Appendix A.

Table 4-1: AM V/C with HNWR, M3 Motorway

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
M3 Mainline, Through J1	Westbound	2,842	29	71.05	2,848	21	71.21			
M3 Mainline, J1-J2	Westbound	4,064	76	58.14	4,068	21	58.20			
M3 Mainline, Through J2	Westbound	2,320	0	99.57	2,318	0	99.49			
M3 Mainline, J2-J3	Westbound	6,163	306	73.37	6,183	389	73.61			
M3 Mainline, J3-J2	Eastbound	6,519	153	85.13	6,579	202	85.88			
M3 Mainline, Through J2	Eastbound	3,644	63	81.75	3,674	6	82.42			
M3 Mainline, J2-J1	Eastbound	4,461	83	68.16	4,387	59	67.13			
M3 Mainline, Through J1	Eastbound	2,976	19	49.59	2,953	40	49.21			
M3 Off Slip, J1	Westbound	1,219	0	52.99	1,229	12	53.42			
M3 On Slip, J1	Westbound	1,222	47	69.06	1,220	0	68.94			
M3 Off Slip, J2	Westbound	1,744	76	49.27	1,750	21	49.44			
M3 On Slip, J2	Westbound	3,782	306	106.83	3,804	389	107.45			✓
M3 Off Slip, J2	Eastbound	3,514	89	99.27	3,582	197	101.19		✓	
M3 On Slip, J2	Eastbound	817	19	23.08	712	53	20.12			
M3 Off Slip, J1	Eastbound	1,486	63	64.59	1,434	19	62.34			
M3 On Slip, J1	Eastbound	1,063	0	60.06	1,072	0	60.57			
M3 / M25 Intersection, J2/J12	-	2,282	306	112.06	2,302	389	111.93			
M3 / A308 Intersection, J1	-	1,514	65	65.84	1,547	19	67.27			

Figure 4-1: AM V/C Impact of HNWR, M3 Motorway

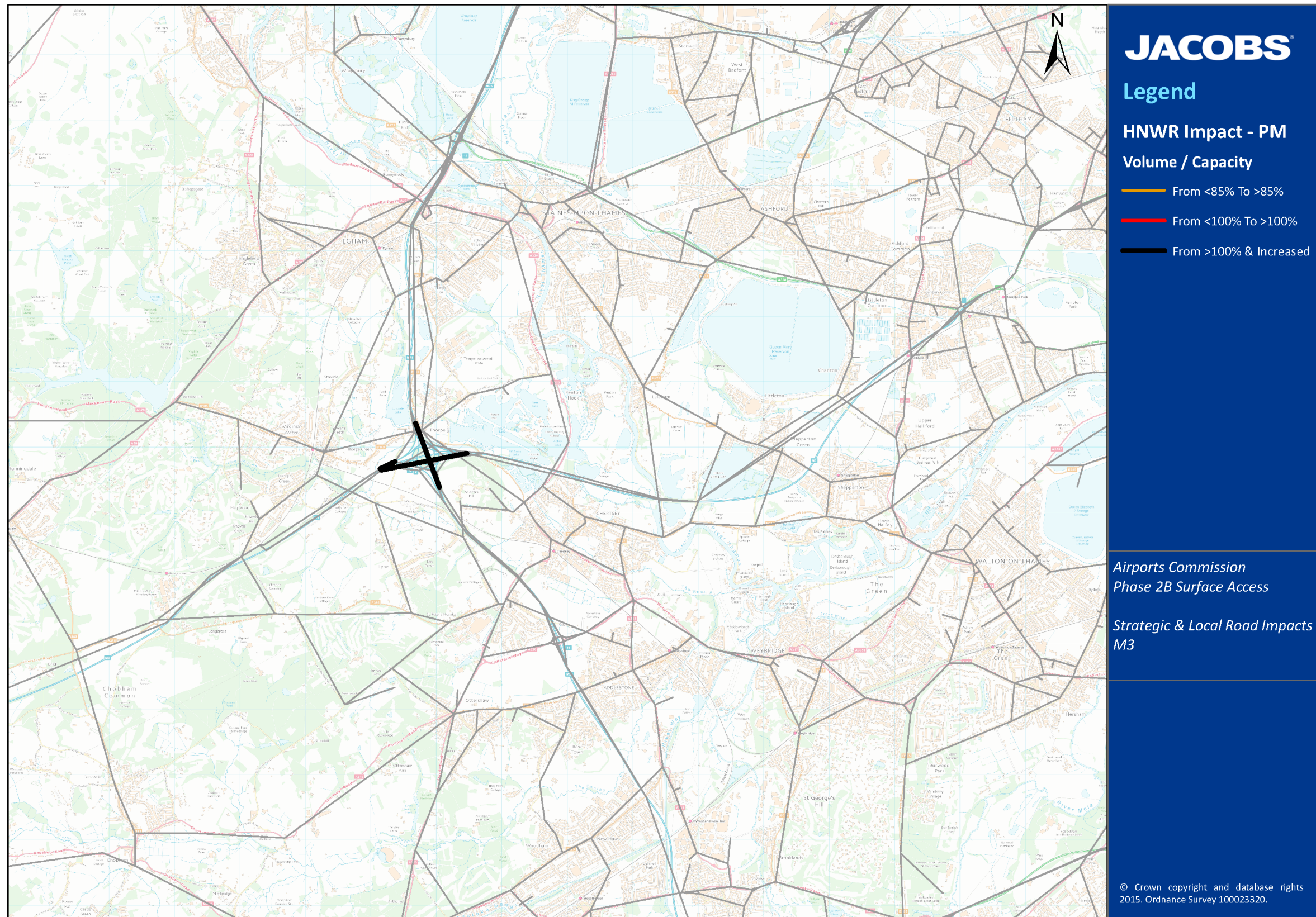


- 4.1.8 The forecast flows derived from the traffic model for the Extended Baseline and HNWR suggest that the key impacts on the M3 corridor in the AM peak period are likely to be on the slip roads of Junction 2.
- 4.1.9 The westbound on-slip at Junction 2 is forecast to be over capacity by 2030 even without expansion at Heathrow Airport. The introduction of the HNWR is forecast to cause the V/C to increase to over 107%, adding almost 100 airport PCUs in the AM peak to the slip road. This would account for approximately 10% of the total PCUs on the slip road in this period, which is an increase on the predicted 8% in the Extended Baseline.
- 4.1.10 The eastbound off-slip at Junction 2 is forecast to experience a V/C of just over 99% in the Extended Baseline. Theoretically, it would therefore be operating within capacity - however given how close to capacity it would be operating; it is likely that the slip road would be experiencing some operational issues. With the introduction of HNWR, the V/C is forecast to increase to above 101%, indicating that the slip road is over capacity. With respect to traffic from Heathrow Airport, the introduction of HNWR is forecast to lead to an increase of more than 100 airport PCUs using the slip road in the AM peak period. This would account for more than 5% of the total PCUs using the slip road, which is an increase from the 2.5% in the Extended Baseline. The slip road is an important access point between the M3 eastbound and the M25 northbound, which in turn provides access to Heathrow Airport. It is likely that without further improvement by 2030 the junction will be operating close to its capacity in the AM peak period, and the additional traffic generated by the HNWR will cause the junction to exceed this capacity.
- 4.1.11 Modelled traffic flow data for the Extended Baseline and HNWR is presented in **Table 4-2** for the PM peak period. **Figure 4-2** is presented below Table 4-2 and shows the impact of the HNWR in the PM peak period spatially.

Table 4-2: PM V/C with HNWR, M3 Motorway

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
M3 Mainline, Through J1	Westbound	2,937	22	73.42	2,950	20	73.75			
M3 Mainline, J1-J2	Westbound	4,117	46	58.90	4,097	31	58.61			
M3 Mainline, Through J2	Westbound	2,490	0	106.85	2,493	0	107.01			✓
M3 Mainline, J2-J3	Westbound	6,366	202	75.79	6,332	276	75.38			
M3 Mainline, J3-J2	Eastbound	6,406	306	83.51	6,351	391	82.76			
M3 Mainline, Through J2	Eastbound	2,868	0	64.33	2,897	0	64.98			
M3 Mainline, J2-J1	Eastbound	4,439	2	68.87	4,443	38	68.83			
M3 Mainline, Through J1	Eastbound	3,212	2	53.54	3,190	37	53.16			
M3 Off Slip, J1	Westbound	1,213	0	52.74	1,249	0	54.29			
M3 On Slip, J1	Westbound	1,181	24	66.70	1,147	11	64.81			
M3 Off Slip, J2	Westbound	1,628	46	45.98	1,604	31	45.30			
M3 On Slip, J2	Westbound	3,800	202	107.36	3,769	276	106.46			
M3 Off Slip, J2	Eastbound	3,619	306	102.22	3,622	391	102.33			✓
M3 On Slip, J2	Eastbound	1,571	2	44.39	1,547	38	43.69			
M3 Off Slip, J1	Eastbound	1,227	0	53.33	1,254	1	54.51			
M3 On Slip, J1	Eastbound	963	4	54.38	975	0	55.11			
M3 / M25 Intersection, J2/J12	-	7,042	494	106.69	7,076	642	107.21			✓
M3 / A308 Intersection, J1	-	1,636	156	71.13	1,629	170	70.84			

Figure 4-2: PM V/C Impact of HNWR, M3 Motorway



- 4.1.12 As in the AM peak period, the forecast flows derived from the traffic model for the Extended Baseline and HNWR suggest that the key impacts on the M3 corridor in the PM peak period are likely to be at Junction 2.
- 4.1.13 Although the M3 westbound through Junction 2 is forecast to be over capacity in the Extended Baseline and get worse with the introduction of the HNWR, the difference in traffic flows on this road is very minor, and furthermore the amount of airport traffic on the road is zero in both the Extended Baseline and HNWR scenarios. Earlier in Chapter 3 of this report, it was noted that simply because there is no airport traffic travelling on a particular section, it is not necessarily the case that the HNWR is not having an impact on the section. It is possible that airport-related traffic elsewhere in the network causes the rerouting of non-airport traffic onto the section, leading to capacity issues. However, given the available data from the traffic model, it is difficult to attribute the capacity issues on this section of the M3 directly to the HNWR.
- 4.1.14 The eastbound off-slip at Junction 2 is forecast to be over capacity in the Extended Baseline and to operate at a still greater V/C with the introduction of HNWR. With respect to traffic from Heathrow Airport, the introduction of HNWR is forecast to lead to an increase of almost 100 airport PCUs using the slip road in the PM peak period. This would account for approximately 11% of the total number of PCUs using the slip road, which is an increase from the 8% in the Extended Baseline. The slip road is an important access point between the M3 eastbound and the M25 northbound, which in turn provides access to Heathrow Airport. Whilst in the AM Extended Baseline the slip road operates marginally within capacity, in the PM peak period this is not the case. Demand on the slip road is expected to exceed capacity and the problem is likely to be further exacerbated by the introduction of the HNWR.
- 4.1.15 The M3 / M25 intersection at Junction 2 of the M3 and Junction 12 of the M25 is also flagged in **Table 4-2** as likely to be over capacity in the Extended Baseline and to further exceed its capacity in the HNWR. The particular road within this section is on the M25 and has been included only as part of the analysis of the entire intersection of the M3 and M25. It is discussed further in the section of this report which covers the M25.
- 4.1.16 The pre-consultation analysis undertaken considered the impact of expansion at Heathrow on a selection of strategic links. The analysis was based on a static assessment of capacity on the mainline of the M3 and consequently did not take into account specific junctions, such as M3 Junction 2. It should be noted that whilst the analysis suggested that the M3 mainline would operate at under 85% capacity with the introduction of the HNWR, the dynamic modelling undertaken and reported above suggests that westbound between junctions 3 and 2 is likely to operate marginally above 85% capacity both with and without the HNWR in the AM peak period. Westbound through Junction 2 is also likely to be approaching capacity with and without HNWR.
- 4.1.17 The forecast impacts of the HNWR do not significantly deviate from any of the conclusions stated in the pre-consultation analysis. It is considered that the impacts on the M3 corridor that have been discussed will not materially impact the conclusions made by the AC.

4.2 M4

- 4.2.1 The M4 corridor forms a key east-west route across southern England and Wales. It extends from Chiswick in the London Borough of Hounslow in the east to South Wales in the west. The motorway skirts several major towns and cities including Slough, Reading, Bristol, Newport and Cardiff and joins with the A4 at its most easterly point to complete the route into central London. Located to the north of Heathrow Airport, the motorway intersects the M25 at Junction 15.
- 4.2.2 Given that the motorway is one of the key routes to Heathrow Airport, the number of trips at Heathrow Airport is likely to have a very direct impact on the motorway and its operation.
- 4.2.3 Junctions 1 to 5 of the motorway have been modelled within the detailed simulation area of the traffic model. The remainder of the motorway is located outside the simulation area, and has therefore not been included in this assessment. However, since the impact of any additional demand for Heathrow

Airport is likely to be most significant between junctions 1 to 5 of the M4, it is considered that sufficient information is available to provide an understanding of the key impacts on the motorway.

- 4.2.4 Modelled traffic flow data for the Extended Baseline and HNWR is presented in **Table 4-3** for the AM peak period. **Figure 4-3** is presented below Table 4-3 and shows the impact of the HNWR in the AM peak period spatially.
- 4.2.5 Further figures showing the V/C of *all* links (and not just those exceeding a threshold in the HNWR scenario) along the M4 corridor in both the Extended Baseline and HNWR are provided in Appendix A.

Table 4-3: AM V/C with HNWR, M4 Motorway

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
M4 Mainline, J1-J2	Westbound	4,291	1,020	107.73	4,402	1,245	110.43			✓
M4 Mainline, Through J2	Westbound	3,952	996	106.20	4,122	1,245	109.11			✓
M4 Mainline, J2-J3	Westbound	4,312	1,003	98.00	4,427	1,246	100.61		✓	
M4 Mainline, Through J3	Westbound	4,118	995	68.64	4,261	1,246	71.02			
M4 Mainline, J3-J4	Westbound	7,074	1,394	84.22	7,290	1,757	86.78	✓		
M4 Mainline, Through J4	Westbound	5,128	520	73.26	5,130	642	73.29			
M4 Mainline, J4-J4B	Westbound	7,440	1,455	101.22	7,433	1,785	101.13			
M4 Mainline, Through J4B	Westbound	4,070	272	96.19	4,034	425	103.12		✓	
M4 Mainline, J4B-J5	Westbound	6,521	424	77.63	6,890	694	82.02			
M4 Mainline, Through J5	Westbound	8,518	715	8.52	8,348	856	8.35			
M4 Mainline, J5-J4	Eastbound	7,676	629	91.38	7,773	991	92.53			
M4 Mainline, Through J4	Eastbound	4,176	439	79.54	4,213	587	80.24			
M4 Mainline, J4-J4B	Eastbound	7,831	1,426	93.22	7,876	1,763	93.76			
M4 Mainline, Through J4B	Eastbound	4,634	630	77.23	4,652	794	77.54			
M4 Mainline, J4-J3	Eastbound	6,095	1,384	83.50	6,128	1,743	83.95			
M4 Mainline, Through J3	Eastbound	3,155	1,018	78.87	3,271	1,250	81.78			
M4 Mainline, J3-J2	Eastbound	3,434	1,032	81.75	3,588	1,251	85.43	✓		
M4 Mainline, Through J2	Eastbound	2,702	946	96.90	2,824	1,142	98.94			
M4 Mainline, J2-J1	Eastbound	3,460	946	97.74	3,541	1,142	100.03		✓	
M4 Off Slip, J2	Westbound	339	24	23.23	280	0	19.21			
M4 On Slip, J2	Westbound	277	7	89.58	229	0	86.94			
M4 Off Slip, J3	Westbound	194	8	48.61	166	0	41.61			
M4 On Slip, J3	Westbound	2,956	399	83.51	3,029	511	85.56	✓		

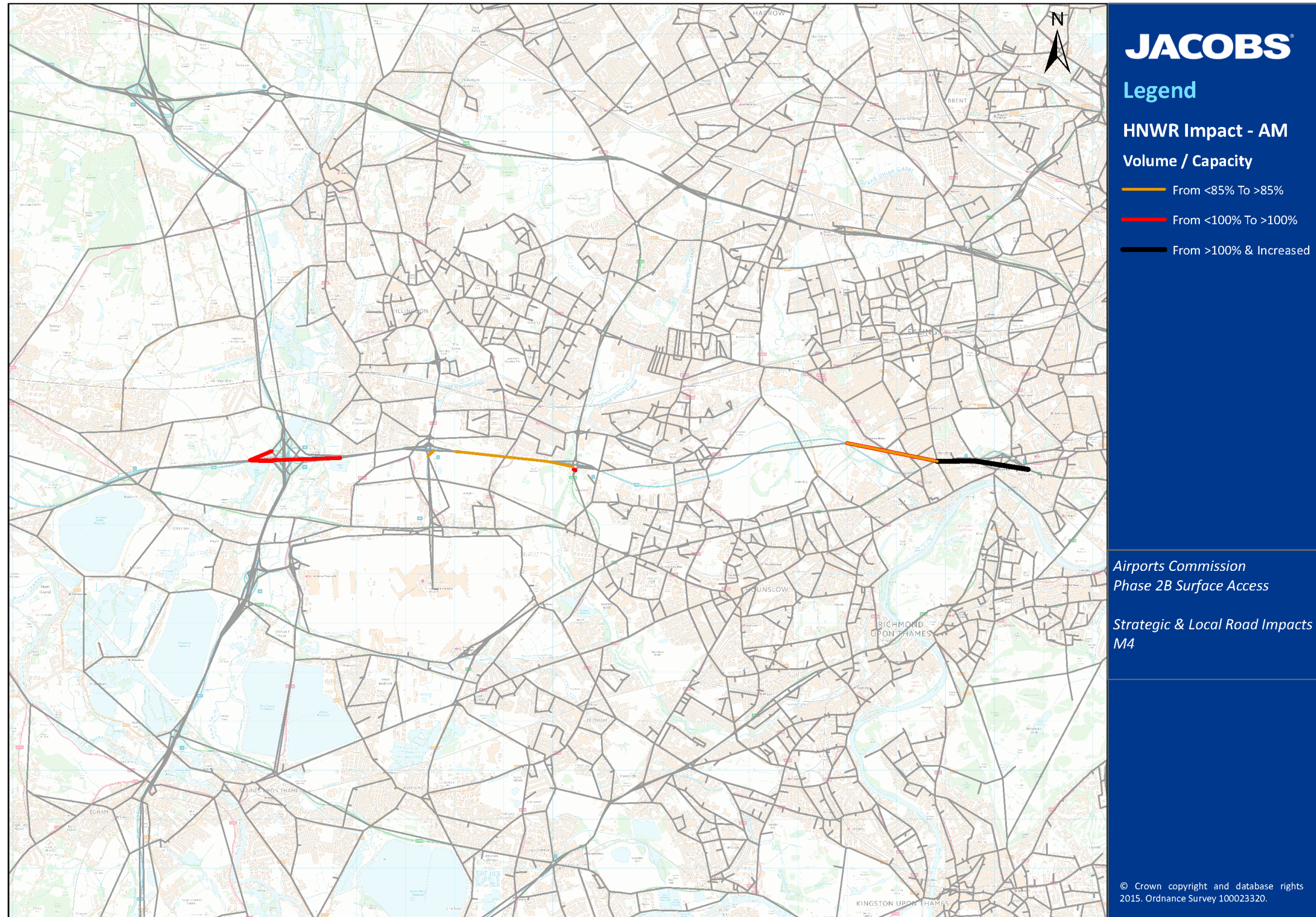
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M4 Off Slip, J4	Westbound	1,947	873	63.04	2,159	1,115	69.93			
M4 On Slip, J4	Westbound	2,312	934	73.39	2,303	1,143	73.10			
M4 Off Slip, J4B	Westbound	3,396	1,183	95.94	3,399	1,360	96.01			
M4 On Slip, J4B	Westbound	2,451	152	93.65	2,855	270	101.07		✓	
M4 Off Slip, J4B	Eastbound	3,500	190	98.87	3,560	404	100.57		✓	
M4 On Slip, J4B	Eastbound	2,008	550	90.09	2,033	663	91.21			
M4 On Slip, J4B	Eastbound	1,647	437	82.33	1,630	513	81.48			
M4 Off Slip, J4	Eastbound	3,197	796	39.97	3,223	969	40.29			
M4 On Slip, J4	Eastbound	1,462	754	41.29	1,476	949	41.69			
M4 Off Slip, J3	Eastbound	2,941	365	95.23	2,857	493	92.51			
M4 Off Slip, J3	Eastbound	2,941	365	95.23	2,857	493	92.51			
M4 On Slip, J3	Eastbound	279	14	33.13	317	2	37.57			
M4 Off Slip, J2	Eastbound	731	86	50.08	764	109	52.35			
M4 On Slip, J2	Eastbound	758	0	80.72	718	0	79.59			
M4/A312interchange , J3	-	1,735	345	97.52	1,958	508	110.05		✓	
M4/M4 Spur Interchange, J4	-	1,075	873	73.11	1,361	1,115	92.59	✓		
M4/M25 Interchange , J15/J4B	-	3,595	987	101.54	3,575	1,176	100.99			
M4 Spur	-	2,647	1,878	67.86	3,158	2,372	80.97			

Figure 4-3: AM V/C Impact of HNWR, M4 Motorway



- 4.2.6 Forecast flows derived from the traffic model for the Extended Baseline and HNWR suggest that there will be a number of impacts along the M4 corridor in the AM peak period. Both the westbound on-slip and eastbound off-slip at Junction 4B are forecast to exceed capacity in the HNWR scenario. The slip roads provide important access to the M25 and Heathrow Airport. The westbound on-slip is expected to experience an increase of more than 100 PCUs in the AM peak period, meaning that airport traffic would account for approximately 9% of all traffic on the slip road with the introduction of the HNWR, compared to 6% in the Extended Baseline. The eastbound off-slip is forecast to experience an increase of more than 200 PCUs in the AM peak period. This would account for more than 11% of total traffic on the slip road, compared with just 5% in the Extended Baseline. In addition, whilst traffic flows through Junction 4B in the westbound direction are forecast to decrease marginally compared to the Extended Baseline, the introduction of the HNWR would mean that a higher proportion of the traffic on this section would be airport-related (circa 150 PCUs more airport traffic). More importantly, whilst the overall traffic flow on this section may be forecast to decrease marginally with HNWR, it is still forecast to go over capacity. This is due to capacity being constrained by higher traffic flows on the westbound on-slip at Junction 4B.
- 4.2.7 The westbound off-slip towards the southbound M4 spur at Junction 4 is expected to experience an increase in V/C as a result of the HNWR. The slip road is still forecast to remain within capacity, but the V/C is forecast to rise from 73% in the Extended Baseline to close to 93% in the HNWR scenario. Consequently, it would be expected that some operational issues would be likely here. The majority of the circa 300 PCU increase in AM traffic flows on this section can also be attributed to additional trips to Heathrow Airport following the introduction of the HNWR.
- 4.2.8 The mainline M4 westbound between junctions 3 and 4 is forecast to experience an increase in V/C with the HNWR. The increase, from 84% in the Extended Baseline to 87% with HNWR, crosses the 85% threshold whereby traffic conditions may begin to be adversely affected. The traffic model suggests that along this section of the motorway there will be a significant increase in airport-related traffic of more than 350 PCUs in the AM peak following the introduction of the HNWR.
- 4.2.9 Similarly, the westbound on-slip at Junction 3 is forecast to increase from below 85% in the Extended Baseline to above 85% in the HNWR scenario. This can be attributed to an increase in airport-related traffic in the HNWR scenario, which sees the proportion of airport-related traffic on the slip road in the AM peak period increase to 17% from 14% in the Extended Baseline.
- 4.2.10 The impact on the roundabout at Junction 3 of the M4 has also been considered in this analysis. Here, the M4 meets the A312 at a signalised roundabout. The junction is forecast to be adversely impacted by the HNWR, moving from being marginally under capacity in the Extended Baseline (98%) to significantly over capacity in the HNWR scenario (110%). In the Extended Baseline, there are forecast to be approximately 350 airport PCUs using this section, which accounts for 20% of all PCUs. With HNWR, the number of airport-related PCUs increases to more than 500, equating to 26% of the total number of PCUs. Heathrow Airport is therefore likely to be a significant contributor to traffic at this junction whether expansion occurs or not; however with the introduction of a third runway the operation of the junction is likely to deteriorate significantly.
- 4.2.11 Further to the east along the corridor, there are likely to be capacity issues on the mainline of the motorway. Travelling westbound from the start of the motorway at Junction 1 towards and through Junction 2 and to Junction 3, the introduction of the HNWR is forecast to exacerbate existing capacity issues. This section of the M4 experiences increases in airport-related traffic of approximately 200 PCUs in the AM peak period as a result of the HNWR. In the eastbound direction, the mainline between junctions 1 and 2 is also forecast to go over capacity in the HNWR scenario following a similar increase of approximately 200 airport PCUs. The M4 in this area forms part of a key corridor that provides direct access to the A4 and central London, and given that with the introduction of HNWR, anywhere from 28% to approximately one third of the overall traffic on this section is likely to be travelling either to or from an expanded Heathrow, the operation of the motorway is considered vital to an accessible Heathrow.

- 4.2.12 Modelled traffic flow data for the Extended Baseline and HNWR is presented in **Table 4-4** for the PM peak period. **Figure 4-4** is presented below Table 4-4 and shows the impact of the HNWR in the PM peak period spatially.

Table 4-4: PM V/C with HNWR, M4 Motorway

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
M4 Mainline, J1-J2	Westbound	4,113	931	103.33	4,264	1,131	107.02			✓
M4 Mainline, Through J2	Westbound	3,725	931	111.44	3,937	1,131	115.56			✓
M4 Mainline, J2-J3	Westbound	4,454	1,001	103.58	4,619	1,203	107.42			✓
M4 Mainline, Through J3	Westbound	4,049	997	67.48	4,248	1,202	70.81			
M4 Mainline, J3-J4	Westbound	7,115	1,255	84.70	7,300	1,577	86.90	✓		
M4 Mainline, Through J4	Westbound	5,254	550	75.06	5,313	677	75.90			
M4 Mainline, J4-J4B	Westbound	7,748	1,265	105.42	7,884	1,825	107.26			✓
M4 Mainline, Through J4B	Westbound	4,483	322	108.24	4,468	693	108.38			✓
M4 Mainline, J4B-J5	Westbound	7,136	634	84.96	7,240	1,099	86.19	✓		
M4 Mainline, Through J5	Westbound	7,867	612	7.87	7,784	917	7.78			
M4 Mainline, J5-J4	Eastbound	5,391	347	64.18	5,818	531	69.26			
M4 Mainline, Through J4	Eastbound	3,897	205	74.22	3,771	264	71.84			
M4 Mainline, J4-J4B	Eastbound	7,271	1,109	86.56	7,397	1,334	88.06			
M4 Mainline, Through J4B	Eastbound	4,637	501	77.28	4,791	628	79.85			
M4 Mainline, J4-J3	Eastbound	6,422	1,317	87.97	6,587	1,707	90.23			
M4 Mainline, Through J3	Eastbound	3,872	970	96.79	3,956	1,216	98.90			
M4 Mainline, J3-J2	Eastbound	4,057	971	96.59	4,204	1,218	100.09		✓	
M4 Mainline, Through J2	Eastbound	3,273	954	98.47	3,434	1,198	102.48		✓	
M4 Mainline, J2-J1	Eastbound	3,710	972	104.80	3,855	1,201	108.90			✓
M4 Off Slip, J2	Westbound	387	0	26.52	326	0	22.34			
M4 On Slip, J2	Westbound	670	70	108.28	615	71	108.73			✓
M4 Off Slip, J3	Westbound	405	4	53.14	371	0	48.64			
M4 On Slip, J3	Westbound	3,066	258	86.62	3,051	375	86.19			
M4 Off Slip, J4	Westbound	1,861	706	60.26	1,987	900	64.34			

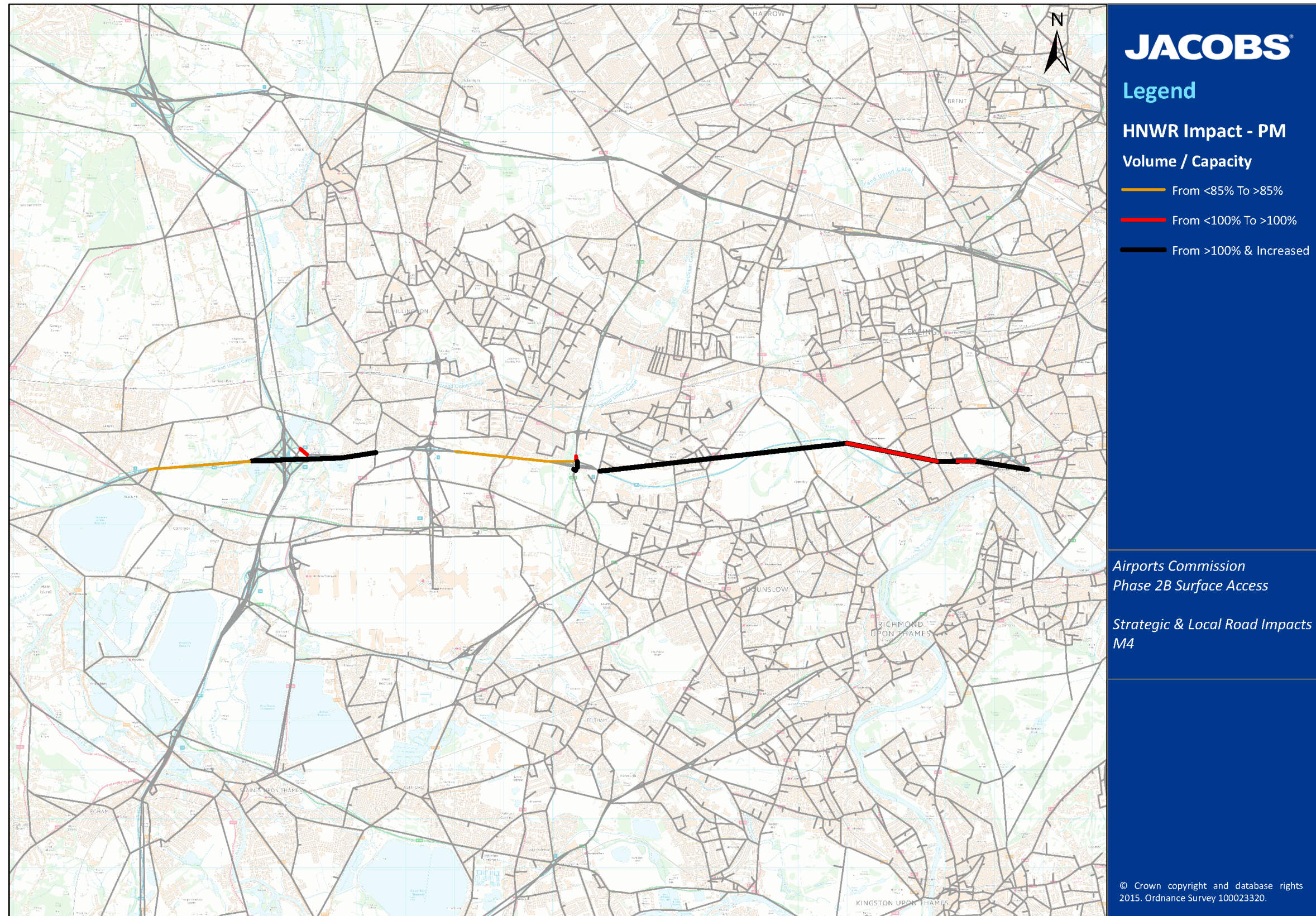
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M4 On Slip, J4	Westbound	2,494	715	79.17	2,571	1,148	81.61			
M4 Off Slip, J4B	Westbound	3,431	943	96.91	3,490	1,132	98.60			
M4 On Slip, J4B	Westbound	2,653	312	102.96	2,772	407	106.70			✓
M4 Off Slip, J4B	Eastbound	1,495	142	42.22	2,046	267	57.80			
M4 On Slip, J4B	Eastbound	1,627	439	72.99	1,823	546	81.78			
M4 On Slip, J4B	Eastbound	1,748	466	87.39	1,803	524	90.13			
M4 Off Slip, J4	Eastbound	2,634	608	32.93	2,606	707	32.58			
M4 On Slip, J4	Eastbound	1,785	816	50.42	1,796	1,079	50.72			
M4 Off Slip, J3	Eastbound	2,550	347	82.58	2,631	490	85.19	✓		
M4 Off Slip, J3	Eastbound	2,550	347	82.58	2,631	490	85.19	✓		
M4 On Slip, J3	Eastbound	185	1	30.40	217	2	35.34			
M4 Off Slip, J2	Eastbound	783	17	53.66	769	20	52.70			
M4 On Slip, J2	Eastbound	436	18	60.31	421	3	59.51			
M4/A312interchange , J3	-	2,750	262	98.46	2,688	358	103.32		✓	
M4/M4 Spur Interchange, J4	-	1,612	91	86.37	1,669	124	89.42			
M4/M25 Interchange , J15/J4B	-	3,375	905	95.33	3,626	1,070	102.42		✓	
M4 Spur	-	1,862	1,328	47.74	2,307	1,670	59.16			

Figure 4-4: PM V/C Impact of HNWR, M4 Motorway



- 4.2.13 The capacity issues highlighted in the AM peak period are also reflected in the PM period. The exacerbation of capacity problems between junctions 1 and 3 as a result of the HNWR continues in the PM period. In both the eastbound and westbound directions, the M4 mainline is forecast to experience increases in airport-related traffic of around 200 PCUs, accounting for between a quarter and a third of all traffic. It is evident from **Figure 4-4** that every section of the motorway between these junctions is likely to change from being either under capacity in the Extended Baseline and over capacity with HNWR, or over capacity in the Extended Baseline and further worsened with the introduction of the HNWR. The capacity issues on the mainline impact on the Junction 2 westbound on-slip, where capacity is constrained such that the slip road's V/C increases in the HNWR scenario despite there being no additional airport-demand using the slip and an overall decrease in flow.
- 4.2.14 Further to the west of the corridor, the westbound M4 between junctions 4 and 4B and through Junction 4B are forecast to be over capacity in the Extended Baseline and even further over capacity with HNWR. Between junctions 4 and 4B, the HNWR is expected to cause an increase in airport-related traffic of more than 550 PCUs in the PM peak hour. This represents a significant increase in airport traffic along what is likely to be an already congested section of motorway. This is similarly the case through Junction 4B, which is forecast to experience an increase in airport-related traffic of almost 400 PCUs in the PM peak period following the introduction of the HNWR. Whilst both sections are likely to be significantly over capacity by 2030 even without a third runway at Heathrow Airport, it should be noted that traffic to and from the airport also contributes to this situation in the Extended Baseline. With the HNWR, it simply does so to an even greater extent. This is also the case on the westbound on-slip at Junction 4B, which provides access to the M4 from the northbound M25, while the slip road from the M25 southbound to the M4 eastbound at Junction 4B also goes over capacity with HNWR.
- 4.2.15 The westbound M4 mainline between junctions 3 and 4 increases from a forecast V/C of just under 85% in the Extended Baseline to 87% in the HNWR. This is likely to be caused by the additional airport traffic using this section of the motorway. The eastbound off-slip at Junction 3 also marginally exceeds the 85% threshold in the HNWR scenario. It is likely that the additional airport-related demand (circa 150 PCUs in the PM) will cause some operational issues on this off slip to the roundabout at Junction 3, which is already likely to be adversely impacted by the HNWR.
- 4.2.16 The pre-consultation analysis considered the impact of expansion at Heathrow on a selection of strategic links. The analysis was based on a static assessment of capacity on the mainline of the M4 and concluded that interventions may be required on the M4 mainline between junctions 2 and 3, between junctions 3 and 4, between junctions 4 and 4B. The analysis presented above from the dynamic traffic model identifies the same pressure points on the M4 corridor.
- 4.2.17 The M4 spur is also flagged as an area of concern in the pre-consultation analysis, however in the current analysis the mainline spur is predicted to operate within capacity. It should be noted however that Junction 4 of the M4 is forecast to operate above 85% capacity along a number of its slip roads in the HNWR scenario, which may affect those accessing the spur.
- 4.2.18 In addition to the locations along the M4 corridor that have already been identified in the pre-consultation work, it is also likely that some form of intervention will be required between junctions 1 and 2 of the M4. This section of the corridor experiences significant capacity issues even without the HNWR, and these problems are likely to be exacerbated by the third runway. The section is relied upon to carry high volumes of traffic, significant portions of which travel to or from Heathrow Airport. The capacity issues on the mainline have also been shown to influence the operation of the slip-roads and junctions and it is recommended that these are also considered as a key part of any potential intervention.

4.3 M25

- 4.3.1 The M25 is an orbital motorway that encircles Greater London. To the west, the motorway lies adjacent to Heathrow Airport on a north-south alignment. The M25 provides direct access to the airport between junctions 13 and 15, and along with the M4 motorway, is relied upon to carry the most

significant proportions of traffic to and from the airport. The motorway is located within the simulation area of the traffic model.

- 4.3.2 Modelled traffic flow data along the M25 corridor for the Extended Baseline and HNWR is presented in **Table 4-5** for the AM peak period. **Figure 4-5** is presented below Table 4-5 and shows the impact of the HNWR in the AM peak period spatially.
- 4.3.1 Further figures showing the V/C of *all* links (and not just those exceeding a threshold in the HNWR scenario) along the M25 corridor in both the Extended Baseline and HNWR are provided in Appendix A.

Table 4-5: AM V/C with HNWR, M25 Motorway

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
M25 Mainline, J10-J11	Northbound	8,053	555	8.05	8,184	699	8.18			
M25 Mainline, Through J11	Northbound	6,941	570	99.29	6,973	629	99.76			
M25 Mainline, J11-J12	Northbound	8,362	673	99.61	8,478	832	100.93		✓	
M25 Mainline, Through J12	Northbound	6,585	673	94.21	6,733	832	96.33			
M25 Mainline, J12-J13	Northbound	9,130	838	91.30	9,517	1,050	95.17			
M25 Mainline, Through J13	Northbound	7,596	838	81.50	8,060	1,049	86.48	✓		
M25 Mainline, J13-J14	Northbound	9,442	1,226	94.42	9,982	1,617	99.82			
M25 Mainline, Through J14	Northbound	7,135	42	80.03	4,581	0	51.38			
M25 Mainline, Through J14B	Northbound	7,135	42	80.03	4,581	0	51.38			
M25 Mainline, J14B-J15	Northbound	9,560	1,241	79.67	5,886	471	70.07			
M25 Mainline, Through J15	Northbound	9,560	1,241	79.67	5,886	471	70.07			
M25 Mainline, J15-J16	Northbound	8,751	768	104.18	8,881	953	105.73			✓
M25 Mainline, Through J16	Northbound	6,922	551	104.88	6,990	688	105.91			✓
M25 Mainline, J16-J17	Northbound	8,518	485	101.40	8,604	612	102.43			✓
M25 Mainline, Through J17	Northbound	7,808	467	92.95	7,896	589	94.00			
M25 Mainline, J17-J18	Northbound	8,314	467	98.97	8,405	589	100.06		✓	
M25 Mainline, Through J18	Northbound	8,653	466	103.02	8,764	587	104.34			✓
M25 Mainline, J18-J19	Northbound	8,653	466	103.02	8,764	587	104.34			✓
M25 Mainline, J19-J20	Northbound	7,515	454	89.47	7,626	571	90.78			

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
M25 Mainline, Through J20	Northbound	6,792	430	97.16	6,898	541	98.68			
M25 Mainline, J20-J21	Northbound	8,139	430	96.89	8,238	541	98.07			
M25 Mainline, Through J21	Northbound	6,364	270	96.42	6,424	341	97.33			
M25 Mainline, Through J21A	Northbound	5,564	198	88.32	5,620	256	89.20			
M25 Mainline, J21A - J22	Southbound	7,854	198	93.50	7,919	256	94.28			
M25 Mainline, J22-J21A	Southbound	6,921	322	82.39	6,974	404	83.03			
M25 Mainline, Through J21A	Southbound	5,284	316	83.87	5,334	393	84.67			
M25 Mainline, J21A-J21	Southbound	4,307	332	65.25	4,334	418	65.66			
M25 Mainline, Through J21	Southbound	4,307	332	65.25	4,334	418	65.66			
M25 Mainline, J21-J20	Southbound	6,414	521	76.35	6,484	654	77.19			
M25 Mainline, Through J20	Southbound	5,159	471	78.17	5,225	590	79.17			
M25 Mainline, J20-J19	Southbound	8,217	580	97.83	8,315	731	98.99			
M25 Mainline, Through J18	Southbound	7,031	580	83.70	7,129	731	84.87			
M25 Mainline, J18-J17	Southbound	7,397	582	88.07	7,494	732	89.22			
M25 Mainline, Through J17	Southbound	6,436	582	76.62	6,538	732	77.83			
M25 Mainline, J17_J16	Southbound	7,215	602	85.89	7,303	758	86.94			
M25 Mainline, Through J16	Southbound	6,064	602	91.88	6,177	758	93.60			
M25 Mainline, J16-J15	Southbound	9,006	1,029	107.2 2	9,225	1,271	109.8 4			✓
M25 Mainline, Through J15	Southbound	6,792	722	97.17	7,118	926	84.74			
M25 Mainline, J15_J14B	Southbound	6,792	722	97.17	7,118	926	84.74			
M25 Mainline, Through J14B	Southbound	8,023	264	89.99	5,309	0	59.55			
M25 Mainline, Through J14	Southbound	8,023	264	89.99	5,309	0	59.55			
M25 Mainline, J14_J13	Southbound	9,223	917	92.23	9,291	1,152	92.91			
M25 Mainline, Through J13	Southbound	7,287	810	108.9 8	7,230	1,010	108.1 2			

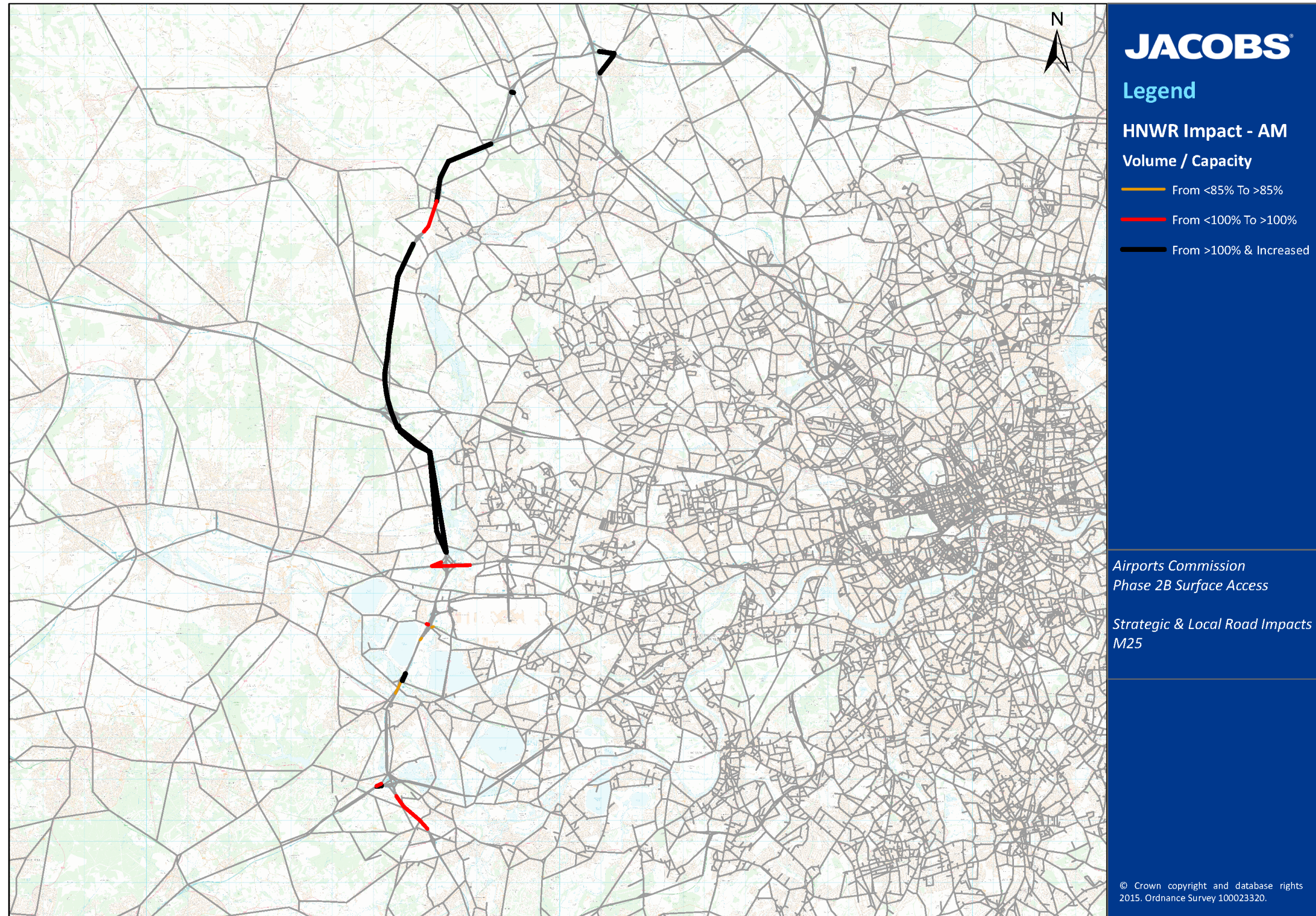
Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
M25 Mainline, J13-J12	Southbound	8,533	810	85.33	8,509	1,045	85.09			
M25 Mainline, Through J12	Southbound	5,712	484	86.55	5,747	603	87.08			
M25 Mainline, J12-J11	Northbound	8,626	484	102.6 9	8,497	603	101.1 5			
M25 Mainline, Through J11	Northbound	7,391	421	164.2 3	7,264	522	161.4 2			
M25 Mainline, J11-J10	Northbound	7,567	385	7.57	7,532	476	7.53			
M25 Off Slip, J11	Northbound	2,906	84	2.91	3,006	180	3.01			
M25 On Slip, J11	Northbound	1,422	103	40.16	1,504	204	42.49			
M25 Off Slip, J12	Northbound	1,777	0	50.19	1,744	0	49.27			
M25 On Slip, J12	Northbound	2,545	165	71.88	2,783	218	78.62			
M25 Off Slip, J13	Northbound	1,534	1	36.10	1,457	1	34.28			
M25 On Slip, J13	Northbound	1,846	388	52.16	1,923	567	54.32			
M25 Off Slip, J14	Northbound	2,307	1,184	49.51	5,401	1,617	64.30			
M25 On Slip, J14B	Northbound	2,425	1,199	52.03	1,304	471	55.99			
M25 On Slip, J15	Northbound	3,023	360	85.39	2,995	482	84.60			
M25 Off Slip, J16	Northbound	1,829	218	51.66	1,891	265	53.41			
M25 Off Slip, J16	Northbound	222	65	10.71	233	76	11.28			
M25 On Slip, J16	Northbound	1,785	0	50.42	1,830	0	51.70			
M25 Off Slip, J17	Northbound	710	18	55.92	708	23	55.82			
M25 On Slip, J17	Northbound	506	0	24.44	509	0	24.58			
M25 Off Slip, J18	Northbound	425	1	103.5 1	427	2	103.4 0			
M25 On Slip, J20	Southbound	724	24	46.60	727	29	46.85			
M25 Off Slip, J20	Southbound	1,348	0	30.23	1,340	0	30.06			
M25 On Slip, J21	Southbound	1,775	160	50.15	1,815	200	51.26			

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
M25 Off Slip, J21	Southbound	625	0	17.64	629	0	17.77			
M25 On Slip, J21A	Southbound	800	72	106.7	804	85	107.9			✓
M25 Off Slip, J21A	Southbound	1,665	0	47.04	1,670	0	47.18			
M25 Off Slip, J21A	Southbound	1,637	6	80.84	1,640	11	80.88			
M25 Off Slip, J21A	Southbound	1,482	0	41.85	1,504	0	42.49			
M25 On Slip, J21A	Southbound	504	16	14.25	503	25	14.22			
M25 On Slip, J21	Southbound	2,107	188	47.26	2,151	236	48.24			
M25 Off Slip, J20	Southbound	1,254	49	72.24	1,259	64	72.52			
M25 Off Slip, J20	Southbound	1,592	90	88.63	1,604	116	89.32			
M25 On Slip, J20	Southbound	1,389	90	39.24	1,421	117	40.14			
M25 Off Slip, J18	Southbound	1,187	0	96.73	1,187	0	96.74			
M25 On Slip, J18	Southbound	367	1	17.72	366	2	17.67			
M25 Off Slip, J17	Southbound	961	0	97.80	957	0	97.13			
M25 On Slip, J17	Southbound	779	20	37.64	765	26	36.96			
M25 Off Slip, J16	Southbound	1,151	0	55.60	1,126	0	54.38			
M25 Off Slip, J16	Southbound	810	0	39.12	784	0	37.86			
M25 On Slip, J16	Southbound	3,589	427	101.3	3,650	513	103.1			✓
M25 Off Slip, J15	Southbound	2,214	307	62.54	2,107	346	59.53			
M25 Off Slip, J14	Southbound	0	0	0.00	1,860	641	79.82			
M25 Off Slip, J14	Southbound	1,200	653	51.49	2,122	511	91.06	✓		
M25 Off Slip, J13	Southbound	1,936	107	105.0	2,061	142	107.4			✓
M25 On Slip, J13	-	1,245	0	35.18	1,279	35	36.13			
M25 Off Slip, J12	-	2,820	326	79.67	2,762	442	78.02			

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
M25 On Slip, J12	-	2,914	0	82.31	2,749	0	77.66			
M25 Off Slip, J11	-	1,235	63	26.51	1,233	81	26.45			
M25 On Slip, J11	-	2,429	63	2.43	2,506	64	2.51			
M25 J14A - Western Terminal Intersection , M25 J14A - Western Perimeter Road	-	1,499	1,194	64.32	1,480	1,454	61.67			
M25 J1 5 - M4B Intersection , London Orbital Motorway - M4 Junction	-	4,070	272	96.19	4,034	425	103.12		✓	
M25 J14 - Airport Way Intersection , M25 J14 - Airport Way	-	1,102	51	82.62	1,501	157	100.09		✓	
M25 J14 - M25 J14A Intersection , M25 J14 - M25 J14A	-	581	566	24.95	2,782	691	39.80			
M25 J13 - A30 Intersection , M25 J13 - Staines By-Pass	-	4,705	108	78.42	4,657	142	77.62			
M25 J16 - M40 J1A Intersection , London Orbital Motorway - M40 Junction	-	3,332	298	94.12	3,506	378	99.05			
M25 J21 - M1 J 6a Intersection , London Orbital Motorway - M1 J6A Junction	-	3,257	160	92.00	3,319	200	93.75			
M25 J21A - N Orbital Rd Intersection , M25 J21A - N Orbital Rd	-	3,210	16	107.01	3,216	25	107.20			✓
M25 J20 - A41 Intersection , London Orbital Motorway - Watford Rd Junction	-	1,452	0	101.66	1,453	1	101.74			✓
M25 J18 - Chorleywood Road Intersection , M25 J18 - Chorleywood Road Junction	-	1,122	0	79.33	1,121	0	79.32			
M25 J17 - A405 Intersection , London Orbital Road - A409 Junction	-	1,183	19	54.74	1,172	25	54.24			
M25 J12 - M3 J2 intersection , M25 J12 - M3 J2	-	3,514	89	99.27	3,582	197	101.19		✓	
M25 J11 - A320 Intersection , London Orbital Motorway - St Peter's Way	-	2,718	36	2.72	2,743	46	2.74			
M25 Off Slip - HNWR ONLY, J14B	Southbound	-	-	-	1,717	837	73.69			
M25 Off Slip - HNWR ONLY, J14B	Southbound	-	-	-	92	89	4.11			
M25 J14A - Western Terminal Intersection - HNWR ONLY, M25 J14A - Western Perimeter Road	-	-	-	-	1,480	1,454	34.42			

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
M25 J14 - A3113 Intersection - HNWR ONLY, M25 J14 - Airport Way Junction	-	-	-	-	1,835	1,613	78.76			
M25 J14 - A3113 Intersection , M25 J14 - Airport Way Junction - HNWR ONLY	-	-	-	-	939	0	95.97			
M25 J14 - J14a Intersection , M25 J14 - J14a - HNWR ONLY	-	-	-	-	71	70	5.66			
M25 J15/J14a - Airport Way Intersection , M25 J15/J14a - Airport Way New Junction - HNWR ONLY	-	-	-	-	3,483	2,010	81.00			
M25 J15 - M25 J14a Collector/Distributor - HNWR ONLY	-	-	-	-	4,323	1,100	100.53			

Figure 4-5: AM V/C Impact of HNWR, M25 Motorway



- 4.3.2 The M25 corridor is likely to experience a wide range of capacity impacts as a result of the HNWR. It can be seen from Figure 4-5 that the route is forecast to suffer from capacity problems along many of its sections, mainly to the north of Heathrow Airport. This is likely to have significant impacts on travellers using the M25. Whilst many of the sections are likely to exceed capacity regardless of whether the HNWR is introduced, they are likely to be further adversely impacted by its introduction.
- 4.3.3 A number of pressure points on the M25 corridor are at a small number of the motorway's junctions. These are summarised below:
- **Junction 12 (M3 Junction)** –the M3 eastbound off-slip provides access to the northbound and southbound M25 and is forecast to operate with a V/C of more than 101% in the HNWR scenario, having remained marginally below capacity in the Extended Baseline. The westbound on-slip from the M25 to the M3 is forecast to operate above capacity in the Extended Baseline and increase still further in the HNWR scenario, with a V/C of more than 107%.The additional airport trips in the HNWR scenario (approximately 100 PCUs) combine with an Extended Baseline already on the brink of capacity to ensure that there are issues at this junction in the HNWR scenario;
 - **Junction 13** – the southbound off-slip at Junction 13 increases from 105% V/C in the Extended Baseline, to 107% in the HNWR scenario. Whilst traffic flow along this section increases by more than 100 PCUs in the AM peak period, less than 40 of these can be attributed to airport traffic. The proportion of airport traffic increases marginally from 6% in the Extended Baseline to 7% in the HNWR, however, this is considered a minor change and the impact of the HNWR is considered to be in addition to the capacity issues that would face the junction regardless of expansion at Heathrow Airport;
 - **Junction 14** – at the M25 intersection with Airport Way the proportion of airport traffic is forecast to rise from approximately 5% in the Extended Baseline to more than 10% in the HNWR scenario. The section changes from operating within capacity in the Extended Baseline (83%) to exceeding capacity in the HNWR scenario;
 - **Junction 15 (M4 Junction)** – in addition to the westbound M4 mainline through Junction 15 of the M25, which has a V/C of more than 103% in the HNWR, the M4 eastbound off-slip and M4 westbound on-slip also exceed capacity in the HNWR scenario. This is also discussed in the earlier M4 section;
 - **Junction 16** – the southbound on-slip at this junction is forecast to operate above capacity in the Extended Baseline, with a V/C of 101%. Almost 90 additional airport-related PCUs add to the capacity issues at the junction in the HNWR, where the V/C is increased still further to 103%; and
 - **Junction 21A** – the southbound on-slip at this junction is forecast to operate above capacity in the Extended Baseline, with a V/C of 107%. The V/C increases to 108% in the HNWR despite virtually no change in the amount of overall traffic at the junction. The increase in V/C is likely to be caused by increased flows at opposing movements, which reduces the operational capacity of the junction at this particular section.
- 4.3.4 A number of pressure points on the M25 corridor are located on the mainline of the motorway. These are summarised below, with the Extended Baseline V/C and HNWR V/C values provided in brackets:
- **Junction 11 to 12, northbound (+99% in EBL to 101% in HNWR)** –the section experiences an increase of more than 150 airport-related PCUs in the AM peak period;
 - **Through Junction 13, northbound (82% to 86%)** – the section experiences an increase of more than 200 airport-related PCUs in the AM peak period;
 - **Junction 15 to 16, northbound (104% to 106%)** - the section experiences an increase of almost 200 airport-related PCUs in the AM peak period;
 - **Junction 16 to 15, southbound (107% to 110%)** - the section experiences an increase of almost 250 airport-related PCUs in the AM peak period;

- **Through Junction 16, northbound (105% to 106%)** – the section experiences an increase of almost 150 airport-related PCUs in the AM peak period;
- **Junction 16 to 17, northbound (101% to 102%)** – the section experiences an increase of approximately 125 airport-related PCUs in the AM peak period;
- **Junction 17 to 18, northbound (99% to 100%)** – the section experiences an increase of approximately 125 airport-related PCUs in the AM peak period;
- **Through Junction 18, northbound (103% to 104%)** – the section experiences an increase of 120 airport-related PCUs in the AM peak period; and
- **Junction 18 to 19, northbound (103% to 104%)** – the section experiences an increase of 120 airport-related PCUs in the AM peak period.

4.3.5 Modelled traffic flow data for the Extended Baseline and HNWR is presented in **Table 4-6** for the PM peak period. **Figure 4-6** is presented below Table 4-6 and shows the impact of the HNWR in the PM peak period spatially.

Table 4-6: PM V/C with HNWR, M25 Motorway

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
M25 Mainline, J10-J11	Northbound	7,277	371	7.28	7,419	475	7.42			
M25 Mainline, Through J11	Northbound	6,959	280	99.56	6,976	332	99.79			
M25 Mainline, J11-J12	Northbound	8,313	408	98.97	8,429	515	100.35		✓	
M25 Mainline, Through J12	Northbound	5,422	408	77.56	5,554	515	79.45			
M25 Mainline, J12-J13	Northbound	8,635	760	86.35	8,876	937	88.76			
M25 Mainline, Through J13	Northbound	7,503	760	80.50	7,805	937	83.74			
M25 Mainline, J13-J14	Northbound	9,260	875	92.60	9,540	1,074	95.40			
M25 Mainline, Through J14	Northbound	7,765	24	87.09	5,588	0	62.68			
M25 Mainline, Through J14B	Northbound	7,765	24	87.09	5,588	0	62.68			
M25 Mainline, J14B-J15	Northbound	10,893	1,354	90.78	7,550	440	89.89			
M25 Mainline, Through J15	Northbound	7,310	456	104.57	7,551	440	89.89			
M25 Mainline, J15-J16	Northbound	9,990	686	118.93	10,360	825	123.34			✓
M25 Mainline, Through J16	Northbound	8,142	573	123.37	8,368	735	126.78			✓
M25 Mainline, J16-J17	Northbound	9,794	481	116.59	10,043	613	119.56			✓
M25 Mainline, Through J17	Northbound	9,000	464	107.15	9,246	591	110.07			✓
M25 Mainline, J17-J18	Northbound	9,848	464	117.23	10,090	591	120.12			✓
M25 Mainline, Through J18	Northbound	10,507	462	125.09	10,728	588	127.71			✓
M25 Mainline, J18-J19	Northbound	10,776	462	128.28	11,020	588	131.19			✓
M25 Mainline, J19-J20	Northbound	9,189	451	109.40	9,416	574	112.09			✓
M25 Mainline, Through J20	Northbound	8,141	437	116.46	8,359	556	119.59			✓
M25 Mainline, J20-J21	Northbound	9,172	437	109.19	9,419	556	112.13			✓
M25 Mainline, Through J21	Northbound	6,397	296	96.92	6,571	376	99.56			
M25 Mainline, Through J21A	Northbound	5,096	234	80.88	5,240	300	83.18			
M25 Mainline, J21A - J22	Southbound	7,361	234	87.63	7,490	300	89.16			

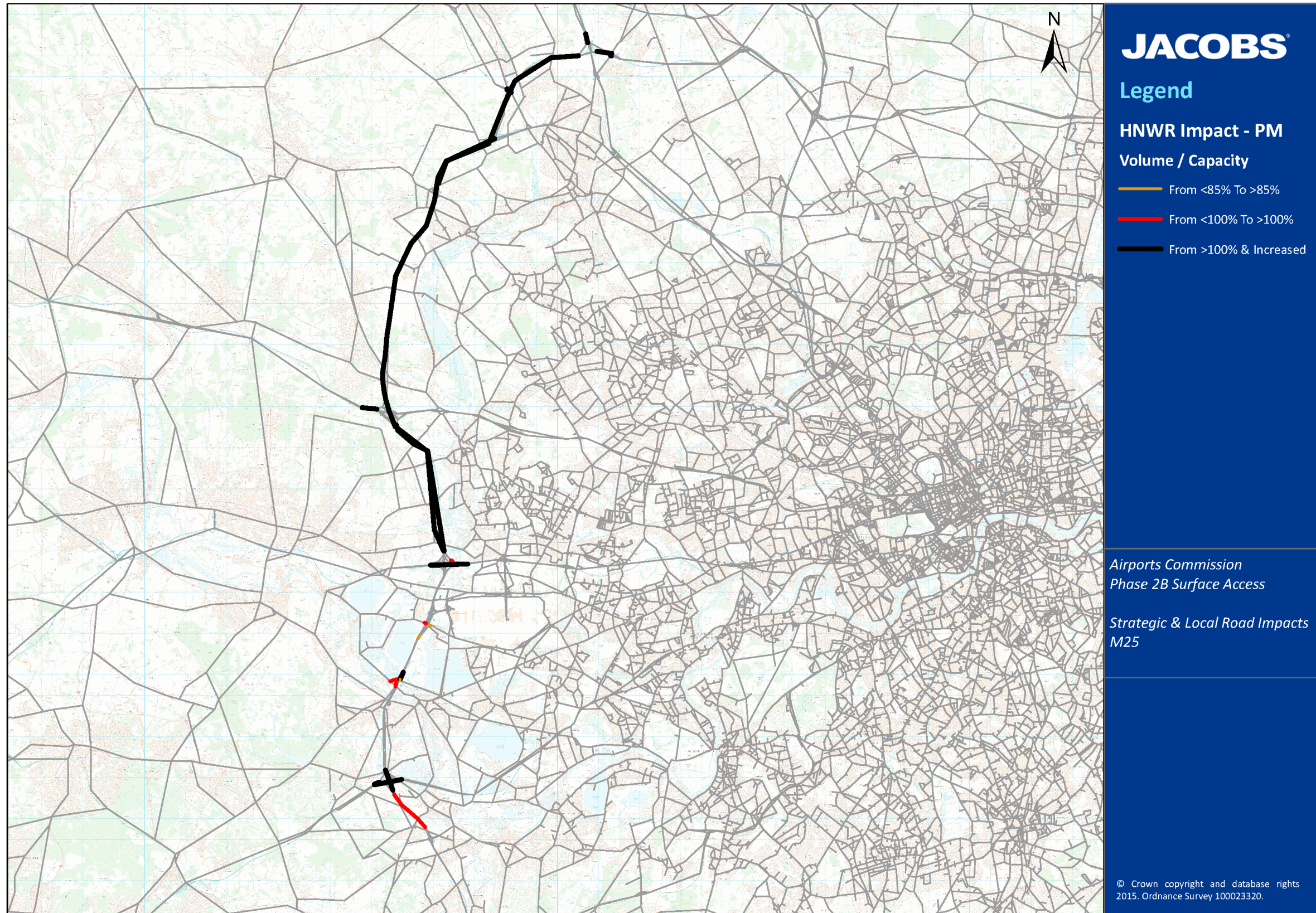
Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
M25 Mainline, J22-J21A	Southbound	6,752	211	80.38	6,808	269	81.05			
M25 Mainline, Through J21A	Southbound	5,210	210	82.70	5,261	267	83.51			
M25 Mainline, J21A-J21	Southbound	4,621	248	70.02	4,668	311	70.73			
M25 Mainline, Through J21	Southbound	4,621	248	70.02	4,668	311	70.73			
M25 Mainline, J21-J20	Southbound	7,004	397	83.38	7,051	497	83.95			
M25 Mainline, Through J20	Southbound	5,922	383	89.73	5,946	478	90.09			
M25 Mainline, J20-J19	Southbound	8,567	479	101.99	8,617	600	102.59			✓
M25 Mainline, Through J18	Southbound	7,428	479	88.43	7,469	600	88.92			
M25 Mainline, J18-J17	Southbound	7,597	480	90.45	7,635	602	90.89			
M25 Mainline, Through J17	Southbound	6,907	480	82.23	6,947	602	82.70			
M25 Mainline, J17_J16	Southbound	7,520	492	89.52	7,560	617	90.00			
M25 Mainline, Through J16	Southbound	6,320	492	95.76	6,359	617	96.34			
M25 Mainline, J16-J15	Southbound	8,659	754	103.09	8,722	930	103.84			✓
M25 Mainline, Through J15	Southbound	6,221	435	88.99	6,464	536	76.96			
M25 Mainline, J15_J14B	Southbound	6,221	435	88.99	6,464	536	76.96			
M25 Mainline, Through J14B	Southbound	6,719	142	75.35	5,000	0	56.08			
M25 Mainline, Through J14	Southbound	6,719	142	75.35	5,000	0	56.08			
M25 Mainline, J14_J13	Southbound	8,472	991	84.72	8,380	1,280	83.80			
M25 Mainline, Through J13	Southbound	7,037	665	105.23	6,996	907	104.63			
M25 Mainline, J13_J12	Southbound	9,256	698	92.56	9,236	956	92.36			
M25 Mainline, Through J12	Southbound	7,042	494	106.69	7,076	642	107.21			✓
M25 Mainline, J12_J11	Northbound	9,274	494	110.91	9,179	642	109.87			
M25 Mainline, Through J11	Northbound	7,759	455	172.43	7,688	594	170.85			
M25 Mainline, J11-J10	Northbound	8,447	427	8.45	8,585	558	8.59			
M25 Off Slip, J11	Northbound	2,141	135	2.14	2,247	196	2.25			

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
M25 On Slip, J11	Northbound	1,354	128	38.25	1,454	183	41.07			
M25 Off Slip, J12	Northbound	2,892	0	81.68	2,876	0	81.23			
M25 On Slip, J12	Northbound	3,214	352	90.78	3,323	422	93.86			
M25 Off Slip, J13	Northbound	1,132	0	26.64	1,071	0	25.21			
M25 On Slip, J13	Northbound	1,757	115	49.63	1,735	137	49.02			
M25 Off Slip, J14	Northbound	1,495	851	32.08	3,952	1,074	47.05			
M25 On Slip, J14B	Northbound	3,128	1,330	67.13	1,962	440	84.22			
M25 On Slip, J15	Northbound	2,195	230	62.01	2,199	385	62.11			
M25 Off Slip, J16	Northbound	1,847	113	52.18	1,993	90	56.30			
M25 Off Slip, J16	Northbound	414	92	20.01	438	121	21.16			
M25 On Slip, J16	Northbound	2,065	0	58.33	2,114	0	59.71			
M25 Off Slip, J17	Northbound	793	17	67.06	797	23	67.17			
M25 On Slip, J17	Northbound	847	0	40.93	844	0	40.76			
M25 Off Slip, J18	Northbound	490	2	76.65	516	3	80.60			
M25 On Slip, J20	Southbound	1,048	14	94.51	1,056	18	95.22			
M25 Off Slip, J20	Southbound	1,031	0	23.13	1,060	0	23.78			
M25 On Slip, J21	Southbound	2,775	141	78.39	2,848	180	80.46			
M25 Off Slip, J21	Southbound	766	0	21.64	739	0	20.87			
M25 On Slip, J21A	Southbound	1,301	62	103.77	1,331	76	106.95			✓
M25 Off Slip, J21A	Southbound	1,499	0	42.34	1,510	0	42.67			
M25 Off Slip, J21A	Southbound	1,542	1	84.57	1,547	2	84.70			
M25 Off Slip, J21A	Southbound	1,296	0	36.61	1,294	0	36.54			
M25 On Slip, J21A	Southbound	707	38	19.97	701	44	19.80			
M25 On Slip, J21	Southbound	2,382	148	53.44	2,383	186	53.46			
M25 Off Slip, J20	Southbound	1,081	14	67.43	1,105	19	66.37			

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
M25 Off Slip, J20	Southbound	1,568	27	104.02	1,570	36	104.13			✓
M25 On Slip, J20	Southbound	1,166	27	32.94	1,168	36	33.01			
M25 Off Slip, J18	Southbound	1,139	0	92.86	1,148	0	93.62			
M25 On Slip, J18	Southbound	169	2	8.17	166	2	8.00			
M25 Off Slip, J17	Southbound	690	0	74.80	688	0	74.25			
M25 On Slip, J17	Southbound	613	12	29.60	613	16	29.61			
M25 Off Slip, J16	Southbound	1,200	0	57.97	1,201	0	58.03			
M25 Off Slip, J16	Southbound	1,337	0	64.57	1,317	0	63.61			
M25 On Slip, J16	Southbound	3,676	262	103.84	3,680	313	103.97			✓
M25 Off Slip, J15	Southbound	2,438	319	68.88	2,258	394	63.77			
M25 Off Slip, J14	Southbound	35	39	1.49	1,384	635	59.39			
M25 Off Slip, J14	Southbound	1,718	810	73.75	1,996	645	85.67	✓		
M25 Off Slip, J13	Southbound	1,435	326	103.42	1,384	373	105.65			✓
M25 On Slip, J13	-	1,930	33	54.51	2,020	50	57.07			
M25 Off Slip, J12	-	2,214	204	62.56	2,161	314	61.04			
M25 On Slip, J12	-	2,233	0	63.07	2,103	0	59.42			
M25 Off Slip, J11	-	1,515	39	32.51	1,491	48	31.99			
M25 On Slip, J11	-	2,942	16	2.94	3,100	17	3.10			
M25 J14A - Western Terminal Intersection , M25 J14A - Western Perimeter Road	-	1,694	1,327	72.70	1,492	1,286	62.18			
M25 J1 5 - M4B Intersection , London Orbital Motorway - M4 Junction	-	3,375	905	95.33	3,626	1,070	102.42		✓	
M25 J14 - Airport Way Intersection , M25 J14 - Airport Way	-	1,291	22	96.85	1,506	53	100.41		✓	
M25 J14 - M25 J14A Intersection , M25 J14 - M25 J14A	-	891	680	38.23	2,132	475	30.50			
M25 J13 - A30 Intersection , M25 J13 - Staines By-Pass	-	1,095	17	90.32	1,262	0	102.39		✓	
M25 J16 - M40 J1A Intersection , London Orbital Motorway - M40 Junction	-	3,588	190	101.35	3,626	235	102.43			✓

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
M25 J21 - M1 J 6a Intersection , London Orbital Motorway - M1 J6A Junction	-	4,071	141	115.00	4,142	180	117.00			✓
M25 J21A - N Orbital Rd Intersection , M25 J21A - N Orbital Rd	-	3,551	62	102.92	3,592	76	104.11			✓
M25 J20 - A41 Intersection , London Orbital Motorway - Watford Rd Junction	-	1,658	0	111.96	1,669	0	112.71			✓
M25 J18 - Chorleywood Road Intersection , M25 J18 - Chorleywood Road Junction	-	1,525	0	96.86	1,524	0	97.16			
M25 J17 - A405 Intersection , London Orbital Road - A409 Junction	-	1,243	12	57.66	1,236	15	57.32			
M25 J12 - M3 J2 intersection , M25 J12 - M3 J2	-	2,490	0	106.85	2,493	0	107.01			✓
M25 J11 - A320 Intersection , London Orbital Motorway - St Peter's Way	-	2,279	18	2.28	2,381	22	2.38			
M25 Off Slip - HNWR ONLY, J14B	Southbound	-	-	-	1,464	536	62.85			
M25 Off Slip - HNWR ONLY, J14B	Southbound	-	-	-	0	0	0.00			
M25 J14A - Western Terminal Intersection - HNWR ONLY, M25 J14A - Western Perimeter Road	-	-	-	-	1,492	1,286	34.71			
M25 J14 - A3113 Intersection - HNWR ONLY, M25 J14 - Airport Way Junction	-	-	-	-	1,114	1,061	47.80			
M25 J14 - A3113 Intersection , M25 J14 - Airport Way Junction - HNWR ONLY	-	-	-	-	3,380	1,280	78.60			
M25 J14 - J14a Intersection , M25 J14 - J14a - HNWR ONLY	-	-	-	-	105	104	7.63			
M25 J15/J14a - Airport Way Intersection , M25 J15/J14a - Airport Way New Junction - HNWR ONLY	-	-	-	-	3,094	1,497	71.96			
M25 J15 - M25 J14a Collector/Distributor - HNWR ONLY	-	-	-	-	4,140	1,083	96.27			

Figure 4-6: PM V/C Impact of HNWR, M25 Motorway



- 4.3.6 The junctions forecast to go over capacity in the PM peak period are largely consistent with those identified in the AM peak period. In addition, Figure 4-6 shows that in the PM peak period the M25 is predicted to experience capacity problems in many of the same mainline locations as the AM peak period. The M25 from Heathrow Airport to the north is expected to be particularly adversely affected.
- 4.3.7 In addition to the sections highlighted in the AM peak period analysis, the following sections have been identified as operating above capacity in the PM peak:
- **Through Junction 12, southbound (107% to >107%)** – the section experiences an increase of approximately 150 airport-related PCUs in the PM peak period;
 - **Through Junction 17, northbound (107% to 110%)** – the section experiences an increase of approximately 125 airport-related PCUs in the PM peak period;
 - **Junction 19 to Junction 20, northbound (109% to 112%)** – the section experiences an increase of approximately 125 airport-related PCUs in the PM peak period;
 - **Junction 20 to Junction 19, southbound (102% to 103%)** – the section experiences an increase of approximately 120 airport-related PCUs in the PM peak period;
 - **Through Junction 20, northbound (107% to 110%)** – the section experiences an increase of approximately 120 airport-related PCUs in the PM peak period; and
 - **Junction 20 to Junction 21, northbound (109% to 112%)** – the section experiences an increase of approximately 120 airport-related PCUs in the PM peak period.
- 4.3.8 The pre-consultation analysis of the M25 concluded that although many sections of the M25 between junctions 7 and 16 were approaching capacity by 2030, the actual flows on these sections were similar to those from the airport in 2012. It was therefore concluded that there was no compelling case for Heathrow Airport to be responsible for improvements to the network in these areas. The analysis presented above differs from the analysis undertaken before the public consultation in that it makes use of the AC's latest "Carbon-Traded Global Growth" demand projections as well as a detailed, dynamic highway model - rather than a static spreadsheet-based model. This model suggests that many of the sections of the M25 are likely to operate above capacity by 2030 even without a third runway at Heathrow, and are likely to be further impacted by additional airport traffic should it go ahead.
- 4.3.9 The traffic model predicts that the mainline M25 will typically be required to carry between 100 and 250 additional airport PCUs (by direction in a peak period) as a result of the HNWR; including along sections that are already operating close to or over capacity.

4.4 M40

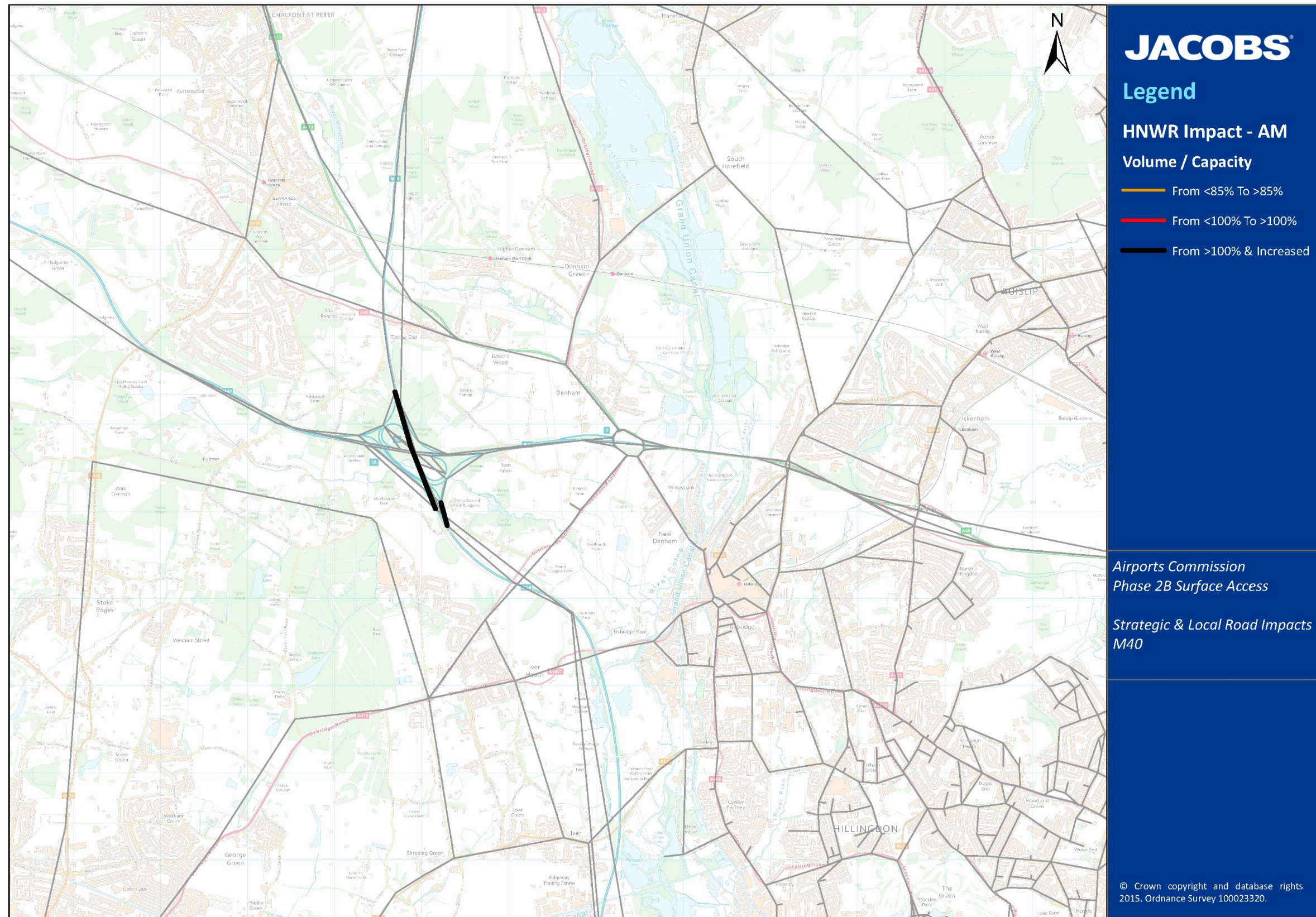
- 4.4.1 The M40 lies to the north of Heathrow Airport. It commences at its junction with the A40 to the north of the town of Uxbridge, and extends in a north westerly direction until it connects with the M42 to the south of Birmingham. It intersects the M25 at Junction 16.
- 4.4.2 Only a small part of the M40 has been modelled within the detailed simulation area of the traffic model. The remainder of the motorway is located outside the simulation area, and has therefore not been included in this assessment. However, the impact of any additional demand for Heathrow Airport is likely to be most significant between junctions 1 and 1A of the M40, next to where the motorway intersects the M25. This part of the motorway is included within the model simulation area and is documented within this assessment.
- 4.4.3 Modelled traffic flow data for the M40 in the Extended Baseline and HNWR scenarios is presented in **Table 4-7** for the AM peak period. **Figure 4-7** is presented below Table 4-7 and shows the impact of the HNWR in the AM peak period spatially.

- 4.4.4 Further figures showing the V/C of *all* links (and not just those exceeding a threshold in the HNWR scenario) along the M40 corridor in both the Extended Baseline and HNWR are provided in Appendix A.

Table 4-7: AM V/C with HNWR, M40 Motorway

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
M40 Mainline, Park Rd/ Western Av Roundabout - J1	Westbound	5,066	61	90.46	5,058	68	90.31			
M40 Mainline, Through J1	Westbound	3,799	120	83.50	3,817	126	83.89			
M40 Mainline, J1-J1A	Westbound	5,920	129	84.69	5,905	136	84.48			
M40 Mainline, Through J1A	Westbound	6,719	218	72.10	6,755	265	72.48			
M40 Mainline, Through J1A	Eastbound	4,149	65	59.36	4,174	76	59.72			
M40 Mainline, J1A-J1	Eastbound	5,300	65	86.04	5,300	76	86.04			
M40 Mainline, Through J1	Eastbound	3,812	61	54.53	3,808	68	54.47			
M40 Off Slip, J1	Westbound	1,663	0	100.81	1,659	0	100.53			
M40 On Slip, J1	Westbound	2,121	9	99.80	2,088	10	98.27			
M40 Off Slip, J1A	Westbound	1,839	129	51.94	1,824	136	51.52			
M40 On Slip, J1A	Westbound	1,829	218	51.66	1,891	265	53.41			
M40 Off Slip, J1A	Eastbound	3,332	298	94.12	3,506	378	99.05			
M40 On Slip, J1A	Eastbound	1,151	0	32.51	1,126	0	31.80			
M40 Off Slip, J1	Eastbound	1,585	5	74.61	1,590	8	74.81			
M40 On Slip, J1	Eastbound	1,254	0	27.87	1,250	0	27.78			
M40/A413 Intersection , J1	-	2,161	0	98.41	2,162	0	98.47			
M40/M25, J1A/J16	-	6,922	551	104.88	6,990	688	105.91			✓
M40 Mainline, Park Rd/ Western Av Roundabout - J1	Eastbound	5,462	120	97.54	5,475	126	97.78			

Figure 4-7: AM V/C Impact of HNWR, M40 Motorway

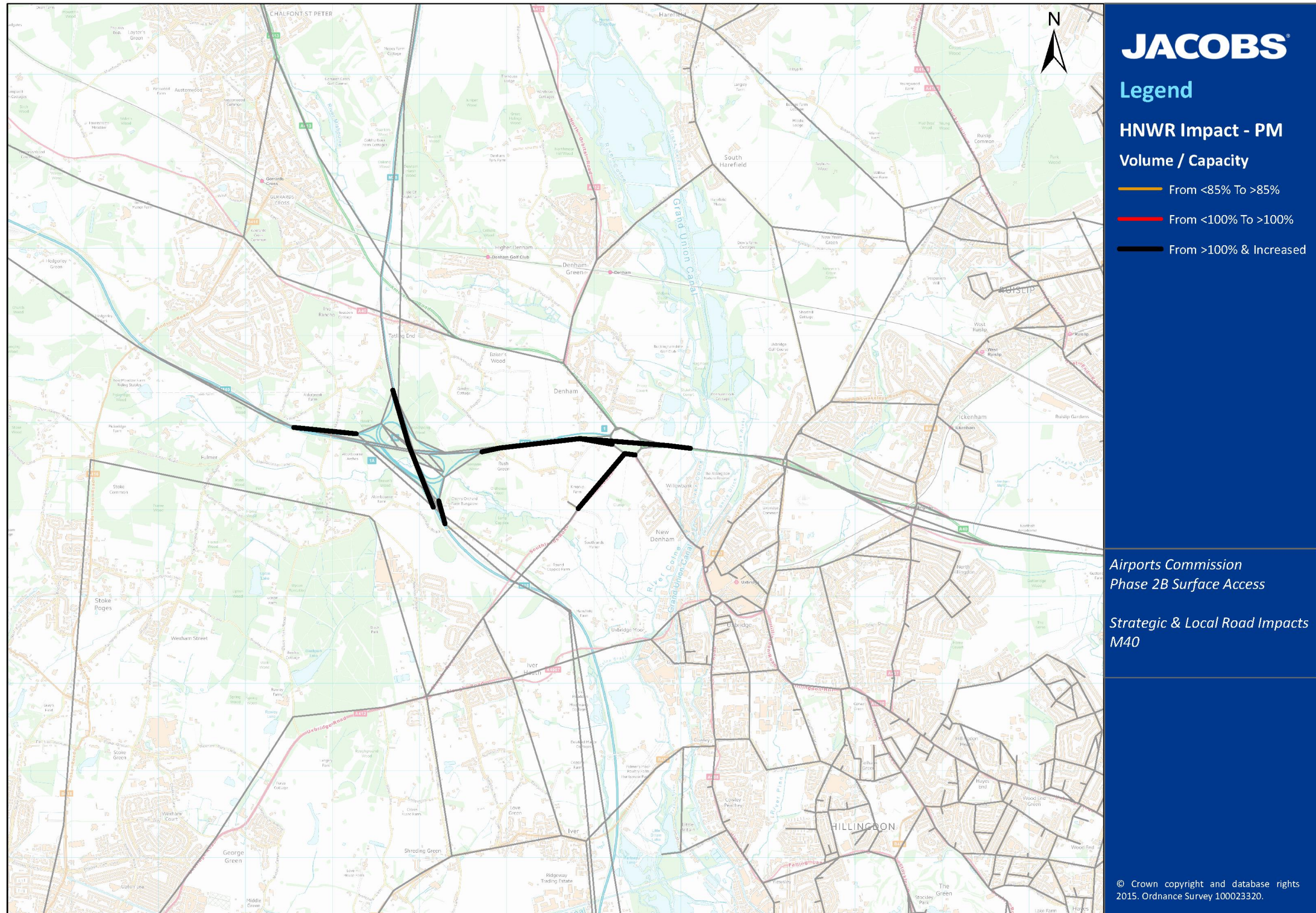


- 4.4.5 The M40 / M25 intersection at Junction 1A of the M40 and Junction 16 of the M25 is the only section that is flagged in Table 4-7 as likely to be over capacity in the Extended Baseline and to further exceed its capacity in the HNWR. The particular roads within this section are on the M25 mainline and the southbound on-slip of the M25. The links have been included only as part of the analysis of the entire intersection of the M40 and M25. It is discussed further in the section of this report which covers the M25.
- 4.4.6 No other sections on the M40 corridor have been flagged in Table 4-7. In the AM peak period it is notable that the M40 westbound off-slip at Junction 1 operates above capacity in both the Extended Baseline and HNWR scenarios, but this is not directly related to the HNWR traffic. The section carries zero airport traffic and overall flow decreases in the HNWR scenario.
- 4.4.7 On the M40 eastbound off-slip at Junction 1A, the V/C increases in the HWNR scenario to 99% from 94% in the Extended Baseline. Since the V/C remains below 100%, it is not highlighted in the impact columns of Table 4-7 or within Figure 4-7. However, the HNWR scenario is forecast to lead to an increase of 80 airport PCUs on the slip road in the AM peak, which is likely to add further stress to the slip road as it approaches its operational capacity.
- 4.4.8 Modelled traffic flow data for the Extended Baseline and HNWR is presented in **Table 4-8** for the PM peak period. **Figure 4-8** is presented below Table 4-8 and shows the impact of the HNWR in the PM peak period spatially.

Table 4-8: PM V/C with HNWR, M40 Motorway

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
M40 Mainline, Park Rd/ Western Av Roundabout - J1	Westbound	5,301	79	94.67	5,360	106	95.72			
M40 Mainline, Through J1	Westbound	4,712	63	103.55	4,747	67	104.33			✓
M40 Mainline, J1-J1A	Westbound	6,994	72	100.06	7,025	77	100.50			✓
M40 Mainline, Through J1A	Westbound	6,286	0	89.93	6,275	0	89.78			
M40 Mainline, Through J1A	Eastbound	4,087	92	58.47	4,139	122	59.22			
M40 Mainline, J1A-J1	Eastbound	5,287	92	85.83	5,340	122	86.70			
M40 Mainline, Through J1	Eastbound	3,817	79	54.61	3,869	106	55.35			
M40 Off Slip, J1	Westbound	1,424	0	86.33	1,437	0	87.12			
M40 On Slip, J1	Westbound	2,254	8	106.09	2,262	10	106.47			✓
M40 Off Slip, J1A	Westbound	2,045	72	57.75	2,067	77	58.38			
M40 On Slip, J1A	Westbound	1,847	113	52.18	1,993	90	56.30			
M40 Off Slip, J1A	Eastbound	3,588	190	101.35	3,626	235	102.43			✓
M40 On Slip, J1A	Eastbound	1,200	0	33.90	1,201	0	33.93			
M40 Off Slip, J1	Eastbound	1,545	13	72.68	1,549	15	72.91			
M40 On Slip, J1	Eastbound	1,484	0	32.99	1,491	0	33.13			
M40/A413 Intersection , J1	-	1,252	1	111.89	1,261	1	113.04			✓
M40/M25, J1A/J16	-	8,142	573	123.37	8,368	735	126.78			✓
M40 Mainline, Park Rd/ Western Av Roundabout - J1	Eastbound	6,136	63	109.57	6,185	67	110.44			✓

Figure 4-8: PM V/C Impact of HNWR, M40 Motorway



- 4.4.9 In the PM peak period, the westbound M40 mainline through Junction 1 and between junction 1 and 1A exceed capacity in both the Extended Baseline and HNWR scenarios. This is also the case on the M40 westbound on-slip at Junction 1 and the eastbound off-slip at Junction 1A. However, in each case the forecast increase in traffic and the forecast increase in airport-related traffic as a result of the HNWR are low. The level of airport traffic on these sections of the M40 are typically less than 5% and it is suggested that the motorway and its associated slip roads will require some form of intervention in the future regardless of the whether the HNWR goes ahead.
- 4.4.10 The pre-consultation analysis noted that expansion at Heathrow would increase the V/C on the M40 between junctions 1A and 2 from the low to mid 90s. The dynamic modelling assessment listed above does not explicitly cover between these junctions since they are located outside the simulated traffic area. The M40 eastbound off-slip at Junction 1A does however offer some insight to the likely impact on the operation of the M40 to the west of its junction with the M25. In both the AM and PM peak periods there is an increase in airport-related traffic on the slip road. In the AM the V/C on the slip road increases to 99% with HNWR from 94% in the Extended Baseline. In the PM the slip road is already over capacity in the Extended Baseline and rises to 102% with the HNWR. It is therefore quite feasible that these additional trips that diverge at this slip road will also have an impact on the mainline between Junction 2 and Junction 1A.

4.5 A4

- 4.5.1 The A4 is an east-west corridor connecting central London with the West of England. From its most easterly point in central London, the A4 moves westbound towards Chiswick Roundabout where it meets the M4, running beneath the motorway until their alignments separate at Brentford. The A4 continues westbound where it passes along the northern edge of Heathrow Airport and once again meets the M4 at Junction 5 after crossing the M25 on a section known as the Colnbrook Bypass. The A4 then passes through Slough, where it leaves the simulation area of the traffic model.
- 4.5.2 As part of the HNWR scenario, the Colnbrook Bypass section of the A4 is to be removed and replaced by a new section of the A4 which will connect Junction 5 of the M4 with local roads in the Colnbrook and Poyle areas and provide access to Junction 4 of the M4 and M4 Spur.
- 4.5.3 Modelled traffic flow data along the A4 corridor for the Extended Baseline and HNWR is presented in **Table 4-9** for the AM peak period. **Figure 4-9** is presented below Table 4-9 and shows the impact of the HNWR in the AM peak period spatially.
- 4.5.4 Further figures showing the V/C of *all* links (and not just those exceeding a threshold in the HNWR scenario) along the A4 corridor in both the Extended Baseline and HNWR are provided in Appendix A.

Table 4-9: AM V/C with HNWR, A4

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
A4 Mainline, A4/Langley Rd Junction -J5 M4	Eastbound	2,133	84	2.13	2,192	123	2.19			
A4 Mainline, J5 M4 - Colnbrook By-Pass/ A3044 Junction - Brands Rd/London Road Junction	Eastbound	1,854	181	104.76	1,812	2	102.40			
A4 Mainline, Through Brands Rd/London Road Junction	Eastbound	2,145	223	29.38	2,068	40	44.60			
A4 Mainline, M4 J4a - New lane/ A4 Junction	Eastbound	860	217	29.25	759	236	25.80			
A4 Mainline, New lane/ A4 Junction -A437/A4 Junction	Eastbound	660	212	64.71	590	229	57.85			
A4 Mainline, A437/A4 Junction - The Avenue/A4 Junction	Eastbound	922	203	64.41	895	227	62.55			
A4 Mainline, The Avenue/A4 Junction - The Great West Rd/A3006 Roundabout	Eastbound	890	165	103.18	858	152	100.34			
A4 Mainline, Through The Great West Rd/A3006 Roundabout	Eastbound	1,084	115	82.19	1,121	117	82.96			
A4 Mainline, The Great West Rd/A3006 Roundabout - A4/Jersey Road Junction	Eastbound	1,872	85	105.25	1,857	100	104.40			
A4 Mainline, A4/Jersey Road Junction - Spur Rd/A4 Junction	Eastbound	1,871	78	108.22	1,861	91	107.66			
A4 Mainline, Spur Rd/A4 Junction - M4/Riverbank Way Roundabout	Eastbound	1,269	7	55.64	1,249	8	55.85			
A4 Mainline, Through Riverbank Way Roundabout	Eastbound	1,688	2	60.57	1,654	1	59.38			
A4 Mainline, Riverbank Way Roundabout - M4/ Great West Road Merge	Eastbound	868	0	31.67	824	0	30.06			
A4 Mainline, Through M4/ Great West Road Merge	Eastbound	834	86	44.52	861	109	45.98			
A4 Mainline, M4/ Great West Road Merge - Chiswick High Rd/A4 Roundabout	Eastbound	540	50	104.08	544	61	104.86			✓
A4 Mainline, Through Chiswick High Rd/A4 Roundabout	Eastbound	1,555	56	61.63	1,545	71	61.24			
A4 Mainline, Chiswick High Rd/A4 Roundabout - Hogarth Ln/Burlington Ln Roundabout	Eastbound	3,311	778	95.89	3,317	936	96.09			
A4 Mainline, Through Hogarth Ln/Burlington Ln Roundabout	Eastbound	4,263	838	84.95	4,298	1,018	85.69	✓		
A4 Mainline, Hogarth Ln/Burlington Ln Roundabout - Hammersmith Flyover	Eastbound	4,669	752	106.12	4,703	907	106.89			✓

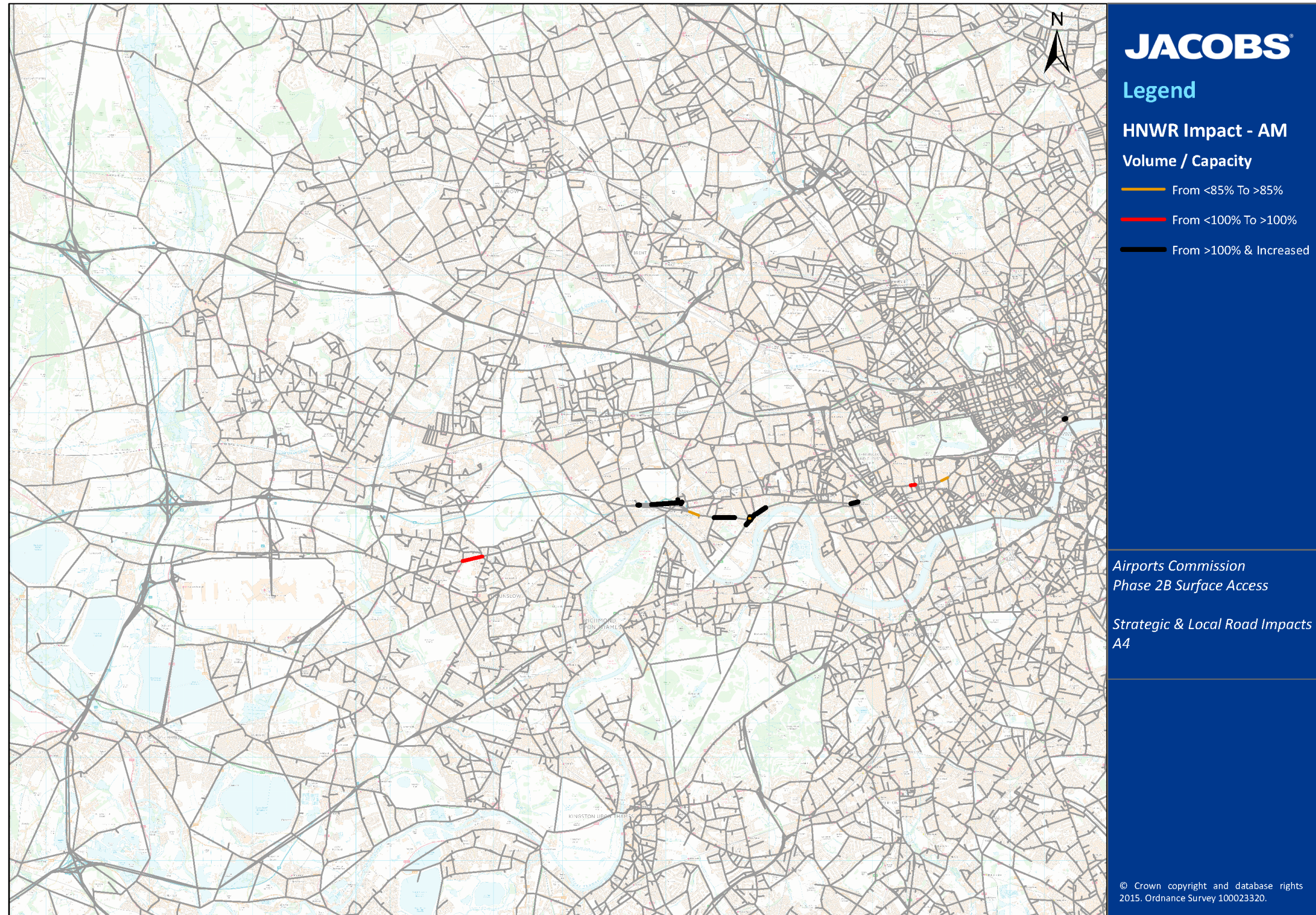
Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
A4 Mainline, Hammersmith Flyover	Eastbound	2,867	517	71.67	2,912	615	72.80			
A4 Mainline, Hammersmith Flyover - A4/Warwick Road Junction	Eastbound	3,007	510	108.53	3,031	606	109.40			✓
A4 Mainline, A4/Warwick Road Junction - Earl's Court Rd/A4 Junction	Eastbound	2,747	484	85.56	2,783	574	86.69			
A4 Mainline, Earl's Court Rd/A4 Junction - Queen's Gate/A4 Junction	Eastbound	1,956	214	98.62	1,985	256	100.11		✓	
A4 Mainline, Queen's Gate/A4 Junction - Thurloe Pl/A4 Junction	Eastbound	1,341	163	64.95	1,364	196	66.02			
A4 Mainline, Thurloe Pl/A4 - Sloane Street/A4 Junction	Eastbound	1,566	163	83.91	1,589	196	85.11	✓		
A4 Mainline, Sloane Street/A4 Junction - Apsley Way Arch Roundabout	Eastbound	1,099	130	57.65	1,109	154	58.16			
A4 Mainline, Over Apsley Way Arch Roundabout	Eastbound	585	64	29.24	591	74	29.56			
A4 Mainline, Apsley Way Arch Roundabout - Albemarle St/ A4 Junction	Eastbound	1,358	58	74.88	1,366	67	75.28			
A4 Mainline, Albemarle St/ A4 Junction - Piccadilly Circus/ Regent St	Eastbound	516	19	65.55	520	21	66.01			
A4 Mainline, Albemarle St/ A4 Junction - The Mall/A4 Roundabout	Eastbound	384	28	47.58	386	32	47.75			
A4 Mainline, Through The Mall/A4 Roundabout	Eastbound	1,141	20	20.74	1,143	24	20.78			
A4 Mainline, The Mall/A4 Roundabout - Chancery Lane/A4 Junction	Eastbound	789	21	101.38	790	25	101.59			✓
A4 Mainline, Chancery Lane/A4 Junction - St Andrews St/A4 Junction	Eastbound	865	11	78.45	866	12	78.48			
A4 Mainline, St Andrews St/A4 Junction - Chancery Lane/A4 Junction	Westbound	883	33	53.72	887	39	53.93			
A4 Mainline, Chancery Lane/A4 Junction - The Mall/A4 Roundabout	Westbound	376	10	95.57	377	12	95.75			
A4 Mainline, Through The Mall/A4 Roundabout	Westbound	1,255	54	62.45	1,262	64	62.81			
A4 Mainline, The Mall/A4 Roundabout - Albemarle St/ A4 Junction	Westbound	1,021	74	68.23	1,024	91	68.42			
A4 Mainline, Piccadilly Circus/ Regent St - Albemarle St/ A4 Junction	Westbound	185	7	21.08	194	9	22.11			
A4 Mainline, Albemarle St/ A4 Junction - Apsley Way Arch Roundabout	Westbound	1,369	94	68.46	1,382	109	69.11			
A4 Mainline, Over Apsley Way Arch Roundabout	Westbound	878	94	43.91	888	109	44.41			
A4 Mainline, Apsley Way Arch Roundabout - Sloane Street/A4 Junction	Westbound	1,261	195	90.38	1,267	230	90.82			
A4 Mainline, Through Sloane Street/A4 Junction	Westbound	1,556	197	41.44	1,573	232	41.89			
A4 Mainline, Sloane Street/A4 Junction - Thurloe Pl/A4	Westbound	1,619	211	83.12	1,631	249	83.69			
A4 Mainline, Thurloe Pl/A4 - Queen's Gate	Westbound	1,330	317	79.72	1,344	375	80.58			

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
A4 Mainline, Queen's Gate/A4 Junction - Earl's Court Rd/A4 Junction	Westbound	1,611	392	93.76	1,630	468	95.00			
A4 Mainline, Earl's Court Rd/A4 Junction - A4/Warwick Road Junction	Westbound	1,922	535	53.17	1,982	638	54.84			
A4 Mainline, A4/Warwick Road Junction - Hammersmith Flyover	Westbound	2,771	709	96.30	2,834	852	98.46			
A4 Mainline, Hammersmith Flyover	Westbound	2,832	738	70.80	2,906	891	72.65			
A4 Mainline, Hammersmith Flyover - Hogarth Ln/Burlington Ln Roundabout	Westbound	3,838	847	87.22	3,890	1,031	88.40			
A4 Mainline, Through Hogarth Ln/Burlington Ln Roundabout	Westbound	3,838	847	101.95	3,890	1,031	103.33			✓
A4 Mainline, Hogarth Ln/Burlington Ln Roundabout - Chiswick High Rd/A4 Roundabout	Westbound	3,235	913	102.74	3,325	1,119	105.60			✓
A4 Mainline, Through Chiswick High Rd/A4 Roundabout	Westbound	279	0	104.22	278	0	104.03			
A4 Mainline, Chiswick High Rd/A4 Roundabout - M4/ Great West Road Merge	Westbound	763	25	59.97	769	39	60.44			
A4 Mainline, Through M4/ Great West Road Merge	Westbound	953	43	64.83	1,030	72	70.09			
A4 Mainline, M4/ Great West Road Merge - M4/Riverbank Way Roundabout	Westbound	1,292	67	102.38	1,311	72	104.23			✓
A4 Mainline, Through M4/Riverbank Way Roundabout	Westbound	1,314	67	72.65	1,334	72	73.77			
A4 Mainline, M4/Riverbank Way Roundabout - Spur Rd/A4 Junction	Westbound	2,089	126	85.82	2,135	144	87.69			
A4 Mainline, Spur Rd/A4 Junction - Jersey Ln/A4 Junction	Westbound	1,536	173	93.04	1,549	201	93.86			
A4 Mainline, A4/Jersey Road Junction - The Great West Rd/A3006 Roundabout	Westbound	1,516	220	99.78	1,561	270	102.72		✓	
A4 Mainline, Through The Great West Rd/A3006 Roundabout	Westbound	2,771	259	83.52	2,775	252	83.65			
A4 Mainline, The Great West Rd/A3006 Roundabout - High St/A4 Junction	Westbound	1,298	201	108.70	1,360	171	105.77			
A4 Mainline, High St/A4 Junction - A437/A4 Junction	Westbound	915	341	76.73	894	284	74.97			
A4 Mainline, A437/A4 Junction - M4 J4a	Westbound	1,176	418	72.17	1,048	514	62.36			
A4 Mainline, Through Sutton Ln/New A4 Junction	Westbound	0	0	0.00	0	0	0.00			
A4 Mainline, Sutton Ln/ New A4 Junction - M4 J5	Westbound	1,359	75	76.79	1,237	0	69.90			

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
A4 Mainline, J5 M4 - A4/Langley Rd Junction	Westbound	0	0	0.00	0	0	0.00			
A4 Off Slip, M4/ Great West Road Merge	Eastbound	758	0	51.90	718	0	49.16			
A4 On Slip, M4/ Great West Road Merge	Westbound	339	24	29.27	280	0	24.20			
A4 Off Slip, A4/Apsley Way Roundabout	Eastbound	407	66	24.69	411	80	24.89			
A4 On Slip, A4/Apsley Way Roundabout	Eastbound	628	0	31.41	627	0	31.36			
A4 Off Slip, A4/Apsley Way Roundabout	Westbound	83	0	4.15	84	0	4.20			
A4 On Slip, A4/Apsley Way Roundabout	Westbound	408	11	20.39	400	12	19.99			
A4 Off Slip, A4/Apsley Way Roundabout	Eastbound	972	64	38.10	967	88	37.88			
A4 On Slip, A4/Apsley Way Roundabout	Westbound	820	103	40.99	799	133	39.93			
A4/A302/ B310 Intersection , Knightsbridge/Piccadilly Roundabout	-	2,265	0	95.07	2,273	0	95.41			
A4/Strand/Aldwych Access Roads, A4/Strand/Aldwych Access Roads	-	856	36	97.88	859	43	98.11			
Hammersmith Flyover Intersection , A4/Hammersmith Bridge Rd Intersection	-	676	95	66.28	669	125	65.54			
Henlys Roundabout/A4 Intersection, A4/Burns Way/ Great South-West Rd	-	236	8	108.97	228	11	106.58			
A4/Church Street/Burlington Ln, Great West Rd Chiswick Roundabout Intersection , A4/Church Street Roundabout Intersection Roundabout	-	1,261	0	104.24	1,264	0	104.49			✓
A4/Chiswick Roundabout Intersection , A4/ Gunnersbury Ave/ Chiswick High Rd Roundabout	-	1,124	18	107.09	1,127	27	107.37			✓
A4/Ealing Roundabout Intersection, A4/Ealing Roundabout	-	653	30	26.64	667	33	27.21			
A4/London Road Intersection , Colnbrook By-Pass/ London Rd Junctions	-	1,849	78	56.04	1,411	2	42.77			
M4/ Great West Road Merge Intersection , M4/ Great West Road Merge Intersection	-	758	0	37.89	718	0	35.88			
A4 Mainline, Brands Rd/London Road Junction - Harmondsworth Rd/ New A4 Junction - HNWR ONLY	Eastbound	-	-	-	1,544	40	65.91			
A4 Mainline, Harmondsworth Rd/ New A4 Junction - Sipsons Rd/ New A4 Junction - HNWR ONLY	Eastbound	-	-	-	969	158	46.41			
A4 Mainline, Sipsons Rd/ New A4 Junction - M4 J4a - HNWR ONLY	Eastbound	-	-	-	946	168	23.21			

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
A4 Mainline, Through M4 J4a - HNWR ONLY	Eastbound	-	-	-	470	184	90.90			
A4 Mainline, Through M4 J4a - HNWR ONLY	Westbound	-	-	-	679	99	18.60			
A4 Mainline, M4 J4a - Sipsons Rd/ New A4 Junction - HNWR ONLY	Westbound	-	-	-	547	94	34.96			
A4 Mainline, Sipsons Rd/ New A4 Junction - Harmondsworth Rd/ New A4 Junction -HNWR ONLY	Westbound	-	-	-	1,146	93	37.90			
A4 Mainline, Harmondsworth Rd/ New A4 Junction - Sutton Ln/New A4 Junction - HNWR ONLY	Westbound	-	-	-	1,287	68	77.25			
M4 J4a/A4 Intersection, Bath Rd/Tunnel Rd E Junction -HNWR ONLY	-	-	-	-	630	133	86.90	✓		
McArdle Way / A4 Junction Intersection , McArdle Way / A4 Junction - HNWR ONLY	-	-	-	-	857	71	61.23			

Figure 4-9: AM V/C Impact of HNWR, A4



- 4.5.5 A number of sections either nearby or at Chiswick Roundabout are forecast to operate above capacity in the Extended Baseline and still further above capacity in the HNWR scenario. These include the A4 mainline eastbound and the A406 Gunnersbury Avenue approaching Chiswick Roundabout, however both of these sections are forecast to experience relatively minor changes in traffic as a result of the HNWR.
- 4.5.6 One of the sections of the A4 that is predicted to experience the most significant increases in airport-related traffic is the westbound A4 mainline between Burlington Lane Roundabout and the Chiswick Roundabout. The HNWR scenario adds more than 200 PCUs in the AM peak period to this section, contributing to a V/C of 106% compared to 103% in the Extended Baseline. Indeed, the proportion of airport-related traffic at this location increases from 28% in the Extended Baseline to 34% with the introduction of the HNWR. Similarly, 22% of the traffic carried on the A4 mainline through the Burlington Roundabout in the Extended Baseline is airport traffic. This is forecast to increase to 27% in the HNWR following an increase of almost 200 airport PCUs in the AM peak period, resulting in a V/C of more than 103%. In the eastbound direction through the Burlington Roundabout there is an increase in airport-related traffic in the HNWR scenario of 180 PCUs in the AM peak period, which is forecast to cause the V/C in this scenario to marginally exceed 85%.
- 4.5.7 The Hammersmith Flyover section of the A4 mainline is also predicted to experience capacity problems in the eastbound direction between its junctions at Burlington Lane Roundabout and the A3220 Warwick Road. Along these sections, increases of 100-200 airport-related PCUs lead to the existing capacity issues in the Extended Baseline to be exacerbated. The HNWR scenario is forecast to experience V/Cs in these locations of 107-109%, with airport trips accounting for roughly 20% of all trips.
- 4.5.8 The A4 mainline between its junctions with Earls Court Road and Queens Gate (eastbound), and between its junctions with Jersey Road and the A3006 roundabout (westbound) are forecast to operate marginally within capacity in the Extended Baseline, and over capacity with HNWR. In both instances there are increases of approximately 50 airport PCUs predicted in the HNWR scenario. At these locations airport-related traffic accounts for 13-17% of all traffic in the HNWR scenario, representing an increase on the 11-14% forecast in the Extended Baseline.
- 4.5.9 Modelled traffic flow data for the A4 corridor in the Extended Baseline and HNWR scenarios is presented in **Table 4-10** for the PM peak period. **Figure 4-10** is presented below Table 4-10 and shows the impact of the HNWR in the PM peak period spatially.

Table 4-10: PM V/C with HNWR, A4

Road	Direction	EBL			HHNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
A4 Mainline, A4/Langley Rd Junction -J5 M4	Eastbound	2,174	58	2.17	2,348	82	2.35			
A4 Mainline, J5 M4 - Colnbrook By-Pass/ A3044 Junction - Brands Rd/London Road Junction	Eastbound	1,363	78	77.00	957	16	54.08			
A4 Mainline, Through Brands Rd/London Road Junction	Eastbound	1,927	91	26.40	1,127	25	27.97			
A4 Mainline, M4 J4a - New lane/ A4 Junction	Eastbound	1,136	259	38.63	981	329	33.37			
A4 Mainline, New lane/ A4 Junction -A437/A4 Junction	Eastbound	806	231	73.22	753	300	68.34			
A4 Mainline, A437/A4 Junction - The Avenue/A4 Junction	Eastbound	1,004	226	81.07	1,011	279	81.59			
A4 Mainline, The Avenue/A4 Junction - The Great West Rd/A3006 Roundabout	Eastbound	807	177	105.90	831	196	108.09			✓
A4 Mainline, Through The Great West Rd/A3006 Roundabout	Eastbound	1,280	151	87.14	1,408	169	92.05			
A4 Mainline, The Great West Rd/A3006 Roundabout - A4/Jersey Road Junction	Eastbound	1,787	193	103.80	1,813	250	105.23			✓
A4 Mainline, A4/Jersey Road Junction - Spur Rd/A4 Junction	Eastbound	1,607	124	104.92	1,640	174	107.10			✓
A4 Mainline, Spur Rd/A4 Junction - M4/Riverbank Way Roundabout	Eastbound	1,788	79	97.16	1,840	102	100.08		✓	
A4 Mainline, Through Riverbank Way Roundabout	Eastbound	1,597	54	59.56	1,629	67	60.75			
A4 Mainline, Riverbank Way Roundabout - M4/ Great West Road Merge	Eastbound	500	19	18.32	488	4	17.88			
A4 Mainline, Through M4/ Great West Road Merge	Eastbound	806	18	43.05	795	21	42.47			
A4 Mainline, M4/ Great West Road Merge - Chiswick High Rd/A4 Roundabout	Eastbound	554	11	106.87	575	12	110.82			✓
A4 Mainline, Through Chiswick High Rd/A4 Roundabout	Eastbound	1,699	53	62.39	1,710	59	62.79			
A4 Mainline, Chiswick High Rd/A4 Roundabout - Hogarth Ln/Burlington Ln Roundabout	Eastbound	3,403	832	95.28	3,531	1,036	98.88			
A4 Mainline, Through Hogarth Ln/Burlington Ln Roundabout	Eastbound	3,438	830	83.71	3,562	1,033	86.75	✓		
A4 Mainline, Hogarth Ln/Burlington Ln Roundabout - Hammersmith Flyover	Eastbound	4,353	730	98.93	4,479	918	101.80		✓	

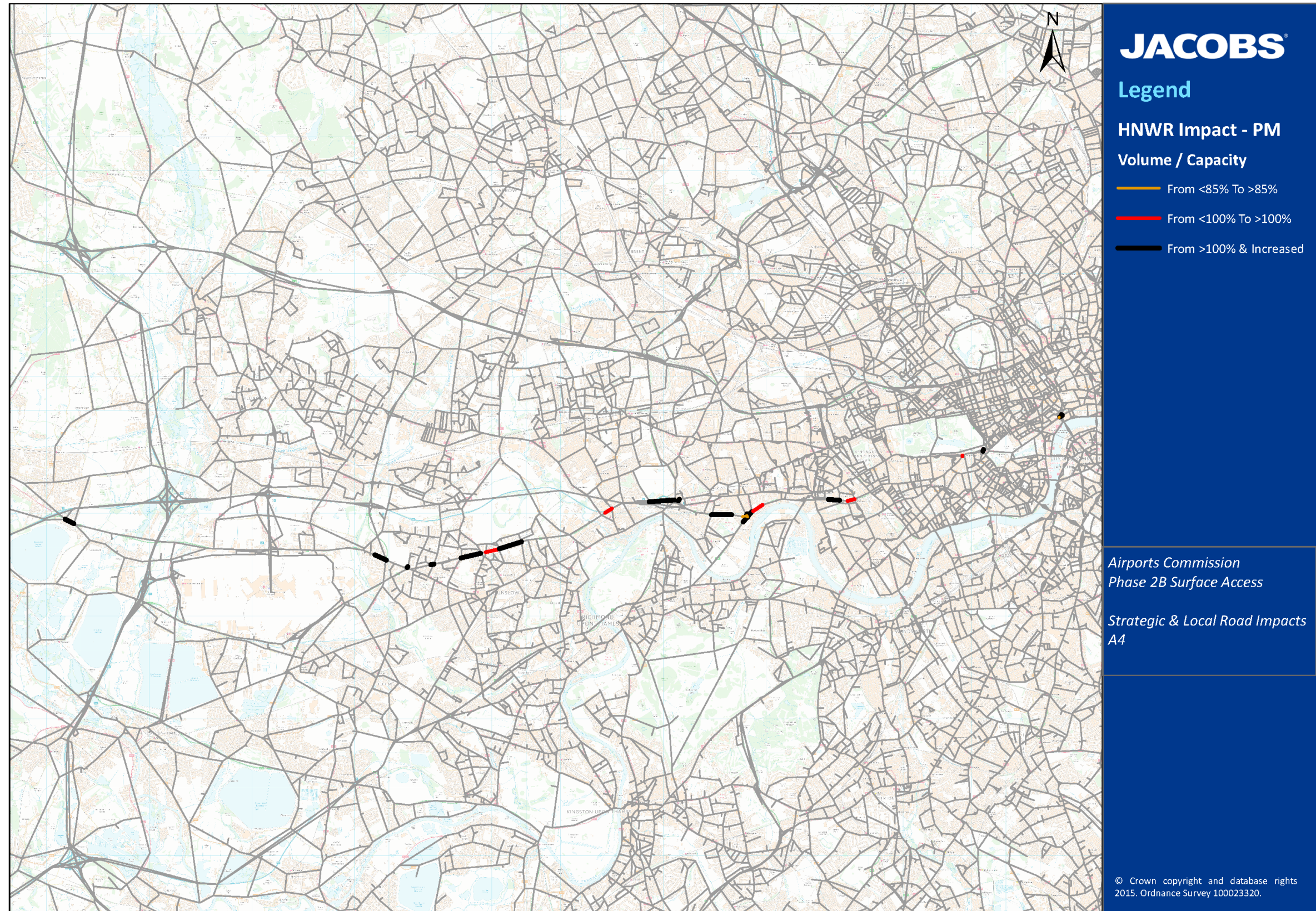
Road	Direction	EBL			HHNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
A4 Mainline, Hammersmith Flyover	Eastbound	2,636	587	65.90	2,743	730	68.57			
A4 Mainline, Hammer Smith Flyover - A4/Warwick Road Junction	Eastbound	3,011	572	97.57	3,116	710	100.99		✓	
A4 Mainline, A4/Warwick Road Junction - Earl's Court Rd/A4 Junction	Eastbound	2,472	521	86.85	2,558	644	89.86			
A4 Mainline, Earl's Court Rd/A4 Junction - Queen's Gate/A4 Junction	Eastbound	1,690	350	88.93	1,750	429	92.06			
A4 Mainline, Queen's Gate/A4 Junction - Thurloe Pl/A4 Junction	Eastbound	1,082	193	48.10	1,117	236	49.68			
A4 Mainline, Thurloe Pl/A4 - Sloane Street/A4 Junction	Eastbound	845	100	99.47	857	117	100.84		✓	
A4 Mainline, Sloane Street/A4 Junction - Apsley Way Arch Roundabout	Eastbound	1,241	162	65.09	1,283	196	67.29			
A4 Mainline, Over Apsley Way Arch Roundabout	Eastbound	1,171	162	19.52	1,214	196	20.23			
A4 Mainline, Apsley Way Arch Roundabout - Albemarle St/ A4 Junction	Eastbound	1,438	39	79.46	1,452	49	80.23			
A4 Mainline, Albemarle St/ A4 Junction - Piccadilly Circus/ Regent St	Eastbound	560	23	71.04	565	28	71.73			
A4 Mainline, Albemarle St/ A4 Junction - The Mall/A4 Roundabout	Eastbound	461	0	72.84	464	0	73.19			
A4 Mainline, Through The Mall/A4 Roundabout	Eastbound	1,357	19	24.69	1,361	20	24.76			
A4 Mainline, The Mall/A4 Roundabout - Chancery Lane/A4 Junction	Eastbound	667	13	102.93	669	15	103.14			✓
A4 Mainline, Chancery Lane/A4 Junction - St Andrews St/A4 Junction	Eastbound	718	2	60.61	720	2	60.79			
A4 Mainline, St Andrews St/A4 Junction - Chancery Lane/A4 Junction	Westbound	859	16	52.23	860	18	52.31			
A4 Mainline, Chancery Lane/A4 Junction - The Mall/A4 Roundabout	Westbound	323	11	98.66	324	13	98.91			
A4 Mainline, Through The Mall/A4 Roundabout	Westbound	1,921	38	68.24	1,923	44	68.32			
A4 Mainline, The Mall/A4 Roundabout - Albemarle St/ A4 Junction	Westbound	1,292	24	86.32	1,295	29	86.53			
A4 Mainline, Piccadilly Circus/ Regent St - Albemarle St/ A4 Junction	Westbound	172	10	19.61	173	13	19.75			

Road	Direction	EBL			HHNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
A4 Mainline, Albemarle St/ A4 Junction - Apsley Way Arch Roundabout	Westbound	1,075	34	87.86	1,078	41	88.10			
A4 Mainline, Over Apsley Way Arch Roundabout	Westbound	1,000	39	49.99	1,004	47	50.22			
A4 Mainline, Apsley Way Arch Roundabout - Sloane Street/A4 Junction	Westbound	1,148	121	82.03	1,153	145	82.44			
A4 Mainline, Through Sloane Street/A4 Junction	Westbound	1,410	123	37.59	1,423	148	37.92			
A4 Mainline, Sloane Street/A4 Junction - Thurloe Pl/A4	Westbound	1,624	131	83.34	1,627	159	83.51			
A4 Mainline, Thurloe Pl/A4 - Queen's Gate	Westbound	1,340	217	77.82	1,352	263	78.50			
A4 Mainline, Queen's Gate/A4 Junction - Earl's Court Rd/A4 Junction	Westbound	1,592	238	88.85	1,604	291	90.05			
A4 Mainline, Earl's Court Rd/A4 Junction - A4/Warwick Road Junction	Westbound	1,651	325	45.68	1,687	389	46.66			
A4 Mainline, A4/Warwick Road Junction - Hammersmith Flyover	Westbound	2,222	448	103.02	2,213	538	102.58			
A4 Mainline, Hammersmith Flyover	Westbound	2,633	488	65.82	2,646	588	66.15			
A4 Mainline, Hammersmith Flyover - Hogarth Ln/Burlington Ln Roundabout	Westbound	3,976	696	90.36	3,995	849	90.79			
A4 Mainline, Through Hogarth Ln/Burlington Ln Roundabout	Westbound	3,975	696	110.64	3,995	849	111.18			✓
A4 Mainline, Hogarth Ln/Burlington Ln Roundabout - Chiswick High Rd/A4 Roundabout	Westbound	3,311	780	115.79	3,382	953	118.25			✓
A4 Mainline, Through Chiswick High Rd/A4 Roundabout	Westbound	2,203	65	58.65	2,209	72	58.82			
A4 Mainline, Chiswick High Rd/A4 Roundabout - M4/ Great West Road Merge	Westbound	1,021	58	89.74	1,009	65	88.64			
A4 Mainline, Through M4/ Great West Road Merge	Westbound	960	12	65.29	1,016	16	69.13			
A4 Mainline, M4/ Great West Road Merge - M4/Riverbank Way Roundabout	Westbound	1,347	12	108.11	1,342	16	107.01			
A4 Mainline, Through M4/Riverbank Way Roundabout	Westbound	2,423	20	90.24	2,438	39	90.82			
A4 Mainline, M4/Riverbank Way Roundabout - Spur Rd/A4 Junction	Westbound	1,815	16	98.40	1,814	24	99.54			
A4 Mainline, Spur Rd/A4 Junction - Jersey Ln/A4 Junction	Westbound	1,585	40	99.07	1,602	59	100.11		✓	

Road	Direction	EBL			HHNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
A4 Mainline, A4/Jersey Road Junction - The Great West Rd/A3006 Roundabout	Westbound	1,664	74	109.95	1,686	99	111.38			✓
A4 Mainline, Through The Great West Rd/A3006 Roundabout	Westbound	2,562	247	77.23	2,405	282	72.47			
A4 Mainline, The Great West Rd/A3006 Roundabout - High St/A4 Junction	Westbound	1,282	112	94.42	1,213	80	81.14			
A4 Mainline, High St/A4 Junction - A437/A4 Junction	Westbound	683	212	61.22	589	100	52.81			
A4 Mainline, A437/A4 Junction - M4 J4a	Westbound	737	224	44.67	543	118	32.97			
A4 Mainline, Through Sutton Ln/New A4 Junction	Westbound	0	0	0.00	0	0	0.00			
A4 Mainline, Sutton Ln/ New A4 Junction - M4 J5	Westbound	1,860	152	105.09	1,935	12	109.30			✓
A4 Mainline, J5 M4 - A4/Langley Rd Junction	Westbound	0	0	0.00	0	0	0.00			
A4 Off Slip, M4/ Great West Road Merge	Eastbound	436	18	29.90	421	3	28.83			
A4 On Slip, M4/ Great West Road Merge	Westbound	387	0	33.41	326	0	28.14			
A4 Off Slip, A4/Apsley Way Roundabout	Eastbound	1,005	129	60.92	1,041	156	63.08			
A4 On Slip, A4/Apsley Way Roundabout	Eastbound	690	11	34.51	694	16	34.69			
A4 Off Slip, A4/Apsley Way Roundabout	Westbound	33	0	1.67	32	0	1.62			
A4 On Slip, A4/Apsley Way Roundabout	Westbound	473	11	23.66	471	15	23.57			
A4 Off Slip, A4/Apsley Way Roundabout	Eastbound	923	35	34.06	926	44	34.17			
A4 On Slip, A4/Apsley Way Roundabout	Westbound	1,096	206	54.78	1,103	257	55.17			
A4/A302/ B310 Intersection , Knightsbridge/Piccadilly Roundabout	-	2,378	0	104.04	2,382	0	104.25			✓
A4/Strand/Aldwych Access Roads, A4/Strand/Aldwych Access Roads	-	883	18	100.94	884	21	100.99			✓
Hammersmith Flyover Intersection , A4/Hammersmith Bridge Rd Intersection	-	1,051	202	95.38	1,059	253	96.15			
Henlys Roundabout/A4 Intersection, A4/Burns Way/ Great South-West Rd	-	240	2	107.37	243	4	110.27			✓
A4/Church Street/Burlington Ln, Great West Rd Chiswick Roundabout Intersection , A4/Church Street Roundabout Intersection Roundabout	-	715	83	106.06	727	103	107.84			✓

Road	Direction	EBL			HHNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
A4/Chiswick Roundabout Intersection , A4/ Gunnersbury Ave/ Chiswick High Rd Roundabout	-	529	12	106.74	530	13	106.96			✓
A4/Ealing Roundabout Intersection, A4/Ealing Roundabout	-	1,040	8	42.34	1,060	22	43.15			
A4/London Road Intersection , Colnbrook By-Pass/ London Rd Junctions	-	2,280	165	69.10	2,231	136	67.59			
M4/ Great West Road Merge Intersection , M4/ Great West Road Merge Intersection	-	670	70	45.87	615	71	42.15			
A4 Mainline, Brands Rd/London Road Junction - Harmondsworth Rd/ New A4 Junction - HNWR ONLY	Eastbound	-	-	-	1,104	25	47.88			
A4 Mainline, Harmondsworth Rd/ New A4 Junction - Sipsons Rd/ New A4 Junction - HNWR ONLY	Eastbound	-	-	-	1,027	98	50.58			
A4 Mainline, Sipsons Rd/ New A4 Junction - M4 J4a - HNWR ONLY	Eastbound	-	-	-	892	105	22.12			
A4 Mainline, Through M4 J4a - HNWR ONLY	Eastbound	-	-	-	518	109	99.81			
A4 Mainline, Through M4 J4a - HNWR ONLY	Westbound	-	-	-	769	324	20.30			
A4 Mainline, M4 J4a - Sipsons Rd/ New A4 Junction - HNWR ONLY	Westbound	-	-	-	835	308	48.53			
A4 Mainline, Sipsons Rd/ New A4 Junction - Harmondsworth Rd/ New A4 Junction -HNWR ONLY	Westbound	-	-	-	1,194	302	46.88			
A4 Mainline, Harmondsworth Rd/ New A4 Junction - Sutton Ln/New A4 Junction - HNWR ONLY	Westbound	-	-	-	2,217	136	100.23			
M4 J4a/A4 Intersection, Bath Rd/Tunnel Rd E Junction -HNWR ONLY	-	-	-	-	409	34	66.33			
McArdle Way / A4 Junction Intersection , McArdle Way / A4 Junction - HNWR ONLY	-	-	-	-	1,512	24	97.88			

Figure 4-10: PM V/C Impact of HNWR, A4



- 4.5.10 In addition to the capacity issues to the east of the A4 corridor identified in the AM peak period, the PM analysis suggests that a number of sections closer to Heathrow Airport will exceed their capacities in the HNWR scenario. For example, the A4 eastbound between its Jersey Road junction and Spur Road is forecast to be more than 107% over capacity in the HNWR scenario, compared with 105% in the Extended Baseline, with airport-relating traffic rising from 8% to 11% of total traffic on the section. In the westbound direction the section is forecast to operate marginally within capacity (99%) in the Extended Baseline but marginally over capacity in the HNWR scenario following a minor increase in overall traffic levels (less than 20 PCUs).
- 4.5.11 The eastbound A4 mainline between the A3006 roundabout and Jersey Road is also predicted to exceed capacity following an increase in PM traffic of approximately 50 PCUs in the HNWR scenario. Further to the west, the approaches to the A4 / A30 roundabout (110%) and A4 / A312 roundabout (108%) are also forecast to exceed capacity in the HNWR scenario. Whilst both approaches experience only minor increases in traffic in the PM peak period, the already congested conditions forecast in the Extended Baseline are exacerbated.
- 4.5.12 The other notable exceedance is on the westbound A4 mainline towards Junction 5 of the M4. The section is forecast to operate 105% over capacity in the Extended Baseline, and 107% over capacity in the HNWR scenario, following an increase in overall traffic of approximately 75 PCUs. Despite the increase, the amount of airport-related trips has actually fallen. These changes in traffic flow are likely to be caused by re-routing following the removal of the Colnbrook Bypass, and its associated layout changes.
- 4.5.13 Whilst not shown in the Table or Figure, these changes also lead to some sections of Poyle Road to operate above 100% capacity in the PM peak (and above 85% capacity in the AM peak). The model forecasts significant increases in traffic flow along some of these sections. Whilst only a minor number of these additional trips are airport-related, it is suggested that the revised arrangement around this area of network may require further consideration should the HNWR be introduced, in order to ensure that the impact on the village is not unduly adverse. It is understood that since this analysis was undertaken Heathrow Airport Limited have put forward a revised masterplan proposal that includes the routing of traffic away from the village centre of Poyle. These changes to the network should be assessed to ascertain their impact. Finally, it is noted that the Horton Road approach to the M25 Junction 14 roundabout is also predicted to operate over capacity with the introduction of the HNWR.
- 4.5.14 The pre-consultation analysis discussed the changes to the layout of the A4 as part of the HNWR option but did not draw any specific conclusions regarding its operation should the third runway at Heathrow be introduced. The analysis undertaken and summarised as part of this report suggests that the mainline A4 and a number of its intersections are likely to operate close to, or above capacity even without the HNWR. Along a number of sections of the A4, the introduction of the HNWR is forecast to add to these existing capacity issues. Although many of the sections are located outside the immediate Heathrow area, on some of the sections airport-related traffic accounts for more than one third of the total traffic. Heathrow Airport therefore has both a direct interest in, and impact on the operation of the A4 corridor.

4.6 A40

- 4.6.1 The A40 corridor is an east-west route located to the north of Heathrow Airport, running from central London and connecting with the M40 at Junction 1, approximately 3km east of the M25. From this junction the A40 runs parallel to the M40 before diverging east of Oxford and continuing into Wales.
- 4.6.2 The road is located within the simulation area of the traffic model to its junction with the M40, and forms an important part of routes to and from Heathrow Airport, as travellers make use of its connections with both the A312 and the M25.
- 4.6.3 Modelled traffic flow data along the A40 corridor for the Extended Baseline and HNWR is presented in **Table 4-11** for the AM peak period. **Figure 4-11** is presented below Table 4-11 and shows the impact of the HNWR in the AM peak period spatially.

- 4.6.4 Further figures showing the V/C of *all* links (and not just those exceeding a threshold in the HNWR scenario) along the A40 corridor in both the Extended Baseline and HNWR are provided in Appendix A.

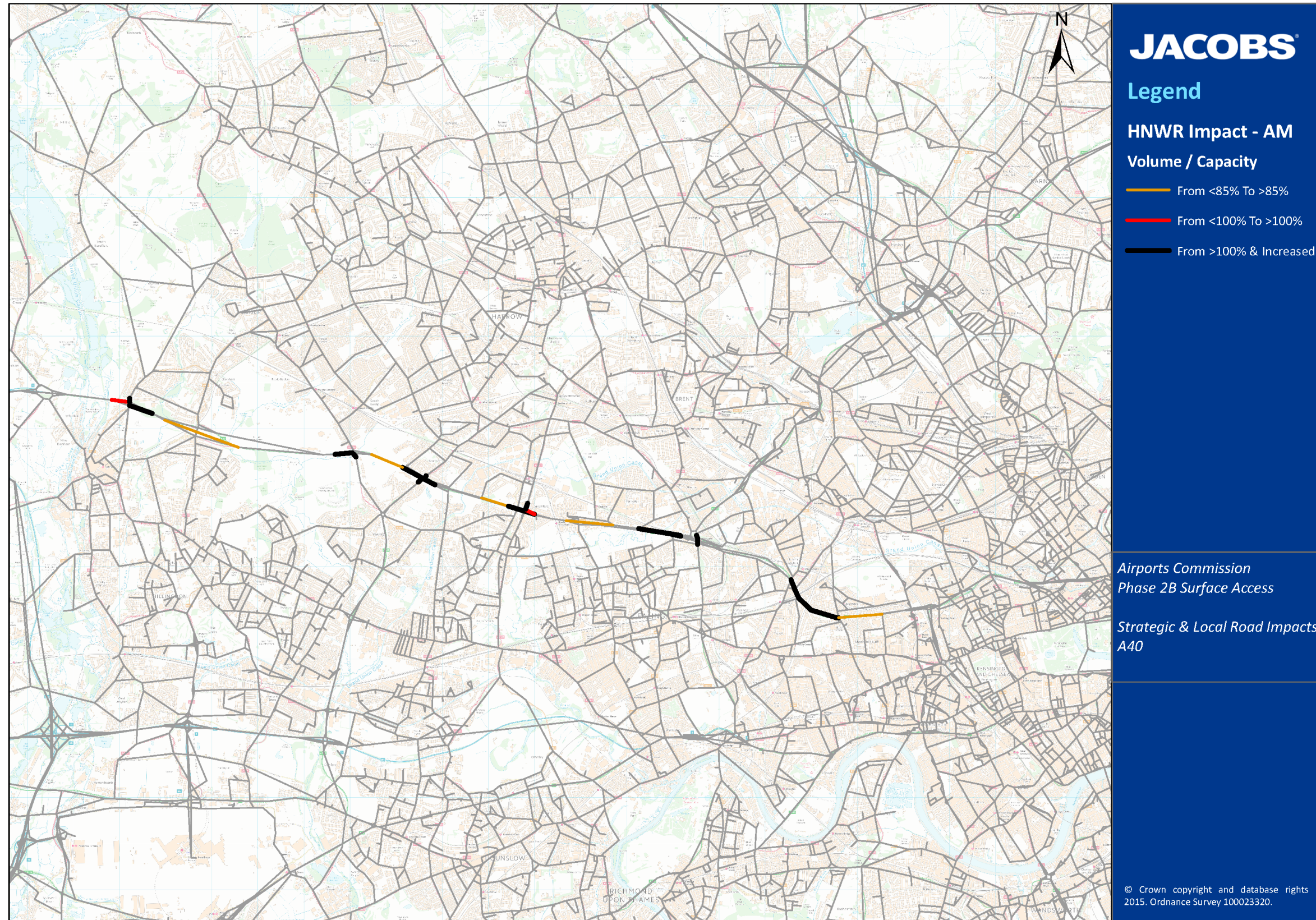
Table 4-11: AM V/C with HNWR, A40

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
A40 Mainline, J1 M40 - B467/A40 Junction	Eastbound	5,066	61	90.46	5,058	68	90.31			
A40 Mainline, Through A40/B467 Junction	Eastbound	4,116	55	78.08	4,131	63	78.33			
A40 Mainline, A40/B467 Junction - A40/A4180 Roundabout	Eastbound	4,735	54	82.32	4,766	62	82.75			
A40 Mainline, Through A40/A4180 Roundabout	Eastbound	3,771	48	67.70	3,831	56	68.99			
A40 Mainline, A40/A4180 Roundabout - A40/A312 Roundabout	Eastbound	4,301	94	76.13	4,384	123	77.60			
A40 Mainline, A40/A4180 Roundabout - A40/A312 Roundabout	Eastbound	3,601	91	90.03	3,678	123	91.96			
A40 Mainline, A40/A312 Roundabout - A40/A4127 Roundabout	Eastbound	4,755	228	84.91	4,840	303	86.43	✓		
A40 Mainline, Through A40/A4127 Roundabout	Eastbound	4,285	217	101.38	4,379	289	102.34			✓
A40 Mainline, A40/A4127 Roundabout - A40/A406 Roundabout	Eastbound	4,549	186	103.38	4,581	243	104.12			✓
A40 Mainline, Through A40/A406 Roundabout	Eastbound	2,812	3	80.91	2,804	4	80.69			
A40 Mainline, A40/A406 Roundabout - West Cross Route/A40 Junction	Eastbound	3,415	0	107.15	3,441	0	107.94			✓
A40 Mainline, West Cross Route/A40 Junction - Edgware Road/A40 Junction	Eastbound	2,428	186	62.26	2,438	221	62.50			
A40 Mainline, Edgware Road/A40 Junction -West Cross Route/A40 Junction	Westbound	1,718	77	56.27	1,740	100	57.08			
A40 Mainline, West Cross Route/A40 Junction - A40/A406 Roundabout	Westbound	2,348	36	84.75	2,376	40	85.74	✓		
A40 Mainline, Through A40/A406 Roundabout	Westbound	2,242	47	64.53	2,271	52	65.35			
A40 Mainline, A40/A406 Roundabout - A40/A4127 Roundabout	Westbound	4,681	211	106.38	4,710	273	107.05			✓
A40 Mainline, Through A40/A4127 Roundabout	Westbound	4,124	237	83.52	4,174	310	84.52			
A40 Mainline, A40/A4127 Roundabout - A40/A312 Roundabout	Westbound	5,438	265	93.76	5,488	349	94.62			
A40 Mainline, Through A40/A312 Roundabout	Westbound	4,194	68	104.84	4,230	62	105.76			✓
A40 Mainline, A40/A312 Roundabout - A40/A4180 Roundabout	Westbound	4,962	74	84.84	5,046	70	86.23	✓		
A40 Mainline, Through A40/A4180 Roundabout	Westbound	4,358	74	102.12	4,445	70	102.38			✓
A40 Mainline, A40/A4180 Roundabout -A40/B467 Roundabout	Westbound	4,674	96	84.73	4,714	93	85.22	✓		
A40 Mainline, Through A40/B467 Roundabout	Westbound	4,544	98	86.27	4,575	95	86.64			
A40 Mainline, A40/B467 Roundabout - J1 M40	Westbound	5,462	120	97.54	5,475	126	97.78			

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
M40 Off Slip, M40 J1	Eastbound	1,585	5	74.61	1,590	8	74.81			
M40 On Slip, M40 J1	Westbound	2,121	9	99.80	2,088	10	98.27			
A40 On Slip, M40 J1	Eastbound	1,254	0	27.87	1,250	0	27.78			
A40 Off Slip, M40 J1	Westbound	1,663	0	100.81	1,659	0	100.53			
A40 Off Slip, A40/B467 Roundabout	Eastbound	949	5	99.97	927	5	100.32		✓	
A40 On Slip, A40/B467 Roundabout	Westbound	915	22	54.48	900	31	53.93			
A40 On Slip, A40/B467 Roundabout	Eastbound	456	0	52.23	456	0	52.33			
A40 Off Slip, A40/B467 Roundabout	Westbound	424	0	105.10	426	0	106.01			✓
A40 Off Slip, A40/A4180 Roundabout	Eastbound	964	6	93.62	936	6	94.16			
A40 On Slip, A40/A4180 Roundabout	Westbound	1,107	22	98.54	1,065	23	96.88			
A4 On Slip, A40/A4180 Roundabout	Eastbound	531	45	31.64	554	67	33.14			
A40 Off Slip, A40/A4180 Roundabout	Westbound	604	0	72.32	601	0	72.55			
A40 Off Slip, A40/A312 Roundabout	Eastbound	700	3	35.01	706	0	35.31			
A40 Off Slip, A40/A312 Roundabout	Eastbound	1,064	25	95.67	1,078	28	96.89			
A40 On Slip, A40/A312 Roundabout	Westbound	769	6	64.06	816	7	67.96			
A40 On Slip, A40/A312 Roundabout	Eastbound	1,536	136	49.74	1,552	180	50.26			
A40 On Slip, A40/A312 Roundabout	Eastbound	1,258	136	62.89	1,264	180	63.22			
A40 Off Slip, A40/A312 Roundabout	Westbound	1,245	197	44.93	1,258	287	45.69			
A40 Off Slip, A40/A312 Roundabout	Westbound	1,992	197	86.71	2,017	287	87.79			
A40 Off Slip, A40/A4127 Roundabout	Eastbound	470	11	15.21	461	15	14.93			
A40 Off Slip, A40/A4127 Roundabout	Eastbound	849	12	99.24	849	16	99.29			
A40 On Slip, A40/A4127 Roundabout	Westbound	851	26	22.54	896	37	23.81			
A40 On Slip, A40/A4127 Roundabout	Westbound	1,314	28	66.47	1,314	39	66.73			
A40 On Slip, A40/A4127 Roundabout	Eastbound	1,100	0	97.68	1,075	0	104.14		✓	
A40 Off Slip, A40/A4127 Roundabout	Westbound	693	0	17.31	702	0	17.55			

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
A40 Off Slip, A40/A4127 Roundabout	Westbound	781	1	58.45	791	1	59.17			
A40 Off Slip, A40/A406 Roundabout	Eastbound	1,737	183	81.15	1,777	240	83.05			
A40 On Slip, A40/A406 Roundabout	Westbound	2,413	163	76.08	2,402	221	75.74			
A40 On Slip, A40/A406 Roundabout	Westbound	2,413	163	104.93	2,402	221	104.45			
A40 On Slip, A40/A406 Roundabout	Eastbound	866	0	41.83	894	0	43.17			
A40 On Slip, A40/A406 Roundabout	Eastbound	738	0	49.75	760	0	50.76			
A40 Off Slip, A40/A406 Roundabout	Westbound	1,180	0	59.02	1,176	0	58.79			
A40 Off Slip, A40/A406 Roundabout	Westbound	1,180	0	79.18	1,176	0	78.87			
A40 Off Slip, A40/West Cross Route Roundabout	Eastbound	666	0	59.21	671	0	59.63			
A40 Off Slip, A40/West Cross Route Roundabout	Eastbound	550	0	33.35	547	1	33.15			
A40 On Slip, A40/West Cross Route Roundabout	Westbound	655	0	56.65	647	0	55.92			
A40 On Slip, A40/West Cross Route Roundabout	Westbound	101	0	13.45	102	0	13.65			
A40 On Slip, A40/West Cross Route Roundabout	Eastbound	1,193	214	44.23	1,215	253	44.93			
A40 Off Slip, A40/West Cross Route Roundabout	Westbound	1,139	32	46.36	1,139	42	46.36			
M40/A40 Intersection, J1 M40	Northbound	2,161	0	98.41	2,162	0	98.47			
A40/B467 Intersection, A40/B467 Roundabout	Northbound	1,964	25	104.26	1,974	35	104.54			✓
A40/A4180 Intersection, A40/A4180 Roundabout	Southbound	1,077	73	110.37	1,095	103	110.95			✓
A40/A312 Intersection, A40/A312 Roundabout	Northbound	1,350	216	105.23	1,358	266	105.84			✓
A40/A4127 Intersection, A40/A4127 Roundabout	Northbound	1,082	17	103.35	1,085	24	103.63			✓
A40/A406 Intersection, A40/A406 Roundabout	Eastbound	1,980	0	106.56	1,984	0	106.74			✓
A40/West Cross Route Intersection, A40/West Cross Route Roundabout	Eastbound	1,474	0	80.77	1,472	0	80.67			

Figure 4-11: AM V/C Impact of HNWR, A40



- 4.6.5 The A40 corridor is likely to experience a wide range of capacity impacts as a result of the HNWR. It can be seen from Figure 4-11 that the route is forecast to suffer from capacity problems along many of its sections. This is likely to have significant impacts on travellers using the A40, or indeed passing through the A40 whilst travelling on another road. Whilst many of the sections are likely to exceed capacity regardless of whether the HNWR is introduced, they are likely to be further adversely impacted by its introduction.
- 4.6.6 The most noticeable pressure points on the A40 corridor are located at the intersections that the corridor shares with other A and B roads. The following intersections have been identified as likely to operate above capacity with the HNWR. These are locations where the Extended Baseline scenario is predicted to operate below the 100% V/C threshold, but above it with HNWR, or where the Extended Baseline scenario is predicted to operate over capacity and the introduction of the HNWR leads to the V/C to increase still further:
- **B467** – the intersection of the A40 and B467 is forecast to operate either close to or over capacity without the introduction of the HNWR. This makes the A40 mainline and the associated junctions at this location sensitive to even minor changes in traffic flow. The level of airport demand at this location remains virtually unchanged between the Extended Baseline and HNWR scenarios;
 - **A4180** – the junction of the A40 and the A4180 is also forecast to operate either close to or over capacity without the introduction of the HNWR. This is also the case on the westbound mainline through the junction, which is over capacity in the Extended Baseline. Similarly to the B467, relatively minor flow increases at this location have caused a number of sections to exceed their capacities. These increases cannot be directly attributed to additional airport traffic at this location since the level of demand remains virtually unchanged between the scenarios;
 - **A312** – the junction of the A40 and the A312 is particularly important with respect to Heathrow Airport since it offers those travelling on the A40 the opportunity to access the A312 to travel south towards the M4 and the airport. The A40 westbound through the junction exceeds capacity in the Extended Baseline and increases still further in the HNWR scenario, which is caused by a small increase in non-airport traffic. The A40 / A312 roundabout does experience an increase in airport-related traffic of 50 PCUs in the AM peak period, and this further exacerbates the capacity problems at this junction;
 - **A4127** – the junction of the A40 and A4127 is forecast to operate either close to or over capacity without the introduction of the HNWR. The eastbound mainline A40 through the junction is also forecast to experience an increase of approximately 70 airport PCUs in the AM peak period, causing the already over capacity section to increase to a V/C of more than 102%; and
 - **Hanger Lane & West Cross** – the junctions of the A40 and the mainline approaches at its junctions at Hanger Lane and West Cross are forecast to be over capacity in the Extended Baseline and exacerbated in the HNWR scenario. For example, between the A4127 and the Hanger Lane (A406) junctions, the mainline A40 is forecast to experience an increase of approximately 60 airport PCUs in the HNWR scenario in both the eastbound and westbound directions, with these sections being 104% and 107% over capacity respectively.
- 4.6.7 It should also be acknowledged that even on sections where airport demand is not forecast to increase significantly as a result of the HNWR (as is the case in a number of the above intersections); it is possible that airport trips are causing the rerouting of traffic to corridors such as the A40, which may lead to capacity issues. This is one of the advantages of using the dynamic traffic models in this assessment.
- 4.6.8 Modelled traffic flow data for the Extended Baseline and HNWR is presented in **Table 4-12** for the PM peak period. **Figure 4-12** is presented below Table 4-12 and shows the impact of the HNWR in the PM peak period spatially.

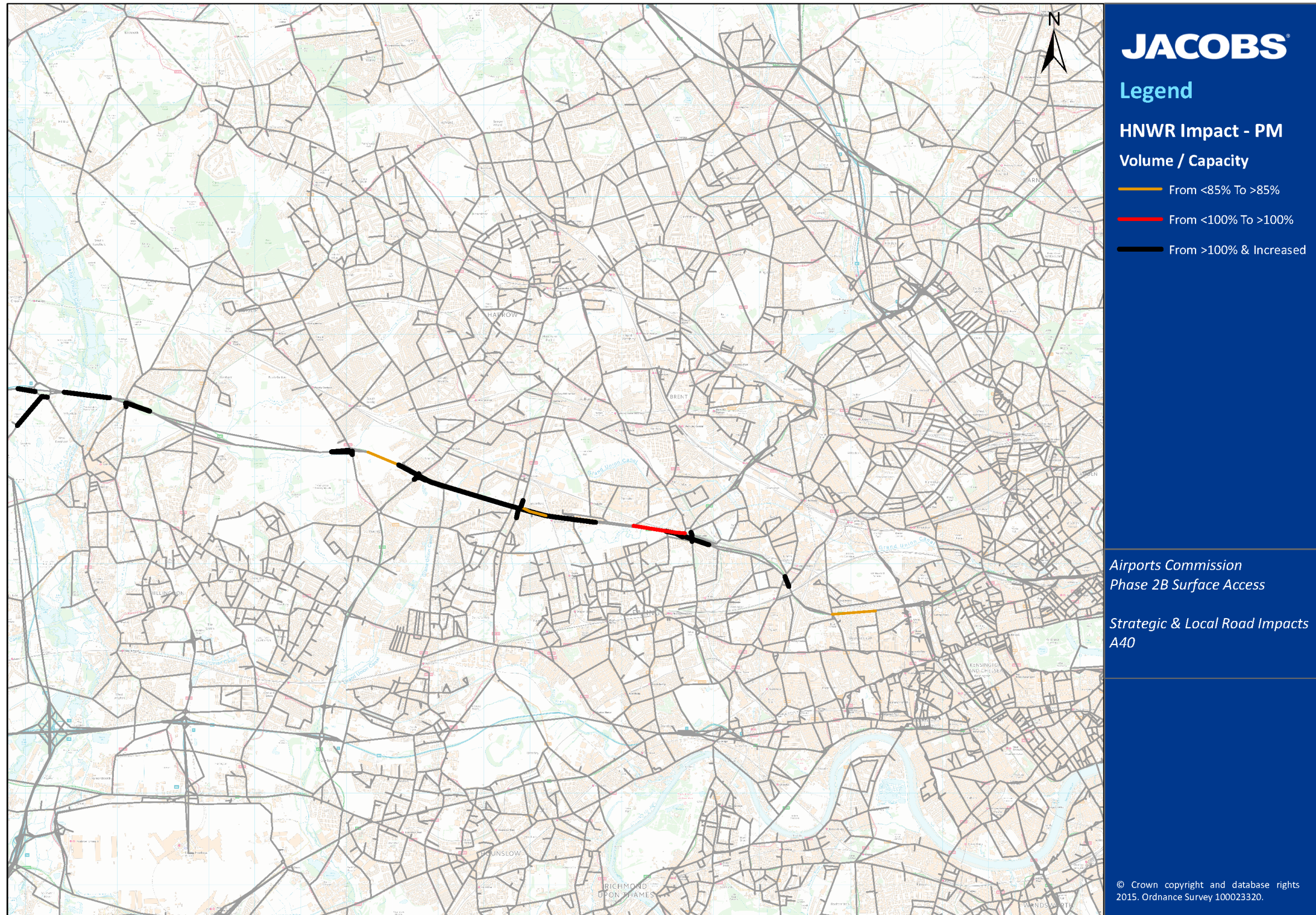
Table 4-12: PM V/C with HNWR, A40

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
A40 Mainline, J1 M40 - B467/A40 Junction	Eastbound	5,301	79	94.67	5,360	106	95.72			
A40 Mainline, Through A40/B467 Junction	Eastbound	3,985	57	80.30	4,024	73	81.31			
A40 Mainline, A40/B467 Junction - A40/A4180 Roundabout	Eastbound	5,339	56	92.39	5,377	72	93.07			
A40 Mainline, Through A40/A4180 Roundabout	Eastbound	4,377	53	78.17	4,400	68	78.57			
A40 Mainline, A40/A4180 Roundabout - A40/A312 Roundabout	Eastbound	4,795	72	84.86	4,829	97	85.47	✓		
A40 Mainline, A40/A4180 Roundabout - A40/A312 Roundabout	Eastbound	3,897	72	97.42	3,934	97	98.35			
A40 Mainline, A40/A312 Roundabout - A40/A4127 Roundabout	Eastbound	4,934	202	88.11	5,023	273	89.69			
A40 Mainline, Through A40/A4127 Roundabout	Eastbound	4,162	162	91.28	4,238	215	92.92			
A40 Mainline, A40/A4127 Roundabout - A40/A406 Roundabout	Eastbound	4,358	108	99.54	4,434	142	101.74		✓	
A40 Mainline, Through A40/A406 Roundabout	Eastbound	2,238	7	64.40	2,287	8	65.81			
A40 Mainline, A40/A406 Roundabout - West Cross Route/A40 Junction	Eastbound	2,975	0	93.32	2,992	1	93.88			
A40 Mainline, West Cross Route/A40 Junction - Edgware Road/A40 Junction	Eastbound	2,307	161	59.15	2,325	204	59.62			
A40 Mainline, Edgware Road/A40 Junction -West Cross Route/A40 Junction	Westbound	1,953	151	65.31	1,976	189	66.44			
A40 Mainline, West Cross Route/A40 Junction - A40/A406 Roundabout	Westbound	3,573	5	102.09	3,588	5	102.50			✓
A40 Mainline, Through A40/A406 Roundabout	Westbound	3,161	17	114.22	3,197	27	115.52			✓
A40 Mainline, A40/A406 Roundabout - A40/A4127 Roundabout	Westbound	5,241	86	119.12	5,296	120	120.35			✓
A40 Mainline, Through A40/A4127 Roundabout	Westbound	4,978	99	104.71	5,046	136	106.25			✓
A40 Mainline, A40/A4127 Roundabout - A40/A312 Roundabout	Westbound	6,581	109	113.47	6,662	146	114.86			✓
A40 Mainline, Through A40/A312 Roundabout	Westbound	4,624	21	115.59	4,670	15	116.76			✓
A40 Mainline, A40/A312 Roundabout - A40/A4180 Roundabout	Westbound	5,240	21	89.71	5,304	16	90.77			
A40 Mainline, Through A40/A4180 Roundabout	Westbound	4,569	21	110.12	4,633	16	111.03			✓
A40 Mainline, A40/A4180 Roundabout -A40/B467 Roundabout	Westbound	5,808	36	96.80	5,869	34	97.82			
A40 Mainline, Through A40/B467 Roundabout	Westbound	4,747	37	96.05	4,801	34	97.00			
A40 Mainline, A40/B467 Roundabout - J1 M40	Westbound	6,136	63	109.57	6,185	67	110.44			✓

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
M40 Off Slip, M40 J1	Eastbound	1,545	13	72.68	1,549	15	72.91			
M40 On Slip, M40 J1	Westbound	2,254	8	106.09	2,262	10	106.47			✓
A40 On Slip, M40 J1	Eastbound	1,484	0	32.99	1,491	0	33.13			
A40 Off Slip, M40 J1	Westbound	1,424	0	86.33	1,437	0	87.12			
A40 Off Slip, A40/B467 Roundabout	Eastbound	1,316	22	96.17	1,336	34	98.22			
A40 On Slip, A40/B467 Roundabout	Westbound	1,389	27	72.43	1,384	33	72.40			
A40 On Slip, A40/B467 Roundabout	Eastbound	642	0	65.13	651	0	66.04			
A40 Off Slip, A40/B467 Roundabout	Westbound	632	0	114.55	633	0	115.37			✓
A40 Off Slip, A40/A4180 Roundabout	Eastbound	962	3	88.50	977	4	91.03			
A40 On Slip, A40/A4180 Roundabout	Westbound	1,239	14	105.18	1,236	18	105.63			✓
A4 On Slip, A40/A4180 Roundabout	Eastbound	417	19	30.50	429	30	31.10			
A40 Off Slip, A40/A4180 Roundabout	Westbound	671	0	92.27	671	0	94.37			
A40 Off Slip, A40/A312 Roundabout	Eastbound	898	0	44.90	895	0	44.77			
A40 Off Slip, A40/A312 Roundabout	Eastbound	1,182	9	105.45	1,181	11	105.31			
A40 On Slip, A40/A312 Roundabout	Westbound	617	0	51.38	634	0	52.80			
A40 On Slip, A40/A312 Roundabout	Eastbound	1,309	130	42.39	1,319	175	42.72			
A40 On Slip, A40/A312 Roundabout	Eastbound	1,037	130	51.87	1,089	175	54.44			
A40 Off Slip, A40/A312 Roundabout	Westbound	1,957	88	72.83	1,992	131	74.99			
A40 Off Slip, A40/A312 Roundabout	Westbound	2,783	118	103.75	2,844	168	106.01			✓
A40 Off Slip, A40/A4127 Roundabout	Eastbound	679	18	21.98	681	26	22.06			
A40 Off Slip, A40/A4127 Roundabout	Eastbound	1,156	8	98.30	1,161	8	98.72			
A40 On Slip, A40/A4127 Roundabout	Westbound	1,424	11	38.73	1,427	13	38.80			
A40 On Slip, A40/A4127 Roundabout	Westbound	1,603	10	79.45	1,616	10	80.18			
A40 On Slip, A40/A4127 Roundabout	Eastbound	910	9	84.68	911	1	85.45	✓		
A40 Off Slip, A40/A4127 Roundabout	Westbound	1,267	0	31.67	1,258	1	31.46			

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
A40 Off Slip, A40/A4127 Roundabout	Westbound	1,300	1	97.26	1,292	1	96.63			
A40 Off Slip, A40/A406 Roundabout	Eastbound	2,120	101	99.08	2,147	134	100.34		✓	
A40 On Slip, A40/A406 Roundabout	Westbound	1,952	69	61.55	1,970	93	62.11			
A40 On Slip, A40/A406 Roundabout	Westbound	1,952	69	122.69	1,970	93	123.82			✓
A40 On Slip, A40/A406 Roundabout	Eastbound	689	0	33.29	644	0	31.13			
A40 On Slip, A40/A406 Roundabout	Eastbound	753	0	45.56	713	0	44.01			
A40 Off Slip, A40/A406 Roundabout	Westbound	1,142	0	57.12	1,133	0	56.64			
A40 Off Slip, A40/A406 Roundabout	Westbound	1,142	0	86.96	1,133	0	87.26			
A40 Off Slip, A40/West Cross Route Roundabout	Eastbound	602	0	55.67	604	0	55.83			
A40 Off Slip, A40/West Cross Route Roundabout	Eastbound	401	4	24.28	399	5	24.17			
A40 On Slip, A40/West Cross Route Roundabout	Westbound	544	0	49.65	538	0	49.12			
A40 On Slip, A40/West Cross Route Roundabout	Westbound	123	0	16.08	127	0	16.65			
A40 On Slip, A40/West Cross Route Roundabout	Eastbound	1,522	102	50.73	1,537	155	51.27			
A40 Off Slip, A40/West Cross Route Roundabout	Westbound	1,355	137	55.01	1,366	170	55.39			
M40/A40 Intersection, J1 M40	Northbound	1,252	1	111.89	1,261	1	113.04			✓
A40/B467 Intersection, A40/B467 Roundabout	Northbound	706	0	109.16	715	0	109.43			✓
A40/A4180 Intersection, A40/A4180 Roundabout	Southbound	1,092	58	114.93	1,104	76	117.20			✓
A40/A312 Intersection, A40/A312 Roundabout	Northbound	1,251	167	113.70	1,260	224	114.51			✓
A40/A4127 Intersection, A40/A4127 Roundabout	Northbound	827	11	105.52	832	3	106.18			✓
A40/A406 Intersection, A40/A406 Roundabout	Eastbound	1,110	0	114.02	1,101	0	114.82			✓
A40/West Cross Route Intersection, A40/West Cross Route Roundabout	Eastbound	1,437	102	79.35	1,451	155	80.12			

Figure 4-12: PM V/C Impact of HNWR, A40



- 4.6.9 In the PM peak period there are also a significant number of sections that are forecast to operate above capacity in the HNWR scenario. It can be seen from the number of black sections shown in Figure 4-12 that many of these sections are forecast to be over capacity in the Extended Baseline, but are further exacerbated with the introduction of the HNWR. The intersections identified in the AM peak period analysis continue to face capacity problems in the PM peak, with additional capacity problems also forecast at the junction of the A40 and M40.
- 4.6.10 The pre-consultation analysis of network capacity did not discuss the impact on the A40. The above analysis is based on data derived from the dynamic traffic model, and suggests that by 2030 the A40 will be operating close to, or above capacity along much of its route into central London. It should be acknowledged that this is forecast to occur even without a third runway at Heathrow Airport. However, given the congested nature of the route, even relatively minor increases in traffic brought about by the HNWR contribute to the capacity problems.

4.7 A30

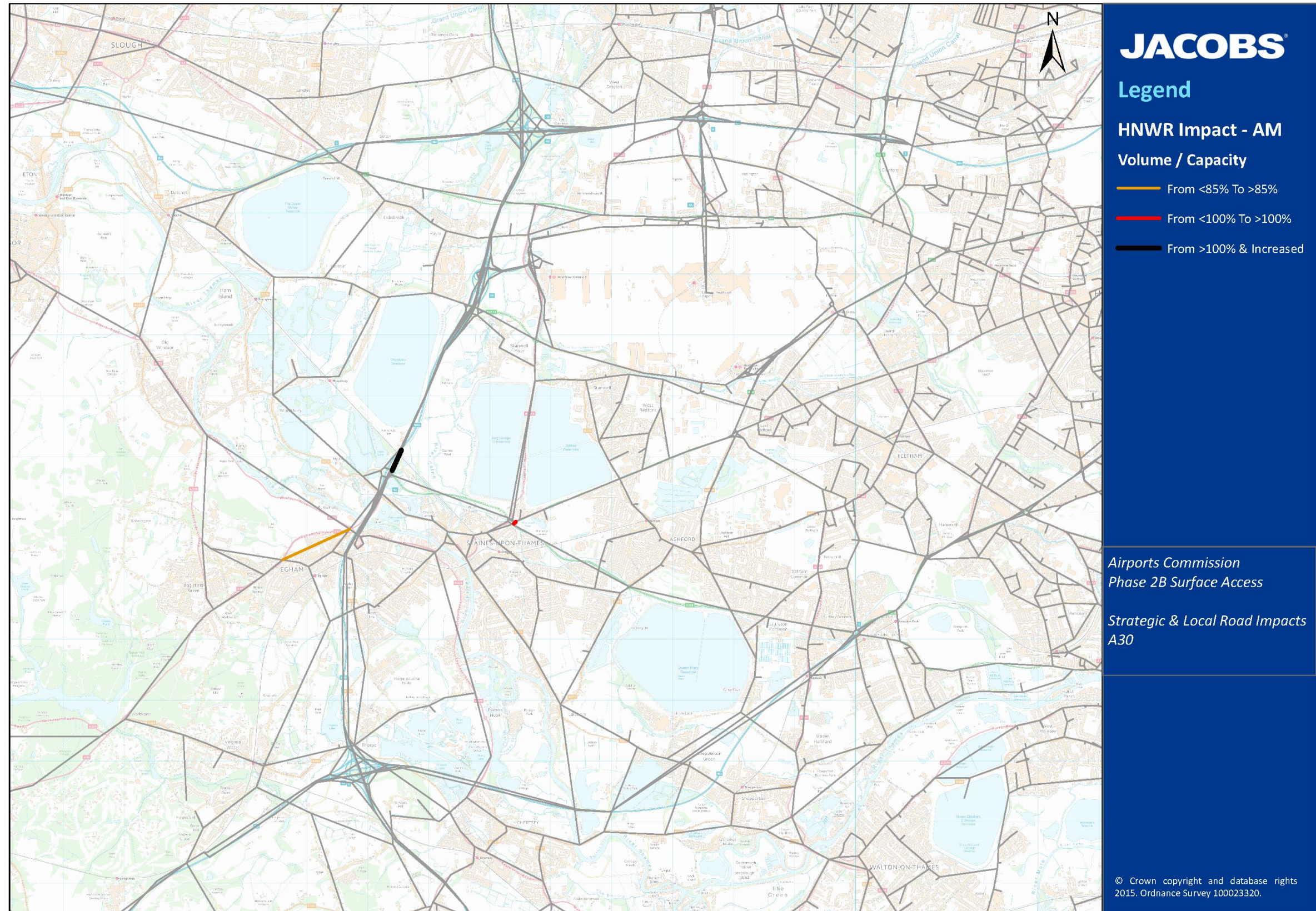
- 4.7.1 The A30 runs along a northeast to southwest alignment, and passes immediately alongside Heathrow Airport at its south eastern perimeter. In the vicinity of Heathrow Airport, the A30 commences at its junction with the A4 in Hounslow to the east, crossing a junction with the A308 before intersecting the M25 at Junction 13. The A30 is located inside the traffic model simulation area until its junction with the B389 at Wentworth, allowing for the key impacts of the HNWR to be assessed.
- 4.7.2 Modelled traffic flow data along the A30 corridor for the Extended Baseline and HNWR is presented in **Table 4-13** for the AM peak period. **Figure 4-13** is presented below Table 4-13 and shows the impact of the HNWR in the AM peak period spatially.
- 4.7.3 Further figures showing the V/C of *all* links (and not just those exceeding a threshold in the HNWR scenario) along the A30 corridor in both the Extended Baseline and HNWR are provided in Appendix A.

Table 4-13: AM V/C with HNWR, A30

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
A30 Mainline, A30/Christchurch Rd - Egham By-Pass/Windsor Rd Roundabout	Eastbound	1,879	308	81.44	2,080	507	91.45	✓		
A30 Mainline, Egham By-Pass/Windsor Rd Roundabout - M25 J13/A30 Roundabout	Eastbound	4,181	376	71.11	4,181	567	71.11			
A30 Mainline, Through M25 J13/A30 Roundabout	Eastbound	4,181	376	97.88	4,181	567	98.20			
A30 Mainline, M25 J13/A30 Roundabout - Staines By-Pass/ London Road Roundabout	Eastbound	2,483	0	24.26	2,190	3	21.40			
A30 Mainline, Staines By-Pass/ London Road Roundabout	Eastbound	2,483	0	51.27	2,190	3	45.23			
A30 Mainline, Staines By-Pass/ London Road Roundabout - Staines Rd/Great South-West-Rd Roundabout	Eastbound	1,357	1	72.37	1,223	5	65.28			
A30 Mainline, Through Staines Rd/ Great South -West Road	Eastbound	1,489	2	103.52	1,468	3	102.14			
A30 Mainline, Staines Rd/ Great South -West Road Roundabout - Great South - West Rd/ Fagg's Rd Junction	Eastbound	1,779	194	88.18	1,732	213	85.82			
A30 Mainline, Through Great South - West Rd/ Fagg's Rd Junction	Eastbound	2,015	130	48.64	1,878	93	45.32			
A30 Mainline, Great South - West Rd/ Fagg's Rd Junction - Great South - West Rd/ Causeway Rd Junction	Eastbound	2,213	156	85.50	2,055	99	79.41			
A30 Mainline, Great South -West Rd Roundabout - Great South - West Rd/ Causeway Rd Junction	Westbound	1,561	178	75.81	1,595	296	77.41			
A30 Mainline, Great South - West Rd/ Causeway Rd Junction - Great South - West Rd/ Fagg's Rd Junction	Westbound	1,969	271	70.47	1,919	322	68.71			
A30 Mainline, Through Great South - West Rd/ Fagg's Rd Junction	Westbound	1,654	271	107.94	1,621	322	105.77			
A30 Mainline, Great South - West Rd/ Fagg's Rd Junction - Staines Rd/ Great South -West Road Roundabout	Westbound	1,066	0	59.33	1,242	46	69.08			
A30 Mainline, Through Staines Rd/ Great South -West Road Roundabout	Westbound	1,677	30	71.40	1,774	97	75.54			
A30 Mainline, Staines Rd/ Great South -West Road Roundabout - Staines By-Pass/ London Road Roundabout	Westbound	1,021	1	55.11	1,066	5	57.81			

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
A30 Mainline, Staines By-Pass/ London Road Roundabout	Westbound	401	0	99.24	506	0	104.14		✓	
A30 Mainline, Staines By-Pass/ London Road Roundabout - M25 J13	Westbound	1,719	3	68.61	1,544	0	65.42			
A30 Mainline , M25 J13/A30 Roundabout - Egham By-Pass/Windsor Rd Roundabout	Westbound	2,457	106	104.15	2,479	102	103.55			
A30 Mainline , Egham By-Pass/Windsor Rd Roundabout - A30/Christchurch Rd	Westbound	1,420	90	94.66	1,397	79	93.14			
A30 Off Slip, Great South - West Rd/ Fagg's Rd Junction - Staines Rd/ Great South -West Road Roundabout	-	865	325	28.01	893	524	28.91			
A30/A4 Intersection , Great West Rd/Bath Rd Roundabout	-	236	8	108.97	228	11	106.58			
A30/Bedford Rd/Staines Rd Intersection, Clockhouse Roundabout	-	1,058	30	94.71	1,096	67	98.58			
A30/Bedford Rd/Staines Rd Intersection, Staines By-Pass Intersection	-	865	325	28.01	893	524	28.91			
M25/A30 Intersection, J13	-	4,705	108	78.42	4,657	142	77.62			
A30/A308 Intersect, Staines By-Pass/ London Rd Intersection	-	946	30	100.38	973	99	99.33			
Runnymede Roundabout/A30 Intersection , Runnymede Roundabout/A30 Intersection	-	1,536	4	34.45	1,507	8	33.81			

Figure 4-13: AM V/C Impact of HNWR, A30



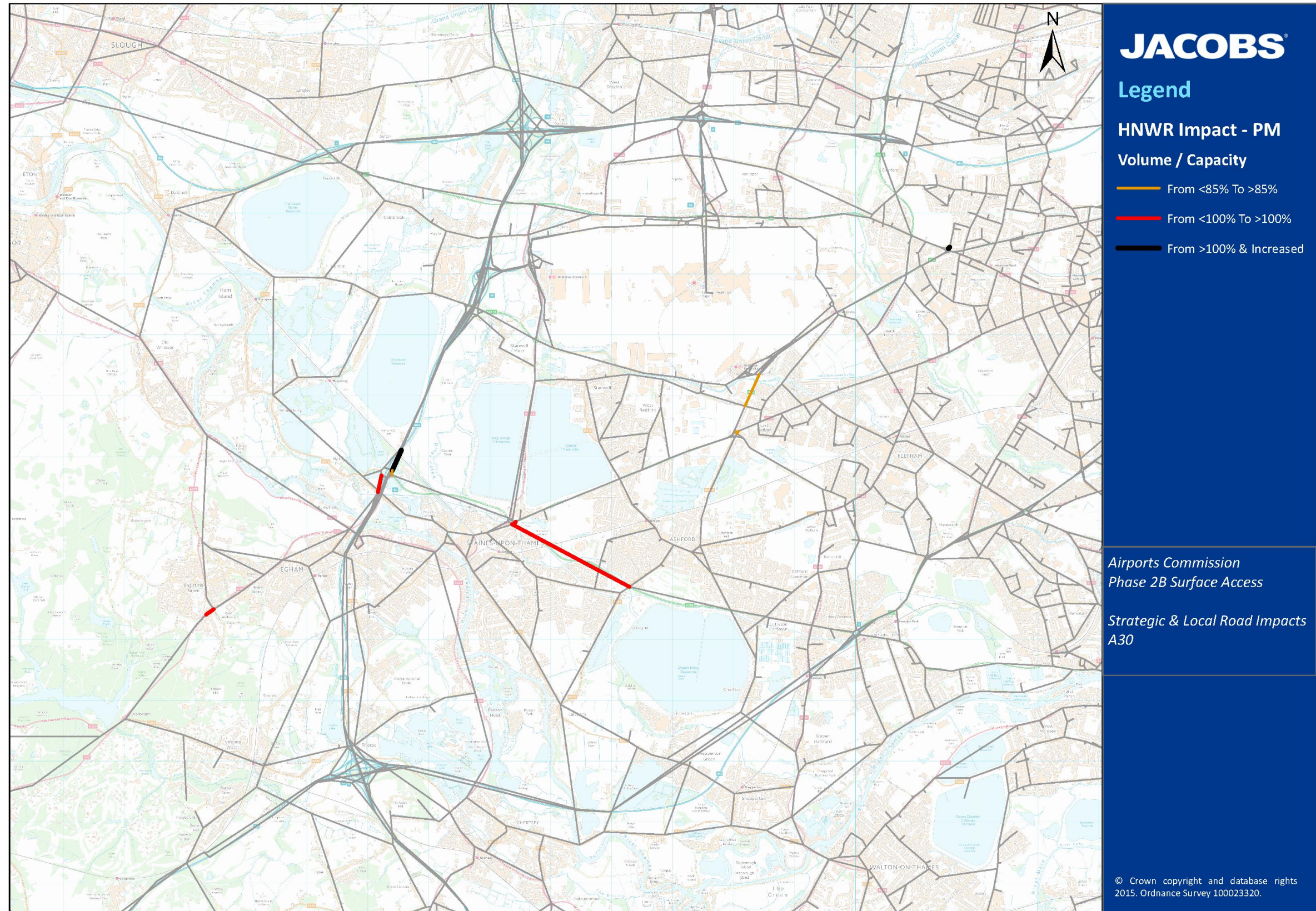
- 4.7.4 There are a small number of sections of the A30 corridor that are forecast to experience capacity problems in the HNWR scenario. The eastbound A30 mainline approaching Runnymede Roundabout at Windsor Road is predicted to operate at 81% capacity in the Extended Baseline, rising to 91% following the introduction of the HNWR. Of the 200 PCU increase in flows in the HNWR, almost all of these can be attributed to additional airport-related traffic. The A30 / London Road roundabout is predicted to operate at just below 100% capacity in the Extended Baseline, increasing to 105% in the HNWR scenario, though neither scenario predicts that airport traffic will use this section.
- 4.7.5 Modelled traffic flow data for the A30 corridor in the Extended Baseline and HNWR scenarios is presented in **Table 4-14** for the PM peak period. **Figure 4-14** is presented below Table 4-14 and shows the impact of the HNWR in the PM peak period spatially.

Table 4-14: PM V/C with HNWR, A30

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
A30 Mainline, A30/Christchurch Rd - Egham By-Pass/Windsor Rd Roundabout	Eastbound	1,251	74	98.00	1,285	106	100.53		✓	
A30 Mainline, Egham By-Pass/Windsor Rd Roundabout - M25 J13/A30 Roundabout	Eastbound	2,952	97	69.47	3,100	137	72.95			
A30 Mainline, Through M25 J13/A30 Roundabout	Eastbound	4,085	97	99.36	4,172	137	100.03		✓	
A30 Mainline, M25 J13/A30 Roundabout - Staines By-Pass/ London Road Roundabout	Eastbound	2,052	0	20.05	1,931	0	18.86			
A30 Mainline, Staines By-Pass/ London Road Roundabout	Eastbound	2,052	0	58.79	1,931	0	55.31			
A30 Mainline, Staines By-Pass/ London Road Roundabout - Staines Rd/Great South-West-Rd Roundabout	Eastbound	1,484	0	80.26	1,408	3	76.25			
A30 Mainline, Through Staines Rd/ Great South -West Road	Eastbound	1,253	1	87.41	1,143	1	79.03			
A30 Mainline, Staines Rd/ Great South -West Road Roundabout - Great South - West Rd/ Fagg's Rd Junction	Eastbound	1,531	79	79.02	1,397	126	72.07			
A30 Mainline, Through Great South - West Rd/ Fagg's Rd Junction	Eastbound	1,739	256	44.00	1,505	224	38.09			
A30 Mainline, Great South - West Rd/ Fagg's Rd Junction -Great South - West Rd/ Causeway Rd Junction	Eastbound	1,908	276	78.00	1,696	231	69.41			
A30 Mainline, Great South -West Rd Roundabout - Great South - West Rd/ Causeway Rd Junction	Westbound	1,273	28	66.93	1,381	77	72.62			
A30 Mainline, Great South - West Rd/ Causeway Rd Junction - Great South - West Rd/ Fagg's Rd Junction	Westbound	1,895	60	92.94	1,855	113	57.42			
A30 Mainline, Through Great South - West Rd/ Fagg's Rd Junction	Westbound	1,554	59	108.77	1,527	113	106.88			
A30 Mainline, Great South - West Rd/ Fagg's Rd Junction - Staines Rd/ Great South -West Road Roundabout	Westbound	1,281	0	73.29	1,606	146	91.89	✓		

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
A30 Mainline, Through Staines Rd/ Great South -West Road Roundabout	Westbound	1,937	93	82.47	2,070	251	88.15	✓		
A30 Mainline, Staines Rd/ Great South -West Road Roundabout - Staines By-Pass/ London Road Roundabout	Westbound	1,195	3	63.99	1,290	8	69.37			
A30 Mainline, Staines By-Pass/ London Road Roundabout	Westbound	586	2	99.15	831	0	102.02		✓	
A30 Mainline, Staines By-Pass/ London Road Roundabout - M25 J13	Westbound	1,633	8	81.25	1,389	2	73.43			
A30 Mainline , M25 J13/A30 Roundabout - Egham By-Pass/Windsor Rd Roundabout	Westbound	3,500	308	105.88	3,455	338	104.40			
A30 Mainline , Egham By-Pass/Windsor Rd Roundabout - A30/Christchurch Rd	Westbound	1,534	215	102.27	1,519	229	101.28			
A30 Off Slip, Great South - West Rd/ Fagg's Rd Junction - Staines Rd/ Great South -West Road Roundabout	-	608	96	19.68	663	251	21.47			
A30/A4 Intersection , Great West Rd/Bath Rd Roundabout	-	240	2	107.37	243	4	110.27			✓
A30/Bedford Rd/Staines Rd Intersection, Clockhouse Roundabout	-	915	96	82.83	984	141	88.41	✓		
A30/Bedford Rd/Staines Rd Intersection, Staines By-Pass Intersection	-	0	0	0.00	340	146	31.13			
M25/A30 Intersection, J13	-	5,051	326	84.18	5,123	373	85.39	✓		
A30/A308 Intersect, Staines By-Pass/ London Rd Intersection	-	997	14	99.39	1,027	33	100.48		✓	
Runnymede Roundabout/A30 Intersection , Runnymede Roundabout/A30 Intersection	-	900	21	20.18	861	13	19.32			

Figure 4-14: PM V/C Impact of HNWR, A30



- 4.7.6 A greater number of sections in the PM peak period have been forecast to operate either close to or above capacity than in the AM peak. This includes the A30 mainline in the eastbound direction between the Runnymede Roundabout at Windsor Road and the Christchurch Road junctions, which operates just below capacity in the Extended Baseline and it exceeds capacity in the HNWR scenario. Immediately south of Heathrow Airport, the westbound mainline between the Fagg's Road and Staines Road junctions is forecast to experience an increase in airport-related traffic of almost 150 PCUs. This contributes to the section operating at 92% capacity in the HNWR scenario, compared with 73% in the Extended Baseline.
- 4.7.7 The following junctions are also forecast to operate above capacity in the PM peak period:
- **M25 / A30 Junction** – parts of the roundabout at Junction 13 of the M25 are expected to exceed 85% capacity with the introduction of the HNWR. The A30 off-slip from Runnymede to Junction 13 is also likely to operate marginally above capacity;
 - **A30 / London Road Roundabout** – the roundabout is forecast to operate marginally within capacity in the Extended Baseline (99%) and exceed capacity in the HNWR scenario (100-102%);
 - **Clockhouse Roundabout** – the roundabout is predicted to operate at above 85% capacity in the HNWR scenario;
 - **A30 / A4 Roundabout** – the minor arm of the roundabout (Burns Way) is forecast to operate above capacity in both the Extended Baseline and HNWR scenarios;
 - **A30 / A315 Staines Road Roundabout** – the roundabout is predicted to operate at above 85% capacity in the HNWR scenario.
- 4.7.8 The impact of expansion at Heathrow on the A30 was not considered as part of the static pre-consultation assessments. This assessment was limited to a selection of key strategic roads in the immediate vicinity of Heathrow and as a result did not draw any specific conclusions regarding the operation of the A30 with or without airport expansion. It is considered that the V/C changes that have been identified along the A30 in the AM and PM peak periods are unlikely to materially affect the AC's understanding of the feasibility of the HNWR option.
- ## 4.8 A312
- 4.8.1 The A312 lies to the east of Heathrow Airport. It commences at its junction with the A311 north of the town of Hampton, which lies to the south east of Heathrow Airport. The A312 then extends in a north westerly direction toward the eastern perimeter of Heathrow Airport before continuing to the north east where it intersects both the A4 and M4 respectively before terminating in the town of Harrow. The entire A312 route has been modelled within the detailed simulation area of the traffic model.
- 4.8.2 Modelled traffic flow data for the A312 in the Extended Baseline and HNWR scenarios is presented in **Table 4-15** for the AM peak period. **Figure 4-15** is presented below Table 4-15 and shows the impact of the HNWR in the AM peak period spatially.
- 4.8.3 Further figures showing the V/C of *all* links (and not just those exceeding a threshold in the HNWR scenario) along the A312 corridor in both the Extended Baseline and HNWR are provided in Appendix A.

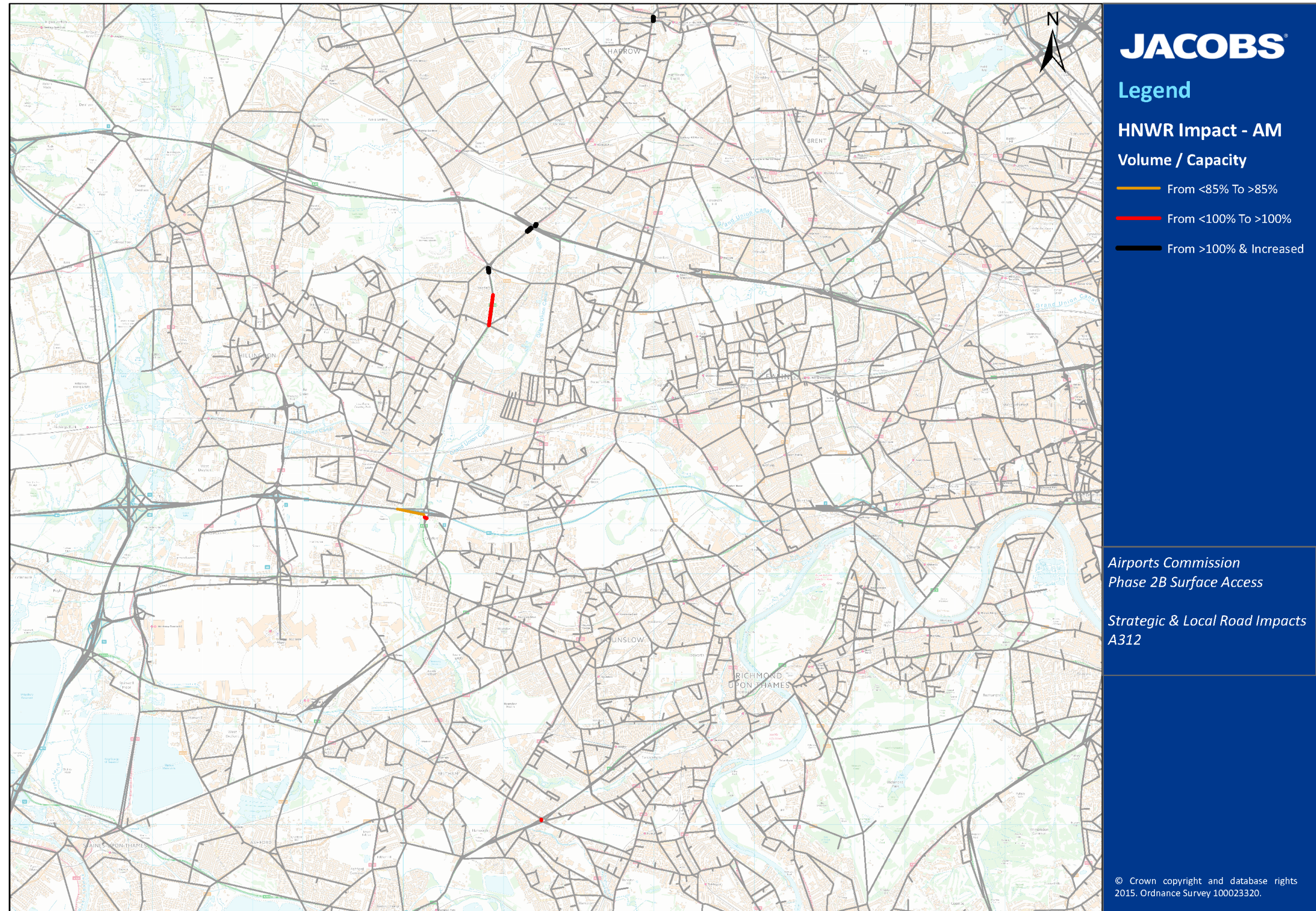
Table 4-15: AM V/C with HNWR, A312

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
A312 Mainline, Pinner Rd/ Greenhill Way Roundabout - Pett's Hill/Dorchester Rd Roundabout	Southbound	1,473	13	103.15	1,475	15	103.26			✓
A312 Mainline, Pett's Hill/Dorchester Rd Roundabout - A40/A312 Roundabout	Southbound	800	54	92.88	801	72	93.14			
A312 Mainline, Through A40/A312 Roundabout	Southbound	1,106	61	102.21	1,109	78	102.53			✓
A312 Mainline, A40/A312 Roundabout - Ruislip Rd/Church Rd Roundabout	Southbound	1,338	274	92.26	1,327	385	91.50			
A312 Mainline, Through Ruislip Rd/Church Rd Roundabout	Southbound	1,559	278	99.15	1,572	389	99.97			
A312 Mainline, Ruislip Rd/Church Rd Roundabout - Willow Tree Ln/A312 Roundabout	Southbound	1,910	341	97.48	1,967	485	101.61		✓	
A312 Mainline, Willow Tree Ln/A312 Roundabout - Uxbridge Road/The Pkwy Roundabout	Southbound	2,608	359	80.73	2,668	510	82.59			
A312 Mainline, Through Uxbridge Road/The Pkwy Roundabout	Southbound	2,112	359	60.00	2,140	510	61.79			
A312 Mainline, Uxbridge Road/The Pkwy Roundabout - Hayes Rd/A312 Roundabout	Southbound	2,339	359	59.98	2,346	436	60.16			
A312 Mainline, Through Hayes Rd/A312 Roundabout	Southbound	2,339	359	98.71	2,346	436	99.60			
A312 Mainline, Hayes Rd/A312 Roundabout - M4 J3 Roundabout	Southbound	2,414	403	68.19	2,869	512	81.04			
A312 Mainline, Through M4 J3 Roundabout	Southbound	2,414	403	110.43	2,869	512	110.29			
A312 Mainline, M4 J3 Roundabout -The Pkwy/A4 Roundabout	Southbound	1,869	67	111.71	1,836	10	109.55			
A312 Mainline, The Pkwy/A4 Roundabout - The Pkwy/ Causeway Junction	Southbound	807	28	105.15	776	45	103.85			
A312 Mainline, Through Twickenham Rd/Great Chertsey Rd Roundabout	Southbound	1,963	43	88.75	1,960	66	88.60			
A312 Mainline, Twickenham Rd/Great Chertsey Rd Roundabout - A312/High St Junction	Southbound	854	8	72.87	852	11	72.69			
A312 Mainline, A312/High St Junction - Twickenham Rd/Great Chertsey Rd Roundabout	Northbound	1,077	71	75.90	1,094	108	77.09			
A312 Mainline, Through Twickenham Rd/Great Chertsey Rd Roundabout	Northbound	2,201	84	99.51	2,219	150	100.30		✓	

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
A312 Mainline, Twickenham Rd/Great Chertsey Rd Roundabout - The Pkwy/ Causeway Junction	Northbound	993	98	101.28	993	165	101.24			
A312 Mainline, The Pkwy/Causeway Junction - The Pkwy/A4 Roundabout	Northbound	1,701	178	103.77	1,596	54	102.31			
A312 Mainline, Through M4 J3	Northbound	2,147	86	91.49	1,952	5	83.17			
A312 Mainline, M4 J3 Roundabout - Hayes Rd/A312 Roundabout	Northbound	2,686	384	75.89	2,662	488	75.20			
A312 Mainline, Through Hayes Rd/A312 Roundabout	Northbound	2,686	384	93.36	2,662	488	92.51			
A312 Mainline, Haynes Rd/A312 Roundabout - Uxbridge Road/The Pkwy Roundabout	Northbound	2,242	351	59.56	2,298	469	60.94			
A312 Mainline, Through Uxbridge Road/The Pkwy Roundabout	Northbound	663	30	48.54	661	39	48.35			
A312 Mainline, Uxbridge Road/The Pkwy Roundabout - Willow tree Ln/A312 Roundabout	Northbound	2,008	321	78.58	2,050	430	79.88			
A312 Mainline, Willow Tree Ln Roundabout - Ruislip/A312 Roundabout	Northbound	1,687	294	43.26	1,694	375	43.44			
A312 Mainline, Through Ruislip Rd/A312 Roundabout	Northbound	1,687	294	100.64	1,694	375	101.04			✓
A312 Mainline, Ruislip Rd/A312 Roundabout - A40/A312 Roundabout	Northbound	1,350	216	105.23	1,358	266	105.84			✓
A312 Mainline, A40/A312 Roundabout - Pett's Hill/Dorchester Rd Roundabout	Northbound	973	59	99.30	978	74	99.78			
A312 Mainline, Pett's Hill/Dorchester Rd Roundabout - Pinner Rd/Greenhill Way Roundabout	Northbound	779	34	99.73	781	41	99.97			
A4020/A316 Intersection, Hanworth Rd/A312 Junction	-	177	2	22.64	200	3	25.03			
A4020/A316 Intersection, Hampton Rd W/ Twickenham Rd Junction	-	2,213	43	100.06	2,209	68	99.85			
M4 J3/A312 Intersection , The Pkwy/ M4 J3	-	1,735	345	97.52	1,958	508	110.05		✓	
A312/ Hayes Rd Intersection , The Pkwy/ Hayed Rd Junction	-	504	3	59.22	564	2	66.22			
A30/A312 Intersection, Great South-West Rd/ Causeway Junction	-	2,213	156	85.50	2,055	99	79.41			
A4/A312 Intersection , The Pkwy/ Bath Rd Junction	-	1,298	201	108.70	1,360	171	105.77			
A4020/A312 Intersection , Uxbridge Road/ The Pkwy Junction	-	1,048	0	57.56	1,066	0	58.54			

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
A40/A312 Intersection , Western Ave/Church Rd Junction	-	1,064	25	95.67	1,078	28	96.89			
A312/B455 Intersection , Whitehart Roundabout	-	644	0	98.67	645	0	98.88			
A312/Pinner Rd Intersection , Pinner Rd/ Greenhill Way Roundabout	-	54	0	4.88	54	0	4.88			
A312 Mainline, Pinner Rd/ Greenhill Way Roundabout - Pett's Hill/Dorchester Rd Roundabout	Northbound	1,507	25	46.37	1,513	31	46.55			
A312 Mainline, Through Uxbridge Road/The Pkwy Roundabout	Northbound	1,579	321	43.27	1,637	430	44.68			
A312 Mainline, Twickenham Rd/Great Chertsey Rd Roundabout - A312/High St Junction	Northbound	387	9	35.92	373	0	34.63			

Figure 4-15: AM V/C Impact of HNWR, A312



- 4.8.4 One of the most important sections of the A312 with respect to the HNWR is its junction with the M4 at Junction 3. As noted in consideration of the M4 corridor, this junction is predicted to operate above capacity in the HNWR scenario. In the AM peak period there are also a number of sections of the mainline A312 that are forecast to operate above capacity in the HNWR scenario:
- Southbound - Pinner Rd/ Greenhill Way Roundabout - Pett's Hill/Dorchester Rd Roundabout ;
 - Southbound - Through A40/A312 Roundabout;
 - Southbound - Ruislip Rd/Church Rd Roundabout - Willow Tree Ln/A312 Roundabout;
 - Northbound - Through Twickenham Rd/Great Chertsey Rd Roundabout ;
 - Northbound - Through Ruislip Rd/A312 Roundabout; and
 - Northbound - Ruislip Rd/A312 Roundabout - A40/A312 Roundabout
- 4.8.5 Several of the sections above are forecast to experience significant increases in airport-related traffic in the HNWR scenario. For instance the southbound A312 mainline between the Ruislip Road roundabout (also known as the White Hart Roundabout) and Willow Tree Lane junction is predicted to experience an increase of almost 150 PCUs in the AM peak period, accounting for 25% of all traffic on the section. The northbound A312 mainline between the Ruislip Road roundabout and the A40 junction is also forecast to experience an increase of 50 PCUs, with airport-related traffic accounting for 20% of all traffic here.
- 4.8.6 Modelled traffic flow data for the A312 in the Extended Baseline and HNWR scenarios is presented in **Table 4-16** for the PM peak period. **Figure 4-16** is presented below Table 4-16 and shows the impact of the HNWR in the PM peak period spatially.

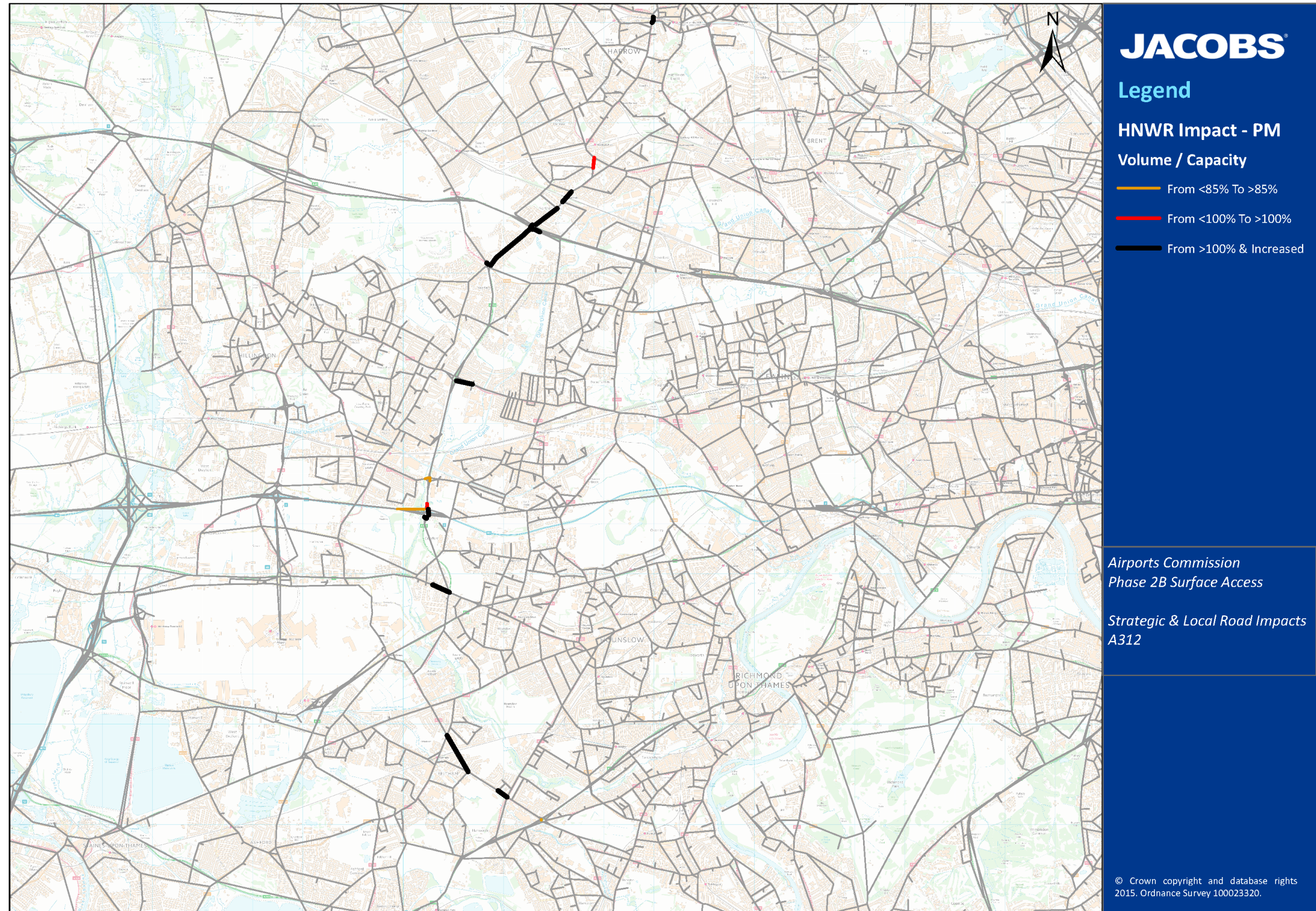
Table 4-16: PM V/C with HNWR, A312

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
A312 Mainline, Pinner Rd/ Greenhill Way Roundabout - Pett's Hill/Dorchester Rd Roundabout	Southbound	1,415	16	102.72	1,421	20	102.85			✓
A312 Mainline, Pett's Hill/Dorchester Rd Roundabout - A40/A312 Roundabout	Southbound	999	61	97.47	1,005	81	98.08			
A312 Mainline, Through A40/A312 Roundabout	Southbound	512	8	96.34	514	8	96.79			
A312 Mainline, A40/A312 Roundabout - Ruislip Rd/Church Rd Roundabout	Southbound	1,784	104	108.15	1,823	149	110.49			✓
A312 Mainline, Through Ruislip Rd/Church Rd Roundabout	Southbound	1,675	105	106.49	1,686	151	107.21			✓
A312 Mainline, Ruislip Rd/Church Rd Roundabout - Willow Tree Ln/A312 Roundabout	Southbound	1,622	118	109.47	1,573	166	109.18			
A312 Mainline, Willow Tree Ln/A312 Roundabout - Uxbridge Road/The Pkwy Roundabout	Southbound	2,610	202	80.81	2,644	281	81.85			
A312 Mainline, Through Uxbridge Road/The Pkwy Roundabout	Southbound	2,303	202	65.75	2,335	281	65.98			
A312 Mainline, Uxbridge Road/The Pkwy Roundabout - Hayes Rd/A312 Roundabout	Southbound	2,594	232	66.51	2,584	319	66.25			
A312 Mainline, Through Hayes Rd/A312 Roundabout	Southbound	2,633	233	82.41	2,719	321	85.08	✓		
A312 Mainline, Hayes Rd/A312 Roundabout - M4 J3 Roundabout	Southbound	2,750	262	77.68	2,688	358	75.92			
A312 Mainline, Through M4 J3 Roundabout	Southbound	2,750	262	98.46	2,688	358	103.32		✓	
A312 Mainline, M4 J3 Roundabout -The Pkwy/A4 Roundabout	Southbound	1,822	21	108.16	1,796	21	106.45			
A312 Mainline, The Pkwy/A4 Roundabout - The Pkwy/Causeway Junction	Southbound	683	23	103.70	688	60	105.12			✓
A312 Mainline, Through Twickenham Rd/Great Chertsey Rd Roundabout	Southbound	1,786	39	80.72	1,777	70	80.32			
A312 Mainline, Twickenham Rd/Great Chertsey Rd Roundabout - A312/High St Junction	Southbound	758	11	64.68	761	20	64.94			

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
A312 Mainline, A312/High St Junction - Twickenham Rd/Great Chertsey Rd Roundabout	Northbound	1,088	28	83.49	1,104	51	84.69			
A312 Mainline, Through Twickenham Rd/Great Chertsey Rd Roundabout	Northbound	1,869	49	84.48	1,884	91	85.17	✓		
A312 Mainline, Twickenham Rd/Great Chertsey Rd Roundabout - The Pkwy/Causeway Junction	Northbound	873	59	104.38	876	120	104.68			✓
A312 Mainline, The Pkwy/Causeway Junction - The Pkwy/A4 Roundabout	Northbound	1,656	161	103.65	1,591	36	95.46			
A312 Mainline, Through M4 J3	Northbound	1,953	57	83.23	1,974	44	84.12			
A312 Mainline, M4 J3 Roundabout - Hayes Rd/A312 Roundabout	Northbound	2,590	390	73.17	2,599	495	73.41			
A312 Mainline, Through Hayes Rd/A312 Roundabout	Northbound	2,590	390	90.01	2,599	495	90.30			
A312 Mainline, Haynes Rd/A312 Roundabout - Uxbridge Road/The Pkwy Roundabout	Northbound	3,057	383	78.39	3,083	501	79.05			
A312 Mainline, Through Uxbridge Road/The Pkwy Roundabout	Northbound	885	41	81.00	880	51	80.52			
A312 Mainline, Uxbridge Road/The Pkwy Roundabout - Willow tree Ln/A312 Roundabout	Northbound	2,448	334	97.86	2,504	443	99.56			
A312 Mainline, Willow Tree Ln Roundabout - Ruislip/A312 Roundabout	Northbound	1,160	142	29.75	1,168	183	29.94			
A312 Mainline, Through Ruislip Rd/A312 Roundabout	Northbound	1,160	142	88.97	1,168	183	89.55			
A312 Mainline, Ruislip Rd/A312 Roundabout - A40/A312 Roundabout	Northbound	1,251	167	113.70	1,260	224	114.51			✓
A312 Mainline, A40/A312 Roundabout - Pett's Hill/Dorchester Rd Roundabout	Northbound	907	78	97.24	937	103	100.66		✓	
A312 Mainline, Pett's Hill/Dorchester Rd Roundabout - Pinner Rd/ Greenhill Way Roundabout	Northbound	1,102	29	102.32	1,107	36	102.54			✓
A4020/A316 Intersection, Hanworth Rd/A312 Junction	-	31	1	3.92	31	1	3.89			
A4020/A316 Intersection, Hampton Rd W/ Twickenham Rd Junction	-	1,920	39	86.79	1,921	75	86.85			

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
M4 J3/A312 Intersection , The Pkwy/ M4 J3	-	1,998	245	108.12	2,037	339	110.24			✓
A312/ Hayes Rd Intersection , The Pkwy/ Hayed Rd Junction	-	769	2	77.05	894	28	89.59	✓		
A30/A312 Intersection, Great South-West Rd/ Causeway Junction	-	1,273	28	66.93	1,381	77	72.62			
A4/A312 Intersection , The Pkwy/ Bath Rd Junction	-	807	177	105.90	831	196	108.09			✓
A4020/A312 Intersection , Uxbridge Road/ The Pkwy Junction	-	1,328	0	63.38	1,344	0	64.14			
A40/A312 Intersection , Western Ave/Church Rd Junction	-	2,783	118	103.75	2,844	168	106.01			✓
A312/B455 Intersection , Whitehart Roundabout	-	947	11	105.52	951	13	106.00			✓
A312/Pinner Rd Intersection , Pinner Rd/ Greenhill Way Roundabout	-	54	0	4.88	54	0	4.88			
A312 Mainline, Pinner Rd/ Greenhill Way Roundabout - Pett's Hill/Dorchester Rd Roundabout	Northbound	1,520	24	46.77	1,528	32	47.01			
A312 Mainline, Through Uxbridge Road/The Pkwy Roundabout	Northbound	2,009	334	55.11	2,045	443	56.33			
A312 Mainline, Twickenham Rd/Great Chertsey Rd Roundabout - A312/High St Junction	Northbound	410	1	37.33	400	1	36.48			

Figure 4-16: PM V/C Impact of HNWR, A312



- 4.8.7 In the PM peak, the following junctions on the A312 are predicted to operate above capacity in the HNWR scenario:
- **A312 / M4** – As noted in consideration of the M4 corridor, this junction is predicted to operate above capacity in the HNWR scenario;
 - **A312 / A4** – the intersection of the A312 and A4 is forecast to operate over capacity in the Extended Baseline (106%) and HNWR (108%) scenarios. Airport-related traffic in the HNWR scenario accounts for 24% of all traffic, compared to 22% in the Extended Baseline;
 - **A312 / A40** – the intersection of the A312 and the A40 is forecast to operate over capacity in the Extended Baseline (104%) and HNWR (106%) scenarios. Airport-related traffic in the HNWR scenario accounts for 6% of all traffic, compared to 4% in the Extended Baseline;
 - **A312 / Ruislip Road (Whitehart Roundabout)** – the Whitehart Roundabout is forecast to operate over capacity in the Extended Baseline (106%) and HNWR (106%) scenarios. Airport-related traffic in both scenarios low, accounting for approximately 1% of total traffic in the Extended Baseline and HNWR scenarios respectively; and
 - **A312 / Hayes Road** - the Hayes Road junction is located immediately north of Junction 3 of the M4. Demand on at this junction increases by 125 PCUs in the HNWR scenario, of which 25 is airport-related. The resulting V/C at this junction increases from 77% in the Extended Baseline to almost 90% in the HNWR scenario.
- 4.8.8 In addition to the locations on the A312 mainline identified the AM analysis, the following sections are predicted to operate close to or above capacity in the HNWR scenario:
- Southbound - A40/A312 Roundabout - Ruislip Rd/Church Rd Roundabout;
 - Southbound – Through Ruislip Rd/Church Rd Roundabout;
 - Southbound – Through Hayes Rd/A312 Roundabout;
 - Southbound - The Pkwy/A4 Roundabout - The Pkwy/Causeway Junction;
 - Northbound - Through Ruislip Rd/A312 Roundabout;
 - Northbound - Twickenham Rd/Great Chertsey Rd Roundabout - The Pkwy/Causeway Junction; and
 - Northbound - Pett's Hill/Dorchester Rd Roundabout - Pinner Rd/ Greenhill Way Roundabout.
- 4.8.9 The impact of expansion at Heathrow on the A312 was not considered as part of the static pre-consultation assessments. This assessment was limited to a selection of key strategic roads in the immediate vicinity of Heathrow and as a result did not draw any specific conclusions regarding the operation of the A312 with or without airport expansion. It is considered that the V/C changes that have been identified along the A312 in the AM and PM peak periods are unlikely to materially affect the AC's understanding of the feasibility of the HNWR option.

4.9 A408

- 4.9.1 The A408 lies to the north of Heathrow Airport. It commences at its junction with the A4 on the northern perimeter of Heathrow Airport. The A408 then extends in a northern direction following the M4 from the Airport where it intersects M4 to the west of Junction 4. The A408 then continues in a north westerly direction before terminating in the town of Uxbridge.
- 4.9.2 All of the A408 has been modelled within the detailed simulation area of the traffic model. The impact of any additional demand for Heathrow Airport is likely to be most significant at its intersection with the M4.
- 4.9.3 Modelled traffic flow data for the A408 in the Extended Baseline and HNWR scenarios is presented in **Table 4-17** for the AM peak period. **Figure 4-17** is presented below Table 4-17 and shows the impact of the HNWR in the AM peak period spatially.

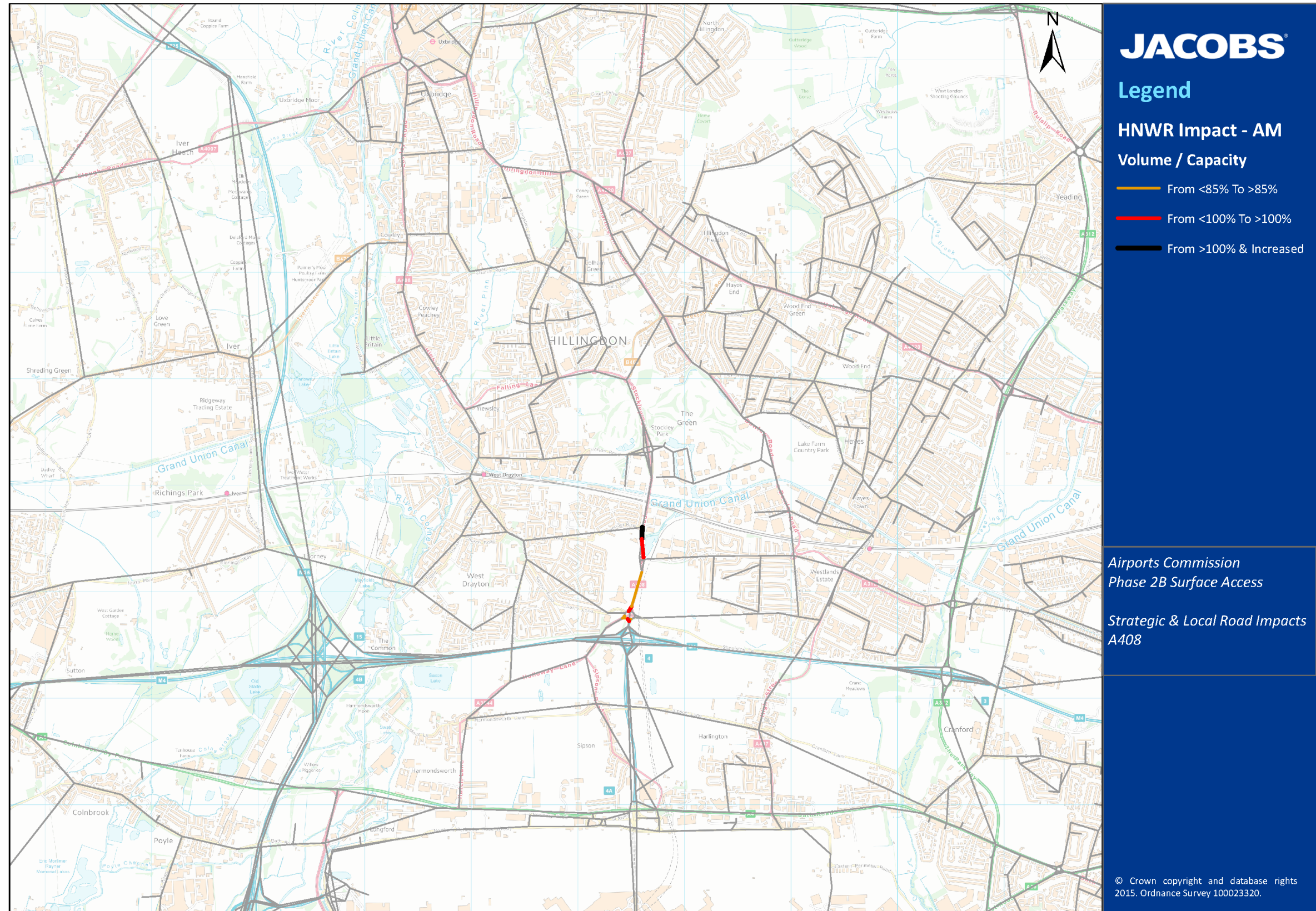
- 4.9.4 Further figures showing the V/C of *all* links (and not just those exceeding a threshold in the HNWR scenario) along the A408 corridor in both the Extended Baseline and HNWR are provided in Appendix A.

Table 4-17: AM V/C with HNWR, A408

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
A408 Mainline, A3044/Sipson Rd Roundabout - Holloway Ln/Stockley Rd Roundabout	Northbound	378	0	18.90	522	2	26.12			
A408 Mainline, Holloway Ln/Stockley Rd Roundabout	Northbound	239	0	98.42	241	0	102.80		✓	
A408 Mainline, Holloway Ln/Stockley Rd Roundabout - Stockley Rd/Horton Rd Roundabout/Flyover	Northbound	2,465	88	104.28	2,469	122	104.44			✓
A408 Mainline, Over Stockley Rd/Horton Rd Roundabout/Flyover	Northbound	1,621	69	42.34	1,614	90	42.16			
A408 Mainline, Stockley Rd/Horton Rd Roundabout/Flyover - Colham Roundabout	Northbound	1,726	69	54.55	1,719	90	54.50			
A408 Mainline, Colham Roundabout - Station Rd/High St Junction	Northbound	642	8	94.38	628	11	92.42			
A408 Mainline, Station Rd/High St Junction - Cowley Rd/Trumper Way Junction	Northbound	832	0	98.77	833	0	98.89			
A408 Mainline, Cowley Rd/Trumper Way Junction - New Windsor St/ Trumper Way Junction	Northbound	1,887	4	47.41	1,882	3	47.27			
A408 Mainline, New Windsor St/ Trumper Way Junction - Oxford St/Cross St Junction	Northbound	1,578	4	37.31	1,569	3	37.09			
A408 Mainline, Oxford St/Cross St Junction - Cross St/Cowley Rd Junction	Northbound	1,990	8	50.85	2,017	13	51.53			
A408 Mainline, Cross St/Cowley Rd Junction - Station Rd/High St Junction	Southbound	824	13	89.50	829	21	89.90			
A408 Mainline, Station Rd/High St Junction - Colham Roundabout	Southbound	1,197	37	67.89	1,221	54	69.39			
A408 Mainline, Colham Roundabout - Stockley Rd/Horton Rd Roundabout/Flyover	Southbound	1,061	109	51.88	1,142	159	56.00			
A408 Mainline, Over Stockley Rd/Horton Rd Roundabout/Flyover	Southbound	1,769	189	51.51	1,839	259	52.71			
A408 Mainline, Stockley Rd/Horton Rd Roundabout/Flyover - Holloway Ln/Stockley Rd Roundabout	Southbound	1,999	248	99.05	2,039	335	101.06		✓	
A408 Mainline, Holloway Ln/Stockley Rd Roundabout	Southbound	729	29	63.93	1,096	10	96.04	✓		
A408 Mainline, Holloway Ln/Stockley Rd Roundabout - A3044/Sipson Rd Roundabout	Southbound	729	30	68.77	1,098	11	64.91			
A408 Off Slip , Stockley Rd/Horton Rd Roundabout/Flyover	Northbound	345	59	34.75	311	76	32.16			

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
A408/Cherry Ln/Shepiston Ln/Stockley Rd Intersection , A408/Stockley Rd Roundabout	-	699	9	99.22	540	10	100.94		✓	
A408/Nine Acres Cl Intersection , Stockley Rd/Nine Acres Cl Roundabout	-	423	12	46.72	441	18	48.72			
A408/Horton Rd Intersection , Stockley Rd/Horton Rd Roundabout	-	606	13	58.24	645	24	61.59			
A408 Mainline, Tunnel Rd E/A4 Junction - A3044/Sipson Rd Roundabout - HNWR ONLY	Northbound	-	-	-	547	94	34.96			
A408 Mainline, A3044/Sipson Rd Roundabout - Tunnel Rd E/A4 Junction -HNWR ONLY	Southbound	-	-	-	470	184	90.90			

Figure 4-17: AM V/C Impact of HNWR, A408



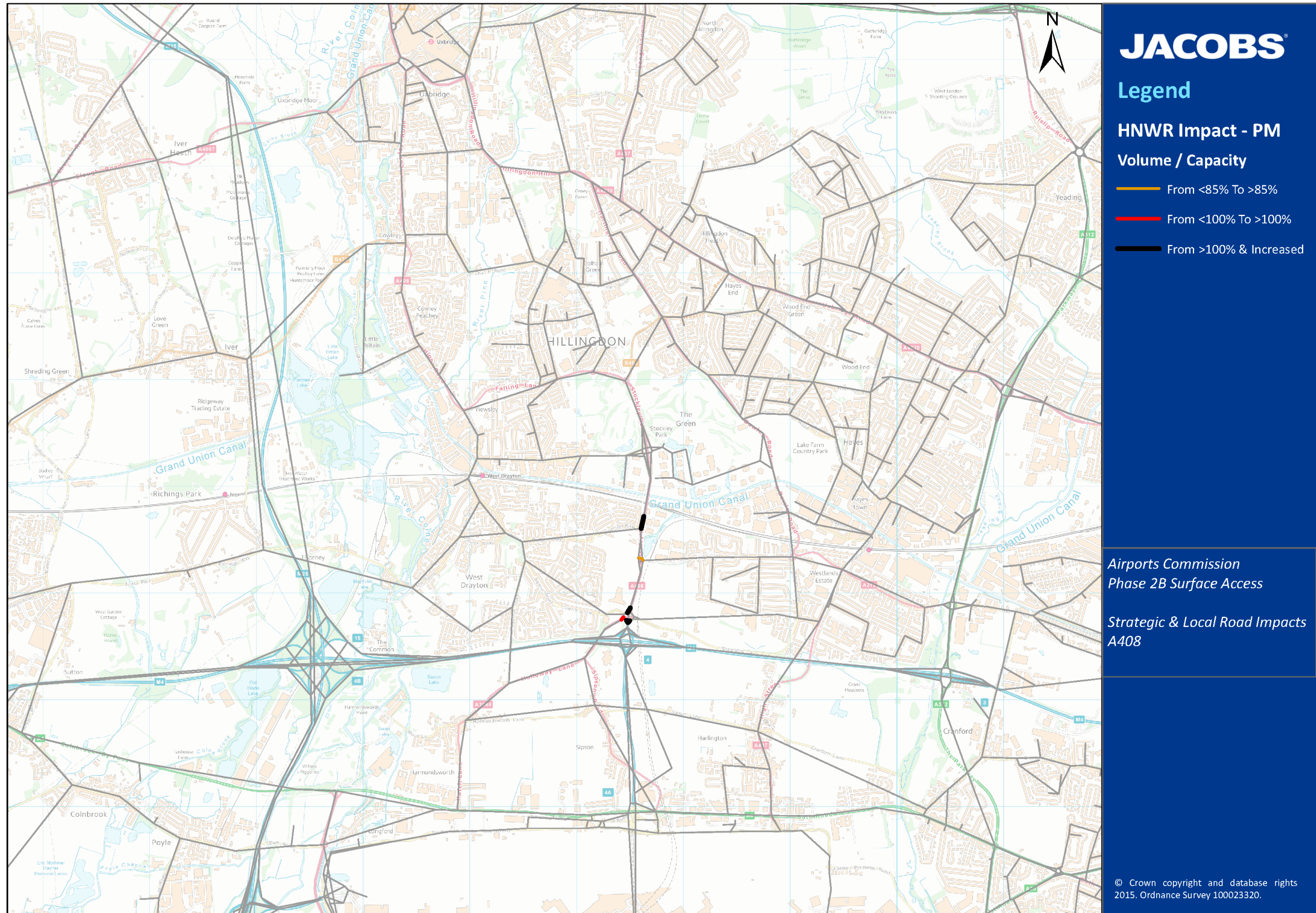
- 4.9.5 The HNWR scenario has a number of capacity-related impacts on both Stockley Road and its signalised roundabout immediately north of M4 Junction 4. On the mainline, between Stockley Road Roundabout and the Horton Road Roundabout junction, both the northbound and southbound A408 is forecast to operate at above 100% capacity. The southbound direction is predicted to experience the greatest increase in airport-related traffic in the HNWR scenario (circa 90 PCUs), with airport-related traffic accounting for 16% of total traffic in this scenario, compared to 12% in the Extended Baseline. On the approaches to the signalised roundabout, there are both increases and decreases in the overall amount of traffic. It is likely that capacity is being restrained at different arms of the roundabout. The northbound approach from M4 Junction 4 is actually expected to experience a decrease in flow in the HNWR scenario; however due to changing traffic flows on the opposing arms of the roundabout, the capacity for this movement is more constrained than in the Extended Baseline. Consequently, this section is calculated to exceed capacity as an indirect result of the introduction of the HNWR.
- 4.9.6 Modelled traffic flow data for the A408 in the Extended Baseline and HNWR scenarios is presented in **Table 4-18** for the PM peak period. **Figure 4-18** is presented below Table 4-18 and shows the impact of the HNWR in the PM peak period spatially.

Table 4-18: PM V/C with HNWR, A408

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
A408 Mainline, A3044/Sipson Rd Roundabout - Holloway Ln/Stockley Rd Roundabout	Northbound	480	2	23.98	600	7	30.01			
A408 Mainline, Holloway Ln/Stockley Rd Roundabout	Northbound	480	2	81.31	600	7	101.75		✓	
A408 Mainline, Holloway Ln/Stockley Rd Roundabout - Stockley Rd/Horton Rd Roundabout/Flyover	Northbound	1,995	170	90.98	2,005	188	91.49			
A408 Mainline, Over Stockley Rd/Horton Rd Roundabout/Flyover	Northbound	1,559	132	44.51	1,561	141	44.97			
A408 Mainline, Stockley Rd/Horton Rd Roundabout/Flyover - Colham Roundabout	Northbound	1,859	132	58.32	1,880	141	59.00			
A408 Mainline, Colham Roundabout - Station Rd/High St Junction	Northbound	489	0	94.82	485	8	94.35			
A408 Mainline, Station Rd/High St Junction - Cowley Rd/Trumper Way Junction	Northbound	670	0	75.74	666	1	75.28			
A408 Mainline, Cowley Rd/Trumper Way Junction - New Windsor St/ Trumper Way Junction	Northbound	1,725	1	43.34	1,717	1	43.15			
A408 Mainline, New Windsor St/ Trumper Way Junction - Oxford St/Cross St Junction	Northbound	1,691	0	58.04	1,686	0	57.84			
A408 Mainline, Oxford St/Cross St Junction - Cross St/Cowley Rd Junction	Northbound	1,317	1	33.66	1,298	1	33.16			
A408 Mainline, Cross St/Cowley Rd Junction - Station Rd/High St Junction	Southbound	1,759	2	83.00	1,751	3	82.63			
A408 Mainline, Station Rd/High St Junction - Colham Roundabout	Southbound	763	20	77.28	793	27	80.30			
A408 Mainline, Colham Roundabout - Stockley Rd/Horton Rd Roundabout/Flyover	Southbound	1,094	33	53.88	1,139	52	56.49			
A408 Mainline, Over Stockley Rd/Horton Rd Roundabout/Flyover	Southbound	1,390	78	57.69	1,482	103	60.12			
A408 Mainline, Stockley Rd/Horton Rd Roundabout/Flyover - Holloway Ln/Stockley Rd Roundabout	Southbound	2,349	89	101.59	2,409	119	103.93			✓
A408 Mainline, Holloway Ln/Stockley Rd Roundabout	Southbound	430	4	35.85	824	7	68.68			

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
A408 Mainline, Holloway Ln/Stockley Rd Roundabout - A3044/Sipson Rd Roundabout	Southbound	430	4	41.67	824	7	49.97			
A408 Off Slip, Stockley Rd/Horton Rd Roundabout/Flyover	Northbound	959	11	79.89	927	17	77.24			
A408/Cherry Ln/Shepiston Ln/Stockley Rd Intersection, A408/Stockley Rd Roundabout	-	325	0	104.53	340	1	106.17			✓
A408/Nine Acres Cl Intersection, Stockley Rd/Nine Acres Cl Roundabout	-	580	20	83.84	638	28	92.20	✓		
A408/Horton Rd Intersection, Stockley Rd/Horton Rd Roundabout	-	972	8	47.48	978	12	47.40			
A408 Mainline, Tunnel Rd E/A4 Junction - A3044/Sipson Rd Roundabout - HNWR ONLY	Northbound	-	-	-	401	7	65.59			
A408 Mainline, A3044/Sipson Rd Roundabout - Tunnel Rd E/A4 Junction -HNWR ONLY	Southbound	-	-	-	518	109	99.81			

Figure 4-18: PM V/C Impact of HNWR, A408



- 4.9.7 The PM capacity impacts of the HNWR on the A408 are largely consistent with those identified in the AM peak period. Several of the approaches to Stockley Road Roundabout operate either close to, or above capacity in the Extended Baseline and these capacity issues are exacerbated in the HNWR scenario. Unlike in the AM, the predicted impacts on the A408 mainline are from the north of its junction with Horton Road, travelling southbound. The section is forecast to be already over capacity in the Extended Baseline, and additional traffic on the section leads the V/C to rise to 104% in the HNWR scenario. Emerging capacity issues are also forecast at the junction with Nine Acres Close, which exceeds 85% capacity in the HNWR scenario.
- 4.9.8 The pre-consultation analysis did not consider the impacts of expansion at Heathrow on the A408. The analysis above suggests that there are likely to be capacity problems along Stockley Road immediately north of M4 Junction 4. Whilst the sections identified are likely to require some form of mitigation if HNWR is introduced, the impacts are not considered materially significant to the AC's understanding of the feasibility of the HNWR.

4.10 A308

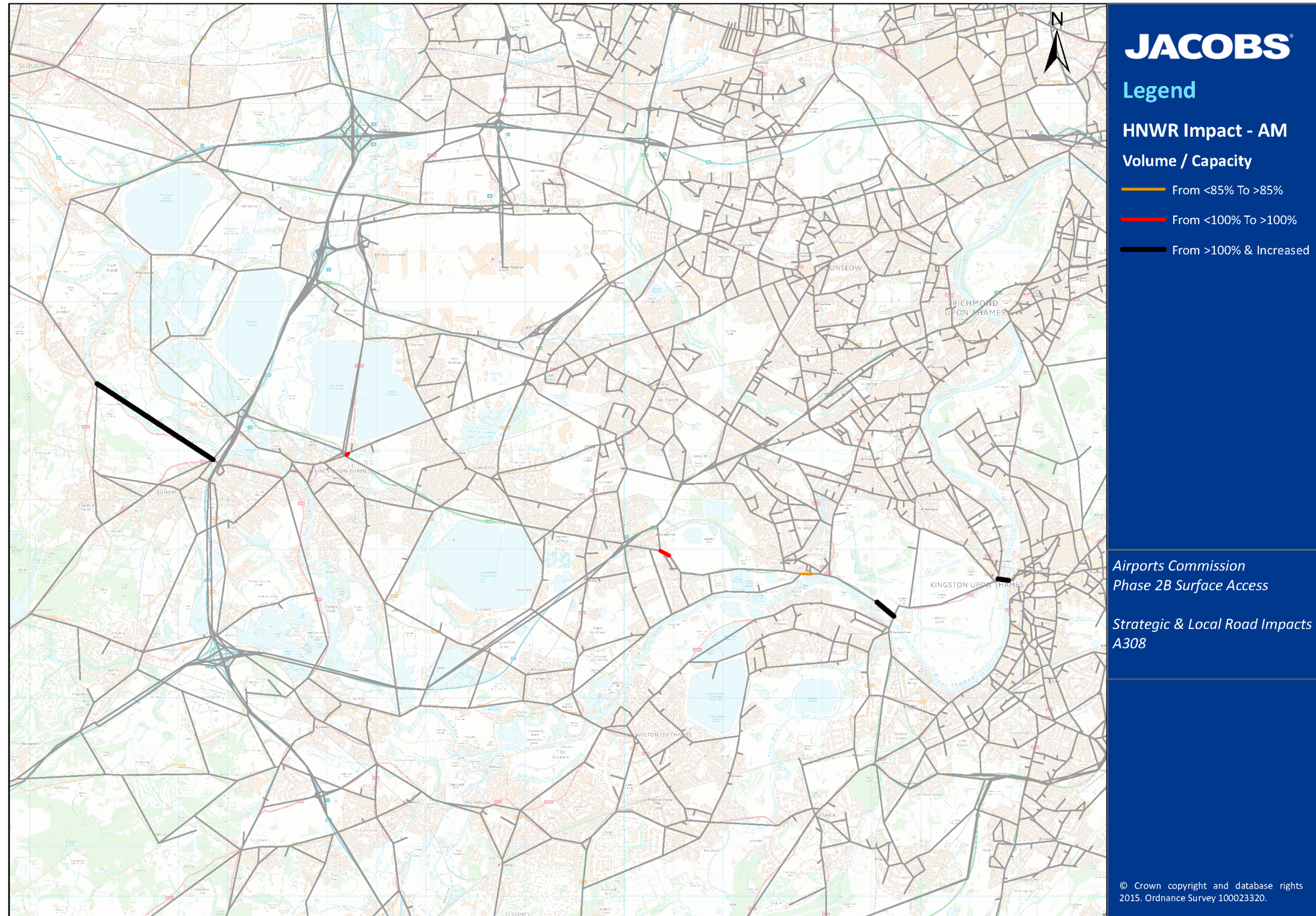
- 4.10.1 The A308 corridor is an east-west route located to the south of Heathrow Airport and runs between Kingston upon Thames to the east and Windsor to the west. The A308 shares junctions with other important roads in the vicinity of Heathrow Airport, such as the M3, A316, A30 and A3044. It also provides a crossing point beneath the M25 to the south of Junction 13. The A308 is located within the simulation area of the traffic model for much of this route, moving outside the detailed model area only as it approaches Windsor in the west.
- 4.10.2 Modelled traffic flow data along the A308 corridor for the Extended Baseline and HNWR is presented in **Table 4-19** for the AM peak period. **Figure 4-19** is presented below Table 4-19 and shows the impact of the HNWR in the AM peak period spatially.
- 4.10.3 Further figures showing the V/C of *all* links (and not just those exceeding a threshold in the HNWR scenario) along the A308 corridor in both the Extended Baseline and HNWR are provided in Appendix A.

Table 4-19: AM V/C with HNWR, A308

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
A308 Mainline, Albert Road/A308 Roundabout - A328/A308 Junction	Eastbound	1,134	1	68.79	1,066	0	64.47			
A308 Mainline, A328/A308 Junction -Egham By-Pass/A308 Roundabout	Eastbound	1,058	6	100.85	850	0	102.52			✓
A308 Mainline, Egham By-Pass/A308 Roundabout - A308/M25 Slip Road	Eastbound	1,536	4	34.45	1,507	8	33.81			
A308 Mainline, A308/M25 Slip Road - A308/A320 Roundabout	Eastbound	868	4	44.45	848	5	43.89			
A308 Mainline, A308/A320 Roundabout - Staines By-Pass/ A308 Roundabout	Eastbound	879	11	95.16	871	58	94.30			
A308 Mainline, Through Staines By-Pass/ A308 Roundabout	Eastbound	2,859	108	48.48	2,750	52	46.62			
A308 Mainline, Staines By-Pass/ A308 Roundabout - Fordbridge Roundabout	Eastbound	1,607	84	92.23	1,551	21	94.82			
A308 Mainline, Fordbridge Roundabout - Littleton Rd/A308 Junction	Eastbound	1,394	76	46.83	1,400	20	47.02			
A308 Mainline, Littleton Ln/A308 Junction - M3/ A308 Roundabout	Eastbound	1,304	71	88.74	1,326	19	90.05			
A308 Mainline, Through M3/ A308 Roundabout	Eastbound	2,776	65	67.26	2,770	35	67.13			
A308 Mainline, M3/ A308 Roundabout - Church Street/A308 Junction	Eastbound	1,337	62	97.76	1,355	75	100.33		✓	
A308 Mainline, Church Street/A308 Junction - Hampton Bridge Roundabout	Eastbound	1,768	58	102.74	1,790	75	102.81			✓
A308 Mainline, Hampton Bridge Roundabout - Chestnut Ave/A308 Junction	Eastbound	1,788	40	92.34	1,800	52	93.03			
A308 Mainline, Chestnut Ave/A308 Junction - High St/A308 Roundabout	Eastbound	1,763	39	96.54	1,779	53	97.37			
A308 Mainline, High St/A308 Roundabout - Horse Fair Bridge	Eastbound	1,729	30	57.65	1,733	45	57.77			
A308 Mainline, Horse Fair Bridge - High St/A308 Roundabout	Westbound	1,691	44	101.90	1,695	86	103.19			✓
A308 Mainline, High St/A308 Roundabout - Chestnut Ave/A308 Junction	Westbound	1,914	48	95.94	1,936	92	97.04			
A308 Mainline, Chestnut Ave/A308 Junction - Hampton Bridge Roundabout	Westbound	1,524	14	76.19	1,538	29	76.90			
A308 Mainline, Hampton Bridge Roundabout - Church Street/A308 Junction	Westbound	1,774	62	88.72	1,812	106	90.60			
A308 Mainline, Church Street/A308 Junction - M3/A308 Roundabout	Westbound	1,337	54	82.76	1,386	106	86.00	✓		
A308 Mainline, Through M3/A308 Roundabout	Westbound	2,537	57	61.47	2,616	125	63.38			
A308 Mainline, M3/A308 Roundabout - Littleton Rd/ A308 Junction	Westbound	1,370	82	94.12	1,430	136	97.89			
A308 Mainline, Littleton Rd/ A308 Junction - Fordbridge Roundabout	Westbound	885	11	62.54	1,004	75	71.15			
A308 Mainline, Fordbridge Roundabout - Staines By-Pass/ A308 Roundabout	Westbound	946	30	100.38	973	99	99.33			

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
A308 Mainline, Staines By-Pass/ A308 Roundabout - A320/A308 Roundabout	Westbound	784	12	105.66	844	19	105.54			
A308 Mainline, A320/A308 Roundabout - M25 Slip Road	Westbound	868	15	36.78	867	0	36.22			
A308 Mainline, M25 Slip Road - Egham By-Pass/A308 Roundabout	Westbound	3,325	121	102.91	3,346	102	102.61			
A308 Mainline, Egham By-Pass/A308 Roundabout - Albert Road/A308 Roundabout	Westbound	499	0	16.62	479	0	15.97			
A308/A30 Intersection, Staines By-Pass / London Rd Roundabout	-	401	0	99.24	506	0	104.14		✓	
M3/A308 Intersection , Staines Rd E/ Green St Roundabout	-	2,842	29	71.05	2,848	21	71.21			
A308 Mainline, Hampton Bridge Roundabout - Chestnut Ave/A308 Junction	Westbound	1,405	14	94.42	1,419	29	95.31			

Figure 4-19: AM V/C Impact of HNWR, A308



- 4.10.4 In the AM peak period there are two sections of the A308 that are under capacity in the Extended Baseline but over capacity in the HNWR scenario. The section from the M3/A308 Roundabout to the Church Street/A308 Junction experiences a relatively minor increase in overall traffic of less than 20 PCUs in the HNWR scenario in the AM peak period. Of these, only 13 are additional airport trips. In the opposing westbound direction the section experiences an increase in V/C in the HNWR scenario due to an increase of approximately 50 PCUs on the section, causing it to exceed the 85% threshold.
- 4.10.5 The other section that is under capacity in the Extended Baseline but over capacity in the HNWR scenario is Staines Bypass / A30 London Road roundabout. The V/C in the HNWR scenario is more than 104% compared to 99% in the Extended Baseline, however the exceedance cannot be directly attributed to additional airport traffic. This is because this particular part of the roundabout does not carry any airport trips in the AM peak period in either of the scenarios. Whilst this data would suggest that the HNWR does not contribute to the deteriorating performance of the junction, it should be acknowledged that it is possible that the third runway at Heathrow Airport may have influenced the operation of the junction less directly. For instance, the airport traffic may have caused rerouting in other parts of the network, contributing to the circa 100 PCU increase in non-airport traffic on this section. In addition, increased flows on opposing arms of the roundabout could also reduce the available capacity on this section, leading to the capacity issues noted above.
- 4.10.6 The HNWR is also forecast to adversely impact three sections of the A308 that are already over capacity in the Extended Baseline. The first of these sections is from the A328/A308 junction to the Runnymede Roundabout (Egham Bypass/A308 Roundabout). Despite the overall decrease in flow along this section in the HNWR scenario compared to the Extended Baseline, the V/C has increased. Although this may seem counter-intuitive, this is because the operational capacity of the roundabout has decreased in the HNWR scenario due to an increase in circulating traffic at the roundabout.
- 4.10.7 The second of these sections is the A308 between the Church Street/A308 junction and Hampton Bridge Roundabout. The section is already over capacity in the Extended Baseline and the V/C increases still further in the HNWR scenario; however the overall increase in demand amounts to only 22 PCUs in the AM peak hour. The third of the sections is the A308 between Horse Fair Bridge and the High St /A308 Roundabout which follows this same pattern, but in this case overall demand is virtually unchanged.
- 4.10.8 Modelled traffic flow data for the Extended Baseline and HNWR is presented in **Table 4-20** for the PM peak period. **Figure 4-20** is presented below Table 4-20 and shows the impact of the HNWR in the PM peak period spatially.

Table 4-20: PM V/C with HNWR, A308

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
A308 Mainline, Albert Road/A308 Roundabout - A328/A308 Junction	Eastbound	607	1	36.95	594	2	36.13			
A308 Mainline, A328/A308 Junction -Egham By-Pass/A308 Roundabout	Eastbound	821	3	69.79	805	5	76.39			
A308 Mainline, Egham By-Pass/A308 Roundabout - A308/M25 Slip Road	Eastbound	900	21	20.18	861	13	19.32			
A308 Mainline, A308/M25 Slip Road - A308/A320 Roundabout	Eastbound	718	17	30.73	678	5	29.32			
A308 Mainline, A308/A320 Roundabout - Staines By-Pass/ A308 Roundabout	Eastbound	877	3	95.02	858	7	92.97			
A308 Mainline, Through Staines By-Pass/ A308 Roundabout	Eastbound	1,460	0	48.68	1,432	0	47.74			
A308 Mainline, Staines By-Pass/ A308 Roundabout - Fordbridge Roundabout	Eastbound	1,433	194	85.30	1,277	45	78.88			
A308 Mainline, Fordbridge Roundabout - Littleton Rd/A308 Junction	Eastbound	1,521	176	51.02	1,449	165	48.62			
A308 Mainline, Littleton Ln/A308 Junction - M3/ A308 Roundabout	Eastbound	1,534	168	94.61	1,523	165	94.14			
A308 Mainline, Through M3/ A308 Roundabout	Eastbound	2,728	156	66.11	2,718	171	65.85			
A308 Mainline, M3/ A308 Roundabout - Church Street/A308 Junction	Eastbound	1,153	143	86.71	1,178	169	88.52			
A308 Mainline, Church Street/A308 Junction - Hampton Bridge Roundabout	Eastbound	1,889	136	101.97	1,896	163	102.62			✓
A308 Mainline, Hampton Bridge Roundabout - Chestnut Ave/A308 Junction	Eastbound	1,401	73	73.25	1,394	76	72.94			
A308 Mainline, Chestnut Ave/A308 Junction - High St/A308 Roundabout	Eastbound	1,470	70	81.95	1,466	78	81.78			
A308 Mainline, High St/A308 Roundabout - Horse Fair Bridge	Eastbound	1,542	60	51.38	1,570	76	52.33			
A308 Mainline, Horse Fair Bridge - High St/A308 Roundabout	Westbound	1,417	17	75.37	1,428	38	75.28			
A308 Mainline, High St/A308 Roundabout - Chestnut Ave/A308 Junction	Westbound	1,286	17	68.16	1,271	38	67.26			
A308 Mainline, Chestnut Ave/A308 Junction - Hampton Bridge Roundabout	Westbound	1,197	6	59.85	1,171	10	58.53			
A308 Mainline, Hampton Bridge Roundabout - Church Street/A308 Junction	Westbound	1,487	34	74.33	1,507	46	75.37			
A308 Mainline, Church Street/A308 Junction - M3/A308 Roundabout	Westbound	1,259	33	91.25	1,301	45	93.03			
A308 Mainline, Through M3/A308 Roundabout	Westbound	2,555	27	61.92	2,586	32	62.66			
A308 Mainline, M3/A308 Roundabout - Littleton Rd/ A308 Junction	Westbound	1,582	6	97.60	1,603	23	98.88			
A308 Mainline, Littleton Rd/ A308 Junction - Fordbridge Roundabout	Westbound	920	6	62.53	1,017	28	68.28			
A308 Mainline, Fordbridge Roundabout - Staines By-Pass/ A308 Roundabout	Westbound	997	14	99.39	1,027	33	100.48		✓	

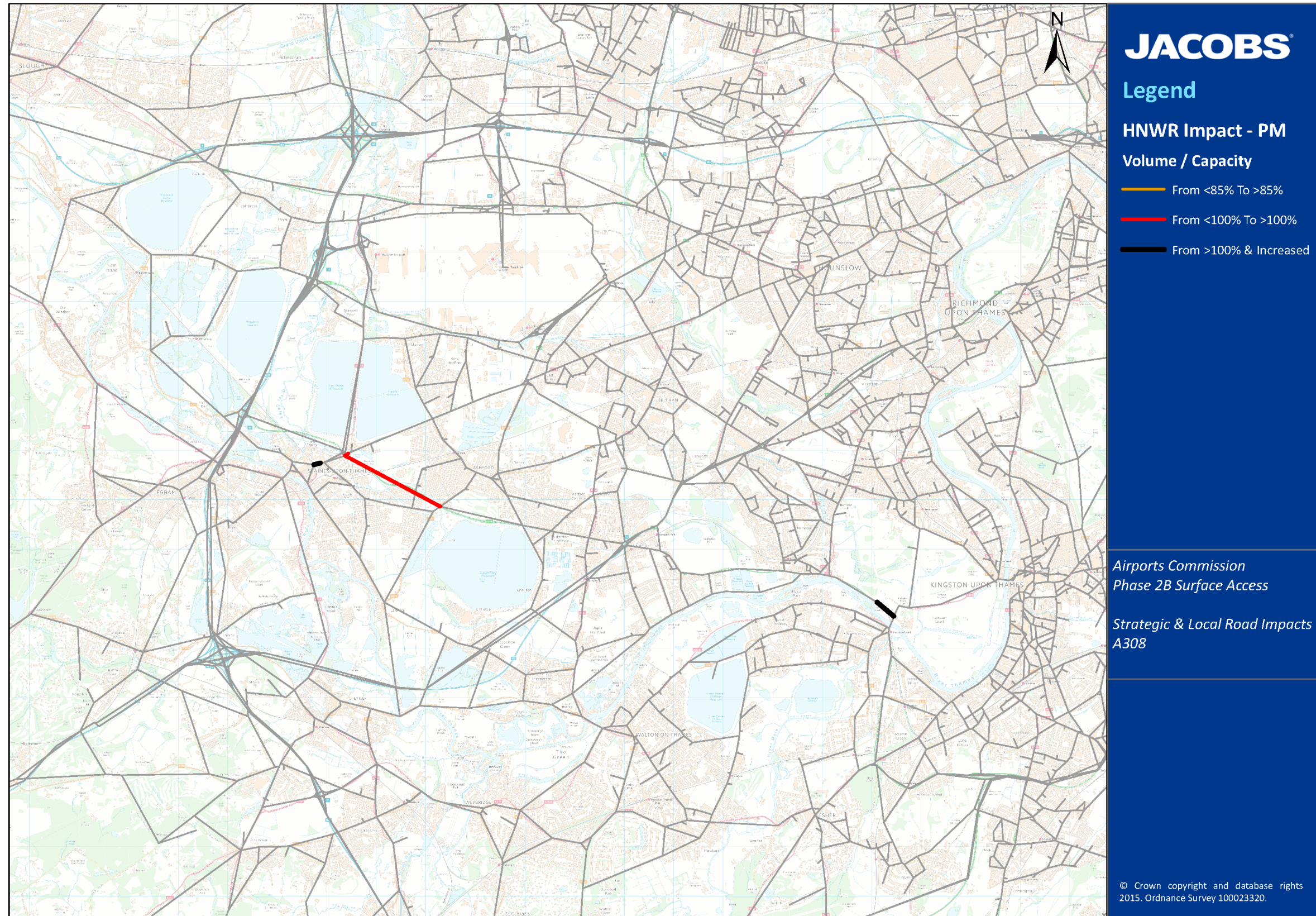
Appraisal Framework Module 4.

Surface Access: Strategic & Local Road Impacts



Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
A308 Mainline, Staines By-Pass/ A308 Roundabout - A320/A308 Roundabout	Westbound	870	41	106.49	857	62	107.24			✓
A308 Mainline, A320/A308 Roundabout - M25 Slip Road	Westbound	1,182	9	26.52	1,225	12	27.47			
A308 Mainline, M25 Slip Road - Egham By-Pass/A308 Roundabout	Westbound	3,500	308	105.88	3,455	338	104.40			
A308 Mainline, Egham By-Pass/A308 Roundabout - Albert Road/A308 Roundabout	Westbound	639	0	21.30	575	0	19.18			
A308/A30 Intersection, Staines By-Pass / London Rd Roundabout	-	586	2	99.15	831	0	102.02		✓	
M3/A308 Intersection , Staines Rd E/ Green St Roundabout	-	2,937	22	73.42	2,950	20	73.75			
A308 Mainline, Hampton Bridge Roundabout - Chestnut Ave/A308 Junction	Westbound	1,084	6	93.30	1,057	10	91.66			

Figure 4-20: PM V/C Impact of HNWR, A308



- 4.10.9 In PM peak period two sections of the A308 are forecast to exceed capacity only with the introduction of the HNWR. One of the sections is the Staines Bypass / A30 London Road roundabout, which was also forecast to exceed capacity in the AM peak period of the HNWR scenario. The V/C on this section is predicted to rise to approximately to 102%, however as was the case in the AM peak period, this cannot be directly attributed to additional airport traffic from the HNWR. As in the AM peak, whilst there is no airport traffic on the section in either scenario, there is a notable increase in non-airport traffic in the HNWR scenario. This amounted to over 100 PCUs in the AM peak period, however in the PM peak period this figure is closer to 250 PCUs. Further analysis would be required to understand how the HNWR impacts upon this junction and to what extent the section's capacity issues can be attributed to it.
- 4.10.10 The mainline A308 approaching the Staines Bypass / A30 London Road roundabout is also forecast to exceed capacity in the HNWR scenario only. The section is forecast to operate marginally within capacity in the Extended Baseline (over 99%) and accordingly even a small increase in overall flow of less than 20 PCUs in the HNWR scenario is enough to take the section over capacity. Less than 2% of traffic on the section is airport-related in the Extended Baseline, and whilst this rises to just over 3% in the HNWR scenario, the impact of the HNWR on the capacity issues here are considered limited.
- 4.10.11 On the A308 mainline, eastbound between the Church Street junction and Hampton Bridge roundabout and westbound between the Staines Bypass and A320 junctions are forecast to be over capacity in the Extended Baseline and face exacerbated capacity issues with the introduction of the HNWR. Both locations are forecast to experience minor increases in airport traffic of approximately 20 PCUs in the PM peak period. The proportion of airport traffic on each of the sections is forecast to increase marginally in the HNWR scenario, but remain no higher than 8% of total traffic. In summary, these sections of the A308 are likely to operate above capacity even without the third runway at Heathrow Airport, but its introduction adds a further, albeit minor adverse impact. Airport-related traffic is forecast to account for 5-7% of the total number of PCUs on the sections.
- 4.10.12 The impact of expansion at Heathrow on the A308 was not considered as part of the static pre-consultation assessments. This assessment was limited to a selection of key strategic roads in the immediate vicinity of Heathrow and as a result did not draw any specific conclusions regarding the operation of the A308 with or without airport expansion. It is considered that the V/C changes that have been identified along the A308 in the AM and PM peak periods are unlikely to materially affect the AC's understanding of the feasibility of the HNWR option.

4.11 A3044

- 4.11.1 The A3044 is a short road that runs adjacent to Heathrow Airport along a north-south alignment. In the Extended Baseline scenario, where no design changes have been made to how the airport is accessed, the A3044 begins at the A30 Staines Bypass / A308 roundabout immediately south of Heathrow Airport, and continues northbound through a junction with the Southern Perimeter Road and beneath the M25 access to Heathrow Terminal 5, before continuing reaching its junction with the A4 Colnbrook Bypass.
- 4.11.2 In the HNWR scenario the layout of the A3044 north of its junction with the Southern Perimeter Road is altered as part of a revised surface access arrangement to the West Terminal. In order to compare the operation of the road with the Extended Baseline, only the sections of the A3044 to the south of this junction have been included in this assessment (those in common with the Extended Baseline), however Appendix A provides plots of V/C in the HNWR scenario, and includes sections specific to the HNWR proposals. In both scenarios the A3044 is located entirely within the simulation area of the traffic model.
- 4.11.3 Modelled traffic flow data along the A3044 corridor for the Extended Baseline (EBL) and HNWR is presented in **Table 4-21** for the AM peak period. This is immediately followed by **Figure 4-21** which shows the impact of the HNWR in the AM peak period spatially. Data for the PM peak period is presented in **Table 4-22** and **Figure 4-22**.

- 4.11.4 Figures showing the V/C of *all* links (and not just those exceeding a threshold in the HNWR scenario) along the A3044 corridor in both the Extended Baseline and HNWR are provided in Appendix A.

Table 4-21: AM V/C with HNWR, A3044

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
A3044 Mainline, A3044/Staines Bypass Rd Roundabout - Stanwell Moor Rd/B378 Junction	Northbound	1,008	70	44.31	1,036	216	45.38			
A3044 Mainline, Stanwell Moor Rd/B378 Junction - Airport Way/Southern Perimeter Rd Roundabout	Northbound	1,309	90	32.71	1,240	222	31.98			
A3044 Mainline, Hatch Ln/A4 Junction - Sipson Rd/A3044 Roundabout	Northbound	447	46	40.95	969	158	46.41			
A3044 Mainline, Sipson Rd/A3044 Roundabout - Hatch Ln/A4 Junction	Southbound	697	33	91.88	1,146	93	37.90			
A3044 Mainline, Airport Way/Southern Perimeter Rd Roundabout - Stanwell Moor Rd/B378 Junction	Southbound	1,177	109	76.49	1,117	50	72.60			
A3044/A308 Intersection , A3044/Staines Bypass Rd Roundabout	-	401	0	99.24	506	0	104.14		✓	
A3044 Mainline, Stanwell Moor Rd/B378 Junction - Airport Way/Southern Perimeter Rd Roundabout - HNWR ONLY	Northbound	-	-	-	1,291	231	45.17			
A3044 Mainline, Through Airport Way/Southern Perimeter Rd Roundabout - HNWR ONLY	Northbound	-	-	-	423	301	10.57			
A3044 Mainline, Southern Perimeter Rd/ A3044 Roundabout - West Terminal - HNWR ONLY	Northbound	-	-	-	2,167	2,071	21.67			
A3044 Mainline, West Terminal - Southern Perimeter Rd/A3044 Roundabout - HNWR ONLY	Northbound	-	-	-	2,167	2,071	21.67			
A3044 Mainline, A3044/Hatch Ln Junction - Sipson Rd/A3044 Roundabout - HNWR ONLY	Northbound	-	-	-	1,012	61	27.69			
A3044 Mainline, Sipson Rd/A3044 Roundabout - A3044/Hatch Ln Junction - HNWR ONLY	Southbound	-	-	-	1,287	68	77.25			
A3044 Mainline, Airport Way/Southern Perimeter Rd Roundabout - Stanwell Moor Rd/B378 Junction	Southbound	-	-	-	1,046	0	94.56			
West Terminal Junction Intersection , New Heathrow West Terminal Access Road - HNWR ONLY	-	-	-	-	2,140	2,071	35.66			

Figure 4-21: AM V/C Impact of HNWR, A3044

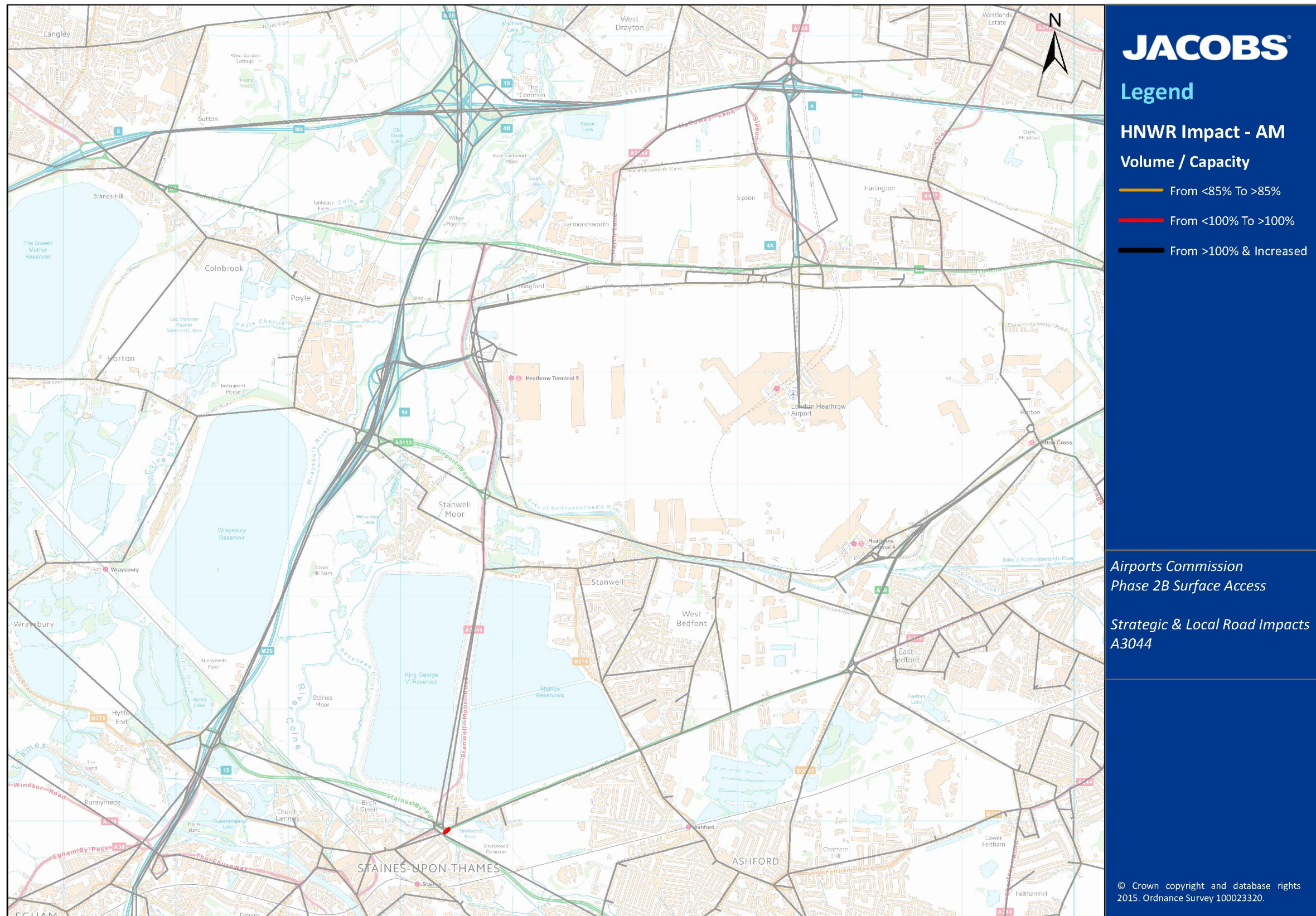
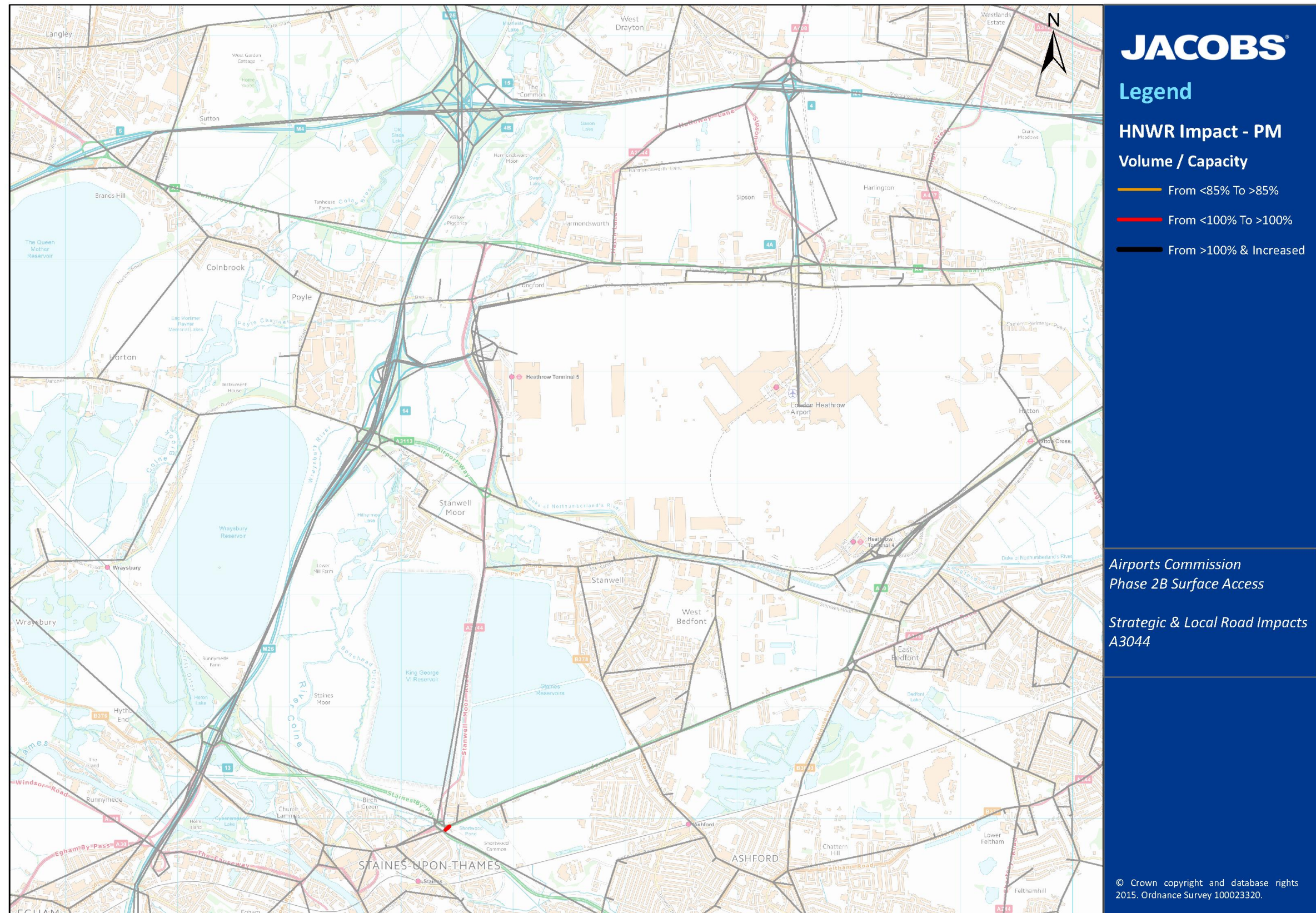


Table 4-22: PM V/C with HNWR, A3044

Road	Direction	EBL			HNWR			Impact		
		Total Demand	Airport Demand	V/C	Total Demand	Airport Demand	V/C	> 85%	> 100%	> 100% +
A3044 Mainline, A3044/Staines Bypass Rd Roundabout - Stanwell Moor Rd/B378 Junction	Northbound	1,076	50	52.92	1,263	93	57.59			
A3044 Mainline, Stanwell Moor Rd/B378 Junction - Airport Way/Southern Perimeter Rd Roundabout	Northbound	1,241	54	31.03	1,377	95	35.17			
A3044 Mainline, Hatch Ln/A4 Junction - Sipson Rd/A3044 Roundabout	Northbound	597	35	55.00	1,027	98	50.58			
A3044 Mainline, Sipson Rd/A3044 Roundabout - Hatch Ln/A4 Junction	Southbound	481	28	56.63	1,194	302	46.88			
A3044 Mainline, Airport Way/Southern Perimeter Rd Roundabout - Stanwell Moor Rd/B378 Junction	Southbound	1,512	282	98.28	1,230	143	79.93			
A3044/A308 Intersection , A3044/Staines Bypass Rd Roundabout	-	586	2	99.15	831	0	102.02		✓	
A3044 Mainline, Stanwell Moor Rd/B378 Junction - Airport Way/Southern Perimeter Rd Roundabout - HNWR ONLY	Northbound	-	-	-	1,334	97	45.66			
A3044 Mainline, Through Airport Way/Southern Perimeter Rd Roundabout - HNWR ONLY	Northbound	-	-	-	423	164	10.57			
A3044 Mainline, Southern Perimeter Rd/ A3044 Roundabout - West Terminal (NOT A3044) - HNWR ONLY	Northbound	-	-	-	2,100	1,834	21.00			
A3044 Mainline, West Terminal - Southern Perimeter Rd/A3044 Roundabout (NOT A3044) - HNWR ONLY	Northbound	-	-	-	2,100	1,834	21.00			
A3044 Mainline, A3044/Hatch Ln Junction - Sipson Rd/A3044 Roundabout - HNWR ONLY	Northbound	-	-	-	979	0	86.72			
A3044 Mainline, Sipson Rd/A3044 Roundabout - A3044/Hatch Ln Junction - HNWR ONLY	Southbound	-	-	-	1,188	195	58.76			
A3044 Mainline, Airport Way/Southern Perimeter Rd Roundabout - Stanwell Moor Rd/B378 Junction	Southbound	-	-	-	1,048	0	94.79			
West Terminal Junction Intersection , New Heathrow West Terminal Access Roads - HNWR ONLY	-	-	-	-	1,891	1,834	31.52			

Figure 4-22: PM V/C Impact of HNWR, A3044



- 4.11.5 Across both the AM and PM peak periods there is just one section that has been identified as operating over capacity. This section is the Staines Bypass / A30 London Road roundabout, which has been discussed earlier under the A308 section.
- 4.11.6 The pre-consultation work on network capacity did not refer to the A3044, apart from with respect to the proposed layout changes in the HNWR. The analysis above is considered unlikely to materially affect the AC's understanding of the feasibility of the HNWR. It is assumed that the layout changes that are proposed in the vicinity of the A3044 and the Western Terminal at Heathrow Airport would be designed to such a standard that traffic can be accommodated within capacity.

5. Summary

5.1 Background

- 5.1.1 On the 3rd February 2015 the AC's consultation on short-listed options for a new runway in the south east ended after a period of 12 weeks. During this time the AC received approximately 75,000 responses on the three options for expansion at Heathrow and Gatwick.
- 5.1.2 Following an initial review of the consultation responses by the AC, Jacobs were provided with a selection of consultee responses pertaining to surface access. The AC's Secretariat considered that these responses raised issues whose technical complexity did not allow all of their points to be addressed without support from Jacobs.
- 5.1.3 This report covers the strategic and local road impacts of each of the three short-listed options. These impacts were highlighted as a concern by a number of the consultees.

5.2 Approach

- 5.2.1 Further assessment of the surface access implications of the three short-listed expansion options was undertaken during the consultation period. The updated analysis included enhanced distribution and mode-share modelling which was subsequently applied to a series of dynamic highway models of Heathrow and Gatwick, inherited from Transport for London (the Highway Assignment Models).
- 5.2.2 The updated methodology differed from the pre-consultation analysis in three key ways:
- An AM peak hour (0800-0900) and PM peak-hour (1700-1800) were modelled, along with an average Inter Peak (IP) hour covering the period 1000-1600. The pre-consultation analysis focussed on a single AM peak hour;
 - The updated models were dynamic, which meant that the capacity assessments undertaken could account for the changing costs of travel across the network and how travellers respond to these costs. The pre-consultation analysis was static in nature; and
 - The forecast passenger numbers adopted the Commission's "Carbon-Traded Global Growth" forecasts. Estimates of the number of airport employees were also adjusted.
- 5.2.3 In order to ascertain whether the specific concerns expressed by the consultees regarding the impact on strategic and local roads would materially affect the AC's understanding of the feasibility of a particular option, the Volume over Capacity (V/C) on the roads identified by the consultees were examined.
- 5.2.4 The V/Cs on the roads highlighted by consultees were examined for the HNWR option and compared against an Extended Baseline scenario. The methodology was developed to support the AC in identifying which roads or corridors (and which sections of the roads or corridors) would be adversely impacted by expansion and the implications that this would have with regards to the viability of a particular option.
- 5.2.5 The following strategic and local roads have been included in the analysis of the HNWR option:
- M3;
 - M4;
 - M25;
 - M40;
 - A4 (including Colnbrook Bypass);
 - A40;

- A30;
- A312;
- A408;
- A308; and
- A3044.

5.2.6 The list reflects the roads raised by consultees, as well as a small number of additional roads considered relevant to the assessment.

5.2.7 The results have been presented for the AM peak period (0800-0900) and the PM peak period (1700-1800) which is when the impact on strategic and local roads is likely to be the greatest.

5.3 Responses

5.3.1 A tabulated summary of the consultee comments were provided in Chapter 2. Based upon the corridor-based analysis of this report, responses to each of the comments are provided in **Table 5-1** below.

Table 5-1: HNWR Strategic & Local Roads Consultee Responses

Ref	Consultee(s)	Summary of Issue Raised	Road / Location	Summary Response
1	Heathrow Airport Limited	Recommend incorporating HA modelling for M4 J3-12 SMART motorway into assessment. Remove the need to widen the M4 and the associated costs from the NWR business case.	M4 including J3-12	<p>The Highway Assignment Models (HAM) developed by Transport for London have been used as the basis for the assessment outlined in this report. The models are considered to provide a consistent modelling approach across the three short-listed options.</p>
2	Heathrow Airport Limited Heathrow Hub Limited	<p>Heathrow Airport Limited disagree with conclusions of M4 into London and M4 Spur analysis. Costs of improvements and property impacts should be removed from the NWR assessment.</p> <p>Heathrow Hub Limited argue that the suggested works required on the M4 J2-3 is due to Jacobs using an inaccurate, lower capacity in their assessment of this link.</p>	M4 into London (including J2-J3) and M4 Spur	<p>The models have been developed to include a number of infrastructure improvements that are either committed or likely to be in place by 2030 regardless of airport expansion in the South of England. Amongst these improvements is the M4 Junction 3-12 Smart Motorway, which has been incorporated into the models through the provision of additional capacity.</p> <p>Even with these capacity improvements in place along the M4, the HNWR traffic model suggests that during peak periods, the M4 will operate above capacity:</p> <ul style="list-style-type: none"> • between junctions 1 and 3; and • between junctions 4 and 4B. <p>A number of slip roads at junctions 1, 2, 3, and 4B will also exceed capacity, whilst some sections of Junction 4 will begin to approach capacity with the HNWR.</p> <p>In some of these locations the M4 is forecast to operate above capacity even without the introduction of the HNWR, and in these instances the capacity issues are further exacerbated by the introduction of the HNWR.</p> <p>The pre-consultation analysis suggested that the M4 spur was likely to suffer capacity problems as a result of expansion at Heathrow. The most recent analysis, which benefits from the use of the dynamic traffic models and revised passenger and employee forecasts, suggests that the M4 spur will operate within capacity with the introduction of the HNWR.</p> <p>The impact of the HNWR on the M4 is dealt with in more detail in section 4.2 of the report.</p>

Ref	Consultee(s)	Summary of Issue Raised	Road / Location	Summary Response
3	Heathrow Airport Limited Heathrow Hub Limited	<p>Heathrow Airport Limited disagree that widening is required due to uncertainty in forecasting and the crude strategic modelling approach adopted. Furthermore, argue that widening is not the correct solution in marginal cases of roads operating above capacity, where induced traffic can cause wider network impacts. The costs added to the surface access costs for the NWR are not considered justified or commensurate.</p> <p>Heathrow Hub Limited argue that it is not justifiable for the airport to pay £274m when the existing scenario is only 1% away from 85% V/C.</p>	M4 between J3 and J4	<p>The modelling approach was updated during the consultation period. More detail on the approach is provided in Chapter 3 of the report, however the key changes since the pre-consultation analysis can be summarised as follows:</p> <ul style="list-style-type: none"> assessment of multiple model time periods (AM 0800-0900, IP 1000-1600, PM 1700-1800); development of a series of dynamic traffic models that account for the changing costs of travel through route choice; and updated passenger numbers based on the AC's "Carbon-Traded Global Growth" forecasts and revised employee numbers. <p>With respect to the need for widening; it is suggested that the nature of any required mitigation will likely depend on the location and magnitude of the predicted impact.</p> <p>The analysis presented in this report estimates that the M4 between junctions 3 and 4 will approach (approximately 90% V/C in the PM) but not exceed capacity with the introduction of the HNWR.</p> <p>The impact of the HNWR on the M4 is dealt with in more detail in section 4.2 of the report.</p>
4	Heathrow Airport Limited	Believe that a two-lane capacity has been assumed for the assessment, when in reality the M4 Spur has three lanes plus a bus lane. Using the correct capacity would suggest that widening is not necessary and that the costs should be removed from NWR.	M4 Spur	<p>The pre-consultation analysis suggested that the M4 spur was likely to suffer capacity problems as a result of expansion at Heathrow. The most recent analysis, which benefits from the use of the dynamic traffic models and revised passenger and employee forecasts, suggests that the M4 spur will operate within capacity with the introduction of the HNWR.</p> <p>The models assume the spur has three lanes in each direction.</p>
5	Heathrow Airport Limited	Based on flows provided in the Surface Access Appraisal Report, it is unclear why capacity improvements to the main airport tunnel are recommended. The tunnel has 2 lanes in either direction and so would be able to accommodate the arrivals / departures stated. Furthermore, additional capacity will be provided by the southern road tunnel. This should be removed from the NWR appraisal.	M4 and existing Airport tunnel	<p>The most recent analysis, which benefits from the use of the dynamic traffic models and revised passenger and employee forecasts, suggests that the tunnel will operate within capacity with the introduction of the HNWR. It is assumed that the tie-in at the Southern Perimeter Road will be designed to a standard that ensures it operates within capacity.</p> <p>The models assume the tunnel has two lanes in each direction.</p>

Ref	Consultee(s)	Summary of Issue Raised	Road / Location	Summary Response
6	Heathrow Airport Limited Heathrow Hub Limited	Heathrow Airport Limited argue that no methodology or justification is provided for the suggested improvements needed to M4 J4 and J4B. Would expect these infrastructure improvements and their associated costs to be avoidable. Heathrow Hub Limited argue that it does not seem defensible to add such a significant cost to the Heathrow proposals (£338m) due to a very small increase in traffic. Suggest the same criteria has not been applied to the Gatwick analysis and that the process needs to be revisited to provide like for like comparisons.	M4 J4 and J4B	The most recent analysis, which benefits from the use of the dynamic traffic models and revised passenger and employee forecasts, also predicts that the M4 between junctions 4 and 4B will operate above capacity with the introduction of the HNWR. More detail on the updated approach is provided in Chapter 3 of the report.
7	Virgin Atlantic	Would like to see proposals to widen M4 reviewed, as current analysis does not fully consider modal shifts, particularly to Crossrail.	M4	The propensity for travellers to switch mode between car and rail has been accounted for in the development of demand in both the dynamic rail and dynamic highway assessments. The likely impact of Crossrail has been included within these assessments.
8	Royal Borough of Windsor and Maidenhead	Concerned about the impact of M4 widening on adjacent communities and would like to see greater certainty sought on this issue.	M4	The traffic model outputs discussed in this report will be used to feed into the Air Quality and Noise assessments, which are likely to provide greater insight into the wider environmental impacts of widening.
9	Slough Borough Council	Significant measures needed to alleviate congestion and poor air quality around M4 J5 / Brands Hill. Suggest that the composition of traffic here should be studied. The introduction of a low emission zone is raised.	M4 J5 / Brands Hill	The assessment suggests that there are likely to be capacity issues at the Sutton Lane junction with the A4, and on the A4 between the Sutton Lane junction and Junction 5 of the M4. These locations are expected to operate above capacity even without the HNWR, but are likely to be exacerbated by its introduction. The mainline M4 is forecast to approach capacity between junctions 4 and 5 (approximately 86% in the PM).
10	Slough Borough Council	Recommend that more is done to promote, fund and construct more sustainable transport links along the A4 and M4 corridors.	M4 A4	N/A
11	Royal Borough of Kensington and Chelsea	Suggest that without a substantial shift from road to rail, congestion on major roads will increase. Concerned that no detailed modelling of local roads or the strategic road network (such as the A4) has been carried out. No forecast of Heathrow-related HGV traffic along the A4.	A4 Local roads (unspecified)	The assessment accounts for the impact of Heathrow-related goods vehicle traffic and has identified a number of capacity issues along the A4 corridor. Many of the sections of the A4 forecast to experience capacity problems are located to the east of Heathrow Airport. This includes sections of the A4 around the Chiswick and Burlington roundabouts. Airport-related traffic accounts for approximately one third of all traffic on the mainline A4 between these junctions in the HNWR scenario. Other locations predicted to face capacity problems with the introduction of the HNWR are the Hammersmith Flyover and the A4 close to the Jersey Road and A3006 junctions. To the west of Heathrow Airport, the A4 near Junction 5 of the M4 is likely to operate above capacity on some of its sections. The rerouting of the Colnebrook Bypass section of the A4 is forecast to significantly increase traffic travelling through the villages of Colnebrook and

Ref	Consultee(s)	Summary of Issue Raised	Road / Location	Summary Response
				<p>Poyle. Heathrow Airport Limited have put forward an alternative masterplan with alignment changes at these locations, however these have not been appraised in this assessment.</p> <p>The impact of the HNWR on the A4 is dealt with in more detail in section 4.5 of the report.</p>
12	Slough Borough Council	Concerned about further congestion generated by disruption on the strategic road network due to the A4 being used as an alternative route.	A4 via Slough Town Centre	The A4 through Slough is not included in the model simulation area. It is therefore not possible to draw specific conclusions with regards to congestion here.
13	Hounslow Council	Suggests there are serious issues around proposed surface access improvements which are unfunded, not fully planned and do not have parliamentary approval. Concerned about the impact of Heathrow expansion on local roads, the public transport network and key roads such as the A4. Specifically interested in the new Southern Link Road in the NWR proposal. Also interested in mitigation measures for all three options and suggest the assessment year should be 2050.	A4 New Southern Link Road Local roads (unspecified)	<p>The assessment includes background infrastructure improvements that are either fully committed, or considered likely to be in place by 2030. There is a degree of uncertainty in the selection of these schemes, however this was based on best assumptions regarding the state of the 2030 transport network at the time, and was informed by discussions with the AC's stakeholders. This is discussed in more detail in paragraphs 3.1.3 – 3.1.7 of the report.</p> <p>The forecast impact of the HNWR on the A4 is summarised in comment reference 11 above and in further detail in section 4.5 of the report. With respect to the southern tunnel in the HNWR proposals, the section is predicted to operate within capacity, as is the Southern Perimeter Road at its tie in. Two lanes have been assumed in both directions in the model.</p> <p>The impact of the HNWR on a further 10 corridors are also included within the report.</p> <p>The measures that would be necessary to mitigation the impacts of the HNWR are not included within the scope of this report.</p> <p>The current assessment year of 2030 is considered appropriate for the purposes of this assessment.</p>
14	Buckinghamshire County Council	Would like to see a more detailed assessment of the impact of a new access road from the diverted A4 on the local Buckinghamshire road network, particularly in southern Buckinghamshire which has existing HGV issues. Also concerned about potential for increased local congestion from the A4 works and M25 tunnelling works.	A4 nr Colnbrook M25 Tunnelling	<p>Much of the Buckinghamshire road network lies outside the traffic model's simulation area, and as such it is not possible to draw specific conclusions regarding network conditions following the introduction of the HNWR (with the exception of small sections of the M25, which is discussed in comment reference 16 and in more detail in section 4.3 of the report).</p> <p>The impact of the HNWR on the A4 is dealt with in more detail in section 4.5 of the report.</p> <p>The construction impacts of the associated surface access works of the HNWR have not been modelled as part of this assessment.</p>

Ref	Consultee(s)	Summary of Issue Raised	Road / Location	Summary Response
15	Heathrow Airport Limited	Recommend improvements to M25 junctions 10-16 (from 2014 autumn statement) are incorporated into appraisal. Reconsider distribution of costs of M25 works related to Heathrow expansion.	M25 J10-16	<p>The following background infrastructure schemes on the M25 are included in the assessment:</p> <ul style="list-style-type: none"> • M25 Junction 23-27 Smart Motorway; and • M25 Junction 5-6/7 Smart Motorway. <p>More detail on the inclusion of background infrastructure schemes in the traffic modelling is provided in paragraphs 3.1.3 – 3.1.7 of the report.</p>
16	Kent County Council	Recommend a capacity upgrade to western section of M25 when it is diverted into tunnel. Junctions 10 to 15 of the M25 exceed 100% VCR from background growth only in 2030, therefore capacity issues need to be addressed to facilitate airport growth.	M25 J10-16	<p>The assessment suggests that a number of sections on the M25 will operate above capacity with the introduction of the HNWR. The following junctions have been identified as likely to operate above capacity:</p> <ul style="list-style-type: none"> • Junction 12 (M3 Junction); • Junction 13; • Junction 14; • Junction 15 (M4 Junction); • Junction 16; and • Junction 21A. <p>The following sections of the M25 mainline have been identified as likely to operate above capacity:</p> <ul style="list-style-type: none"> • Junction 11 to 12, northbound; • Through Junction 13, northbound; • Junction 15 to 16, northbound; • Junction 16 to 15, southbound; • Through Junction 16, northbound; • Junction 16 to 17, northbound; • Junction 17 to 18, northbound; • Through Junction 18, northbound; and • Junction 18 to 19, northbound. <p>In many of these locations the M25 is forecast to operate above capacity even without the introduction of the HNWR, and in these instances the capacity issues are further exacerbated by the introduction of the HNWR.</p> <p>The impact of the HNWR on the M25 is dealt with in more detail in section 4.3 of the report.</p>
17	Royal Borough of Windsor and Maidenhead	Concerned that impacts on local congestion and air quality cannot be addressed as the AC has yet to receive appropriate information with regard to surface access pressures (in particular to local roads and key congestion areas, such as M25 J13)	M25 J13	<p>The most recent analysis, which benefits from the use of the dynamic traffic models and revised passenger and employee forecasts, is capable of identifying congestion issues that have been brought about by the HNWR.</p> <p>The impacts of the HNWR on the M25 are summarised in comment reference 16 above, and in more detail in section 4.3 of the report.</p>

Ref	Consultee(s)	Summary of Issue Raised	Road / Location	Summary Response
				The traffic model outputs discussed in this report will be used to feed into the Air Quality assessments.
18	Royal Borough of Windsor and Maidenhead	Concerned that local roads will be overwhelmed if modal shift aspirations are not realised. A308 is mentioned as a specific concern, as is the potential for additional freight traffic.	A308 Local roads (unspecified)	<p>The assessment accounts for additional freight traffic as a result of the HNWR and models conditions over the busiest periods of the day (0800-0900 in the AM and 1700-1800 in the PM) .It suggests that a number of sections on the A308 will operate above capacity with the introduction of the HNWR. Locations include:</p> <ul style="list-style-type: none"> the Staines Bypass / A30 London Road junction; the mainline A308 between the M3 / A308 junction and Church Street junction; the mainline A308 between the Church Street junction and Hampton Bridge Roundabout; and approaching the Runneymede Roundabout.
19	Royal Borough of Windsor and Maidenhead	Concerned about the volume of additional HGV / freight traffic associated with the airport exacerbating existing concerns about HGV movements on local A-roads. Would like to see further modelling work to understand impacts and mitigation measures required.	A308 A330 Local roads (unspecified)	
20	Royal Borough of Windsor and Maidenhead	Concerned that during times of congestion on the strategic road network, already congested local roads (such as the A308) will be used, causing reduced air quality. AQMAs in Bray and Windsor are mentioned specifically.	A308 Local roads, notably in Bray & Windsor	<p>The A308 corridor is discussed in more detail in section 4.10 of the report.</p> <p>The traffic model outputs discussed in this report will be used to feed into the Air Quality assessments.</p> <p>The A330 has not been included in the assessment because it falls outside the traffic model's simulation area and as such it is not possible to draw specific conclusions regarding network conditions following the introduction of the HNWR.</p>
21	Heathrow Airport Limited	Recommend A3044 is re-routed to avoid Poyle village centre.	A3044, Poyle Village Centre	<p>The rerouting of the Colnebrook Bypass section of the A4 is forecast to significantly increase traffic travelling through the villages of Colnebrook and Poyle.</p> <p>Heathrow Airport Limited have put forward an alternative masterplan with alignment changes at these locations, however these have not been appraised as part of this assessment, nor has any other alternative alignment.</p>
22	Slough Borough Council	The new road to replace the Colnebrook Bypass would divert traffic south to the High Street / Old Bath Road and disturb that community. The alignment is considered unsuitable and an under provision. An alternative should be provided that skirts Colnebrook.	Colnebrook Bypass High Street / Old Bath Road	
23	Slough Borough Council	To provide a connection to Colnebrook Bypass from the south would require the removal of Galleymead Road and loss of business rates. Alternative solution would be to provide a tunnelled southern access road alongside M25.	Colnebrook Bypass	
24	Slough Borough Council	Concerned that proposals for a southern branch of the Colnebrook Bypass / replacement of the A3044 will encourage rat running between M25 J14 and the M4 J5. Would favour a new tunnelled road, parallel to the tunnelled M25 which reconnects with the new A4 diversion west of the M25. A similar measure has been suggested for the Heathrow Hub ENR.	A3044 / Colnebrook Bypass	

Ref	Consultee(s)	Summary of Issue Raised	Road / Location	Summary Response
25	Gatwick Airport Limited	Argue there has not been a complete and consistent assessment of local roads in the vicinity of each airport. It is recommended that the AC undertake independent modelling of roads in the vicinity of all three airports. This should include freight, demand management and congestion charging proposals.	Local roads (unspecified)	<p>The impact of the HNWR on 11 corridors in the vicinity of Heathrow Airport has been included within the report. The list of corridors reflects the locations raised by consultees, as well as a small number of additional locations considered relevant to the assessment. For Gatwick, a total of 7 corridors were identified and included within the assessment of local and strategic roads close to Gatwick Airport.</p> <p>The assessments detailed in this report include the impact of freight traffic, however, additional assessments of both freight and demand management proposals have been carried out separately by Jacobs on behalf of the AC.</p>
26	Buckinghamshire County Council	Note that the assumption seems to be that the impact on the local network within Buckinghamshire will be reasonably small during operation. This needs to be assessed with appropriate mitigation identified and discussed with the council. Also concerned if modal shift targets are not realised.	Local roads in Buckinghamshire (unspecified)	Much of the Buckinghamshire road network lies outside the traffic model's simulation area, and as such it is not possible to draw specific conclusions regarding network conditions following the introduction of the HNWR (with the exception of small sections of the M25, which is discussed in comment reference 16 and in more detail in section 4.3 of the report).
27	Slough Borough Council	The Slough transport network is heavily impacted by Heathrow - the network is susceptible to congestion if the M4 or M25 are congested. Suggest technical work needs to be carried out to ensure that the local network will be able to cater for future demand (Airport and non-Airport). Account also needs to be given to any associated air quality impacts.	Local roads in Slough (unspecified)	<p>The Slough road network lies outside the traffic model's simulation area, and as such it is not possible to draw specific conclusions regarding network conditions following the introduction of the HNWR.</p> <p>The traffic model outputs discussed in this report will be used to feed into the Air Quality assessments, however only links within the simulation area are likely to be included in this assessment.</p>

Appendix A. Volume / Capacity Figures

Figure A 1: AM V/C in Extended Baseline, M3 Motorway
Figure A 2: PM V/C in Extended Baseline, M3 Motorway
Figure A 3: AM V/C with HNWR, M3 Motorway
Figure A 4: PM V/C with HNWR, M3 Motorway
Figure A 5: AM V/C in Extended Baseline, M4 Motorway
Figure A 6: PM V/C in Extended Baseline, M4 Motorway
Figure A 7: AM V/C with HNWR, M4 Motorway
Figure A 8: PM V/C with HNWR, M4 Motorway
Figure A 9: AM V/C in Extended Baseline, M25 Motorway
Figure A 10: PM V/C in Extended Baseline, M25 Motorway
Figure A 11: AM V/C with HNWR, M25 Motorway
Figure A 12: PM V/C with HNWR, M25 Motorway
Figure A 13: AM V/C in Extended Baseline, M40 Motorway
Figure A 14: PM V/C in Extended Baseline, M40 Motorway
Figure A 15: AM V/C with HNWR, M40 Motorway
Figure A 16: PM V/C with HNWR, M40 Motorway
Figure A 17: AM V/C in Extended Baseline, A4
Figure A 18: PM V/C in Extended Baseline, A4
Figure A 19: AM V/C with HNWR, A4
Figure A 20: PM V/C with HNWR, A4
Figure A 21: AM V/C in Extended Baseline, A40
Figure A 22: PM V/C in Extended Baseline, A40
Figure A 23: AM V/C with HNWR, A40
Figure A 24: PM V/C with HNWR, A40
Figure A 25: AM V/C in Extended Baseline, A30
Figure A 26: PM V/C in Extended Baseline, A30
Figure A 27: AM V/C with HNWR, A30
Figure A 28: PM V/C with HNWR, A30
Figure A 29: AM V/C in Extended Baseline, A312
Figure A 30: PM V/C in Extended Baseline, A312
Figure A 31: AM V/C with HNWR, A312
Figure A 32: PM V/C with HNWR, A312
Figure A 33: AM V/C in Extended Baseline, A408
Figure A 34: PM V/C in Extended Baseline, A408
Figure A 35: AM V/C with HNWR, A408
Figure A 36: PM V/C with HNWR, A408
Figure A 37: AM V/C in Extended Baseline, A308
Figure A 38: PM V/C in Extended Baseline, A308
Figure A 39: AM V/C with HNWR, A308
Figure A 40: PM V/C with HNWR, A308
Figure A 41: AM V/C in Extended Baseline, A3044
Figure A 42: PM V/C in Extended Baseline, A3044
Figure A 43: AM V/C with HNWR, A3044
Figure A 44: PM V/C with HNWR, A3044

Figure A 1: AM V/C in Extended Baseline, M3 Motorway

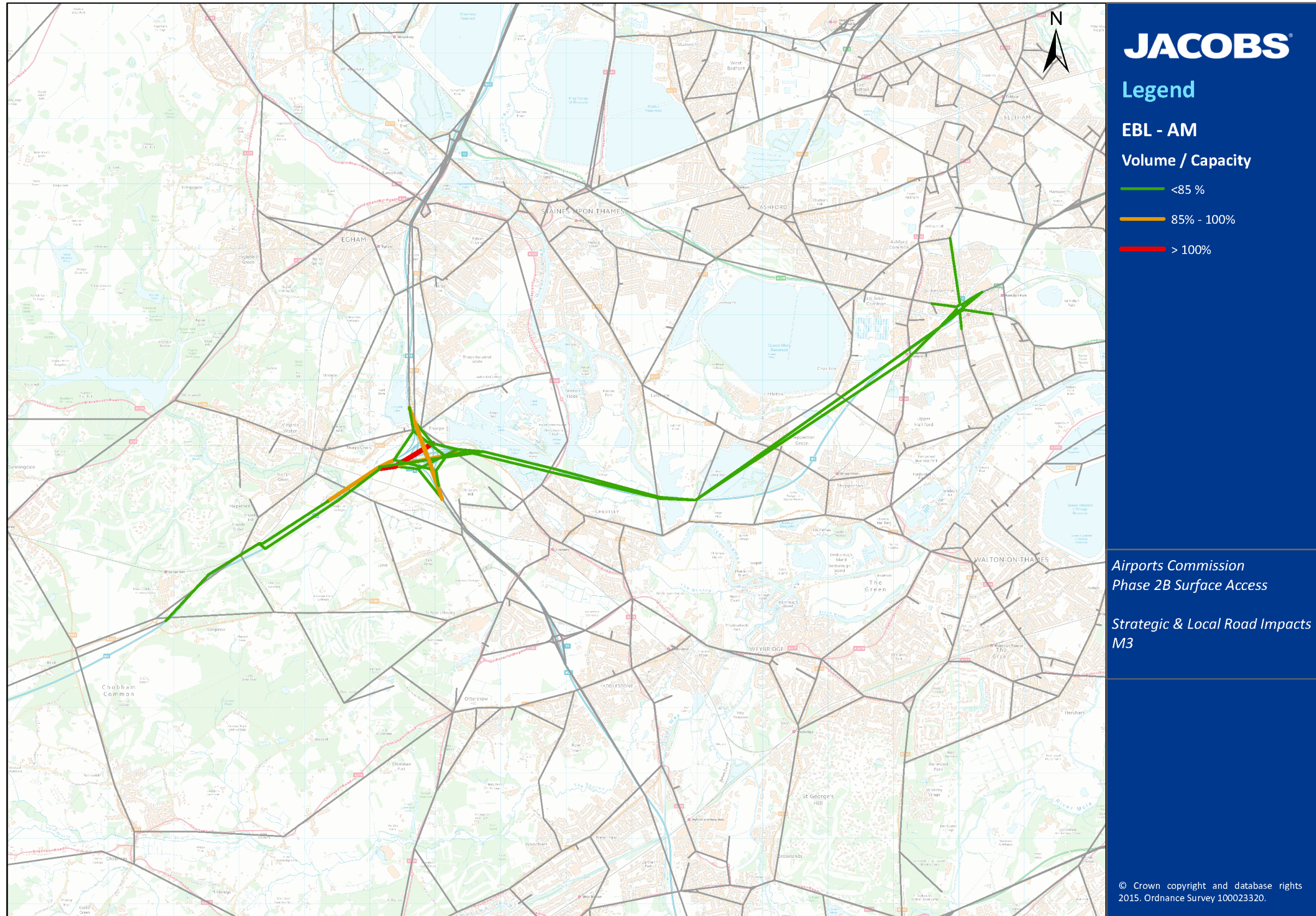


Figure A 2: PM V/C in Extended Baseline, M3 Motorway

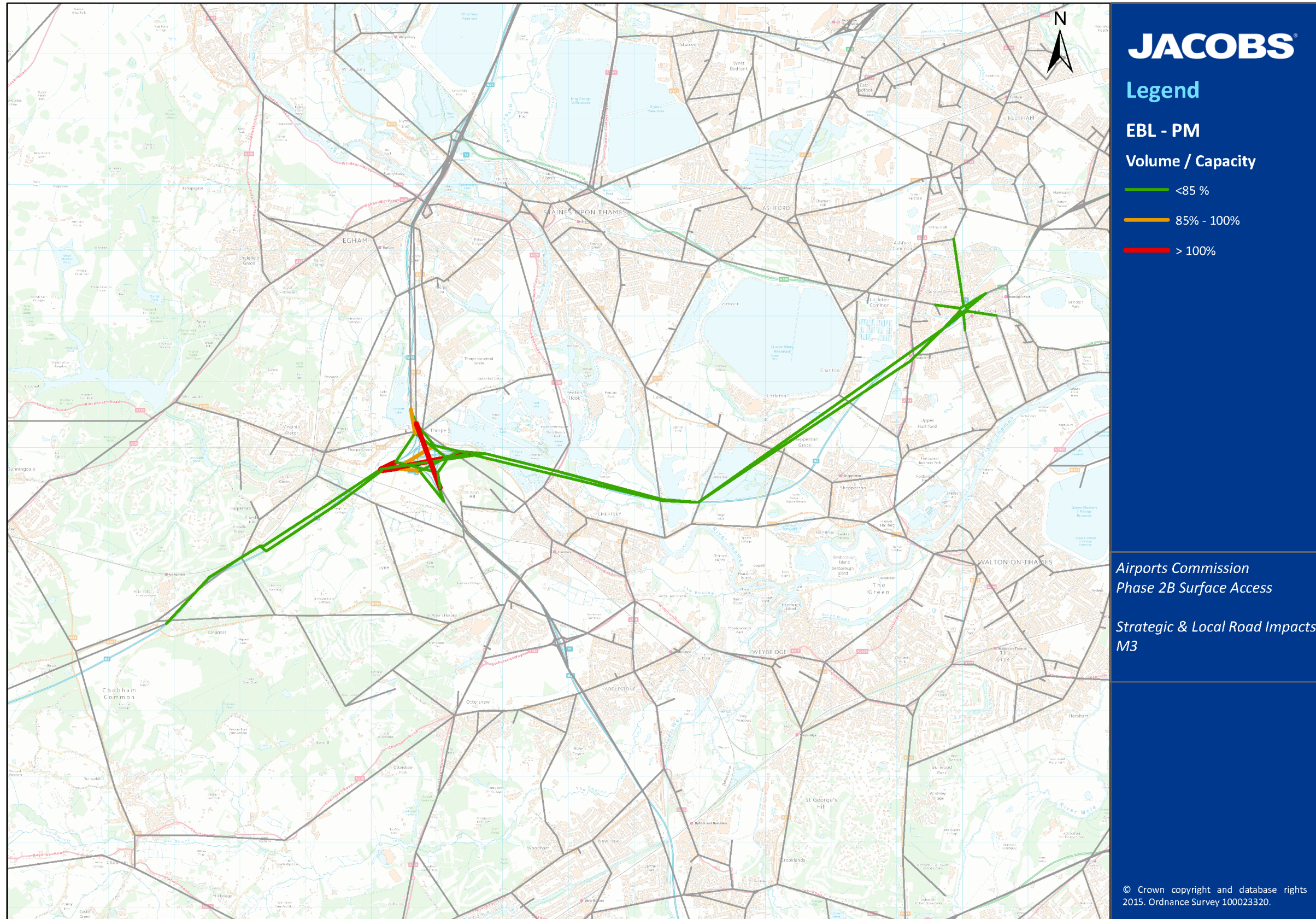


Figure A 3: AM V/C with HNWR, M3 Motorway

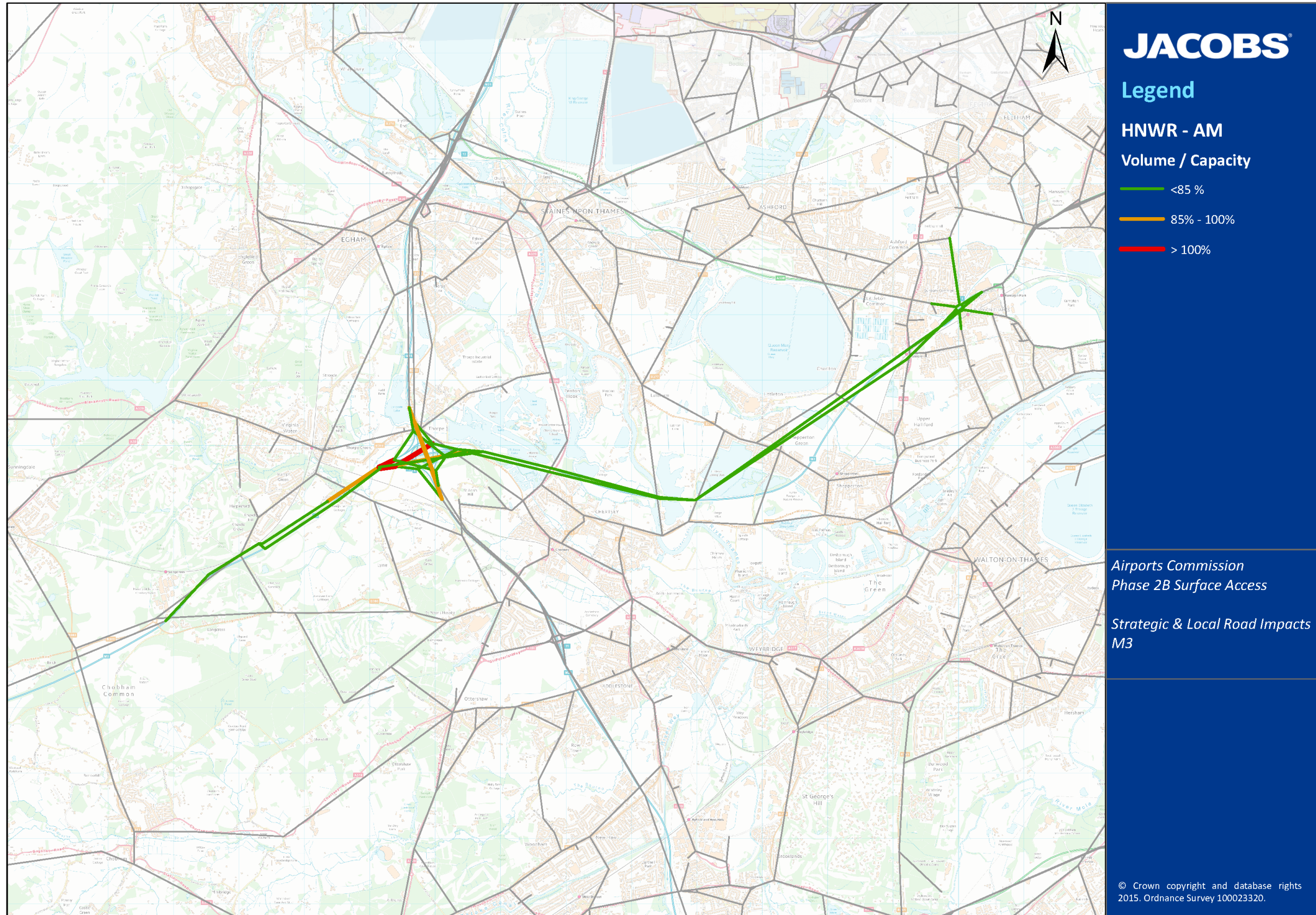


Figure A 4: PM V/C with HNWR, M3 Motorway

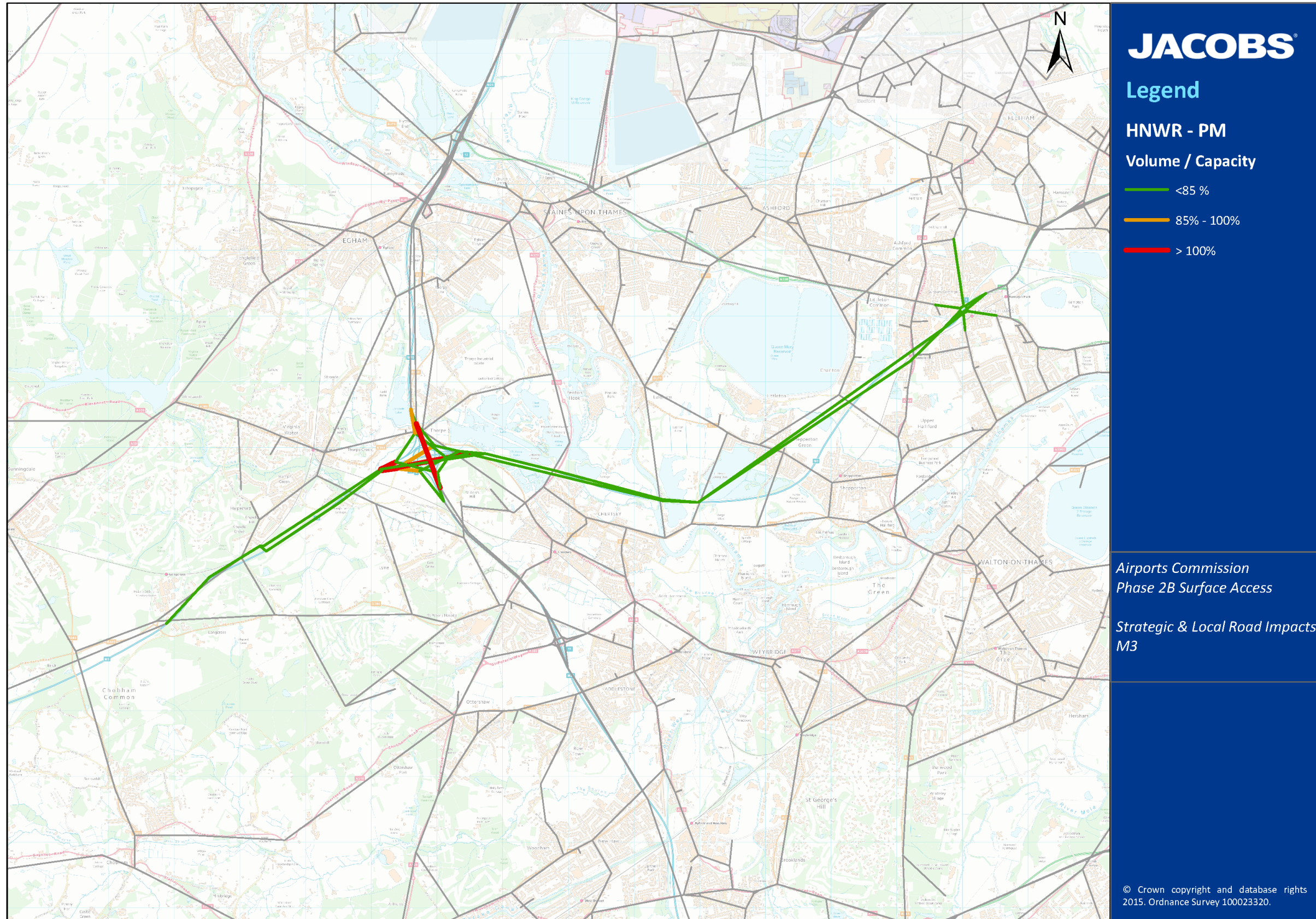


Figure A 5: AM V/C in Extended Baseline, M4 Motorway

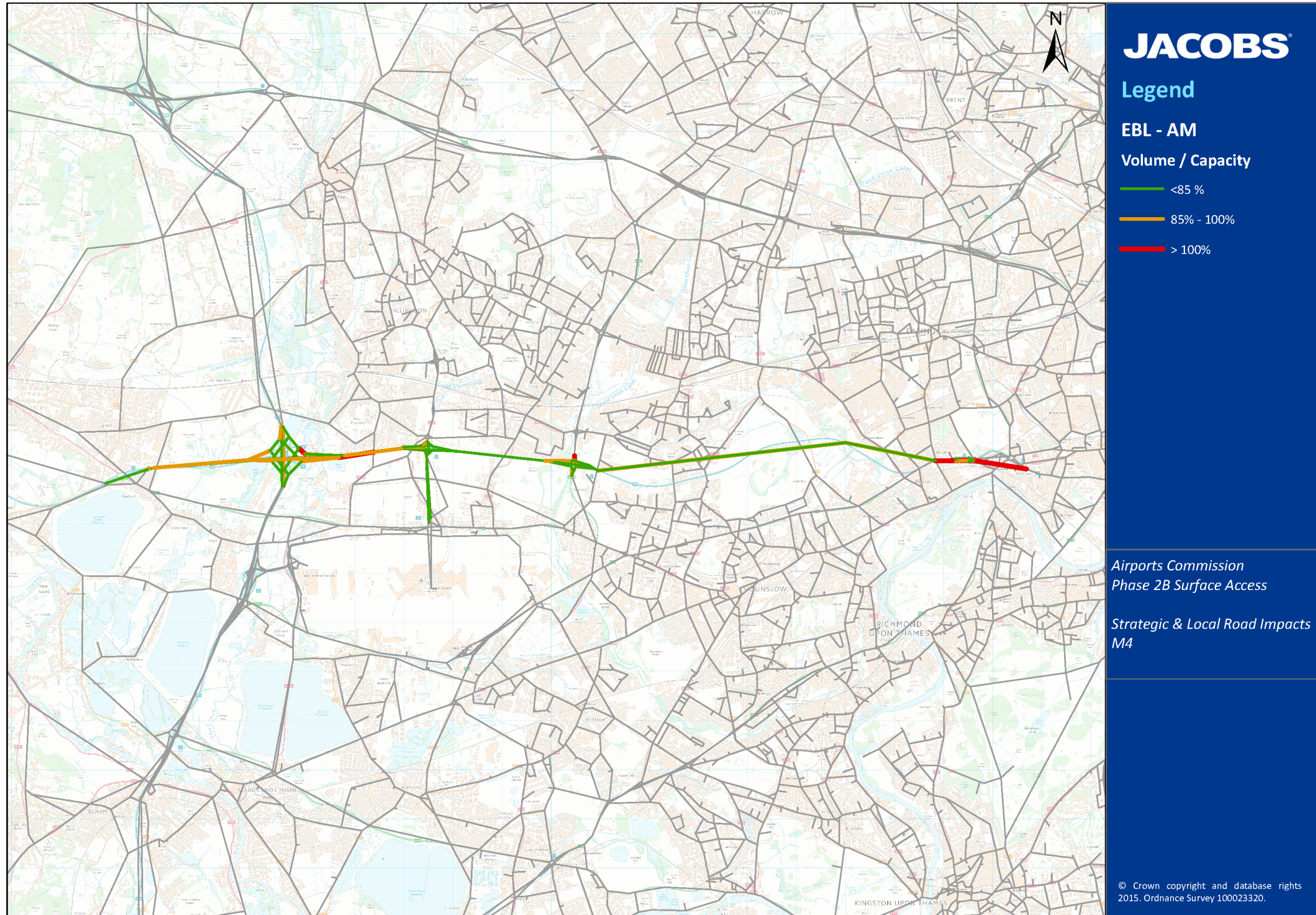


Figure A 6: PM V/C in Extended Baseline, M4 Motorway

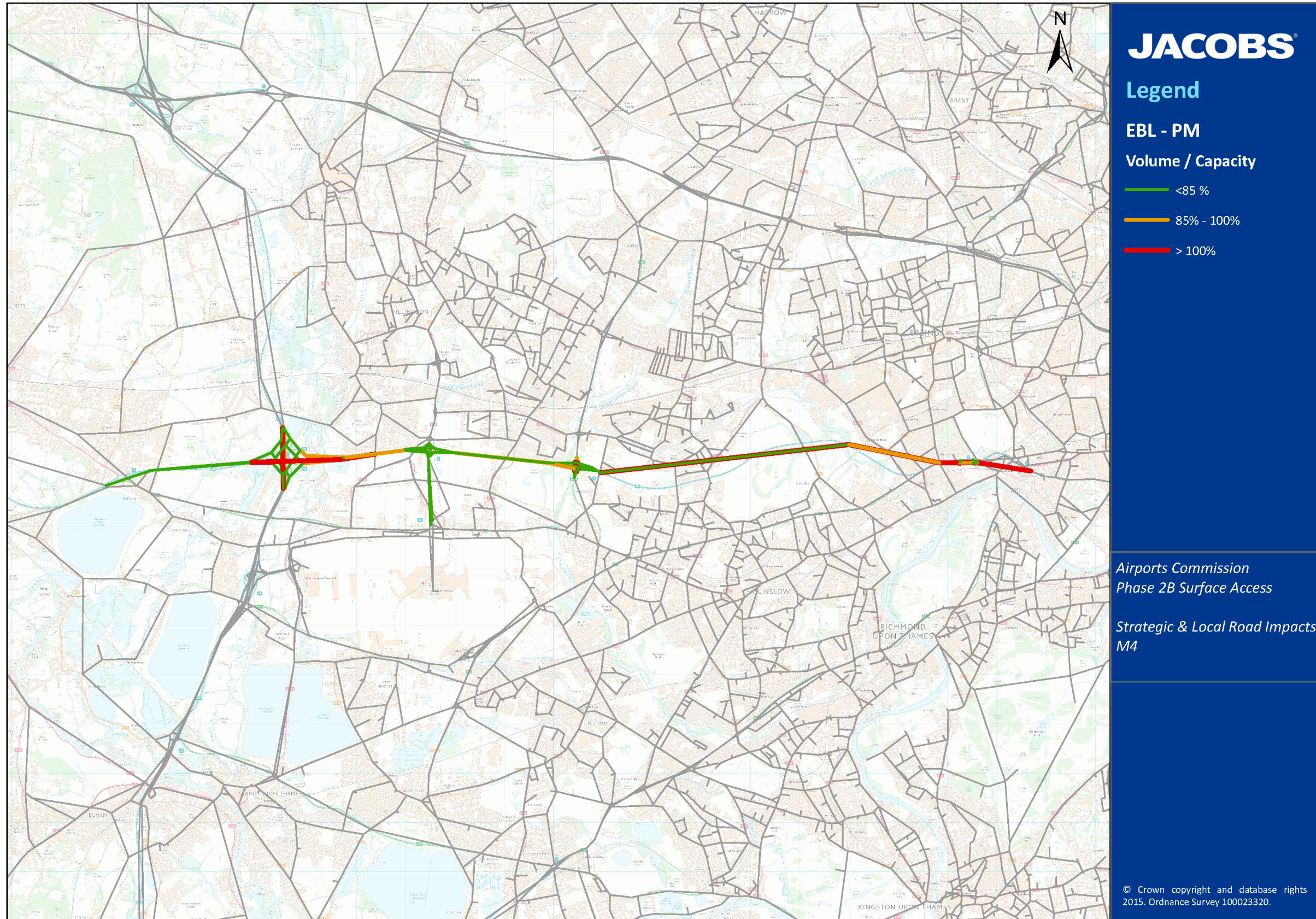


Figure A 7: AM V/C with HNWR, M4 Motorway

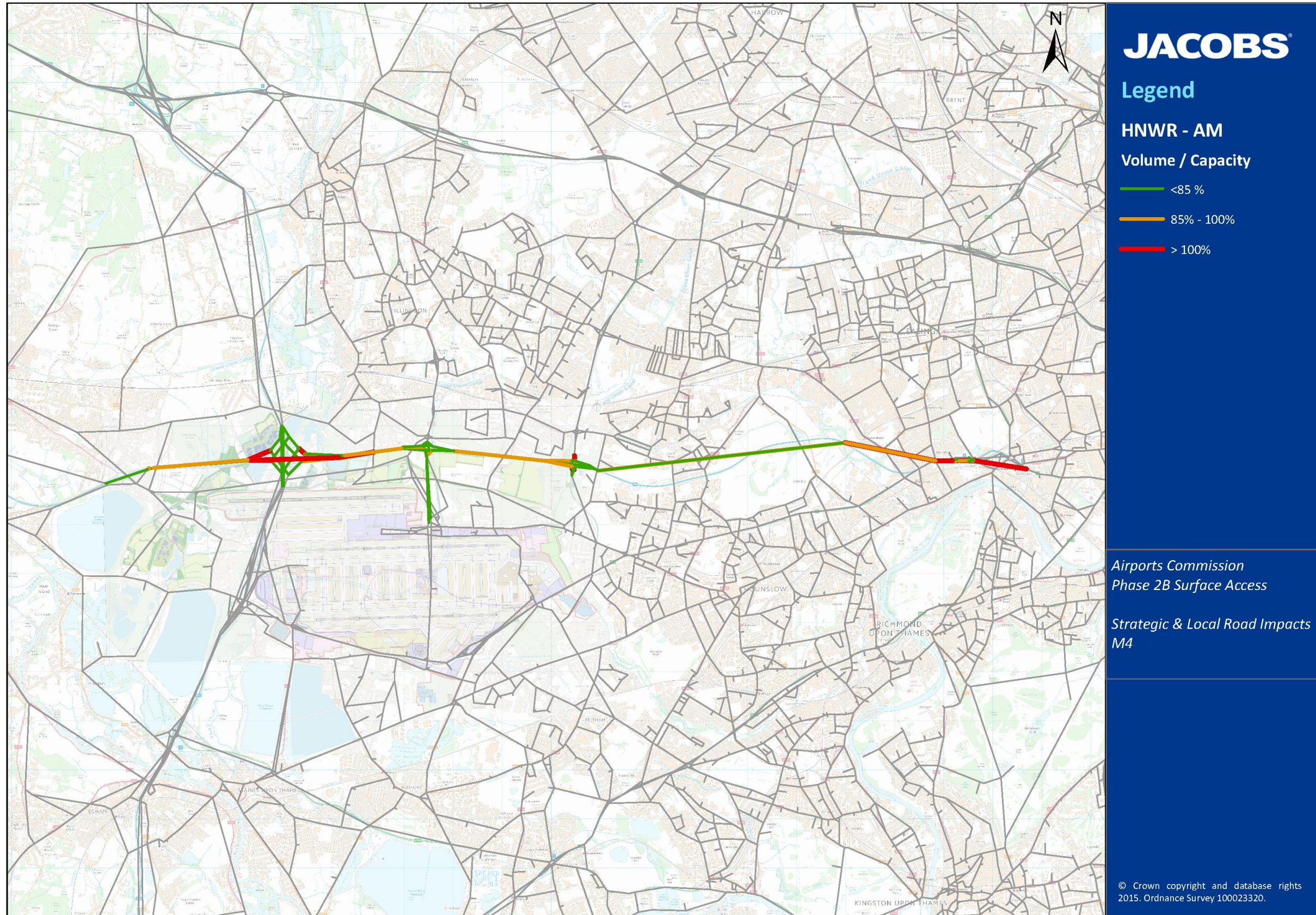


Figure A 8: PM V/C with HNWR, M4 Motorway

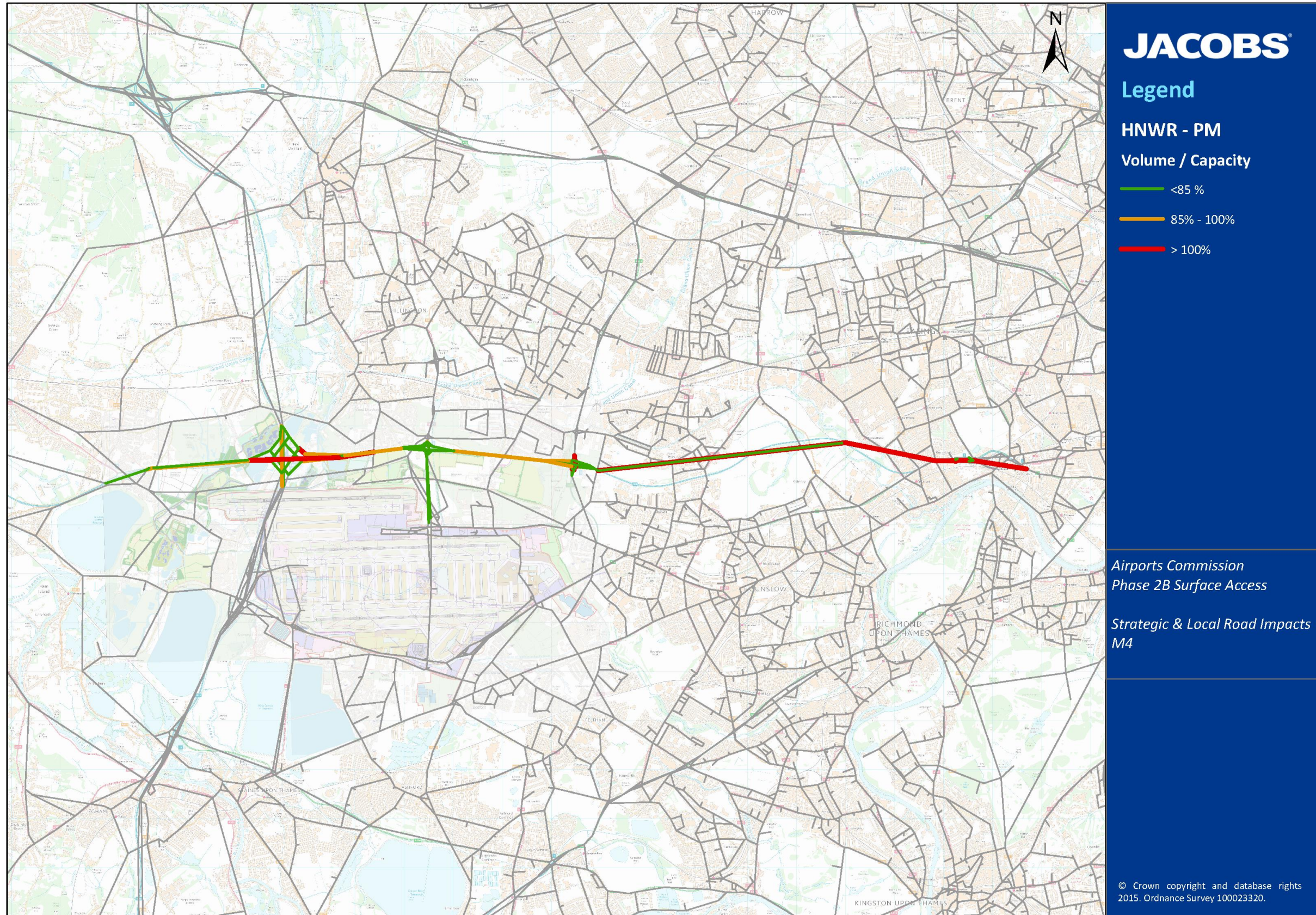


Figure A 9: AM V/C in Extended Baseline, M25 Motorway

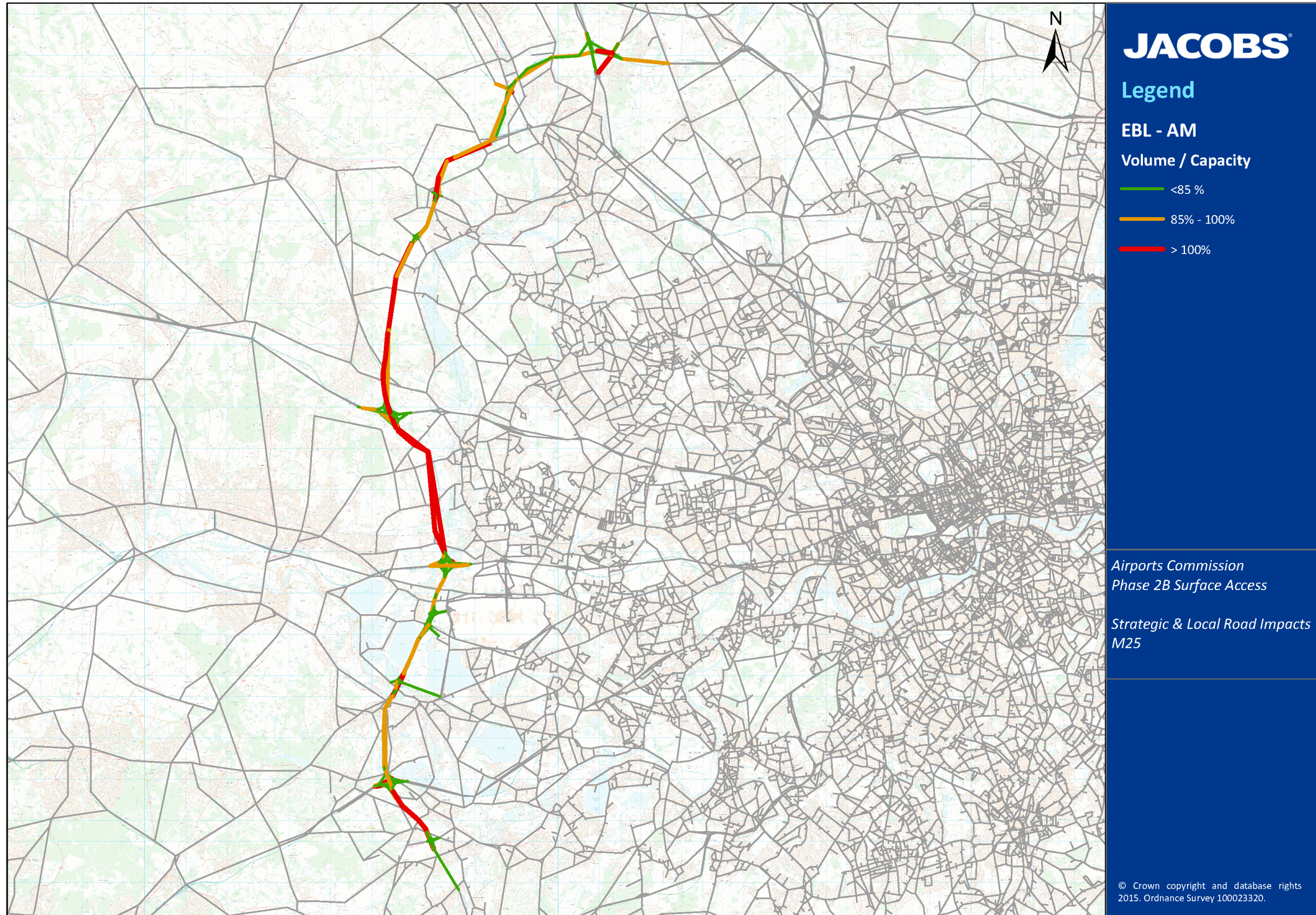


Figure A 10: PM V/C in Extended Baseline, M25 Motorway

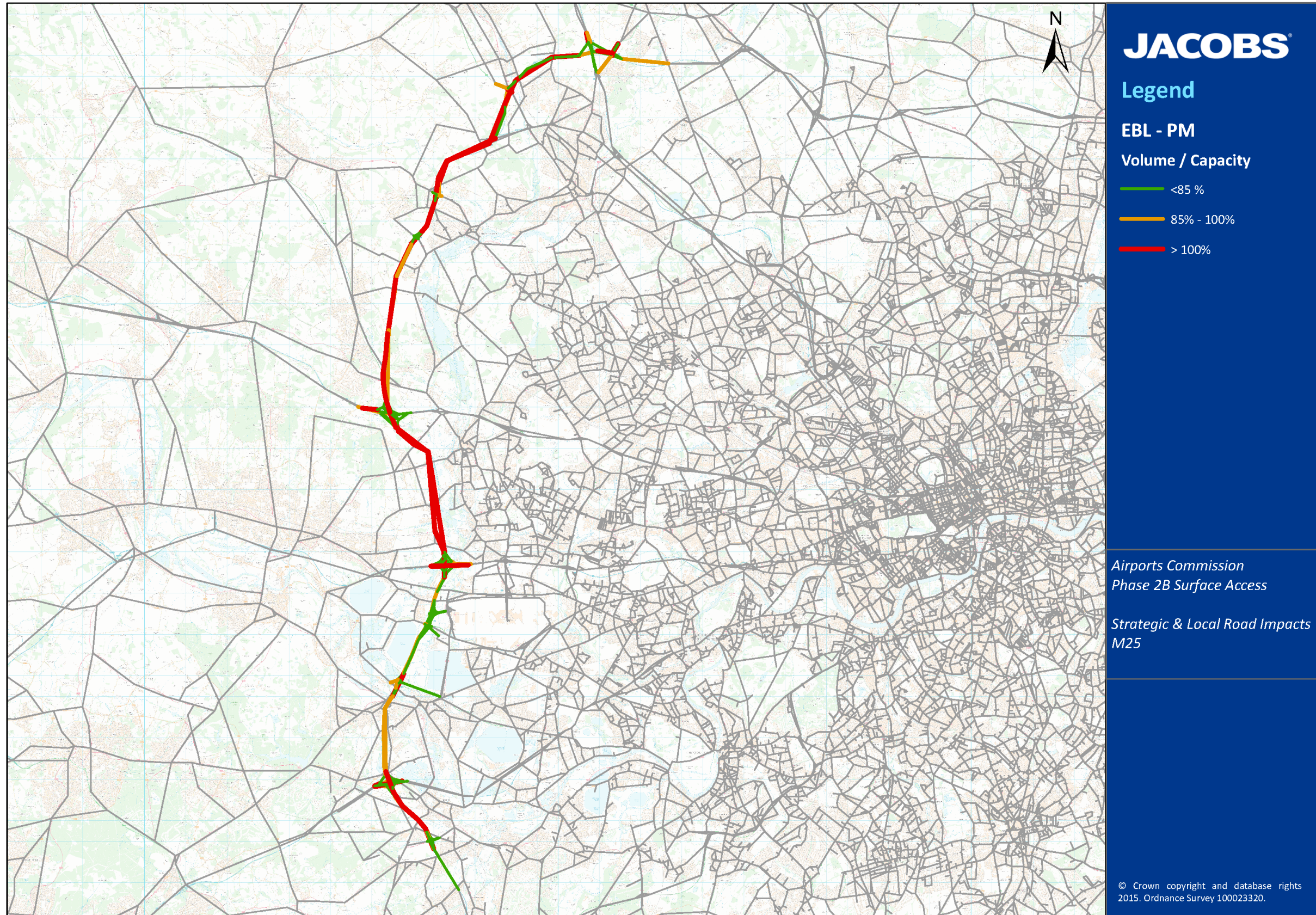


Figure A 11: AM V/C with HNWR, M25 Motorway

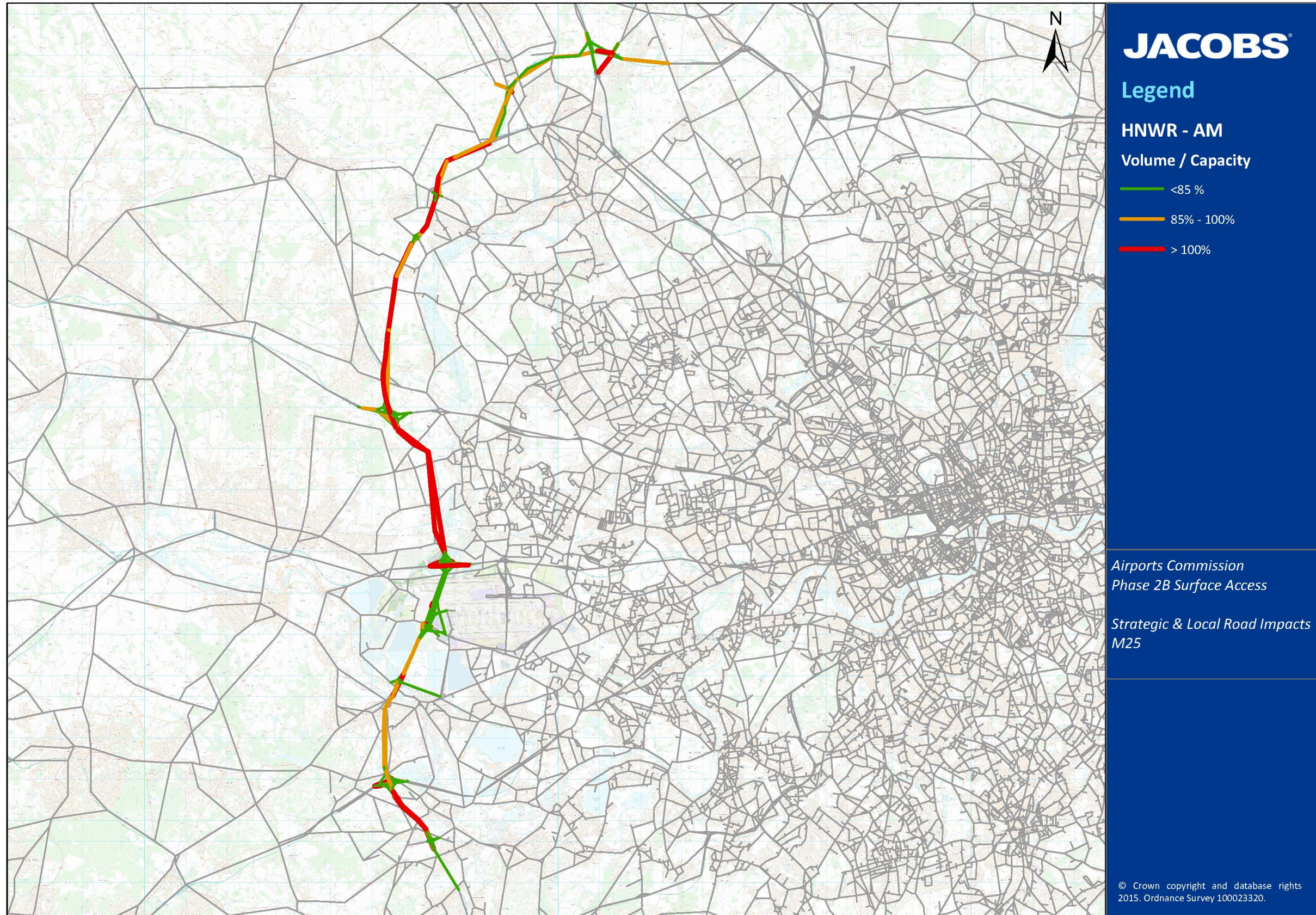


Figure A 12: PM V/C with HNWR, M25 Motorway

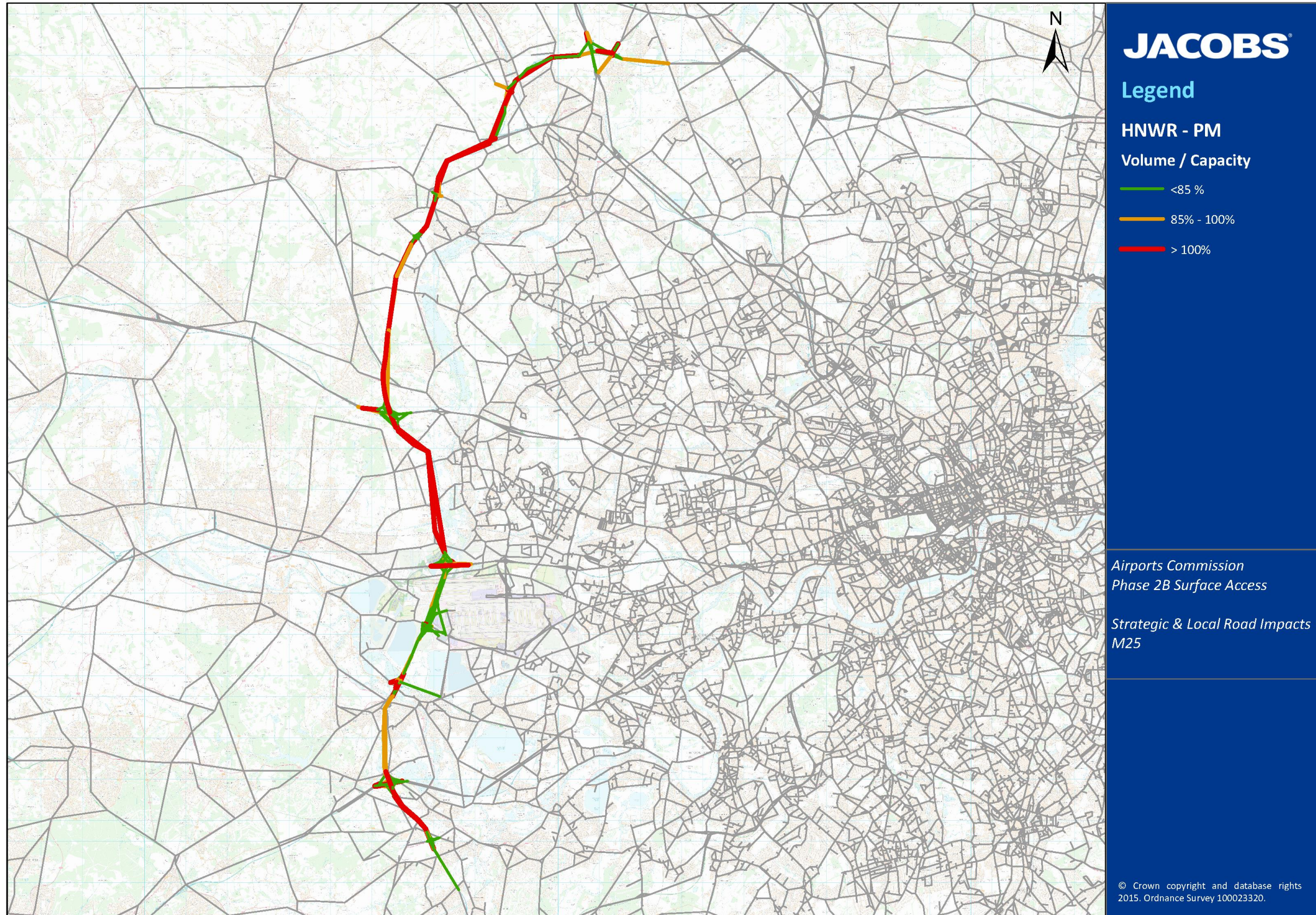


Figure A 13: AM V/C in Extended Baseline, M40 Motorway

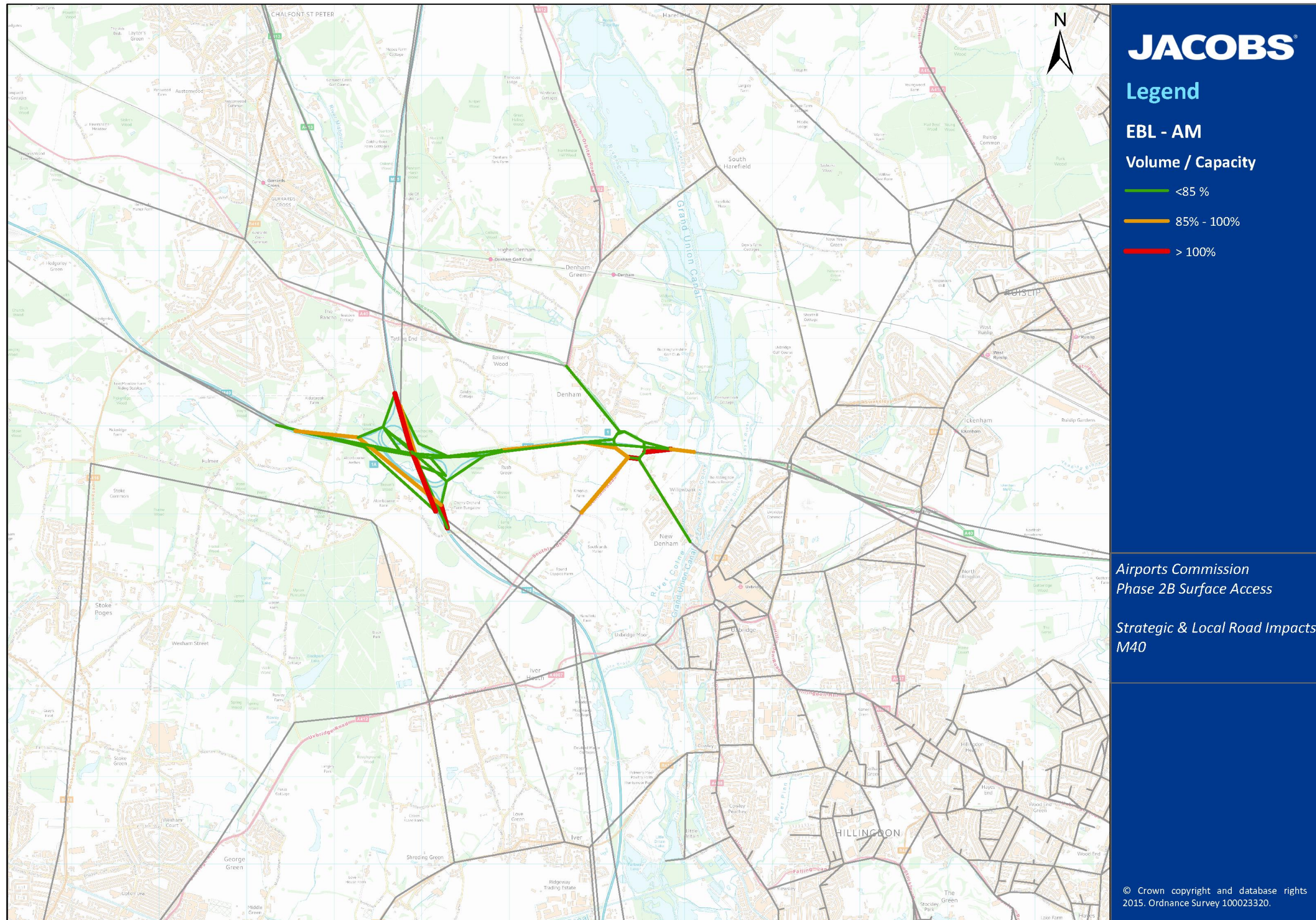


Figure A 14: PM V/C in Extended Baseline, M40 Motorway

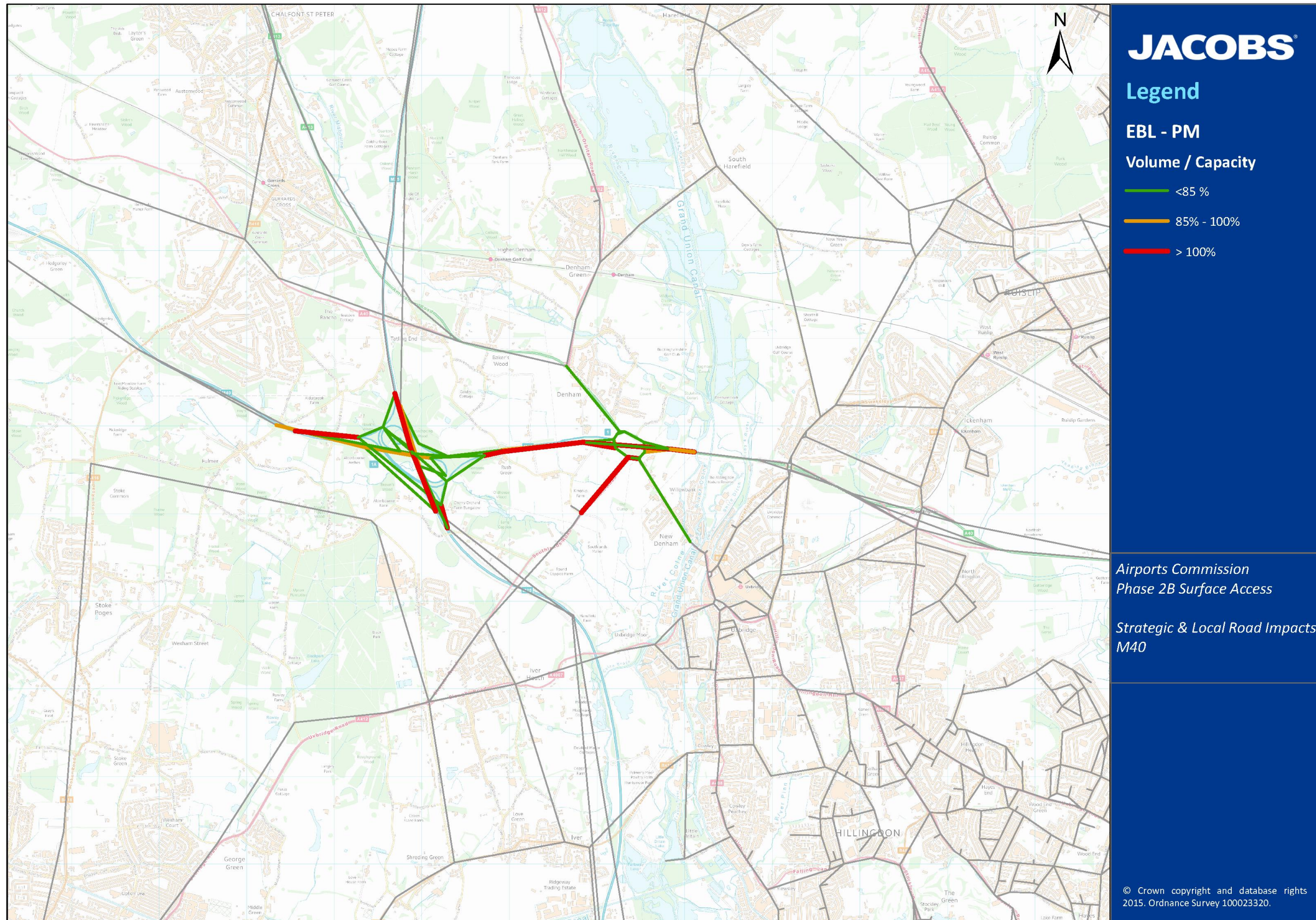


Figure A 15: AM V/C with HNWR, M40 Motorway

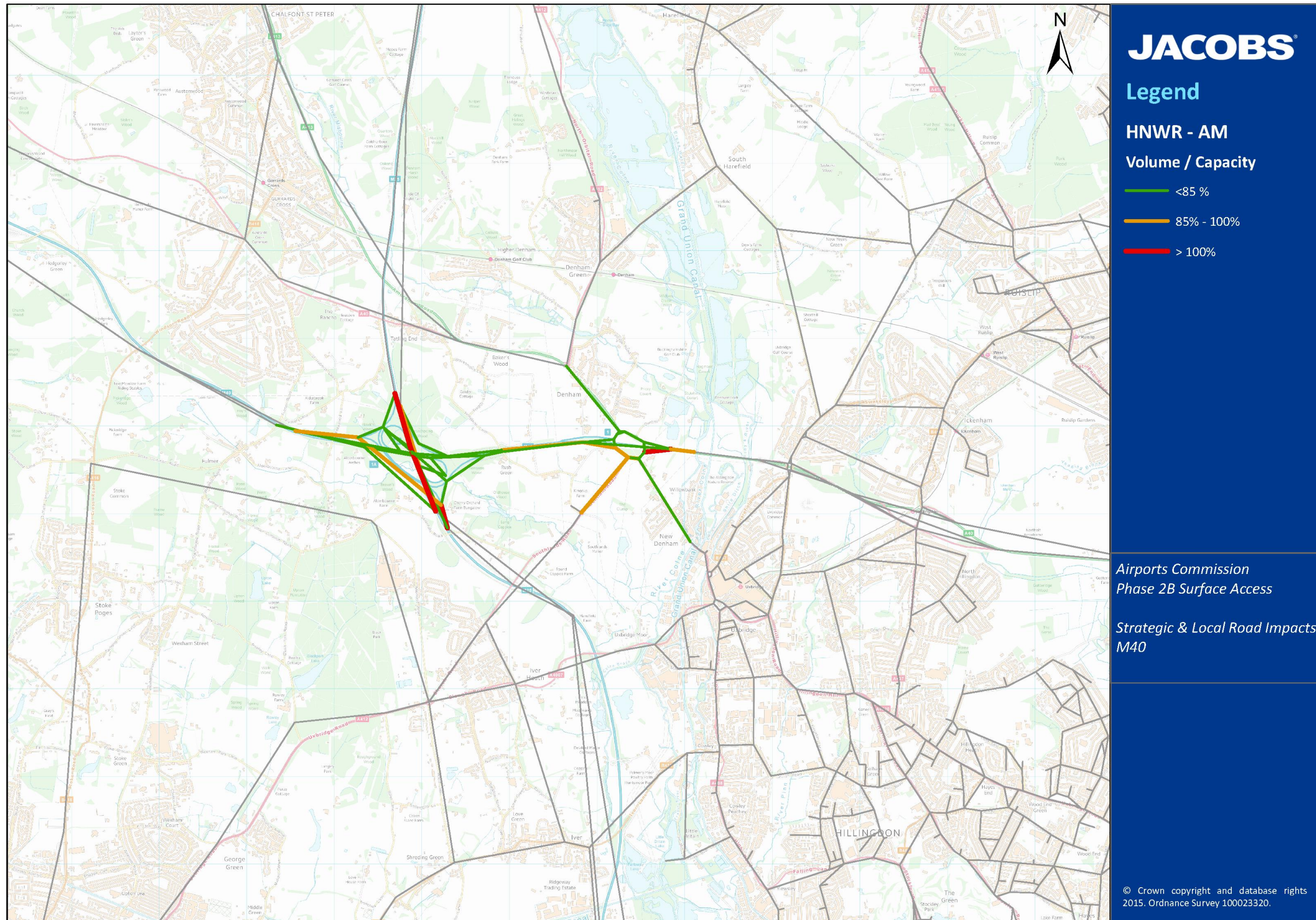


Figure A 16: PM V/C with HNWR, M40 Motorway

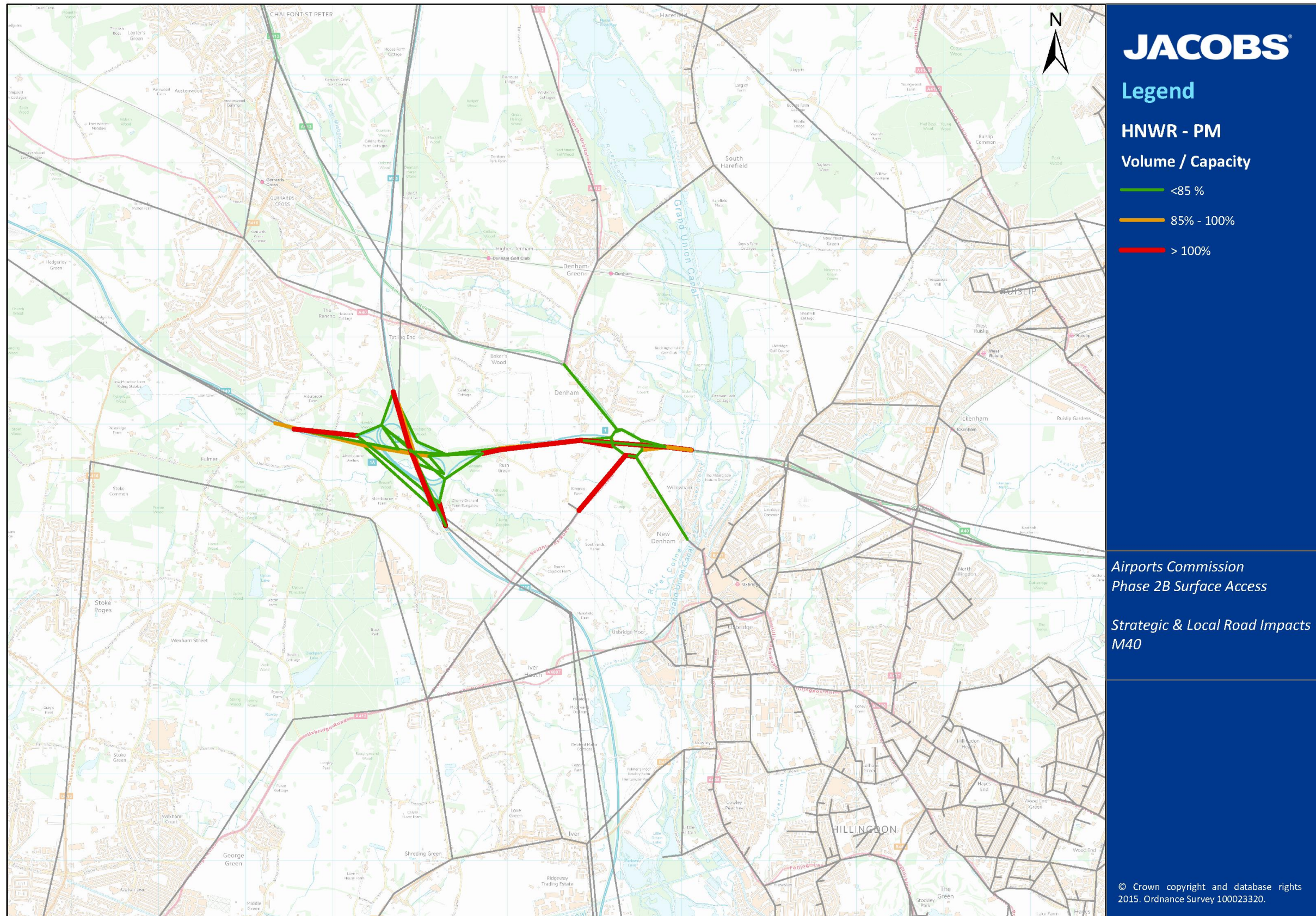


Figure A 17: AM V/C in Extended Baseline, A4

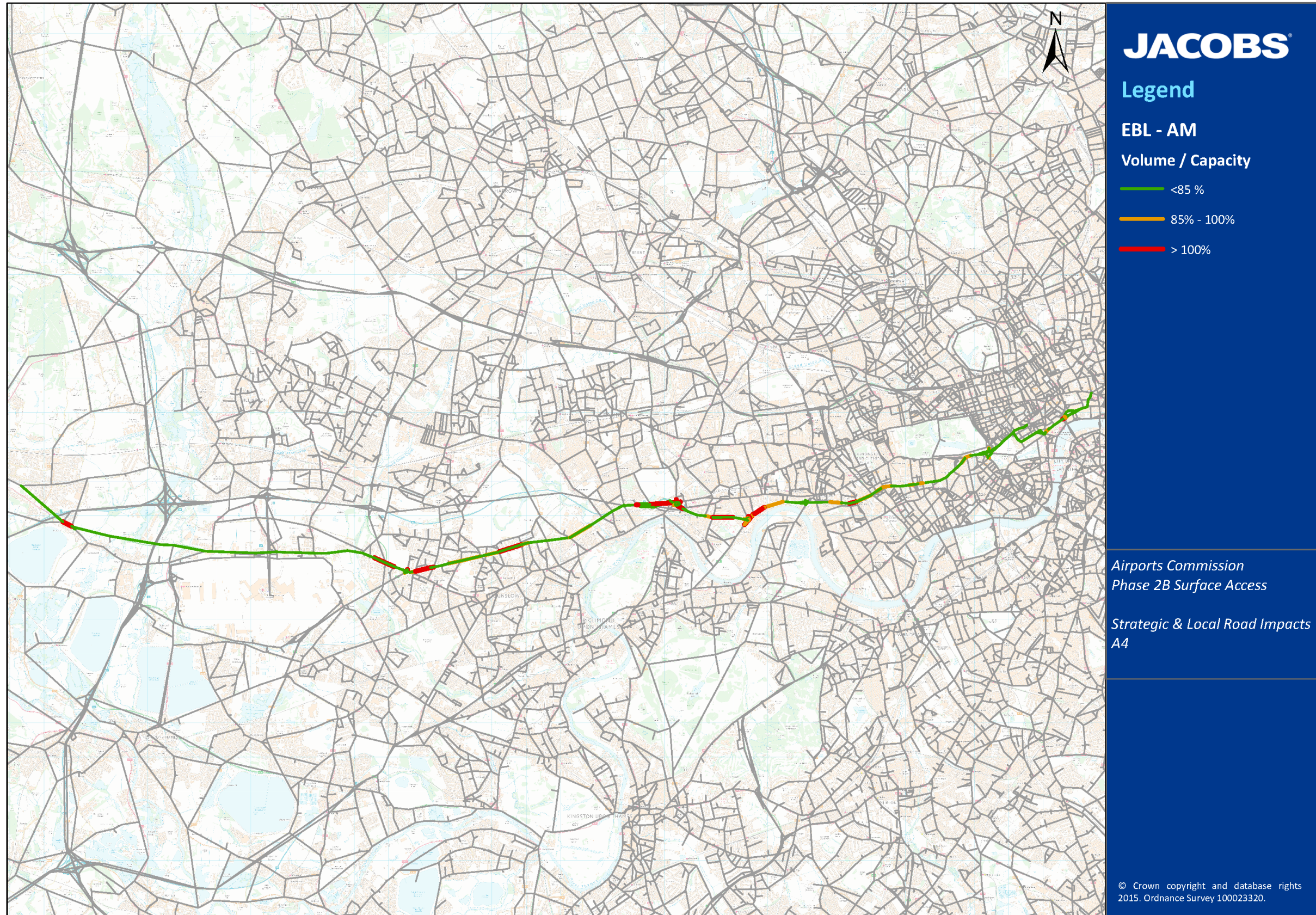


Figure A 18: PM V/C in Extended Baseline, A4

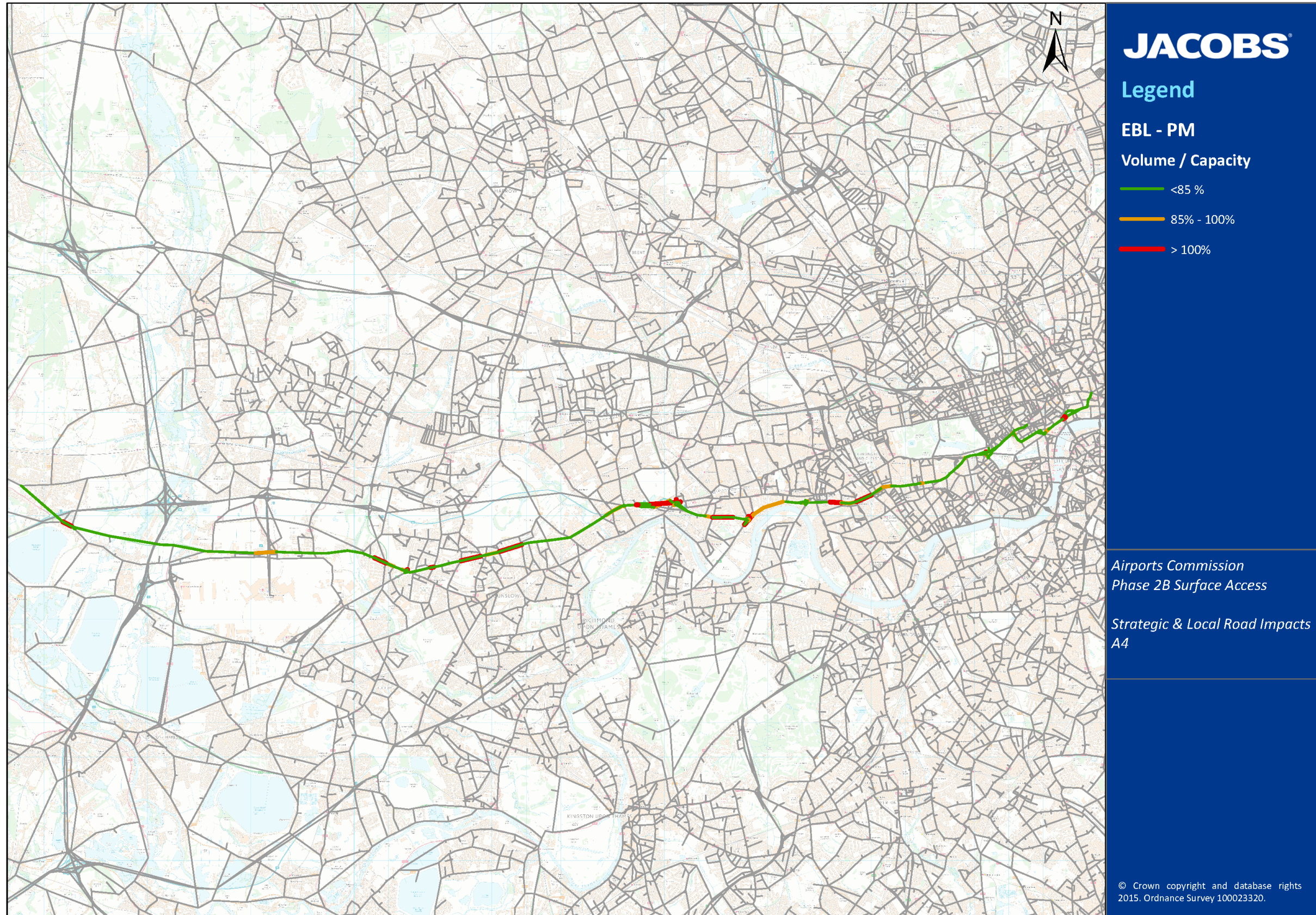


Figure A 19: AM V/C with HNWR, A4

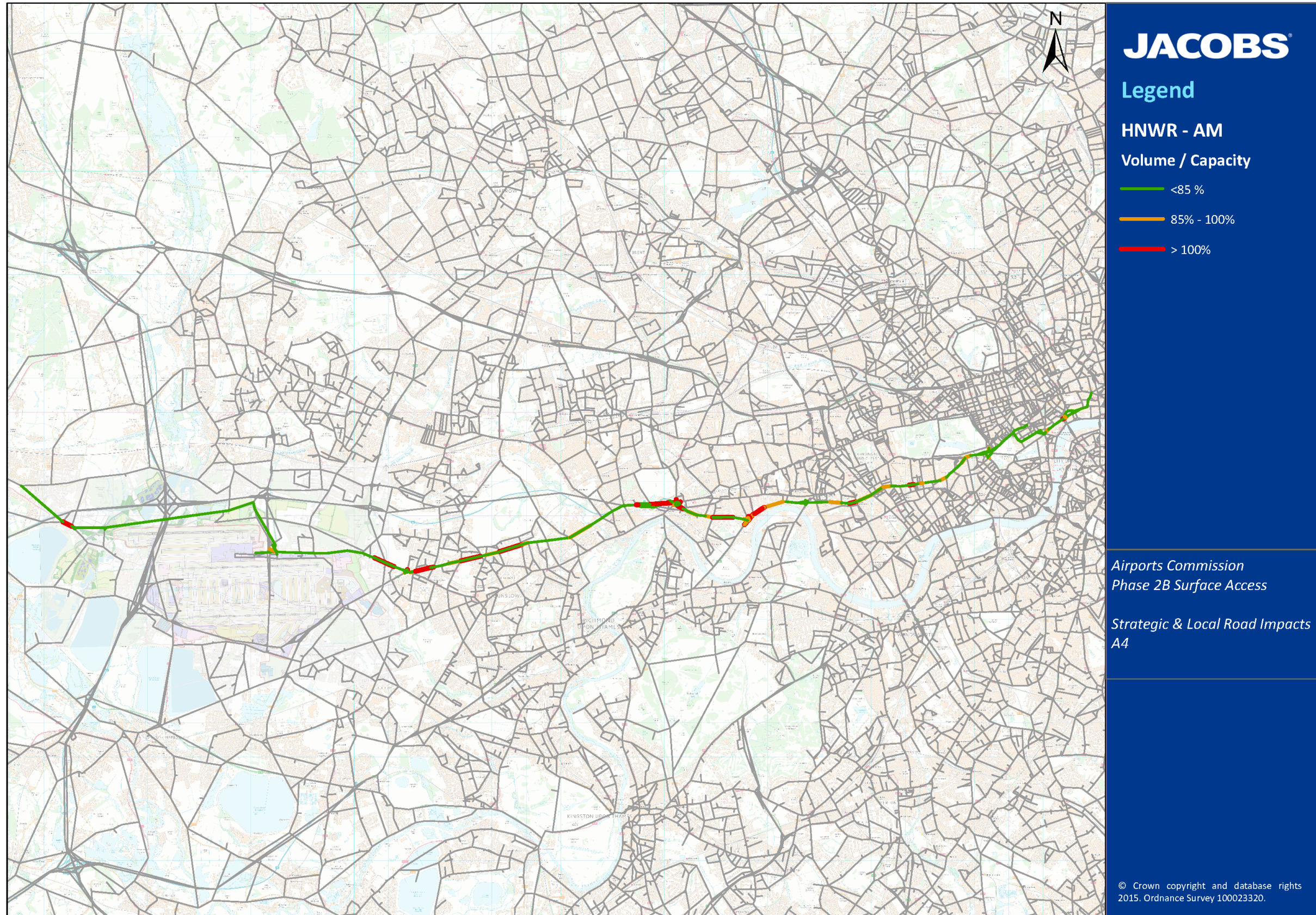


Figure A 20: PM V/C with HNWR, A4

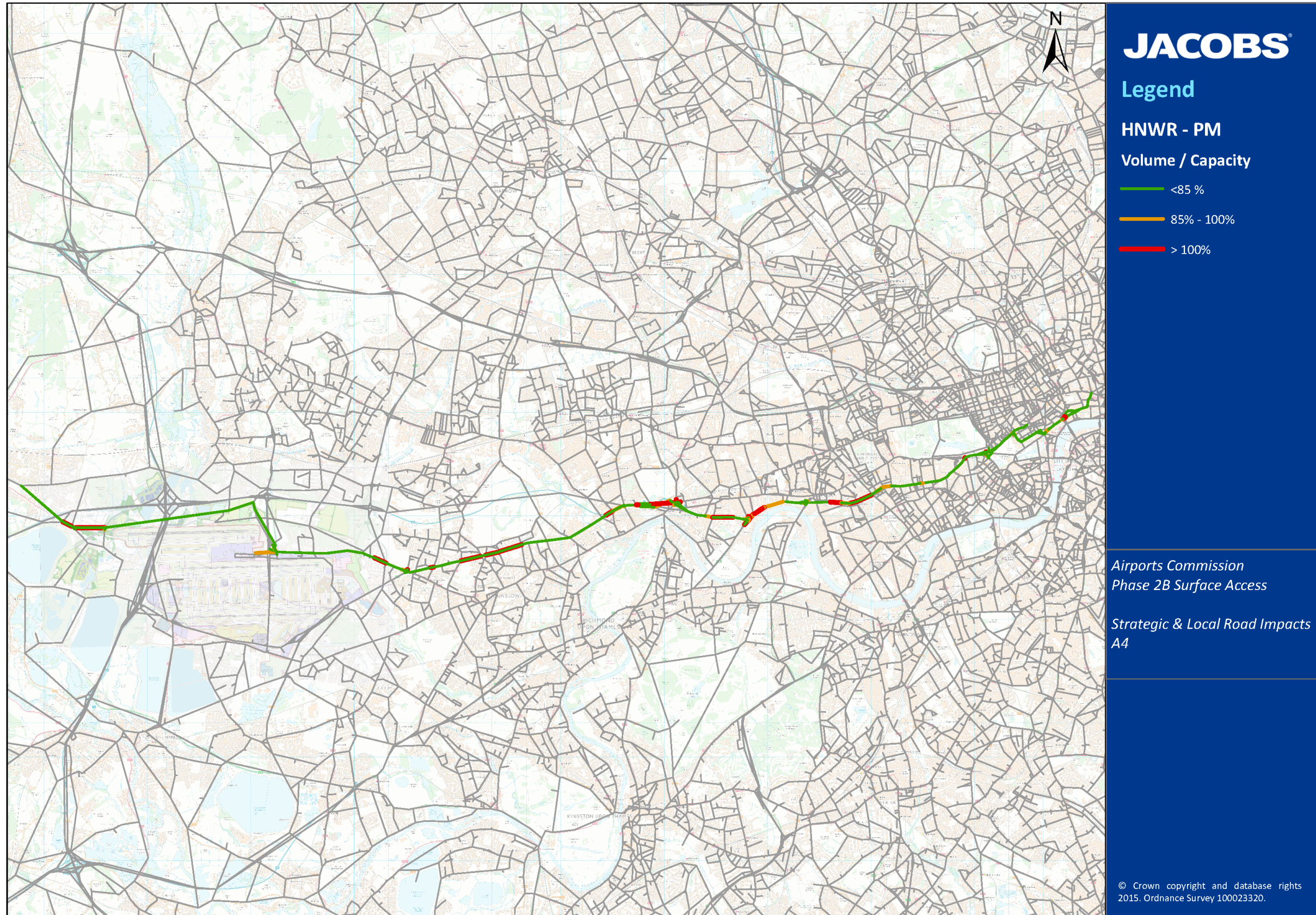


Figure A 21: AM V/C in Extended Baseline, A40

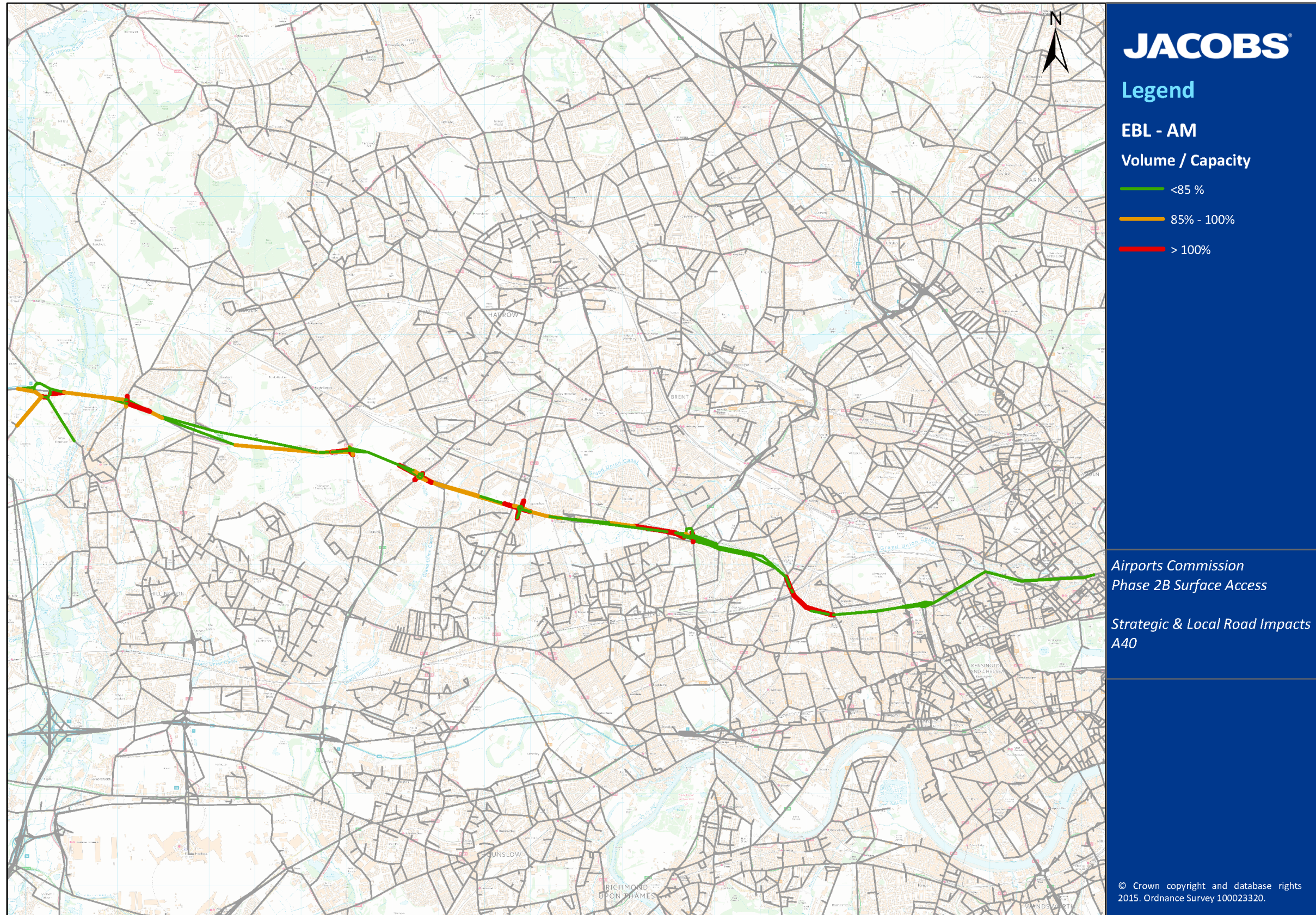


Figure A 22: PM V/C in Extended Baseline, A40

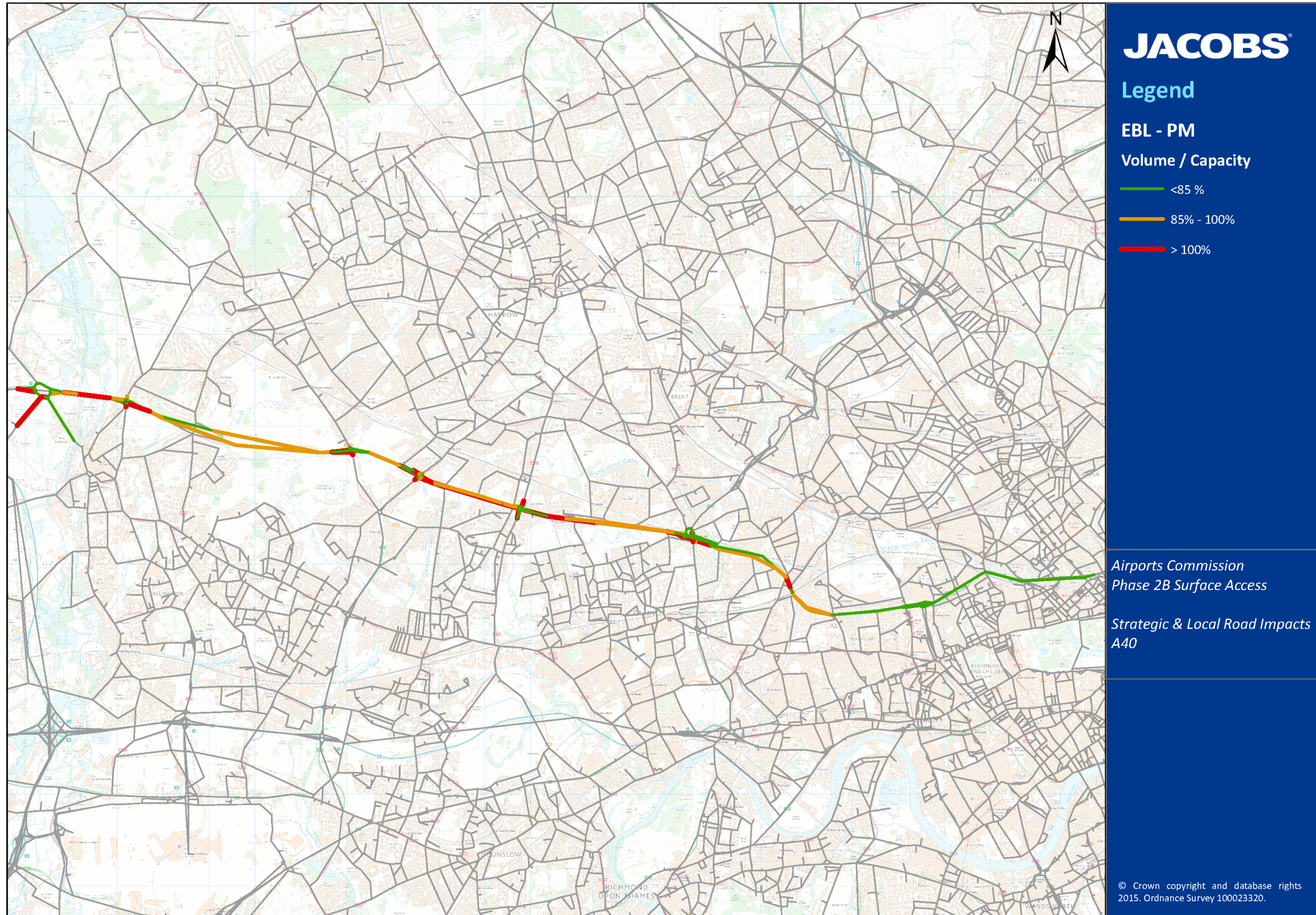


Figure A 23: AM V/C with HNWR, A40

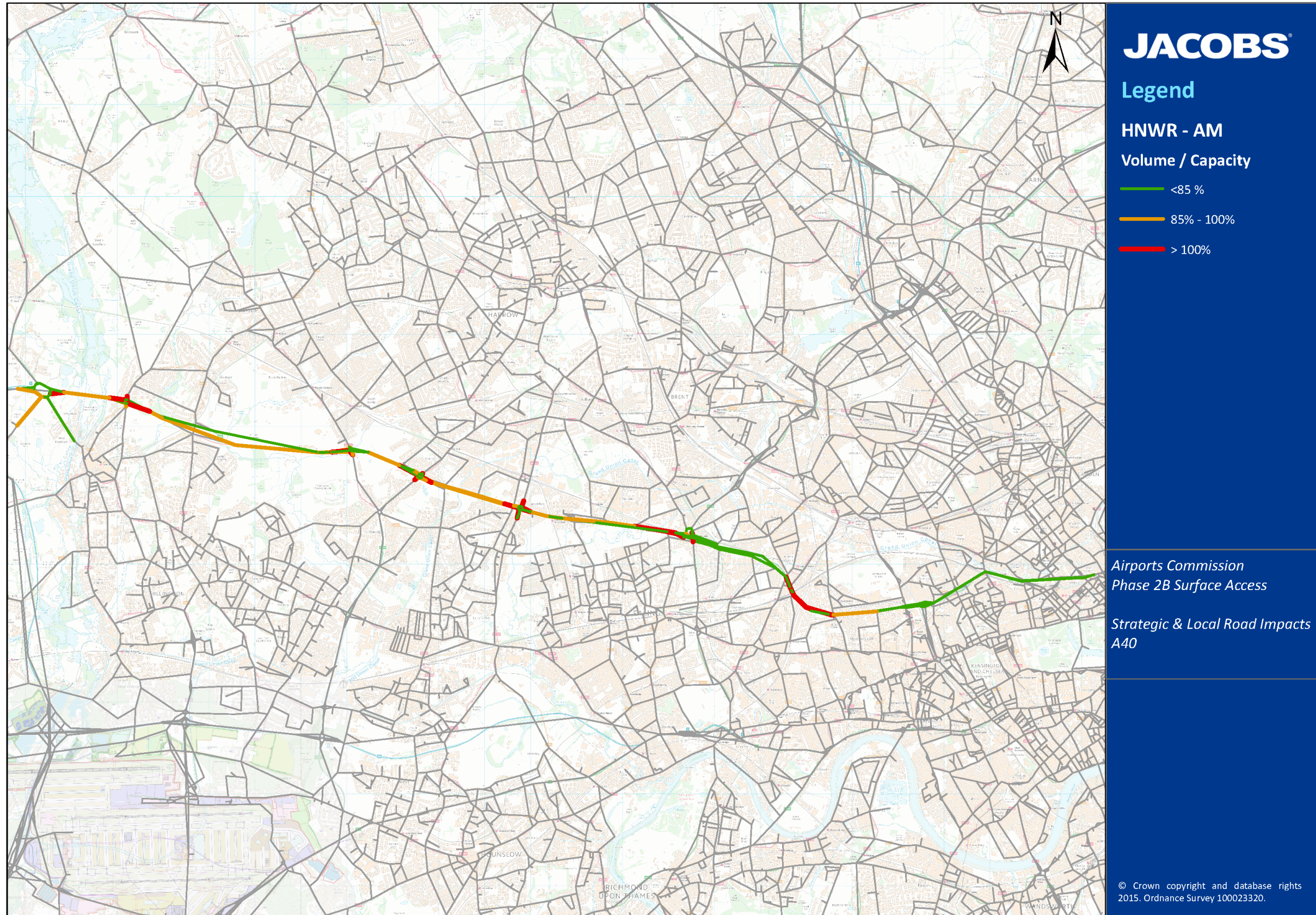


Figure A 24: PM V/C with HNWR, A40

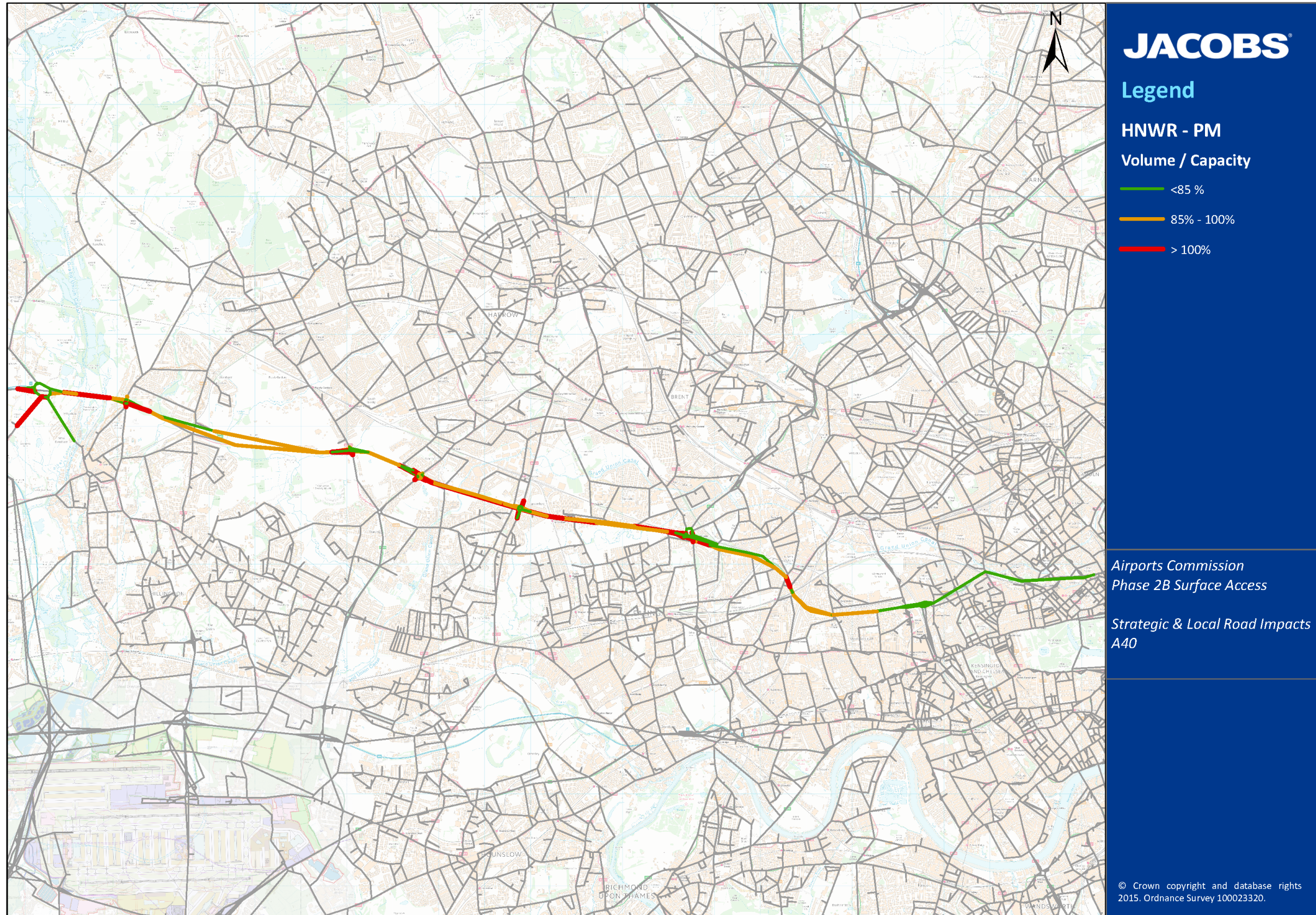


Figure A 25: AM V/C in Extended Baseline, A30

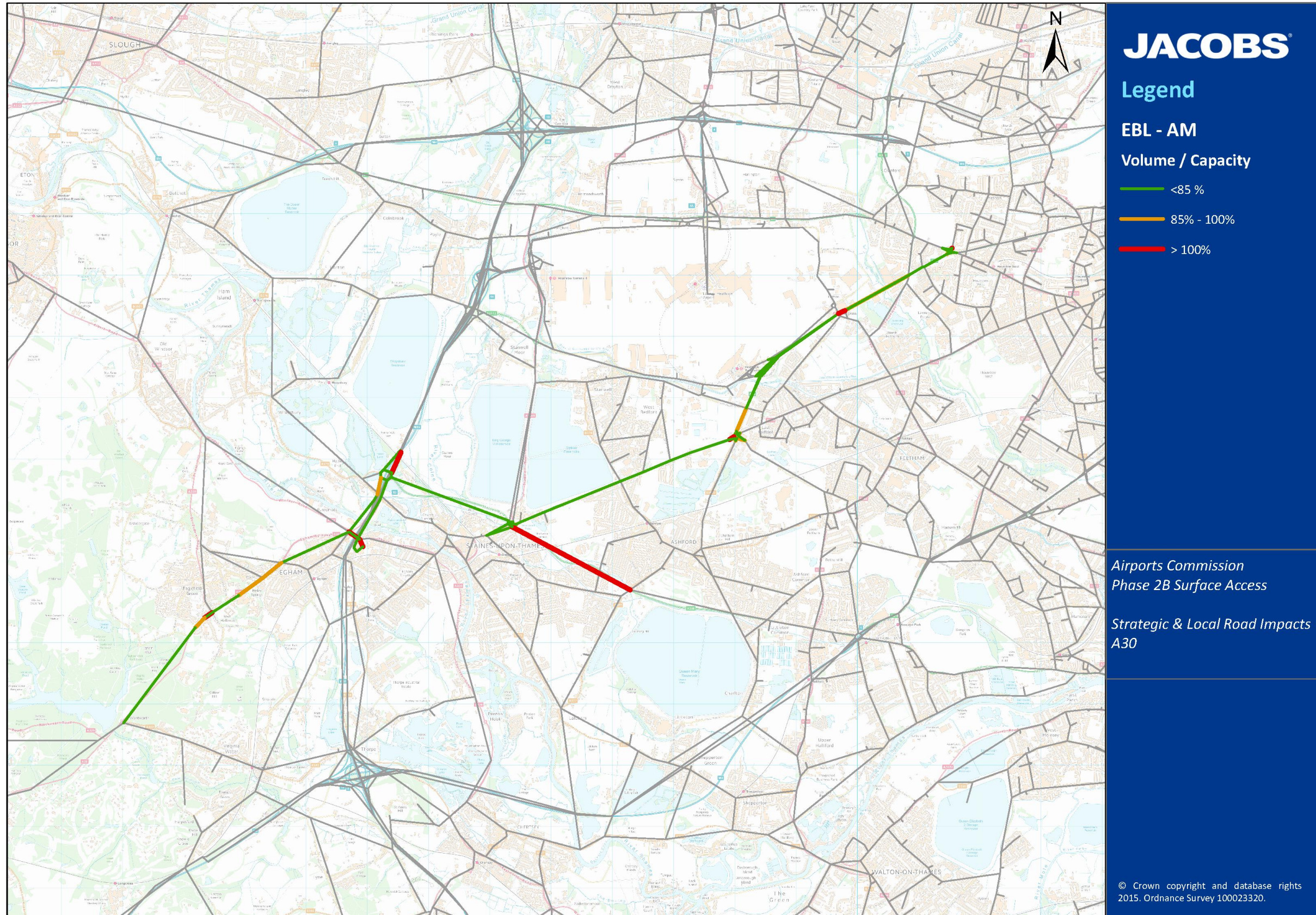


Figure A 26: PM V/C in Extended Baseline, A30

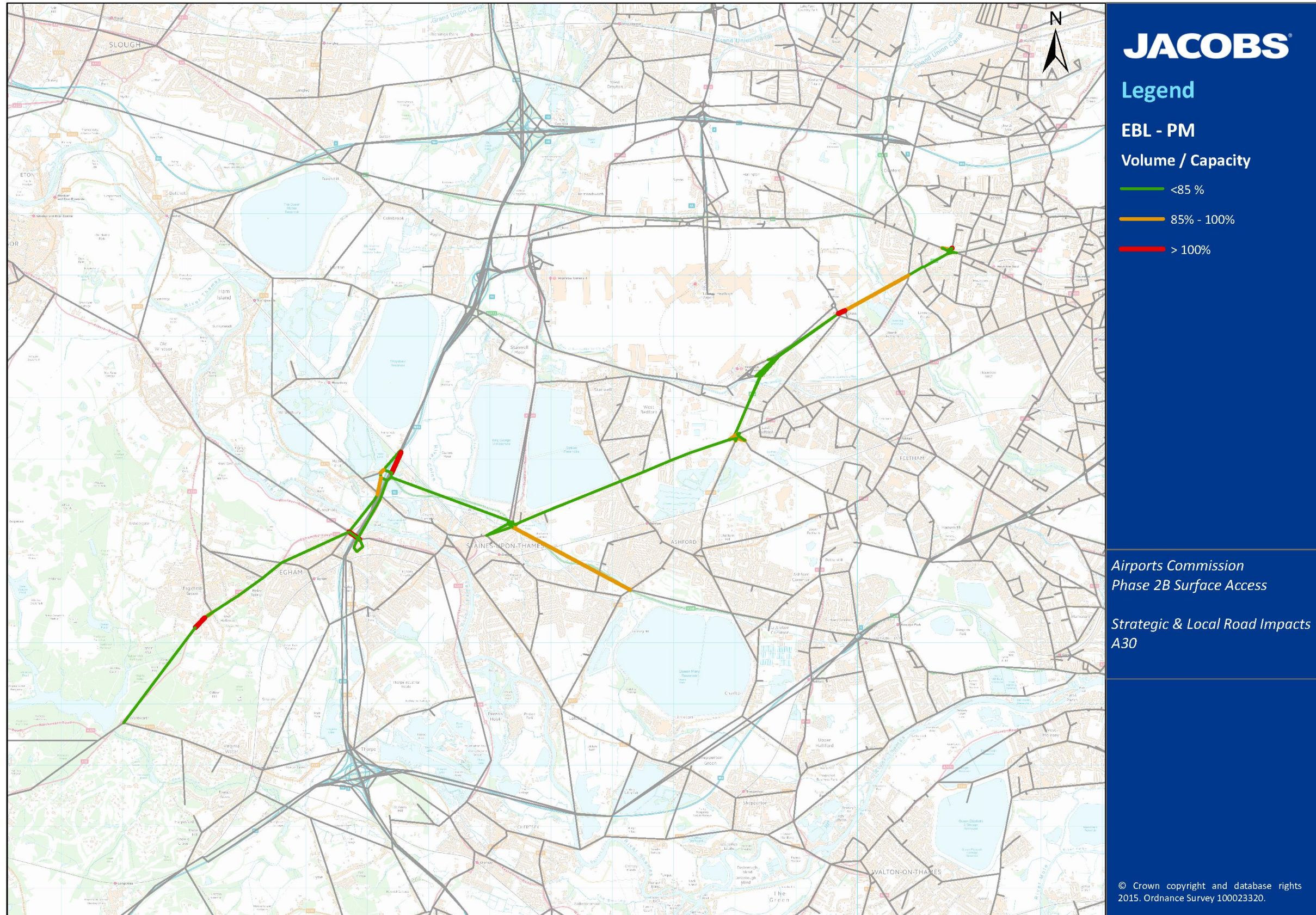


Figure A 27: AM V/C with HNWR, A30

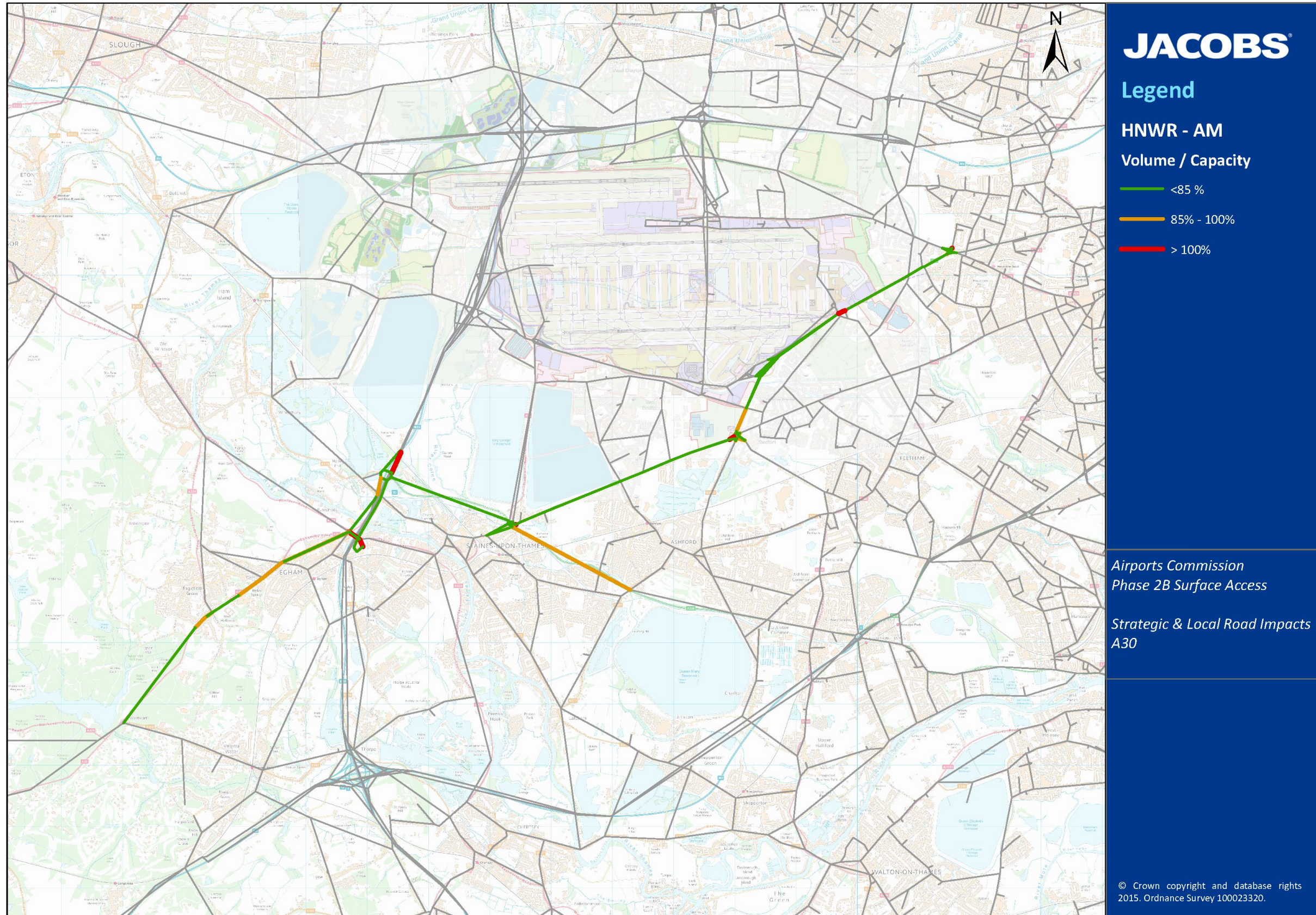


Figure A 28: PM V/C with HNWR, A30

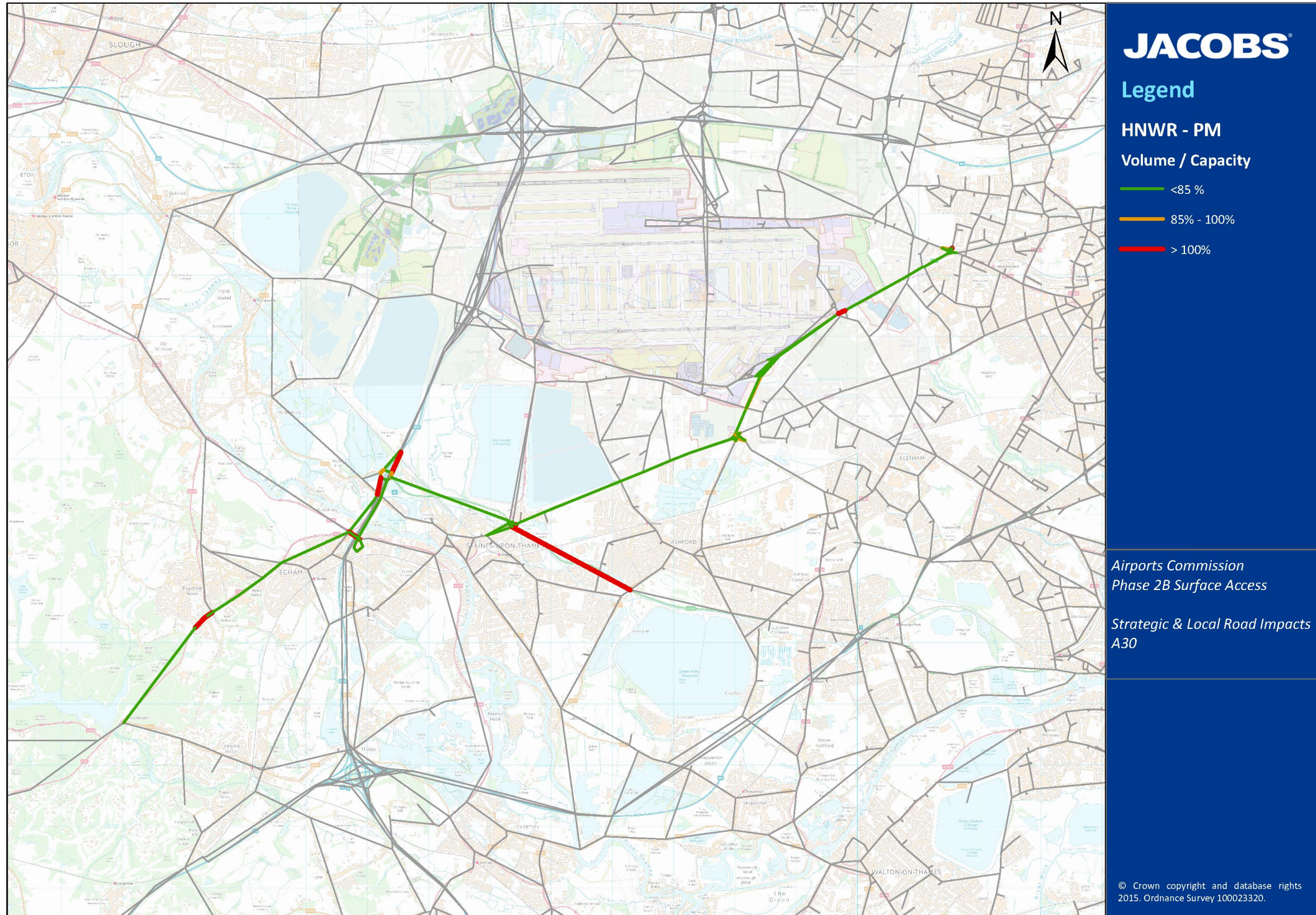


Figure A 29: AM V/C in Extended Baseline, A312

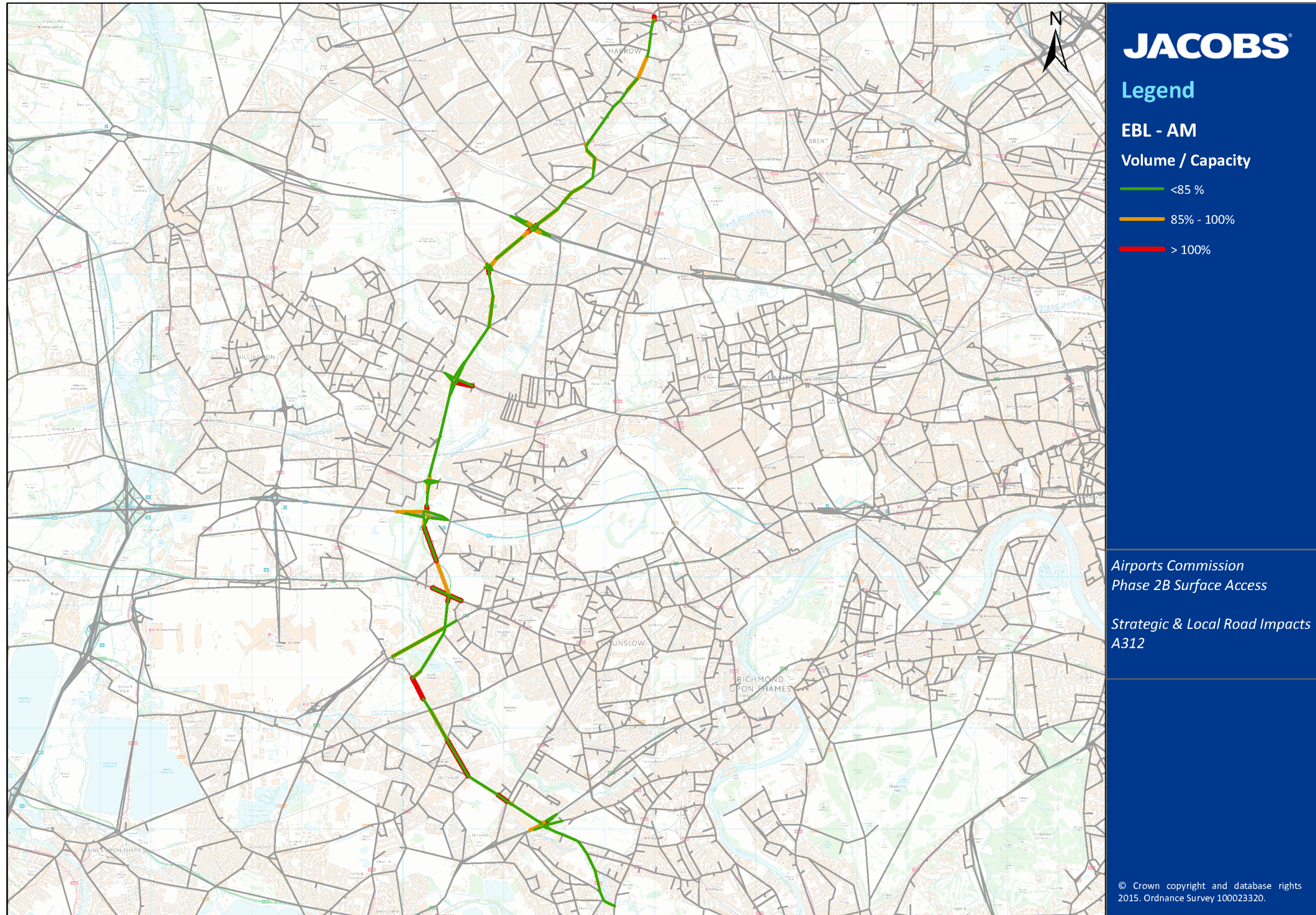


Figure A 30: PM V/C in Extended Baseline, A312

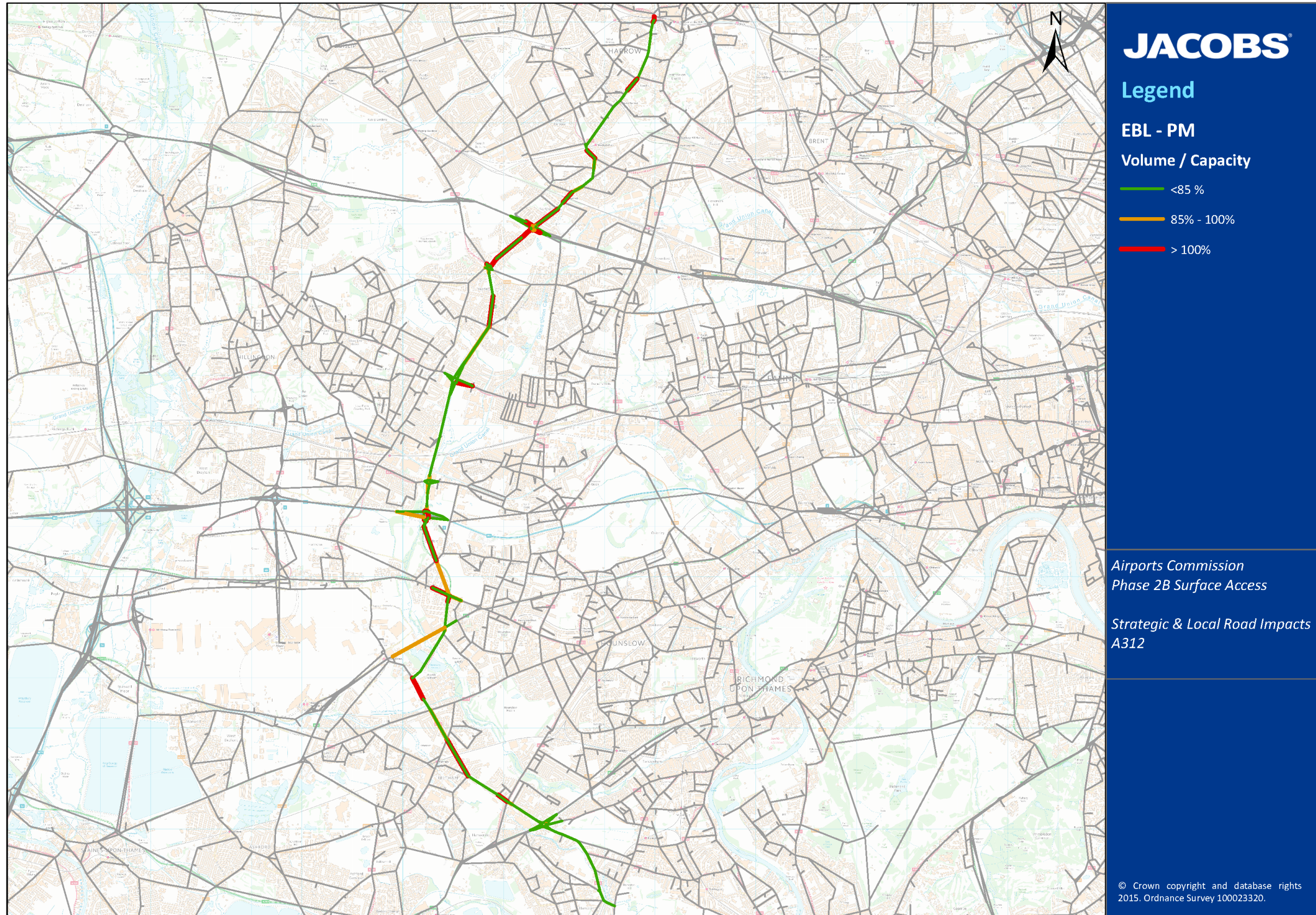


Figure A 31: AM V/C with HNWR, A312

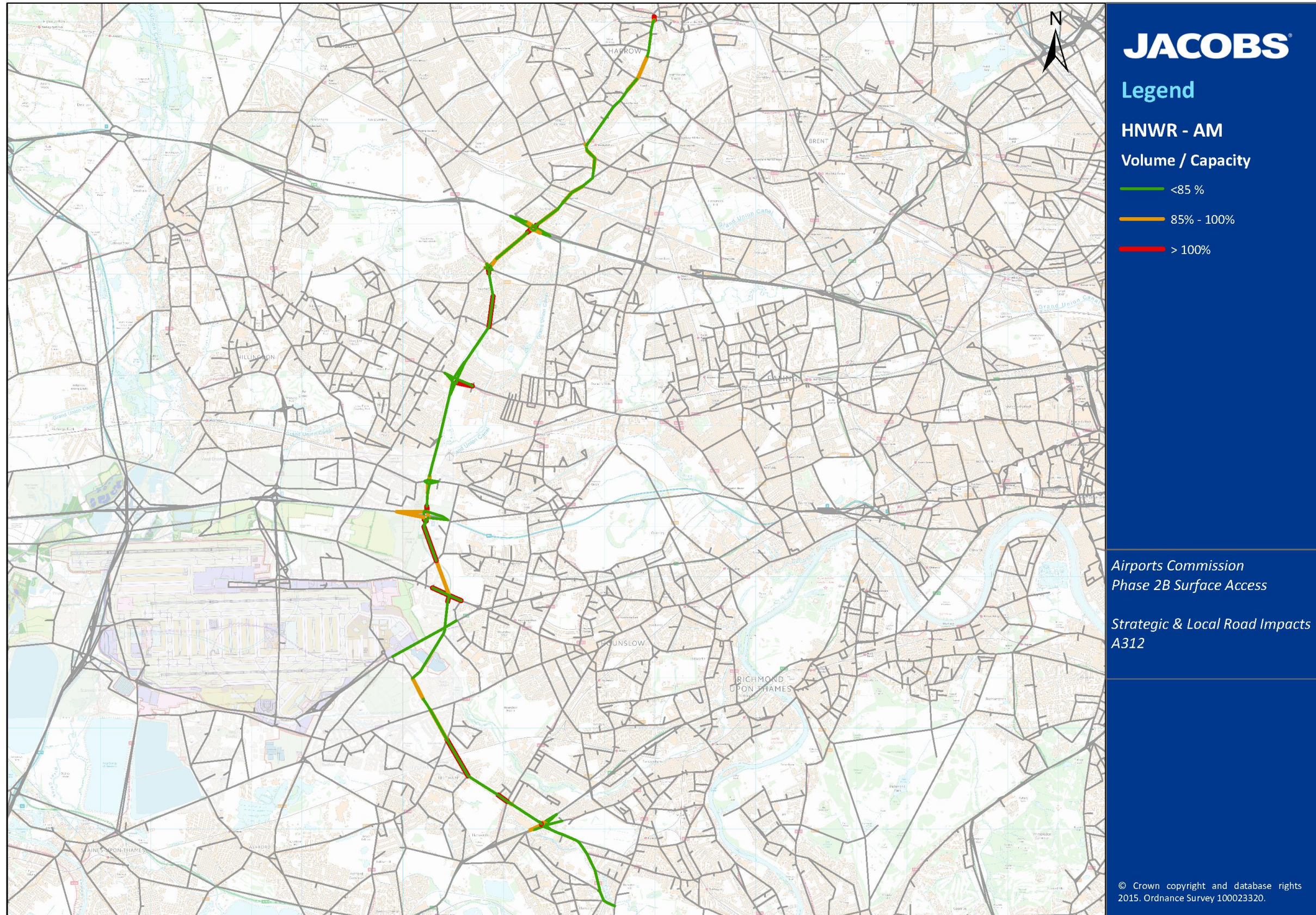


Figure A 32: PM V/C with HNWR, A312

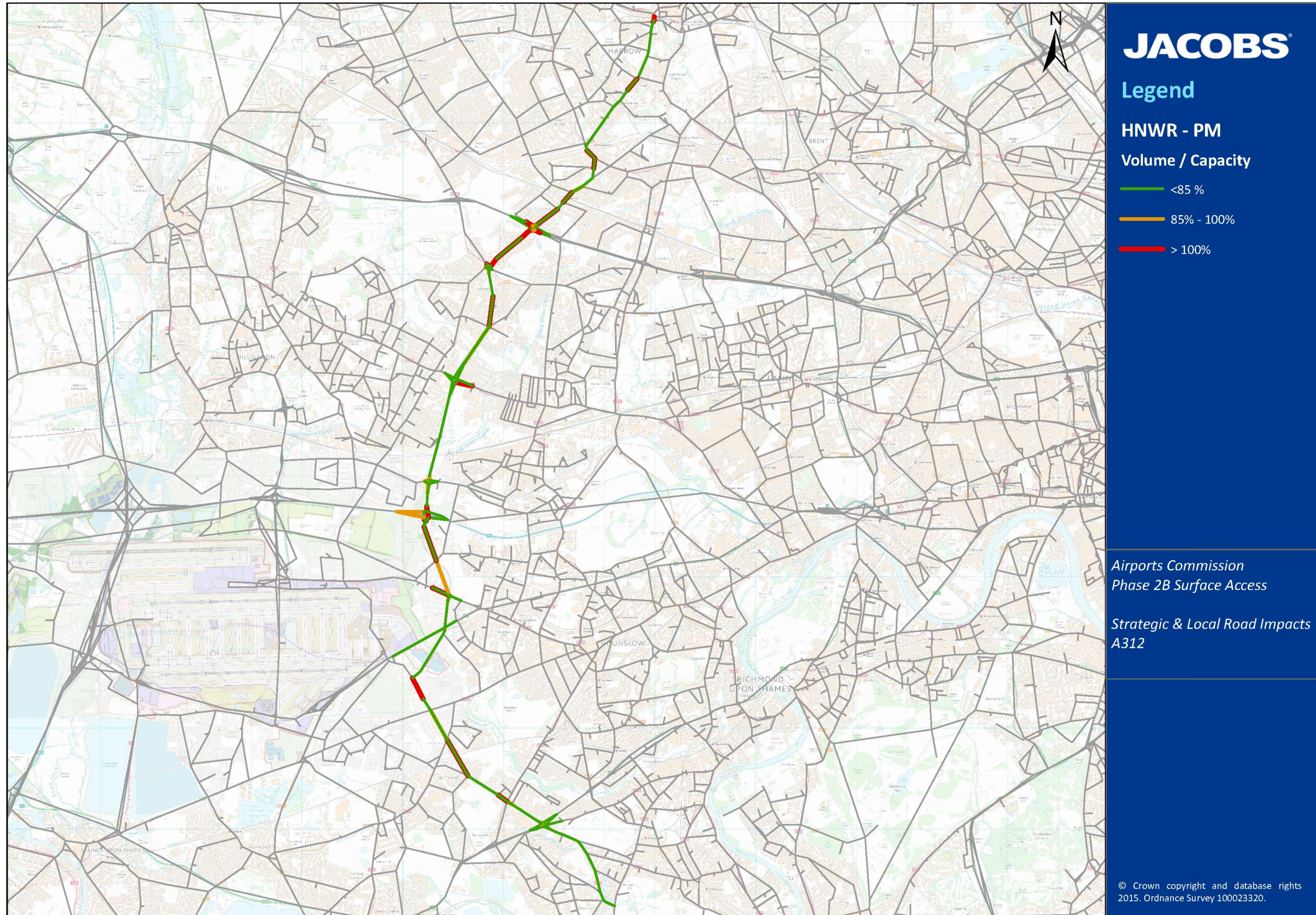


Figure A 33: AM V/C in Extended Baseline, A408

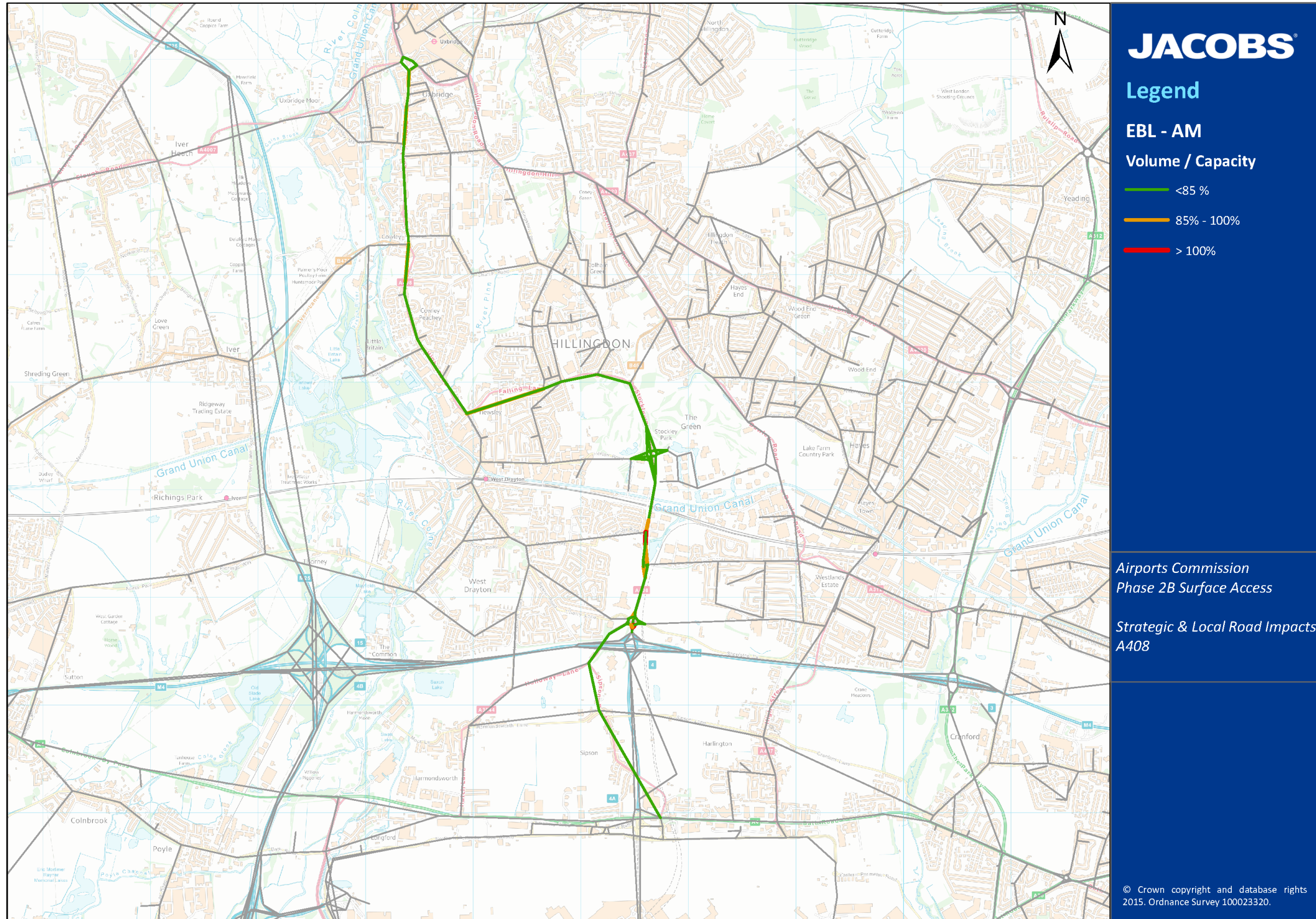


Figure A 34: PM V/C in Extended Baseline, A408

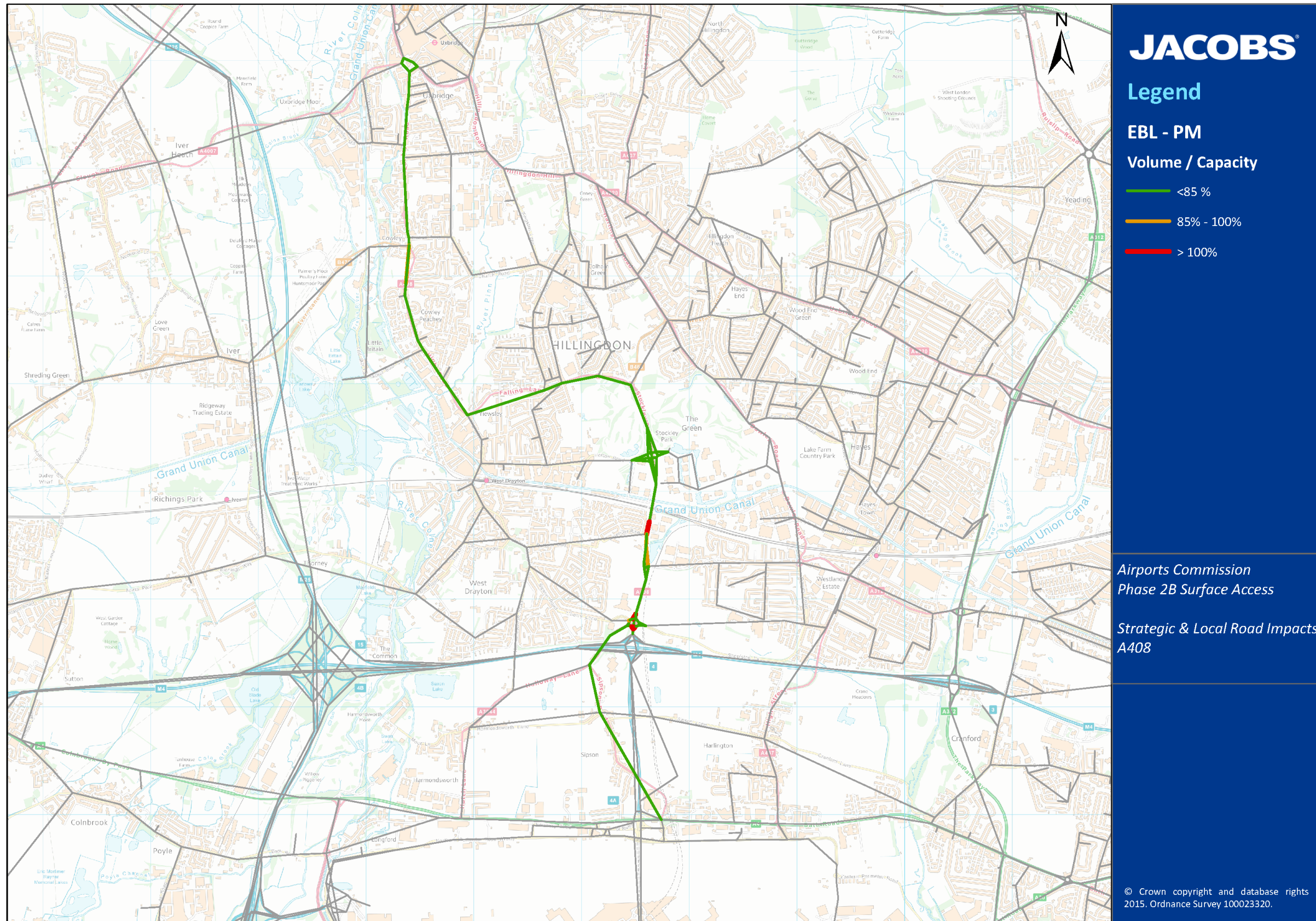


Figure A 35: AM V/C with HNWR, A408

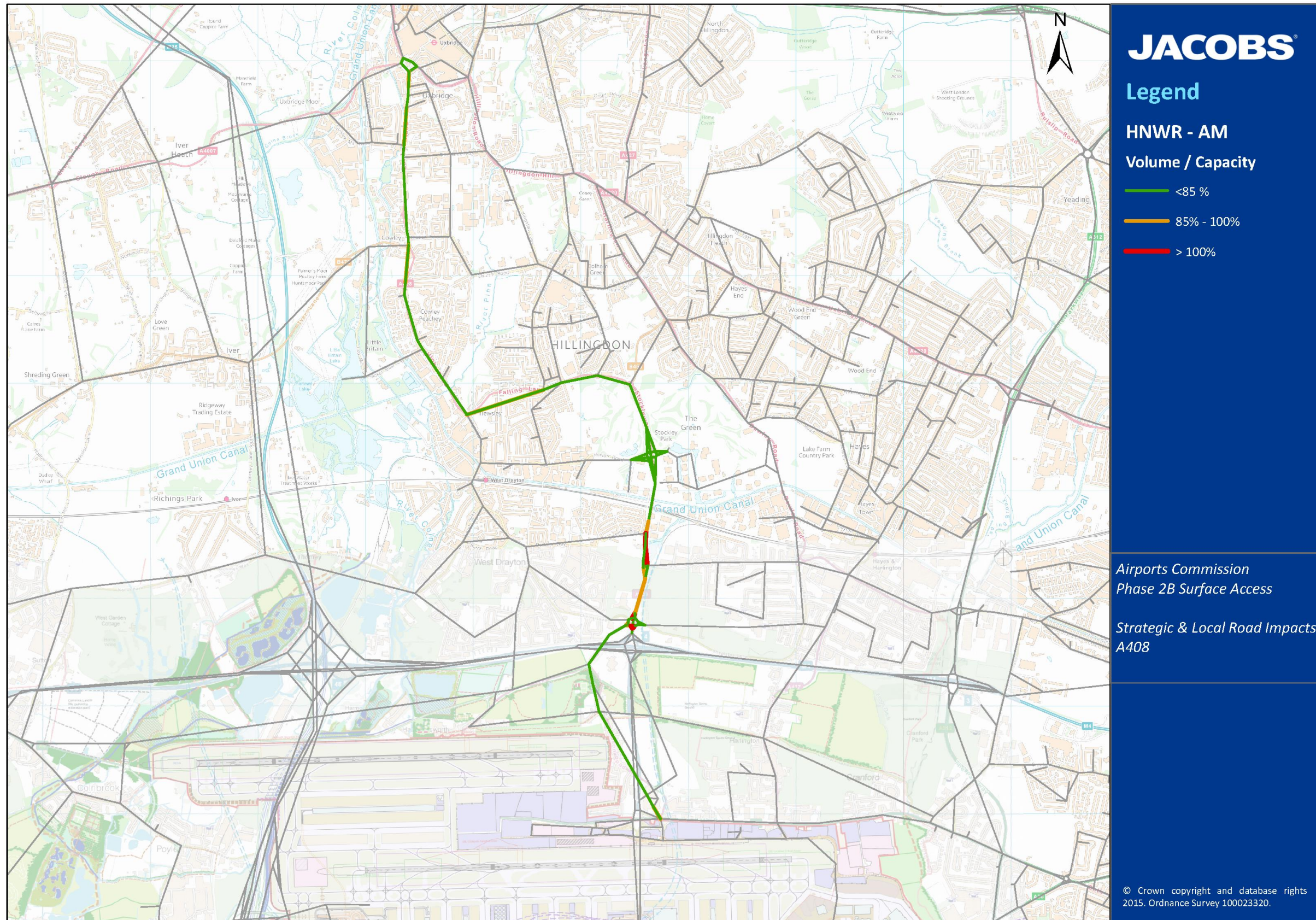


Figure A 36: PM V/C with HNWR, A408

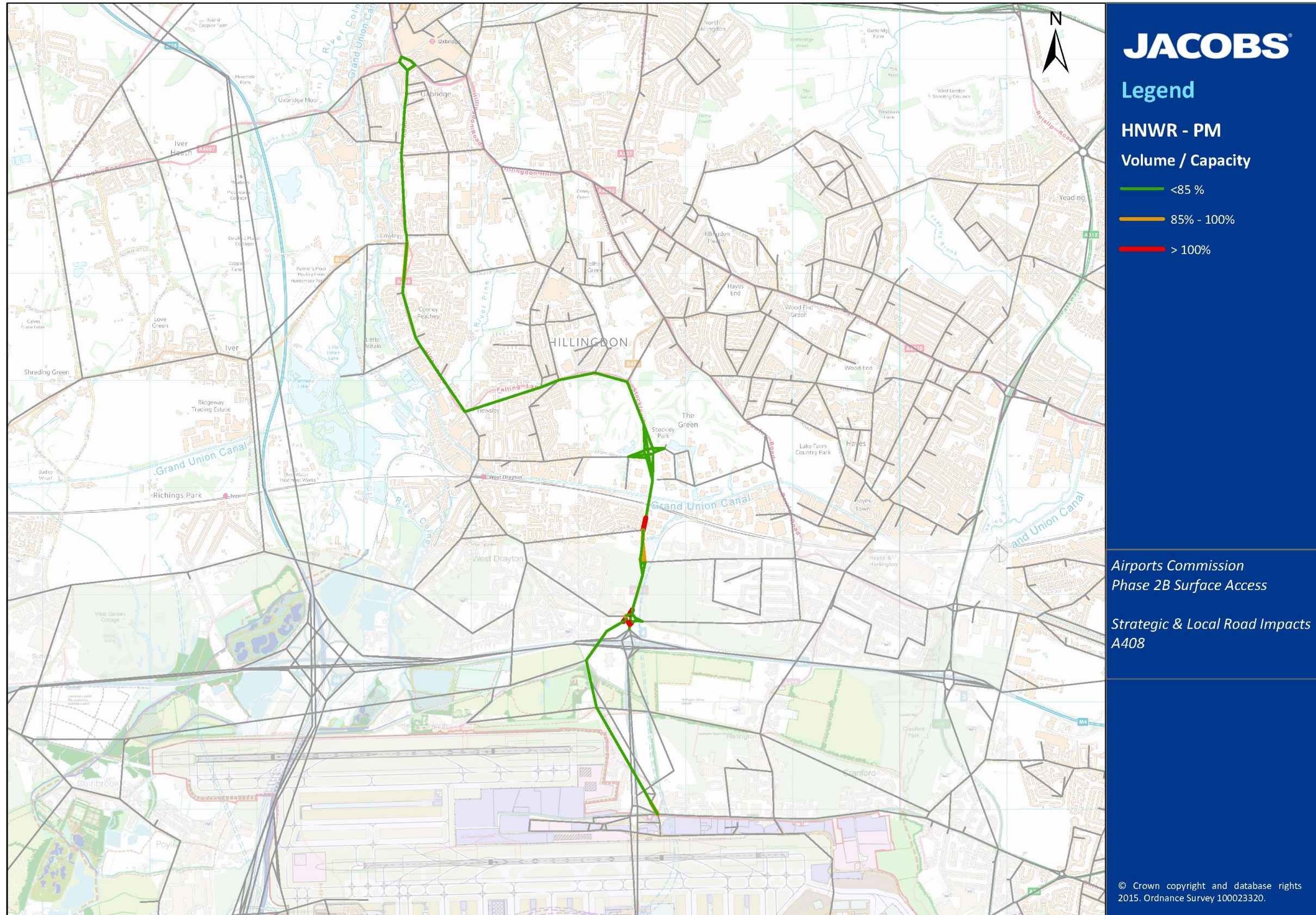


Figure A 37: AM V/C in Extended Baseline, A308

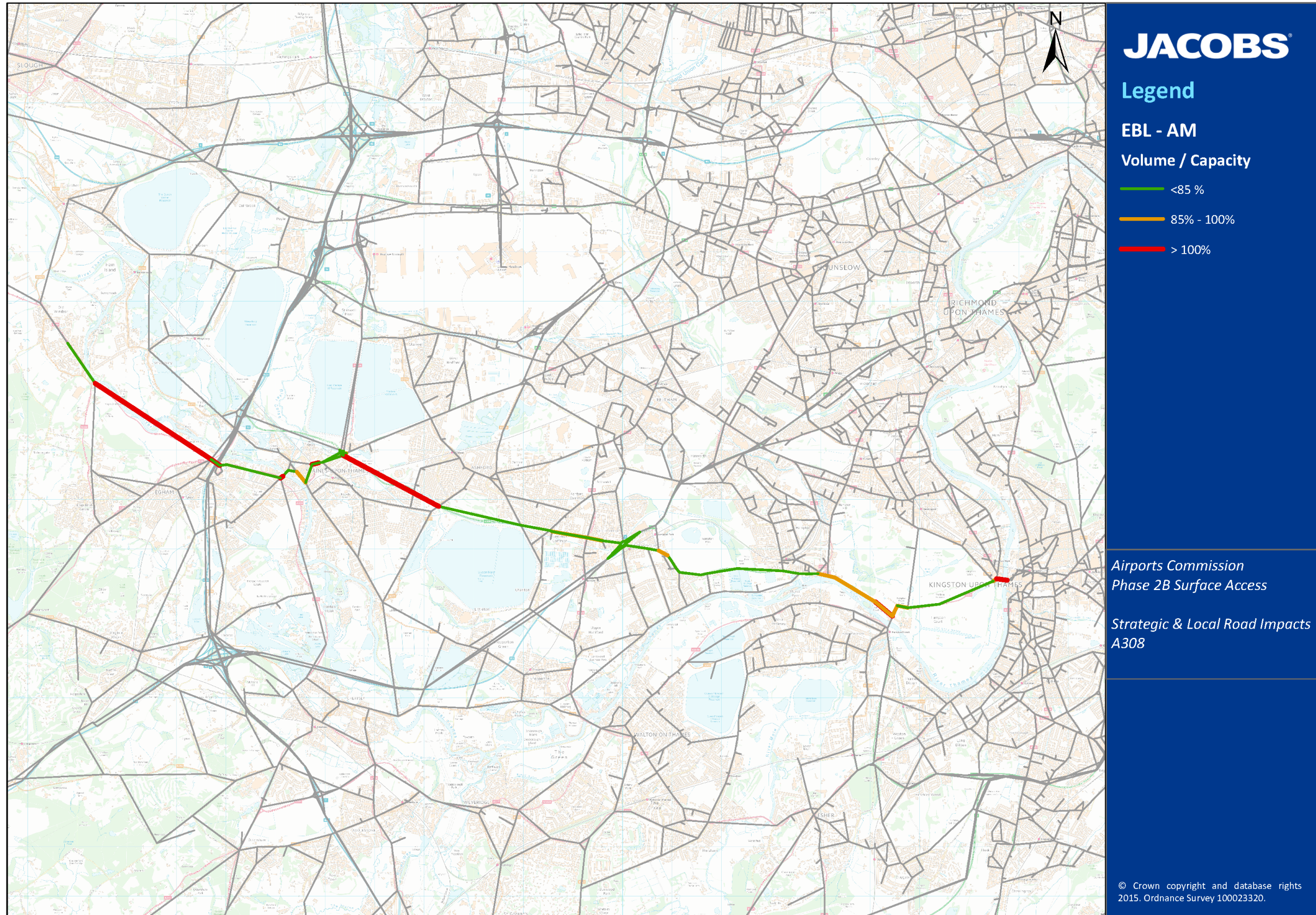


Figure A 38: PM V/C in Extended Baseline, A308

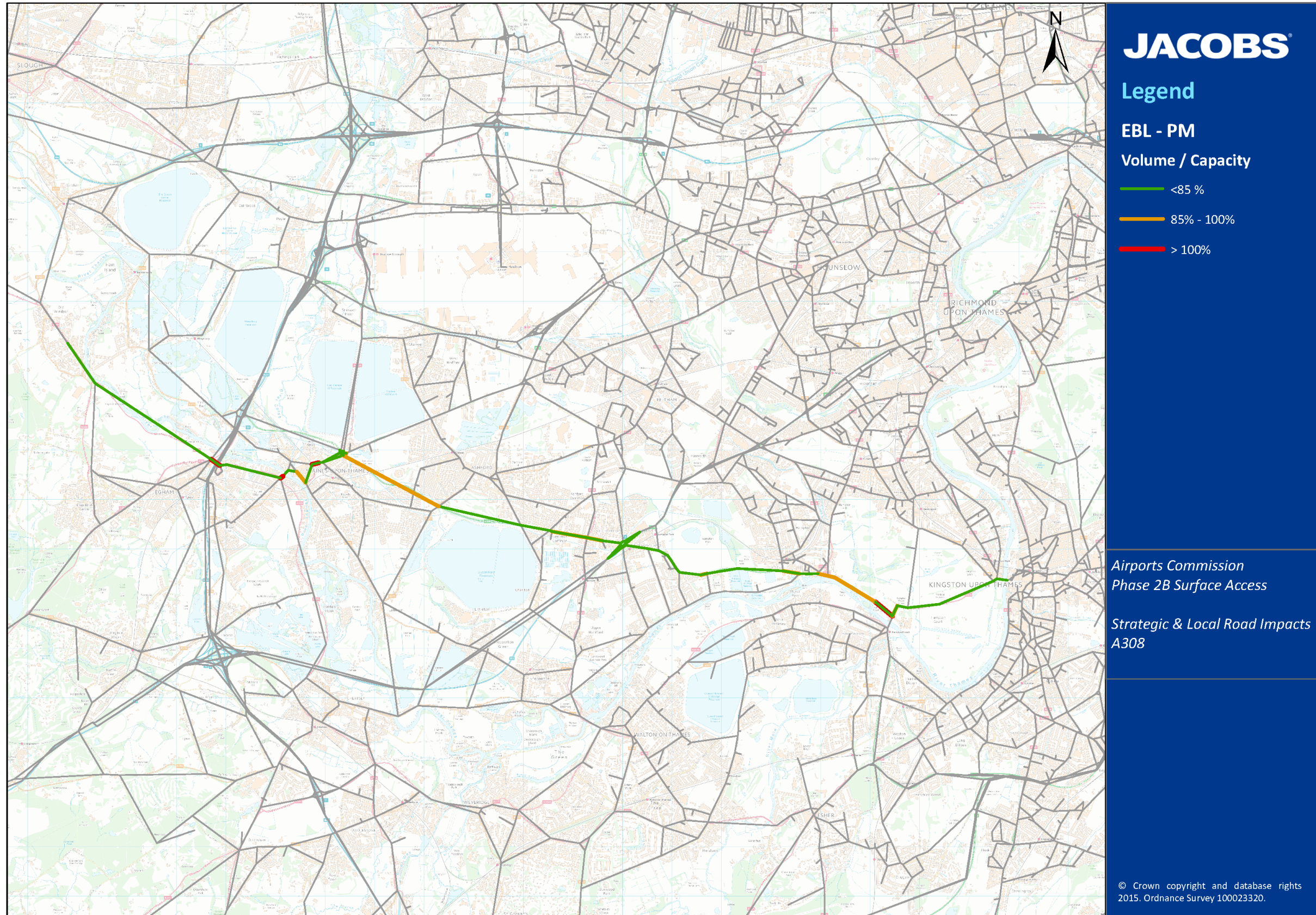


Figure A 39: AM V/C with HNWR, A308

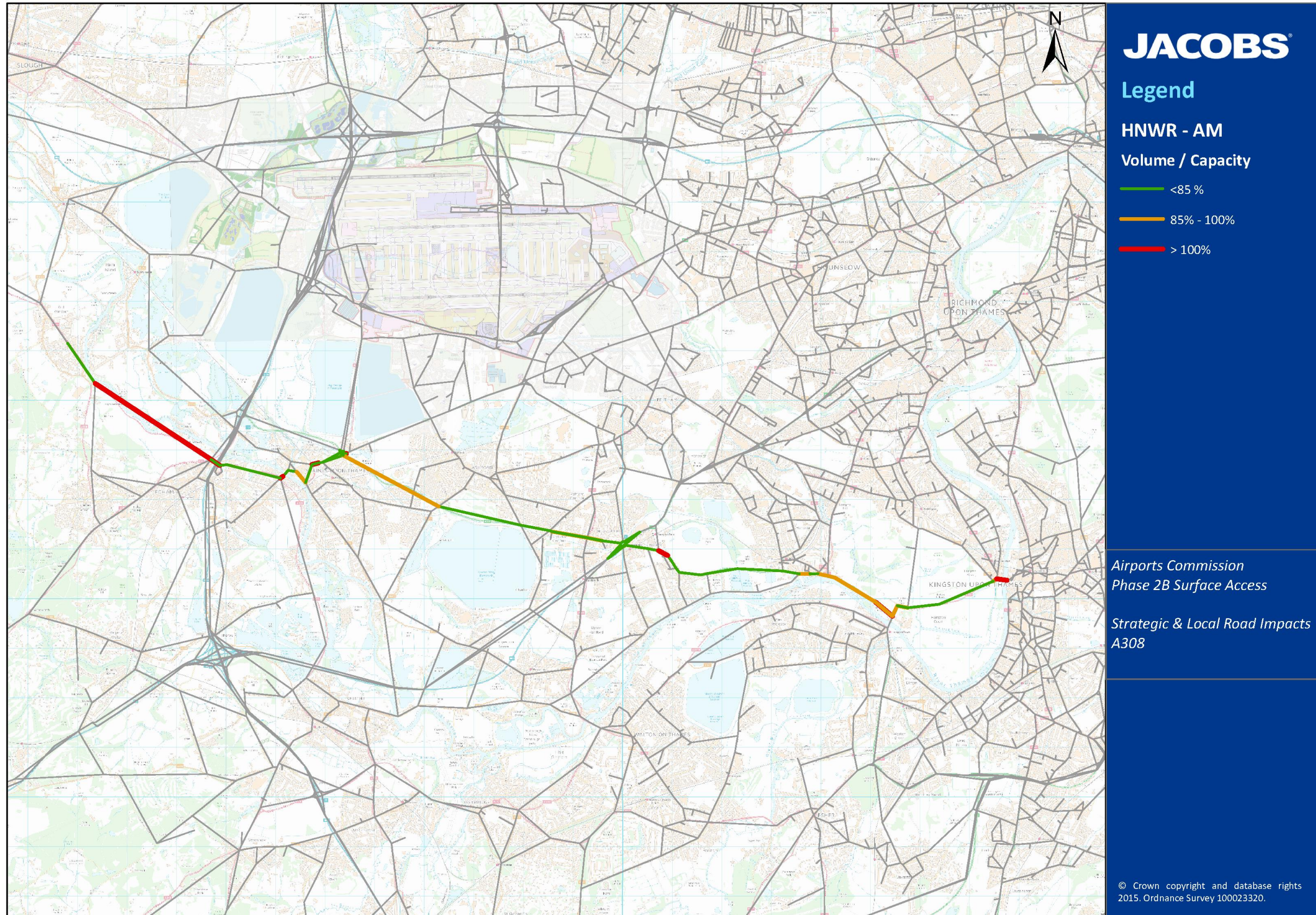


Figure A 40: PM V/C with HNWR, A308

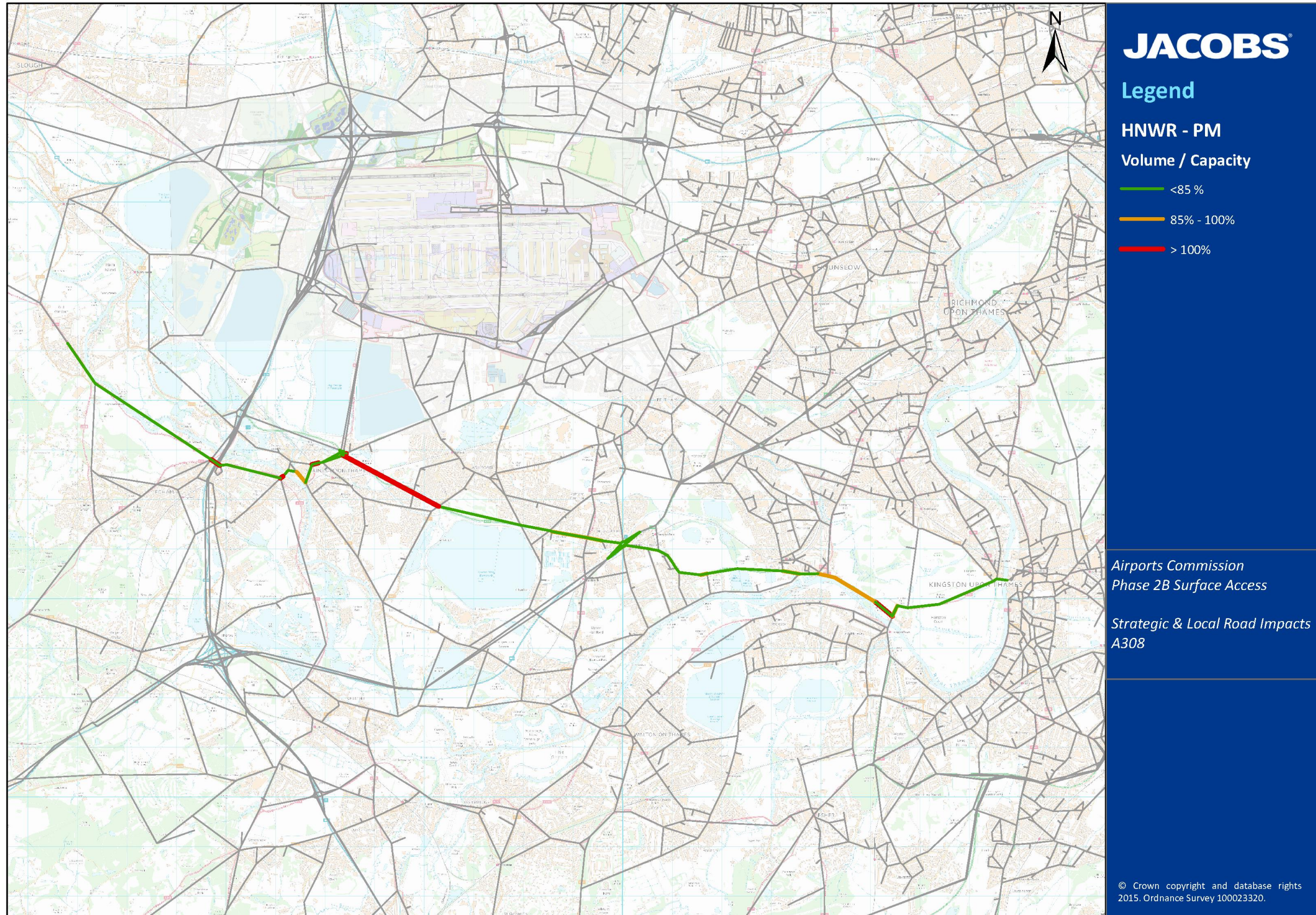


Figure A 41: AM V/C in Extended Baseline, A3044

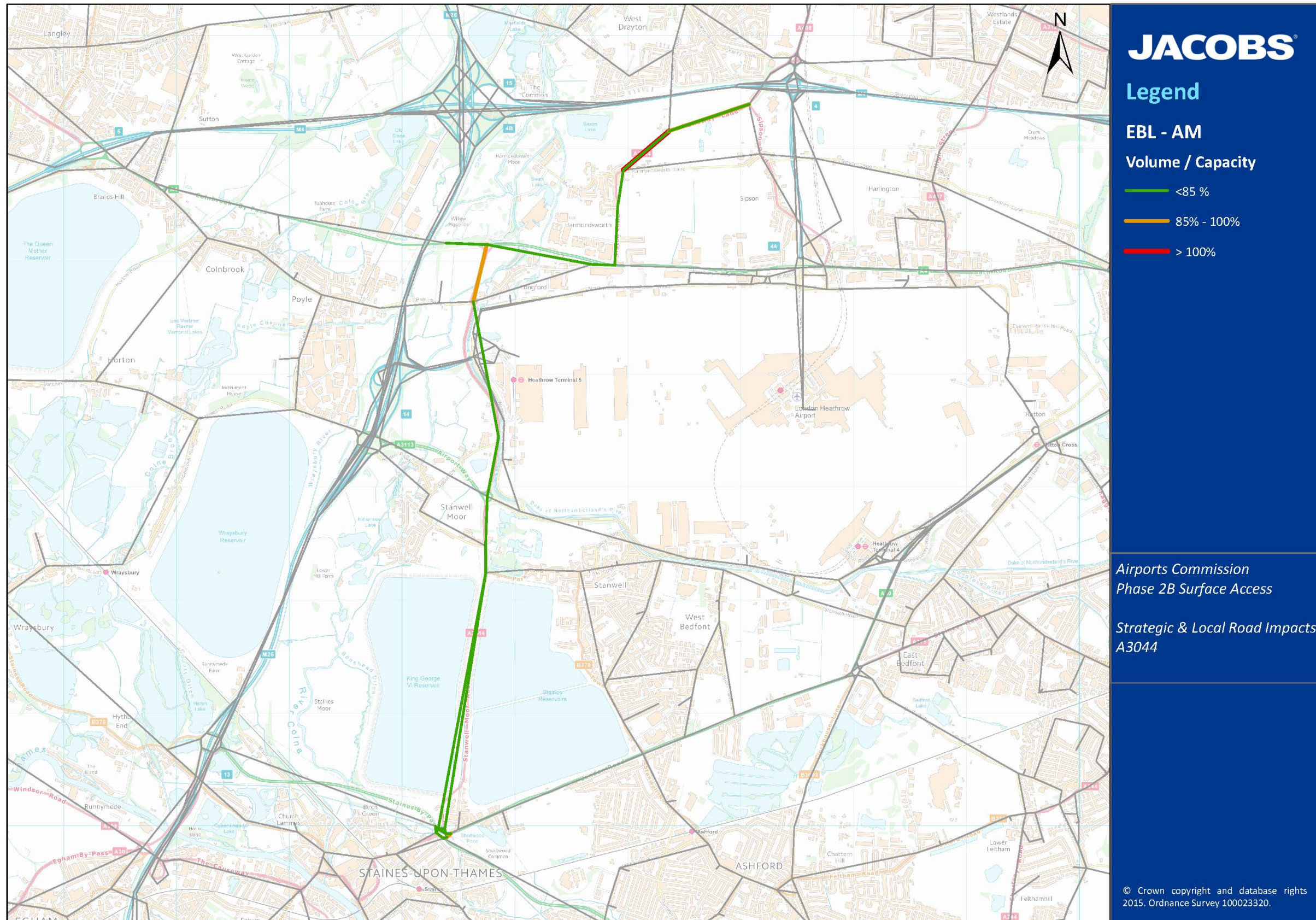


Figure A 42: PM V/C in Extended Baseline, A3044



Figure A 43: AM V/C with HNWR, A3044

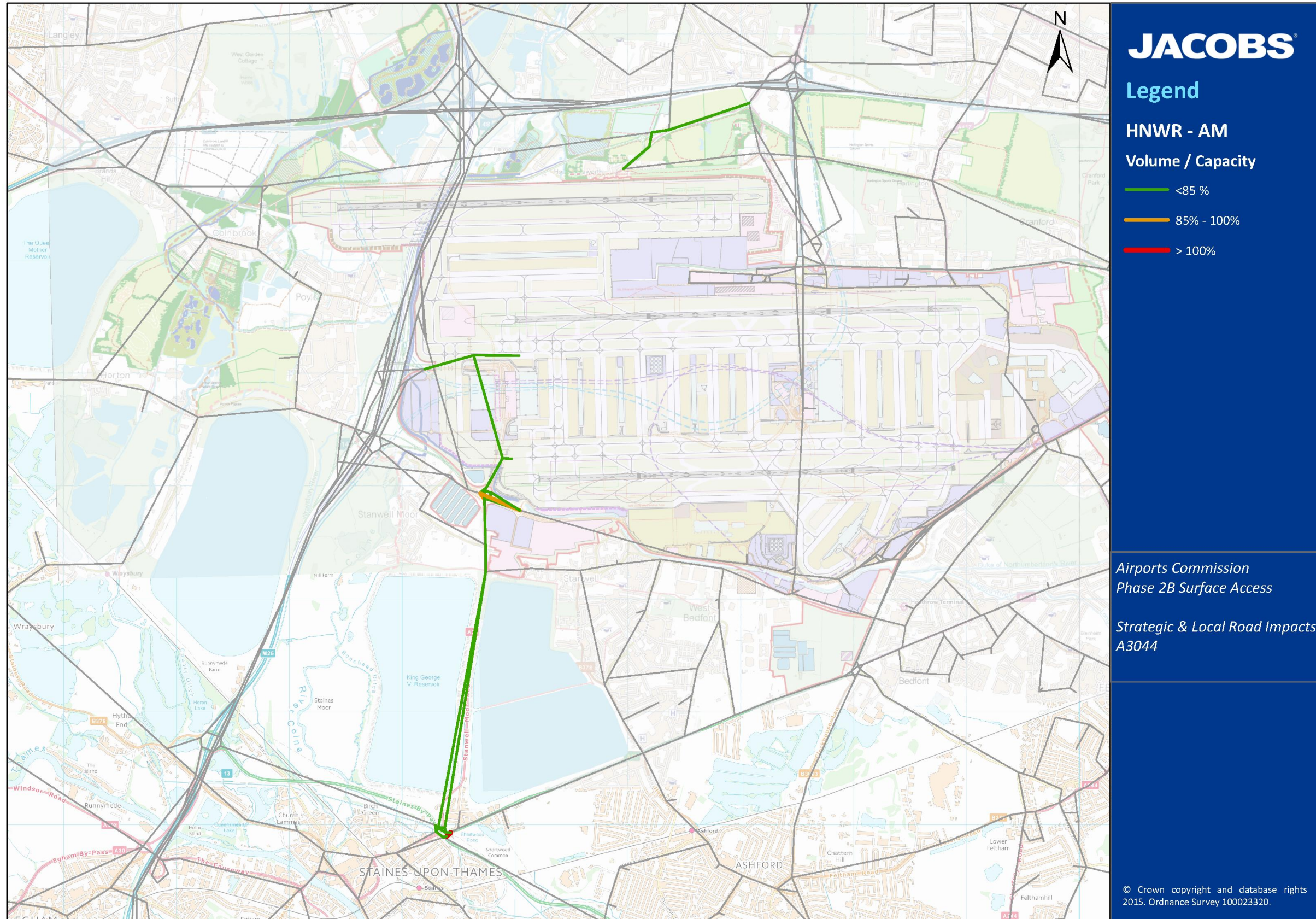


Figure A 44: PM V/C with HNWR, A3044

