London Borough of Lewisham

Local Plan Transport Assessment

Transport Modelling

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1. Introduction

1.1. Background

1.1.1. WSP were commissioned by the London Borough of Lewisham (LBL) in August 2018 to undertake the transport modelling work required to assess the impacts of the proposed Local Plan. This work has been undertaken in collaboration with Transport for London (TfL) using the transport models they have to assess the LBL proposals.

1.1.2. In line with the 'Local Plan Transport Assessment – Project Brief' WSP's approach to the study was to split it into 4 stages as outlined in Figure 1. The four stages were, Stage 1 Inception Report which included the project plan, the policy and local context as well as the LTS future growth assumption comparisons. Stage 2 which involved auditing the existing base and future year models within the London Borough of Lewisham and identifying the future transport issues in the borough. Stage 3 presents the results of the intervention assessment which was undertaken and the impacts this has on the public transport and highway network. Stage 4 compares the outputs of the intervention tests. This report provides a record of all the work undertaken throughout each of the stages, with detailed technical note and additional information contained within the Appendices. It was agreed at the Inception Meeting that instead of four separate reports one report would be produced which summarised the project.

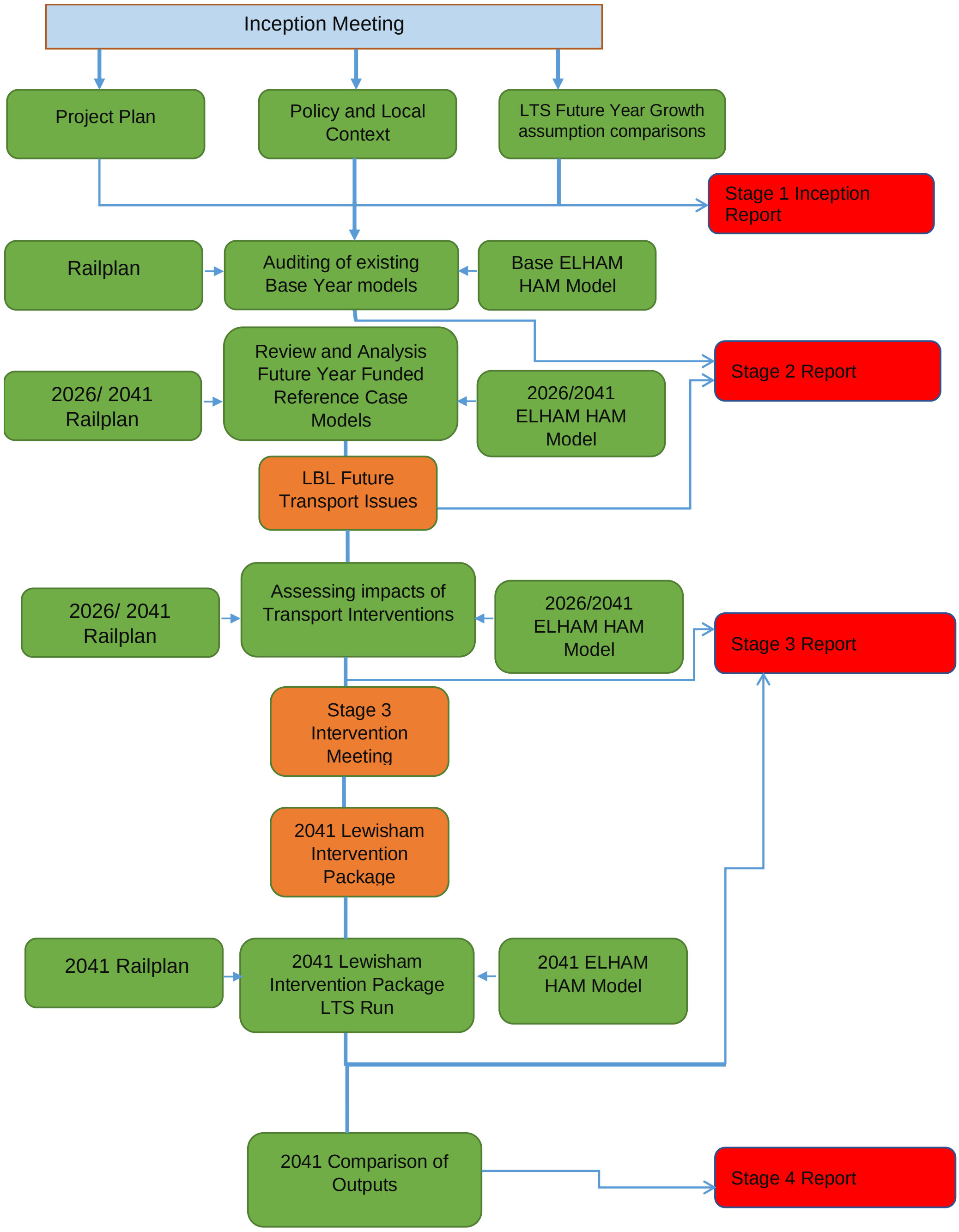

Figure 1: Study Methodology

1.2. Structure of this Report

1.2.1. This report is structured into eight chapters which are summarised below:

- Chapter 2 summarises the local policy and context for the LBL
- Chapter 3 provides a review of the TfL Model LTS and the inputs within it for LBL
- Chapter 4 details the key outcomes of the highway and public transport base year model review

- Chapter 5 details the key outcomes of the highway and public transport future year model review
- Chapter 6 summarises the interventions assessed and the key outcomes
- Chapter 7 details the results of the 2026 and 2041 Lewisham Intervention package
- Chapter 8 compares the 2041 scenarios and summarises the differences within LBL

- Appendix A Base Year ELHAM Model Review Technical Note
- Appendix B Base Year Railplan Model Review Technical Note
- Appendix C Future Year ELHAM Model Review Technical Note
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- Appendix E Railplan Local Plan Intervention Testing Technical Note
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  - ELHAM Vehicle Filter Technical Note 1
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- Appendix G 2026 and 2041 Lewisham Intervention Package Technical Note

2. Policy and Local Context

2.1. Introduction

2.1.1. This chapter summarises the local context and policy within the LBL. This is an important element of this study as any solutions and interventions will need to be aligned with the local context and policy.

2.2. Local Context

2.2.1. The London Borough of Lewisham is the 13th largest borough in London by population and the fifth largest in inner London, with a population of around 292,000 (mid-year estimate, ONS 2014). The borough has one of the fastest rates of growth across the inner London boroughs.

2.2.2. The LBL has the challenge to ensure that the highway and public transport infrastructure is able to cope with the projected growth for the borough. Alongside this the LBL is also required to help deliver the aspirations set out in the Mayor's Transport Strategy (MTS) for London which sets out ambitious targets including those for modal share and traffic reduction. The LBL have a sustainable mode share target of 81% by 2041 from a 2014/2015-2016/2017 base level of 68% and a traffic reduction target of 15-20% from a base level of 766 million vehicle km's. The challenge is providing the transport infrastructure required for the growth predicted whilst meeting the MTS targets.

2.2.3. Our challenge for this work is to generate a transport solution for the LBL in the future that delivers and facilitates growth and alongside meeting the MTS targets. We will be using TfL's transport modelling tools to assess the impacts of the proposed growth to 2026 and 2041. This will provide an understanding of the highway and public transport issues it generates. A range of interventions will be assessed to understand how they improve the transport situation across the borough. A number of interventions will then be selected to form the package of transport interventions which are required to come forward as part of the new Local Plan and LIP alongside the proposed growth in households and jobs. These interventions will need to align with the MTS to ensure the LBL targets are met.

2.3. Understanding the Local Issues and Opportunities

2.3.1. In order to understand the transport opportunities in the future a comprehensive understanding of the current issues across the LBL is of fundamental importance. From our work in the area, local knowledge and research we have pulled together a high-level summary of some of the issues and local context.

- **Access to Central London** – Currently Lewisham is not connected to the TfL Underground network despite being an Inner London borough. The 2011 Journey to Work data shows that 21% of people within the LBL travel to Westminster and the City of London for work. However public transport travel time to London, via overground services, within the LBL varies across the borough from 15minutes in the north of the borough to up to 75 minutes in the south of the borough. Therefore improved public transport system in the south of the borough with many potential schemes such as the Bakerloo Line extension would seek to improve this.
- **Traffic congestion** – traffic congestion in the LBL has several impacts including detrimentally affecting air quality in the borough and affecting bus services and bus journey time reliability. By improving alternative options to car travel such as cycling and public transport option this in turn will lead to reduced congestion and improvements in air quality.
- **Connectivity across the borough** – the 2011 LIP highlights the opportunity to improve connectivity across the borough through the Surrey Canal area and Deptford/ NewCross improving walking and cycling opportunities. This in turn would help to reduce traffic congestion and increase the modal share for active modes.

2.4. Local Implementation Plan

2.4.1. The Draft Transport Strategy and Local Implementation Plan 2019-2041 (LIP3) (20th September 2018) forms part of the Council's policy framework and has been written taking all relevant plans and strategies into consideration. The objectives and proposals recommended for LIP have been shaped and prioritised by the Major of London Transport Strategy (MTS).

2.4.2. The LIP 3 Objectives and targets align with and assist with meeting the overarching MTS aim of increasing the sustainable travel mode share, as well as the three core MTS objectives and its associated nine outcomes listed in Table 1.

Table 1: Lewisham LIP Objectives

Lewisham Objectives	Outcomes	MTS Outcomes
Travel by sustainable modes will be the most pleasant, reliable and attractive option for those travelling to, from and within Lewisham	Improved network of cycling and walking routes with links to town centre and improved east-west connections. Reduced ownership and use of private motor vehicles. Improved public transport links to the south, including the delivery of the Bakerloo Line Extension. Creation of new orbital public transport connections and improved interchange.	**1** London Streets will be healthier and more Londoners will travel actively **2** London streets will be safe and secure **7** Journeys by public transport will be pleasant, fast and reliable **6** Public Transport will be safe, affordable and accessible to all
Lewisham's streets will be safe, secure and accessible to all	Improved safety and security will increase social inclusion and encourage walking and cycling. 100% of all feasible bus stops will be brought to TfL accessible standards. Increase number of step-free rail stations. Eliminate fatal and serious collisions on Lewisham's roads.	**2** London streets will be safe and secure **6** Public Transport will be safe, affordable and accessible to all
Lewisham's streets will be healthy, clean and green with less motor traffic	Reduce air pollution from road traffic. Encourage switch to electric vehicle use and reduce car ownership to absolute terms. Reduce traffic levels, congestion and vehicle idling and encourage active travel. More street trees to promote carbon capture.	**3** London's streets will be used more efficiently and have less traffic on them (annual vehicle km) **4** London's streets will be clean and green

Lewisham Objectives	Outcomes	MTS Outcomes
Lewisham's transport network will support new development whilst providing for existing demand	Walking, cycling and public transport will be prioritised in new developments as the best options. Work with TfL and Network Rail to increase public transport capacity in the Borough, to support growth.	**5** The public transport network will meet the needs of a growing London **8** Active, efficient and sustainable travel will be the best options in new developments **9** Transport investment will unlock the delivery of new homes and jobs

2.4.3. As part of the Stage 3 measures of this study the transport interventions considered to improve the future transport should be aligned with the Lewisham objectives.

2.4.4. Table 2 to Table 9 outlines the targets that Lewisham need to work towards to help achieve the nine MTS outcomes.

Table 2: MTS Outcomes

MTS Outcomes	Current	2021	2041
80% walking, cycling, public transport	68%	72%	81%

Table 3: MTS Outcome 1 London Streets will be healthier and more Londoners will travel actively

Outcome 1	Current	2021	2041
Target 1a: % of residents doing at least 20 minutes of active travel	37%	44%	70%
Target 1b: % of residents within 400m strategic cycle network	4%	19%	71%

Table 4: MTS Outcome 2 London streets will be safe and secure

Outcome 2	Current	2021	2041
Target 2: Vision Zero (KSI)	67	48	0

Table 5: MTS Outcome 3 London's streets will be used more efficiently and have less traffic on them (annual vehicle km)

Outcome 3	Current	2021	2041
Target 3a: Low: -15% by 2041	766	747	635
Target 3b: High: -20% by 2041	766	747	598
Target 3c: Reduce car ownership (no. cars of cars owned)	79,792	75,100	67,800

Table 6: MTS Outcome 4 London's streets will be clean and green

Outcome 4	Current	2021	2041
Target 4a: CO^2 (tonnes)	155,200	132,000	34,800
Target 4b: NO_x (tonnes)	610	200	30
Target 4c: PM10 (tonnes)	54	44	24
Target 4d: PM2.5 (tonnes)	30	21	12

Table 7: MTS Outcome 5 London streets will be safe and secure

Outcome 5	Current	2021	2041
Target 5: PT Use (Trips per day (000s))CO^2 (tonnes)	222	255	331

Table 8: MTS Outcome 6 London streets will be safe and secure

Outcome 6	Current	2021	2041
Target 6: Step-free journey time (% change between 2015 and 2041)	Not Applicable	Not Applicable	-51%

Table 9: MTS Outcome 7 London streets will be safe and secure

Outcome 7	Current	2021	2041
Target 7: Bus speeds (mph) 15% overall reduction High: +15% by 2041	9.2	9.6	10.6
Low: +5% by 2041	9.2	9.3	9.7

2.4.5. Again as part of the Stage 3 measures of this study the transport interventions considered to improve the future transport should be aligned with the MTS Outcomes.

3. LTS Review

3.1. Introduction

3.1.1. This section outlines the growth assumptions which are within the 2026 and 2041 London Transportation Study (LTS) model and compares them to the growth which LBL have provided us with. A comparison is then made between the two and consideration taken as to the impact of the differences between the two datasets.

3.2. LTS Growth

3.2.1. TfL have provided us with the number of houses and jobs contained within the following LTS 7.1 scenarios:

- 2011
- 2016
- 2026
- 2041

3.2.2. The number of houses, population and jobs in LBL for each of these scenarios is presented in Table 10 alongside the absolute and percentage growth between the years.

Table 10: LTS Summary of LBL Houses, Population and Jobs

Year	Number of Houses	Growth in Houses Absolute	Growth in Houses Percentage	Population	Growth in Population Absolute	Growth in Population Percentage	Number of Jobs	Growth in Jobs Absolute	Growth in Jobs Percentage
2011	116,550	Not applicable	Not applicable	277,525	Not applicable	Not applicable	78,895	Not applicable	Not applicable
2016	129,977	13,427	12%	302,454	24,929	9%	87,170	8,275	10%
2026	147,731	17,754	14%	321,947	19,493	6%	92,715	5,546	6%
2041	170,203	22,472	15%	363,502	41,555	13%	101,019	8,304	9%

3.2.3. Table 10 shows that between 2016 and 2026 in the LBL there is a growth of 17,754 (14%) in houses, an increase in 19,493 (6%) people and a growth of 5,546 (6%) jobs. Between 2026 and 2041 in the LBL there is a growth of 22,472 (14%) in houses, an increase in 41,555 (13%) people and a growth of 8,304 (9%) jobs.

3.2.4. LTS is able to provide the breakdown in house and job growth for each London borough. The LBL is represented in LTS by 26 individual zones which are illustrated in Figure 2.

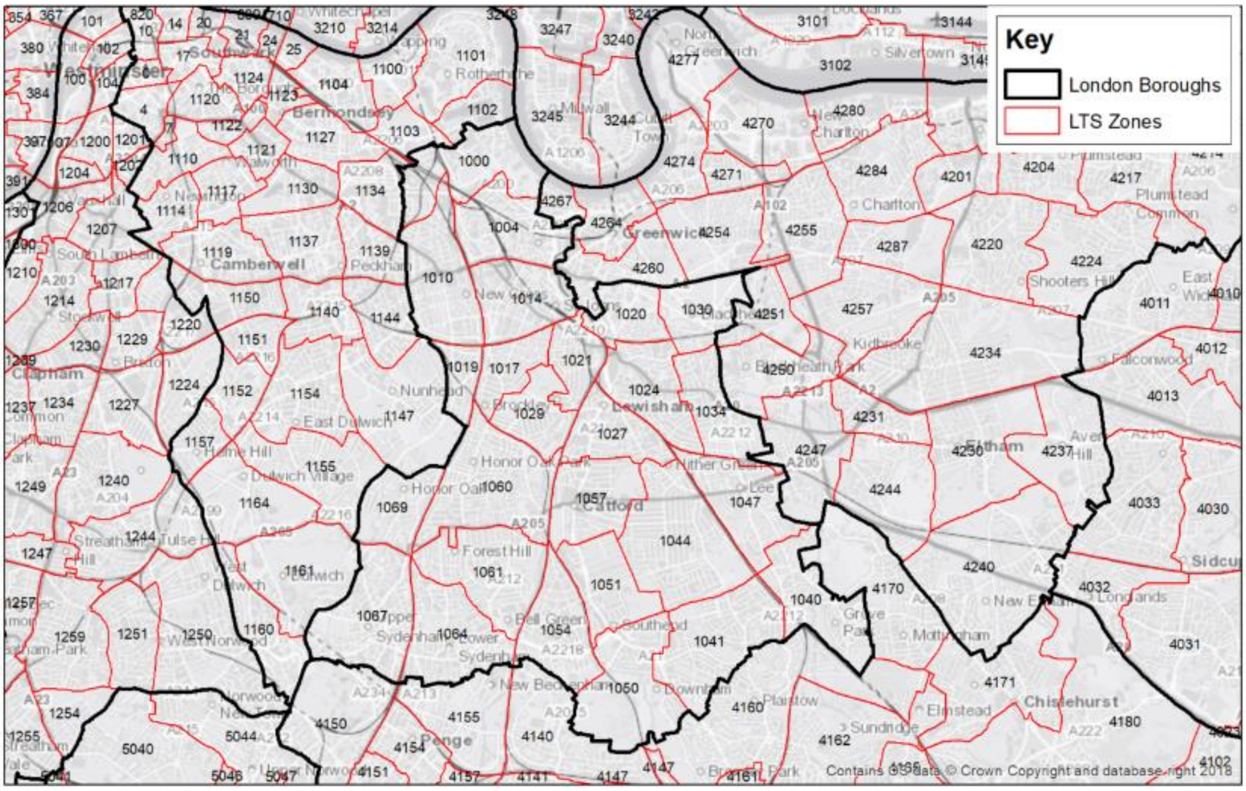

Figure 2: London Borough of Lewisham LTS Zones

Growth in Houses

3.2.5. The increase in houses by LTS zone across the LBL is shown in Table 11 and graphically illustrated in Figure 3 and Figure 4.

Table 11: Growth in Houses in LBL by LTS Zone

LTS Zone	2016	2026	2041	Increase 2016-2026	Increase 2016-2041
1000	6,184	11,624	15,211	5,440	9,028
1004	7,539	9,388	10,470	1,849	2,931

LTS Zone	2016	2026	2041	Increase 2016-2026	Increase 2016-2041
1010	7,501	8,198	9,866	698	2,366
1014	6,409	6,831	7,987	423	1,578
1017	3,568	3,757	4,296	189	728
1019	2,532	2,704	3,095	172	563
1020	3,260	4,941	5,561	1,682	2,301
1021	3,445	4,226	5,127	781	1,682
1024	6,058	6,466	8,330	408	2,272
1027	4,763	5,151	6,373	388	1,610
1029	2,265	2,379	2,717	114	453
1030	1,557	1,630	1,812	73	255
1034	4,491	4,922	5,449	431	958
1040	4,232	4,426	4,825	194	592
1041	6,396	6,678	7,127	283	731
1044	9,060	9,758	10,938	698	1,878
1047	3,875	4,066	4,476	192	602
1050	2,388	2,472	2,659	84	271
1051	2,667	2,843	3,146	176	480
1054	4,136	4,351	4,737	215	600
1057	5,705	6,322	7,549	617	1,844
1060	7,851	8,862	9,860	1,010	2,008
1061	6,271	6,551	7,097	280	826
1064	6,868	7,310	8,164	442	1,296
1067	7,547	8,091	9,062	545	1,516
1069	3,411	11,624	4,268	372	857
Total	**129,979**	**155,571**	**170,202**	**17,756**	**40,226**

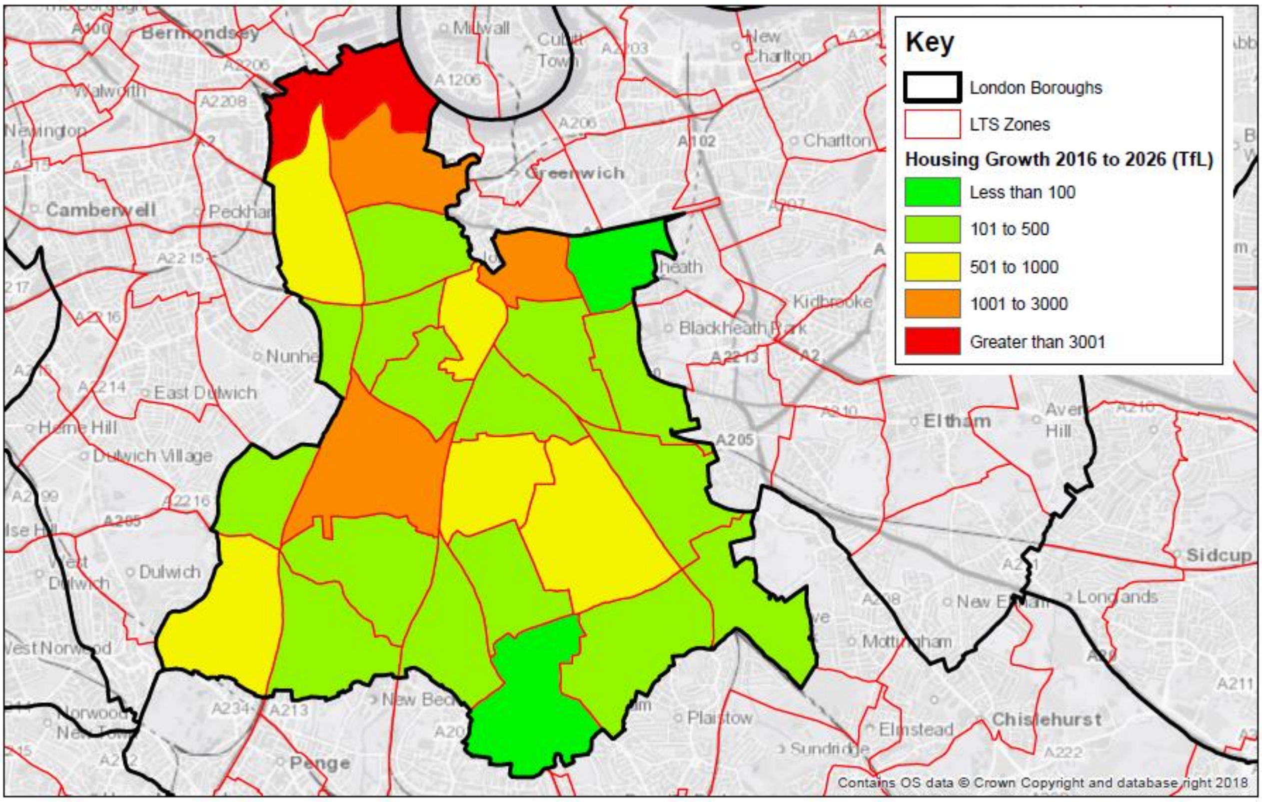

Figure 3: LBL Household Growth 2016 to 2026 in LTS Model

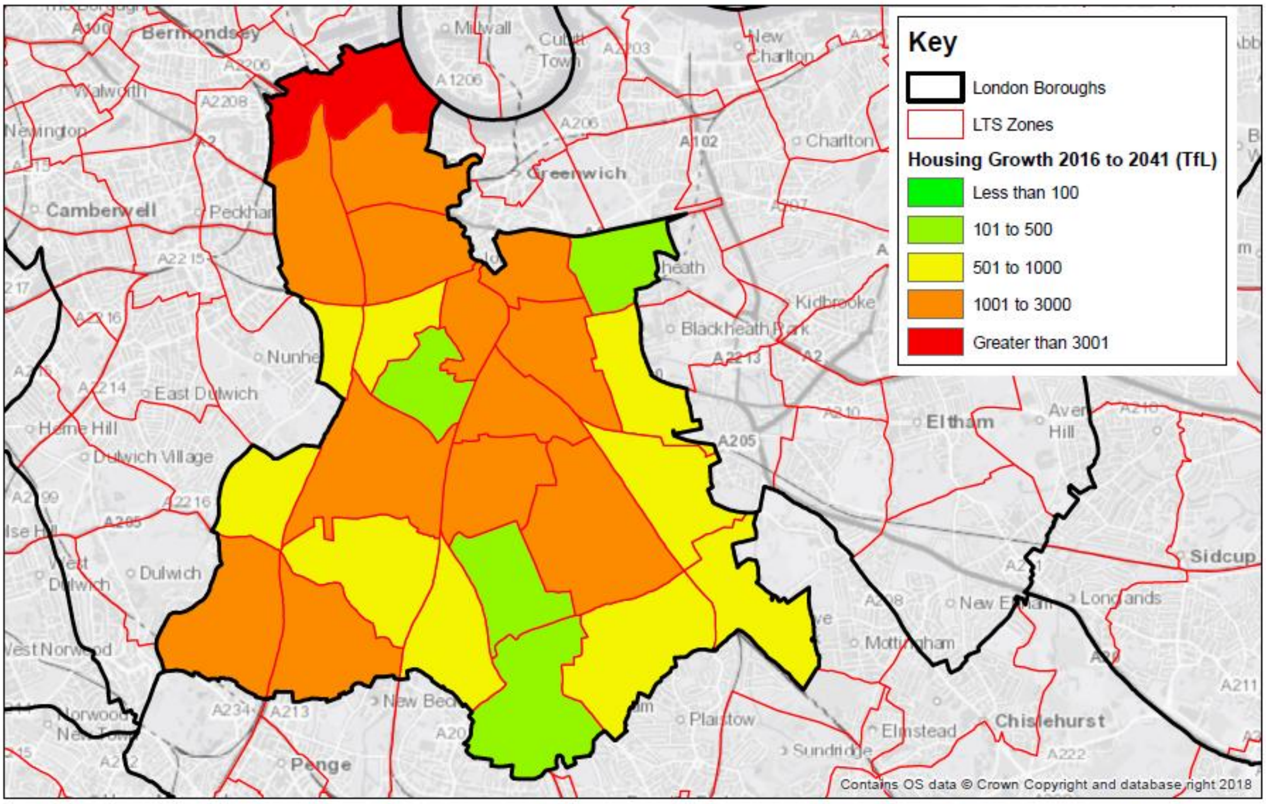

Figure 4: LBL Household Growth 2016 to 2041 in LTS Model

Growth in Population

3.2.6. The increase in population by LTS zone across the LBL is shown in Table 12 and graphically illustrated in Figure 5 and Figure 6.

Table 12: Growth in Population in LBL by LTS Zone

LTS Zone	2016	2026	2041	Increase 2016-2026	Increase 2016-2041
1000	14,148	25,299	31,453	11,152	17,306
1004	17,838	21,229	22,652	3,391	4,814
1010	17,566	18,480	21,135	913	3,569
1014	14,421	14,822	16,585	401	2,164
1017	8,303	8,427	9,210	125	908
1019	6,117	6,288	6,856	171	739
1020	7,304	10,652	11,507	3,348	4,203
1021	8,318	9,712	11,165	1,394	2,847
1024	13,442	13,849	17,013	407	3,571
1027	10,764	11,229	13,236	466	2,473
1029	5,710	5,777	6,267	67	557
1030	3,252	3,287	3,525	35	273
1034	9,431	10,001	10,678	570	1,246
1040	9,745	9,828	10,289	83	544
1041	15,345	15,450	15,846	106	502
1044	22,460	23,253	24,854	793	2,393
1047	9,246	9,353	9,862	108	616
1050	5,806	5,798	5,985	-7	179
1051	6,930	7,097	7,486	167	556
1054	9,913	10,048	10,489	135	576
1057	13,186	14,057	15,988	871	2,802
1060	18,410	19,959	21,270	1,548	2,860
1061	14,768	14,877	15,473	109	705
1064	15,437	15,842	16,986	405	1,549

LTS Zone	2016	2026	2041	Increase 2016-2026	Increase 2016-2041
1067	16,753	17,331	18,645	578	1,892
1069	7,841	8,371	9,047	530	1,207
Total	**302,454**	**330,318**	**363,502**	**27,864**	**61,049**

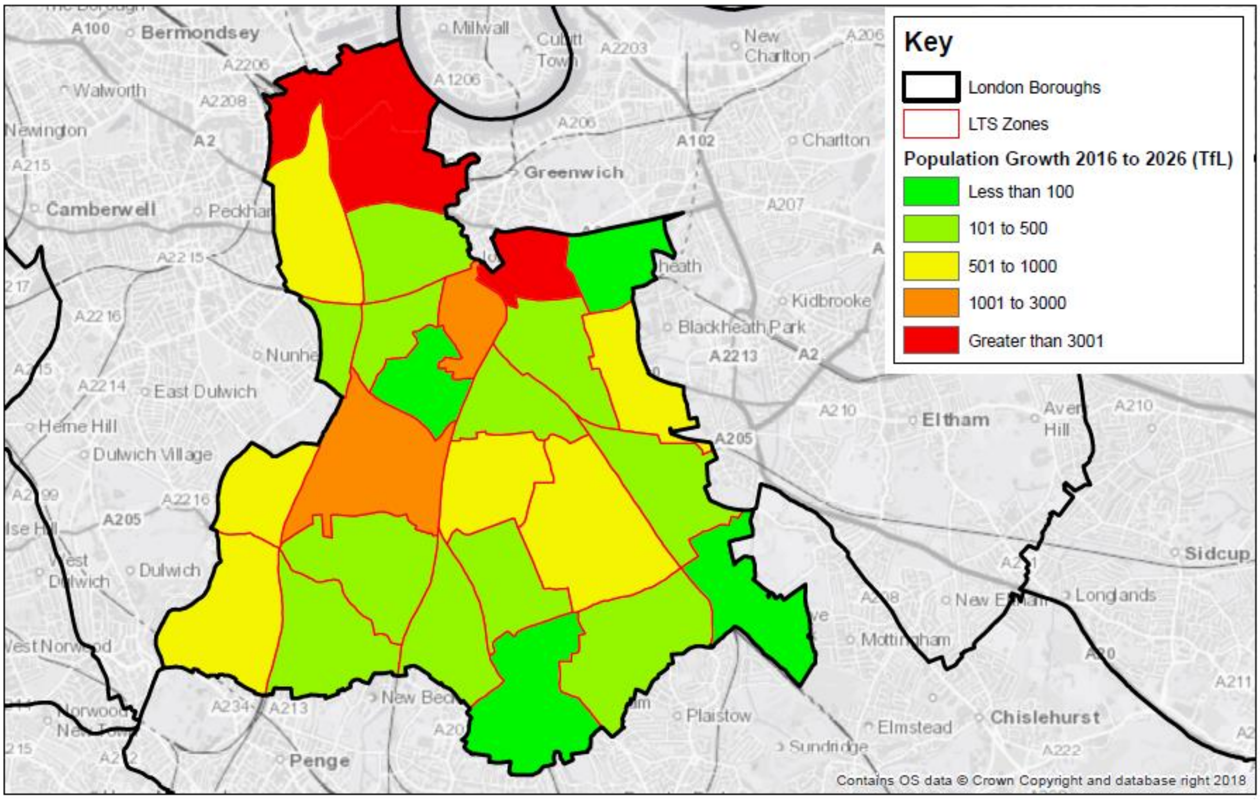

Figure 5: LBL Population Growth 2016 to 2026 in LTS Model

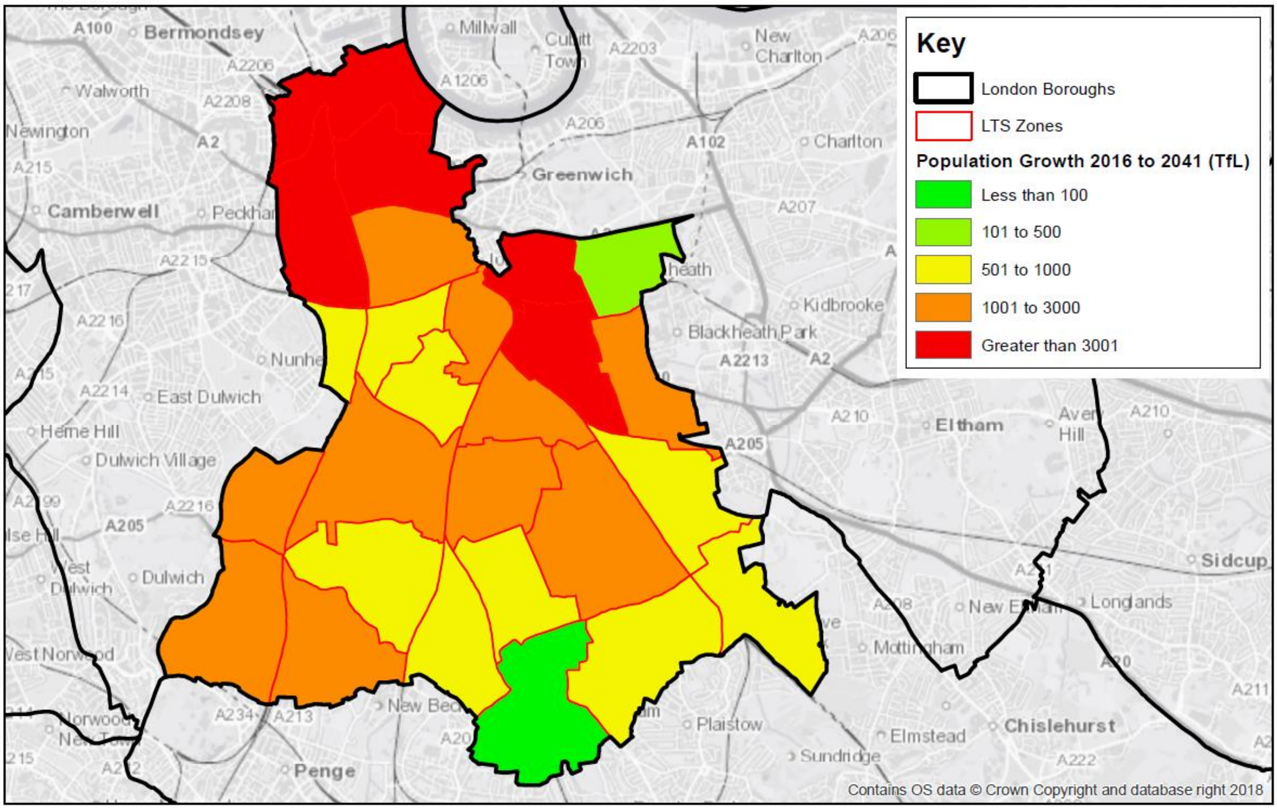

Figure 6: LBL Population Growth 2016 to 2041 in LTS Model

Growth in Jobs

3.2.7. The increase in jobs by LTS zone across the LBL is shown in Table 13 and graphically illustrated in Figure 7 and Figure 8.

Table 13: Growth in Jobs in LBL by LTS Zone

LTS Zone	2016	2026	2041	Increase 2016-2026	Increase 2016-2041
1000	3,771	4,685	7,183	913	3,412
1004	5,524	5,672	5,901	148	377
1010	5,098	5,347	5,817	250	719
1014	5,504	5,708	6,177	204	673
1017	1,747	1,805	1,943	57	196
1019	926	962	1,037	36	111
1020	1,077	2,573	3,002	1,496	1,925
1021	2,273	2,486	2,637	213	364
1024	8,314	8,597	9,116	283	802
1027	5,818	5,970	6,378	153	561

LTS Zone	2016	2026	2041	Increase 2016-2026	Increase 2016-2041
1029	725	744	794	19	69
1030	2,388	2,433	2,573	45	185
1034	2,741	3,069	3,342	327	601
1040	1,642	1,677	1,773	35	130
1041	2,274	2,338	2,502	63	228
1044	4,188	4,252	4,461	63	273
1047	1,861	1,914	2,010	53	149
1050	1,337	1,357	1,427	20	90
1051	2,194	2,218	2,374	24	180
1054	1,816	1,819	1,867	4	51
1057	6,705	6,990	7,426	285	721
1060	5,401	5,533	5,822	132	421
1061	4,002	4,408	4,639	405	637
1064	4,550	4,746	5,062	196	513
1067	3,440	3,520	3,740	80	300
1069	1,853	1,894	2,015	40	161
Total	**87,170**	**92,715**	**101,019**	**5,546**	**13,850**

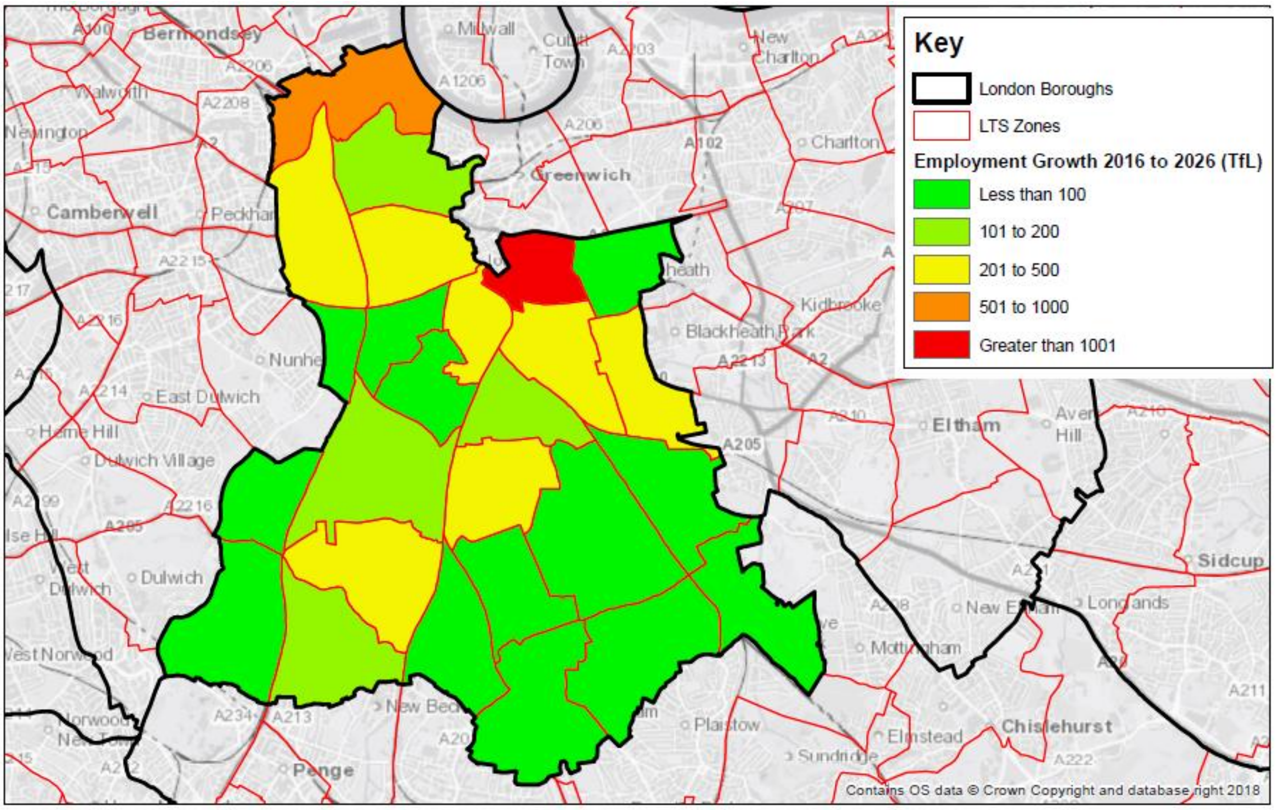

Figure 7: LBL Job Growth 2016 to 2026 in LTS Model

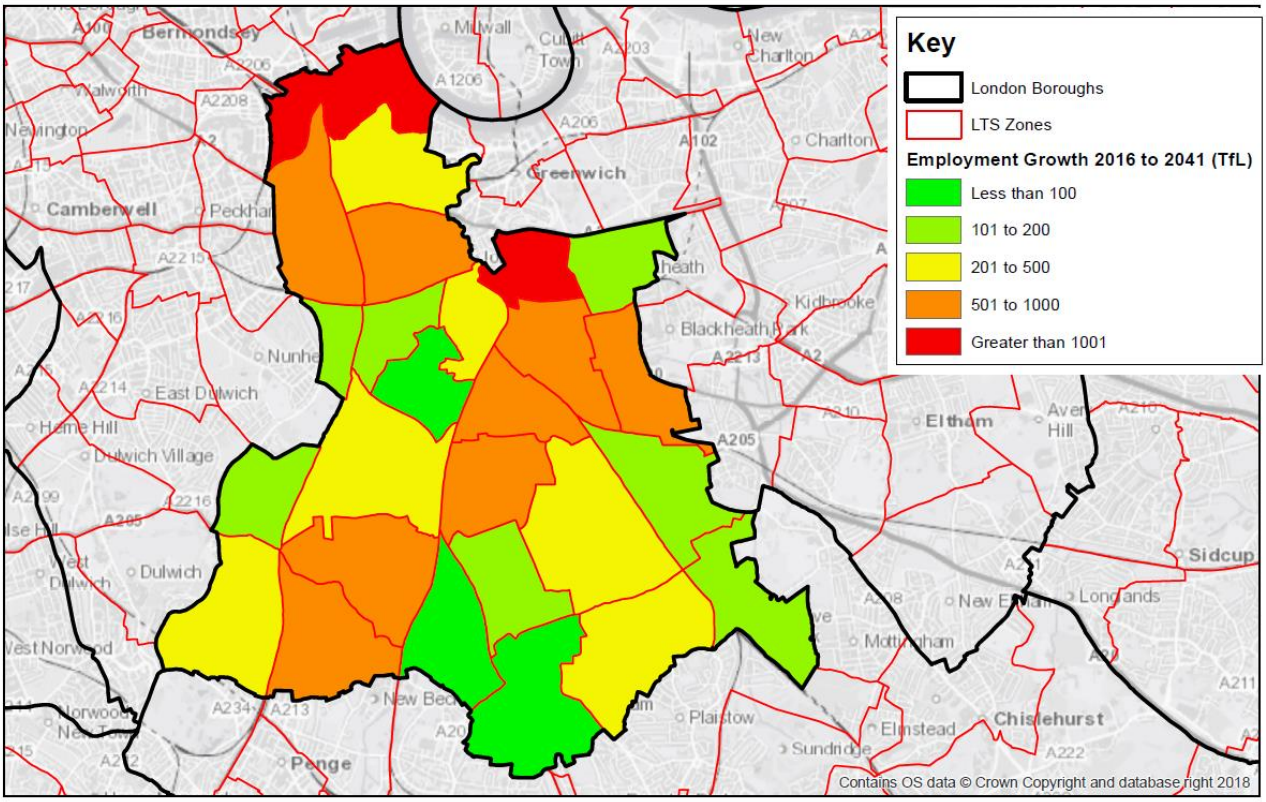

Figure 8: LBL Job Growth 2016 to 2041 in LTS Model

3.3. LBL Growth

Growth in Houses

3.3.1. LBL planning team have provided us with their latest housing trajectory from 2018/2019 to 2033/2034. To enable direct comparisons with the LTS model information they also provided us with the housing completions between 2016-2018. Figure 9 shows the locations for the growth in housing provided by LBL across the borough between 2016-2034.

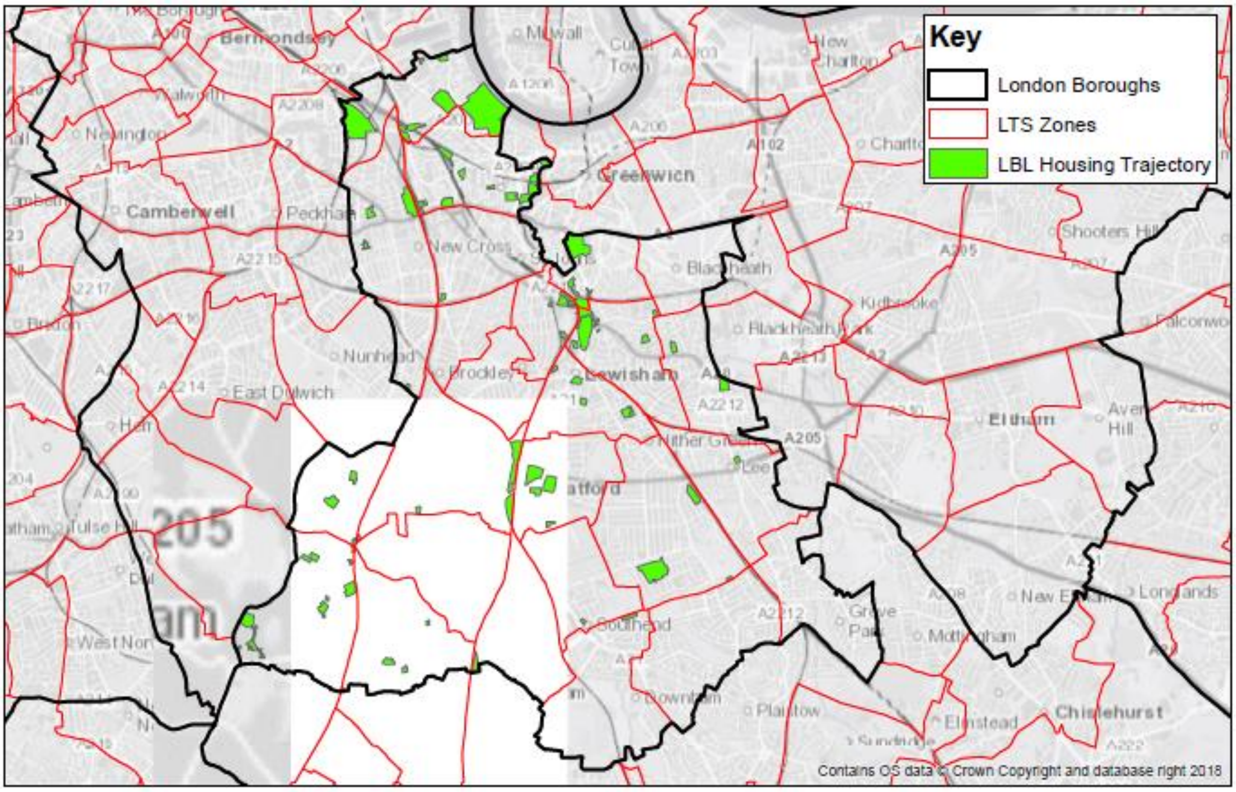

Figure 9: LBL Housing Growth 2016-2034

3.3.2. Between 2016 and 2026 the LBL are predicting a growth in houses across the borough of 18,187 houses and from 2016 and 2033/34 34,008 houses with 318 houses current planned between 2034 and 2039.

3.3.3. The LBL housing information has then been associated to the LTS zones. However not all sites have a known geographic location and there are small sites, windfall sites and uplift for the Local Plan where these cannot be located to a LTS zone. The growth in houses across the LTS model zones is shown in Table 14 and illustrated in Figure 10 and Figure 11.

Table 14: Growth in Houses in LBL by LTS Zone

LTS Zone	LBL Increase 2016 - 2026	LBL Increase 2016 - 2034
1000	5,150	8,569
1004	2,153	2,676
1010	308	1,107
1014	149	149
1017	57	57
1019	64	64
1020	2,101	2,851
1021	1,020	1,020
1024	243	843
1027	213	742
1029	12	12
1030	6	6
1034	247	247
1040	3	3
1041	1	1
1044	245	365
1047	33	33
1050	24	24
1051	4	33
1054	4	35
1057	249	1,871
1060	581	1,074
1061	29	29
1064	189	189
1067	214	414
1069	128	202
Small sites/ Windfall/ Uplift for Local Plan	4,760	11,392
Total	**18,187**	**34,008**

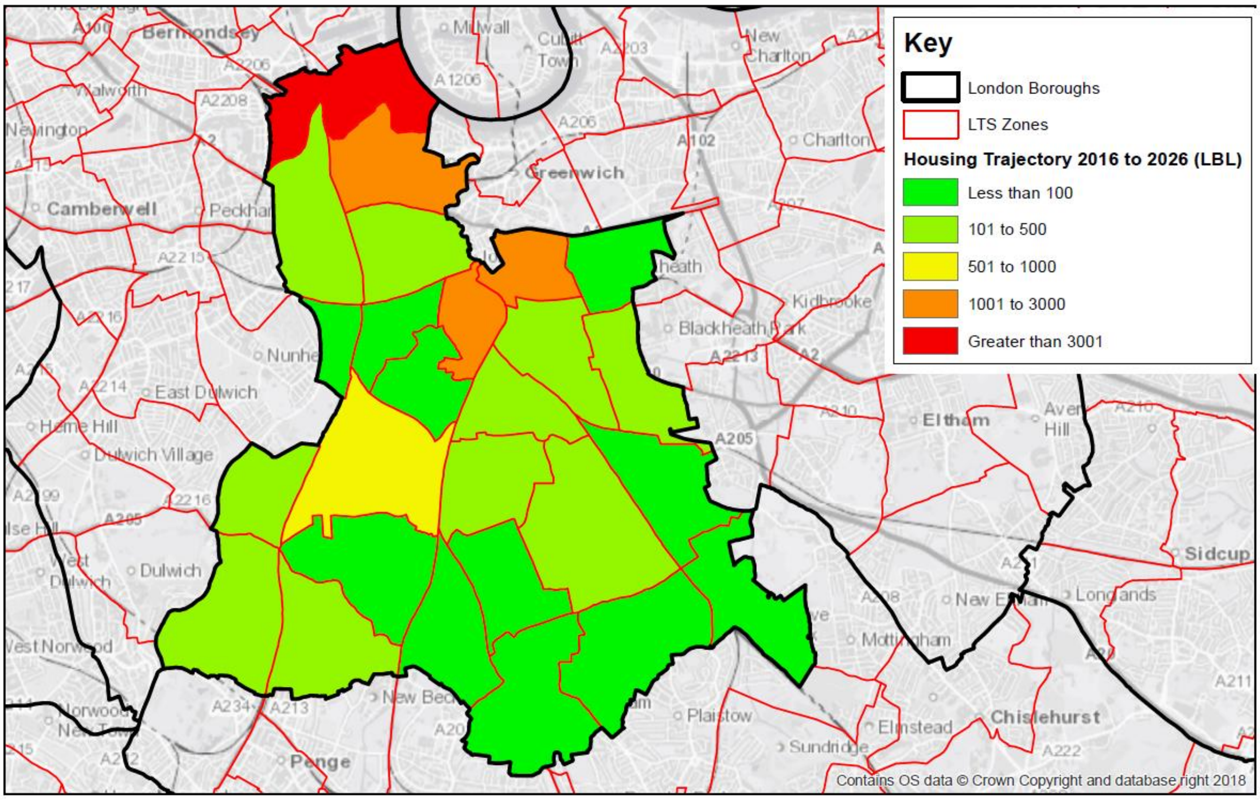

Figure 10: LBL Household Growth 2016 to 2026 provided by LBL

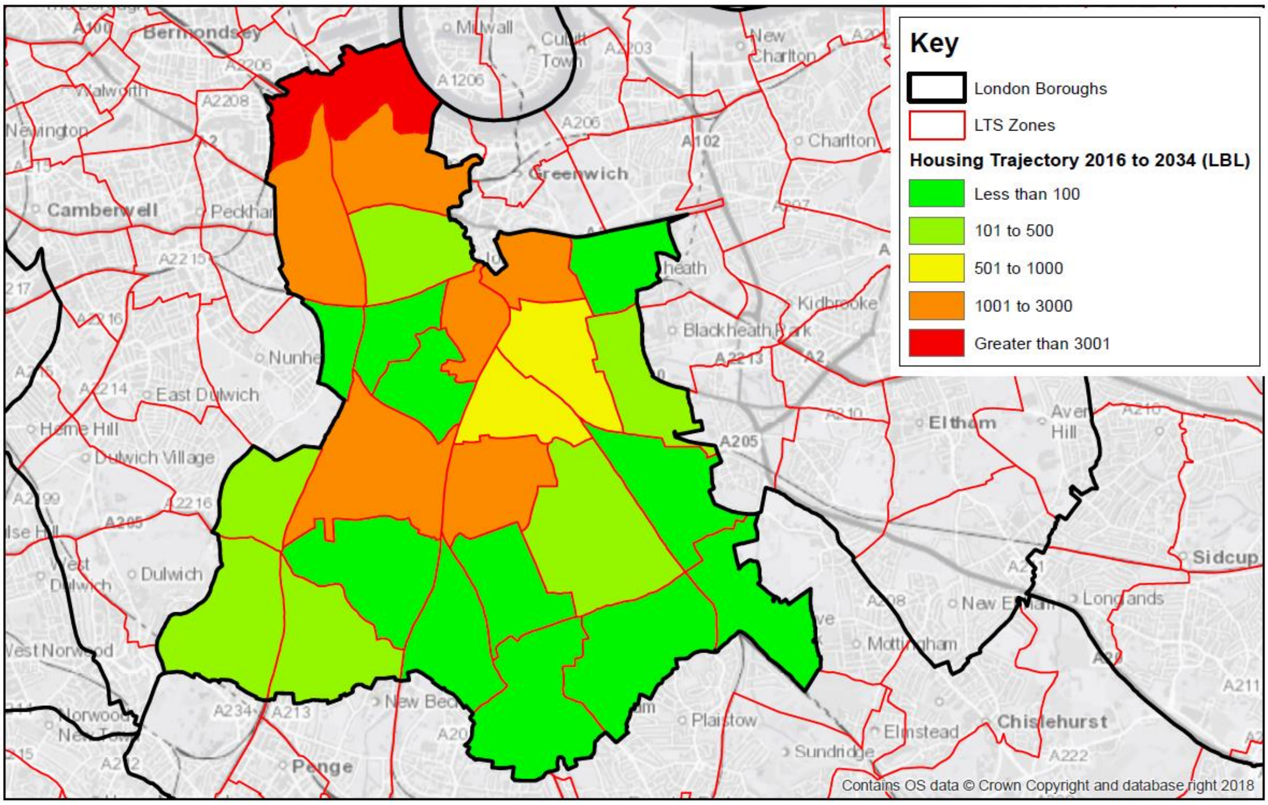

Figure 11: LBL Household Growth 2016 to 2034 provided by LBL

Growth in Jobs

3.3.4. LBL advised that the growth in jobs for the borough is consistent with the 2017 London Employment Sites Database / 2017 Long term labour market projection (i.e. assumptions used for draft London Plan). The LTS Model uses the latest GLA employment forecasts from July 2016 so from our understanding these should be similar. TfL and LBL to confirm.

3.4. Comparison in Growth of Houses

3.4.1. A comparison has been undertaken in the growth in houses between LTS and the LBL predictions 2016-2026. Table 15 shows the across the LBL that the growth in houses in LTS is very similar to the LBL predictions.

Table 15: Comparison between LTS and LBL Housing Growth

Year	LTS	LBL	Difference	Difference
2016-2026	17,756	18,187	431	2.3%

3.4.2. A comparison has been undertaken in the growth in houses between LTS and the LBL predictions 2016-2026, these can be found in Table 16 and graphically illustrated in Figure 12.

Table 16: Comparison between LBL and LTS Housing Growth by LTS Zone

LTS Zone	LTS Increase 2016 - 2026	LBL Increase 2016 - 2026	Absolute Difference	Percentage Difference
1000	5,440	5,150	-290	-6%
1004	1,849	2,153	304	14%
1010	698	308	-390	-127%
1014	423	149	-274	-184%
1017	189	57	-132	-232%
1019	172	64	-108	-169%
1020	1,682	2,101	419	20%
1021	781	1,020	239	23%
1024	408	243	-165	-68%

LTS Zone	LTS Increase 2016 - 2026	LBL Increase 2016 - 2026	Absolute Difference	Percentage Difference
1027	388	213	-175	-82%
1029	114	12	-102	-850%
1030	73	6	-67	-1117%
1034	431	247	-184	-74%
1040	194	3	-191	-6367%
1041	283	1	-282	-28200%
1044	698	245	-453	-185%
1047	192	33	-159	-482%
1050	84	24	-60	-250%
1051	176	4	-172	-4300%
1054	215	4	-211	-5275%
1057	617	249	-368	-148%
1060	1,010	581	-429	-74%
1061	280	29	-251	-866%
1064	442	189	-253	-134%
1067	545	214	-331	-155%
1069	372	128	-244	-191%
Small sites/ Windfall/ Uplift for Local Plan	0	4,760	4760	100%
Total	**17,756**	**18,187**	**431**	**2%**

3.4.3. Table 16 shows the difference in housing growth by LTS zone, by absolute and percentage difference. The absolute range of differences between LBL and LTS data by LTS zone ranges from:

- An increase of 419 (20%) houses in zone 1020
- A decrease of 453 (185%) houses in zone 1044

3.4.4. These are relatively small differences in absolute terms considering the increase in houses across the borough, approximately 18,000. However, some of the percentage differences in Table 16 are quite high because although the absolute differences are under 400 in percentage terms the change is quite high. Overall, we are of the view that the high percentage differences should not be of concern and that the differences in values across the LTS zones is not significant to warrant any additional modelling work. However, the spatial differences will be considered when reviewing the future year problems and issues.

3.4.5. Figure 12 graphically illustrates the spatial differences between the housing growth LBL is predicting compared to TfL.

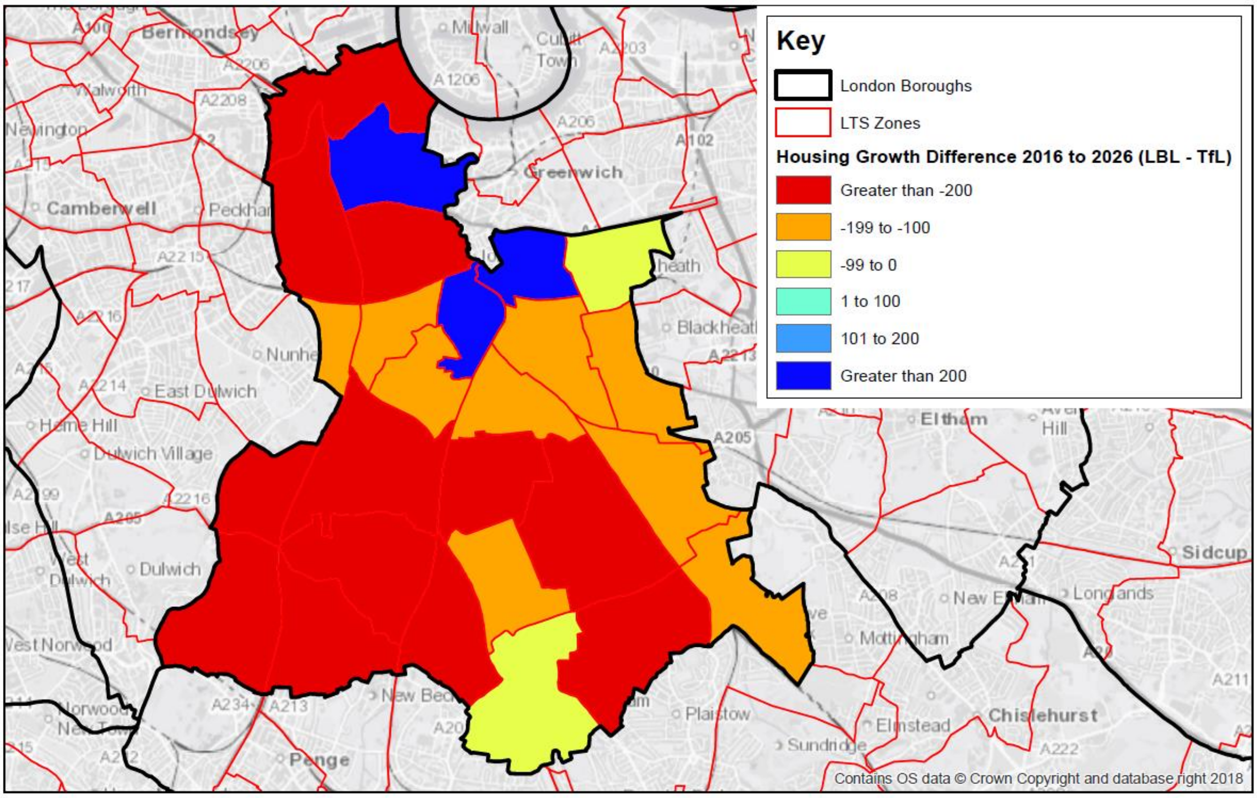

Figure 12: Comparison between LBL and LTS Housing Growth by LTS Zone

3.5. Summary

3.5.1. Overall this section has summarised in detail the LTS growth in houses, population and employment between 2016 and 2026 and 2041. The growth in houses predicted by LBL between 2016 and 2026 has also been analysed and mapped to the LTS zones. Comparisons have been drawn between the LTS and LBL growth. The growth in houses across the LBL is very similar between LTS and LBL predictions, within 2.3%. There are some spatial differences across the borough but we are of the view that these are not significant to warrant and additional modelling, however the spatial variations will be taken into consideration when assessing the future year problems and issues.

4. Base Year Model Review

4.1. Introduction

4.1.1. This chapter of the report summarises the key outcomes of the base year model review process that has been undertaken using the Railplan public transport model and ELHAM highway model. Technical notes outlining in detail of the review undertaken can be found in separate document Appendix A for the Railplan Model Review and separate document Appendix B for the ELHAM Model Review.

4.2. Railplan Public Transport Model

4.2.1. A detailed review of the AM peak RailPlan 7.0 (EMME) Model version (WE001A08A) was undertaken, the technical note generated can be found in separate document Appendix A. A range of checks were undertaking including checks on:

- Inner cordon public transport flow validation
- Eastern screenline validation
- Docklands Light Railway (DLR) and Network Rail links flows
- Bus boarding and alighting
- London rail termini
- Rail services and frequencies
- Station demand validation
- Bus demand validation
- Bus flows along corridors
- Network review including walk network

4.2.2. Our overall conclusion from the model review is that the Railplan model represents the 2012 AM peak three hour public transport services and demand reasonably well across the study area. There are however a few weak areas in the RailPlan model which WSP will undertake a few additional checks on, as suggested by TfL at the Stage 2 meeting. This will provide additional confidence in the model representing 2012 conditions. The performance is summarised below:

DLR

- Services validate well against timetable data

- Passenger demand represented well in both directions between Lewisham, Elverson Road and Deptford Bridge

Overground

- Services validate well against timetable data
- Northbound demand into London (peak direction) is close to observations
- Southbound there is some discrepancy between modelled and observed data

Network Rail

- Services validate well against timetable data
- Lack of available data for comparisons
- London Bridge (South Eastern, Southern and Thames Link) performs relatively accurately
- London Victoria and London St Pancras do not perform very accurately against observed data

Buses

- Services validate well against timetable data
- The volume of bus boarders and alighted across the borough is very accurate between observations and the model
- Volumes of bus passenger are generally higher on the two main corridors in the borough compared to observations
- At individual bus stops there are stops which compare better to observed data than others, key bus stops such as those at stations tend to perform well

4.2.3. As mentioned previously WSP will undertake a few additional checks on the RailPlan model as suggested by TfL at the Stage 2 meeting to provide additional confidence in the model representing 2012. These additional checks will be added into the Final Model Audit Technical Note has found that the existing 2012 base year RailPlan public transport model is deemed to be sufficiently detailed and validated for the assessment of highway impacts in the London Borough of Lewisham.

4.3. Elham Highway Transport Model

4.3.1. A detailed review of the AM peak ELHAM Model version E3.08 was undertaken, the technical note generated can be found in separate document Appendix B. A range of checks were undertaking including checks on:

- Local network density
- Zone system
- Junction and link coding
- Junction specific parameters
- Convergence issues
- Realism checks
- Routing
- Testing increased demand
- Calibration of screenlines/ enclosures
- Mini-screenlines/ enclosures
- Calibration of link counts

4.3.2. Our overall conclusion from the model review is that the ELHAM model represents the 2012 AM peak hour demand and traffic conditions well across the study area. Inspection of local screenlines and journey times confirmed that the model is reflective of observed strategic highway travel behaviour. Levels of congestion, delays and routing behaviour are also realistic and well matched to observed data.

4.3.3. In the study area the model meets the calibration/validation criteria in terms of screenlines, enclosures, mini-screenlines and journey times. The calibration of individual links falls slightly short of meeting the WebTAG criteria. However, given the strategic nature of the highway impact assessment and the large size of the Borough, the level of link calibration is considered sufficient.

4.3.4. In conclusion WSP has found that the existing 2012 base year ELHAM highway model is deemed to be sufficiently detailed and validated for the assessment of highway impacts in the London Borough of Lewisham.

5. Future Year Model Review

5.1. Introduction

5.1.1. This chapter of the report summarises the impacts that future year growth in population and employment in the borough and identifies the key transport problems and issues that occur in both 2026 and 2041 using the Railplan public transport model and ELHAM highway model. Technical notes outlining in detail of the review undertaken can be found in separate document Appendix C for the Railplan Model Review and separate document Appendix D for the ELHAM Model Review.

5.2. Railplan Public Transport Model

5.2.1. A detailed review of the 2026 and 2041 AM peak RailPlan 7.0 (EMME) Model version (LW004A45D & LW005A45P) was undertaken, the technical note generated can be found in separate document Appendix C.

5.2.2. The key problems and issues in LBL associated with public transport in 2026 and 2041 are summarised below:

- Passenger growth on all public transport services within LBL, DLR and Overground services are very high.
    1. DLR from 34% to 72% with actual increases ranging from 930 to 3,380
    2. Overground 17% to 202% with actual increases ranging from 40 to 5,290
    3. Bakerloo and Jubilee lines although outside of the LBL experience increases in patronage ranging from 330 to 24,105
- In 2026 and 2041 passenger crowding on the DLR increases between Lewisham and Canary Wharf.
- The Jubilee line is very crowded by 2041.
- Crowding on the overground and Southern services increases from 2011 to 2041.

- Growth of passengers at stations within the LBL is high ranging between 2011 and 2026/2041 ranging from 20%-65% (467-6,772 additional passengers). The station which experiences the biggest increases are Lewisham and Forest Heath in actual terms and Blackheath station in percentage increases.
- Growth in bus passengers is highest on the North-south corridor across the borough which see growth from 17%-40%, an additional 6,388-21,708 passengers across the route.
- Those bus stops experiencing the greatest increases in passengers between 2011-2026/2041 are which experience increases in passengers of up to 1,200 people over the AM peak 3 hour period:
  1. Lewisham Station
  2. New Cross Gate Station
  3. Marquis of Granby Goldsmiths
  4. Lewisham Clock Tower

5.3. Elham Highway Transport Model

5.3.1. WSP has undertaken a review of the adequacy of the 2026 and 2041 forecast year ELHAM models within the London Borough of Lewisham. The review has followed TfL's guidance for the use of the London Highway Assignment Models (HAM), set out in TfL's *"Sub-regional Highway Assignment Model Guidance on Model Use (Version 2.6)"* (TfL, 2017).

5.3.2. Our overall conclusion is that there are several areas, corridors and junctions which experience significant increases in traffic and delay in the future. These identify areas where problems and issues will occur in the future if no mitigation against the growth in traffic occurs. The summary below highlights the key problems and issues in the borough in 2026 and 2041:

Increase in Traffic Flows

- In the north of the Borough, the largest increases occur on A2 New Cross Road (up to approximately 300 PCU one-way).
- In the south of the Borough, the greatest traffic flow increases (up to approximately 200 PCU one-way) occur on/around A21 Bromley Road, Beckenham Hill Road, Southend Lane and Whitefoot Lane.

Increase in Delays

- In the north of the Borough, there are large delay increases in the New Cross / Deptford area, particularly at the junctions of:
  - A2 New Cross Road with Florence Road (+135 seconds to 2026 and +161 seconds to 2041)
  - A2 New Cross Road with Amersham Road (+92 seconds to 2026 and +118 seconds to 2041)
  - A2 Deptford Broadway with A2209 Deptford Church Street (+220 seconds to 2026 and +291 seconds to 2041)
- There are also large delay increases around South Bermondsey and Lewisham at:
  - Ilderton Road with Surrey Canal Road (+121 seconds to 2026 and +376 seconds to 2041)
  - A20 Lewisham High Street with A2211 Lewisham High Street (+221 seconds to 2026 and +232 seconds to 2041)
- In the south of the Borough, delays on the A205 St Mildreds Road corridor and delays around A2212 Burnt Ash Lane increase significantly (up to +100 seconds approximately) between 2012 and 2041.

Increase in Traffic Flow Across Screenlines

- The greatest percentage increase in traffic flow across screenlines occurs on the following three screenlines:
  - Canary Wharf outbound (+24% to 2026 and +32% to 2041)
  - Deptford – St Johns eastbound (+23% to 2026 and +21% to 2041)
  - Eltham – South eastbound (+19% to 2026 and +25% to 2041)

Increase in Journey Times

- The journey time routes with the greatest percentage increases in journey time are:
  - A2-West: New Cross Road to Westhorn Avenue (+31% to 2026 and +39% to 2041)
  - A2-West: Westhorn Avenue to New Cross Road (+15% to 2026 and +32% to 2041)
  - A20-West: Sevenoaks Way to B218 Malpas Road (+29% to 2026 and +38% to 2041)

– A206-North: Basildon Road to A200 Evelyn Street (+13% to 2026 and +44% to 2041)

6. Assessing Interventions

6.1.1. A range of transport interventions were assessed as part of this stage of the work, these are outlined in Table 17 showing both the public transport and highway interventions.

Table 17: Lewisham Transport Interventions Assessed

Intervention Number	Intervention Description
Public Transport RAILPLAN	**Public Transport RAILPLAN Intervention Description**
1	2041 BLE to Lewisham 27tph
2	2041 BLE to Lewisham 27tph + Jubilee Line 36tph + Lewisham bus frequency x2
3	2041 BLE to Hayes 36tph
4	2026 Southeast Riverside Bus Strategy + Cycle Superhighway 4 + Bus route 225 extension
5	2026 Lewisham bus frequency x2
6	2041 Brockley Interchange + New Bermondsey station
7	2041 DLR 30tph
8	2041 Brockley Interchange frequency x2 + BLE to Hayes 36tph
9	2041 Lower Sydenham enhanced bus services + BLE to Hayes 36tph
Highway Transport ELHAM	**Highway Transport ELHAM Intervention Description**
10	Road Space Allocation
11	CS4 and Catford Gyratory Note 1 (Jan 2019 Catford Gyratory design)
12	CS4 and Catford Gyratory Note 2 (June 2019 Catford Gyratory design)
13	Road Closures (Vehicle Filter) Technical Note 1 (Healthy Neighbourhoods)
14	Road Closures (Vehicle Filter) Technical Note 2 (Healthy Neighbourhoods)

Intervention Number	Intervention Description
15	All Interventions Combined

6.2. Railplan Public Transport Interventions

6.2.1. Separate document Appendix E presents the detailed assumptions and results of the impacts of each of the public transport intervention assessed. In summary:

- Bakerloo Line Extension proposals have been assessed for the following:
  - BLE to Lewisham 27tph
  - BLE to Hayes 36tph
- Jubilee Line 36tph (34tph in the Reference Case)
- Lewisham Bus frequency X2 - Doubled bus frequencies that pass through Lewisham Station
- DLR 30tph (23tph in the Reference Case)
- Cycle Superhighway 4
- Southeast Riverside Bus strategy – area is subject to a number of major developments and TfL have proposed a number of improvements to existing bus services for the area
- Bus 225 extension – route extended to Bellingham Station
- Brockley interchange – interchange between South Eastern and East London line services
- New Bermondsey Station – open for overground services
- Lower Sydenham enhanced bus services – increase of bus frequencies travelling past Lower Sydenham train station

6.2.2. A summary of the impacts on all tests are presented below:

2026 Intervention Tests

Intervention Test 4: Southeast Riverside Bus Strategy + Cycle Superhighway 4 + Bus route 225 extension

- Increases in bus passenger demand for 225 route extensions except for the end section of the route
- No significant change in bus passenger demand on key corridors (1-2%)

Intervention Test 5: Lewisham bus frequency x2

- Increases in bus passenger demand on key corridors (12-15%)

2041 Intervention Tests

Intervention Test 1: BLE to Lewisham 27tph

- Increase in passengers using the Bakerloo Line & DLR
- Reductions in passengers using Jubilee line
- Increase in passengers on overground between Sydenham and New Cross Gate
- Reductions in passengers on overground between New Cross Gate and New Cross
- Increases in bus passengers on both main bus corridors (3-11%)
- Increases in passengers at Lewisham Station (23,077)
- Increases in passengers boarding and alighting at Lewisham and New Cross Gate Station
- Reduce capacity on DLR near Lewisham

Intervention Test 2: BLE to Lewisham 27tph + Jubilee Line 36tph + Lewisham bus frequency x2

- Increase in passengers using the Bakerloo Line & DLR
- Reductions in passengers using Jubilee line
- Increase in passengers on overground between Sydenham and New Cross Gate
- Reductions in passengers on overground between New Cross Gate and New Cross
- Increases in bus passengers on both main bus corridors (20-35%)
- Increases in passengers at Lewisham Station (24,556)
- Increases in passengers boarding and alighting at Lewisham and New Cross Gate Station
- Reduce capacity on DLR near Lewisham

Intervention Test 3: BLE to Hayes 36tph

- Increase in passengers using the Bakerloo Line & DLR
- Reductions in passengers using Jubilee line
- Increase in passengers on overground between Sydenham and New Cross Gate (northbound)
- Reductions in passengers on overground between New Cross Gate and New Cross

- Decreases in bus passengers on both main bus corridors (4-12%)
- Increases in passengers at Lewisham Station (19,769)
- Decreases in passengers boarding and alighting at Lewisham and New Cross Gate Station
- Reduce capacity on DLR near Lewisham

Intervention Test 6: Brockley Interchange + New Bermondsey station

- Increases in rail passengers at Brockley Station (17%)

Intervention Test 7: DLR 30tph

- Increases in passengers using DLR
- Slight reduction in passengers on the Jubilee line
- Reductions in passengers on overground between New Cross Gate and New Cross ▪ Increase capacity on the DLR

Intervention Test 8: Brockley Interchange frequency x2 + BLE to Hayes 36tph

- Increase in passengers using the Bakerloo Line & DLR
- Reductions in passengers using Jubilee line
- Increase in passengers on overground between Sydenham and New Cross Gate (northbound)
- Reductions in passengers on overground between New Cross Gate and New Cross
- Decreases in bus passengers on both main bus corridors (6-13%)
- Increases in passengers at Lewisham Station (20,238)
- Decreases in passengers boarding and alighting at Lewisham and New Cross Gate Station
- Reduce capacity on DLR near Lewisham
- Insignificant changes in total number of passengers at Brockley Station
- Crowding improves significantly between Lewisham and Nunhead stations along the Southeastern line

Intervention Test 9: Lower Sydenham enhanced bus services + BLE to Hayes 36tph

- Increase in passengers using the Bakerloo Line & DLR
- Reductions in passengers using Jubilee line

- Increase in passengers on overground between Sydenham and New Cross Gate (northbound)
- Reductions in passengers on overground between New Cross Gate and New Cross
- Increases in bus passengers on both local bus corridors (18-23%)
- Reductions in passenger station usages in the vicinity of Lower Sydenham stations
- Increases in passengers at Lewisham Station (19,699)
- Decreases in passengers boarding and alighting at Lewisham and New Cross Gate Station
- Reduce capacity on DLR near Lewisham

6.3. Elham Highway Transport Interventions

6.3.1. Separate document Appendix F contains all the technical notes including assumptions generated for ELHAM for the interventions assessed which were:

- Road Space Reallocation (A2, A21/A2209/ A2210 and A2218 Whitefoot/ Southend Lane)
- Cycle Super Highway 4 and Catford Gyratory (Jan 2019 and June 2019 designs)
- Vehicle Filters (road closures) for Healthy Neighbourhoods (two options)
- All Interventions combined

Road Space Allocation

6.3.2. An assessment of the highway impact assessment for implementing three road space reallocation schemes into the 2041 forecast year ELHAM within the London Borough of Lewisham. Along each where there are currently two lanes for traffic this would be reduced to one lane for traffic and the other lane for segregated cycle provision and/ or bus lanes. Figure 13 graphically presents where road space allocation was assessed on A2, A21/A2209/ A2210 and A2218 Whitefoot/ Southend Lane.

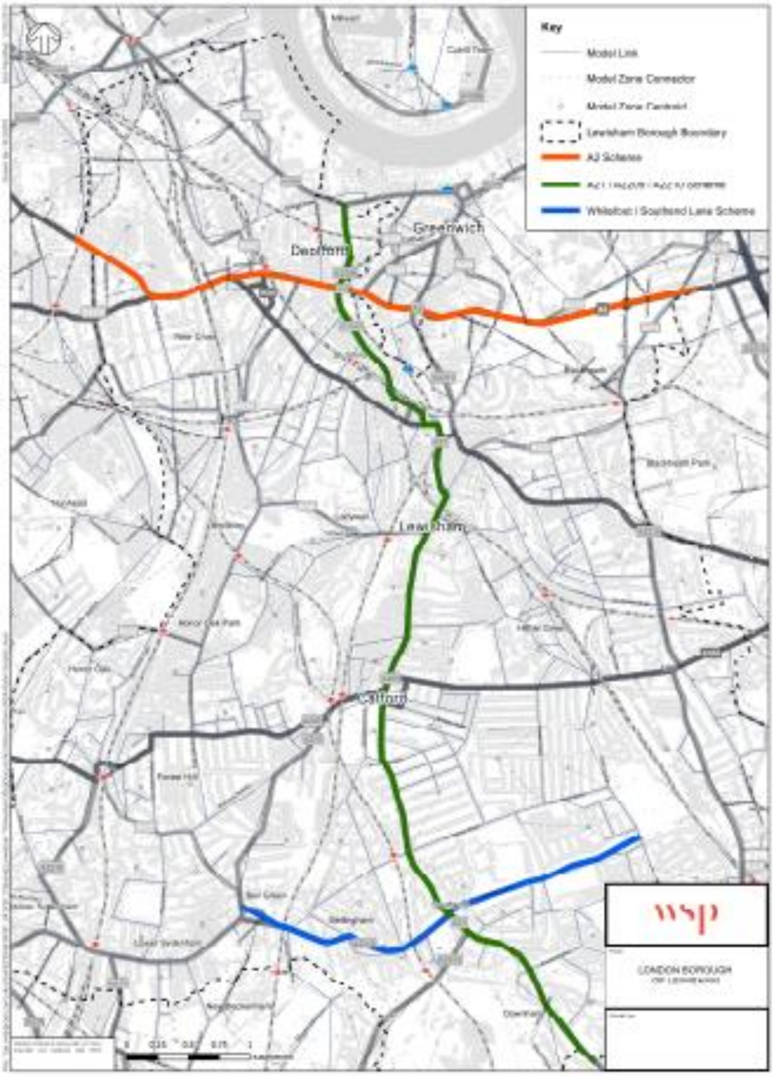

Figure 13: Locations of Road Space Reallocation

6.3.3. The impacts of the space reallocation result in some sections of the A2 in the north west of the borough experiencing traffic reductions significant reductions in traffic, the impact of the scheme is less in the north-east of the Borough on the A2, as this is mostly single carriageway in both directions with smaller reductions.

6.3.4. Impacts on A21/ A2209/ A2210 vary depending on the location in the Borough, in the north there are traffic flow increases, in the centre and south of the Borough there are decreases in traffic.

6.3.5. On Whitefoot Lane there are traffic flow increases and on Southend Lane decreases.

6.3.6. As a result of the proposals there are significant delays around the New Cross gyratory area which is negatively impacted as a result of both the gyratory being reconfigured and the space reallocation proposals.

6.3.7. Journey times across the Borough increase as a result of the proposals specifically around the New Cross area.

Super Cycle Highway 4 and Catford Gyratory

6.3.8. Two designs of the Catford Gyratory were assessed in the 2041 ELHAM model, the January 2019 proposed design and the June 2019 design, these can be found in separate document Appendix F.

Cycle Superhighway 4 Area

6.3.9. Due to improvements to cycling infrastructure along the route of CS4, there have been corresponding reductions in road capacity. These reductions in road capacity have led to some reductions in traffic flow on Jamaica Road, Lower Road and into the London Borough of Lewisham because of the road space re-allocation.

6.3.10. The impact of this is that traffic is 'squeezed' off the strategic routes and re-routed, particularly along Needleman Street, Salter Road, Southwark Park Road, Grinstead Road and other minor roads in the London Borough of Lewisham.

6.3.11. As a result of the CS4 proposals there are both isolated delay reductions and increases but these are not widespread.

Catford Gyratory January 2019

6.3.12. High delays can be seen in the Catford Gyratory area at the main junction between the A205 and A21 (due to its 6-stage method of control). At the moment, there are large flow reductions on many of the strategic routes in the area as traffic re-routes to avoid delays. TfL may wish to make some tweaks to the Catford design to see if delays can be reduced. However, this will need to be balanced against the strong desire to see provision for pedestrian and cyclists prioritised over traffic movement, in line with the healthy streets approach. It should also be noted that this modelling exercise, as presented, assumes a simple reassignment of traffic to alternative routes, rather than any more complex behavioural change that may take place as a result of the increased journey times such as retiming of journeys, transfer of trips to other modes or the trip not being made at all. This will be picked up at a later stage in the study when the LTS runs are undertaken.

6.3.13. Large delays occur in the local area near the gyratory, of up to 300 seconds / 5 minutes.

Catford Gyratory June 2019

6.3.14. The impacts seen with the June 2019 design were very similar to those in the January 2019 proposals, with significant delays and reductions in traffic in the local area. Large delays occur in the local area near the gyratory, of up to 230 seconds / 4 minutes which are improved compared to the delays in the January 2019 design.

Road Closures (vehicle filters) for Healthy Neighbourhoods

6.3.15. As part of the LBL Healthy Neighbourhood there are proposals to close residential roads, WSP assessed two options which are shown in Figure 14 and Figure 15. It must be noted these figures only show the road closures which are proposed to be closed and are represented within the ELHAM networks. More details of the impacts of these proposals can be found in the separate document Appendix F.

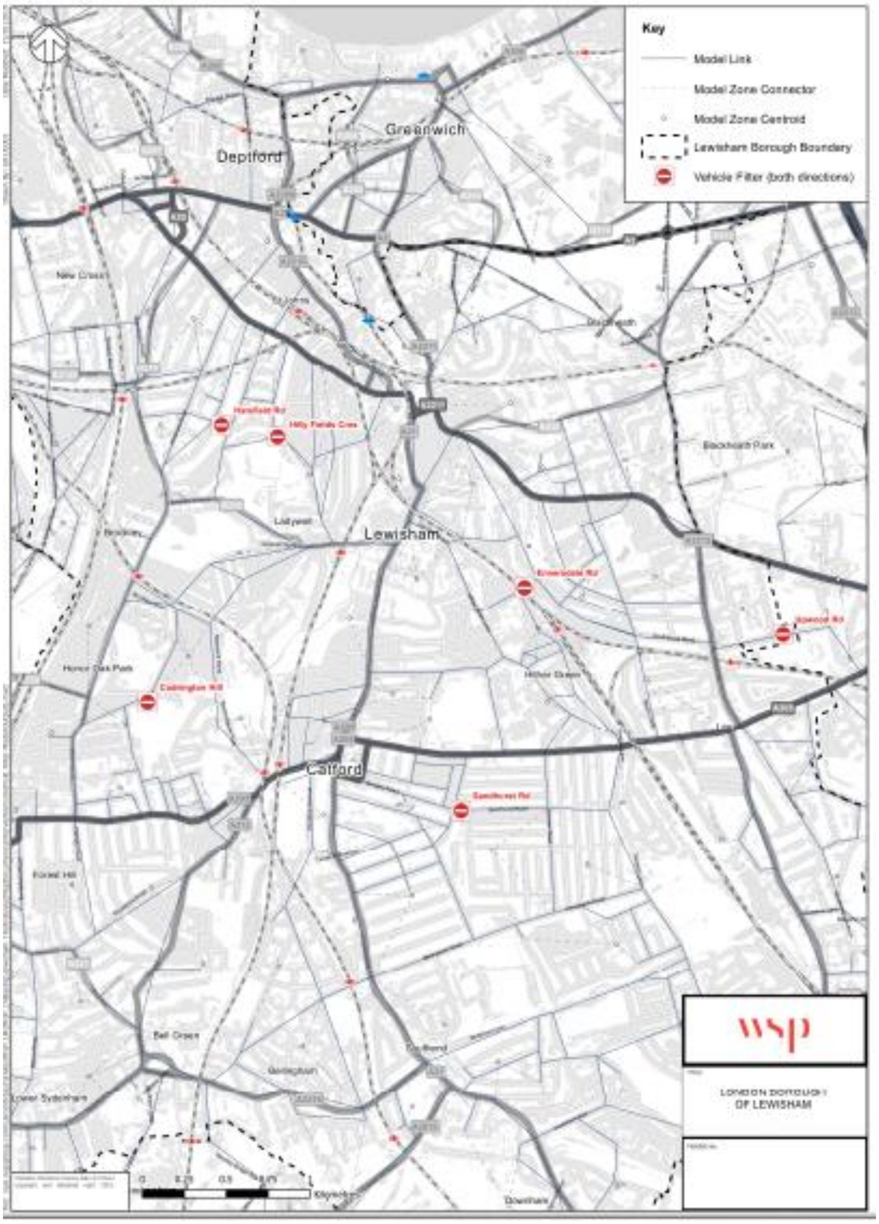

Figure 14: Locations of Road Closures Option 1

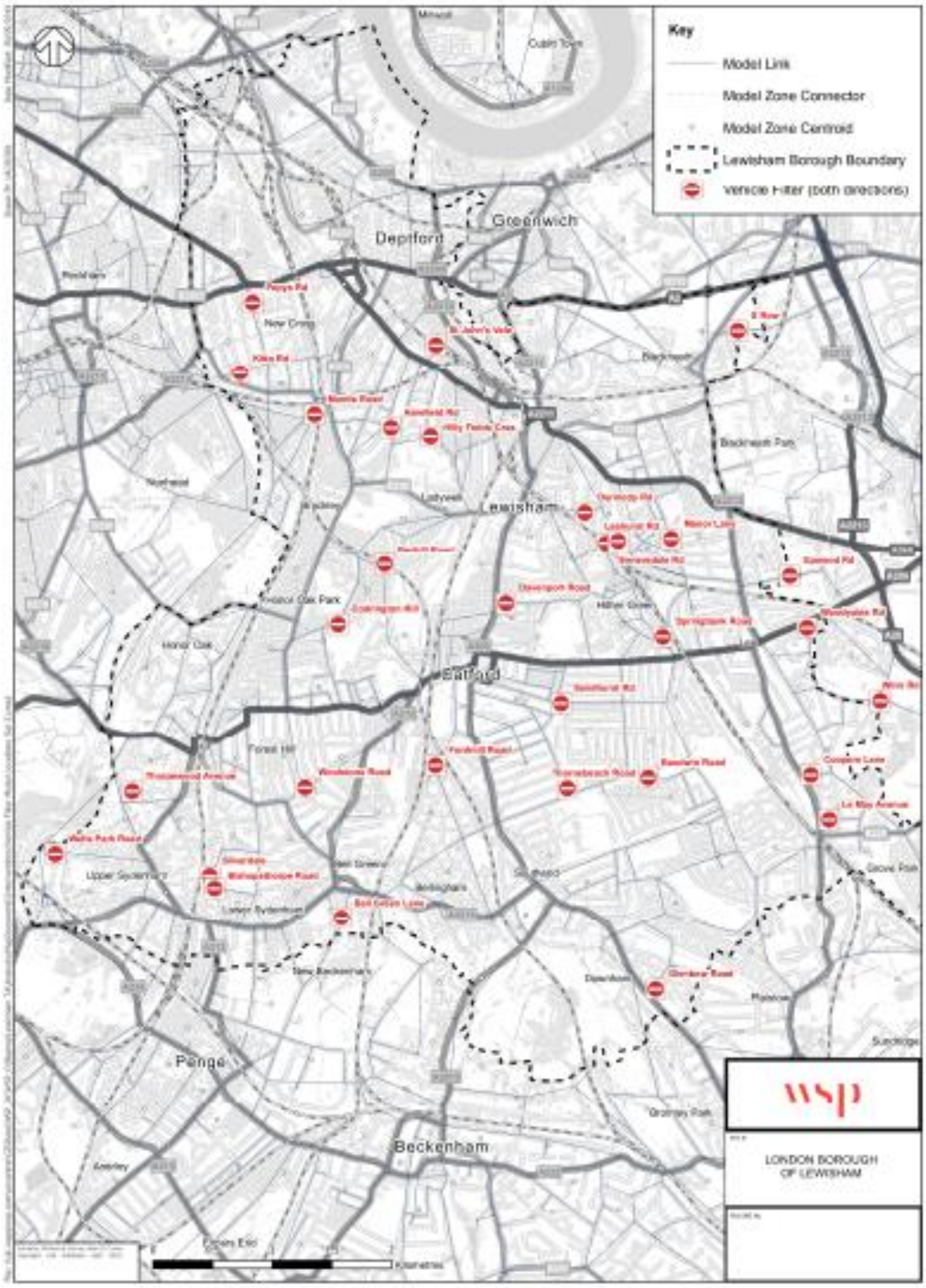

Figure 15: Locations of Road Closures Option 2

Impacts of Option 1

6.3.16. As a result of the road closure on Codrington Hill, vehicle flow is pushed from nearby residential roads, such as Crofton Park Road, Stillness Road and Brockley View, onto the B218 Brockley Road. Here, traffic flow increases are seen. Traffic flow decreases as low as 400 vehicles are seen on nearby residential roads, particularly Crofton Park Road. Some additional traffic flow is pushed onto Ravensbourne Park to bypass Codrington Hill.

6.3.17. The road closures on Sandhurst Road in Catford has the effect of reducing the traffic flow on local residential roads, such as Inchmery Road and Sangley Road, and increasing the traffic flow slightly on A205 Brownhill Road and A21 Bromley Road. On the A21 Bromley Road, traffic flow increases of are experienced, and on the local residential roads, traffic flow decreases are seen, namely on Inchmery Road.

6.3.18. As a result of the road closures on Ennersdale Road in Hither Green, traffic flow decreases occur on local residential roads, particularly on Ennersdale Road itself, but also on Fernbrook Road / Leahurst Road and Nightingale Grove. Traffic is however pushed onto other local residential roads, such as Dermody Road, Morley Road and Eastdown Park, due to the need for traffic to access the junction of Courthill Road with Hither Green Lane. On Morley Road / Dermody Road, flow increases occur. On the strategic road network, flow increases are seen on A20 Lee High Road.

6.3.19. The road closure on Upwood Road (in combination with the closure on Ennersdale Road) has the effect of reducing flow on residential roads such as Southbrook Road and Fernbrook Road / Leahurst Road. Some of the traffic flow is pushed onto A2212 Burnt Ash Road and A205 Westhorne Avenue.

6.3.20. The road closure on Harefield Road and Hilly Fields Crescent, which have been grouped together due to their proximity to one another, result in a traffic flow reductions on local residential roads such as Montague Avenue, and a slight flow increase on the A20 Loampit Hill and Breakspears Road.

6.3.21. The road that experience an delay increase in particular are Manor Lane (+75 seconds) and the adjacent A205 St Mildreds Road (+230 seconds). Here, the delay increases are not due to an increase/decrease in flow per se, but rather due to very sensitive signal timings in ELHAM. A number of tests conducted by WSP using variable signal timings has identified this.

6.3.22. Elsewhere in the Borough, the increases/decreases in delays can be put largely down to increases/decrease in flow, as the two measures are intrinsically linked. For example, the flow increase on the B218 Brockley Road results in an additional delay southbound of 90 seconds. The same is true on the A20 around Lewisham where flow increases result in an increase in delay of up to 70 seconds on the A20 Lee High Road.

6.3.23. Journey times on A20, B218, A205 and A21 all increase as a result of the road closures, with the exception of the A20 southbound which has a marginal reduction in journey time.

Impacts of Option 2

6.3.24. As a result of the proposed road closures there are traffic reductions on several residential roads:

- Davenport Road
- Ennersdale Road
- Leahurst Road
- Hither Green Lane (northern section)
- Courthill Road
- Morley Road / Dermody Road / Gilmore Road corridor
- Springbank Road

6.3.25. In contrast, there are just two residential roads in the Hither Green area which exhibit an increase in traffic flow:

- Hither Green Lane (southern section)
- Manor Lane

6.3.26. Due to traffic re-routing, there are traffic flow increases on A2212 Burnt Ash Hill and A205 Brownhill Road.

6.3.27. In the centre-west of the Borough around Brockley, traffic flow reduces on the local residential roads of Brockley View, Montem Road, Codrington Hill, Crofton Park Road, Ladywell Road and Brockley Grove by up to -400 pcu/hr. Traffic flows increase on the B218 and the B238 Honor Oak Park because of traffic reassignment.

6.3.28. In the south of the Borough there is a notable traffic flow decrease along Kent House Lane in each direction and along Woolstone Road in each direction. Because of traffic reassignment in the south of the Borough, traffic flow increases are evident on A21 Bromley Road.

6.3.29. In the southeast of the Borough around Grove Park, traffic reassignment and the road closure of Coopers Lane causes a flow decrease on Coopers Lane and a flow decrease northbound on A2212 Baring Road. Traffic reassigns onto Burnt Ash Hill, where a flow increases is evident. Because of other road closures in the area (Woodyates Road and Winn Road), traffic reassignment reduces the traffic flow on local residential roads e.g. on Guibal Road and Winn Road.

6.3.30. In the north of the Borough, the impact of the vehicle filters is less widespread and apparent. The largest traffic flow changes occur around New Cross where reductions occur on St Norbert Road. Traffic flow increases occur on B2142 Drakefell Road because of traffic reassignment.

6.3.31. The links that see a delay increase in particular are B218 Stondon Park, Manor Lane and the adjacent A205 St Mildreds Road. Here, the delay increases are not due to an increase/decrease in flow, but rather due to sensitive signal timings in ELHAM, resulting in an unrealistic level of delay.

6.3.32. Journey times on key roads in the borough increase as a result of these proposals.

All Interventions Combined

6.3.33. This scenario includes all the highway interventions individually assessed, please refer to separate document Appendix F for the full Technical Note.

6.3.34. The impact of all the schemes combined is more pronounced in the north of the Borough than in the south, where road space reallocation along the A2 and A21, the associated reconfiguration of the New Cross gyratory and CS4 are located. Here, high flow decreases are experienced on the A2 in the Deptford area, and flow increases can be seen on the A21 due to the road space reallocation scheme and the consequential redistribution of traffic in the area.

6.3.35. In the centre of the Borough, there are generally traffic flow reductions due to road space reallocation along the A2209 and A2210 as traffic is rerouted around the corridor. The Catford Gyratory scheme results in traffic flow reductions due to the consequential delays created by the 6-stage signals at its main junction. Flow reductions can be seen around Catford. There are isolated occurrences of traffic flow increases. The increases around Catford Gyratory are due to the gyratory being converted from one-way to two-way working.

6.3.36. In the south of the Borough, most of the traffic flow changes occur on the A2209 and A2210 corridor once again due to road space reallocation here. There are also flow reductions along Southend Lane. The road space reallocation scheme along Whitefoot Lane results in localised traffic flow increases along Bellingham Road to the north of Whitefoot Lane and along Whitefoot Lane itself.

6.3.37. Delay differences across the Borough are mainly present in two distinct locations.

6.3.38. In the north of the Borough around Deptford, due to the New Cross gyratory being reconfigured in the Do Something models to feature two-way working along the northern arm, increased delays occur at its signalised junctions. The maximum delay increase is 200 seconds, down to a decrease of -150 seconds. Further refinements to the New Cross gyratory scheme are recommended.

6.3.39. A concentration of delay increases is also observed around the Catford Gyratory, where as previously discussed, the 6-stage method of control at the main Catford Gyratory junction results on increased delays in the local area of up to an additional 300 seconds delay. Further refinements to the scheme are recommended here too.

6.3.40. Journey times on key roads in the borough increase as a result of these proposals.

7. 2026 and 2041 Lewisham Intervention Package

7.1.1. For both 2026 and 2041 LBL, in close agreement and consultation with both WSP and TfL agreed that the following interventions would form the Lewisham Intervention package, shown in Table 18.

Table 18: Lewisham Intervention Package

Scheme Type	Scheme Name	LTS 2026 Lewisham Intervention Package	LTS 2041 Lewisham Intervention Package
Public Transport	BLE to Lewisham 27tph	No	No
Public Transport	BLE to Hayes 36tph	No	Yes
Public Transport	DLR 30tph	No	Yes
Public Transport	Jubilee 36tph	No	Yes
Public Transport	Southeast Riverside bus strategy	Yes	Yes
Public Transport	Bus 225 extension	Yes	Yes
Public Transport	Brockley Interchange	No	Yes
Public Transport	New Bermondsey Station	Yes	Yes
Public Transport	Lewisham bus frequency x 2	No	Yes
Public Transport	Lower Sydenham enhanced bus services	No	Yes

Scheme Type	Scheme Name	LTS 2026 Lewisham Intervention Package	LTS 2041 Lewisham Intervention Package
Highway	Cycle Superhighway 4	Yes	Yes
Highway	Road space allocation	Yes	Yes
Highway	Vehicle filters	Yes	Yes
Highway	Catford Gyratory improvement scheme	Yes	Yes

7.1.2. The Technical Note which presents the detailed result of the Intervention package can be found in separate document Appendix G. A high level summary of this note is provided in the rest of this chapter.

7.2. 2026 Lewisham Intervention Package

7.2.1. The transport interventions for both 2026 and 2041 were incorporated into TfL's LTS model which contains population and employment data and allow people to choose which mode of travel they would use by car, public transport and slow modes. As a result of the 2026 interventions there is an increase in public transport trips and a reduction in highway trips within the borough. Increases in public transport trips correlates well with where the public transport schemes are located. In addition, a reduction in highway trips correlates well to the location of highway intervention schemes, with there being slight increases in highway use in the Catford Gyratory area.

7.2.2. As a result of the Lewisham intervention package there are increases in passenger demand on the Bakerloo Line and Overground line with no changes in demand along the Jubilee or DLR lines which is to be expected. Crowding on London underground and Network Rail services does not change significantly with the most notable decrease between Surrey Quays and Canada Water where crowding reduces as a result of the New Bermondsey station nearby.

7.2.3. The number of passengers on buses does increase across the borough by between 2-4%. Passenger demand at Lewisham station marginally increases as a result of the improvement package.

7.2.4. As a result of the Lewisham Intervention package in the north of the Borough the impact of the schemes varies. Generally, there is a reduction in traffic flow on the roads altered by the proposed schemes. Notable reductions in traffic flow are observed on the A2 and the A200, where capacity is restricted due to changes in road space allocation and the CS4 scheme. At the most effected point, the reduction in two-way traffic flow is high. Increases in traffic flow are most prominent on the local road network linking to the A2 andA200; namely, Deptford High Street, Deptford Church Street and the B218.

7.2.5. In the centre of the Borough, the majority of the decreases in traffic flow occur on the A21, namely Lewisham High Street, and the local roads in Hither Green and Crofton Park. The reallocation of road space and the additional road closures in place results in a significant decrease in two-way traffic flow at these locations. Notable reductions on Leahurst Road and on Codrington Hill. As a consequence, traffic flow increases on alternative routes, such as Hither Green Lane and the B218 and B236 in Crofton Park. A notable increase exists on the B218, as a result of a road closures on an adjacent road.

7.2.6. In the south of the Borough, there is a general traffic flow reduction on the A21 and Southend Lane due to road space reallocation. There are also decreases in traffic flow on the A205 and A212, which connect to Southend Lane. The road space reallocation scheme along Whitefoot Lane results in localised traffic flow increases along Bellingham Road and along Whitefoot Lane itself.

7.2.7. The Catford Gyratory scheme results in traffic flow reductions due to the consequential delays created by the 6-stage signals at its main junction. There are isolated occurrences of traffic flow increases on the Catford Gyratory, where increases are observed.

7.2.8. Delay differences across the Borough are mainly present in three distinct locations, which include the New Cross gyratory in Deptford, the Catford Gyratory the A205 in Lee. There are also a number of roads where increased delay occurs in Southend, Bell Green and Honour Oak.

7.2.9. The reconfiguration of the New Cross gyratory in Deptford in the Do Something models features a two-way working system on the northern arm. As a result, the reconfiguration has increased delays at the signalised junctions around the gyratory. The A2 scheme, which connects to the New Cross gyratory, also causes delay on a number of the connecting roads in the area. The model results indicate that further refinements to the A2 and the New Cross gyratory scheme are required.

7.2.10. A concentration of delay increases is observed around the Catford Gyratory, whereas previously discussed, the 6-stage method of control at the main Catford Gyratory junction results on increased delays in the local area. Delays of up to an additional 240 seconds are observed on the A205 eastbound towards the junction gyratory. There are some slight decreases in journey time on the northbound and eastbound gyratory; however, these decreases are relatively minor when compared with overall junction delay. This indicates that further refinements to the Catford Gyratory scheme are required.

7.2.11. Significant delay occurs on the A205 in Lee where there is a road closure. As a result, a delay of 840 seconds is observed on the A205 near the junctions with the A2212. The road closure also causes a delay on various other roads connecting to the A205 in the Lee area. It is considered that further analyses of signal timings are required at the A205/A2212 junctions.

7.2.12. The locations where increased delay occurs in Southend, Bell Green and Honour Oak are attributed to the Whitefoot and Southend Lane scheme and the additional road closures in each respective area. The reallocation of road space on Whitefoot Lane results in an increase in delay of 90 seconds on the most affected section of the road. Discussed previously in terms of increases in actual traffic flow, the vehicle filter on Codrington Hill results in a combined two-way delay increase of 170 seconds on the B218, which acts as the closest alternative route. This highlights the impact the reallocation of road space and vehicle rerouting has on the surrounding highway network.

7.2.13. As a result of the proposals the journey time across the borough increase compared to the scenario without the intervention package.

7.3. 2041 Lewisham Intervention Package

7.3.1. As a result of the 2041 interventions there is a significant increase in public transport trips and a reduction in highway trips within the borough. Increases in public transport trips correlates well with where the public transport schemes are located and the wide impacts in increased public transport usage as a result of the Bakerloo Line Extension is very evident. In addition, a reduction in highway trips correlates well to the location of highway intervention schemes, and across the borough there is a widespread reduction in highway trips.

7.3.2. As a result of the Lewisham intervention package there are increases in passenger demand on the Bakerloo Line and the extension. There are slight decreases in passengers on the Jubilee line and increases in passengers using the DLR. The Overground experiences both increases and decreases in passengers. Crowding on London underground and Network Rail changes with increased crowing levels on the Bakerloo Line and DLR as to be expected as a result of the intervention package, with the Jubilee line and sections of the DLR experiencing reductions in crowding. All Network Rail services experience reductions in crowding.

7.3.3. The number of passengers on buses does increase across the borough by between 17% of boarders and 32% of alighters. Passenger demand at Lewisham station significantly increases as a result of the improvement package in particular the number of interchanges increases by over 5 times.

7.3.4. In the north of the Borough the impact of the schemes varies. Generally, there is a reduction in traffic flow on the roads altered by the proposed schemes. Notable reductions in traffic flow are observed on the A2 New Cross Road, where capacity is restricted due to changes in road space allocation and the CS4 scheme. At the most affected point, the reduction in two-way traffic flow is high. Increases in traffic flow are most prominent on the local road network linking to the A2 and A200; namely, Deptford High Street, Deptford Church Street and the B218.

7.3.5. In the centre of the Borough, the majority of the decreases in traffic flow occur on the A20 around Lewisham High Street, and the local roads in Hither Green, Crofton Park and Perry Vale. The reallocation of road space and the additional vehicle filters in place results in a significant decrease in two-way traffic flow at these locations. Notable reductions are on Leahurst Road and on Crofton Park Road. As a consequence, traffic flow increases on alternative routes, such as Hither Green Lane and the B218 and B236 in Crofton Park. A notable increase exists on the B218, where a two-way increase as a result of a road closure on an adjacent road.

7.3.6. In the south of the Borough, there is a general traffic flow reduction on the A21 and Southend Lane due to road space reallocation. There are also decreases in traffic flow on the A205 around Manor Lane and A212, which connect to Southend Lane. The road space reallocation scheme along Whitefoot Lane results in localised traffic flow increases along Bellingham Road and Whitefoot Lane itself. The Catford Gyratory scheme results in traffic flow reductions due to the consequential delays created by the 6-stage signals at its main junction.

7.3.7. Delay differences across the Borough are mainly present in four distinct locations, which include the New Cross gyratory in Deptford, the Catford Gyratory, and the A205 in Lee. There are also a number of roads where increased delay occurs in Southend, Bell Green, and Honour Oak. The reconfiguration of the New Cross gyratory in Deptford in the Do Something models features a two-way working system on the northern arm. As a result, the reconfiguration has increased delays at the signalised junctions around the gyratory. The maximum delay increase observed on the gyratory is +202 seconds. The A2 scheme, which connects to the New Cross gyratory, also causes delay on a number of the connecting roads in the area. The model results indicate that further refinements to the A2 and the New Cross gyratory scheme are required.

7.3.8. A concentration of delay increases is observed around the Catford Gyratory, where as previously discussed, the 6-stage method of control at the main Catford Gyratory junction results on increased delays in the local area. Delays of up to an additional +246 seconds are observed on the A205 eastbound towards the junction gyratory. There are some slight decreases in journey time on the northbound and eastbound gyratory; however, these decreases are relatively minor when compared with overall junction delay. This indicates that further refinements to the Catford Gyratory scheme are required.

7.3.9. Significant delay occurs on the A205 in Lee where a road closure has been put in place. As a result, a delay of +855 seconds is observed on the A205 near the junctions with the A2212. The road closure also causes a delay on various other roads connecting to the A205 in the Lee area. It is considered that further analyses of signal timings are required at the A205/A2212 junctions.

7.3.10. The locations where increased delay occurs in Southend, Bell Green and Honour Oak are attributed to the Whitefoot and Southend Lane scheme and the additional vehicle filters in each respective area. The reallocation of road space on Whitefoot Lane results in an increase in delay of +27 seconds on the most affected section of the road. Discussed previously in terms of increases in actual traffic flow, the vehicle road closure on B218, which acts as the closest alternative route. This highlights the impact the reallocation of road space and vehicle rerouting has on the surrounding highway network.

7.3.11. As a result of the proposals the journey time across the borough increase compared to the scenario without the intervention package.

8. 2041 Comparison

8.1.1. In 2041 three scenarios have been compared:

- 2041 Do Minimum – the models TfL provided us original **(DM)**
- 2041 Do Something with Lewisham Intervention Package **(DS)**
- 2041 Do Something with Lewisham Intervention Package and MTS proposals **(DS MTS)**

8.1.2. The Technical Note which presents the detailed result of the Intervention package and MTS results can be found in separate document Appendix G. To generate the MTS scenarios WSP undertook the following:

- **Railplan** – WSP took the Railplan model used for the Lewisham Intervention package and incorporated the MTS Metroisation network coding TfL provided. This updated Railplan network was assigned using the public transport demand from TfL from an LTS MTS run.
- **Elham** – TfL provided WSP with a MTS highway demand matrix which was assigned to the Lewisham Intervention package network

8.1.3. A high level summary of this note is provided in the rest of this chapter.

8.2. Railplan Public Transport Model

8.2.1. As a result of the DS MTS scenario passenger demand on LUL, DLR and NR services increases significantly compared to the DS scenario. For example passenger demand on the Bakerloo line increase from around 17% between Elephant and Castle and Lambeth and up to 40% on the sections between New Cross Gate and Lewisham. Passenger demand in DS MTS increases more compared to the DS where changes in passenger levels remain very similar to the DM. Increases also occur in DS MTS on both the DLR and Overground with for example the passenger demand between Lewisham and Elverson Road increasing by up to 13% and passenger demand between Brockley and New Cross Gate on the Overground increasing by up to 98%. The passenger increases experienced results in increased crowding particularly on the Bakerloo line in DS MTS compared to DS.

8.2.2. An increase in crowding is experienced in DS MTS on the Southern/ Overground lines as well as sections of the Southeastern Line. The Thameslink line however experiences a reduction in crowding.

8.2.3. Within DS MTS there are overall increases in bus passenger demand on the North-South bus corridor in Lewisham , with increases in passengers around key public transport interchanges. Similar increases in passengers are seen on the East-West bus corridor. Overall growth in Bus passengers increases in DS MTS by 6,670 boarders and 4,900 alighters during the AM peak period compared to the DS.

8.2.4. Passenger demand at Lewisham station also increase in DS MTS, show in Figure 16. There are increases in passenger entries and exits by up to 2,400 with the greatest increases in passenger demand seen of interchangers increasing by just under 15,000 passengers in a three hour AM peak period.

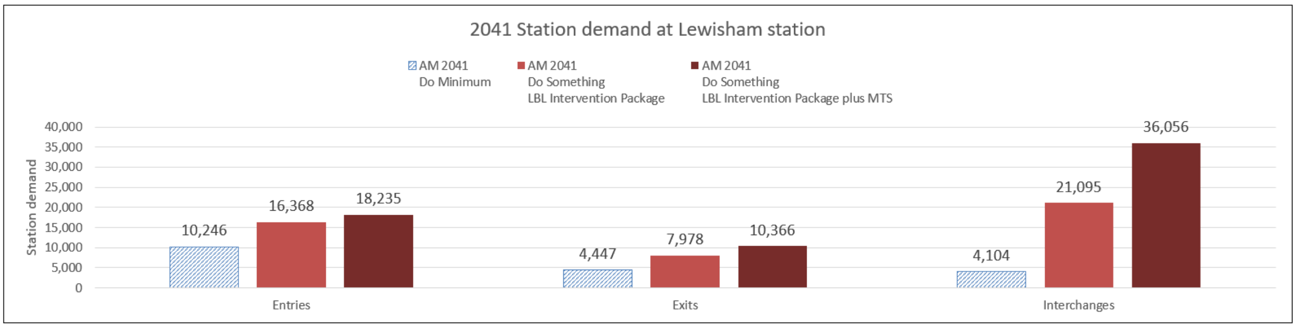

Figure 16: Lewisham Station Demand in 2041 Do Something LBL Intervention Test with and without MTS

8.3. Elham Highway Transport Model

8.3.1. As a result of the MTS proposals within DS MTS overall the vehicular demand across the whole borough decreases significantly, with the majority of roads within the borough experiencing decreases in highway demand. This in turn reduces the highway delays experienced on the highway network which reduce across the borough in DS MTS compared to DS specifically around the key gyratory's of New Cross and Catford, A205 in Lee, A2 and B218.

8.3.2. Journey times on the selected routes in the borough significantly reduce in DS MTS with reductions in journey times ranging from -17% to -54% compared to the DS.

The assessment highlights that the MTS proposals have a significant impact on reducing traffic volumes in the London Borough of Lewisham which is quite a step change compared to the impacts that the Lewisham Intervention package has.

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Appendix A - Technical Note – Lewisham Railplan Local Plan Base Year Model Audit for Lewisham Local Plan Transport Assessment

Date: 9 January 2019

1. Introduction

In August 2018, WSP was appointed by the London Borough of Lewisham (LBL) to provide transport modelling services to support LBL with the preparation of their Local Plan and Local Implementation Plan (LIP). Strategic transport modelling is required to help provide the evidence base for assessing the impacts and the improvements required to support the proposed growth within the Borough.

The purpose of this report is to (a) document the audit of TfL's strategic public transport model in LBL, (b) to identify any areas of weakness, and if required to (c) propose actions to be taken up to the base year model update.

The latest version of Transport for London's (TfL's) Railplan 7.0 (EMME) Model has been used (WE001A08A) as provided by TfL. The base model audit will focus on public transport services and demand within the LBL, including buses, Docklands Light Railway, the Overground and Network Rail.

For context Figure 1 presents the LBL and highlights the network rail and DLR stations within the borough.

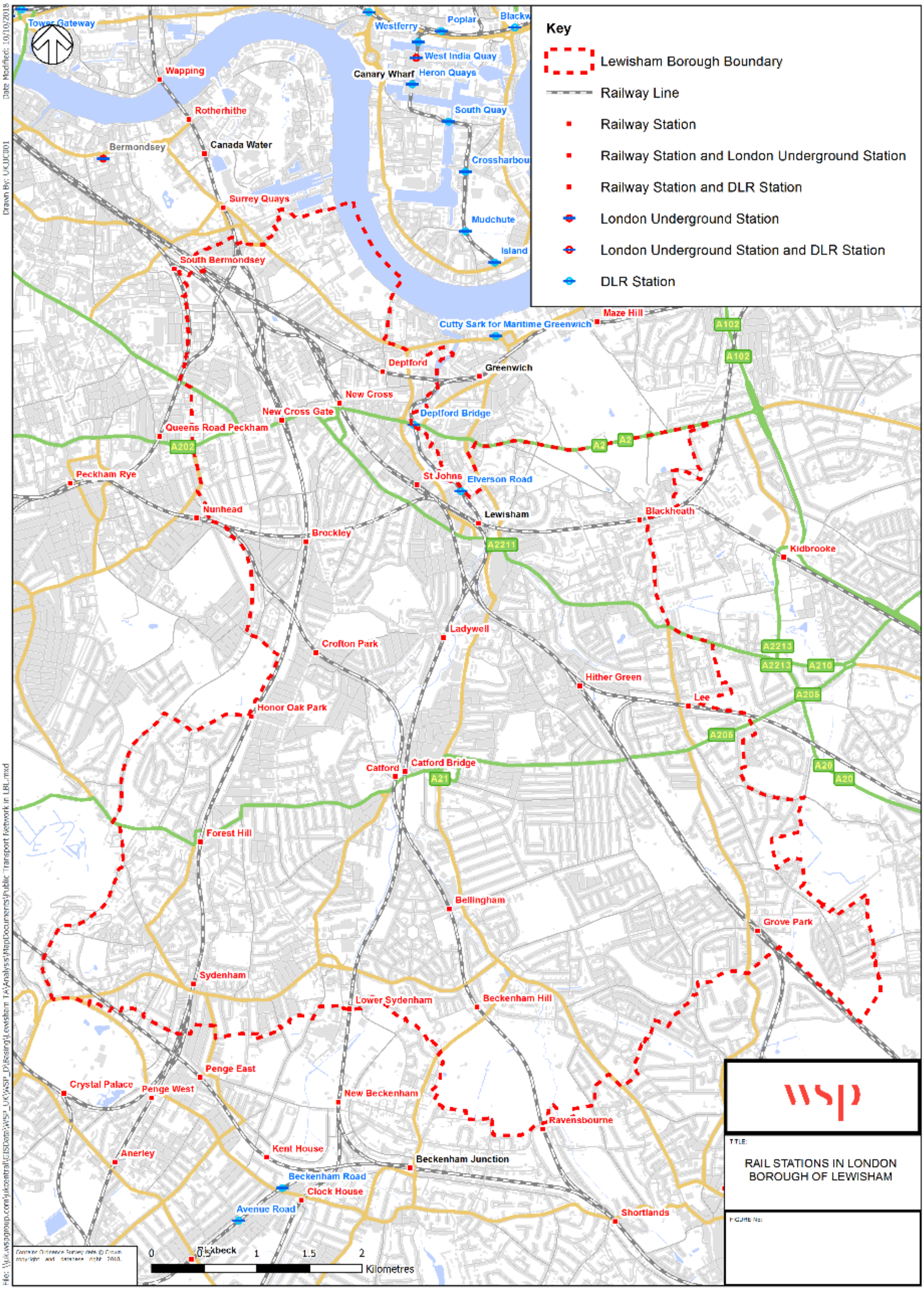


Figure 1: Location of Rail Stations in London Borough of Lewisham

2. Methodology

Audit Criteria

DfT WebTAG guidance, states that the validation of a public transport passenger assignment model should involve three kinds of checks.

- *Validation of the trip matrix;*
- *Network and service validation; and*
- *Assignment validation*

The guidance also states that the 'validation of the trip matrix should involve comparisons of assigned and counted passengers across complete screenlines and cordons (as opposed to individual services)' and 'validation of the assignment should involve comparing modelled and observed:

- *Passenger flows screenlines and cordons, usually by public transport mode and sometimes at the level of individual bus or train services; and*
- *passengers boarding and alighting in urban centres.*

The DfT's suggested guidelines are that:

- *Across complete screenlines i.e. as part of the trip matrix validation 'the differences between assigned and counted flows should, in 95% of the cases, be less than 15%.*
- *On individual links in the network (and it is assumed at individual stops) i.e. as part of the assignment validation 'modelled flows should be within 25% of the counts, except where observed hourly flows are particularly low (less than 150 passengers per hour).*

Scope of Audit

TfL recommended that Railplan 7.0 (in EMME) was used for the strategic transport study of London Borough of Lewisham. This audit report therefore documents a technical review of the Railplan 7.0 model, and assesses whether the model is fit for purpose. Throughout the report the Railplan 7.0 model is referred to as "Railplan" or "the model".

The model scenario audited in this report is the Railplan 2011 AM Base (WE001A08A). The network structure and coding was reviewed in the model at the borough level.

Assessment Scope

The Railplan base model audit and validation check covers the following key aspects:

- *Validation of public transport (and rail only) passenger flows across the TfL Inner Area Screenline against RODS data – this forms part of the trip matrix validation required by DfT;*
- *Review of local network and validation of service frequencies of public transport services through the study area - this forms part of the network and service validation required by DfT.*
- *Comparisons of station demands for the busiest stations against statistics from Office of Rail and Road (ORR) for 2011-2012 - this goes beyond the required assignment validation required by DfT but is useful in a local context;*
- *Validation of link flows along Overground and DLR lines against RODS data - this forms part of both trip matrix and assignment validation required by DfT;*
- *Validation of bus link flows and boardings and alightings at bus nodes along proposed bus corridors against BODS data - this forms part of both trip matrix and assignment validation required by DfT;*

Data / Information Sources used for Validation

We have validated modelled passenger demand flows against the following data sets;

- ***LUL's Rolling Origin Destination Survey (RODS)****: RODS records a sample of passenger origins, trip routings and destinations across the LUL network, and then reconciles these to total passenger gate counts at stations and to oyster data in order to give total link flows, boardings and alightings across the LUL network. The data is reconciled to November counts and is adjusted to remove the effect of abnormal circumstances such as line closures and strikes.*
  WSP have used 2011 RODS data to validate DLR and Overground link flows.

- ***Transport for London's Bus Origin and Destination Survey (BODS)****: These surveys are conducted periodically to generate detailed data on demand for each bus route. The surveys question bus passengers on a route to find out where they are travelling to and from in order to generate an understanding of average distance travelled by passengers on that route. The surveys also include bus loading surveys where people stand at busy points on the bus network and manually count the number of passengers on particular routes at different times of day.*

  WSP have used 2011 BODS data to validate bus link flows, boardings and alightings.
- ***Transport for London's Central London Rail Termini, Analysing passengers' onward travel patterns report (September 2011)****: We have used this to validate passenger demand to/from London Bridge, St Pancras and Victoria via National Rail services.*

WSP have validated service frequencies on public transport services relevant to the development site against the following sources:

- ***National Rail Timetable (May 2011)****: We have used this to validate National Rail service frequencies that pass through the study area*
- ***https://www.tfl.gov.uk/****: We have used this to validate bus service frequencies and routings, as well as DLR service frequencies. The website provides present day bus service timetables and therefore does not correspond with Railplan bus service assumptions which are based on 2011. However, we will confirm with TfL Buses that the relevant local bus services have not changed since 2011.*

WSP have not validated LUL service frequencies as we understand that there are no LUL services within the study area.

3. Global Validation Checks

The *Railplan 7.0 Public Transport Validation Report (September 2015)* documents TfL's assignment validation of the Railplan model at various strategic cordons and screenlines. The cordons used by TfL are shown in Figure 2. The screenline which is most important for LBL is the Inner Cordon South East, which runs through the borough.

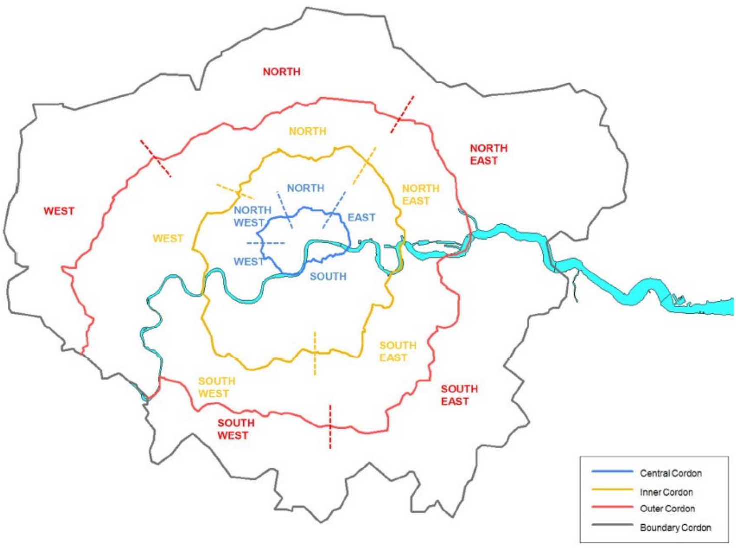


Figure 2: Railplan Validation Cordons (source: TfL's Railplan 7.0 Public Transport Validation Report, September 2015)

TfL compared cordon and screenline model flows against various observed data sources from 2011 including Rail Origin Destination Survey (RODS), DLR, Bus Origin Destination Survey (BODS) and Central Area Peak Count (CAPC). TfL's validation checks considered cordons and screenlines, link flows, bus boarders & alighters by borough and London rail termini flows.

This section considers the global validity of the Railplan model, as reported by TfL, in the London Borough of Lewisham. More specifically, this section discusses validation of the following:

- *Cordon: Inner (South East sector)*
- *Screenline: Eastern*
- *Link flow validation by mode: DLR and Overground East London Line*
- *Bus boarding & alighting in London Borough of Lewisham*
- *London Rail termini: London Bridge, London St Pancras International and London Victoria*

Cordons

Table 1 summarises the modelled and observed flows for the whole cordon as well as for just the South East sector, which cuts through London Borough of Lewisham.

Overall the inbound and outbound modelled flows across the Inner Cordon match well with observed data.

Table 1: Inner Cordon Public Transport Flow Validation

Cordon	Sector	Direction	Observed	Modelled	Difference	% Difference	Within +/- 15%
Inner	Total	Inbound	406,097	421,503	15,405	4%	Yes
Inner	Total	Outbound	182,629	189,923	7,294	4%	Yes
Inner	South East	Inbound	17,943	17,918	-25	0%	Yes
Inner	South East	Outbound	25,234	23,774	-1,460	-6%	Yes

Source: Table 6.1 and Table 6.2 of TfL's Railplan 7.0 Validation Report (September 2015)

The Inner Cordon is shown to reflect observed PT total flows. The total for the Inner Cordon validates well at 4% for the inbound and outbound. The South East sector inbound flows match very accurately with only 25 trips difference however the outbound modelled flows are slightly under-represented by 6% when compared to the observed flows. WebTAG guidance recommends that across complete screenlines and cordons passenger flows should match observed flows within +/- 15% for 95% of cases (i.e. not individual services), and therefore this shows an accurate representation of public transport flows at this level of detail.

Overall, the flow differences seen across the Inner cordon and South East are well within WebTAG's guidelines at a cordon and sector level.

Screenlines

The validation screenlines reported by TfL in the Railplan validation report are shown in Figure 3. This figure is reproduced from TfL's validation report. The most relevant strategic screenline for the London Borough of Lewisham area is the Eastern screenline (dark green).

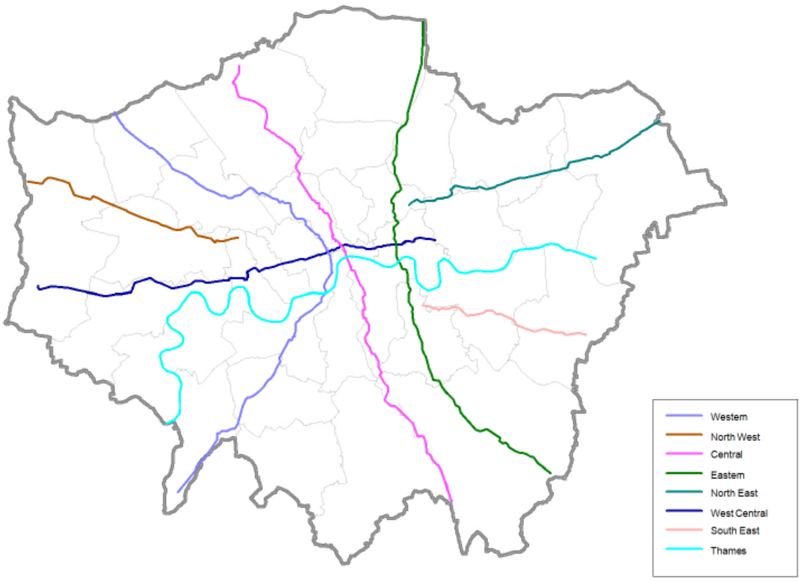


Figure 3: Railplan Validation Screenlines (source: TfL's Railplan 7.0 Public Transport Validation Report, September 2015)

Table 2 summarises the validation of the Eastern screenline by direction. It shows a good overall match with observed flows for the LUL and BUS services but over-estimated DLR flows by 16% eastbound and 23% westbound. Information for the National Rail (NR) is not available for validation. Totals (excluding NR) show a good match with observed flows for both directions, with comparisons in both directions well within 15%.

Table 2: Railplan Eastern Screenline Validation

Screenline	Direction	Mode	Observed	Modelled	Difference	% Difference	Within +/- 15%
Eastern	Eastbound	NR	Not applicable	42,910	Not applicable	Not applicable	Not applicable
Eastern	Eastbound	LUL	60,135	66,135	6,000	10%	Yes
Eastern	Eastbound	DLR	12,060	13,966	1,906	16%	No
Eastern	Eastbound	BUS	31,780	29,343	-2,437	-8%	Yes
Eastern	Eastbound	Total (exclude NR)	103,975	109,444	5,469	5%	Yes
Eastern	Westbound	NR	Not applicable	42,910	Not applicable	Not applicable	Not applicable
Eastern	Westbound	LUL	114,478	118,437	950	1%	Yes
Eastern	Westbound	DLR	12,414	15,213	2,800	23%	No
Eastern	Westbound	BUS	38,394	38,746	352	1%	Yes
Eastern	Westbound	Total (exclude NR)	168,295	172,397	4,102	2%	Yes

Source: Table 6.5b of TfL's Railplan 7.0 Validation Report (September 2015)

4. Link Flows

Given the availability of observed data, flow validation along public transport lines can only be undertaken on Overground and DLR lines. Figure 4 shows the services within the study area (shaded areas). In addition, sections of Bakerloo and Jubilee Lines in the proximity of the study area are considered as they provide certain level of relevance to Lewisham. These include Bakerloo Line to/from Elephant & Castle (potential extension to Lewisham in the BLE scheme) and Jubilee Line passing through Canada Water which is an interchange with Overground Line which leads to the study area. Figure 5 shows the routes and stations of these LUL services

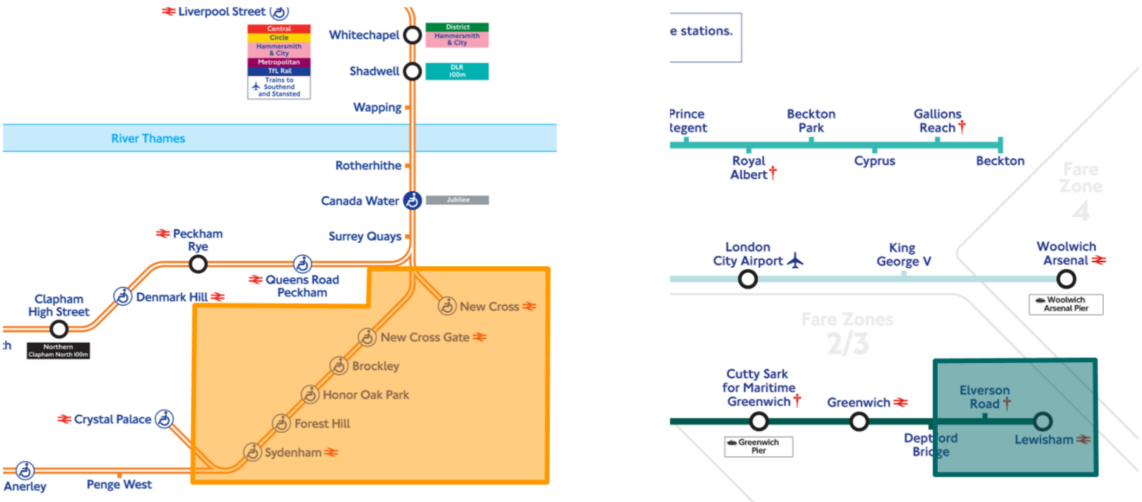


Figure 4: East London Line (left) and DLR (right) Route and Stations

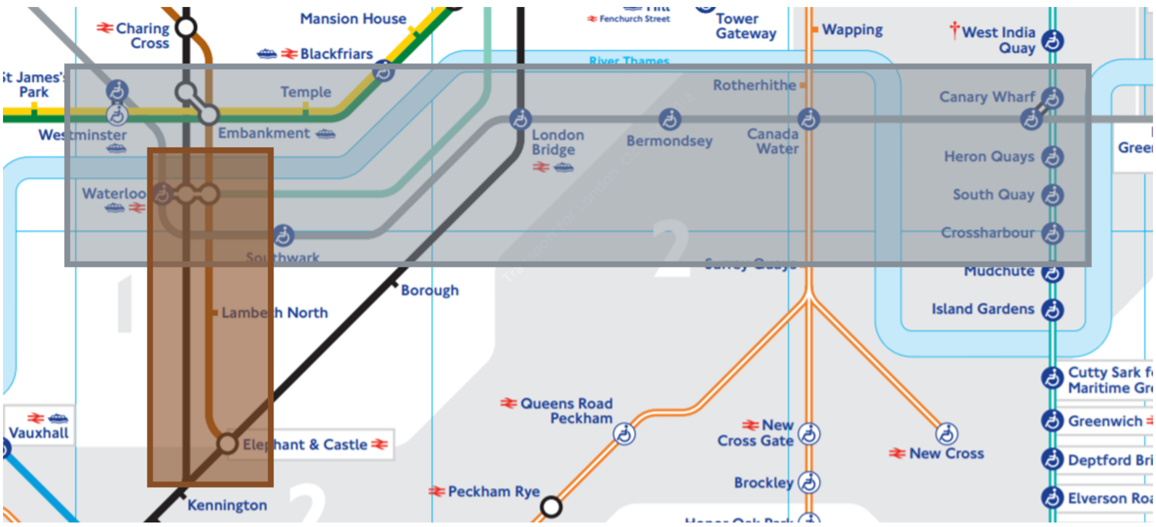


Figure 5: Bakerloo and Jubilee Line Route and Stations

Table 3 shows the link flow summary along services within the LBL, DLR and Overground (on East London Line) services ad those outside of LBL, Jubilee and Bakerloo lines between the observed and modelled data.

Table 3: DLR, NR and LUL Line Flow Validation

From	To	Direction	Mode	Line(s)	Observed Demand	Modelled Demand	Meets Criteria?	Modelled / Observed	Modelled - Observed
Lewisham	Elverson Road	NB	DLR	DLR	6,522	6,199	Yes	-5%	-323
Elverson Road	Deptford Bridge	NB	DLR	DLR	6,983	6,225	Yes	-11%	-758
Deptford Bridge	Elverson Road	SB	DLR	DLR	2,150	1,917	Yes	-11%	-233
Elverson Road	Lewisham	SB	DLR	DLR	2,238	1,891	Yes	-16%	-347
Not applicable	Not applicable	Not applicable	Not applicable	**DLR Sub-total**	**17,893**	**16,232**	Yes	**-9%**	**-1,661**
Crystal Palace	Sydenham	NB	NR	Overground	936	459	No	-51%	-477
Penge West	Sydenham	NB	NR	Overground	1,874	1,536	Yes	-18%	-338
Sydenham	Forest Hill	NB	NR	Overground	3,623	3,256	Yes	-10%	-367
Forest Hill	Honor Oak Park	NB	NR	Overground	5,152	5,019	Yes	-3%	-133
Honor Oak Park	Brockley	NB	NR	Overground	6,323	5,311	Yes	-16%	-1,012
Brockley	New Cross Gate	NB	NR	Overground	7,916	6,198	Yes	-22%	-1,718
New Cross Gate	Surrey Quays	NB	NR	Overground	8,009	6,539	Yes	-18%	-1,470

From	To	Direction	Mode	Line(s)	Observed Demand	Modelled Demand	Meets Criteria?	Modelled / Observed	Modelled - Observed
New Cross	Surrey Quays	NB	NR	Overground	1,477	95	No	-94%	-1,382
Surrey Quays	New Cross	SB	NR	Overground	485	151	No	-69%	-334
Surrey Quays	New Cross Gate	SB	NR	Overground	1,429	1,791	No	25%	362
New Cross Gate	Brockley	SB	NR	Overground	602	1,664	No	176%	1,062
Brockley	Honor Oak Park	SB	NR	Overground	711	1,791	No	152%	1,080
Honor Oak Park	Forest Hill	SB	NR	Overground	864	1,830	No	112%	966
Forest Hill	Sydenham	SB	NR	Overground	1,031	1,733	No	68%	702
Sydenham	Crystal Palace	SB	NR	Overground	834	875	Yes	5%	41
Sydenham	Penge West	SB	NR	Overground	337	182	No	-46%	-155
Not applicable	Not applicable	Not applicable	Not applicable	**NR Sub-total**	**41,603**	**38,430**	Yes	**-8%**	**-3,173**
Elephant & Castle	Lambeth North	NB	LUL	Bakerloo	4,845	4,691	Yes	-3%	-154
Lambeth North	Waterloo	NB	LUL	Bakerloo	5,627	5,220	Yes	-7%	-407
Waterloo	Lambeth North	SB	LUL	Bakerloo	4,145	4,683	Yes	13%	538

From	To	Direction	Mode	Line(s)	Observed Demand	Modelled Demand	Meets Criteria?	Modelled / Observed	Modelled - Observed
Lambeth North	Elephant & Castle	SB	LUL	Bakerloo	3,150	3,828	Yes	22%	678
Waterloo	Southwark	EB	LUL	Jubilee	43,787	48,642	Yes	11%	4855
Southwark	London Bridge	EB	LUL	Jubilee	41,374	46,033	Yes	11%	4659
London Bridge	Bermondsey	EB	LUL	Jubilee	42,404	42,432	Yes	0%	28
Bermondsey	Canada Water	EB	LUL	Jubilee	42,571	41,897	Yes	-2%	-674
Canada Water	Canary Wharf	EB	LUL	Jubilee	44,277	43,834	Yes	-1%	-443
Canary Wharf	Canada Water	WB	LUL	Jubilee	27,157	27,418	Yes	1%	261
Canada Water	Bermondsey	WB	LUL	Jubilee	35,189	32,679	Yes	-7%	-2510
Bermondsey	London Bridge	WB	LUL	Jubilee	36,595	34,994	Yes	-4%	-1601
London Bridge	Southwark	WB	LUL	Jubilee	42,026	43,749	Yes	4%	1723
Southwark	Waterloo	WB	LUL	Jubilee	39,975	41,878	Yes	5%	1903
Not applicable	Not applicable	Not applicable	Not applicable	**LUL Sub-total**	**413,122**	**421,978**	Yes	**2%**	**8,856**
Not applicable	Not applicable	Not applicable	Not applicable	**Total**	**472,618**	**476,640**	Yes	**1%**	**4,022**

As observed from Table 3, the DLR line flow validates well in both directions between both Lewisham, Elverson Road and Deptford Bridge. Whereas the Overground validates well in the NB direction (into London), apart from between Crystal Palace and Sydenham which is on the edge of the LBL. The NB direction is the main flow of movements during the AM peak. The Overground link flows do not validate well in the SB (out of London) direction, with 5 link flows over estimating compared to counts and 3 under estimating. Additionally, links from/to Surrey Quays, Crystal Palace and Penge West do not validate well, yet it is important to note that these stations are outside of LBL.

The Bakerloo and Jubilee line flow validates well in both direction, into and out of London. The largest percentage difference (22%) is along the Bakerloo Southbound section between Lambeth North and Elephant & Castle yet this still satisfies DfT criteria of 25% difference between observed and modelled values.

Bus Boarding and Alighting by Borough

Total bus boarding and alighting within the London Borough of Lewisham is shown in Table 4. The table shows that validation has been achieved within the DfT'S WebTAG criteria.

The 6-7% over-representation of bus boarding & alighting may be caused by too many short-local trips being assigned to walk mode, rather than bus mode.

Table 4: Bus Boarders and Alighters for London Borough of Lewisham

Borough	Boarding / Alighting	Observed	Modelled	Difference	% Difference	Within +/- 25%
Lewisham	Boarding	47,000	50,000	3,000	6%	Yes
Lewisham	Alighting	42,000	45,000	3,000	7%	Yes

Source: Table 6.7 of TfL's Railplan 7.0 Validation Report (September 2015)
Criteria: As stated in TfL's Railplan 7.0 Public Transport Validation Report (September 2015), modelled boarding and alighting differences should be within ±25% at borough level.

More detailed checks of bus line flows, boarding and alighting are provided later in this note.

London Rail Termini

The CAPC 2011 survey provides observations of National Rail services inbound and outbound from Central London during morning and evening peaks.

Table 5 shows the modelled and observed passenger flows in the AM peak associated with London Bridge (Southeastern, Southern and Thameslink), London St Pancras (Thameslink) and Victoria (Southeastern).

Table 5: Network Rail Line Flows

Terminus (TOC)	Direction	Observed	Modelled	Difference	% Difference	Within +/- 25%
London Bridge (southeastern)	Inbound	95,569	88,553	-7,016	-7%	Yes
London Bridge (Southeastern)	Outbound	6,986	7,344	358	5%	Yes
London Bridge (southern)	Inbound	44,026	32,630	-11,396	-26%	No
London Bridge (Southern)	Outbound	3,647	3,660	13	0%	Yes
London St Pancras (Thameslink)	Inbound	16,795	24,508	7,713	26%	No
London St Pancras (Thameslink)	Outbound	2,712	4,887	2,175	80%	No
London Victoria (Southeastern)	Inbound	18,361	25,051	6,690	36%	No
London Victoria (Southeastern)	Outbound	1,759	2,948	1,189	68%	No

Source: Table 6.8 of TfL's Railplan 7.0 Validation Report (September 2015)

Criteria: As stated in TfL's Railplan 7.0 Public Transport Validation Report (September 2015), modelled boarding and alighting differences should be within ±25% at rail line level.

Network Rail passenger flows (inbound/outbound) from London Bridge on Southeastern service, as well as the outbound from London Bridge using the Southern and Thameslink service are all well represented. Whereas the Southern inbound service is under-represented by 26% and the Thameslink service inbound is over-represented by 88%, hence not matching the DfT +/- 25% acceptability threshold.

Services to/from London St Pancras and London Victoria do not validate well, however these services are distant the study area and should not affect the local analysis.

It is worth highlighting that in the validation of Southern flows into/out of London Bridge, which is -26% and 0% for Inbound and Outbound direction respectively, demand contains services from both branches, via Peckham Rye and via Sydenham. In fact, only the Sydenham branch passes through the study area, thus it is necessary to only validate the demand related to the Sydenham branch. Table 6 illustrates the validation of flows on Southern Services (via Sydenham) which terminates at London Bridge.

Table 6: Network Rail Line Flows - Southern Service (via Sydenham)

Terminus (TOC)	Direction	Observed	Modelled	Difference	% Difference	Within +/- 25%
London Bridge (Southern)	Inbound	34,423	27,299	-7,124	-21%	Yes
London Bridge (Southern)	Outbound	2,351	2,439	88	4%	Yes

Table 6 above shows the Southern service flow to/from London Bridge (via Sydenham) validates well. The model still under-represents flows into London Bridge in the Inbound direction, yet the percentage difference (-21%) satisfies the DfT +/- 25% acceptability threshold.

5. Service Validation

Rail Services and Frequencies

As shown in Table 7, we have checked rail service frequencies (train per hour) in the AM peak on key rail routes, including:

- *DLR services including Bank – Lewisham and Stratford – Lewisham*
- *Overground services including Highbury & Islington – West Croydon and Dalston Junction – New Cross*
- *Southern services to/from London Bridge*
- *Southeastern services to/from Victoria, Cannon Street and Charing Cross*
- *Thameslink services to/from Bedford*

Table 7: Comparison of rail service frequencies between NR timetable (2011) and Railplan

Mode	Operator	Services	From London Timetable	From London Model	To London Timetable	To London Model
DLR	DLR	Bank – Lewisham	15	15	15	15
DLR	DLR	Stratford – Lewisham	5	5	5	5
NR	Overground	Highbury & Islington – West Croydon	8	8	7	8
NR	Overground	Dalston Junction – New Cross	4	4	4	4

Mode	Operator	Services	From London Timetable	From London Model	To London Timetable	To London Model
NR	Southern	To / From London Bridge	18	19	22	22
NR	Southeastern	To / From Cannon Street	15	15	20	19
NR	Southeastern	To / From Charing Cross	17	16	23	22
NR	Southeastern	To / From Victoria	11	11	14	14
NR	Thameslink	To / From Bedford	11	12	12	11

The comparison of DLR and National Rail service frequencies shows that modelled frequencies are either exactly consistent with, or differ only slightly to, timetabled frequencies. No changes are required to rail service coding.

Bus Services and Frequencies

There are 24 bus services which travel within London Borough of Lewisham. Figure 6 illustrates the routes for all these services and Table 8 illustrates the headway validation between the model and data from TfL website (date of access: 25/09/2018).

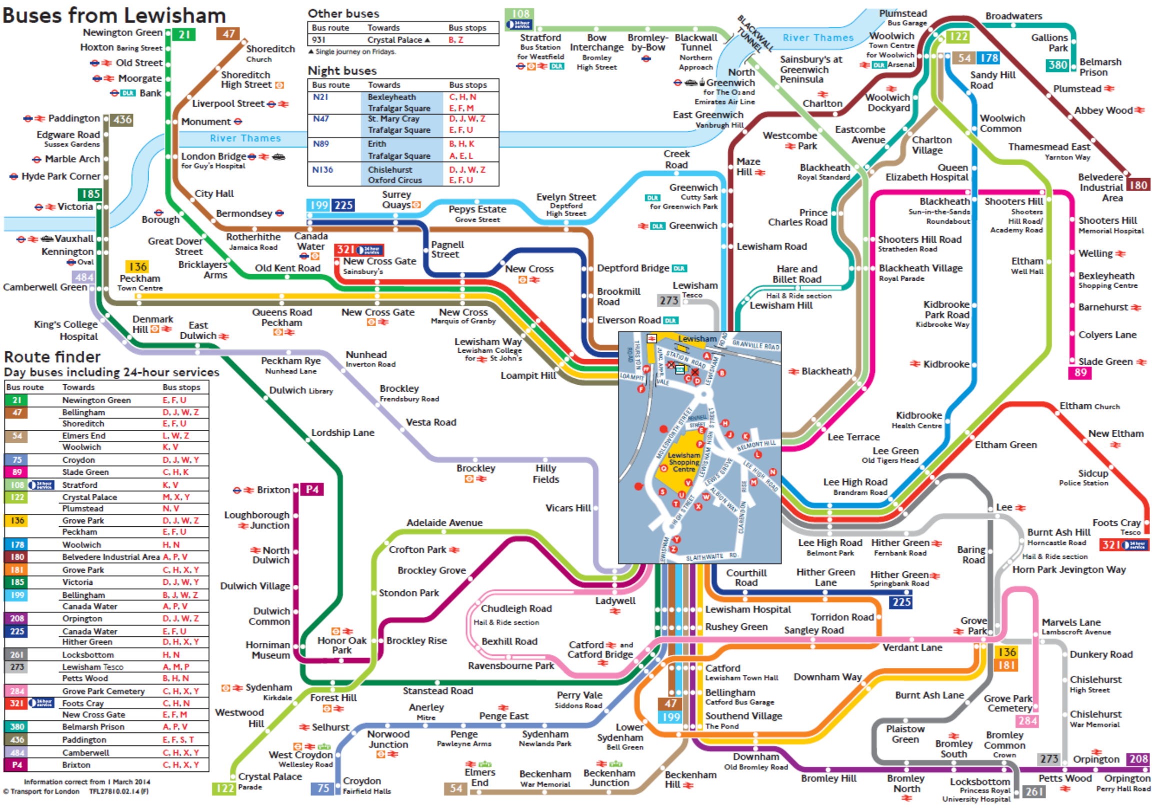


Figure 6: Bus Services/Routes through LBL

Bus service frequencies, as coded in Railplan, were compared against current-day actual service timetables downloaded from TfL in September 2018. Bus route frequencies from 2011 were not available, so in absence of that data, the 2018 frequencies were used.

As it can be seen in Table 8 most services validate well, except services 225 (both directions), where the Railplan headway is 15 minutes and is lower than the TfL suggestive headway of 18-20 minutes. Equally, bus service 380 (Westbound to Molesworth Street) and 436 (both directions) do not validate well both services showing a difference of 4 minutes between Railplan headways and TfL's upper limit headways.

Overall, bus services within the area validate well and no remedial action is proposed.

Table 8: Comparison of bus service frequencies between TfL website and Railplan

Bus Service	Railplan Ref	Destination	Timetable update	TFL Headway (min) Lower Limit	TFL Headway (min) Upper Limit	Railplan Headway (min)	Within TfL's Range?
21	0021ia	Molesworth Street	25/09/2018	5	8	7	Yes
21	0021ia	Newington Green	25/09/2018	6	10	7	Yes
47	0047ia	Catford Garage	25/09/2018	9	13	10	Yes
47	0047ia	Shoreditch	25/09/2018	9	13	10	Yes
54	0054ia	Elmers End	25/09/2018	8	12	12	Yes
54	0054ia	Plumstead Road	25/09/2018	8	12	12	Yes
75	0075ia	Fairfield Halls	25/09/2018	10	14	13	Yes
75	0075ia	Lewisham Station	25/09/2018	10	14	13	Yes
89	0089ia	Slade Green Station	25/09/2018	10	14	10	Yes
89	0089ia	Lewisham Station	25/09/2018	9	10	10	Yes
108	0108ia	Stratford International Station	25/09/2018	7	11	10	Yes
108	0108ia	Lewisham Station	25/09/2018	9	12	10	Yes
122	0122ia	Crystal Palace Parade	25/09/2018	10	13	12	Yes
122	0122ia	Plumstead Road	25/09/2018	10	13	12	Yes
136	0136ia	Elephant & Castle / Newington Causeway	25/09/2018	8	12	10	Yes
136	0136ia	Grove Park Bus Station	25/09/2018	9	13	10	Yes
178	0178ia	Lewisham Station	25/09/2018	12	15	15	Yes
178	0178ia	Thomas Street	25/09/2018	14	15	15	Yes

Bus Service	Railplan Ref	Destination	Timetable update	TFL Headway (min) Lower Limit	TFL Headway (min) Upper Limit	Railplan Headway (min)	Within TfL's Range?
180	0180ia	Molesworth Street	25/09/2018	8	12	12	Yes
180	0180ia	Crabtree Manorway North	25/09/2018	9	12	12	Yes
181	0181ia	Grove Park Bus Station	25/09/2018	11	14	12	Yes
181	0181ia	Lewisham Station	25/09/2018	11	14	12	Yes
185	0185ia	Victoria Station	25/09/2018	7	10	10	Yes
185	0185ia	Lewisham Station	25/09/2018	7	10	10	Yes
199	0199ia	Catford Garage	25/09/2018	11	14	12	Yes
199	0199ia	Canada Water Bus Station	25/09/2018	10	13	12	Yes
208	0208ia	Orpington / Perry Hall Road	25/09/2018	10	12	12	Yes
208	0208ia	Lewisham Station	25/09/2018	10	14	12	Yes
225	0225ia	Canada Water Bus Station	25/09/2018	18	20	15	No
225	0225ia	Hither Green Station	25/09/2018	19	20	15	No
261	0261ia	Princess Royal University Hospital	25/09/2018	12	14	12	Yes
261	0261ia	Lewisham Station	25/09/2018	12	14	12	Yes
273	0273ia	Petts Wood Station	25/09/2018	19	21	20	Yes
273	0273ia	Conington Road	25/09/2018	18	21	20	Yes
284	0284ia	Grove Park Cemetery	25/09/2018	10	14	10	Yes
284	0284ia	Lewisham Station	25/09/2018	10	14	10	Yes
321	0321ia	New Cross Sainsbury's	25/09/2018	7	11	8	Yes
321	0321ia	Foots Cray Tesco	25/09/2018	8	11	8	Yes

Bus Service	Railplan Ref	Destination	Timetable update	TFL Headway (min) Lower Limit	TFL Headway (min) Upper Limit	Railplan Headway (min)	Within TfL's Range?
380	0380ia	Molesworth Street	25/09/2018	11	14	10	No
380	0380ia	Belmarsh Prison	25/09/2018	10	13	10	Yes
436	0436ia	Battersea Park Station	25/09/2018	6	10	6	No
436	0436ia	Molesworth Street	25/09/2018	7	10	6	No
484	0484ia	Camberwell Green / Denmark Hill	25/09/2018	10	12	10	Yes
484	0484ia	Lewisham Station	25/09/2018	10	12	10	Yes
P4	00P4ia	Brixton Station	25/09/2018	10	13	12	Yes
P4	00P4ia	Lewisham Station	25/09/2018	10	14	12	Yes

6. Flow Validation

Station Demand Validation

Due to the unavailability of observed station demand, WSP proposed to compare the ranking of the stations in terms of total demand. Office of Rail and Road (ORR)'s 2011-12 Estimates of station usage is adopted to extract observed data, Table 9 identifies the top 10 stations in London Borough of Lewisham. In order to make an overall comparison, Railplan 3-hour demand for these 10 stations have been extracted and ranked to compare the magnitude with the ORR yearly demand.

Table 9: Comparison of Total Station Demand between ORR Statistics and Railplan

Station	ORR Station Total	ORR Station Rank	Railplan Station Total	Railplan Station Rank
Lewisham	7,387,422	1	12,025	1
Forest Hill	4,183,512	2	6,042	2
New Cross Gate	4,009,208	3	4,150	5
Brockley	3,292,456	4	3,254	6
Sydenham	2,932,596	5	5,182	3
Blackheath	2,878,152	6	2,326	8
Hither Green	2,807,478	7	2,765	7
New Cross	2,345,254	8	2,093	9
Honor Oak Park	2,217,324	9	1,130	10
Grove Park	1,932,662	10	4,736	4

As seen in Table 9, the two busiest stations, Lewisham and Forest Hill match in order of magnitude in both data sources. All the other stations also have a minimum fluctuation in terms of magnitude apart from Grove Park which was ranked 4th on Railplan output but it is shown to have the least yearly total demand of the 10 stations obtained on the ORR data source. This is something we will be mindful of in the future that demand at Grove Park within Railplan may be overestimated.

Bus Demand Validation

TfL required bus passenger flows along key corridors to be included within the validation checks. In order to identify the major corridor, a Railplan network of the TfL reference base (WE001A08A) was utilised to display all bus transits in the study area. One observation is that the majority of bus services pass through Lewisham, Catford and Catford Bridge NR stations.

The proposed bus corridors are decided where there are the highest number of services traversing along. They are;

- East-West corridor; Queen's Road – New Cross Road – Lewisham Way – Lee High Road
- North-South corridor; Greenwich South Street – Lewisham Road – Lewisham High Street – Bromley Road

The bus network in Railplan which shows the density of modelled bus services, together with WSP's proposed bus corridors for the validation exercise are shown in Figure 7.

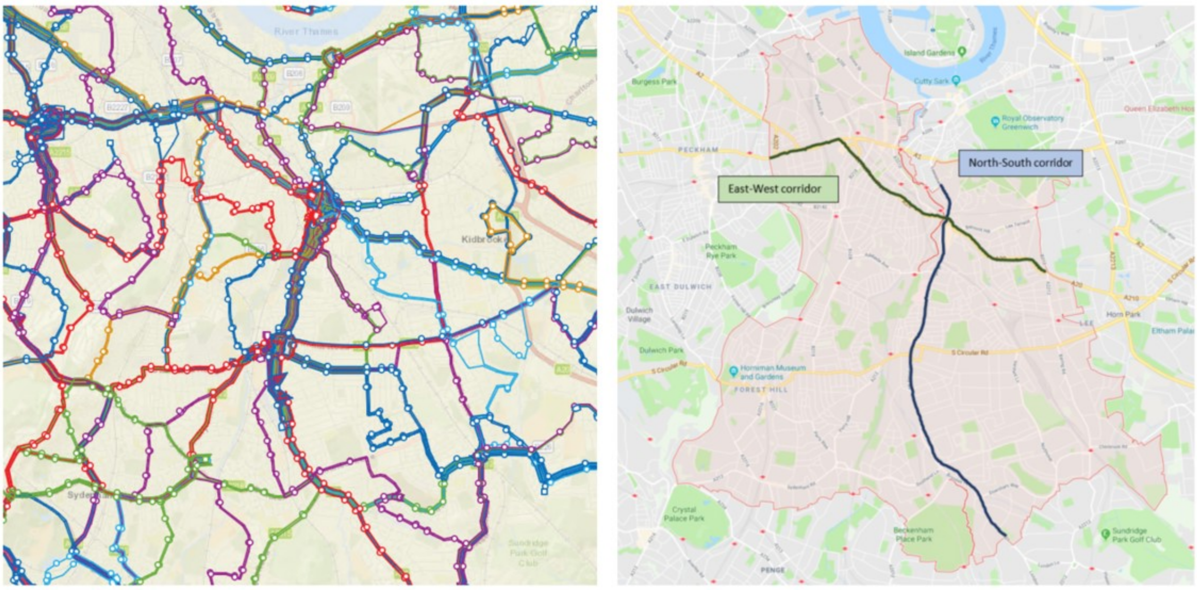


Figure 7: Railplan Bus Transit Lines (left) and Proposed Bus Corridors (right) in London Borough of Lewisham

Bus Flows along Corridors

Link flows on the North-South and East-West bus corridors were compared against observed data (2011 BODS). Table 10 shows the comparison of modelled and observed total bus passenger flows along the two corridors.

Table 10: Bus Corridor Passenger Flow Validation

Bus Corridor	Direction	Observed Flows	Modelled Flows	Difference	% Difference
North-South	NB	45,842	54,005	8,163	18%
North-South	SB	35,733	37,549	1,816	5%
East-West	EB	41,970	57,426	15,456	37%
East-West	WB	51,541	63,907	12,366	24%

As observed in Table 10 the observed and modelled bus total flows show better representation for the North-South bus corridor where the Northbound (into London) showed a 18% difference and the Southbound (out of London) showed a 5% difference. The East-West bus corridor shows a higher percentage difference, eastbound at 37% and Westbound at 24%. In all directions the modelled flows are higher than observed flows which will be taken into consideration as this project progresses.

The plots in Figure 8 show the comparison of bus passenger flows (modelled vs. observed) along each corridor by direction.

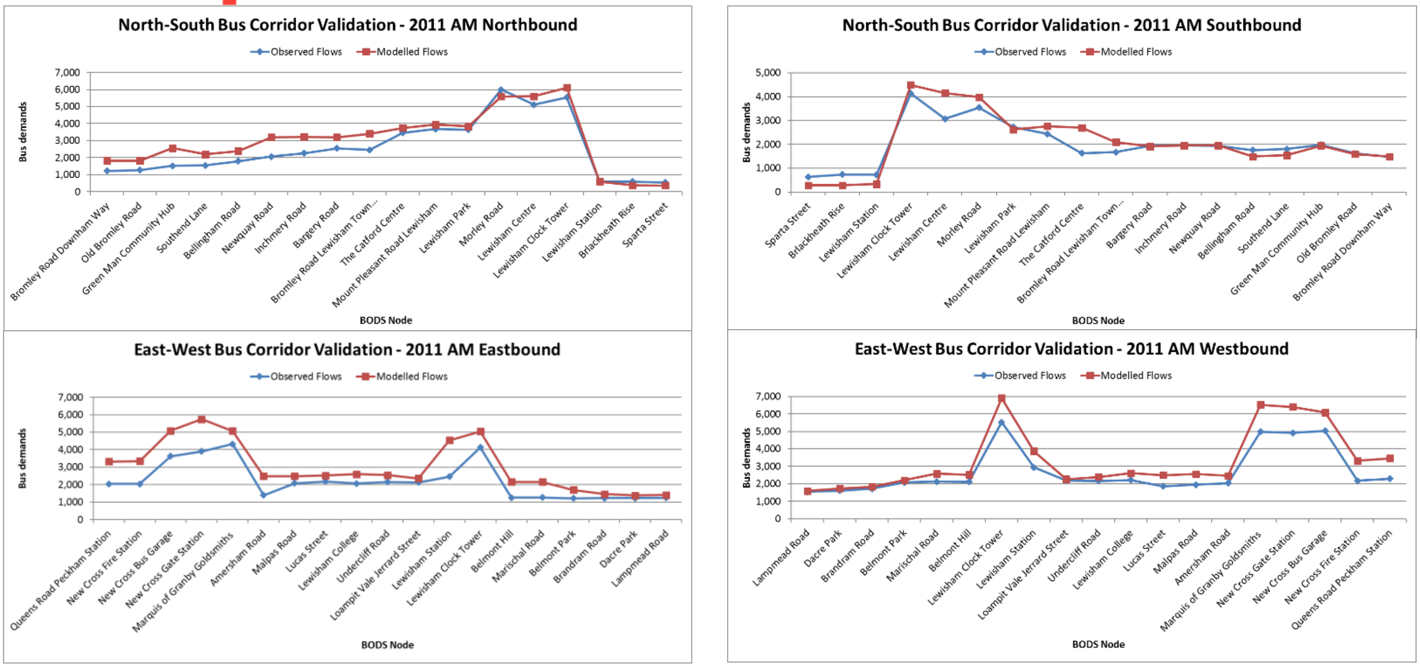


Figure 8: Flow Profiles along North-South (top) and East-West (bottom) Bus Corridors

As observed above the flow profile for both bus corridors show similar behaviour with the modelled flows being consistently higher than the observed flows. The three most noticeable divergences where the model is over-estimating the demand by approximately 1,000 passengers can be seen at;

- Lewisham Centre on the North-South corridor NB.
- Between Marquis of Granby Goldsmith and New Cross bus garage on the East-West corridor WB.
- Between New Cross Bus Garage and Marquis of Granby Goldsmith on the East-West corridor EB.

Overall, both corridors have shown a very similar total flow demand and pattern between the modelled and observed data is very similar which provides confidence that the model is replicating movements accurately.

Boarding and Alightings at Bus Nodes

Analysis has been undertaken of the validation of boardings and alightings at bus nodes (bus stops). In some places where there is no major transport hub (e.g. in the vicinity of railway stations), modelled passenger demand can be low during the peak period. An effect of this is that the percentage differences (derived from the validation), even on relatively small absolute differences, can be large. Although there is no specific guidance on which boarding/alighting values to exclude, the DfT does set a minimum value for individual links, as reproduced below:

> *"modelled flows should be within 25% of the counts, except where observed hourly flows are particularly low (less than 150 passengers per hour)."* - WebTAG Unit M3.2 (para. 7.1.6).

The bus boarding/alighting validations are performed using the Railplan base model (WE001A08A) and adding the criteria of filtering insignificantly small demand. The threshold of 150 passengers per hour is equivalent to 278 passengers across the peak period. Validations results are summarised in Table 11.

Table 11: Bus Boarding and Alighting Validation

Bus Stop Name	Corridor	Boarders Observed	Boarders Modelled	Boarders Diff	Boarders % Diff	Boarders Satisfy DfT criteria?	Alighters Observed	Alighters Modelled	Alighters Diff	Alighters % Diff	Alighters Satisfy DfT criteria?
Bromley Road Downham Way	North-South	404	752	348	86%	No	131	284	153	17%	Not Applicable
Old Bromley Road	North-South	238	13	-225	-95%	Not Applicable	331	108	-223	-67%	No
Green Man Community Hub	North-South	317	867	550	174%	No	178	480	302	170%	Not Applicable
Southend Lane	North-South	347	228	-119	-34%	No	155	88	-67	-43%	Not Applicable
Bellingham Road	North-South	559	470	-89	-16%	Yes	307	221	-86	-28%	No
Newquay Road	North-South	418	1,192	774	185%	No	333	853	520	156%	No
Inchmery Road	North-South	342	89	-253	-74%	No	155	60	-95	-61%	Not Applicable
Bargery Road	North-South	351	124	-227	-65%	No	150	130	-20	-13%	Not Applicable
Bromley Road Lewisham Town Hall	North-South	925	610	-315	-34%	No	746	584	-162	-22%	Yes
The Catford Centre	North-South	1,124	1,033	-91	-8%	Yes	822	941	119	14%	Yes
Mount Pleasant Road Lewisham	North-South	409	492	83	20%	Yes	334	365	31	9%	Yes
Lewisham Park	North-South	282	588	306	109%	No	447	552	105	23%	Yes
Morley Road	North-South	181	392	211	117%	Not Applicable	84	189	105	125%	Not Applicable
Lewisham Centre	North-South	1,125	1,391	266	24%	Yes	2,010	1,601	-409	-20%	Yes
Lewisham Clock Tower	North-South	1,824	1,794	-30	-2%	Yes	1,431	2,030	599	42%	No
Lewisham Station	North-South	252	63	-189	-75%	Not Applicable	569	164	-405	-71%	No
Blackheath Rise	North-South	23	8	-15	-65%	Not Applicable	26	30	4	15%	Not Applicable
Sparta Street	North-South	94	8	-86	-91%	Not Applicable	82	10	-72	-88%	Not Applicable
Queens Road Peckham Station	East-West	668	1,133	465	70%	No	522	1,037	515	99%	No
New Cross Fire Station	East-West	153	412	259	169%	Not Applicable	44	255	211	480%	Not Applicable
New Cross Bus Garage	East-West	2,261	1,905	-356	-16%	Yes	1,899	1,491	-408	-21%	Yes
New Cross Gate Station	East-West	1,496	2,429	933	625	No	1,208	2,166	958	79%	No
Marquis of Granby Goldsmiths	East-West	1,264	955	-309	-24%	Yes	1,249	260	-989	-79%	No

Bus Stop Name	Corridor	Boarders Observed	Boarders Modelled	Boarders Diff	Boarders % Diff	Boarders Satisfy DfT criteria?	Alighters Observed	Alighters Modelled	Alighters Diff	Alighters % Diff	Alighters Satisfy DfT criteria?
Amersham Road	East-West	326	305	-21	-6%	Yes	123	232	109	89%	Not Applicable
Malpas Road	East-West	242	272	30	12%	Not Applicable	78	376	298	382%	Not Applicable
Lucas Street	East-West	346	368	22	6%	Yes	157	268	111	71%	Not Applicable
Lewisham College	East-West	264	294	30	11%	Not Applicable	728	326	-402	-55%	No
Undercliff Road	East-West	189	514	325	172%	Not Applicable	102	394	292	286%	Not Applicable
Loampit Vale Jerrard Street	East-West	125	126	1	1%	Not Applicable	173	191	18	10%	Not Applicable
Lewisham Station	East-West	2,704	2,996	292	11%	Yes	1,729	2,311	582	34%	No
Lewisham Clock Tower	East-West	1,824	1,794	-30	-2%	Yes	1,431	2,030	599	42%	No
Belmont Hill	East-West	154	83	-71	-46%	Not Applicable	542	101	-441	-815	No
Marischal Road	East-West	61	59	-2	-3%	Not Applicable	57	117	60	105%	Not Applicable
Belmont Park	East-West	209	541	332	159%	Not Applicable	198	623	425	215%	Not Applicable
Brandram Road	East-West	269	219	-50	-19%	Not Applicable	80	211	131	164%	Not Applicable
Dacre Park	East-West	177	253	76	43%	Not Applicable	77	25	148	192%	Not Applicable
Lampmead Road	East-West	135	187	52	39%	Not Applicable	59	25	-34	-58%	Not Applicable
Total	Not Applicable	**22,082**	**24,959**	**2,877**	**13%**	**Yes**	**18,747**	**21,329**	**2,582**	**14%**	**Yes**

As seen in Table 11 almost half of the bus stop points are not busy enough to be considered further. As for the bus stop points which contain demands higher than 278 passengers, boarders for all stops validate well for the East-West corridors with the exception of only two stop points Queens Road Peckham Station and New Cross Gate Station, however the boarders for the East-West corridor do not validate well with modelled flow being generally higher than observed. For the North-South corridors there is a balanced total between bus stop points that validate well and those that do not. However, the differences shown are not significant to be proportionate to invest more effort to be further addressed in what is intended to be a strategic public transport model. For bus nodes with high observed demands (higher than 1,000 passengers, suggesting a high density of bus services), all boarding values satisfy DfT criteria and the majority of alighting values validate well.

A possible explanation behind the East-West corridor being better validated than North-South corridor is that the North-South corridor contains a more diverse number of services (refer to Figure 7) thus the aggregated demand is subject to more validation. Needless to say, when bus stop points are grouped together a reasonable match is shown (13% for boarders, 14% for alighters).

7. Network Review

Review of Zone System

The zone network within the London Borough of Lewisham in the Railplan model is illustrated in Figure 9. The zones division within the Borough boundary are detailed enough hence zone disaggregation is not recommended.

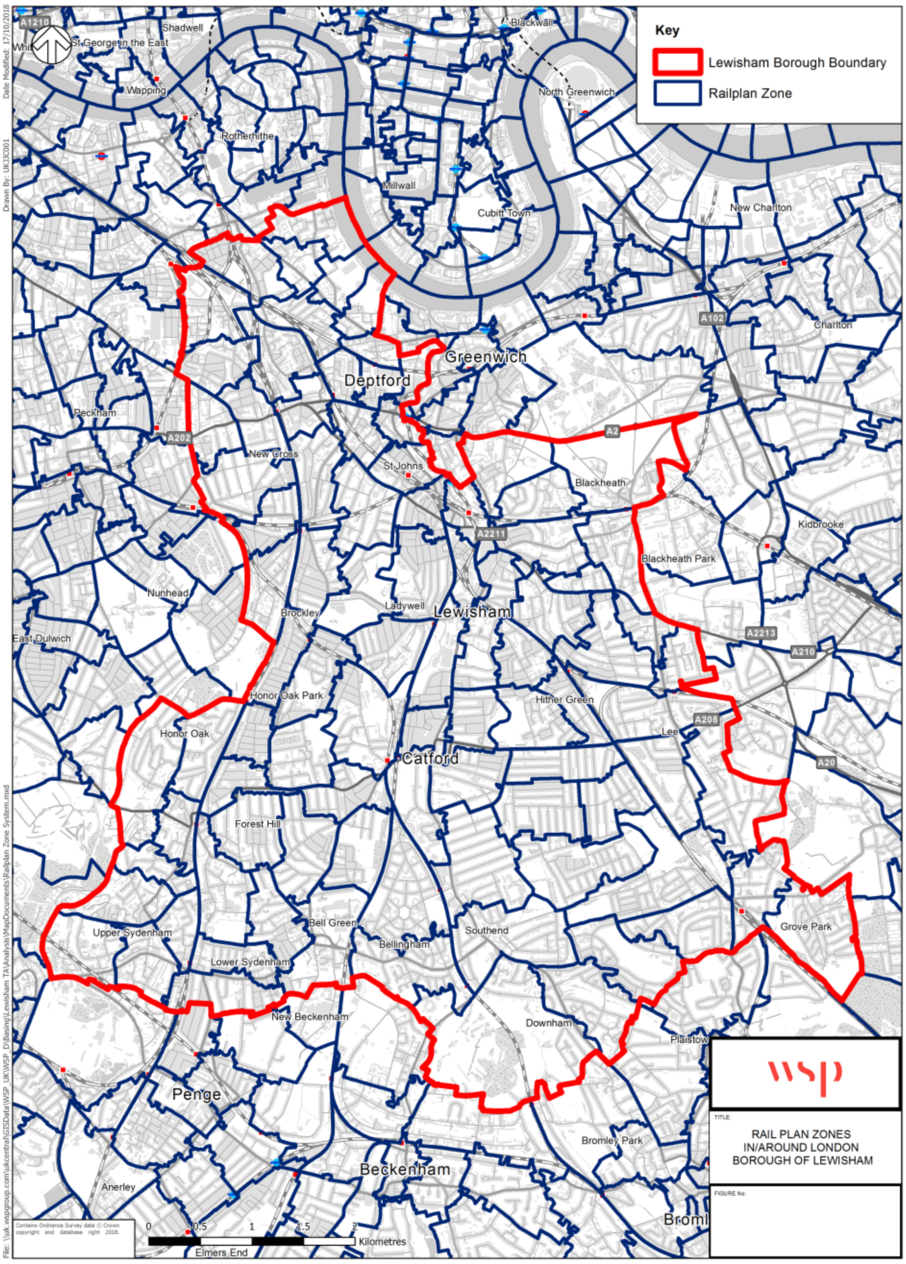


Figure 9: Railplan Zones in/around London Borough of Lewisham

Review of Walk Network

The Railplan walk network (based on ITN) was reviewed in the study area. In general the walk network is detailed across the review area, especially when compared with the existing zone system and number of zone connectors. No base model enhancements are therefore proposed.

8. Conclusions

The key conclusions drawn from the assessment are:

- *At a global level, the Railplan model meets trip matrix validation criteria in all cases when considering the Inner cordon (South East Sector) and Eastern screenline.*
- *Within the study area line flows validate very well on the DLR, with flows being within the DfT's validation criteria overall and on all individual links. The Overground line flows validate well in the Northbound direction (which is the major flows in the AM peak) but not in the opposite direction. Demand along LUL services (Bakerloo and Jubilee) validate well in both directions.*
- *Total bus passenger boarding and alighting is slightly over-represented at the borough level, with the differences between observed and modelled being in the range 6-7% (target threshold +/-25%).*
- *The busiest rail links to/from rail terminus which is close to the study area (i.e. London Bridge) meet validation criteria, the further links to/from other rail termini validate less well.*
- *The vast majority of public transport service frequencies and routes (buses and rails) validate well against service timetables.*
- *Total station demand generally follows the order of magnitudes when compared with ORR data.*
- *Along the proposed bus corridors, the majority of bus nodes are not busy. Boarders generally validate better than alighters, and the East-West corridor validates better than the North-South corridor.*
- *The Railplan zone system and walk network in the London Borough of Lewisham are detailed enough so no modification to the network is required.*

In conclusion, through this assessment we have demonstrated that Railplan validates well against DfT validation criteria. We do not feel any additional validation is required for the purpose of the work being undertaken for the London Borough of Lewisham.

Appendix B – Technical Note – Elham Base Year Model Audit for Lewisham Local Plan Transport Assessment

15 October 2018

1. Introduction

In August 2018, WSP was appointed by the London Borough of Lewisham (LBL) to provide transport modelling services to support LBL with the preparation of their Local Plan and Local Implementation Plan (LIP). Strategic transport modelling is required to help provide the evidence base for assessing the impacts and the improvements required to support the proposed growth within the Borough.

The latest version of Transport for London's (TfL's) West London Highway Assignment Model (ELHAM) has been used. ELHAM is a SATURN highway assignment model covering east London. The base year model was developed to reflect 2012 network conditions and traffic data.

This base year model audit report documents the assessment of ELHAM. It considers whether ELHAM is fit-for-purpose for the evaluation of the development proposals in the Borough.

The model audit has been carried out in accordance with TfL's *"Sub-regional Highway Assignment Model Guidance on Model Use" (Version 2.6)* (TfL, 2017).

The base model audit will focus on the primary roads and A-roads within the Borough. Figure 1 shows the extent of the Borough and the primary roads that have been assessed as part of this audit.

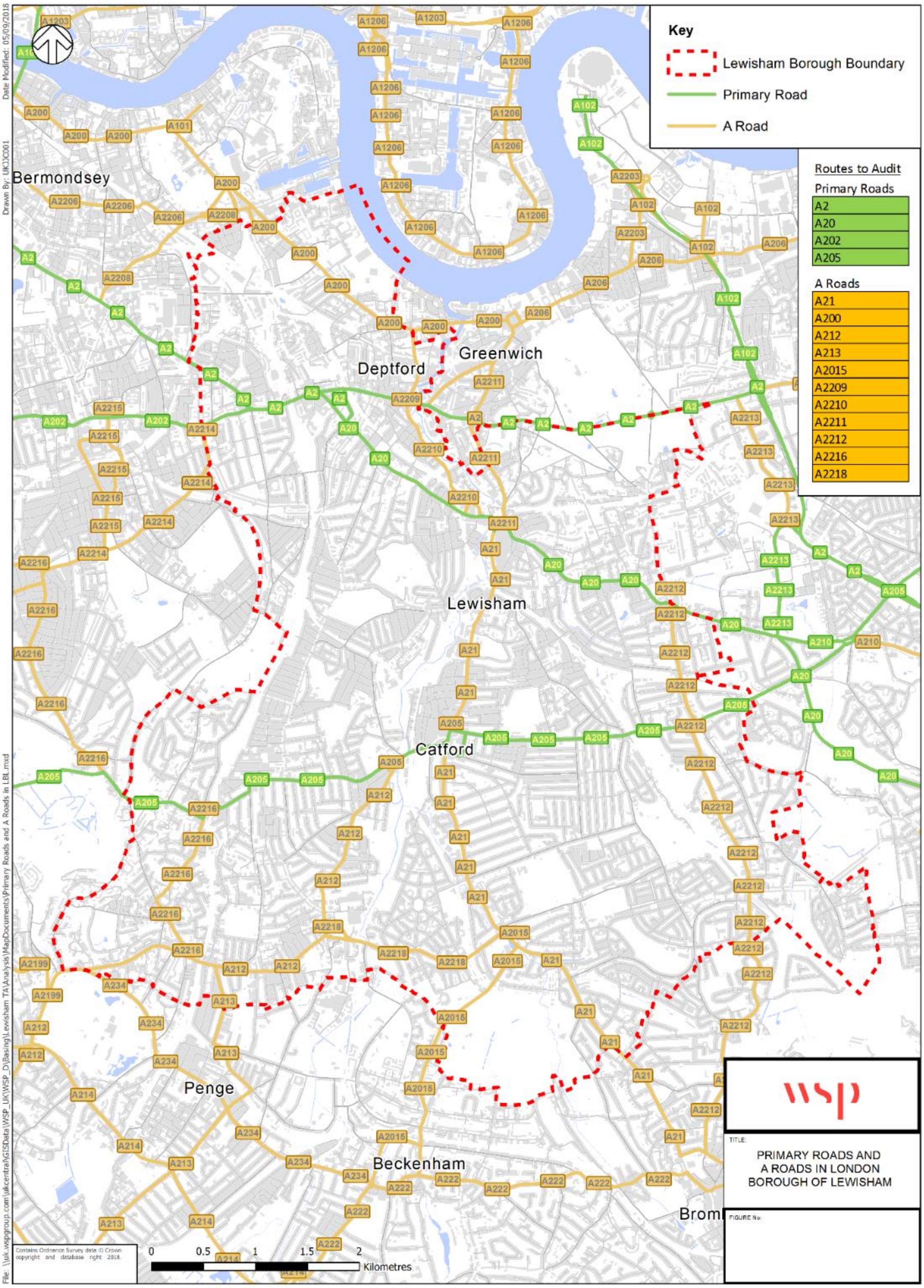


Figure 1: Study Area

2. **Model Files**

2012 base year ELHAM files (version E3.08) were provided to WSP by TfL and included the following AM peak highway assignment files:

- E3_BY12_V145NET_R003_AM_F.UFS
- E3_BY12_V145NET_R003_AMq_F.UFS

As outlined in the *"ELHAM Base Year Model Fact Sheet v3.8"* (TfL) the models with 'q' in their title represent the PASSQ assignment which is a pre-load assignment used as input to the final assignment. (The PASSQ models were not reviewed during the audit process.)

3. Local Network Density

The network structure within ELHAM was reviewed to ensure that the highway network is well represented (see Figure 2). The checks considered the presence of significant roads and junctions and the zone system (see Figure 5).

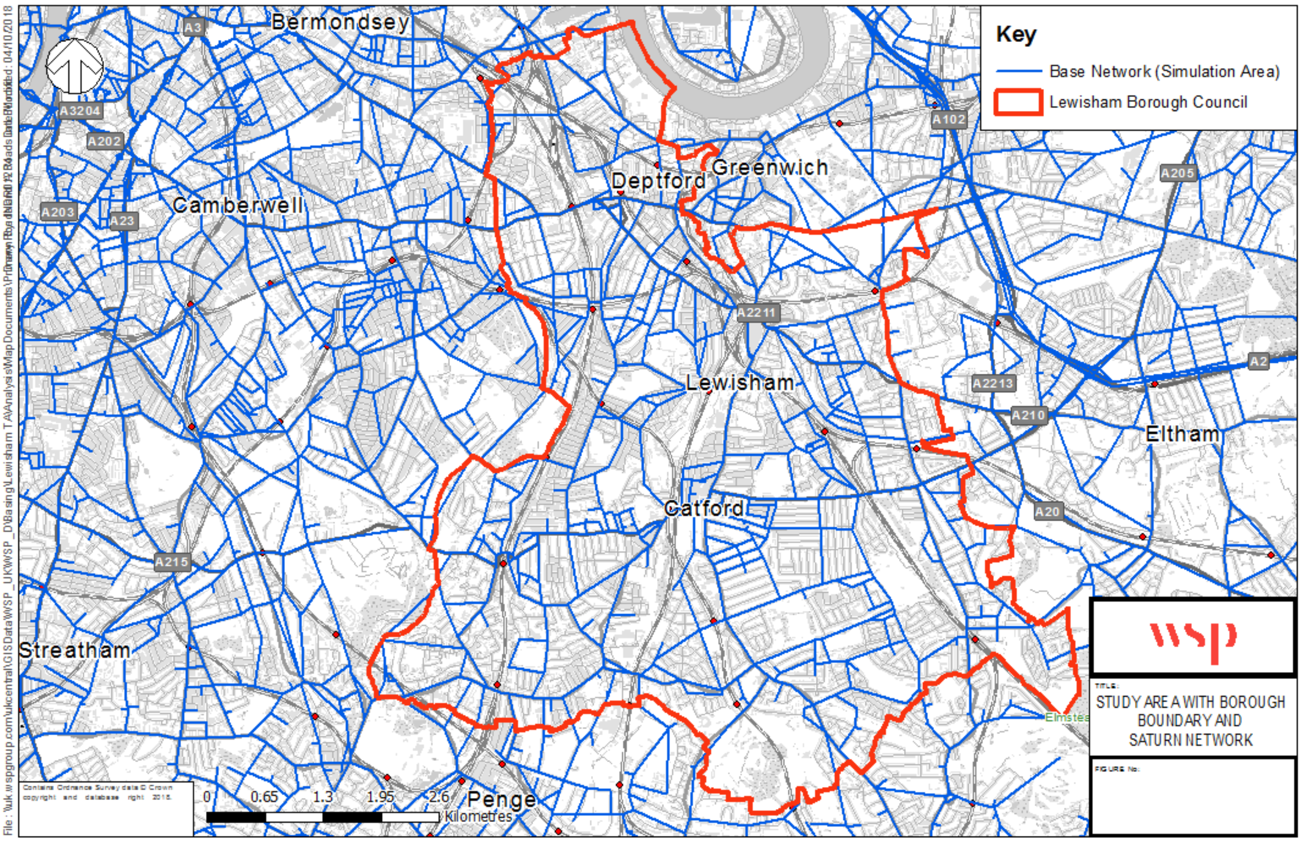


Figure 2: Study Area and SATURN Network

Figure 3 and Figure 4 show the links and nodes that are being assessed as part of this base model audit. As mentioned previously, the base model audit is focussed on the strategic links identified in Figure 1.

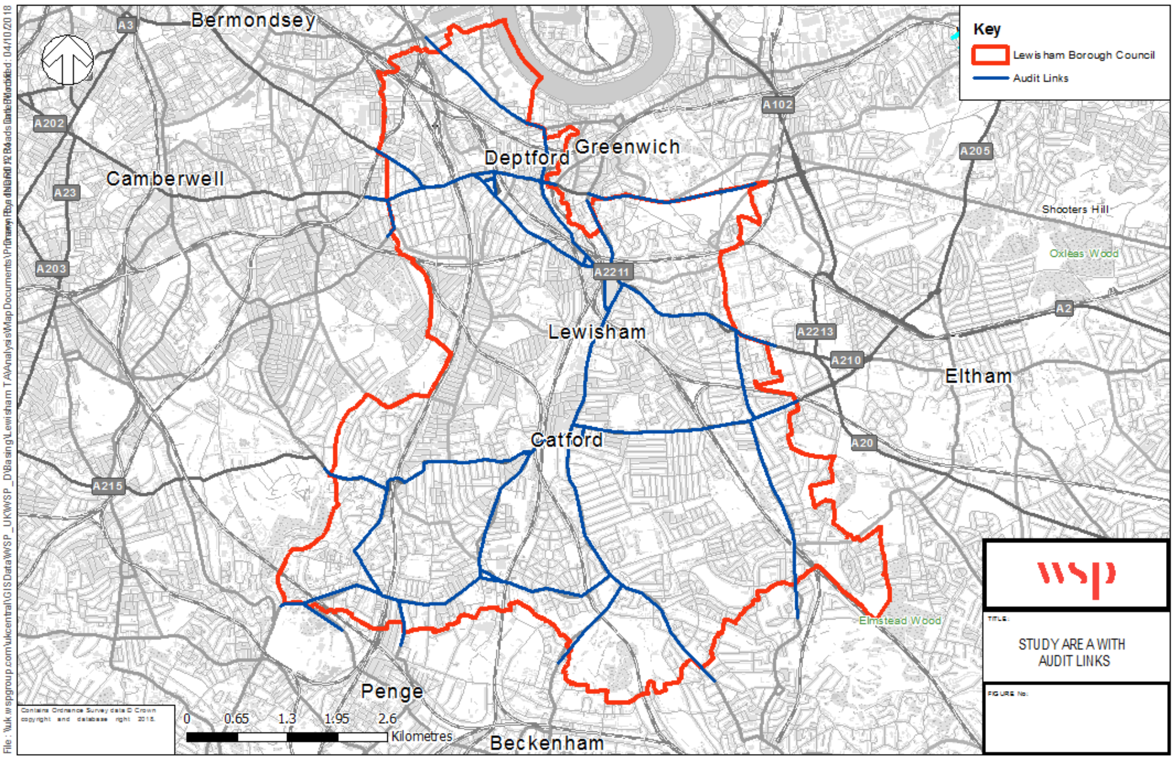


Figure 3: Study Area and SATURN Network – Links Forming Strategic Routes

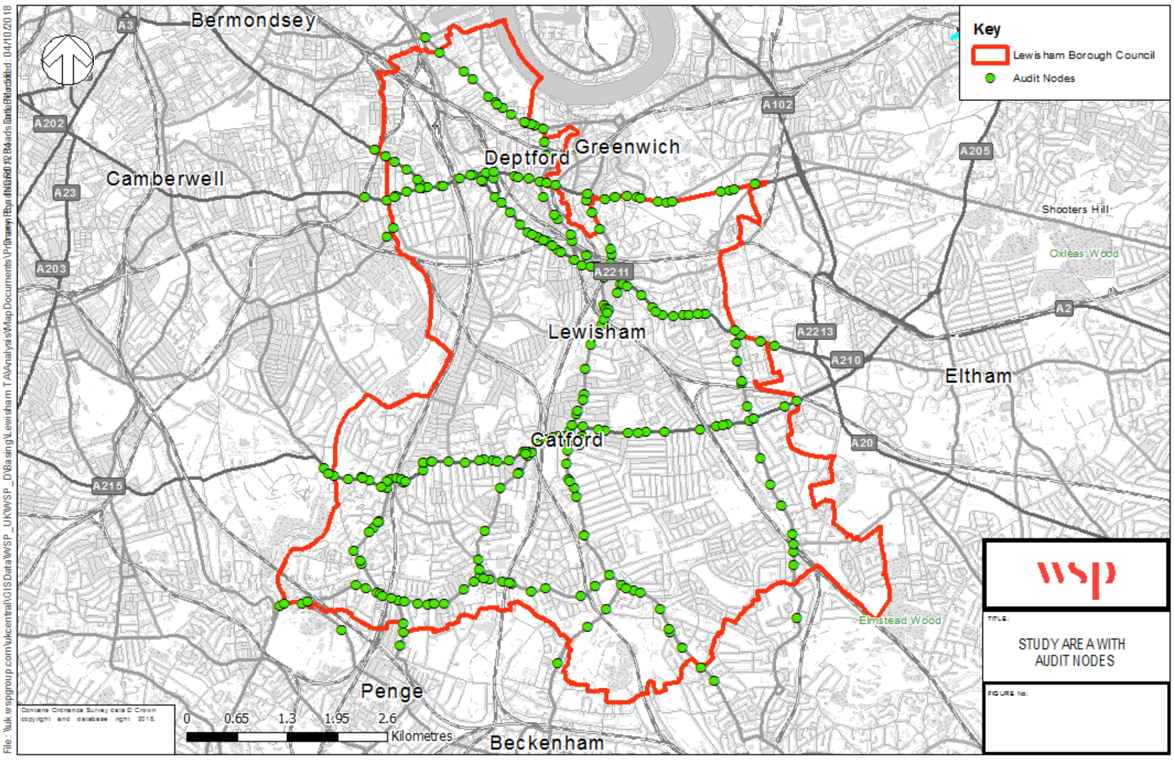


Figure 4: Study Area and SATURN Network – Nodes on Strategic Routes

The network coverage has been checked and it is concluded that the strategic network density and model coverage is adequate for the assessment of the development proposals.

4. Zone System

Figure 5 presents the zone system within the study area. The figure shows that the simulation zones cover the study area in detail, meaning that the zone system is suitable for the highway impact assessment.

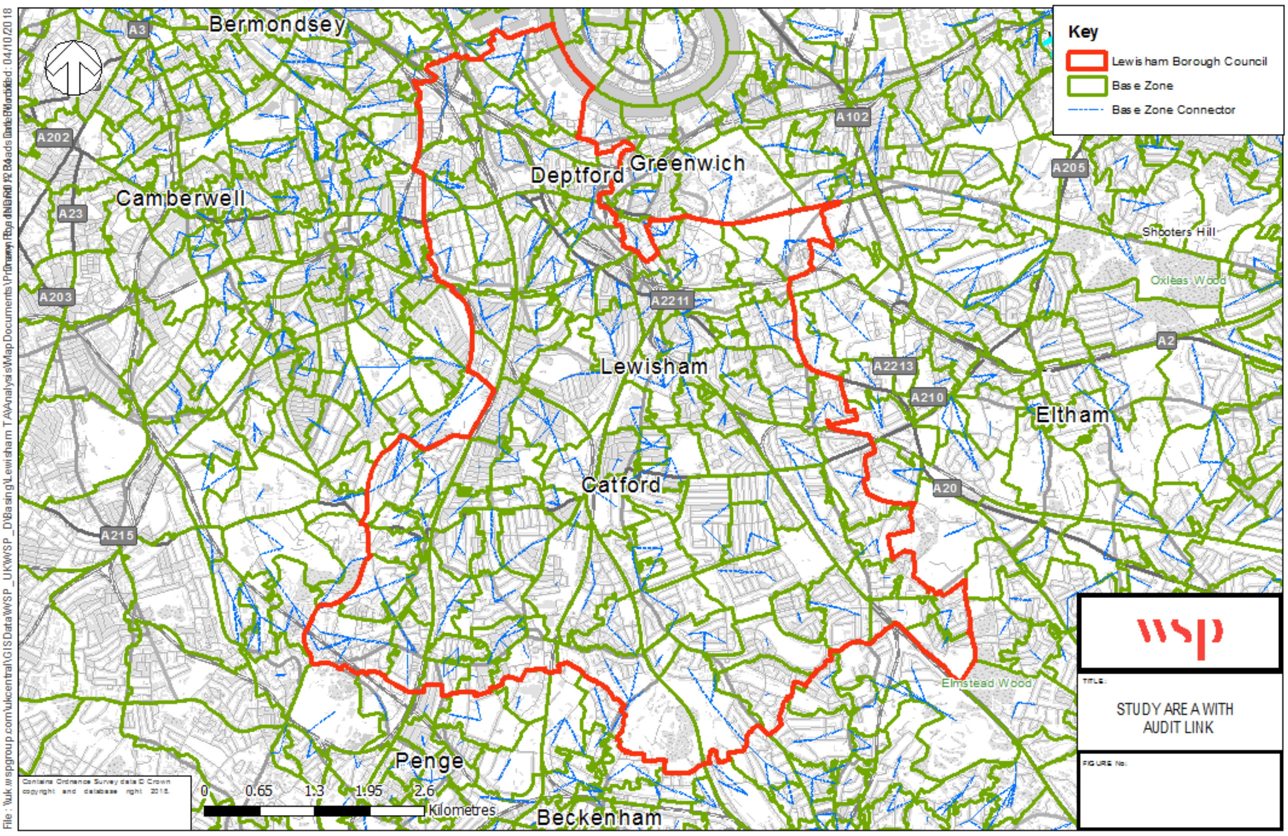


Figure 5: Study Area and Zone System

5. Junction And Link Coding

As stated in the *"London Highway Assignment Model (LoHAM) P3 Report"* (TfL, 2017):

"Semi-fatal errors do allow a network to be built but they prevent the assignment of a matrix to a network unless corrected. […] The TfL specification for developing the HAMs does not permit downgrading of any semi-fatal errors from their defaults in SATURN (version 11.2.05); there are therefore no semi-fatal errors remaining in the models."

Therefore, an assessment of the locations and abundance of any warnings and serious warnings found to be present on the main routes within the study area has been carried out.

The analysis has been split into warnings and serious warnings occurring:

- At nodes (at a single node)
- On links (between two nodes)
- On turns (between three nodes)

The abundance of any warnings and serious warnings found to be present at a single node within the study area is summarised in Table 1. Because they are errors found at single nodes, they are generally errors related to the signal timing data and saturation flows.

Table 1 – Summary of Warnings and Serious Warnings at Nodes

Warning	Error Type	Count of Error
Serious Warnings	Intergreen equals zero but e.g. N-S ends and E-W starts	1
Serious Warnings	LCY for a node differs from its neighbours	20
Serious Warnings	Saturation flows differ widely between roundabout arms	2
Not applicable	**Sub-total Serious Warnings**	**23**
Warnings	Rather long intergreen time for a stage (> 20 seconds)	70
Warnings	Redundant intergreen stage time (all turns continuous green)	10
Warnings	Total intergreen time exceeds the total stage time	1
Not applicable	**Sub-total Warnings**	**81**
Not applicable	**Grand Total**	**104**

The locations of these warnings and serious warnings are shown in Figure 6.

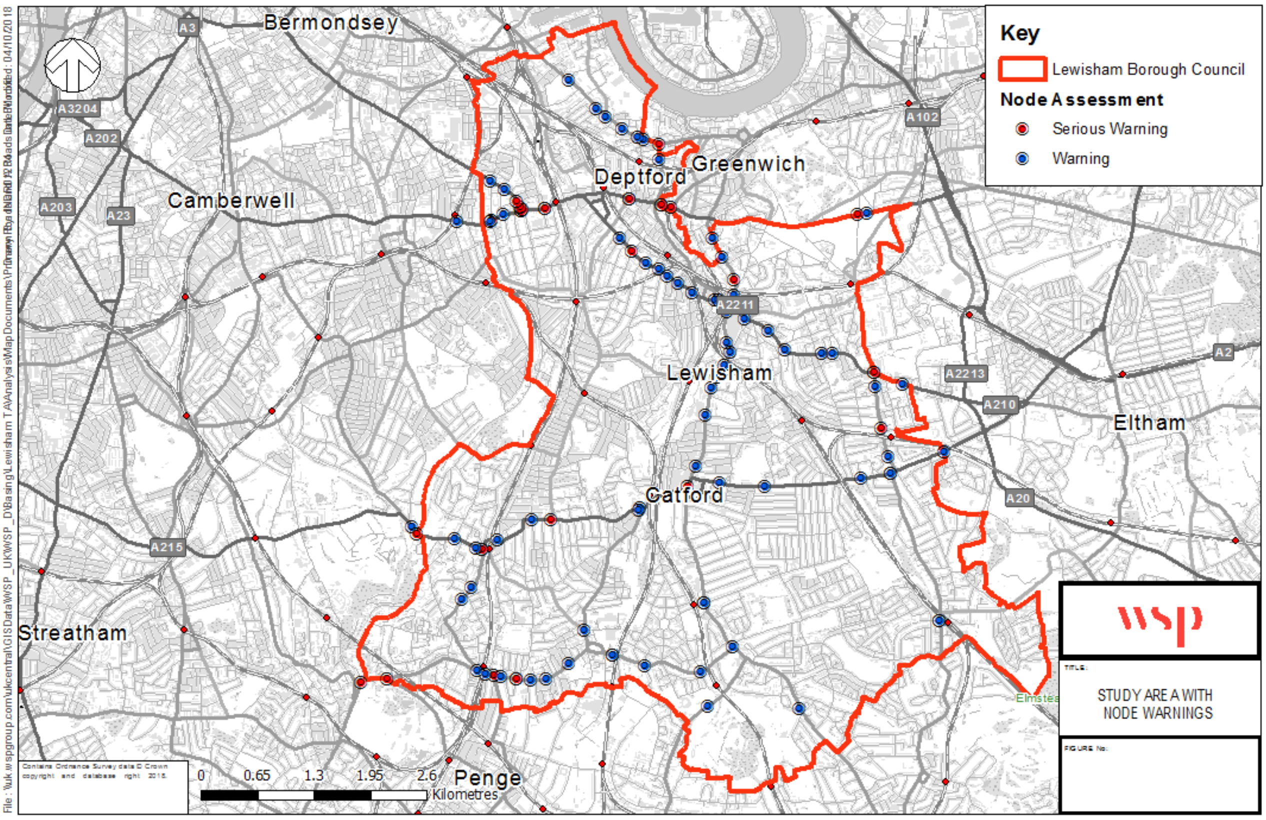


Figure 6: Warnings and Serious Warnings at Single Nodes

The warnings and serious warnings at these nodes were checked and no issues requiring any changes to the coding were identified.

In relation to signal timing errors, page 54 of the *"HAM P3 LoHAM Development Report"* (TfL, 2017) outlines that where possible, signal timing data was taken from the SCOOT system in 2012. Therefore, it is assumed that the signal timings within ELHAM are fit for purpose.

The abundance of any warnings and serious warnings found to be present at on links within the study area is summarised in Table 2. These errors are all found at the B-Node on a link between A and B. The errors are mostly related to turn priority markers, saturation flows, distances and capacity indices.

Table 2: Summary of Warnings and Serious Warnings on Links

Warnings	Error Type	Count of Error
Serious Warnings	2+ give-way turns in a single lane: Major arm priority junction	48
Serious Warnings	A single lane arm at signals which includes an X-marked turn	8
Serious Warnings	Multiple turns sharing multiple lanes: leads to weaving	1
Serious Warnings	Suspicious link distance compared to crow-fly distance	25
Serious Warnings	The mid-link capacity is either >> or << stop-line sat flow	2
Serious Warnings	Turn saturation flows per lane differ widely	35
Not applicable	**Sub-total Serious Warnings**	**119**
Warnings	Simulation link distances and/or times differ in reverse	32
Warnings	Suspicious link distance (input values differ markedly)	127
Warnings	Priority marker X has appeared for 2 or more turns on 1 link	1
Warnings	A turn is coded as an X turn but is not the last	1
Warnings	Input link time/speed out of range from speed-flow record	6
Warnings	More than one give-way turn sharing a single lane	1
Warnings	Low (chain) stacking capacity per lane (1.0 < 3.0 PCU)	3
Warnings	The saturation flow per lane is greater than MAXLSF	6
Warnings	No ban/penalty (i.e. non-zero) entries in a 44444 record	4
Warnings	Some but not all turns coded as G from a single link	1
Warnings	Turn saturation flow less than the minimum MINSAT	1
Warnings	The saturation flow per lane is less than MINLSF	1
Warnings	Total upstream sat flow inconsistent with lanes downstream	1
Not applicable	**Sub-total Warnings**	**185**

Not applicable	**Grand Total**	**304**

The locations of these warnings and serious warnings are shown in Figure 7.

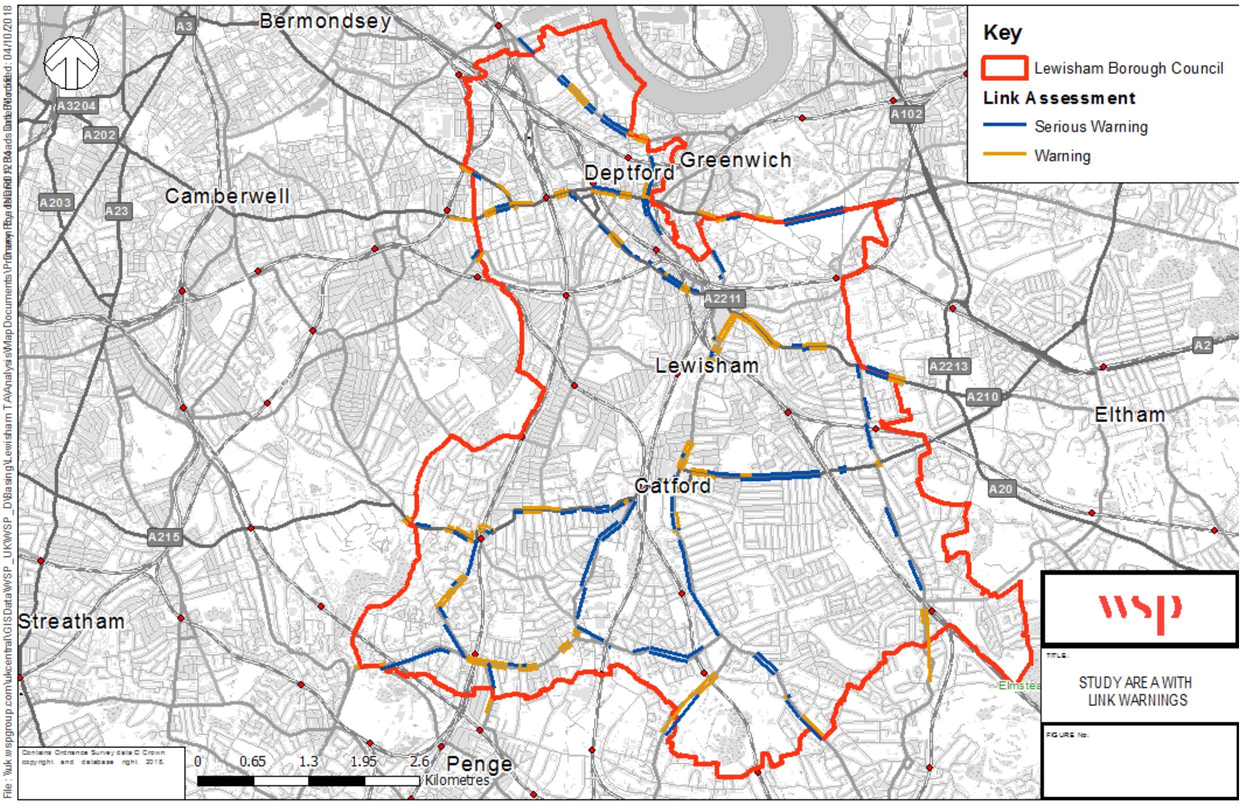


Figure 7: Links where Warnings and Serious Warnings Occur Related to Links

The warnings and serious warnings on these links were checked and no issues requiring any changes to the coding were identified.

Finally, the abundance of any warnings and serious warnings found to be present on turns within the study area is summarised in Table 3. These errors are all found at the B-Node on a turn between A and C. The errors are mostly related to priority markers.

Table 3: Summary of Warnings and Serious Warnings on Turns

Warnings	Error Type	Count of Error
Serious Warnings	No opposing turns found for a turn with a Priority Marker	3
Serious Warnings	Strange stage sequencing for an X-turn at signals	9
Serious Warnings	A nearside turn is all-green but not coded as a filter F	3
Serious Warnings	Zero sat flow for a turn which is green during a stage	5
Not applicable	**Sub-total Serious Warnings**	**20**
Warnings	A priority marker G looks suspiciously like a merge	3
Warnings	An X-turn at signals is only in unopposed stages (no TAX)	2
Warnings	Possible opportunity for a Clear Exit Priority Modifier?	19
Warnings	Turn coded F (filter at signals) included in stage definitions	5
Warnings	Two priority turns share the same exit; should one give way?	4
Not applicable	**Sub-total Warnings**	**33**
Not applicable	**Grand Total**	**53**

The locations of these warnings and serious warnings is shown in Figure 8. Because the errors are related to turns, they are spread across the study area at the B-node between points A and C.

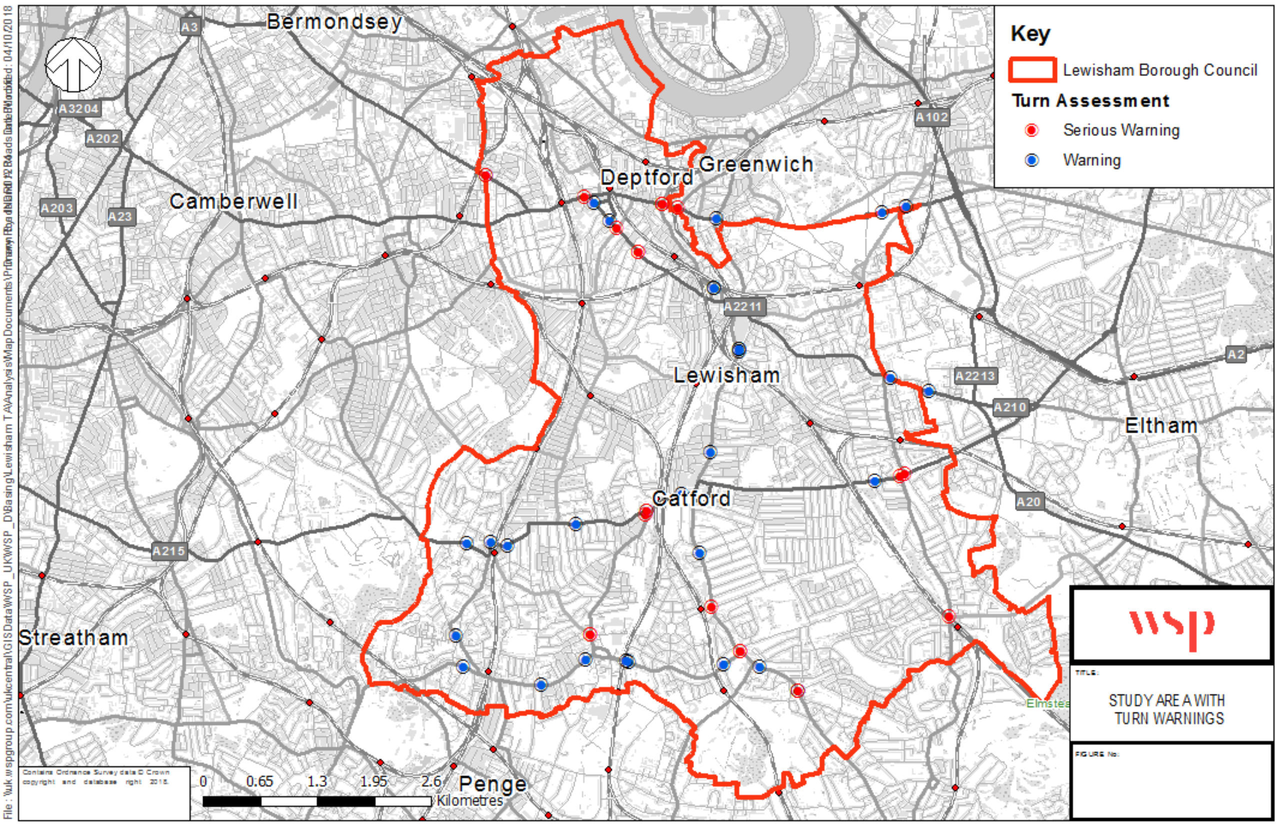


Figure 8: Nodes where Warnings and Serious Warnings Occur Related to Turns

The warnings and serious warnings on these turns were checked and no issues requiring any changes to the coding were identified.

6. Junction Specific Parameters

A systematic approach was taken to checking the junction specific parameters, with the audit focussing upon errors relating to:

- Stack, gap and tax values
- Link lengths
- Number of lanes
- Capacity indices
- Bus lanes
- Banned turns
- Lane allocations
- Priority markers
- Saturation flows

- Signal timings

Regarding link stacking capacity (the number of Passenger Car Units (PCU) which would cause a queue to extend into the previous junction), the SATURN parameter ALEX (average length of a vehicle in a queue) is set to 5.75m (the SATURN default). The link stacking capacity is therefore calculated by LANES*IDIST / 5.75, where IDIST is the length of the link in metres and LANES is the number of entry lanes into the junction. These are standard defaults that follow best practice.

The SATURN parameter TAX (the default number of X-coded PCUs that can stack in the middle of a signalised junction and clear after the end of green) is set to 2.0 PCUs in the DAT files which is the default number.

The GAP values (the minimum gap in seconds accepted by a vehicle seeking to enter a junction) given to the junctions within the study area were reviewed. The *"HAM P3 LoHAM Development Report"* (TfL, 2017) outlines the general approach for the application of GAP values. The guidance stipulates that GAP values within ELHAM were generally set at 2.0 at priority junctions and traffic signals, and at 1.5 at roundabouts.

Table 4 indicates that this approach has generally been adhered to. Most nodes have the default GAP values (highlighted Table 4).

For those junctions that do not have default GAP values, it is noted that TfL's guidance states that, *"some changes from the default GAP values were made on a junction basis in line with saturation flow calibration, where supported by flow and delay evidence*" (TfL, 2017).

Table 4: Summary of GAP Values by Junction Type in the Study Area

Junction Type	ELHAM Default (Advised)	Count of Nodes with GAP Value GAP = <1.5	Count of Nodes with GAP Value GAP = 1.5	Count of Nodes with GAP Value GAP = 1.51-1.99	Count of Nodes with GAP Value GAP = 2.0	Count of Nodes with GAP Value GAP = >2.0
Priority	2.0	15	2	1	116	4
Roundabout	1.5	3	2	1	0	1
Signals	2.0	1	0	0	125	0

Figure 9 shows the location of the nodes which have non-default GAP values.

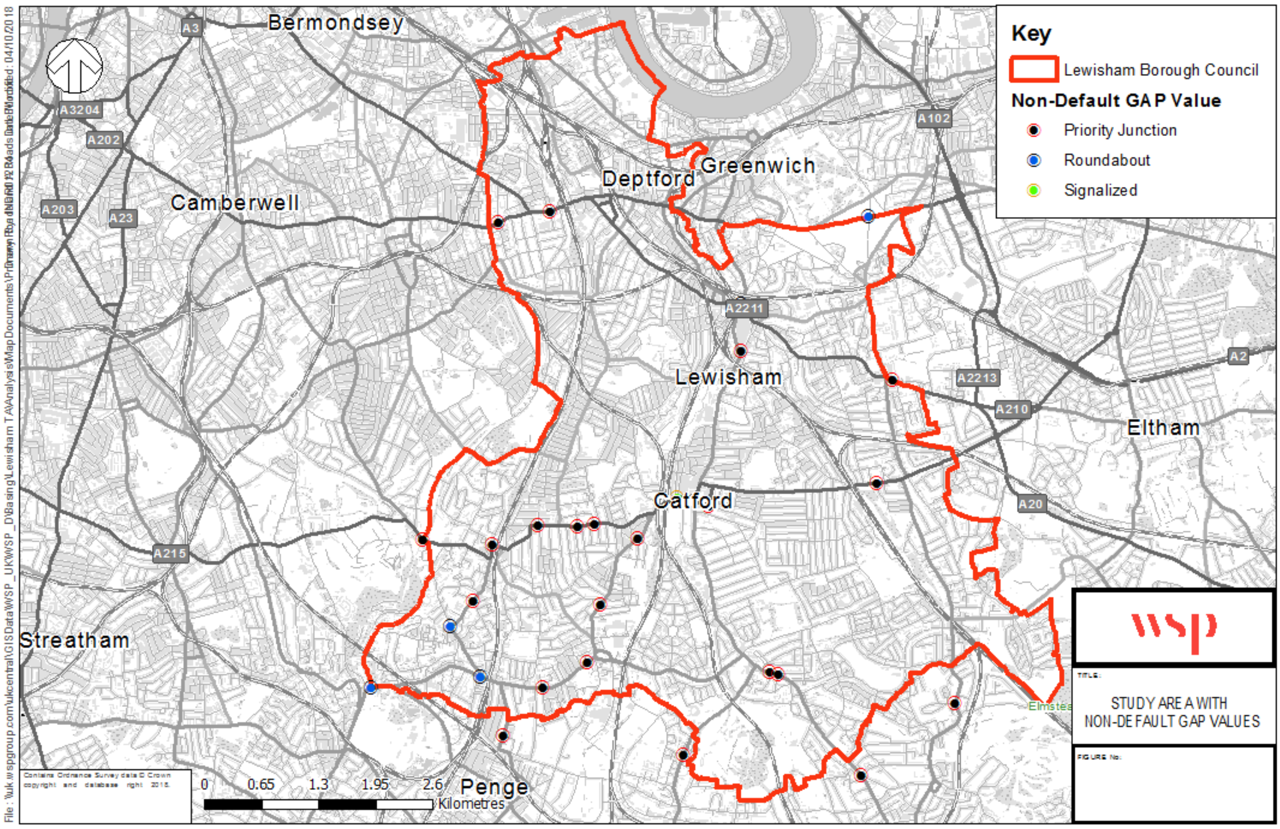


Figure 9: Study Area Junctions with Non-Default GAP Values

The junctions with non-default GAP values were checked and no issues requiring any changes to the coding were identified.

Links with suspicious distance coding were picked up as part of the analysis of any SATURN warnings and serious warnings within the study area. To further this assessment, Figure 10 illustrates the locations of all links with warnings related to distance that exist within the study area.

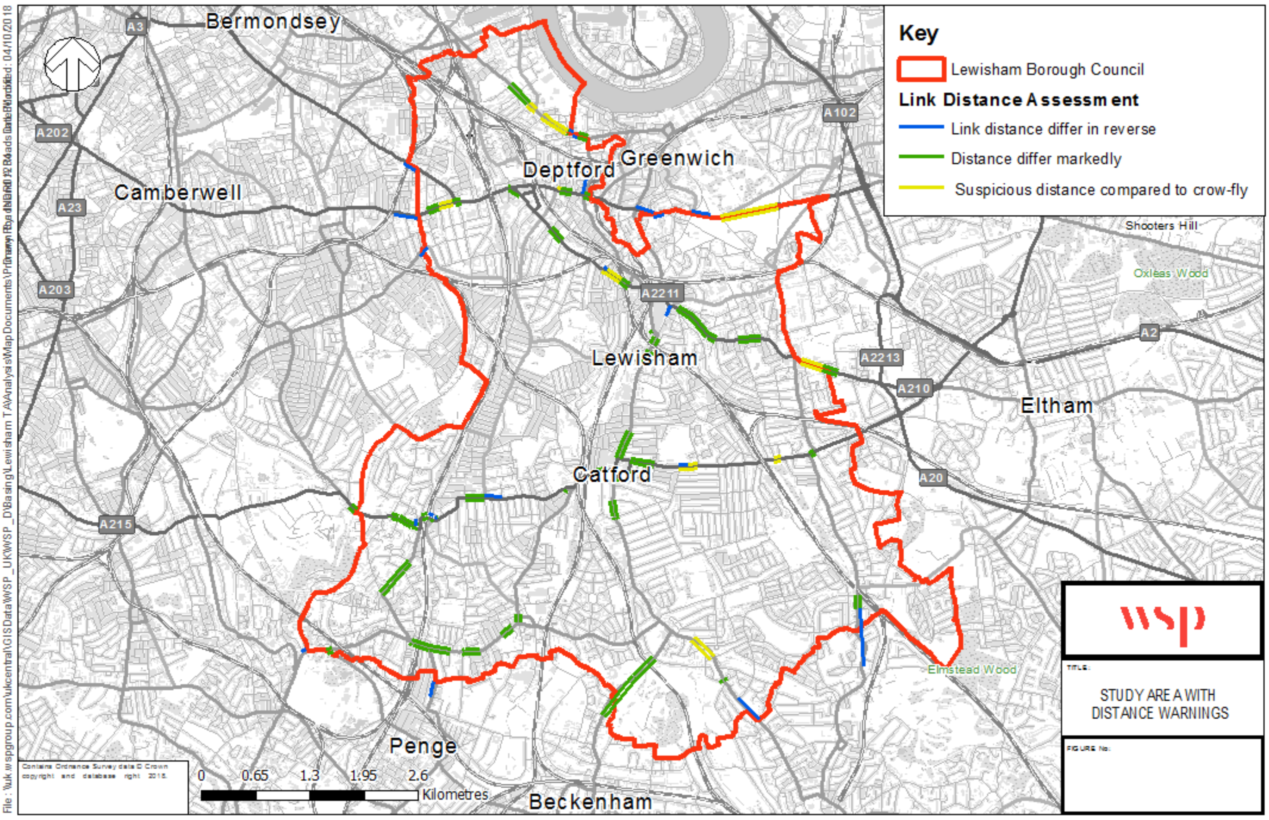


Figure 10: Link with Warnings Related to Distance

Figure 11 shows how many entry lanes each link within the study consists of. The analysis shows that the links with three entry lanes or more into a junction are generally restricted to the main strategic routes. No issues have been identified.

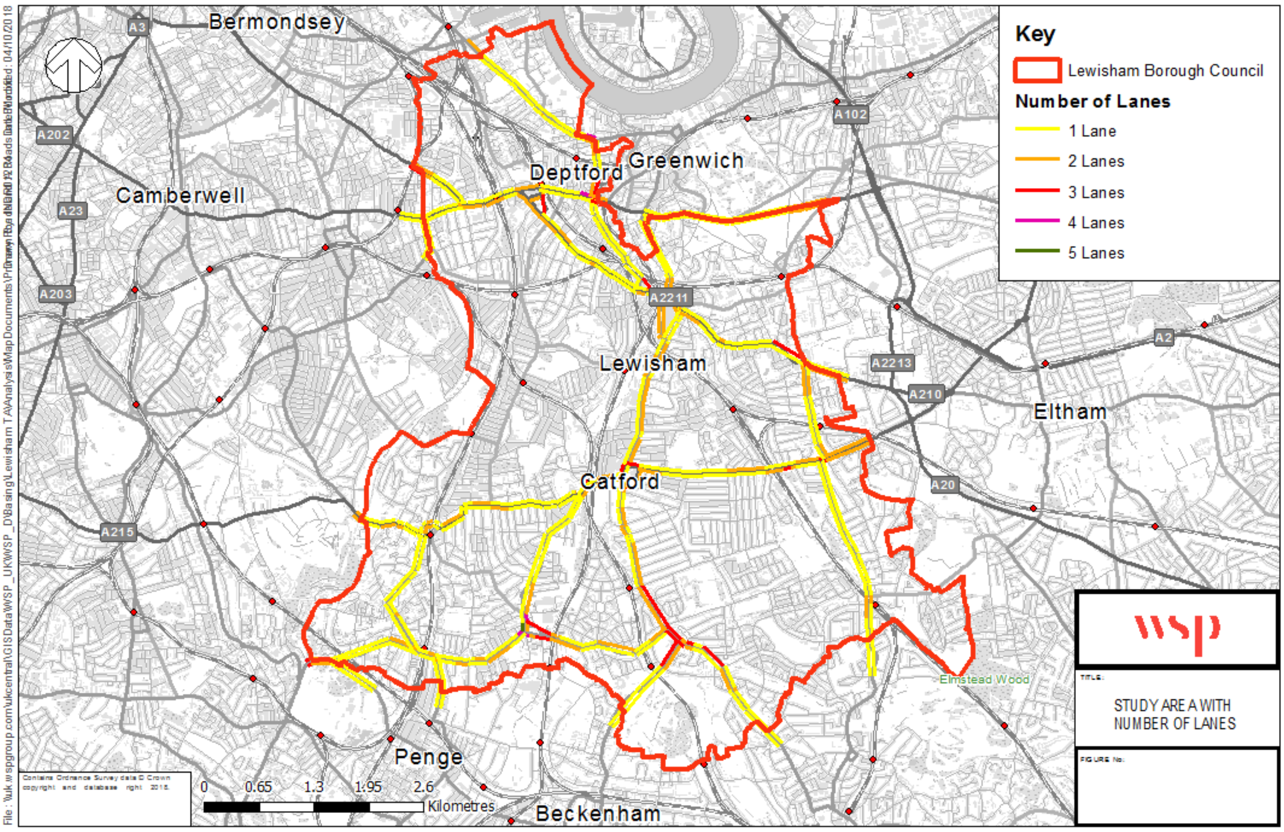


Figure 11: Number of Lanes on Each Link within the Study Area

The *"London Highway Assignment Model (LoHAM) P3 Report"* (TfL, 2017) outlines that capacity indices have been applied on high capacity or grade separated dual carriageways and motorways in the simulation area. Additionally, capacity indices were coded onto roads that have traffic calming measures in place.

A full list of all the capacity indices within ELHAM is available in the *"London Highway Assignment Model (LoHAM) P3 Report"* (TfL, 2017).

An illustration of the application of speed-flow curves is presented in Figure 12 and Figure 13 which show where capacity indices have been applied and the associated free-flow speeds and capacities. Their application has been reviewed and it is concluded that no modifications are required.

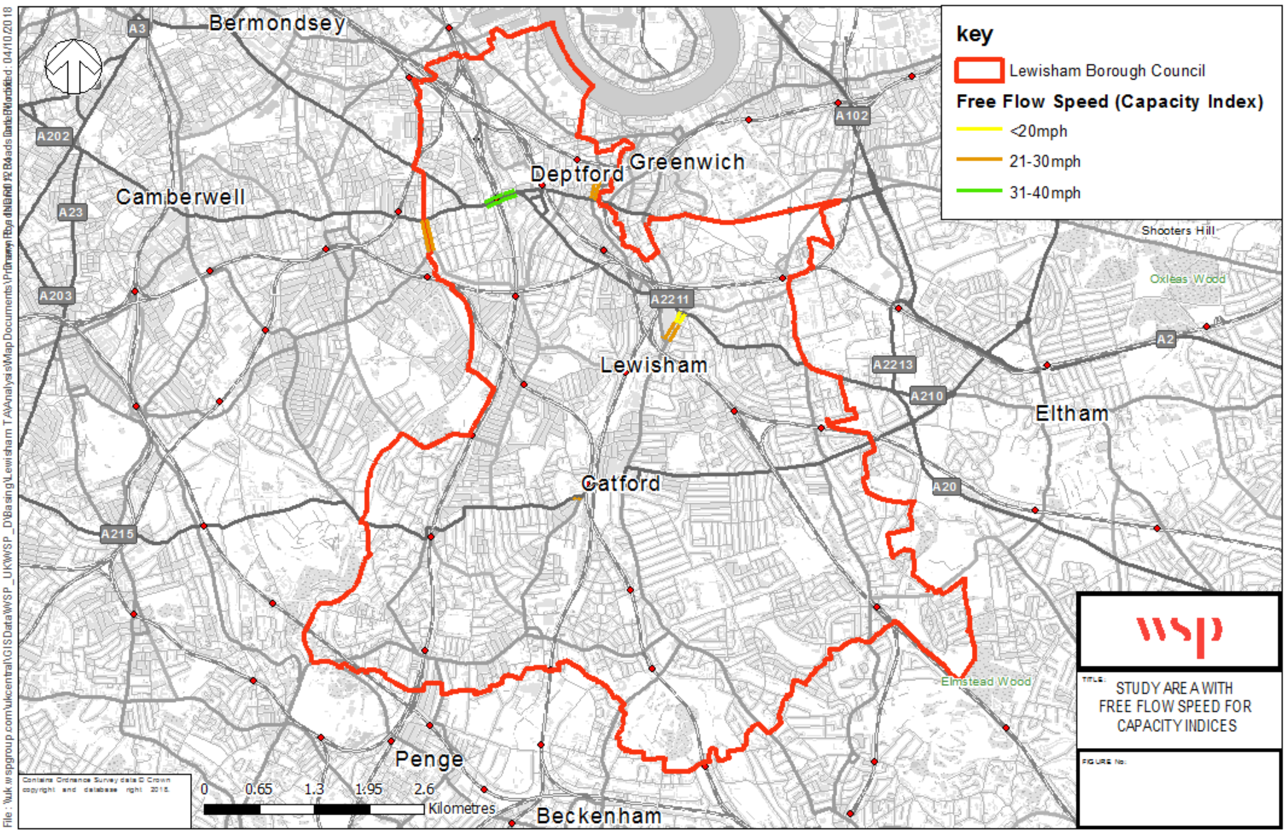


Figure 12: Free-flow Speeds for Capacity Indices Used within the Study Area

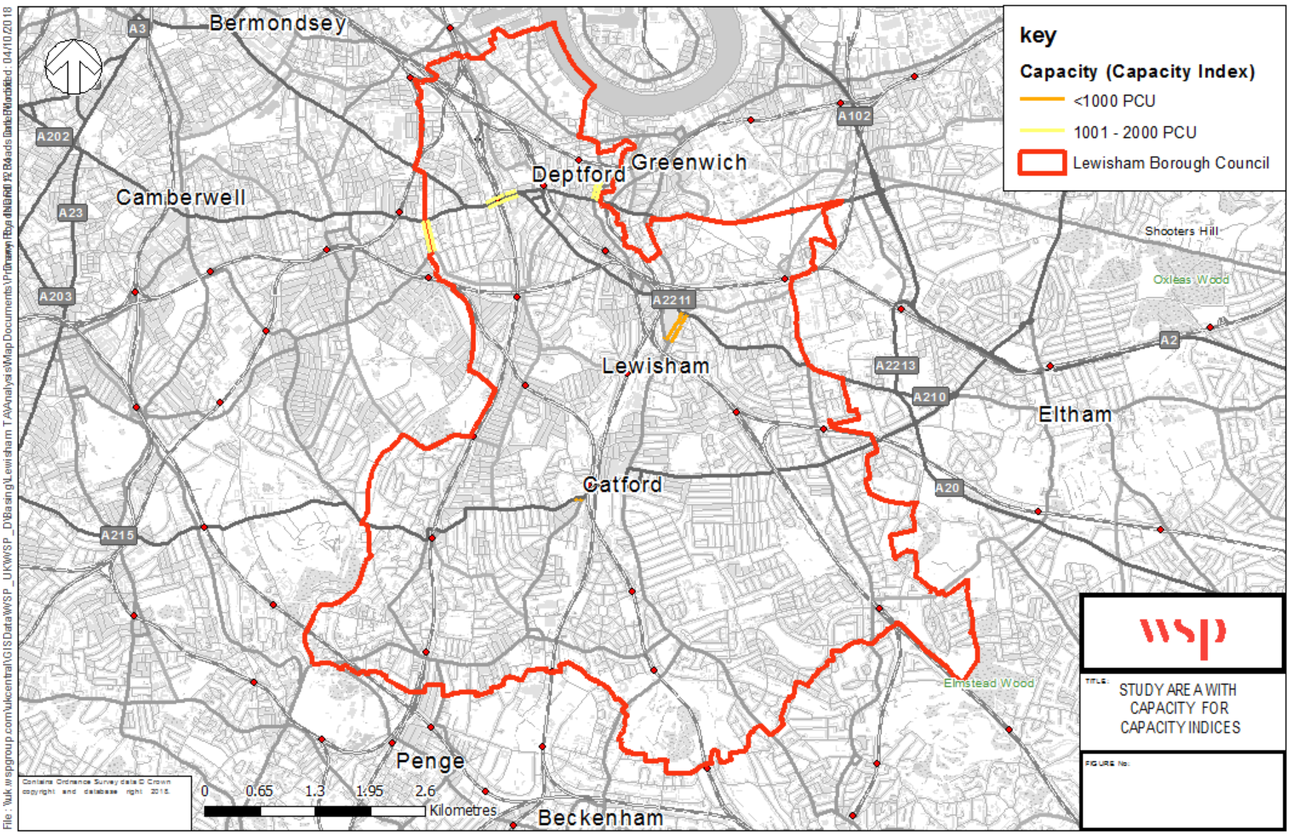


Figure 13: Capacities of Capacity Indices within the Study Area

Figure 14 shows where bus lanes exist within the study area. The presence of the bus lanes has been verified to be accurate and checks have also been carried out using Google Maps to identify any additional bus lanes not currently coded into the base year model. No amendments to the coding is required.

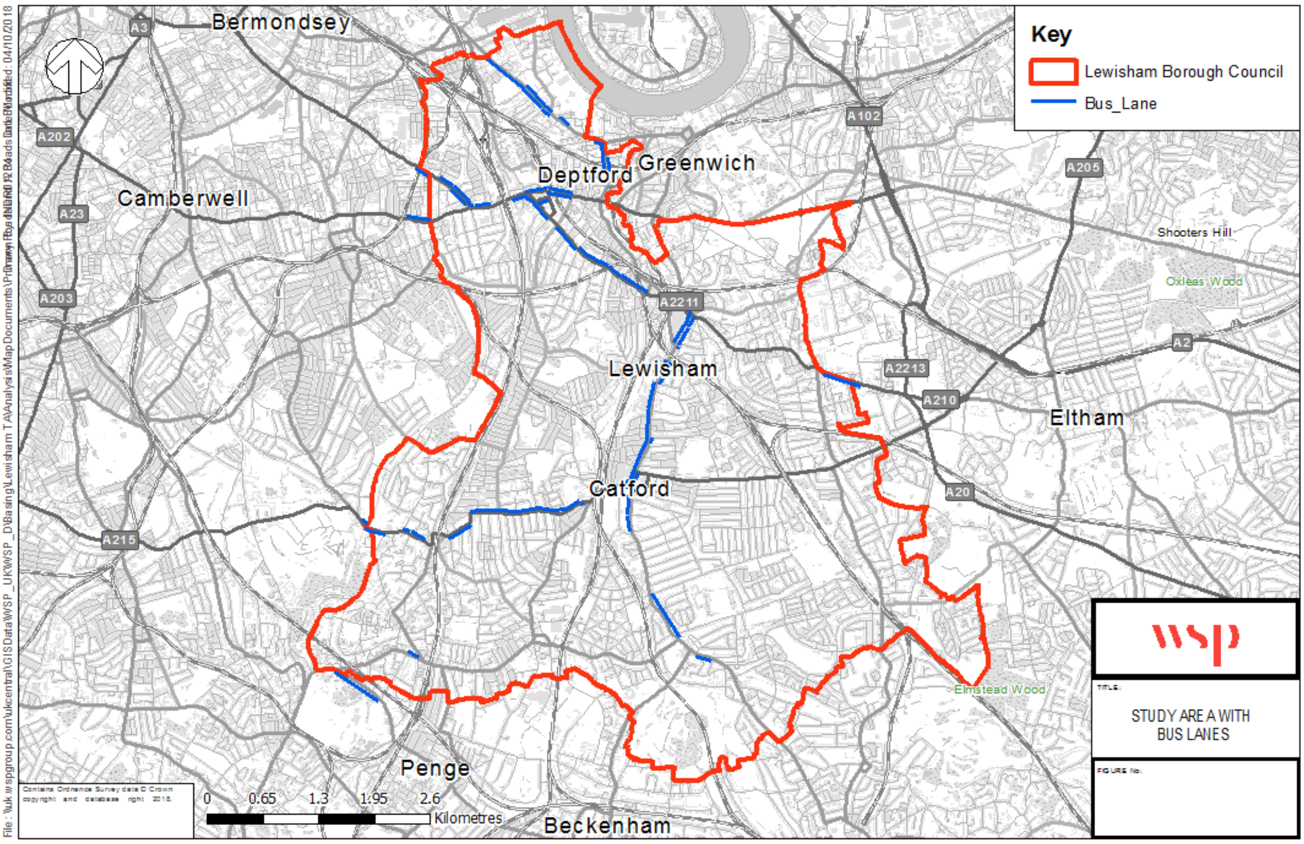


Figure 14: Bus Lanes within the Study Area

The locations of all banned turned within the AM peak ELHAM base year model were identified. No banned turns were found to exist within the study area which is realistic.

Warnings and serious warnings relating to lane allocations were identified as part of the model audit process. Figure 15 shows the locations of the errors within the study area. The errors were reviewed to ensure that the lane allocations within the model match on-street arrangements, focussing on links with serious warnings. No modifications to the lane allocations within the base year model are proposed, as no serious errors in the coding were identified.

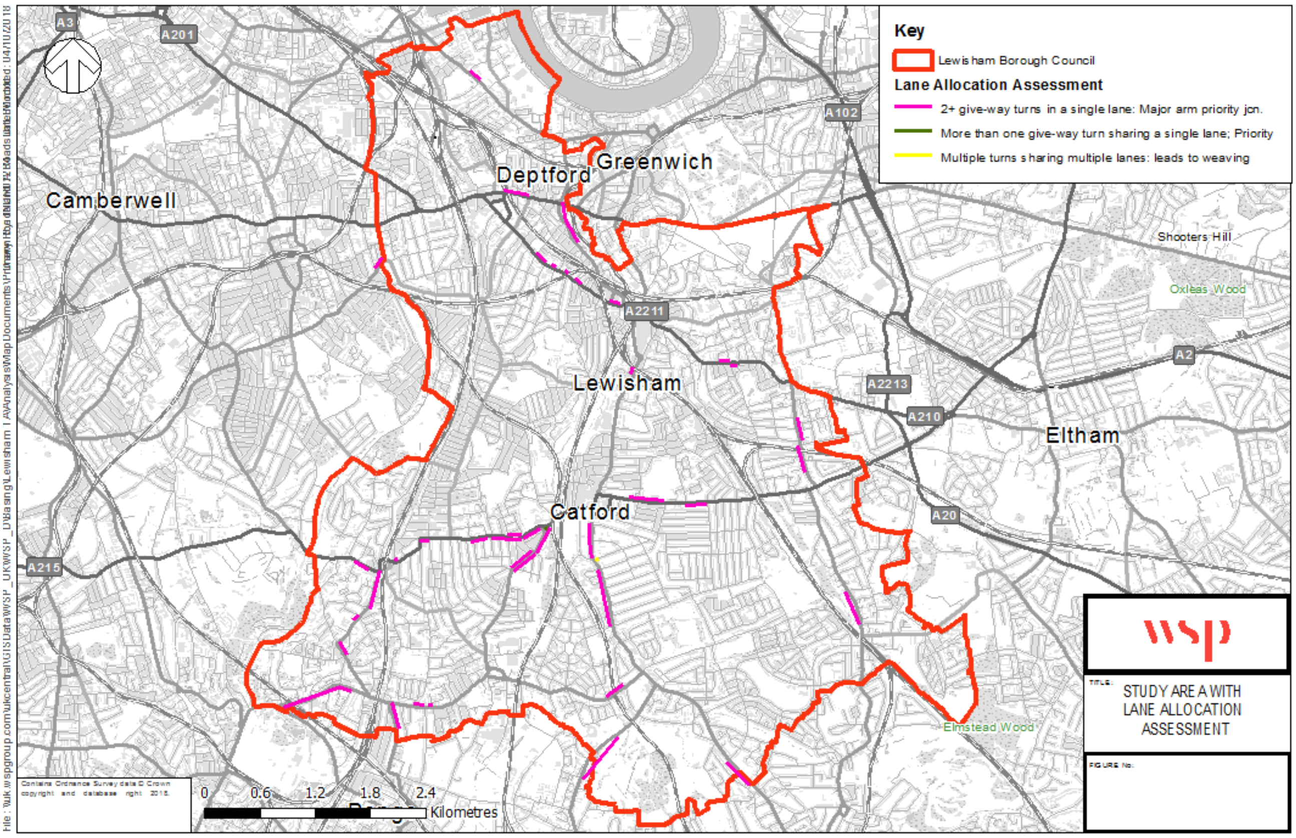


Figure 15: Warnings and Serious Warnings Relating to Lane Allocations

Priority markers, at junctions and on links were also reviewed in a similar way, as shown in Figure 16, with the audit focussing on serious warnings relating to priority markers. The assessment found that no modifications are required to the coding.

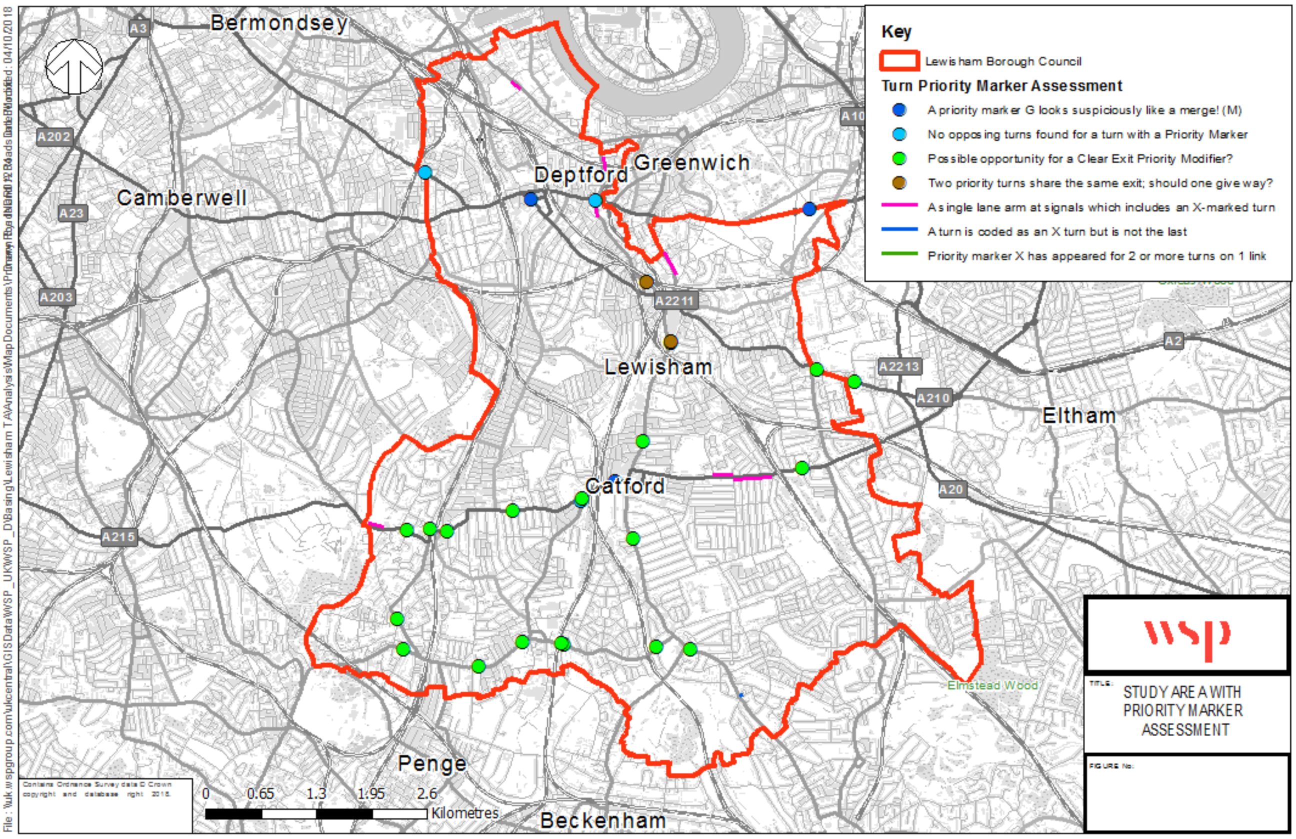


Figure 16: Warnings and Serious Warnings Relating to Priority Markers

Warnings and serious warnings relating to saturation flows were reviewed too, as shown in Figure 17. The audit found that at the junctions flagged, the saturation flows are adequate and concurrent with the values outlined in the *"London Highway Assignment Model (LoHAM) P3 Report"* (TfL, 2017).

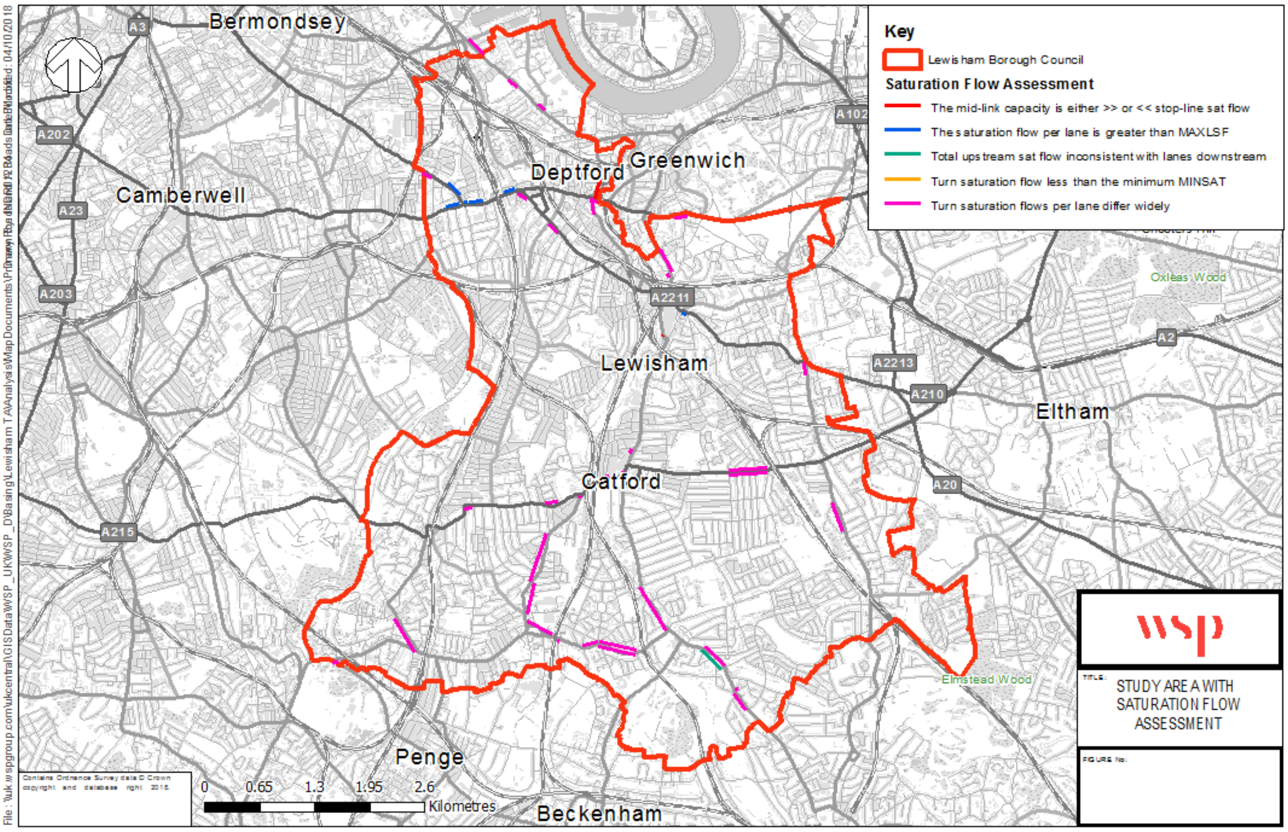


Figure 17: Warnings and Serious Warnings Relating to Saturation Flows

Warnings and serious warnings relating to signal timings were reviewed at the junctions identified in the audit, as shown in Figure 18. No changes to the signal timings are necessary.

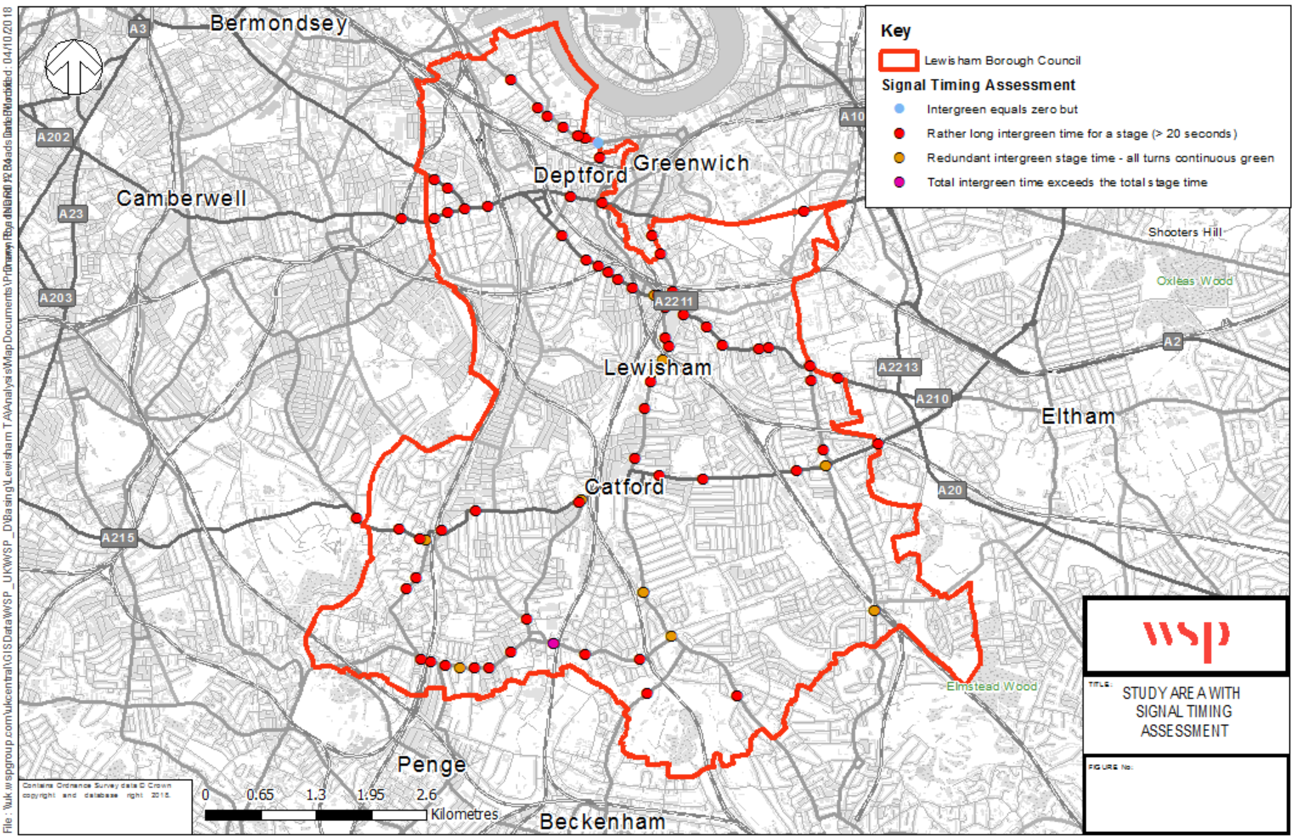


Figure 18: Warnings and Serious Warnings Relating to Signal Timings

7. Convergence Issues

The worst nodes (or turns) for simulation convergence within the AM peak ELHAM model were identified and their coordinates plotted to determine their locations within the study area (Figure 19).

In SATURN, the worst nodes and turns in terms of simulation convergence can be identified and are grouped into the following categories for convergence issues:

- Nodes
- Delays
- Gaps
- Capacities
- Green optimisation
- Flows

Figure 19 indicates that there is only one node (node 24071) in the study area with a capacity convergence issue. This a node that is part of the Catford Gyratory. The coding at this node has been checked and has been found to be accurate, although the junction is operating with a V/C ratio of 98% in the AM peak with some realistic blocking back.

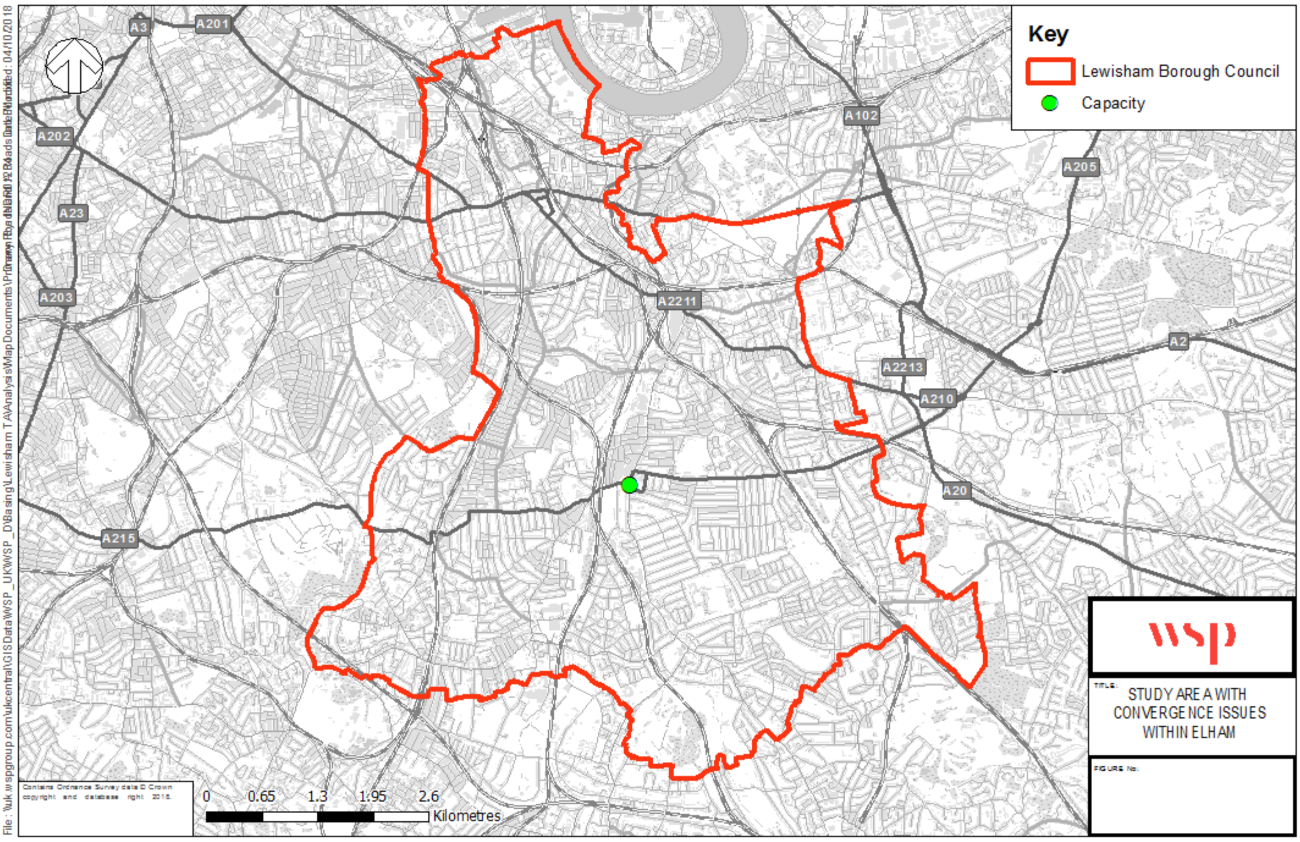


Figure 19: Convergence Issues within the Study Area

8. Realism Checks

Realism checks were undertaken on the base year model for:

- Excessive delays;
- Queuing; and
- High volume/capacity (V/C) ratios.

Figure 20 shows excessive link delays (defined as >60 seconds) within the study area in the AM peak.

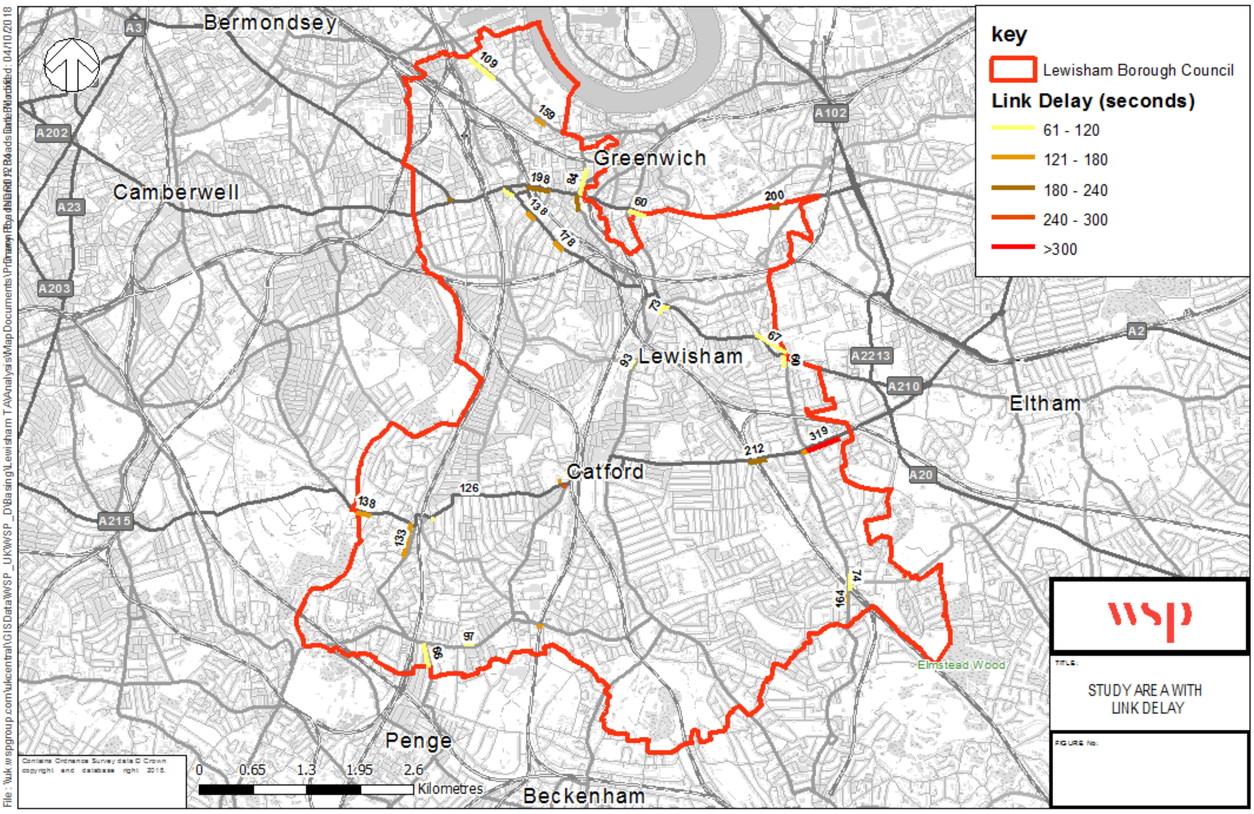


Figure 20: AM Peak Link Delays (seconds)

A check of Google Maps for the same period on a typical weekday shows that the delays modelled are realistic, as shown in Figure 21, meaning that no modifications to the base year models are proposed from this point of view.

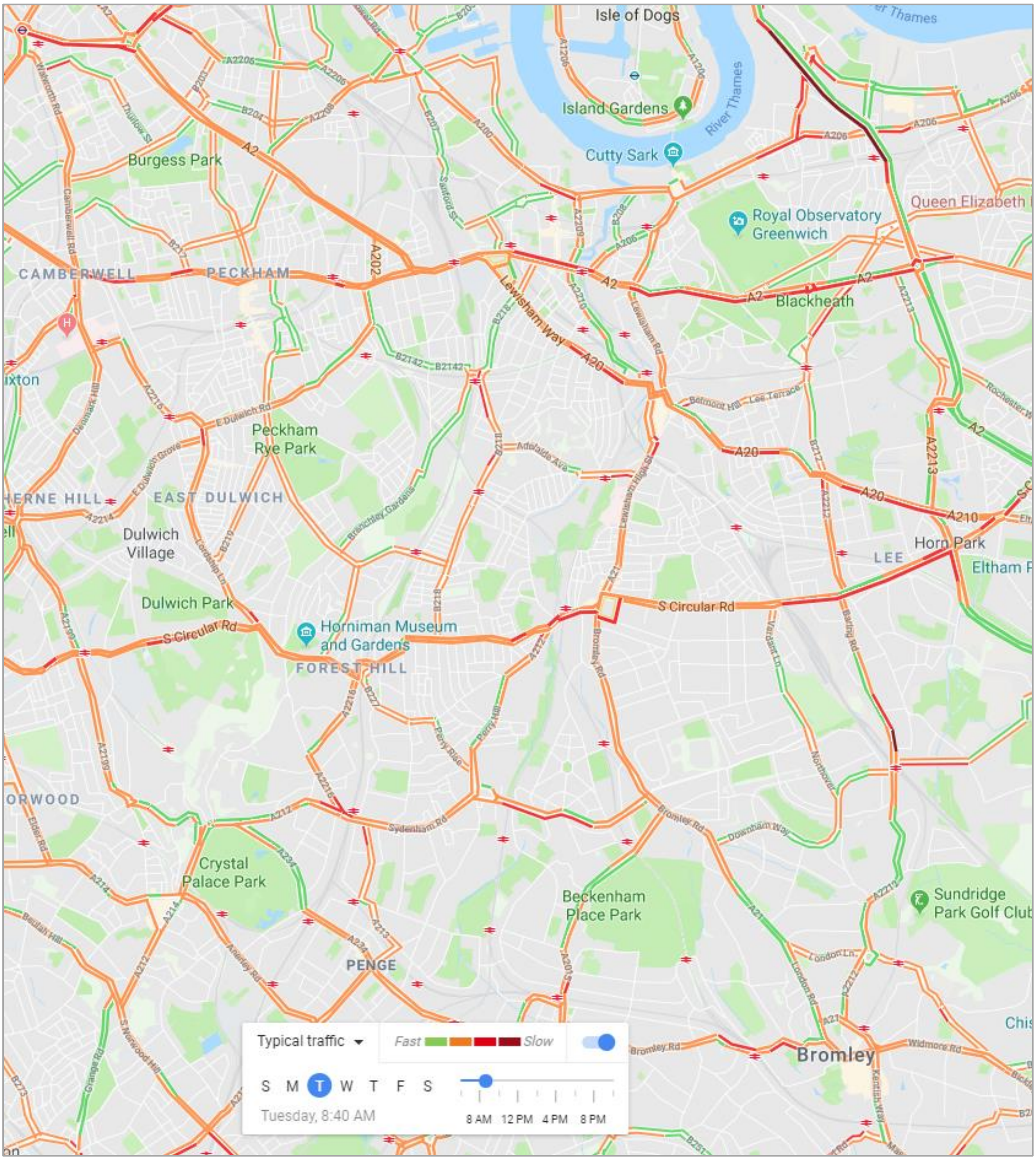


Figure 21: Typical Traffic in the AM Peak (Google Maps)

Figure 22 shows queued flow on links at the end of the AM peak period (in PCU) within the study area.

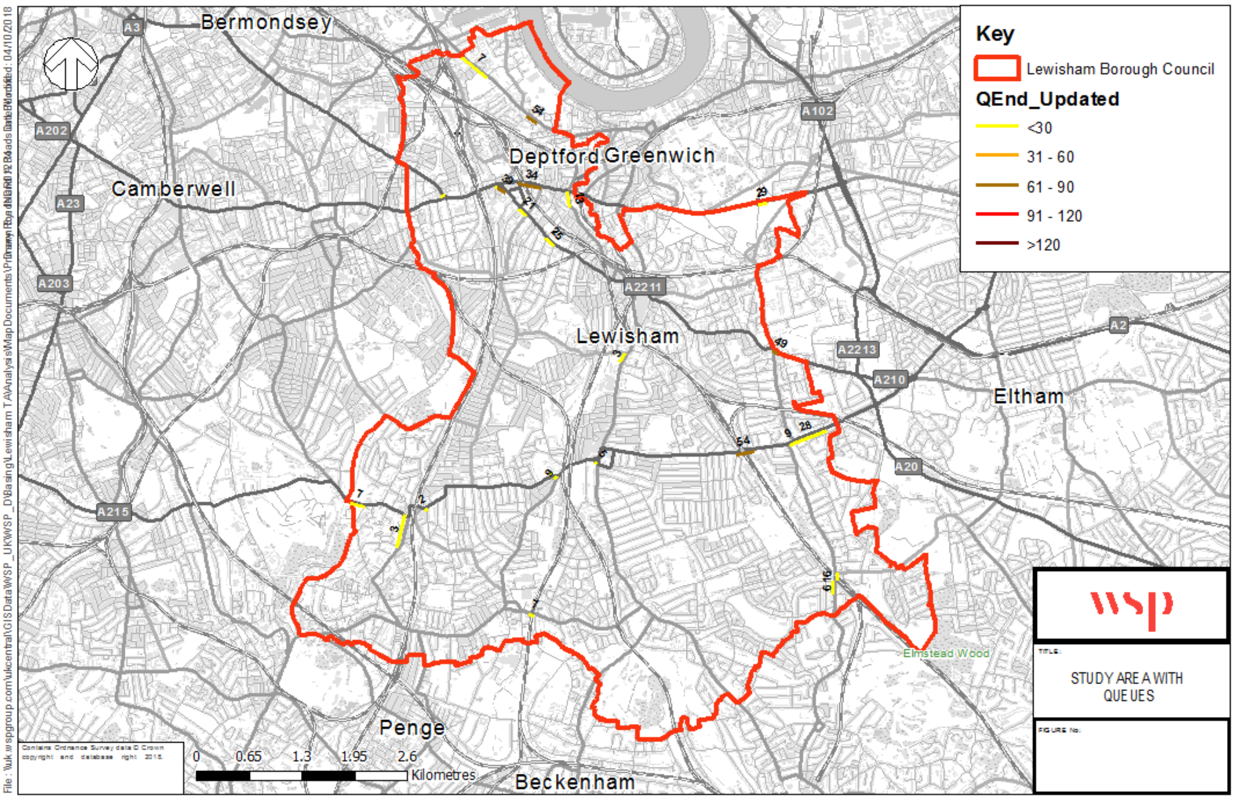


Figure 22: AM Peak Queued Flow at End of Time Period (PCU)

The queues correlate with the locations of excessive delays in the models and the queue locations are realistic when compared to typical traffic conditions, Figure 21.

Figure 23 shows link V/C (%) within the study area for the AM peak.

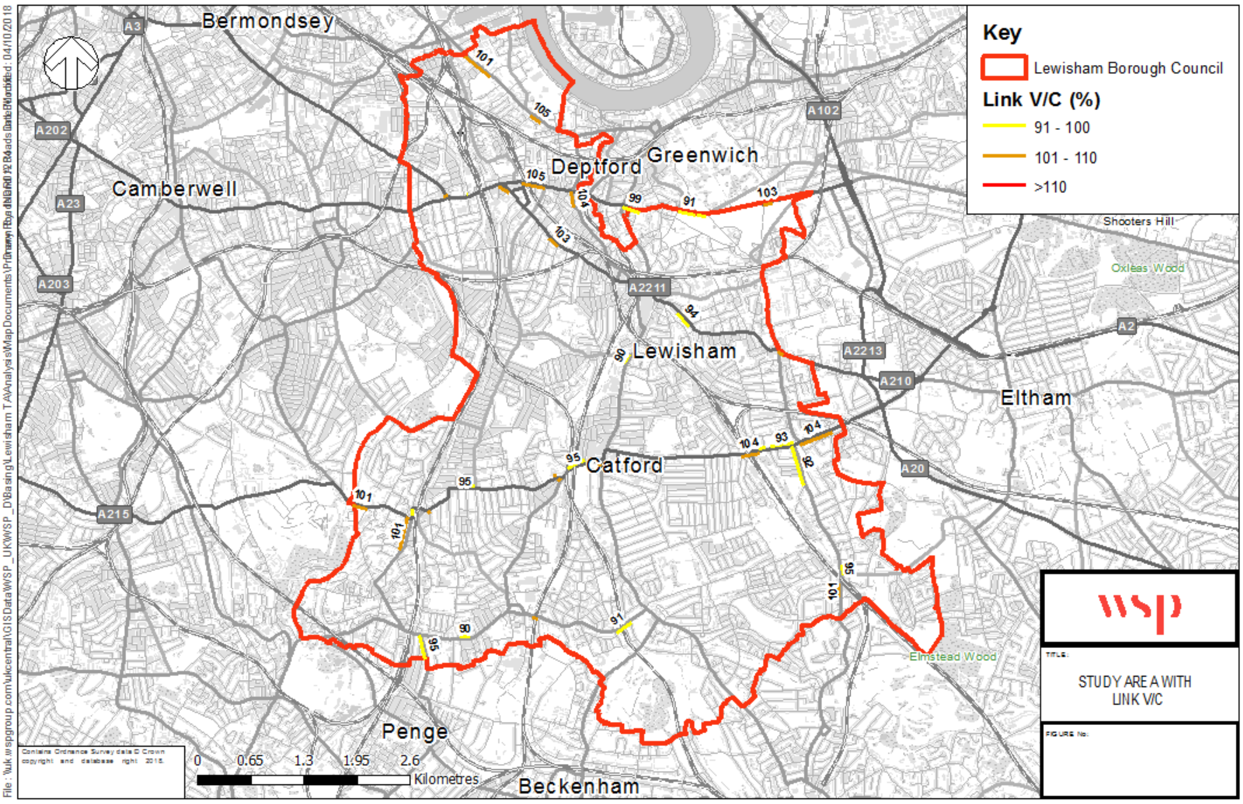


Figure 23: AM Peak Link V/C (%)

Once again, links with high V/C are also those with excessive queues and delays and their locations in the model correlate well with typical traffic conditions observed in Google Maps, Figure 21.

9. Routing

TfL's guidance requires that key traffic routes are checked in the study area to ensure that the routes taken by vehicles in the model are logical and realistic. Within the study area, five Origin-Destination (O-D) pairs were selected, as shown in Figure 24.

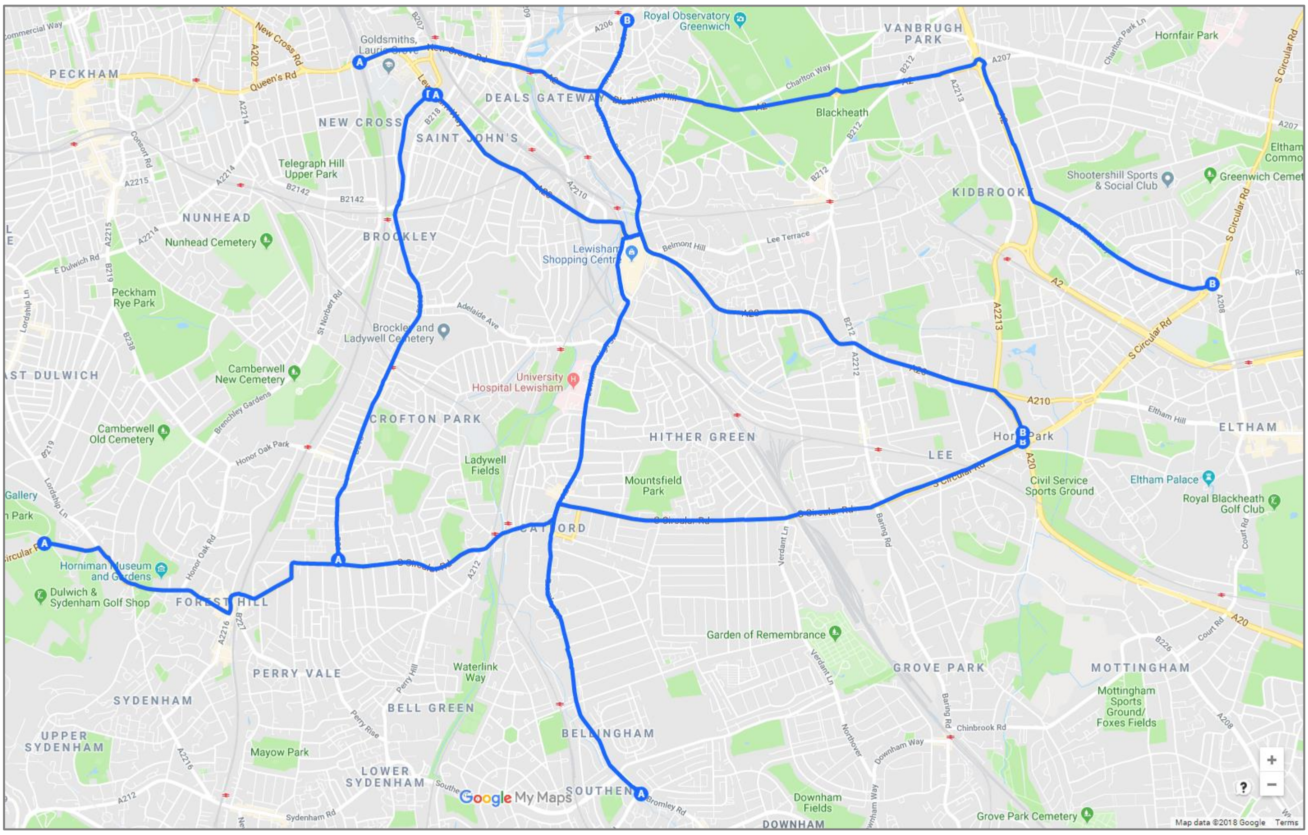


Figure 24 – O-D Pairs Selected for Analysis in the London Borough of Lewisham

Google Maps was used to identify the suggested driving routes between each O-D pair, leaving at 08:30 on a typical weekday morning. In addition, SATURN route trees were produced for the same O-D pairs in the AM peak hour model. The modelled routes in the OD trees were checked for realism against Google Maps' suggested routes. These comparisons can be seen in Figure 25 to Figure 34.

HGV routing was also reviewed by analysing the route trees for User Class 5 (OGVs). The HGV routes taken in SATURN were found to be realistic. They followed the same routes as the routes taken by User Class 1.

No modifications to the base year model are proposed.

It should be noted that Google Maps' mapping is from 2017, whilst the ELHAM model's base year is 2012.

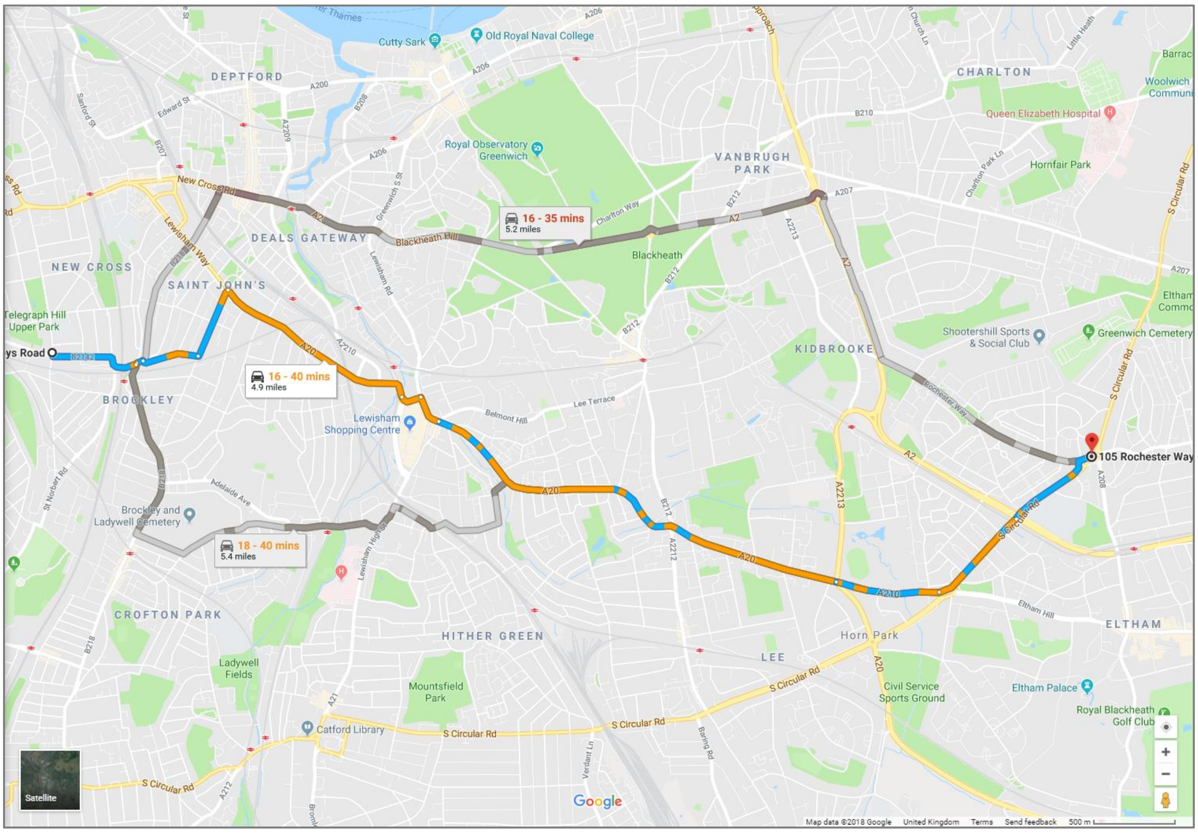


Figure 25: Route 1 (Google Maps)

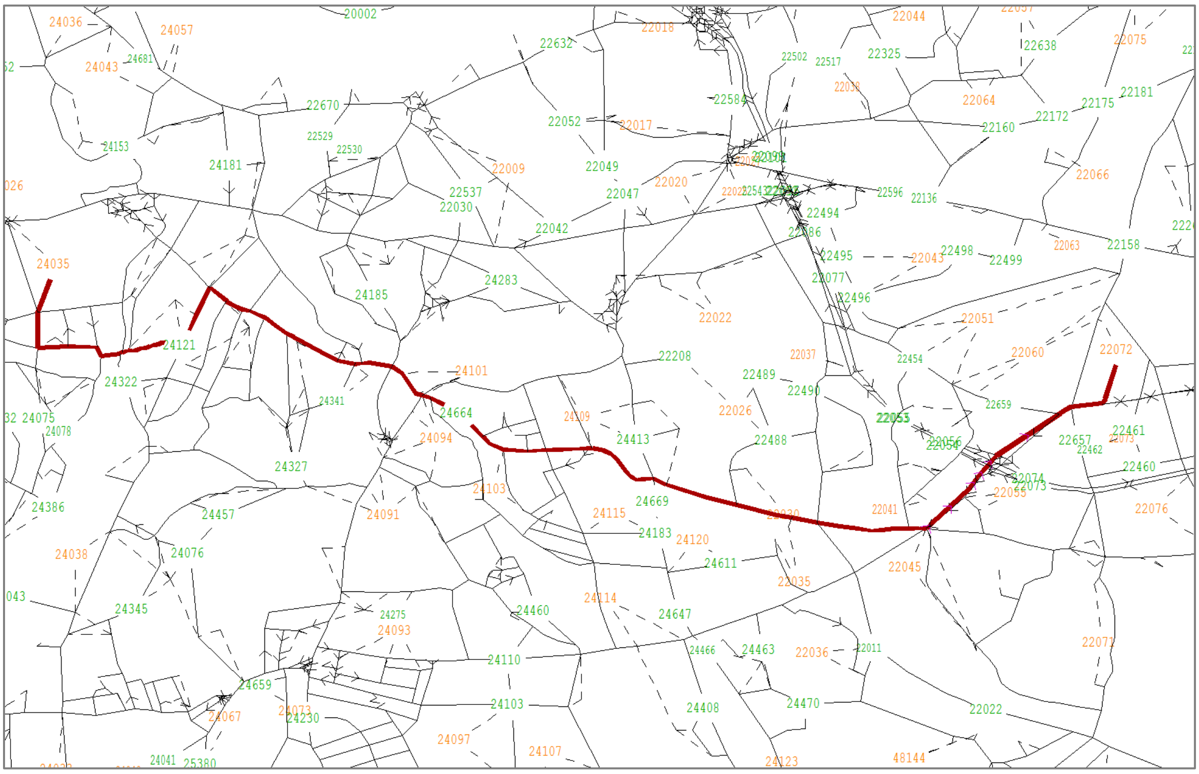


Figure 26: Route 1 (SATURN OD Tree)

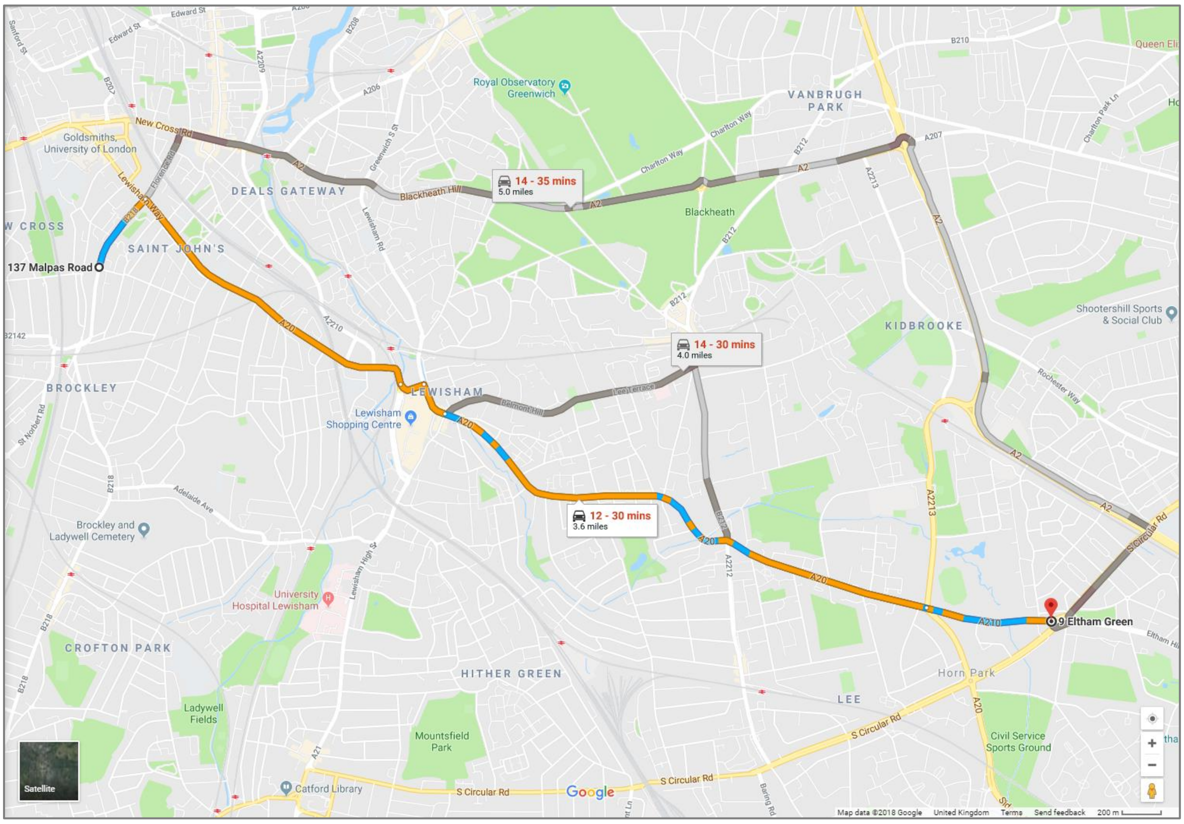


Figure 27: Route 2 (Google Maps)

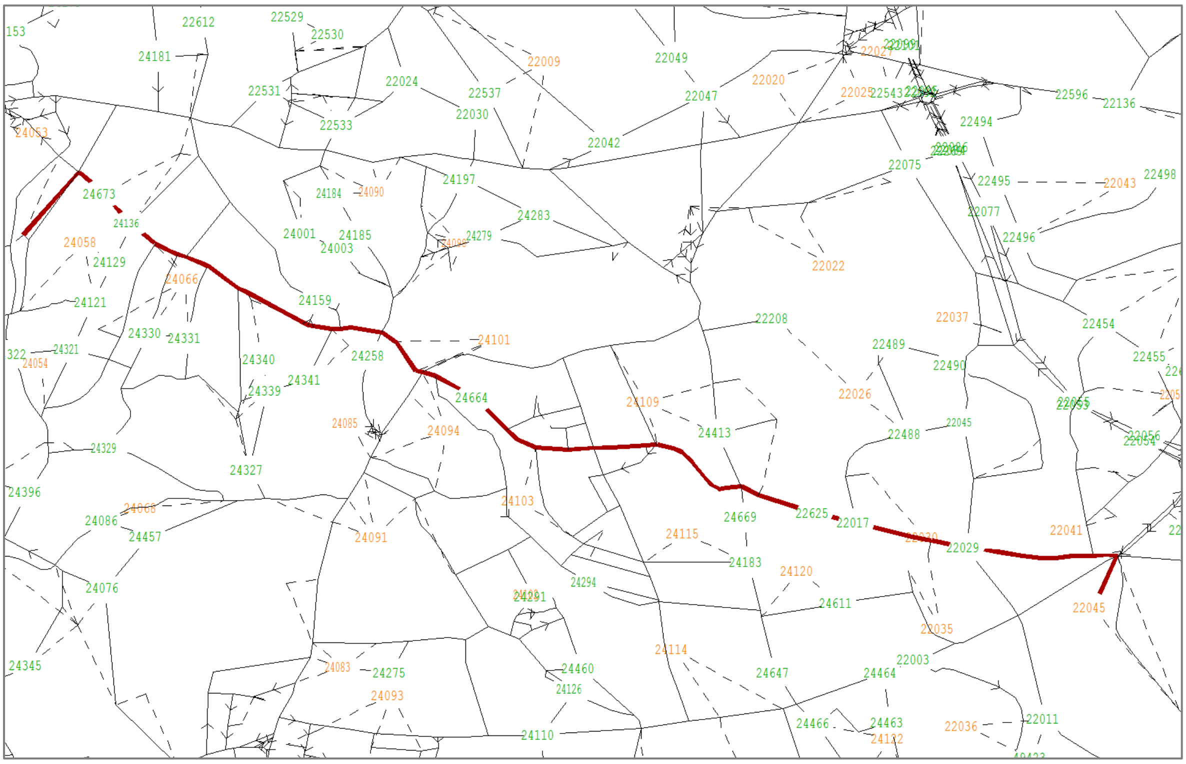


Figure 28: Route 2 (SATURN OD Tree)

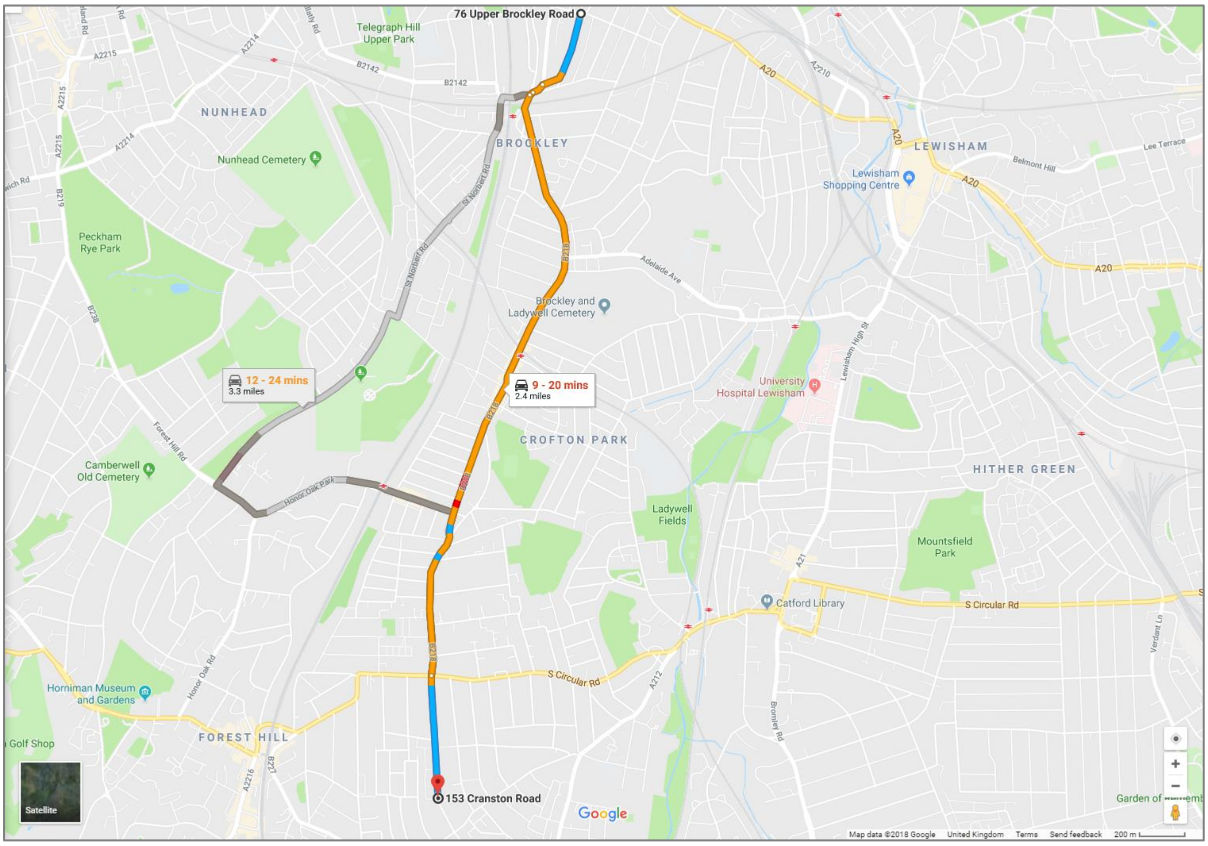


Figure 29: Route 3 (Google Maps)

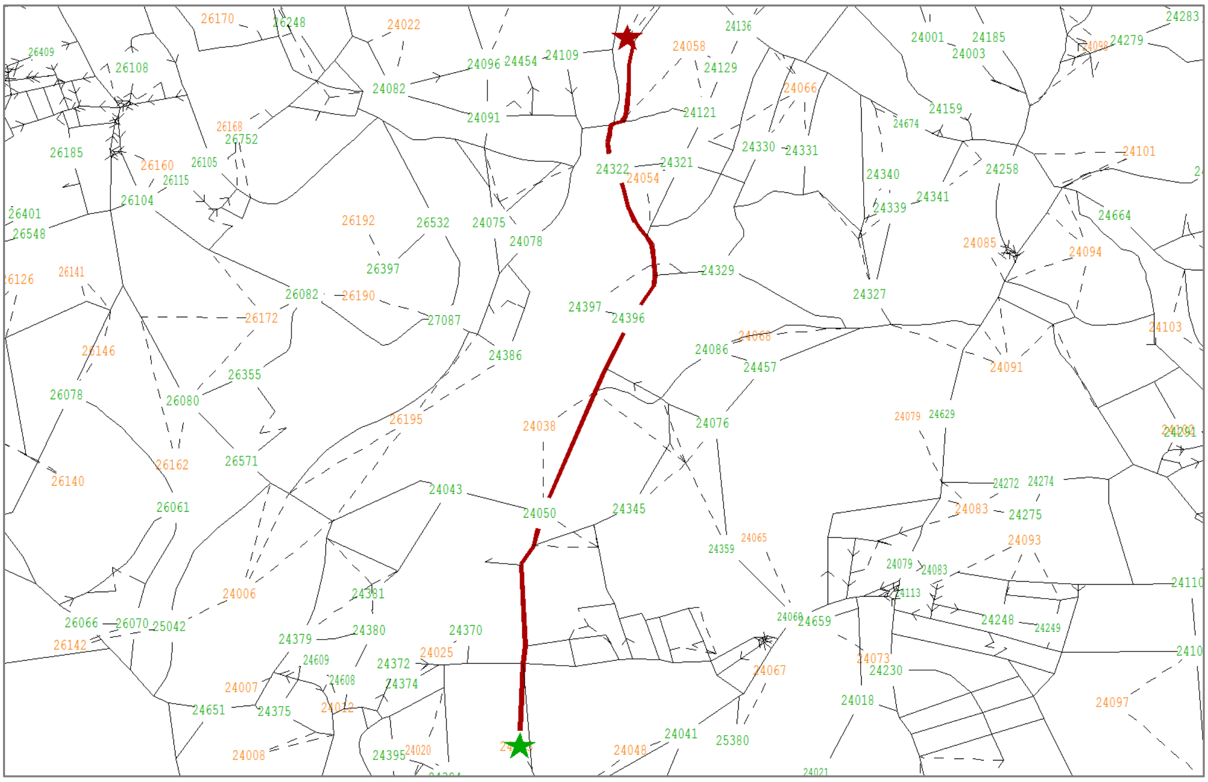


Figure 30: Route 3 (SATURN OD Tree)

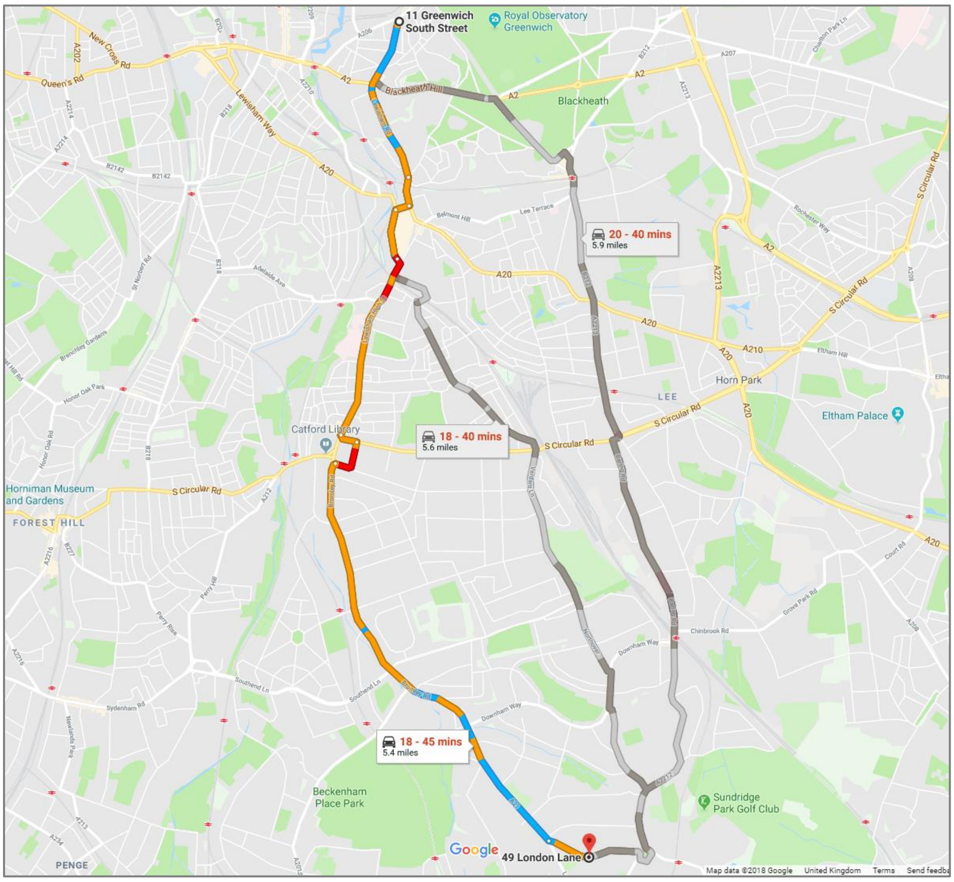


Figure 31: Route 4 (Google Maps)

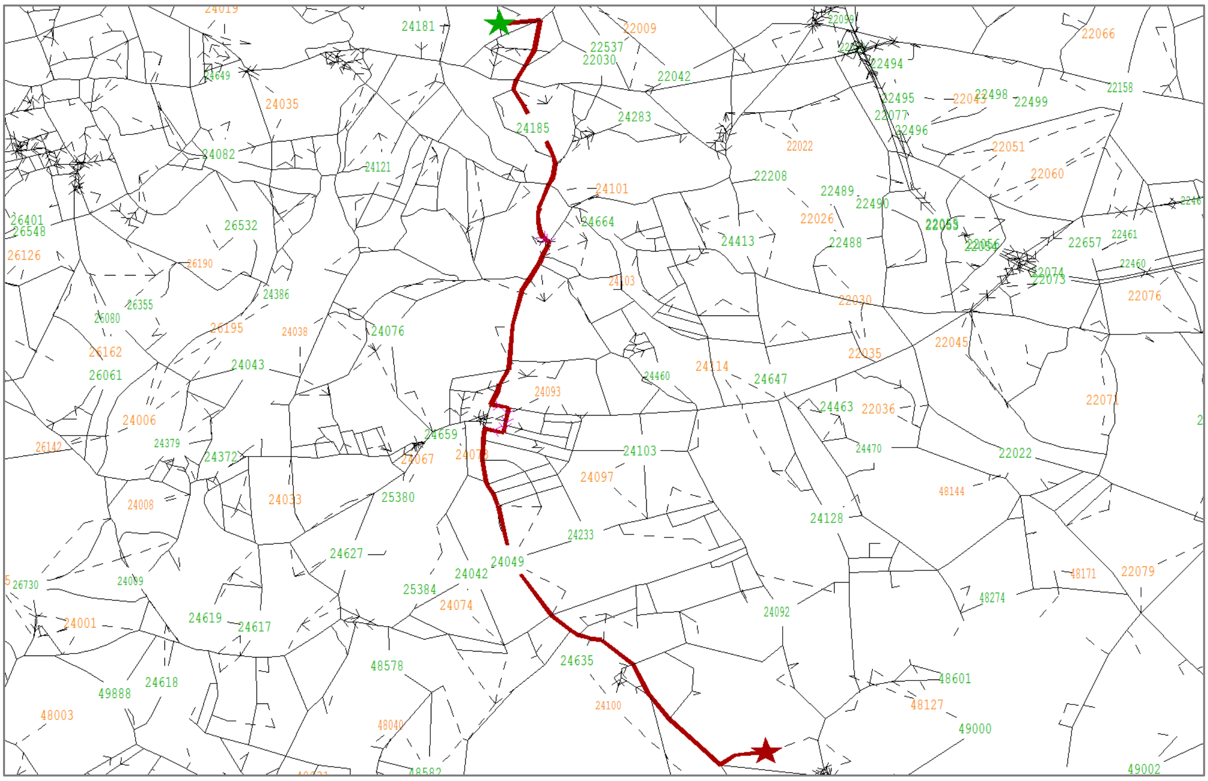


Figure 32: Route 4 (SATURN OD Tree)

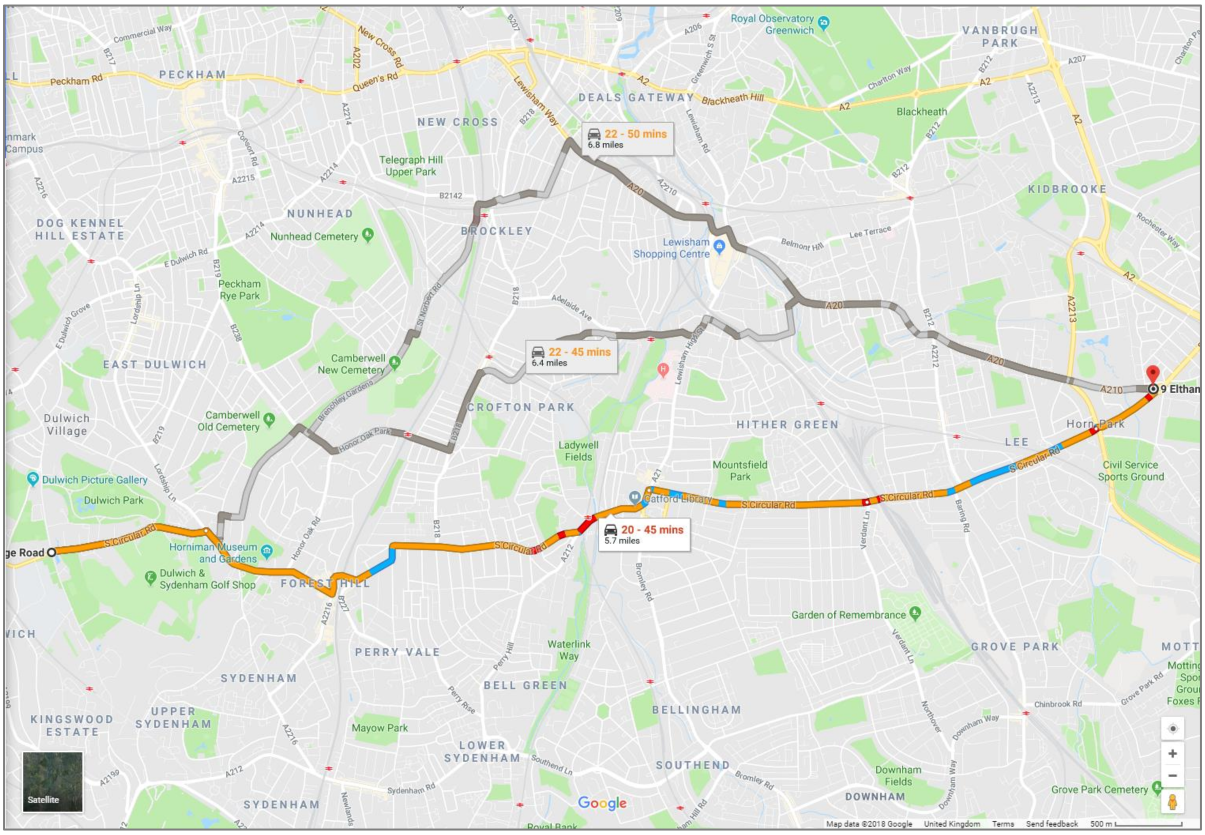


Figure 33: Route 5 (Google Maps)

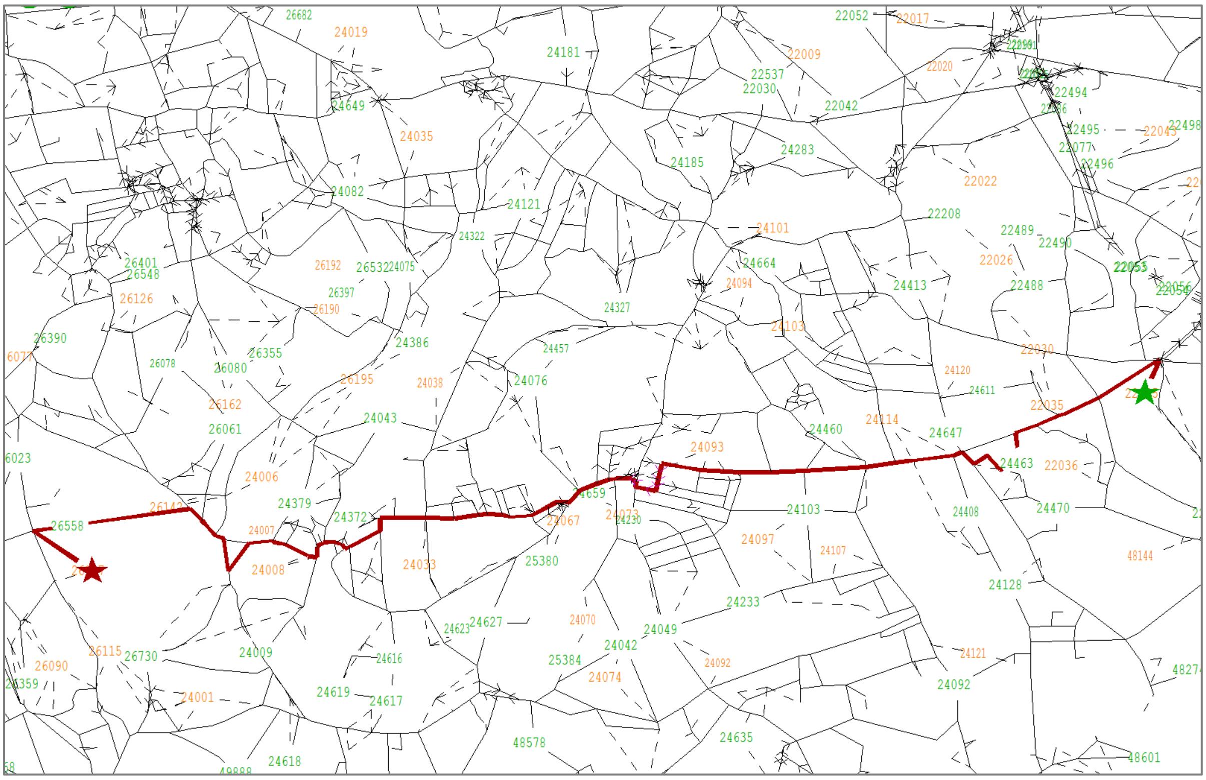


Figure 34: Route 5 (SATURN OD Tree)

10. Testing Increased Demand

Tests were undertaken to assess the impacts of 10% additional demand on the base year model. This process allowed potential coding errors and problem hotspots to be identified. The GONZO factors for the PASSQ and peak hour assignments were raised by 10% from 0.98 and 1.00, to 1.08 and 1.10, respectively. To examine the impact of the increased demand, actual flow and delay difference plots were produced for the study area.

Figure 35 shows the differences in actual flow relative to the 2012 base year model (the model with the original level of demand).

Figure 35: AM Peak Actual Flow Difference (PCU)

Figure 36 shows the differences in delay relative to the 2012 base year model (the model with the original level of demand).

Figure 36: AM Peak Delay Difference (seconds)

The plots for each peak show that the impact of increased demand on traffic flows and delays is relatively small. No modifications to the base year model are required because the model has passed the stress-test of testing increased demand.

11. Calibration Of Screenlines/Enclosures

TfL's guidance requires that calibration of screenlines/enclosures is undertaken to confirm that the aggregate directional movement of trips across the study area is well represented by the model.

A set of screenlines/enclosures were selected in and around the Borough for analysis. The 12 screenlines/enclosures selected are shown in Figure 37 and listed below:

- Deptford
- Sidcup
- Lewisham - Dartford (west)
- Bromley
- Canary Wharf
- Dulwich
- Lewisham
- Penge - Herne Hill
- Inner - East
- Eltham - South
- Deptford - St Johns
- Greenwich East-West

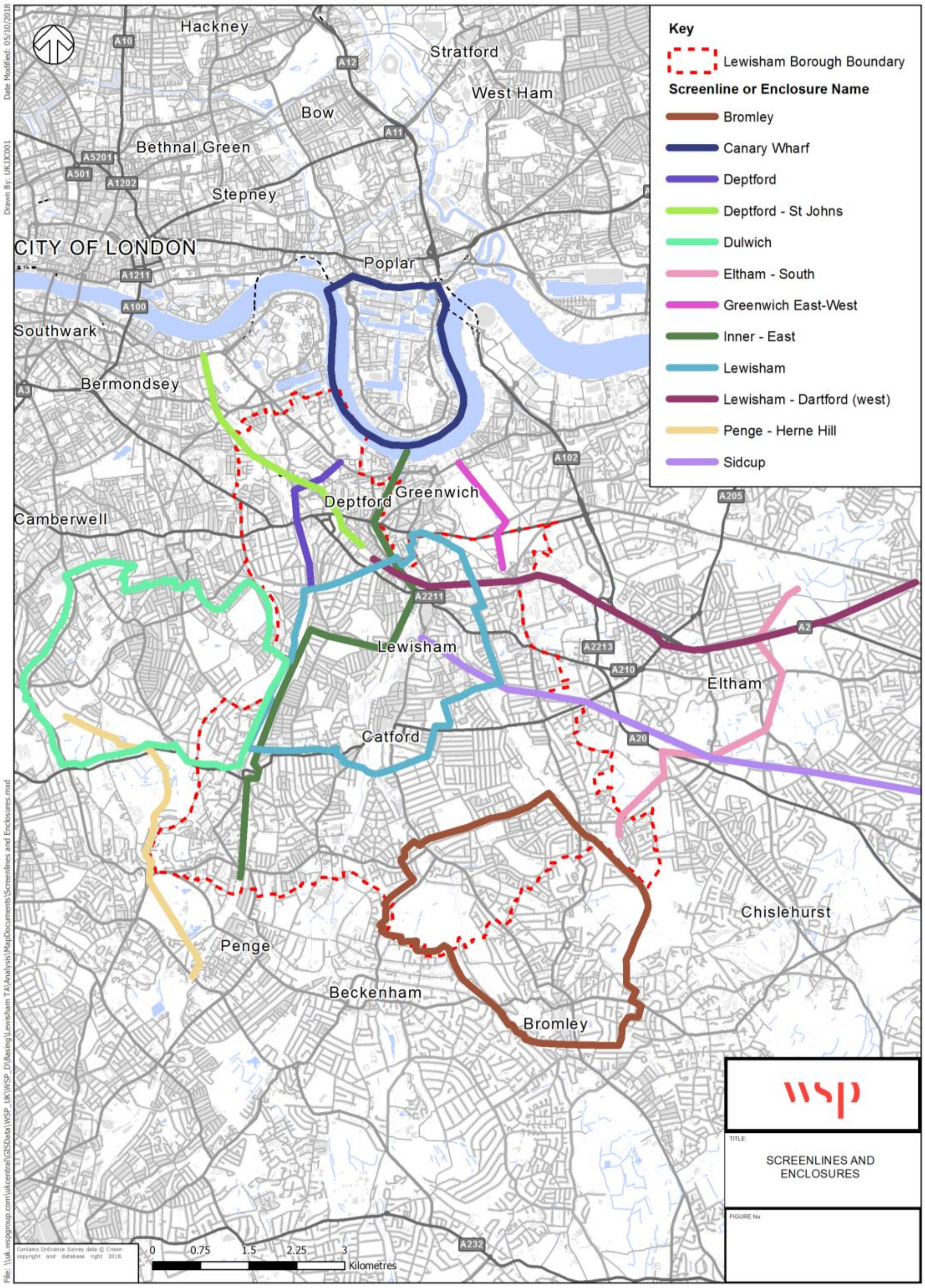


Figure 37: Screenline/Enclosure Locations

According to WebTAG Unit M3-1 and TfL's guidance, the difference between the modelled flow and the observed flow across a screenline or enclosure should be less than 5% for all, or nearly all, of the screenlines/enclosures.

Table 5 shows the screenline/enclosure calibration in the AM peak.

Table 5: AM Peak Screenline/Enclosure Calibration

Screenline / Enclosure	Direction	Observed Flow	Modelled Flow	Diff.	% Diff.	WebTAG Criteria
Deptford	Westbound	3468	3599	130	3.8%	Pass
Deptford	Eastbound	2406	2492	86	3.6%	Pass
Sidcup	Northbound	7295	7613	318	4.4%	Pass
Sidcup	Southbound	7829	8037	209	2.7%	Pass
Lewisham - Dartford (west)	Northbound	9486	9404	-81	-0.9%	Pass
Lewisham - Dartford (west)	Westbound	8489	8573	84	1.0%	Pass
Bromley	Inbound	6664	6999	336	5.0%	Pass
Canary Wharf	Inbound	4079	4002	-76	-1.9%	Pass
Dulwich	Inbound	7838	7666	-172	-2.2%	Pass
Lewisham	Inbound	10449	10423	-26	-0.2%	Pass
Bromley	Outbound	6098	6321	223	3.7%	Pass
Canary Wharf	Outbound	2328	2263	-65	-2.8%	Pass
Dulwich	Outbound	8227	7965	-262	-3.2%	Pass
Lewisham	Outbound	9745	9803	58	0.6%	Pass
Penge - Herne Hill	Eastbound	3945	3550	-395	-10.0%	Fail
Penge - Herne Hill	Westbound	4199	4175	-25	-0.6%	Pass
Inner - East	Westbound	7417	7576	159	2.1%	Pass

Screenline / Enclosure	Direction	Observed Flow	Modelled Flow	Diff.	% Diff.	WebTAG Criteria
Inner - East	Eastbound	5379	5296	-82	-1.5%	Pass
Eltham - South	Eastbound	6022	6209	187	3.1%	Pass
Eltham - South	Westbound	8569	8295	-274	-3.2%	Pass
Deptford - St Johns	Eastbound	2945	2659	-286	-9.7%	Fail
Deptford - St Johns	Westbound	3146	2948	-198	-6.3%	Fail
Greenwich East-West	Eastbound	1919	1928	9	0.5%	Pass
Greenwich East-West	Westbound	2850	2946	97	3.4%	Pass

Just three of the 24 (13%) screenlines/enclosures fail to meet WebTAG's criteria, with the majority passing. The Deptford – St Johns screenline (in the north-west of the Borough) accounts for two of the three fails, this is a screenline to the north west of the borough and is only partially within LBL so is not of significant concern.

All, or nearly all, of the screenlines have a difference between modelled flow and observed flow of less than 5%. The screenlines/enclosures meet WebTAG's criteria.

12. Mini-Screenlines/Enclosures

TfL's guidance also requires that the constituent parts of each screenline/enclosure are analysed. Because there is no official WebTAG criteria for the calibration of mini-screenlines, the assessment has been based on GEH, with a GEH under 5 representing a "pass" and a GEH above 5 representing a "fail".

Figure 38 shows where each of the screenlines fails and passes.

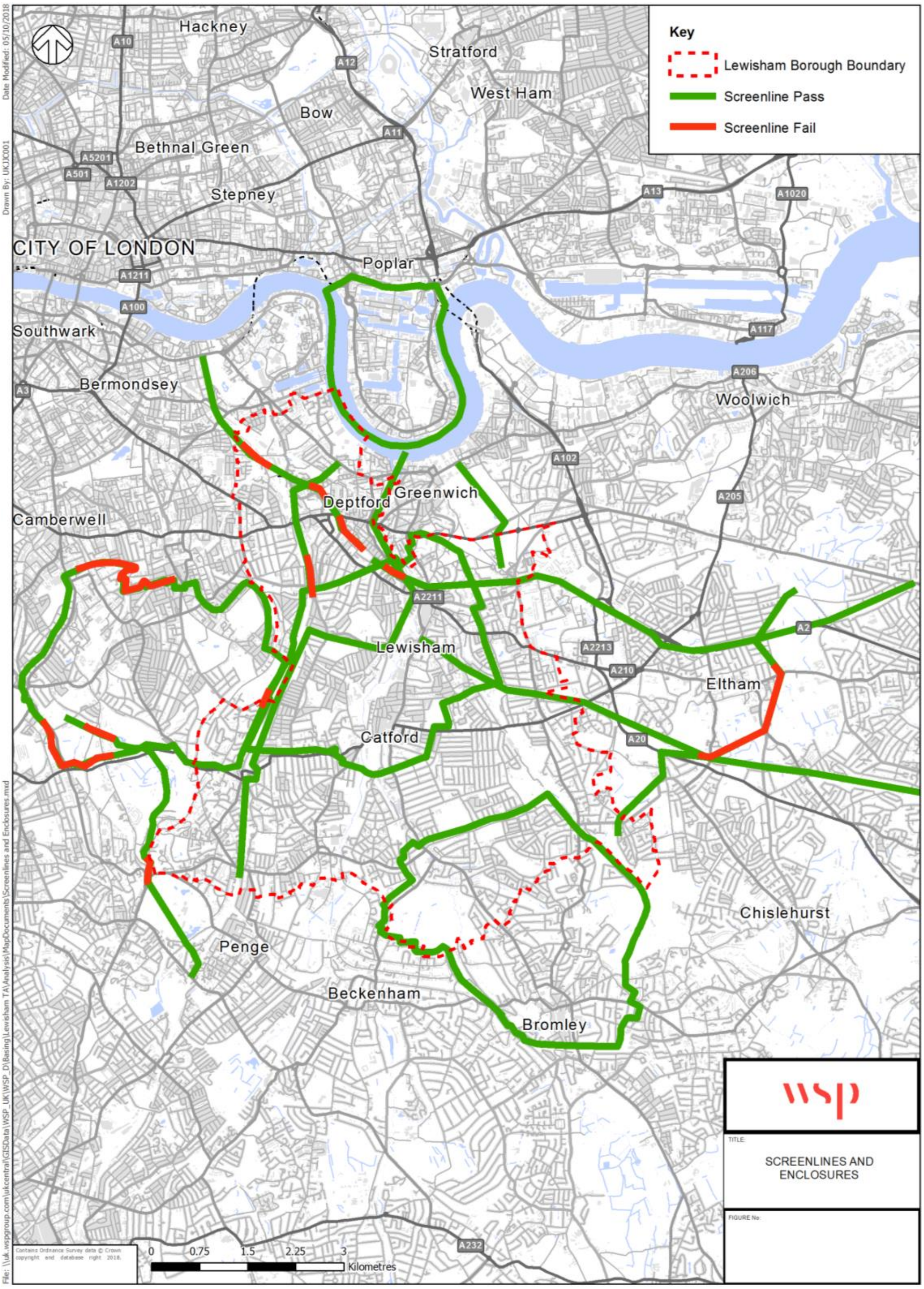


Figure 38: AM Peak Mini-Screenline Calibration

The analysis has shown that all, or nearly all, of the mini-screenlines pass with a GEH below 5. There are some failures outside of the Borough boundary, particularly to the west of the Borough on the Dulwich enclosure. As these are not within the Borough itself, this is a lesser issue.

Based on the analysis of the screenlines and mini-screenlines, no improvements to the calibration of the screenlines/enclosures is required.

13. Validation Of Journey Times

TfL's HAM guidance requires that observed journey times are compared against modelled journey times to confirm their validation. A set of journey time routes were selected in and around the study area for analysis. The selected routes are shown in Figure 39.

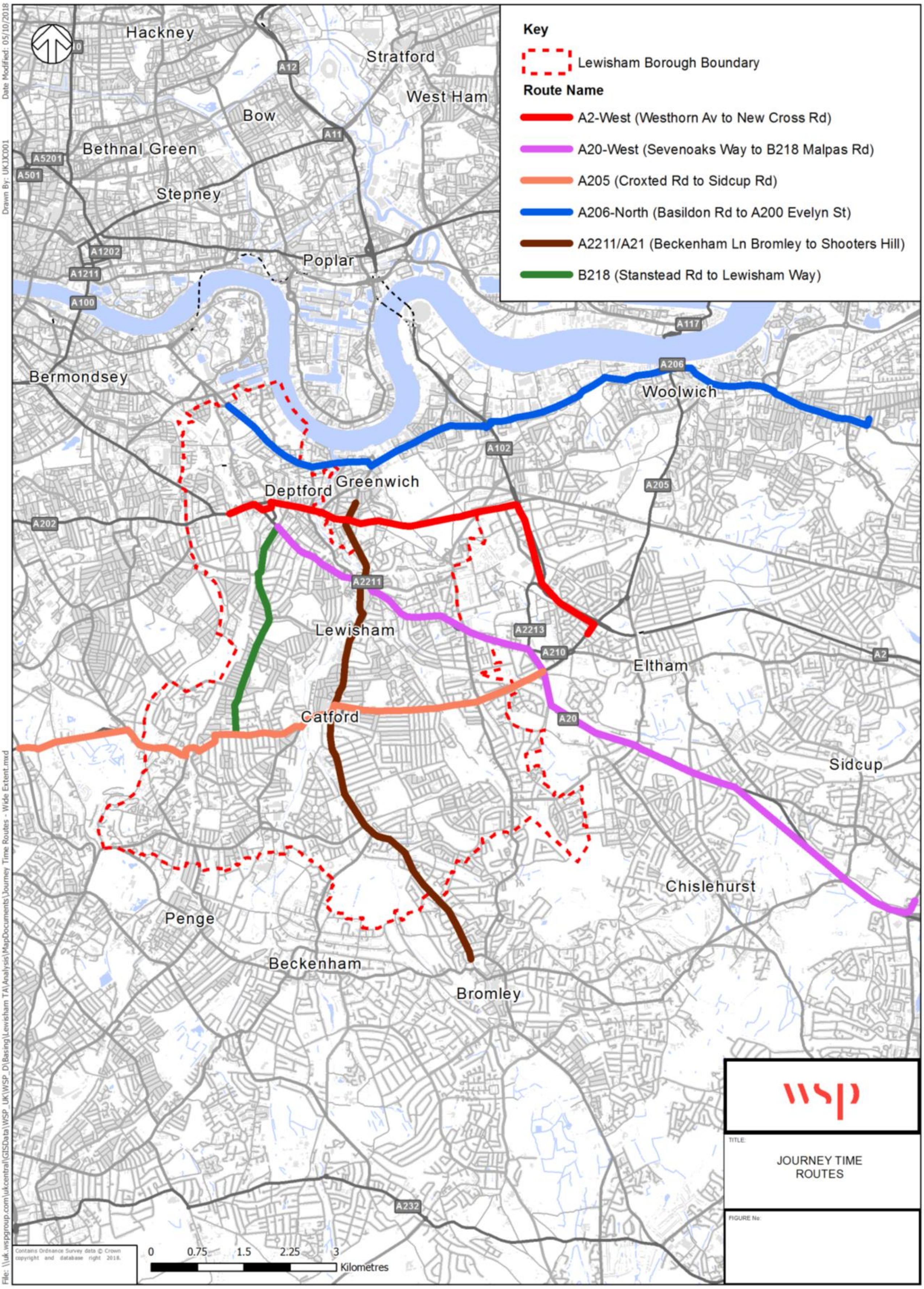


Figure 39: Journey Time Routes

The journey time routes reviewed as part of this model audit were:

- B218 (Stanstead Rd to Lewisham Way) and B218 (Lewisham Way to Stanstead Rd)
- A2211/A21 (Beckenham Ln Bromley to Shooters Hill) and A2211/A21 (Shooters Hill to Beckenham Ln Bromley)
- A206-North (Basildon Rd to A200 Evelyn St) and A206-North (A200 Evelyn St to Basildon Rd)
- A2-West (Westhorn Av to New Cross Rd) and A2-West (New Cross Rd to Westhorn Av)
- A20-West (Sevenoaks Way to B218 Malpas Rd) and A20-West (B218 Malpas Rd to Sevenoaks Way)
- A205 (Croxted Rd to Sidcup Rd) and A205 (Sidcup Rd to Croxted Rd)

According to WebTAG Unit M3-1 and TfL's guidance, the modelled journey times should be within 15% of the observed journey times (or within one minute of each other if higher than 15% different) for more than 85% of the routes.

Table 6 shows the journey time validation in the AM peak.

Table 6: AM Peak Journey Time Validation

Ref.	Description	Dir.	Observed Time (s)	Modelled Time (s)	Diff. (s)	% Diff.	Pass
R157	B218 (Stanstead Rd to Lewisham Way)	N	1173	1027	-146	-12%	Pass
R158	B218 (Lewisham Way to Stanstead Rd)	S	1000	868	-131	-13%	Pass
R159	A2211/A21 (Beckenham Ln Bromley to Shooters Hill)	N	1487	1392	-95	-6%	Pass
R160	A2211/A21 (Shooters Hill to Beckenham Ln Bromley)	S	1471	1354	-117	-8%	Pass
R183	A206-North (Basildon Rd to A200 Evelyn St)	N	2843	2744	-99	-3%	Pass
R184	A206-North (A200 Evelyn St to Basildon Rd)	S	1680	1918	238	14%	Pass
R185	A2-West (Westhorn Av to New Cross Rd)	N	1834	1751	-83	-5%	Pass

Ref.	Description	Dir.	Observed Time (s)	Modelled Time (s)	Diff. (s)	% Diff.	Pass
R186	A2-West (New Cross Rd to Westhorn Av)	S	903	1027	123	14%	Pass
R189	A20-West (Sevenoaks Way to B218 Malpas Rd)	E	1441	1561	120	8%	Pass
R190	A20-West (B218 Malpas Rd to Sevenoaks Way)	W	2402	2226	-176	-7%	Pass
R207	A205 (Croxted Rd to Sidcup Rd)	E	1844	1891	46	3%	Pass
R208	A205 (Sidcup Rd to Croxted Rd)	W	3029	2333	-696	-23%	Fail

Just one of the 12 (8%) routes (route R208) fails to meet WebTAG's criteria, with the rest of the routes (92%) passing.

A graph showing the modelled versus observed journey time along route R208 is shown in Figure 40. As can be seen from the graph, the lines begin to deviate from each other at approximately 6,000 metres along the route, and it is at this point that the route begins to fail according to WebTAG's criteria.

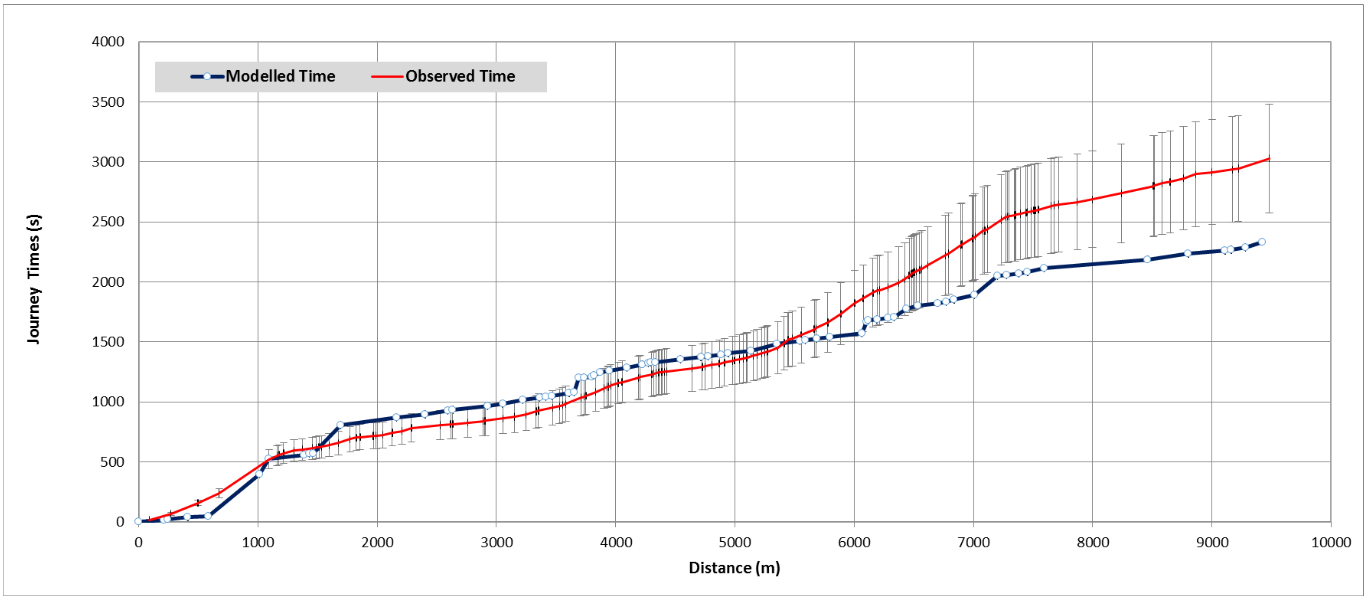


Figure 40: Route R208 Modelled vs Observed Journey Time

Figure 41 shows the route fails primarily outside of the Borough boundary. Given this, based on analysis of the journey times, no improvements to the validation is required.

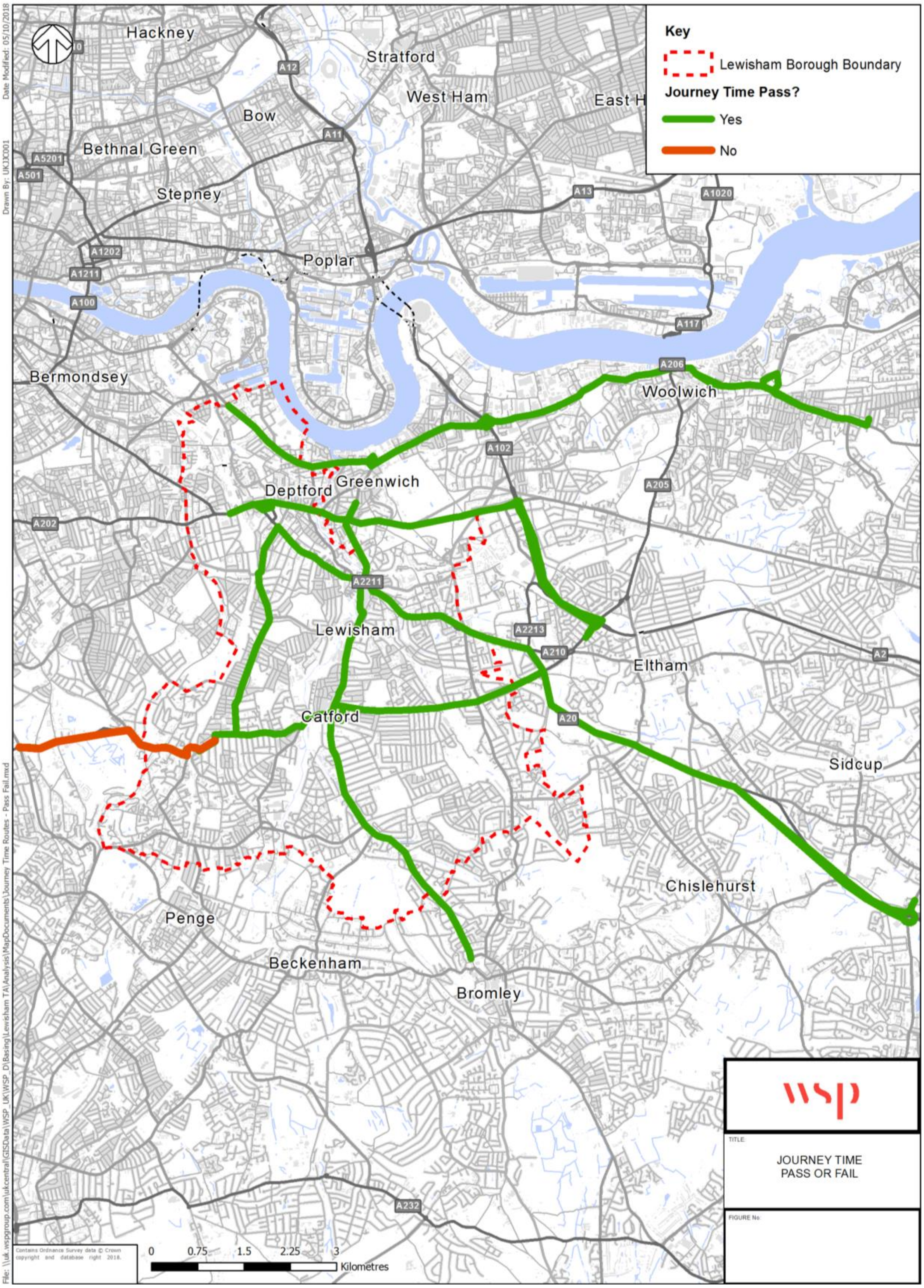


Figure 41: Journey Time Route Validation

14. Calibration Of Link Counts

Link flows in the study area were analysed to ascertain the extent to which the base year model is calibrated to observed count data. The criteria used to assess the calibration of link flows is defined in WebTAG and is shown in Table 7.

Table 7: Assignment Acceptability Guidelines

Criteria and Measure **Assigned Model Hourly Flows compared with Observed Flows**		**Acceptability Guideline**
Flow Criteria		
Observed flow < 700 vph	Modelled flow within ±100 vph	> 85 % of links
Observed flow 700 - 2,700 vph	Modelled flow within ±15%	> 85 % of links
Observed flow > 2,700 vph	Modelled flow within ±400 vph	> 85 % of links
GEH Criteria		
GEH statistic for individual links < 5		> 85 % of links

Source: WebTAG Unit M3.1, Table 2.

For the AM peak, Figure 42 shows which links in the study area pass/fail in terms of meeting the flow criteria or the GEH criteria detailed in Table 7. The figure shows that no area across the borough appears to be weak in terms of flow calibration.

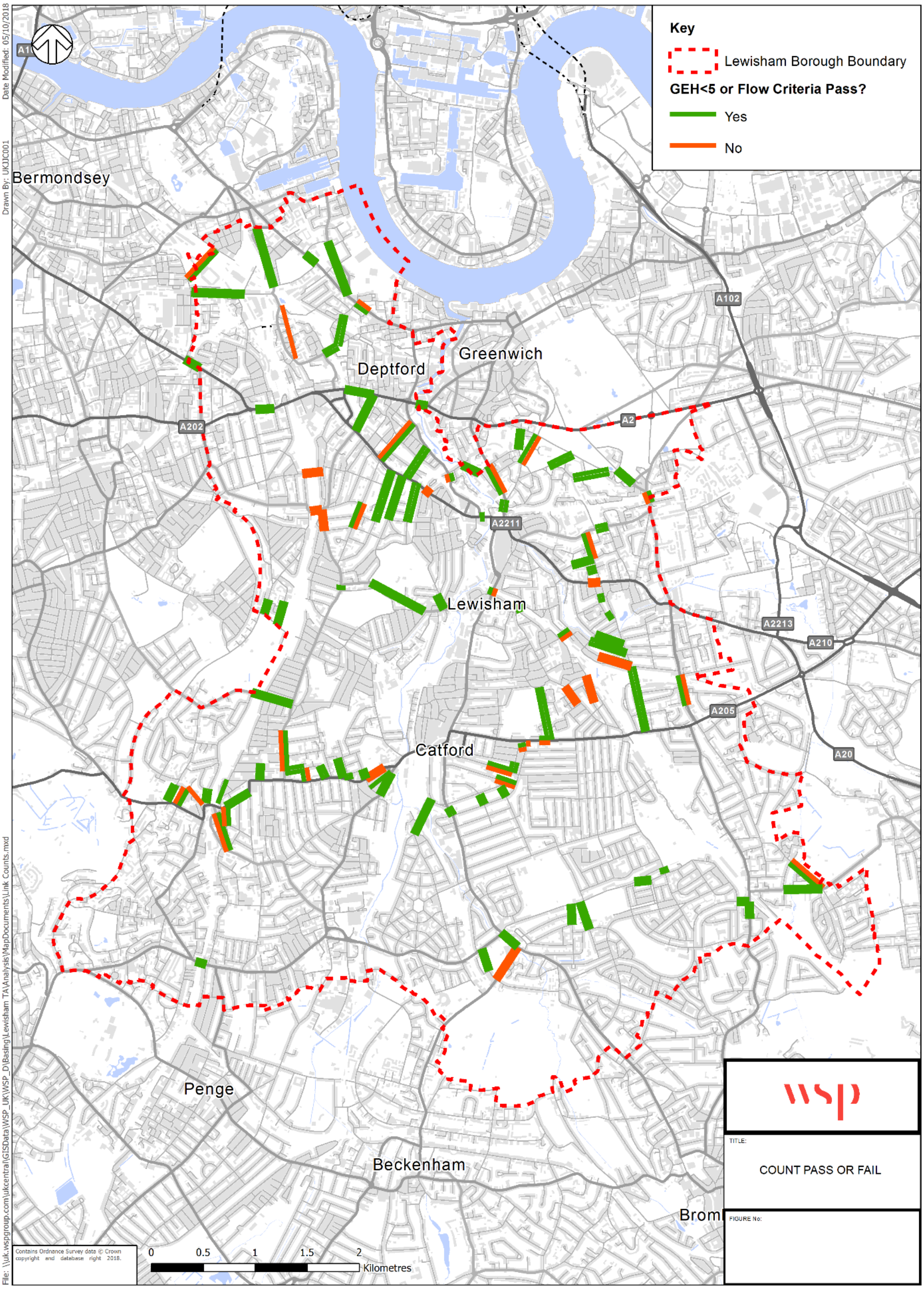


Figure 42: AM Peak Count Calibration

To assess the degree to which the flow criteria and GEH criteria are met, TfL's *"Sub-regional Highway Assignment Model Guidance on Model Use"* (Version 2.6) (TfL, 2017) recognises that:

"due to the strategic nature of the models, and the constraining of matrix estimation to groups of counts (mini-screenlines) rather than individual counts, the WebTAG acceptability guideline for individual links (and turning movements) is unlikely to be met. However, it is suggested that for local studies the achievement of this criteria in the study area is more realistic and should be worked towards."

Table 8 provides a summary of link calibration in the study area.

Table 8: Summary of Link Calibration in the Study Area

Criteria and Measure		AM Peak		
Flow Criteria		Total Counts	Meet Criteria	%
Observed	Modelled			
< 700 vph	±100 vph	178	133	75%
700-2,700 vph	±15%	19	13	68%
> 2,700 vph	±400 vph	0	0	n/a
GEH Criteria				
GEH for individual links < 5		197	115	58%
Flow or GEH Criteria				
GEH < 5 OR Flow Criteria Pass		**197**	**152**	**77%**

The key figure in Table 8 is the final row of the table, which shows the percentage of links on which the flow criteria or the GEH criteria is met. In the AM peak, at least one of these criterion on are met on 77% of the links which is considered good for ELHAM.

Overall, due to the wide extent of the study area, the calibration achieved is felt to be sufficient and it is concluded that no improvements are necessary.

15. Conclusion

WSP has undertaken a review of the adequacy and calibration/validation of the ELHAM model within the London Borough of Lewisham. The review has followed TfL's guidance for the use of the London Highway Assignment Models (HAM), set out in TfL's *"Sub-regional Highway Assignment Model Guidance on Model Use (Version 2.6)"* (TfL, 2017).

Our overall conclusion from the model review is that the ELHAM model represents the 2012 AM peak hour demand and traffic conditions well across the study area. Inspection of local screenlines and journey times confirmed that the model is reflective of observed strategic highway travel behaviour. Levels of congestion, delays and routing behaviour are also realistic and well matched to observed data.

In the study area the model meets the calibration/validation criteria in terms of screenlines, enclosures, mini-screenlines and journey times. The calibration of individual links falls slightly short of meeting the WebTAG criteria. However, given the strategic nature of the highway impact assessment and the large size of the Borough, the level of link calibration is considered sufficient.

In conclusion WSP has found that the existing 2012 base year ELHAM highway model is deemed to be sufficiently detailed and validated for the assessment of highway impacts in the London Borough of Lewisham.

Appendix C – Technical Note – Lewisham Railplan Local Plan Future Year Model Review – Lewisham Local Plan Transport Assessment

Date: 9 January 2019

1. Introduction

In August 2018, WSP was appointed by the London Borough of Lewisham (LBL) to provide transport modelling services to support LBL with the preparation of their Local Plan and Local Implementation Plan (LIP). Strategic transport modelling is required to help provide the evidence base for assessing the impacts and the improvements required to support the proposed growth within the Borough.

In October 2018 WSP audited the Railplan 7.0 Base Year (BY) reference case scenario WE001A08A provided by TfL against sources of observed data. Details can be found in the technical note *Lewisham Local Plan_Railplan_Audit_DRAFT 22.10.2018.pdf*. Though there were a few minor issues identified in the audit process, the Base Year model generally validates well against DfT validation criteria. It was agreed by all attendees at the meeting on 1st November 2018 that there was no update required for the BY scenario.

The next stage of the Public Transport (PT) assessment is to review the Future Year (FY) reference case scenarios. The purpose of the assessment is to document the changes in public transport demand and services within TfL's strategic PT models in LBL and to identify key problems and issues with public transport across the LBL in the future.

The FY model review process will be based on the similar analysis performed in the BY model audit. The focus will be on the PT demand growth between the years within the LBL, including buses, Docklands Light Railway, the Overground and Network Rail. It is important to note that this review covers just the AM peak model which covers the three-hour morning peak 7:00-10:00.

For context Figure 1 presents the LBL and highlights the network rail and DLR stations within the borough.

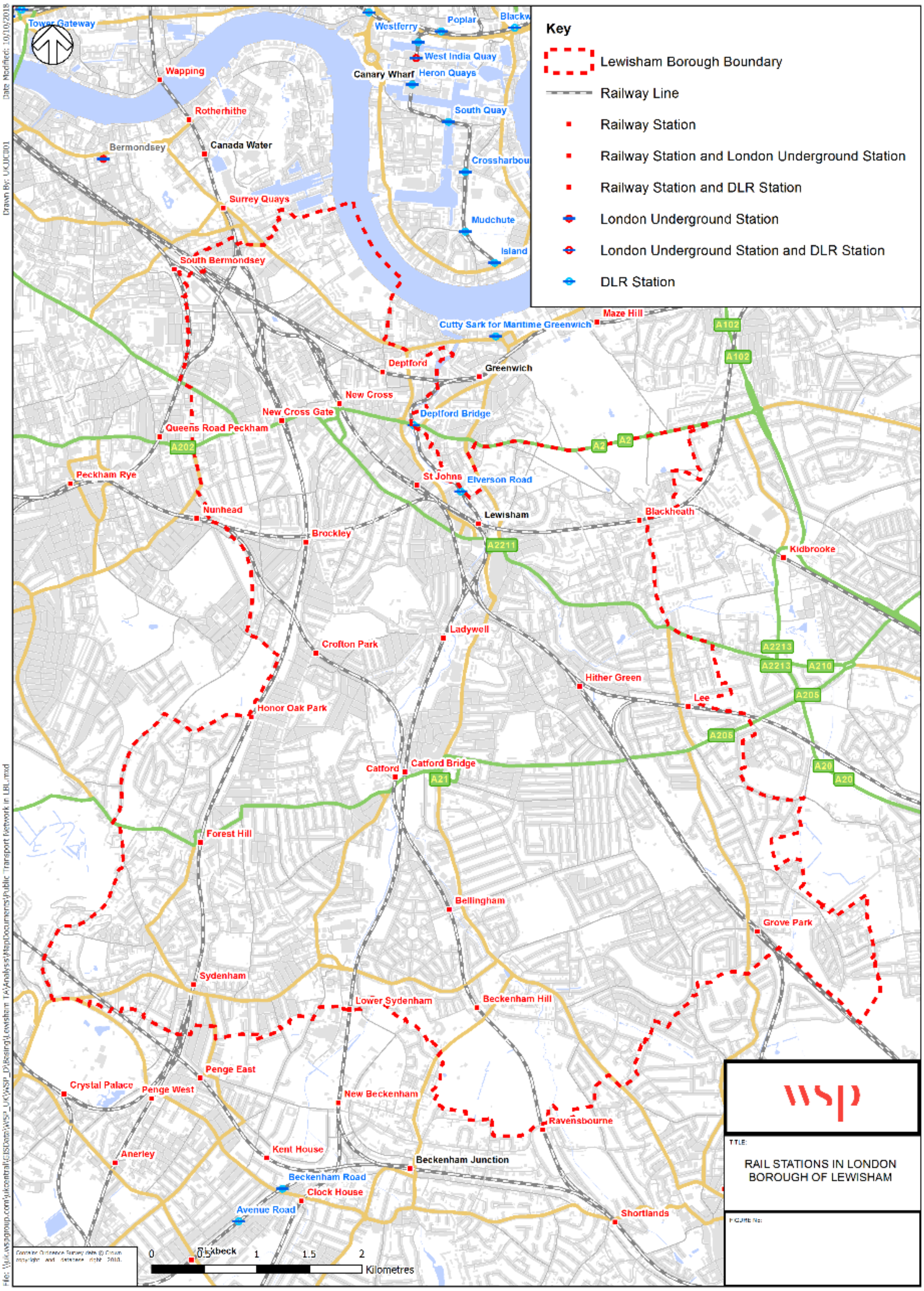


Figure 1: Location of Rail Stations in London Borough of Lewisham

2. Future Year Scenario Development

It was agreed in the proposal that 2026 and 2041 will be used as forecast years for the PT assessment. Certain schemes are incorporated in TfL Reference Case Railplan scenarios. A summary of the schemes and commentary on whether they are included or not is summarised below.

Jubilee and Northern Line Additional Trains

The *Jubilee and Northern Line Additional Trains* (JNAT) upgrade, which proposes to increase peak trains on Jubilee line from 30tph to 36tph by 2020 and on Northern line from 24tph to 30tph by 2022, has now been postponed. For this reason, the coding for the JNAT scheme, which was originally applied for all Railplan FY Reference Case scenarios, was removed.

TfL have provided WSP with network scenarios of 2026 and 2041 with funded infrastructure and not including JNAT scheme, namely;

- CB016A98L: 2031 AM Funded (based on C7131HSP2 network)
- CB004A54O: 2041 AM Funded (based on C7131HSP2 network)

Silvertown Tunnel

The planning of Silvertown Tunnel, which is a twin-tunnel crossing connecting to the A1020 Silvertown Way/Lower Lea Crossing and the A102 Blackwall Tunnel Approach, was approved in May 2018. The tunnel is expected to relieve private vehicle demand on Blackwall Tunnel which currently experiences serious congestion. There would be up to 37 buses per hour using the new tunnel once it is in operation in 2023. Despite the scheme taking place in Royal Borough of Greenwich, the highway and PT impacts of the scheme can well extend up to the study area. Additionally, the proposed bus stations which utilise the tunnel would pass through London Borough of Lewisham, thus it is of necessity to code the transit lines into FY reference models. Coding files were provided by TfL.

Bakerloo Line Extension

WSP are aware that the single most important public transport improvement proposed in the area is the Bakerloo Line extension (BLE) to Lewisham. Although the network coding of BLE was not applied in the FY Reference Cases, one or more intervention packages in Stage 4 will involve the coding of such scheme.

Ultra Low Emission Zones

The extension of Ultra Low Emission Zone (ULEZ) is already implemented in the study area. It is alleged that this scheme, despite not yet incorporated in TfL FY Reference Case scenarios, would have a negligible impact because;

- The traffic impacts of ULEZ expansion are negligible given that the scheme is targeted at the most polluting of vehicles only. The benefits in terms of emissions are significant primarily as a result of speeding up the replacement of polluting vehicles with Euro 6 compliant ones rather than any traffic reduction benefits that could arise.
- The effect of ULEZ diminishes over time given that the percentage of non-compliant vehicles would fall over time. ULEZ simply speeds that process up to bring forward those benefits from 2020 to 2025. Therefore, in 2026 (the first forecast year) any possible traffic impacts of ULEZ are even more diminished, whilst for 2041 no impact is expected at all.

For above reasons there is no action regarding coding the ULEZ extension into FY Railplan models.

Demand Matrices

In accordance with the network updates prior to model review, TfL have provided WSP with associated demand matrices from LTS assignments for 2026 and 2041, which exclude the facilitation of JNAT and Silvertown Tunnel. With the correct network and matrices, Railplan assignments are undertaken for 2026 and 2041 to derive the Lewisham revised Reference Case scenarios. The resultant Railplan scenario names are as below;

- LW004A45D: 2026 AM Funded without JNAT
- LW005A45P: 2041 AM Funded without JNAT

3. Review Findings

Standard outputs from Railplan assignments of the FY Reference Case scenarios (LW004A45D & LW005A45P) are extracted and compared with the BY Reference Case scenario (WE001A08A). The review is based on increase in demand and crowding on PT services, growth in total station demand as well as bus demand.

Link Flows

Regarding non-NR PT services in the study area there are Overground and DLR lines, as shown in Figure 2 (shaded areas). In addition, sections of Bakerloo and Jubilee Lines in the proximity of the study area are considered as they provide certain level of relevance to Lewisham. These include Bakerloo Line to/from Elephant & Castle (potential extension to Lewisham in the BLE scheme) and Jubilee Line passing through Canada Water which is an interchange with Overground Line which leads to the study area. Figure 3 shows the routes and stations of these LUL services.

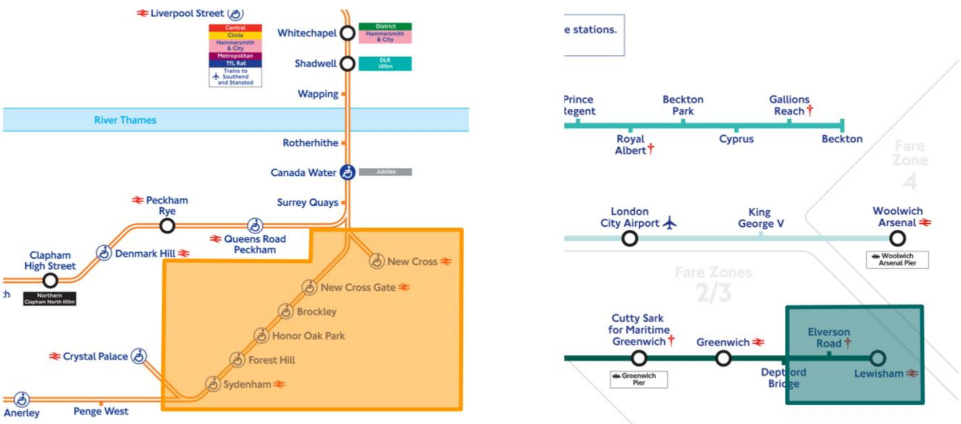


Figure 2: Overground and DLR Route and Stations

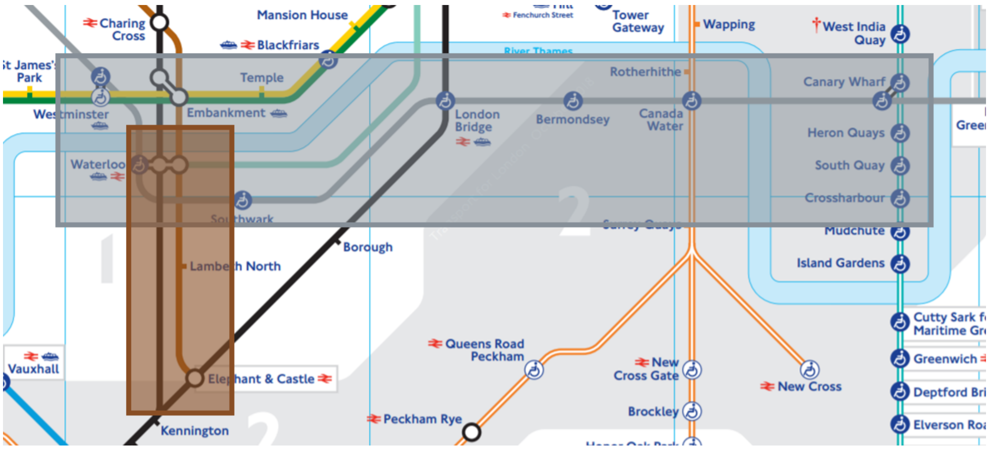


Figure 3: Bakerloo and Jubilee Line Route and Stations

Table 1 shows Railplan demand for 2011, 2026 and 2041 for line flows along services within the LBL, DLR and Overground services and those outside of LBL, Jubilee and Bakerloo lines.

Table 1: Line Flow 2011-2041 Model Comparison

From	To	Direction	Mode	Line(s)	Railplan 2011 Demand	Railplan 2026 Demand	Railplan 2042 Demand	2011-2026 %Growth	2011-2026 Growth	2011-2041 %Growth	2011-2041 Growth
Lewisham	Elverson Road	NB	DLR	DLR	6,199	8,278	9,475	34%	2,079	53%	3,276
Elverson Road	Deptford Bridge	NB	DLR	DLR	6,225	8,331	9,539	34%	2,106	53%	3,314
Deptford Bridge	Elverson Road	SB	DLR	DLR	1,917	2,907	3,300	52%	990	72%	1,383
Elverson Road	Lewisham	SB	DLR	DLR	1,891	2,824	3,197	49%	933	69%	1,306
Not applicable	**Not applicable**	**Not applicable**	**Not applicable**	**DLR Sub-total**	**16,232**	**22,340**	**25,511**	**38%**	**6,108**	**57%**	**9,279**
Crystal Palace	Sydenham	NB	NR	Overground	459	1,178	1,251	157%	719	173%	792
Penge West	Sydenham	NB	NR	Overground	1,536	2,293	2,751	49%	757	79%	1,215
Sydenham	Forest Hill	NB	NR	Overground	3,256	5,450	5,824	67%	2,194	79%	2,568
Forest Hill	Honor Oak Park	NB	NR	Overground	5,019	8,202	8,734	63%	3,183	74%	3,715
Honor Oak Park	Brockley	NB	NR	Overground	5,311	8,748	9,317	65%	3,437	75%	4,006

From	To	Direction	Mode	Line(s)	Railplan 2011 Demand	Railplan 2026 Demand	Railplan 2042 Demand	2011-2026 %Growth	2011-2026 Growth	2011-2041 %Growth	2011-2041 Growth
Brockley	New Cross Gate	NB	NR	Overground	6,198	10,111	10,817	63%	3,913	75%	4,619
New Cross Gate	Surrey Quays	NB	NR	Overground	6,539	10,924	11,829	67%	4,385	81%	5,290
New Cross	Surrey Quays	NB	NR	Overground	95	175	287	84%	80	202%	192
Surrey Quays	New Cross	SB	NR	Overground	151	193	236	28%	42	56%	85
Surrey Quays	New Cross Gate	SB	NR	Overground	1,791	3,738	4,403	109%	1,947	146%	2,612
New Cross Gate	Brockley	SB	NR	Overground	1,664	3,198	3,783	92%	1,534	127%	2,119
Brockley	Honor Oak Park	SB	NR	Overground	1,791	3,092	3,612	73%	1,301	102%	1,821
Honor Oak Park	Forest Hill	SB	NR	Overground	1,830	3,050	3,549	67%	1,220	94%	1,719
Forest Hill	Sydenham	SB	NR	Overground	1,733	2,493	2,881	44%	760	66%	1,148
Sydenham	Crystal Palace	SB	NR	Overground	875	1,022	1,186	17%	147	36%	311
Sydenham	Penge West	SB	NR	Overground	182	360	416	98%	178	129%	234

From	To	Direction	Mode	Line(s)	Railplan 2011 Demand	Railplan 2026 Demand	Railplan 2042 Demand	2011-2026 %Growth	2011-2026 Growth	2011-2041 %Growth	2011-2041 Growth
Not applicable	**Not applicable**	**Not applicable**	**Not applicable**	**NR Sub-total**	**38,430**	**64,227**	**70,876**	**67%**	**25,797**	**84%**	**32,446**
Elephant & Castle	Lambeth North	NB	LUL	Bakerloo	4,691	5,095	6,107	9%	404	30%	1,416
Lambeth North	Waterloo	NB	LUL	Bakerloo	5,220	5,550	6,610	6%	330	27%	1,390
Waterloo	Lambeth North	SB	LUL	Bakerloo	4,683	5,911	6,660	26%	1,228	42%	1,977
Lambeth North	Elephant & Castle	SB	LUL	Bakerloo	3,828	4,792	5,411	25%	964	41%	1,583
Waterloo	Southwark	EB	LUL	Jubilee	48,642	59,836	63,731	23%	11,194	31%	15,089
Southwark	London Bridge	EB	LUL	Jubilee	46,033	55,991	59,843	22%	9,958	30%	13,810
London Bridge	Bermondsey	EB	LUL	Jubilee	42,432	55,561	61,285	31%	13,129	44%	18,853
Bermondsey	Canada Water	EB	LUL	Jubilee	41,897	54,391	60,190	30%	12,494	44%	18,293
Canada Water	Canary Wharf	EB	LUL	Jubilee	43,834	57,527	64,181	31%	13,693	46%	20,347

From	To	Direction	Mode	Line(s)	Railplan 2011 Demand	Railplan 2026 Demand	Railplan 2042 Demand	2011-2026 %Growth	2011-2026 Growth	2011-2041 %Growth	2011-2041 Growth
Canary Wharf	Canada Water	WB	LUL	Jubilee	27,418	41,266	49,930	51%	13,848	82%	22,512
Canada Water	Bermondsey	WB	LUL	Jubilee	32,679	48,181	56,198	47%	15,502	72%	23,519
Bermondsey	London Bridge	WB	LUL	Jubilee	34,994	51,029	59,098	46%	16,035	69%	24,104
London Bridge	Southwark	WB	LUL	Jubilee	43,749	56,933	63,468	30%	13,184	45%	19,719
Southwark	Waterloo	WB	LUL	Jubilee	41,878	53,874	59,451	29%	11,996	42%	17,573
Not applicable	**Not applicable**	**Not applicable**	**Not applicable**	**LUL Sub-total**	**421,978**	**555,937**	**622,163**	**32%**	**133,959**	**47%**	**200,185**
Not applicable	**Not applicable**	**Not applicable**	**Not applicable**	**Total**	**476,640**	**642,504**	**718,550**	**35%**	**165,864**	**51%**	**241,910**

As observed from Table 1, demand on public transport services within the borough increases substantially, the biggest increases are on the DLR in both the NB and SB directions between Lewisham and Elverson Road where in 2041 there is a 50% increase in people using the services, an increase of over 3,000 people in the 3 hour peak period. Increases on the overground within LBL are also high particularly between in a NB direction between Honor Park and Surrey Quays where increases in passengers are between 3,700 and 5,300 by 2041.Outside the borough the Jubilee Line experiences the largest increases of up to 24,000 additional passengers by 2041 in a WB direction. The Bakerloo line also experiences increases in demand of between 27%-42%, between 1,400-2,000 addition passengers between Elephant and Castle and Waterloo.

In relative terms, the percentage growth for 2011-2026 and 2011-2041 for all services by direction are illustrated in Figure 5 to Figure 7. Within the figure the values above the service line represent Northbound or Eastbound direction (to be consistent with the convention of left-side traffic). Values shown below the service line represent Southbound or Westbound direction. For each link growth for both 2011-2026 and 2011-2041 are annotated and colour-coded with relation to magnitude.

Figure 4 shows the increase in passenger growth on the DLR between 2011-2026 and 2041.

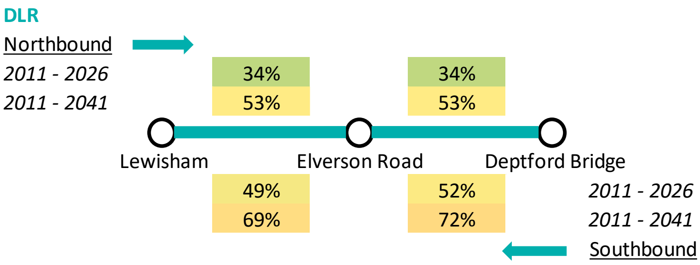


Figure 4: DLR Line Profile Growth 2011-2041

The NB service shows a consistent increase in demand for both years, with an increase of 34% (2,100 passengers) between 2011-2026 and an increase of 53% (3,300) between 2011-2041.

The 2011-2026 SB service has a similar growth percentage as the NB for the same years, 49%-52% (950 passengers). The growth between 2011-2041 is higher compared to the NB direction with a percentage growth of 69%-72% (circa1,400). Although the percentage growth is higher on the SB, it is worth noting that the absolute growth is higher in the NB direction. .

Figure 5 shows the increase in passenger growth on the Overground line between 2011-2026 and 2041.

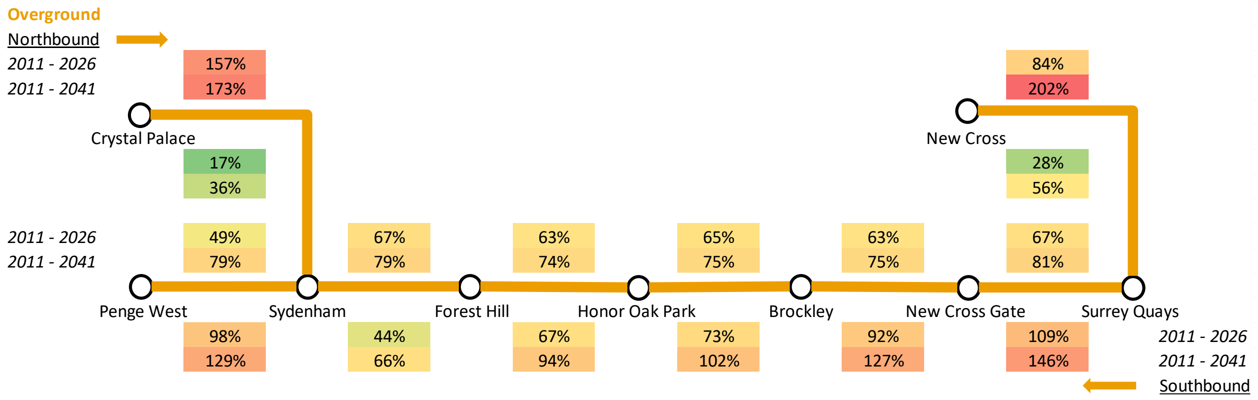


Figure 5: Overground Line Profile Growth 2011-2041

The Overground services show the greatest growth percentage amongst all the service lines analysed within the study area. 2011-2026 comparison shows growth reaching 157% (7,120) for the Crystal Palace-Sydenham NB and 109% (1,950) for the Surrey Quays – New Cross Gate SB service. The 2011-2041 scenario shows growth of 202% (190) for the New Cross – Surrey Quays NB and 146% (2,610) for the Surrey Quays – New Cross Gate SB service. These were identified as the highest percentage growth across the service, yet in terms of absolute growth values they are not as high as the growth between Surrey Quays and New Cross Gate which is 5,290 and 2,610 for 2011-2041 in the NB and SB directions respectively.

There seems to be a concentration of demand growth between Sydenham and Surrey Quays. In the NB direction, the growth is relatively constant between stations. The average growth is approximately 65% for 2011-2026 and 75% for 2011-2041. On the other hand, in the reverse direction, growth is highest from Surrey Quays (109% and 146% for 2011-2026 and 2011-2041) and cascades linearly along the service line, reaching 44% and 66% at Sydenham for the two future years. The high flows at Surrey Quays may be a result of the increasing demand in the Canary Wharf area (generating extra interchange demand from Jubilee Line)

Figure 6 shows the increase in passenger growth on the Bakerloo line between 2011-2026 and 2041.

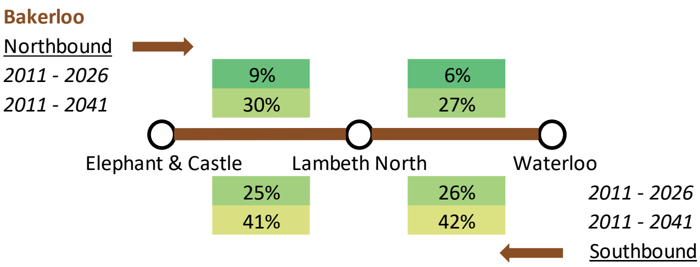


Figure 6: Bakerloo Line Profile Growth 2011-2041

Figure 6 shows that on the Bakerloo line in the NB direction there is an increase in demand from 2011-2026, with growth of 9% (increase of 405) between Elephant & Castle and Lambeth North, and 6% (330) between Lambeth North and Waterloo. As expected the 2011-2041 comparison shows a higher demand with 30% (1,420) growth between Elephant & Castle and Lambeth North, and 27% (1,390) between Lambeth North and Waterloo.

The SB direction on the Bakerloo shows the growth between 2011-2026 is 26% (1,230) between Waterloo and Lambeth North and 25% (965) between Lambeth North and Elephant & Castle. The growth in this direction for the period 2011-2026 is comparable to the NB direction for the period 2011-2041. The SB demand during 2011-2041 has the highest growth forecasted with an increase of 42% (1,980) and 41% (1,585) between the same stations.

Figure 7 shows the increase in passenger growth on the Jubilee line between 2011-2026 and 2041.

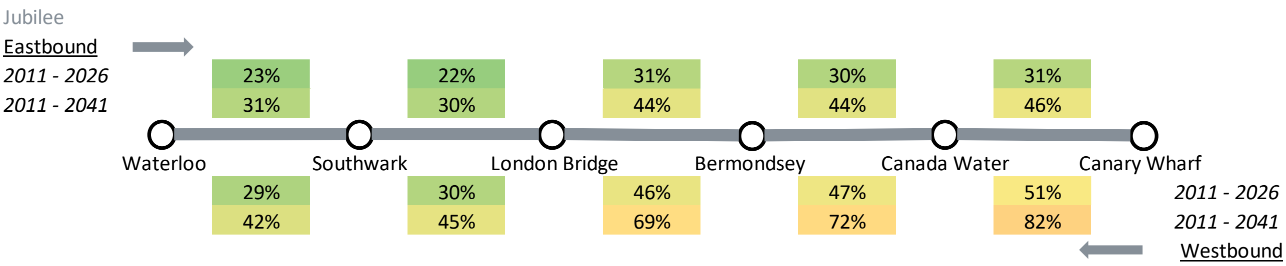


Figure 7: Jubilee Line Profile Growth 2011-2041

The EB Jubilee service shows a consistent increase in demand between stops for both years' comparisons, with an increase ranging from 23% to 31% (11,200-13,700 additional passengers) for the 2011-2026 comparison and an increase ranging from 30% to 46% (13,800-30,350 additional passengers) for the 2011-2041 comparison.

The WB service shows a higher growth in demand compared with the EB service. The higher forecasted growth is identified between Canary Wharf and Canada Water, with 29%-51% (12,000-16,000 additional passengers) between 2011-2026 and 42%-82% (17,500-23,500 additional passengers) between 2011-2041. The more demand toward Bermondsey, Canada Water and Canary Wharf might due to some potential developments within the area.

LUL, DLR and Overground Passenger Growth Problems and Issues

Growth on all public transport services within LBL, DLR and Overground services are very high.

- DLR from 34% to 72% with actual increases ranging from 930 to 3,380
- Overground 17% to 202% with actual increases ranging from 40 to 5,290
- Bakerloo and Jubilee lines although outside of the LBL experience increases in patronage ranging from 330 to 24,105

Crowding on PT Lines

Crowding maps were generated from Railplan outputs in order to illustrate the number of people standing per metre square across the LUL/DLR and NR/Tram network. The crowding maps can be used to be identified busy services in the morning peak 3 hours (7:00-10:00), and how the patterns may change over time. Annex A (separate document) shows crowding plots on the entire LUL network and NR network for 2011, 2026 and 2041 AM scenarios together with the crowding comparison for 2011-2026 and 2011-2041.

LUL Crowding Maps

Figure 8 illustrates LUL crowding maps in relation to the study area for all scenarios.

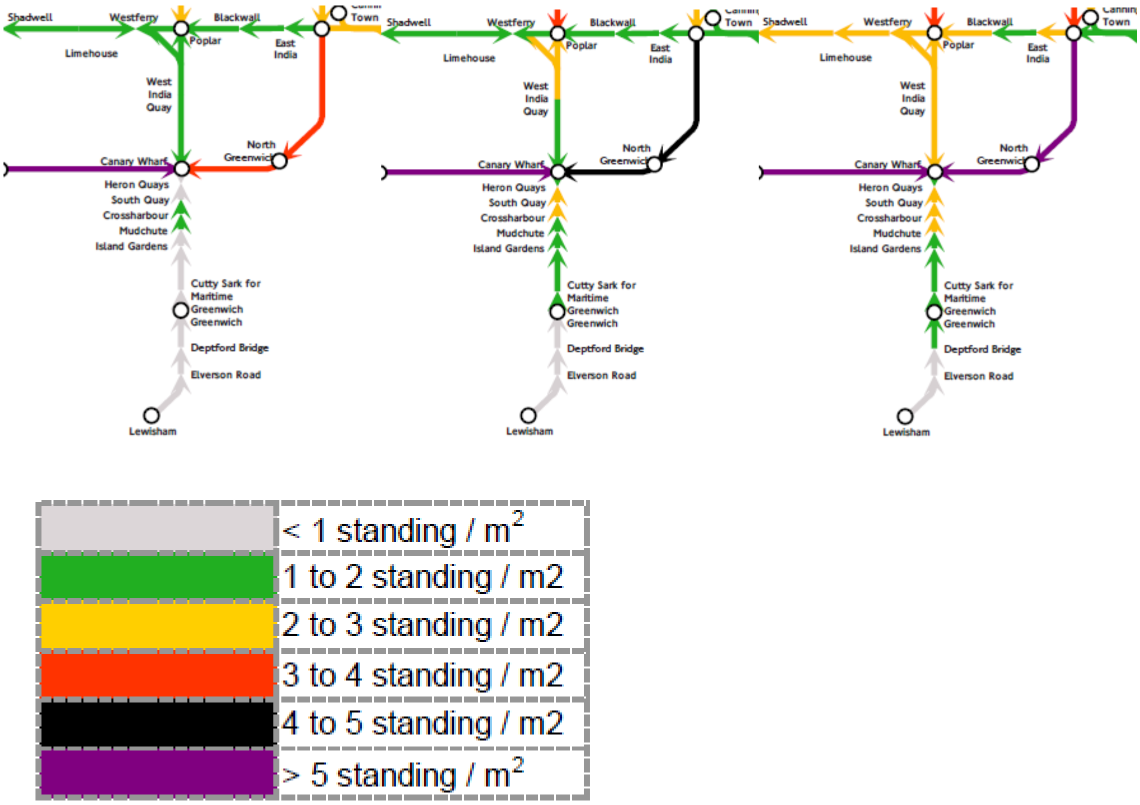


Figure 8: LUL Crowding plots in relation to the study area for 2011 AM, 2026 AM and 2041 AM

The LUL crowding map for the 2011 AM Base Case shows that DLR services shows that there are less than 1 standing passengers per sqm from Lewisham to Canary Wharf, with the exception of Mudchute – South Quay section where the crowding value is 1 to 2 standing per sqm. It is also worth noting that these crowding values were derived from the three-hour peak as well as the total line capacity during the assignment periods, resulting in under-representation of crowding during the peak hours. This means that, in reality there may be people already standing along the DLR line between Lewisham and Canary Wharf during the morning peak.

The 2026 AM Reference Case scenario shows more crowded DLR services, forecasting up to 2 standing passengers per sqm (green category) between Greenwich and Crossharbour, and 2 to 3 passengers per sqm (yellow category) between Crossharbour to Canary Wharf. In 2041, crowding gets worse, with the green category spanning between Deptford Bridge and Mudchute, and yellow category between Mudchute towards Canary Wharf, and beyond. In difference terms, the crowding difference is fluctuated between 0.2 and 0.5 standing passengers per sqm in 2026, and between 0.5 to 1 standing passengers per sqm.

Along the Jubilee Line crowding was already a concern in 2011. Crowding value approaching Canary Wharf from the West is higher than 5 standing passengers per sqm (purple category), and the value approaching from the East if between 3 and 4 standing passengers per sqm (red category). These values worsen over time, with the crowding values from Canning Town to Canary Wharf increase towards black category in 2026 and purple category in 2041. On the other hand, Canada Water – Canary Wharf maintains its purple category.

Table 2 summarises the crowding values along DLR and LUL services in relation to the study area and Table 3 shows crowding differences when compared to the base crowding values. It is worth noting that colour schemes for crowding values and crowding differences are not the same.

Table 2: Crowding Values along DLR and LUL services in relation to the Study Area

TOC	From	To	2011 AM	2026 AM	2041 AM
DLR	Lewisham	Elverson Road	0.06	0.45	0.71
DLR	Elverson Road	Deptford Bridge	0.07	0.46	0.73
DLR	Deptford Bridge	Greenwich	0.46	0.94	1.27
DLR	Greenwich	Cutty Sark	0.77	1.22	1.58
DLR	Cutty Sark	Island Gardens	0.95	1.51	1.89
DLR	Island Gardens	Mudchute	0.96	1.45	1.82
DLR	Mudchute	Crossharbour	1.15	1.84	2.32
DLR	Crossharbour	South Quay	1.14	2.01	2.48
DLR	South Quay	Heron Quays	0.96	2.03	2.52
DLR	Heron Quays	Canary Wharf	0.88	1.67	1.98
LUL Jubilee	Canada Water	Canary Wharf			
LUL Jubilee	Canning Town	North Greenwich	3.31	4.27	
LUL Jubilee	North Greenwich	Canary Wharf	3.80	4.00	

Table 3: Crowding differences along DLR and LUL services in relation to the study area

TOC	From	To	2011-2026 Difference	2011-2041 Difference
DLR	Lewisham	Elverson Road	0.39	0.65
DLR	Elverson Road	Deptford Bridge	0.39	0.66
DLR	Deptford Bridge	Greenwich	0.48	0.81
DLR	Greenwich	Cutty Sark	0.45	0.81
DLR	Cutty Sark	Island Gardens	0.56	0.94
DLR	Island Gardens	Mudchute	0.49	0.86
DLR	Mudchute	Crossharbour	0.69	1.17
DLR	Crossharbour	South Quay	0.87	1.34
DLR	South Quay	Heron Quays	1.07	1.56
DLR	Heron Quays	Canary Wharf	0.79	1.10
LUL Jubilee	Canada Water	Canary Wharf	-0.16	0.61
LUL Jubilee	Canning Town	North Greenwich	0.96	1.88
LUL Jubilee	North Greenwich	Canary Wharf	0.20	1.43

NR Crowding Maps

The NR crowding maps seen in Figure 9 illustrate much busier train services during the AM peak in relation to NR services. In particular, Thameslink services from Catford to Peckham Rye in 2011 is shown with 3 to 4 standing passengers per sqm (red category). Most Southern and Southeastern services which pass through the study area possess crowding values fluctuating between 1 and 3 standing passengers per sqm (i.e. green or yellow category). Red category (3 to 4 standing passengers per sqm) is observed especially from New Cross Gate to Surrey Quay along the Overground.

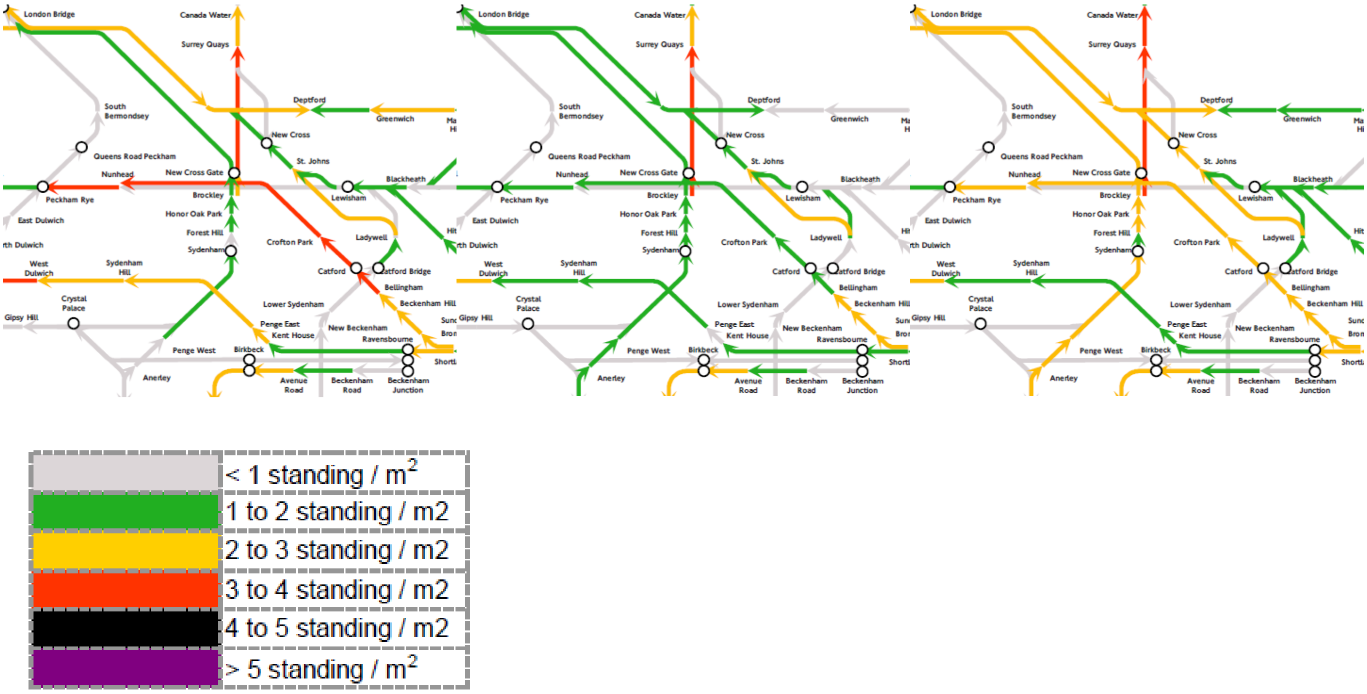


Figure 9: NR Crowding plots in relation to the study area for 2011 AM, 2026 AM and 2041 AM

In the future years (both 2026 and 2041 scenarios), Crossrail (the Elizabeth Line) is already introduced, not to mention a number of service improvements which result in crowding relief. This can be shown in the reduction in crowding values in the sections mentioned earlier, such as Thameslink services reducing from yellow to green category – more than 0.5 standing reduction per sqm in absolute terms. Most Southeastern services show a reduction between 2011 and 2026, yet by 2041 the services get busy again. This can be most apparently seen between London Bridge and Deptford. Crowding value drops from 2 to 3 standing passengers per sqm in 2011 to 1 to 2 standing passengers per sqm in 2026 (reduction of 0.5 to 1 standing per sqm) yet picks up to previous value in 2041 (insignificant change in crowding values compared to 2011). Regarding crowding values along the Southern services from Sydenham to London Bridge, crowding is categorised as green category (1 to 2 standing passengers per sqm) in 2021 and stay unchanged until 2026. However, the section becomes more crowded in 2041 as there are 2 to 3 standing passengers per sqm, with more than 1 standing per sqm increase compared to 2011.

One key point from the NR crowding maps is that the crowding along the particular link New Cross Gate – Surrey Quay stays in the same category of 3 to 4 standing passengers per sqm throughout the period 2011-2041. However these is a difference occurring with an increase in 0.2 to 0.5 standing per sqm between 2011 and 2026, and 0.5 to 1 standing per sqm between 2011 and 2041. The immediate link Surrey Quay – Canada Water shows similar pattern of crowding but of lower magnitude (yellow category). The Overground section between New Cross Gate and Canada Water might be prone to capacity issues in the future due to the fact that both stations are interchanges with Jubilee or other NR services (Southern and Thameslink). For this reason, improving the performance at this PT link may be part of the intervention packages identified at a later stage.

Table 4 summarises the crowding values along NR services in relation to the study area and Table 5 shows crowding differences when compared to the base crowding values. It is worth noting that colour schemes for crowding values and crowding differences are not the same.

Table 4: Crowding values along NR services in relation to the study area

TOC	From	To	2011 AM	2026 AM	2041 AM
Thameslink	Catford	Crofton Park	3.69	1.95	2.34
Thameslink	Crofton Park	Nunhead	3.78	1.97	2.37
Thameslink	Nunhead	Peckham Rye	3.07	1.77	2.23
Southeastern	London Bridge	Deptford	2.10	1.43	2.09
Southeastern	Greenwich	Deptford	1.88	0.98	1.64
Southern	Sydenham	Forest Hill	0.67	1.13	1.71
Southern	Forest Hill	Honor Oak Park	1.14	1.45	2.05
Southern	Honor Oak Park	Brockley	1.22	1.51	2.12
Southern	Brockley	New Cross Gate	1.06	1.40	2.09
Southern	New Cross Gate	London Bridge	1.00	1.40	2.09
Overground	New Cross Gate	Surrey Quays	3.10	3.41	3.81
Overground	Surrey Quays	Canada Water	2.00	2.69	3.19

Table 5: Crowding differences along NR services in relation to the study area

TOC	From	To	2011-2026 Difference	2011-2041 Difference
Thameslink	Catford	Crofton Park	-1.74	-1.35
Thameslink	Crofton Park	Nunhead	-1.81	-1.41
Thameslink	Nunhead	Peckham Rye	-1.30	-0.84
Southeastern	London Bridge	Deptford	-0.67	-0.01
Southeastern	Greenwich	Deptford	-0.90	-0.24
Southern	Sydenham	Forest Hill	0.46	1.04
Southern	Forest Hill	Honor Oak Park	0.31	0.91
Southern	Honor Oak Park	Brockley	0.29	0.90
Southern	Brockley	New Cross Gate	0.34	1.03
Southern	New Cross Gate	London Bridge	0.40	1.09
Overground	New Cross Gate	Surrey Quays	0.31	0.71
Overground	Surrey Quays	Canada Water	0.69	1.19

LUL, DLR and Overground Crowding Problems and Issues

In 2026 and 2041 the crowding on the DLR increases between Lewisham and Canary Wharf.

The Jubilee line is very crowded by 2041.

Crowding on the overground and Southern services increases from 2011 to 2041.

Station Demand

Following similar methodology in the BY model audit, the total station demands were extracted for 2026 and 2041 scenarios, with ranking of the top 10 busiest stations. Table 6 shows the demand comparison.

Table 6: Comparison of Station Total and Ranking between Railplan Scenarios

Station	Railplan 2011 Station Total	2011 Station Rank	Railplan 2026 Station Total	2026 Station Rank	Railplan 2041 Station Total	2041 Station Rank	2011-2026 % Growth	2011-2041 % Growth	2011-2026 Growth	2011-2041 Growth
Lewisham	12,025	1	16,494	1	18,797	1	37%	56%	4,469	6,772
Forest Hill	6,042	2	7,895	2	8,800	2	31%	46%	1,853	2,758
Sydenham	5,182	3	6,467	3	6,784	3	25%	31%	1,285	1,602
Grove Park	4,736	4	6,815	4	7,244	4	44%	53%	2,079	2,508
New Cross Gate	4,150	5	5,444	5	6,173	5	31%	49%	1,294	2,023
Brockley	3,254	6	4,321	6	4,809	6	33%	48%	1,067	1,555
Hither Green	2,765	7	3,321	7	3,805	7	20%	38%	556	1,040
Blackheath	2,326	8	3,492	8	3,834	8	50%	65%	1,166	1,508
New Cross	2,093	9	2,653	9	3,068	9	27%	47%	560	975
Honor Oak Park	1,130	10	1,597	10	1,782	10	41%	58%	467	652

The station rankings stay similar between 2011, 2026 and 2041 apart from two exceptions Grove Park experiences a greater increase in patronage (44% 2079 -53% 2508) compared Sydenham station (25% 1,285- 31% 1,602). Grove Park therefore ranks 3d in 2026 and 2041 when it was previous 4th. The same happens between Hither Green and Blackheath. Blackheath station experiences a lot more growth in the future compared to Hither Green and they swap rankings in 2026 and 2041. The breakdown of the demand increments over the years is summarised in Figure 10.

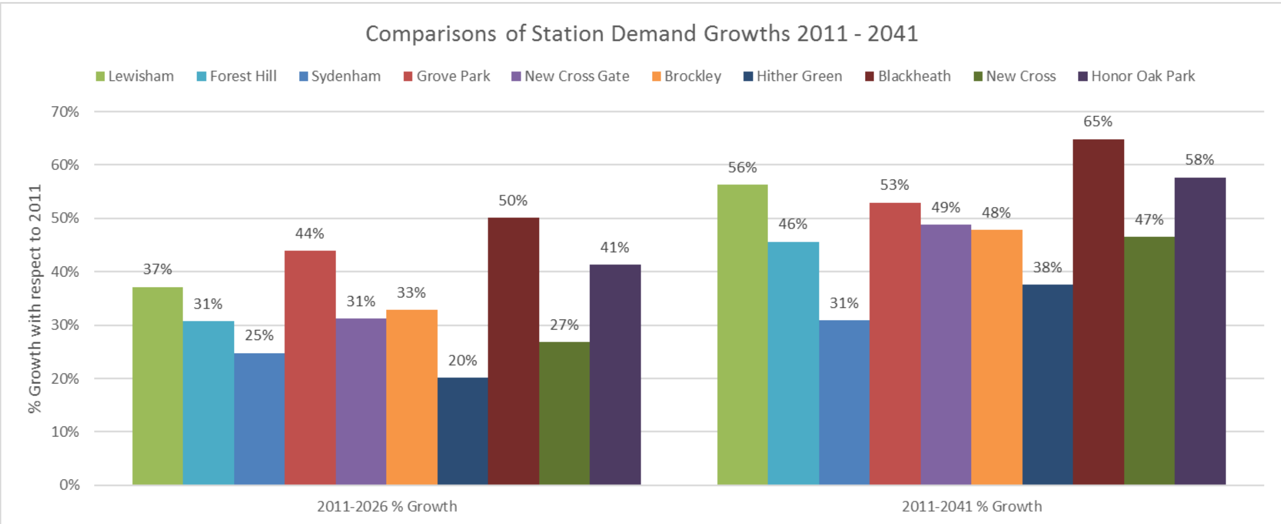


Figure 10: Comparisons of Station Demand Growth 2011 – 2041

Figure 10 presents the growth in passenger demand by percentage for the 10 stations. Between 2011 and 2026, station demand growth is highest at Blackheath (50%), followed by Grove Park (44%), Honor Oak Park (41%) and Lewisham (37%). This trend can also be observed in 2011-2041 growth, Blackheath (65%), Lewisham (56%) and Honor Oak Park (58%) demand growing significantly faster than Grove Park (53%). It is also worth noting the significant growth of New Cross Gate (rank 5) and New Cross (rank 9) stations which are situated along the main Overground line. The passenger demand at New Cross Gate in 2011 is 4,150, increasing to 5,444 in 2026 (31% growth) and to 6,173 in 2041 (49% growth). Figures for New Cross station are 27% and 47% for 2011-2026 and 2011-2041 respectively.

Network Rail Passenger Growth Problems and Issues

Growth of passengers at stations within the LBL is high ranging between 2011 and 2026/2041 ranging from 20%-65% (467-6,772 additional passengers). The station which experiences the biggest increases are Lewisham and Forest Heath in actual terms and Blackheath station in percentage increases.

Bus Demand along Corridors

The bus corridors were kept unchanged from the BY validation exercise. They are listed below and are visualised in Figure 11:

- East-West corridor; Queen's Road – New Cross Road – Lewisham Way – Lee High Road
- North-South corridor; Greenwich South Street – Lewisham Road – Lewisham High Street – Bromley Road

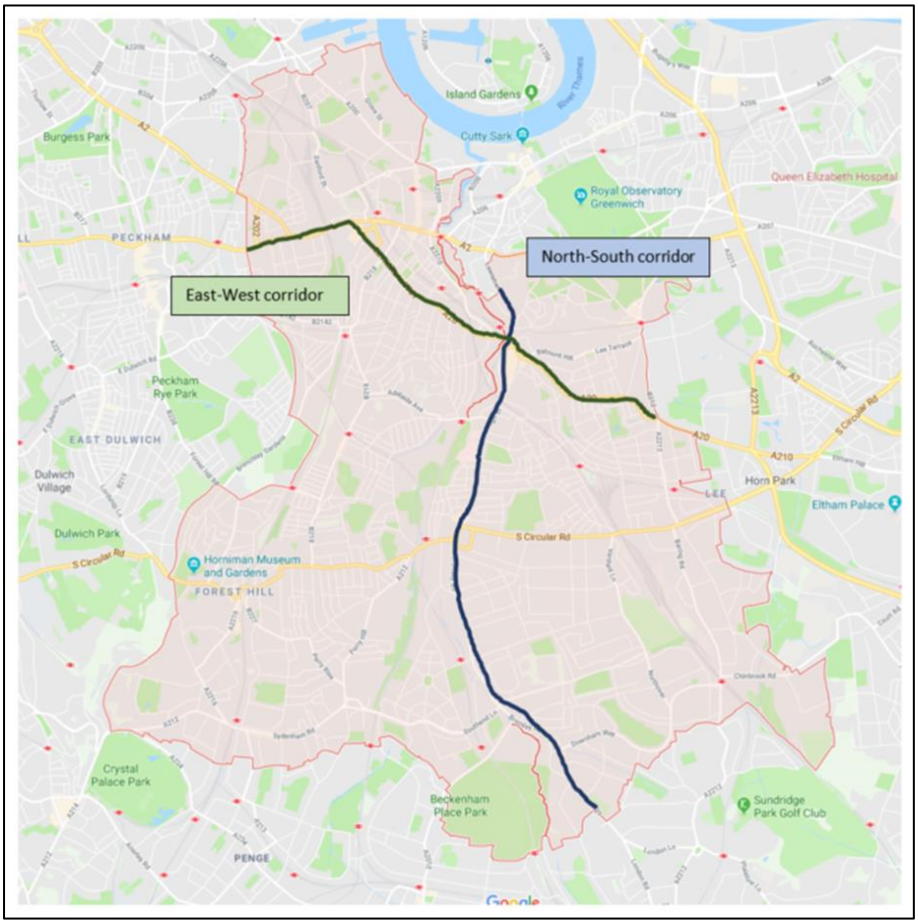


Figure 11 – Proposed Bus Corridors in London Borough of Lewisham

Link flows on the North-South and East-West bus corridors were compared between the modelled scenario years. Table 7 shows the comparison of modelled total bus passenger flows along the two corridors.

Table 7: Bus Corridor Passenger Flow 2011 – 2041

Bus Corridor	Direction	2011 Railplan	2026 Railplan	2041 Railplan	Growth 2026	Growth 2041	%Growth 2026	%Growth 2041
North-South	NB	54,005	70,365	75,713	16,360	21,708	30%	40%
North-South	SB	37,549	43,937	48,082	6,388	10,533	17%	28%
East-West	EB	57,426	64,369	69,949	6,943	12,523	12%	22%
East-West	WB	63,907	79,612	87,238	15,705	23,331	25%	37%

As observed in Table 7, the total passengers are higher on the East-West bus corridor than North-South, however the growth in the total demand is lower on the East-West corridor in both 2026 and 2041 compared to the North-South. Additionally, as expected that the growth in passengers in the northbound and westbound directions is more significant than the other directions, as these are peak directions into London in the morning peak.

Flow profiles along the above bus corridors were plotted for 2011, 2026 and 2041 and are illustrated in Annex B. The plots show the comparison of modelled bus passenger flows along each corridor by direction.

The flow profiles for both bus corridors show similar behaviour with the 2011-2026 growth being significantly higher than the period 2026-2041.Most growth can be observed at bus stops which are close to interchanges (Lewisham station) or train station (New Cross, New Cross Gate station). Bus demand along not busy sections (e.g. between Sparta Street and Lewisham Station bus stops within North-South corridor) growth is minimal.

Bus Demand Problems and Issues

Growth in bus passengers is highest on the North-South corridor across the borough which see growth from 17%-40%, an additional 6,388-21,708 passengers across the route.

Boarding and Alighting at Bus Stops

Boarders and alighters at bus stops were extracted for the BY model as well as the 2026 and 2041 FY models and are presented in Table 8. Bus stops are listed along the bus corridor identified in previous section.

Table 8: Bus Boarding and Alighting Modelled Flow Comparisons 2011 – 2041

Bus Stop Name	Corridor	Boarders 2011 Railplan	Boarders 2026 Railplan	Boarders 2041 Railplan	Boarders Growth (2026)	Boarders Growth (2041)	Boarders %Growth (2026)	Boarders %Growth (2041)	Alighters 2011 Railplan	Alighters 2026 Railplan	Alighters 2041 Railplan	Alighters Growth (2026)	Alighters Growth (2041)	Alighters %Growth (2026)	Alighters %Growth (2041)
Bromley Road Downham Way	North-South	752	1,063	1,127	311	375	41%	50%	284	344	344	60	60	21%	21%
Old Bromley Road	North-South	13	106	77	93	64	715%	492%	108	121	126	13	18	12%	17%
Green Man Community Hub	North-South	867	1,046	1,036	179	169	21%	19%	480	629	666	149	186	31%	39%
Southend Lane	North-South	228	249	245	21	17	9%	7%	88	116	127	28	39	32%	44%
Bellingham Road	North-South	470	498	514	28	44	6%	9%	221	507	564	286	343	129%	155%
Newquay Road	North-South	1,192	1,455	1,526	263	334	22%	28%	853	985	1,045	132	192	15%	23%
Inchmery Road	North-South	89	91	107	2	18	2%	20%	60	58	72	-2	12	-3%	20%
Bargery Road	North-South	124	186	193	62	69	50%	56%	130	208	217	78	87	60%	67%
Bromley Road Lewisham Town Hall	North-South	610	835	909	225	299	37%	49%	584	944	1,026	360	442	62%	76%
The Catford Centre	North-South	1,033	1,182	1,281	149	248	14%	24%	941	1,023	1,120	82	179	9%	19%
Mount Pleasant Road Lewisham	North-South	492	669	749	177	257	36%	52%	365	389	430	24	65	7%	18%
Lewisham Park	North-South	588	743	772	155	184	26%	31%	552	602	646	50	94	9%	17%
Morley Road	North-South	392	405	476	13	84	3%	21%	189	188	241	-1	52	-1%	28%
Lewisham Centre	North-South	1,391	1,592	1,751	201	360	14%	26%	1,601	1,724	1,829	123	228	8%	14%
Lewisham Clock Tower	North-South	1,794	1,968	2,150	174	356	10%	20%	2,030	2,431	2,613	401	583	20%	29%

Bus Stop Name	Corridor	Boarders 2011 Railplan	Boarders 2026 Railplan	Boarders 2041 Railplan	Boarders Growth (2026)	Boarders Growth (2041)	Boarders %Growth (2026)	Boarders %Growth (2041)	Alighters 2011 Railplan	Alighters 2026 Railplan	Alighters 2041 Railplan	Alighters Growth (2026)	Alighters Growth (2041)	Alighters %Growth (2026)	Alighters %Growth (2041)
Lewisham Station	North-South	63	70	75	7	12	11%	19%	164	214	262	50	98	30%	60%
Blackheath Rise	North-South	8	13	15	5	7	63%	88%	30	58	68	28	38	93%	127%
Sparta Street	North-South	8	10	10	2	2	25%	25%	10	11	11	1	1	10%	10%
Queens Road Peckham Station	East-West	1,133	1,174	1,306	41	173	4%	15%	1,037	1,406	1,531	369	494	36%	48%
New Cross Fire Station	East-West	412	529	621	117	209	28%	51%	255	277	292	22	37	9%	15%
New Cross Bus Garage	East-West	1,905	2,253	2,348	348	443	18%	23%	1,491	1,745	1,862	254	371	17%	25%
New Cross Gate Station	East-West	2,429	3,091	3,321	662	892	27%	37%	2,166	2,394	2,759	228	593	11%	27%
Marquis of Granby Goldsmiths	East-West	955	1,635	1,823	680	868	71%	91%	260	303	389	43	129	17%	50%
Amersham Road	East-West	3.5	341	361	36	56	12%	18%	232	215	215	-17	-17	-7%	-7%
Malpas Road	East-West	272	285	289	13	17	5%	6%	376	407	450	31	74	8%	20%
Lucas Street	East-West	368	370	358	2	-10	1%	-3%	268	280	309	12	41	4%	15%
Lewisham College	East-West	294	311	322	17	28	6%	10%	326	366	399	40	73	12%	22%
Undercliff Road	East-West	514	640	695	126	181	25%	35%	394	459	488	65	94	16%	24%
Loampits Vale Jerrard Street	East-West	126	162	177	36	51	29%	40%	191	234	251	43	60	23%	31%
Lewisham Station	East-West	2,996	3,772	4,195	776	1,199	26%	40%	2,311	2,887	3,148	576	837	25%	36%

Bus Stop Name	Corridor	Boarders 2011 Railplan	Boarders 2026 Railplan	Boarders 2041 Railplan	Boarders Growth (2026)	Boarders Growth (2041)	Boarders %Growth (2026)	Boarders %Growth (2041)	Alighters 2011 Railplan	Alighters 2026 Railplan	Alighters 2041 Railplan	Alighters Growth (2026)	Alighters Growth (2041)	Alighters %Growth (2026)	Alighters %Growth (2041)
Lewisham Clock Tower	East-West	1,794	1,968	2,150	174	356	10%	20%	2,030	2,431	2,613	401	583	20%	29%
Belmont Hill	East-West	83	97	95	14	12	17%	14%	101	134	233	33	132	33%	131%
Marischal Road	East-West	59	60	67	1	8	2%	14%	117	164	171	47	54	40%	46%
Belmont Park	East-West	541	704	776	163	235	30%	43%	623	752	822	129	199	21%	32%
Brandram Road	East-West	219	228	258	9	39	4%	18%	211	229	247	18	36	9%	17%
Dacre Park	East-West	253	245	254	-8	1	-3%	0%	225	234	249	9	24	4%	11%
Lampmead Road	East-West	187	233	243	46	56	25%	30%	25	37	40	12	15	48%	60%
Not applicable	**Total**	**24,959**	**30,279**	**32,672**	**5,320**	**7,713**	**21%**	**31%**	**21,329**	**25,506**	**27,875**	**4,177**	**6,546**	**20%**	**31%**

Table 8 shows that there is a range of growth occurring at the bus stops along the two corridors. The growth between 2011-2026 ranges from -7% to 715% (-17 to 776 additional passengers). The bus stops which see the greatest increase are Lewisham Station, New Cross Gate Station and Marquis of Granby Goldsmiths.

The growth between 2011-2041 ranges from -7% to 492% (-17 to 1,199 additional passengers). The bus stops which see the greatest increase are Lewisham Station, New Cross Gate Station, Marquis of Granby Goldsmiths and Lewisham Clock Tower.

Bus Stop Problems and Issues

Those bus stops experiencing the greatest increases in passengers between 2011-2026/2041 are which experience increases in passengers of up to 1,200 people over the AM peak 3 hour period:

- Lewisham Station
- New Cross Gate Station
- Marquis of Granby Goldsmiths
- Lewisham Clock Tower

4. Conclusions

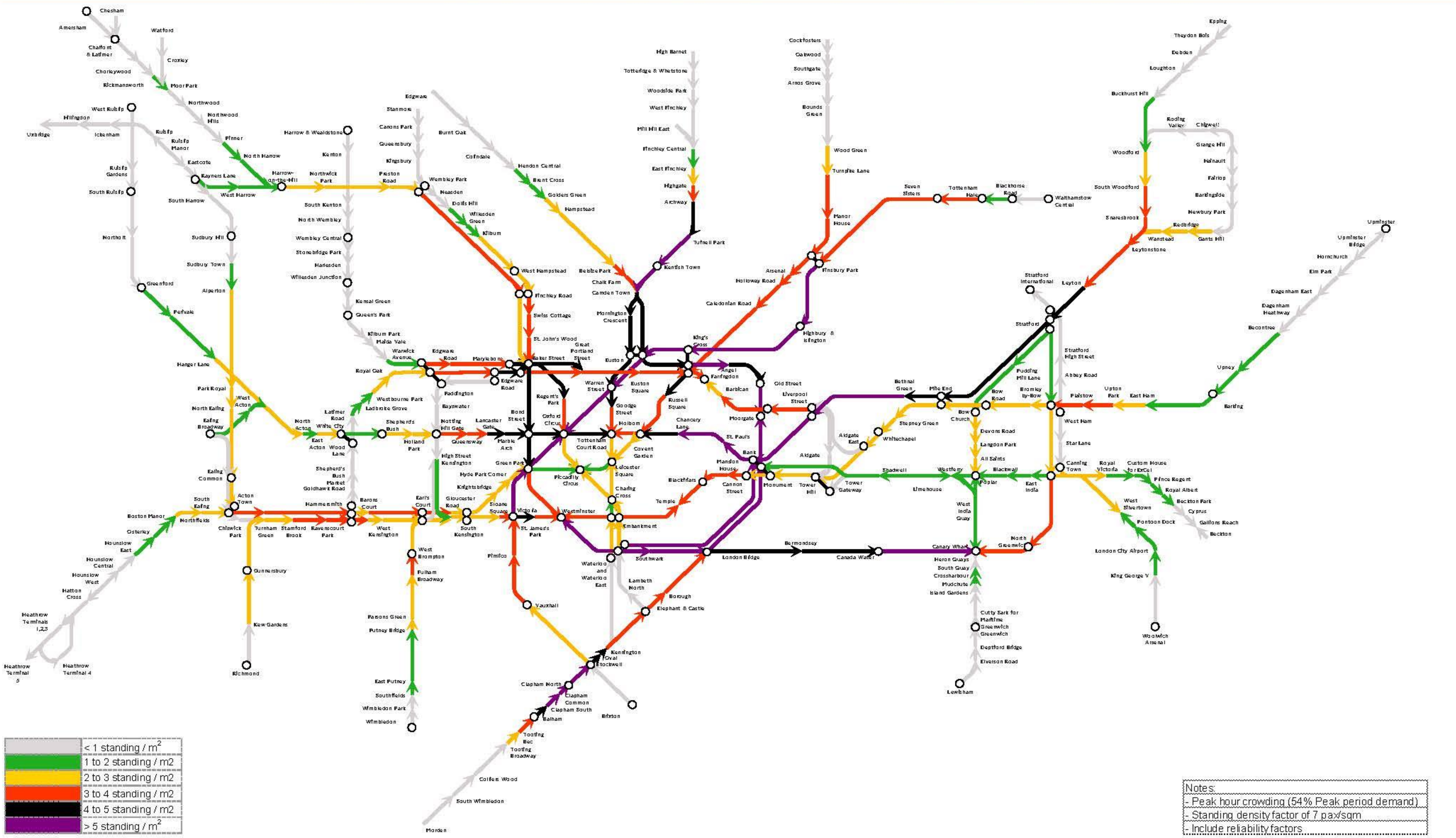
The key problems and issues in LBL associated with public transport in 2026 and 2041 are summarised below:

- Passenger growth on all public transport services within LBL, DLR and Overground services are very high.
    1. DLR from 34% to 72% with actual increases ranging from 930 to 3,380
    2. Overground 17% to 202% with actual increases ranging from 40 to 5,290
    3. Bakerloo and Jubilee lines although outside of the LBL experience increases in patronage ranging from 330 to 24,105
- In 2026 and 2041 passenger crowding on the DLR increases between Lewisham and Canary Wharf.
- The Jubilee line is very crowded by 2041.
- Crowding on the overground and Southern services increases from 2011 to 2041.

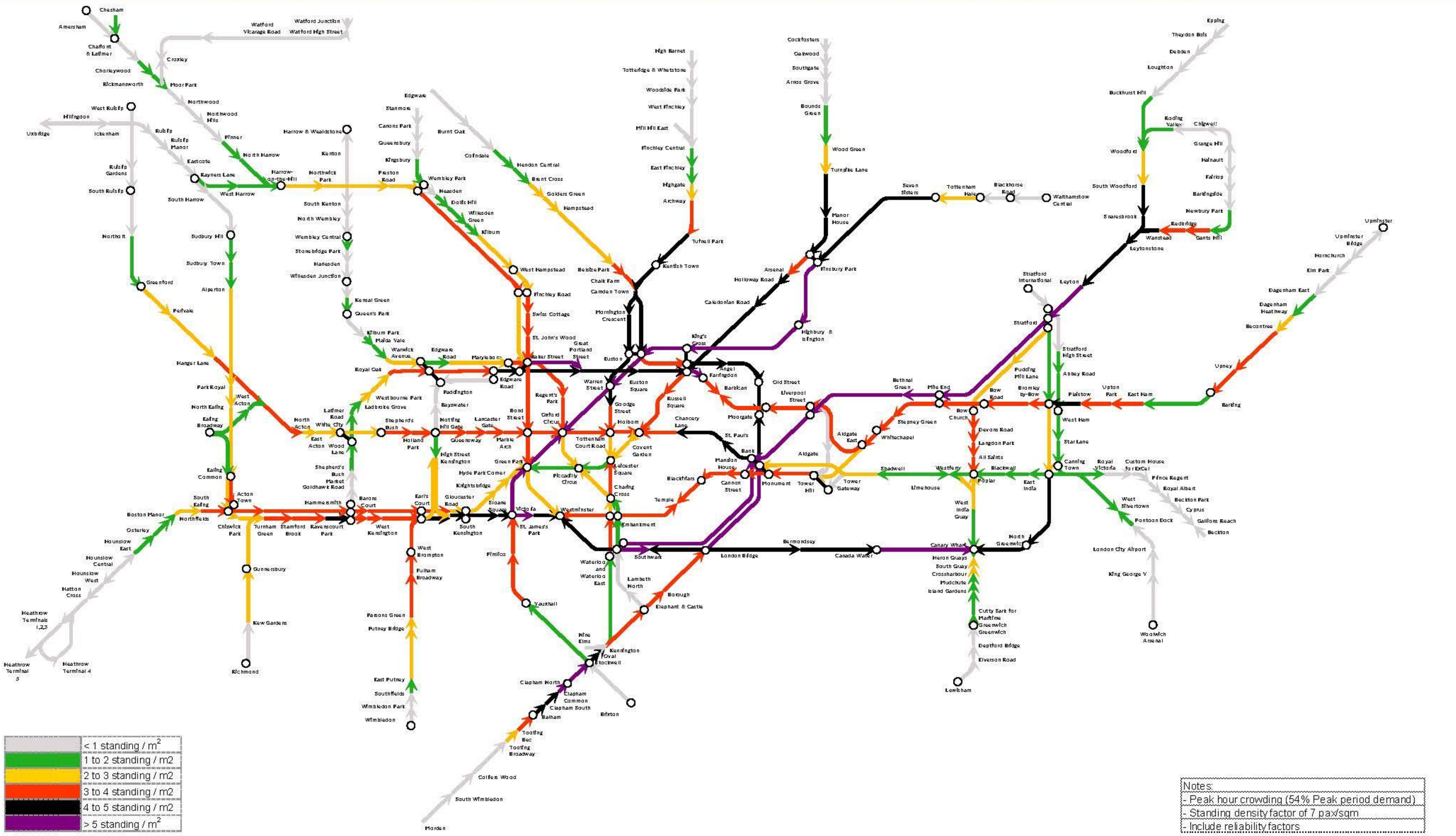
- Growth of passengers at stations within the LBL is high ranging between 2011 and 2026/2041 ranging from 20%-65% (467-6,772 additional passengers). The station which experiences the biggest increases are Lewisham and Forest Heath in actual terms and Blackheath station in percentage increases.
- Growth in bus passengers is highest on the North-south corridor across the borough which see growth from 17%-40%, an additional 6,388-21,708 passengers across the route.
- Those bus stops experiencing the greatest increases in passengers between 2011-2026/2041 are which experience increases in passengers of up to 1,200 people over the AM peak 3 hour period:

    1. Lewisham Station
    2. New Cross Gate Station
    3. Marquis of Granby Goldsmiths
    4. Lewisham Clock Tower

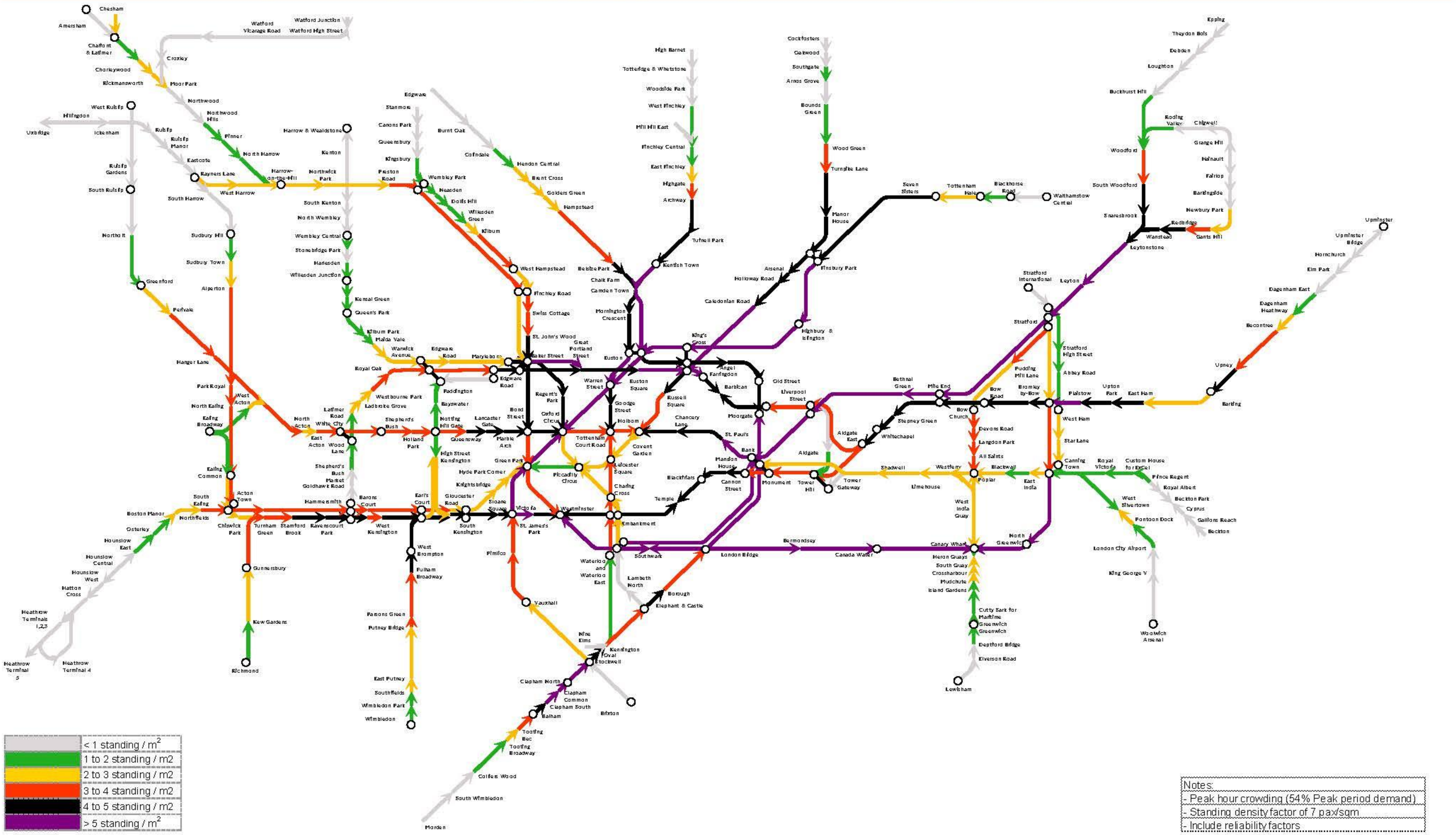
LUL and DLR Crowding Map: WE001A08A - 2011 AM Ref Case w GWML adj



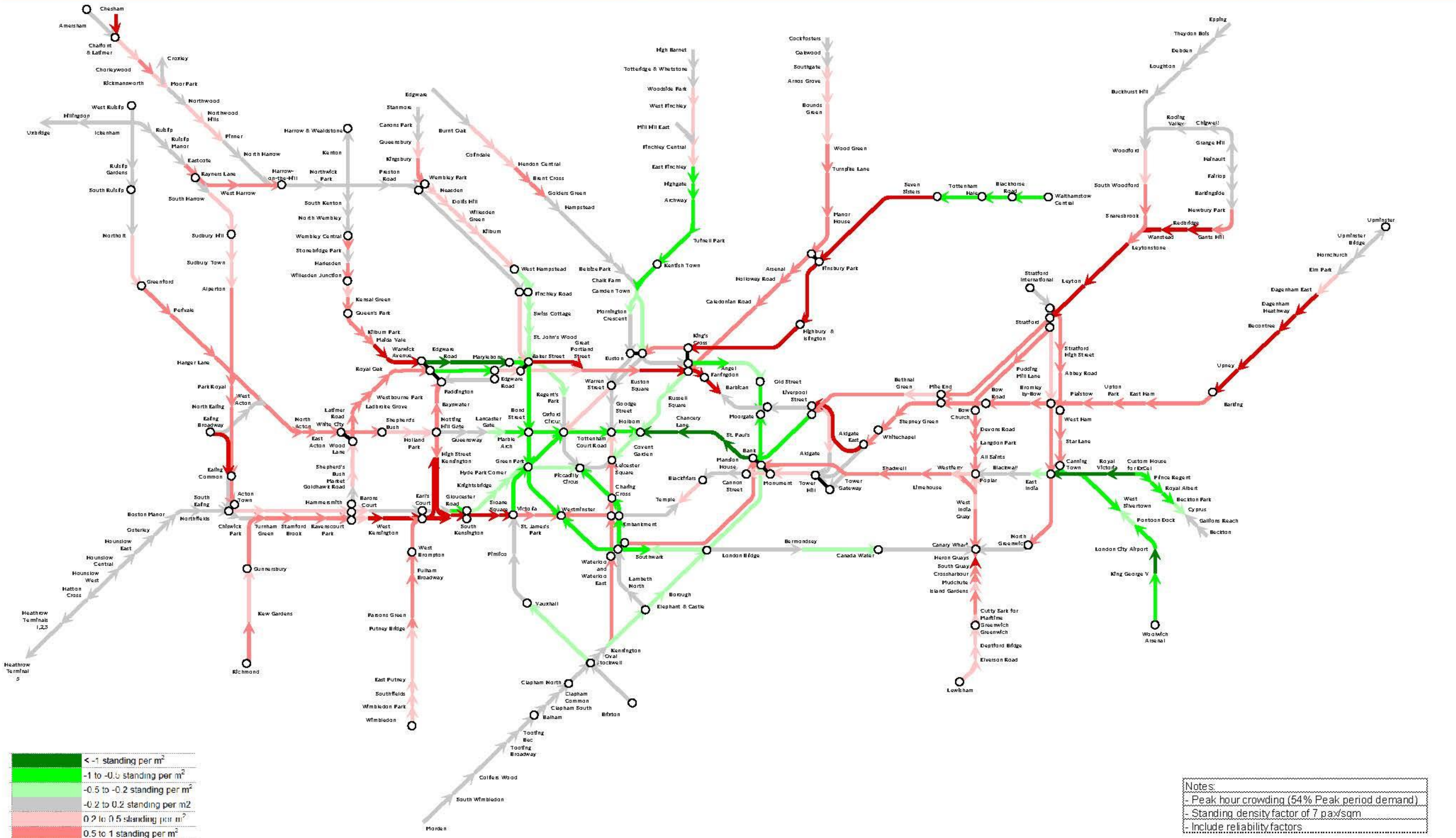
LUL and DLR Crowding Map: LW004A48D70 - 2026AM Funded Scenario without JNAT



LUL and DLR Crowding Map: LW005A48P70 - 2041AM Funded Scenario without JNAT



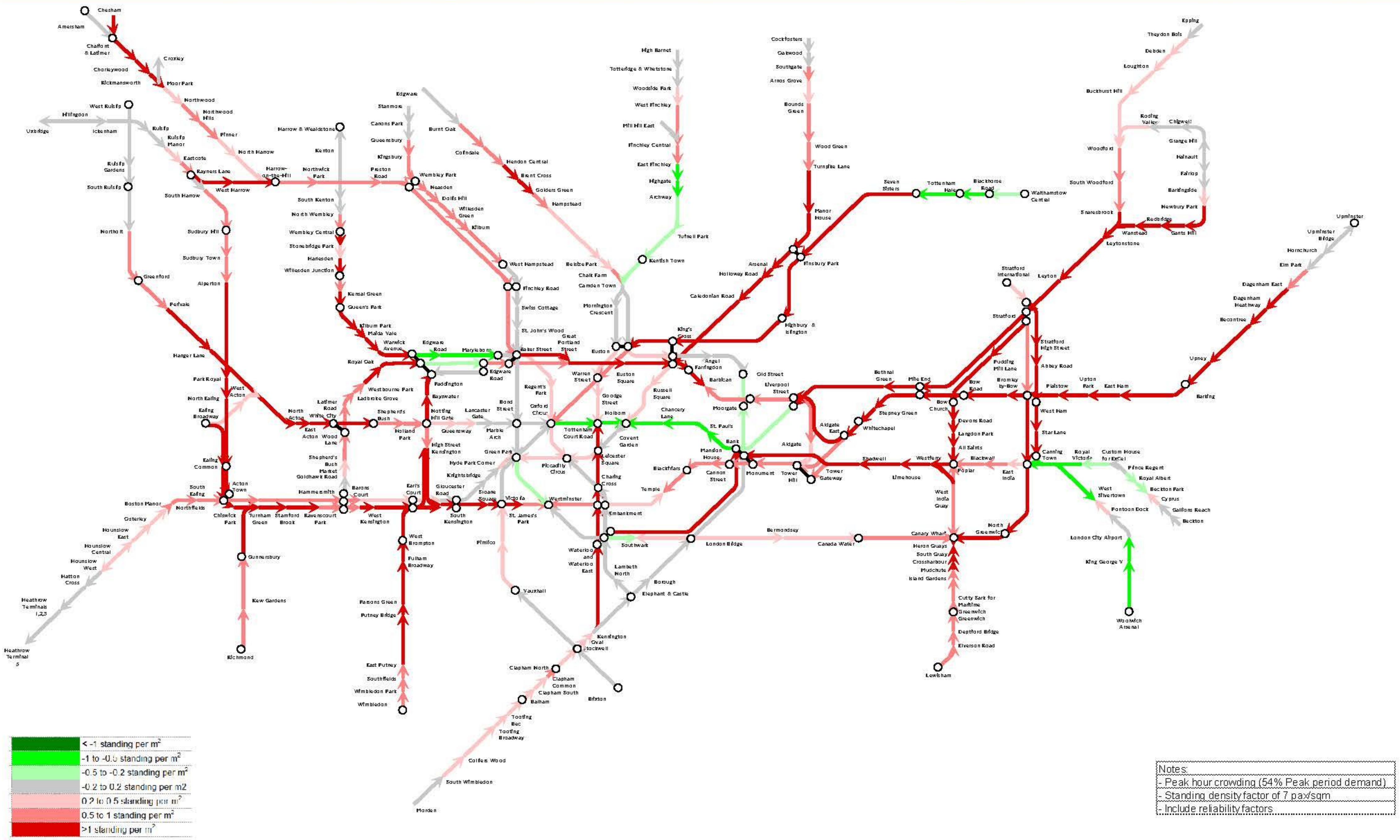
LUL and DLR Crowding Map: LW004A48D - WE001A08A - 2026AM Reference Case - 2011AM Reference Case



	< -1 standing per m²
	-1 to -0.5 standing per m²
	-0.5 to -0.2 standing per m²
	-0.2 to 0.2 standing per m2
	0.2 to 0.5 standing per m²
	0.5 to 1 standing per m²
	>1 standing per m²

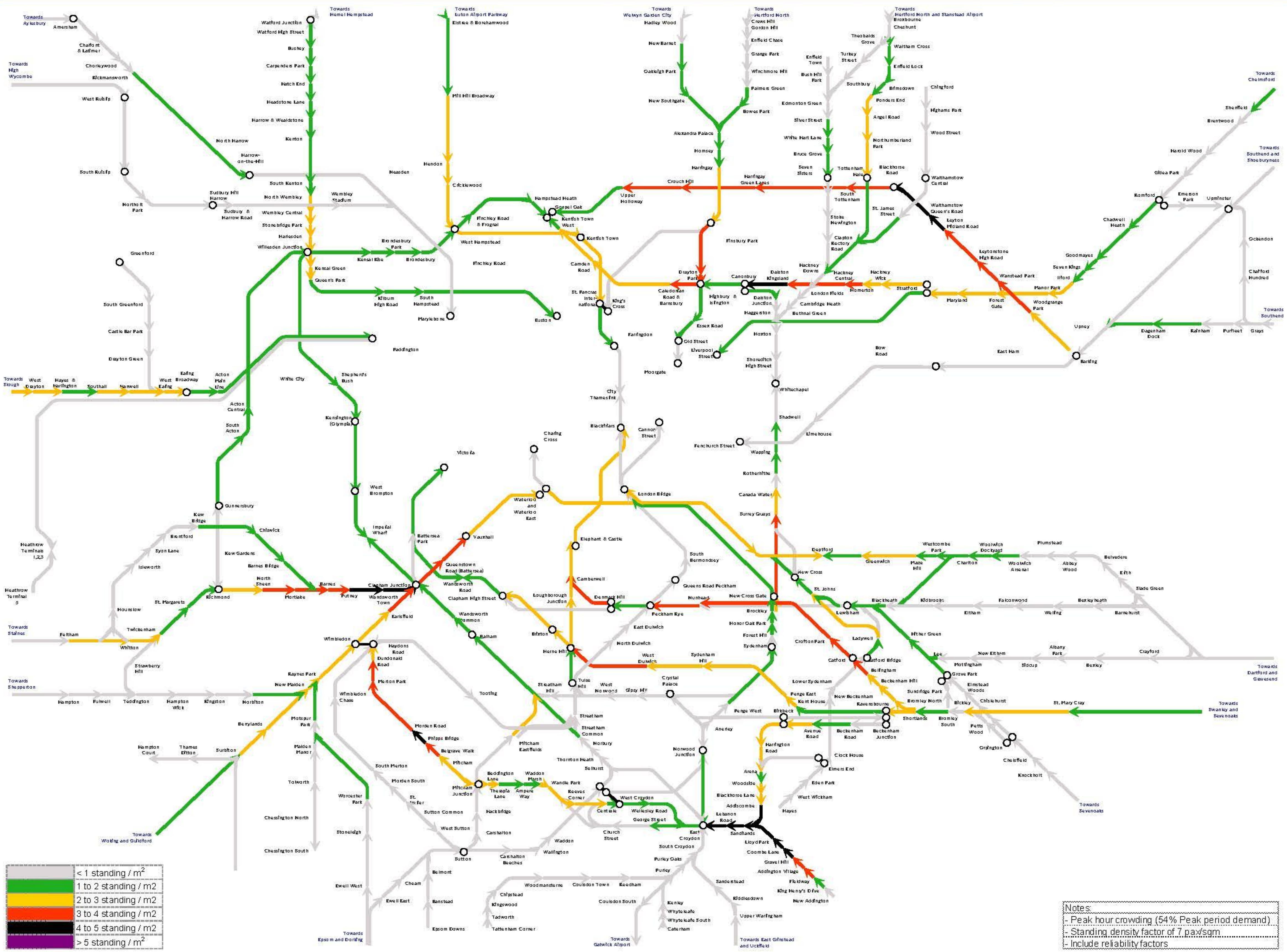
Notes:
- Peak hour crowding (54% Peak period demand)
- Standing density factor of 7 pax/sqm
- Include reliability factors

LUL and DLR Crowding Map: LW005A48P - WE001A08A - 2041AM Reference Case - 2011AM Reference Case

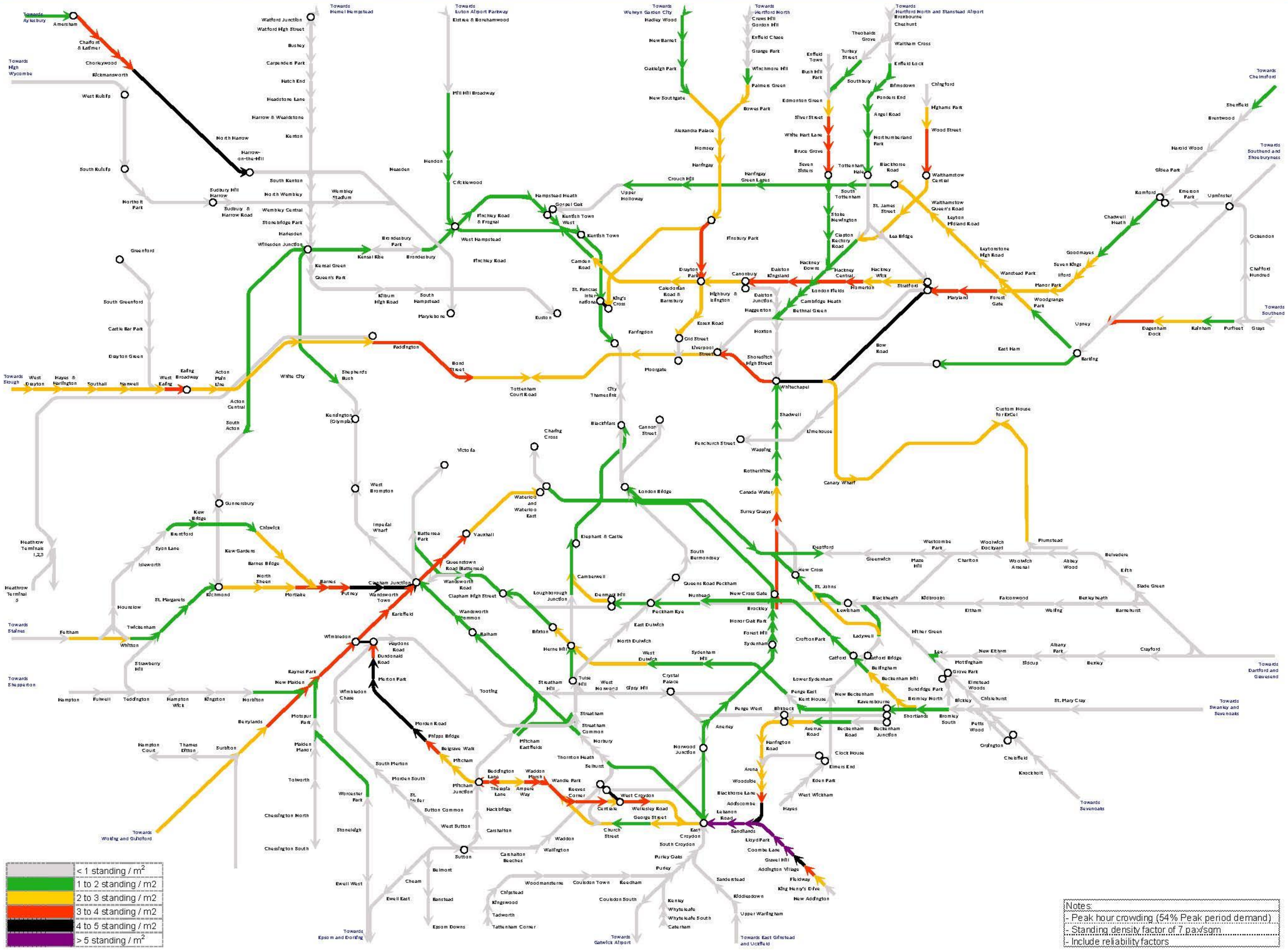


Notes:
- Peak hour crowding (54% Peak period demand)
- Standing density factor of 7 pax/sqm
- Include reliability factors

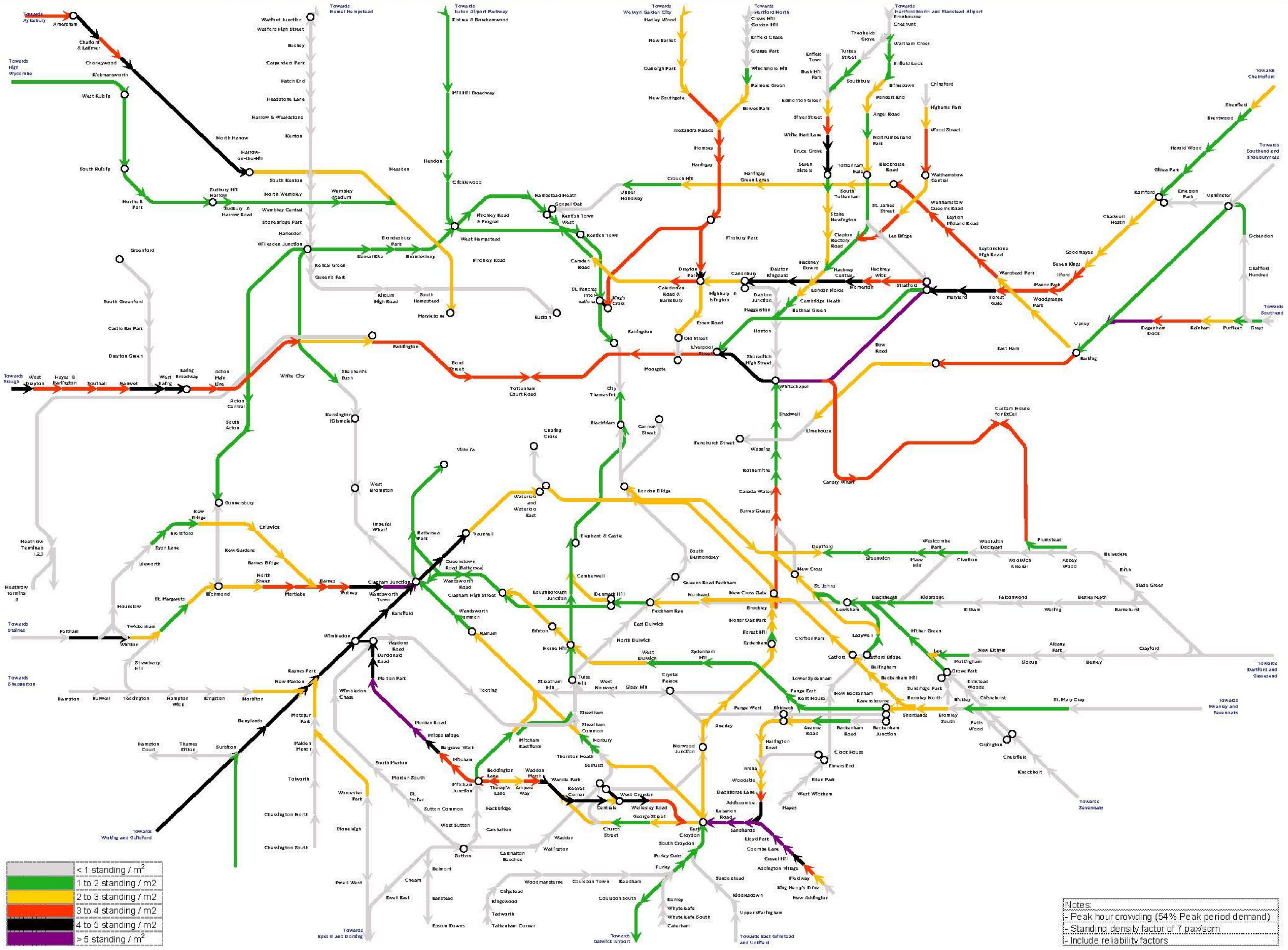
NR and TRAM Crowding Map: WE001A08A - 2011 AM Ref Case w GWML adj



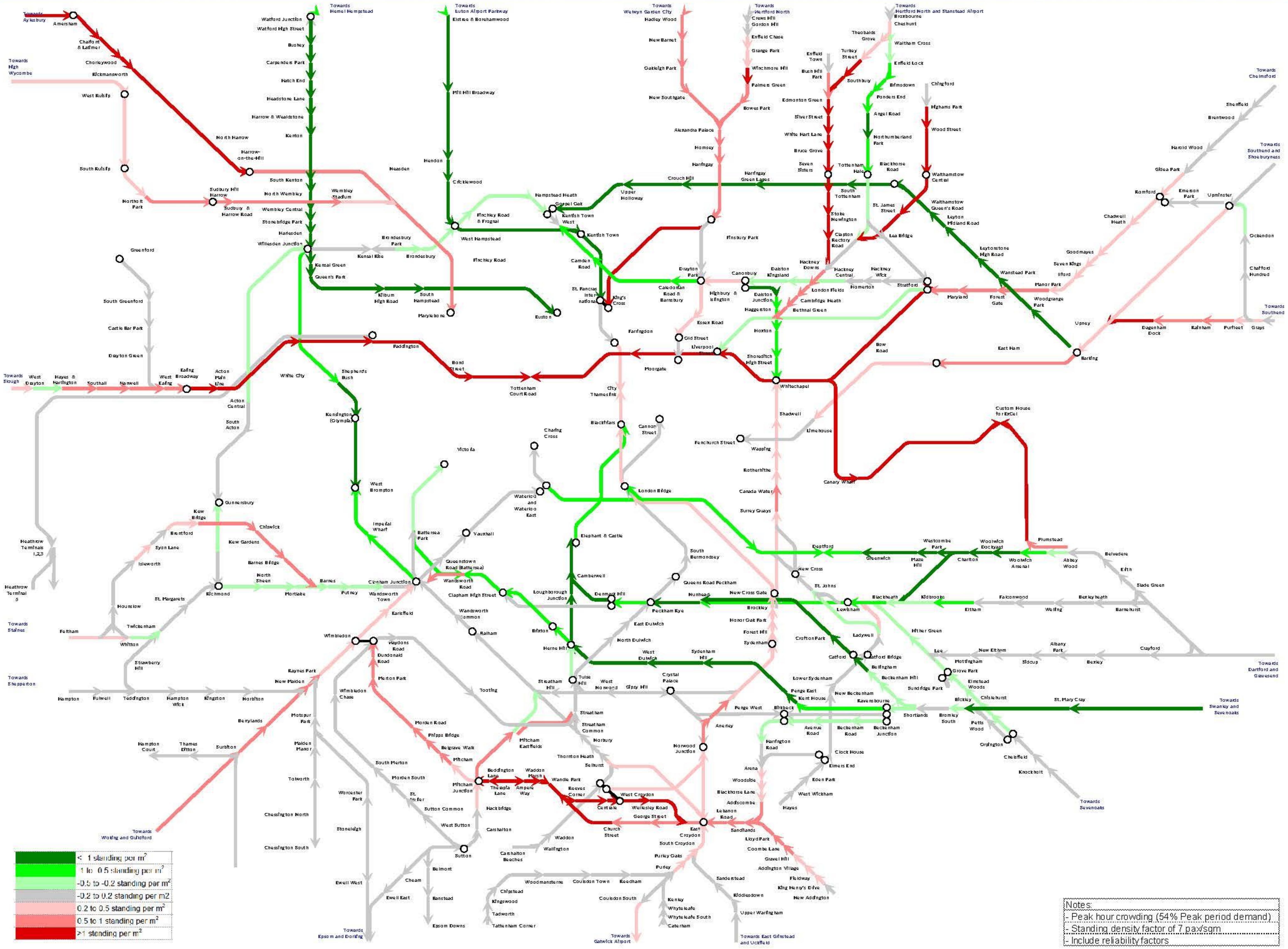
NR and TRAM Crowding Map: LW004A48D70 - 2026AM Funded Scenario without JNAT



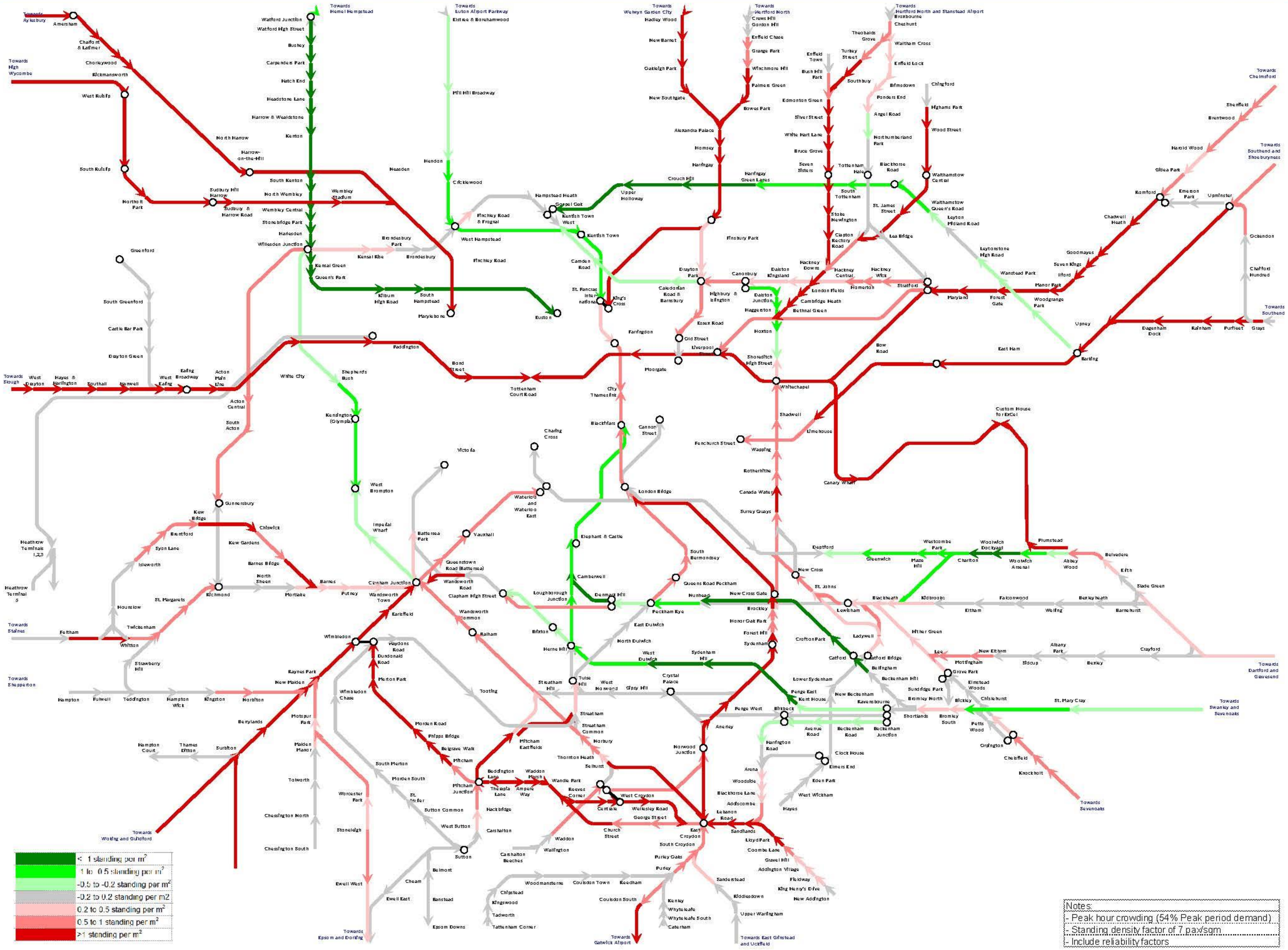
NR and TRAM Crowding Map: LW005A48P70 - 2041AM Funded Scenario without JNAT



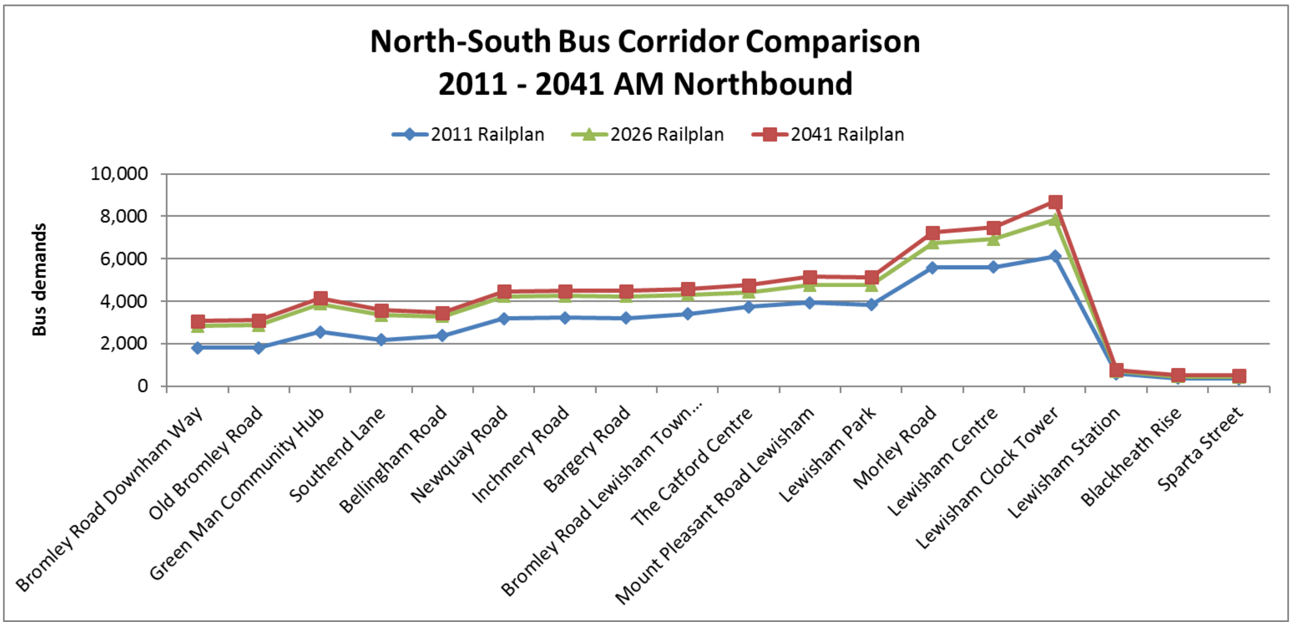
NR and TRAM Crowding Map: LW004A48D - WE001A08A - 2026AM Reference Case - 2011AM Reference Case

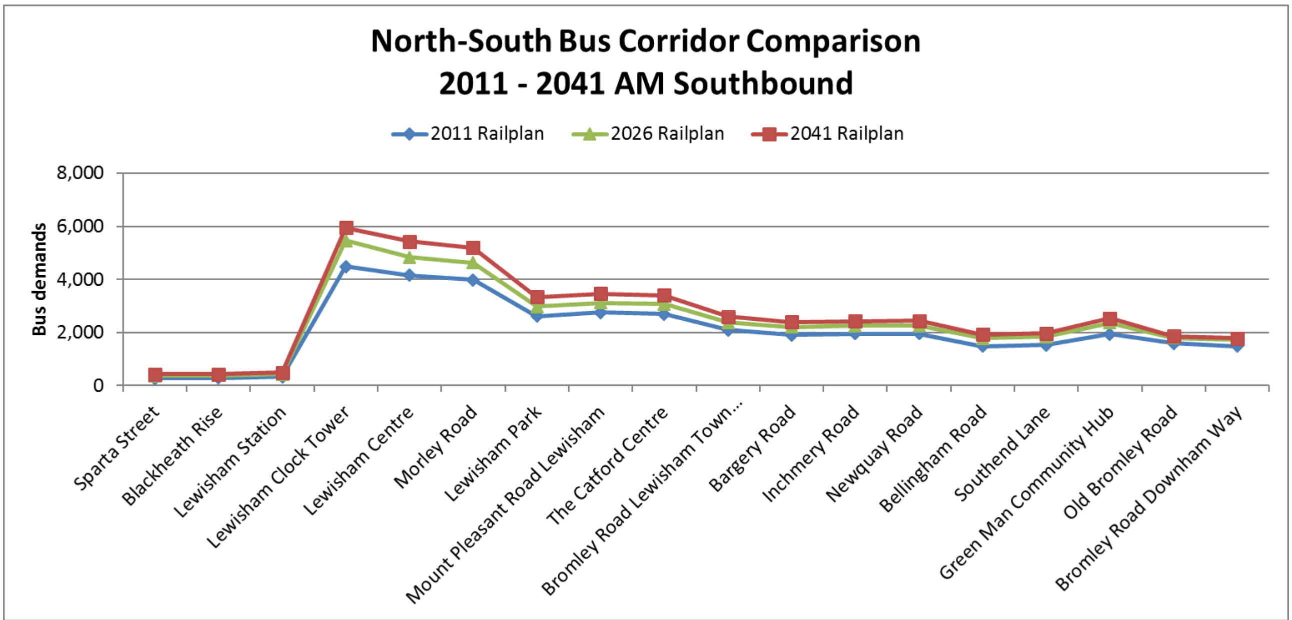


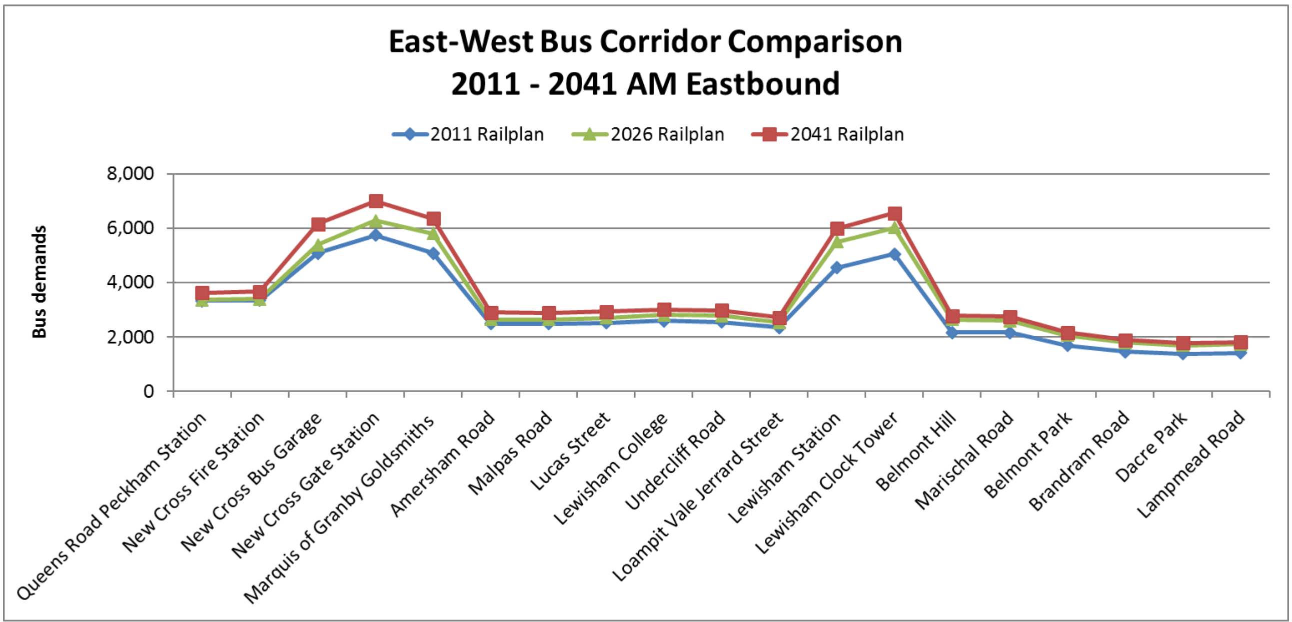
NR and TRAM Crowding Map: LW005A48P - WE001A08A - 2041AM Reference Case - 2011AM Reference Case

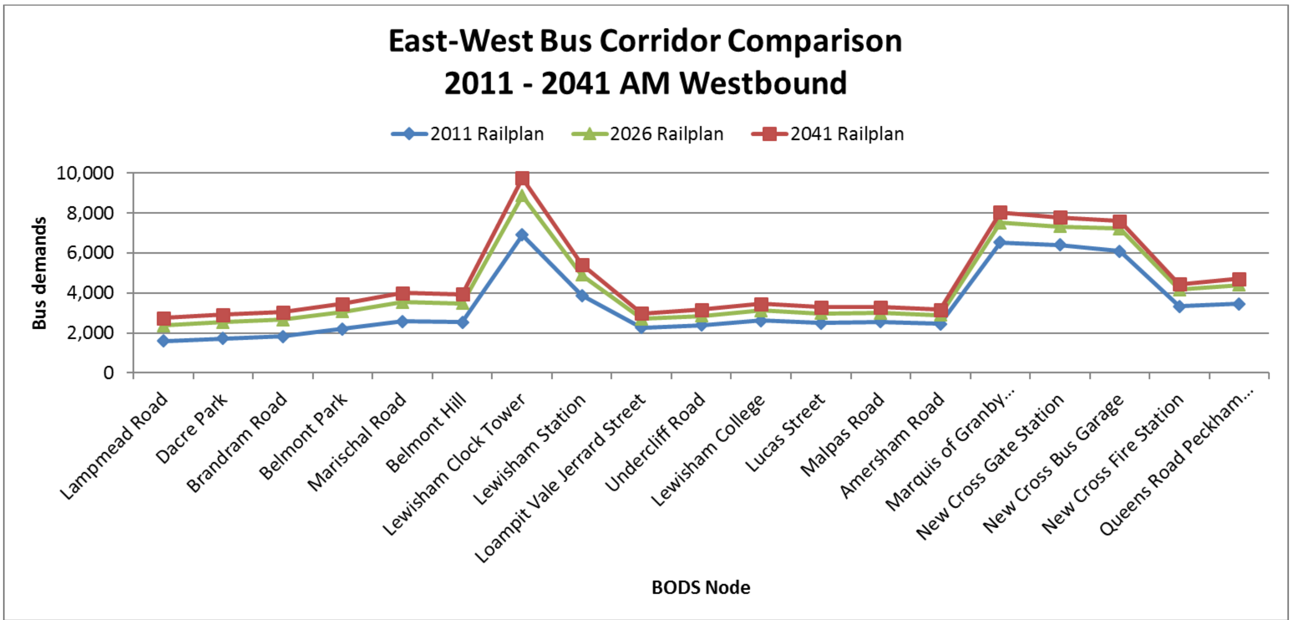


Annex B – Flow Profiles along Bus Corridors






East-West Bus Corridor Comparison
2011 - 2041 AM Eastbound
2011 Railplan
2026 Railplan
2041 Railplan
Bus demands
8,000
6,000
4,000
2,000
0
Queens Road Peckham Station
New Cross Fire Station
New Cross Bus Garage
New Cross Gate Station
Marquis of Granby Goldsmiths
Amersham Road
Malpas Road
Lucas Street
Lewisham College
Undercliff Road
Loampit Vale Jerrard Street
Lewisham Station
Lewisham Clock Tower
Belmont Hill
Marischal Road
Belmont Park
Brandram Road
Dacre Park
Lampmead Road


East-West Bus Corridor Comparison
2011 - 2041 AM Westbound
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Lampmead Road
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Lewisham Clock Tower
Lewisham Station
Loampit Vale Jerrard Street
Undercliff Road
Lewisham College
Lucas Street
Malpas Road
Amersham Road
Marquis of Granby...
New Cross Gate Station
New Cross Bus Garage
New Cross Fire Station
Queens Road Peckham...
BODS Node

Appendix D – Technical Note – ELHAM Future Year Model Audit – Lewisham Local Plan Transport Assessment

Date: 9 January 2019

1. Introduction

In August 2018, WSP was appointed by the London Borough of Lewisham (LBL) to provide transport modelling services to support LBL with the preparation of their Local Plan and Local Implementation Plan (LIP). Strategic transport modelling is required to help provide the evidence base for assessing the impacts and the improvements required to support the proposed growth within the Borough.

The latest version of Transport for London's (TfL's) West London Highway Assignment Model (ELHAM) has been used. ELHAM is a SATURN highway assignment model covering east London. The base year model was developed to reflect 2012 network conditions and traffic, whilst the forecast year models (reviewed here) were developed to reflect 2026 and 2041 network conditions and traffic.

This forecast year model audit report documents the assessment of ELHAM. It considers whether the ELHAM forecast year models are fit-for-purpose for the evaluation of the development proposals in the Borough. The audit has been carried out in accordance with TfL's *"Sub-regional Highway Assignment Model Guidance on Model Use" (Version 2.6)* (TfL, 2017).

This forecast year model audit report considers:

- Highway schemes introduced between 2012 and 2026/2041
- Flow differences between 2012 and 2026/2041
- Delay differences between 2012 and 2026/2041
- Flow changes across screenlines/enclosures between 2012 and 2026/2041
- Journey time changes between 2012 and 2026/2041

2. Model Files

The 2026 and 2041 forecast year ELHAM files (version E3.09) were provided to WSP by TfL and included the following AM peak highway assignment files:

- E3_FY26_V149NET_LP01_AM.UFS
- E3_FY26_V149NET_LP01_AMq.UFS
- E3_FY41_V149NET_LP08_AM.UFS
- E3_FY41_V149NET_LP08_AMq.UFS

As outlined in the *"ELHAM Base Year Model Fact Sheet v3.9a"* (TfL) the models with 'q' in their title represent the PASSQ assignment which is a pre-load assignment. These models were not reviewed during the audit process.

3. Highway Schemes

Table 1 contains a list of highway schemes that were added to the base year network by TfL to create the 2026 and 2041 forecast year networks. Of significance to this project is the inclusion of the Silvertown Tunnel scheme which is located not far (approximately 2km) from the edge of the eastern boundary of the London Borough of Lewisham.

Table 1: Additional Highway Schemes Included in Forecast Year Models

Highway Scheme	Year Introduced
A12/Newbury Park Station (long term)	2013
A4 Sutton Court Road	2013
Acton Town Centre Enhancement Scheme	2013
Battersea Park Road j/w Prince of Wales Drive/Havelock Terrace	2013
Hoe Street - Corridor Scheme 2012-13	2013
A10 Great Cambridge Road with White Hart Lane - Extension of right turn filter	2013
A23 Streatham Hub S278 Works - Phase II	2013
A316 London Road Roundabout Cycle Facilities CJR	2013
M25 Junction 30 Improvements	2014
M25 Junctions 23 to 27 Managed Motorway	2014

Highway Scheme	Year Introduced
M25 Junctions 5 to 7 Managed Motorway	2014
Euston Circus	2014
Exhibition Road/Kensington Gore Junction Improvements	2014
Lea Bridge Road Regeneration Scheme (Formal Sub)	2014
Southall Broadway Boulevard	2014
Tottenham Hale Gyratory	2014
Holborn Circus	2014
Widening along Hayes Road in Southall	2014
Atlas Road roundabout	2014
Leamington Park/Horn Lane Junction	2014
Chandos/Victoria Road Junction and Chandos Road one-way	2014
Kings Cross - Interim	2014
Croydon A232 \Park lane junction improvement	2014
Dartford Remote Crossing Payment Scheme	2015
CS5 Inner - Oval Cricket Ground to Drummond Gate	2015
Haymarket - Piccadilly 2-way	2015
Oval Triangle Better Junctions	2015
Northumberland Development Project	2016
Southall Gasworks	2016
Bow Roundabout (Olympic Park)	2016
Brent Cross at North Circular junction with A5, M1, A41 Hendon Way	2016
Brixton Town Centre Improvements	2016
Coulsdon Town Centre Improvement	2016
E28 Link and LO3 Safeguarding (Olympic Park)	2016
Elephant and Castle	2016
Engineers Way	2016
SCH037 OPTEMS - H02 Cadogan Terrace Traffic Calming (Olympic Park)	2016
SCH038 OPTEMS - H03B* Eastway Improvements (Olympic Park)	2016
Highway near Aquatics / Stratford City Southern Access Road (Olympic Park)	2016
SCH039 OPTEMS - H10 Ball Pond Road (Hackney) (Olympic Park)	2016

Highway Scheme	Year Introduced
SCH042 OPTEMS - H14 Lower Clapton Road (Hackney) (Olympic Park)	2016
Highway Link Assessment (Olympic Park)	2016
L10 North Loop Road / Velodrome Link (Olympic Park)	2016
Lea Interchange/Waterden Rd (Olympic Park)	2016
Marshgate Lane / Southern Loop Road (Olympic Park)	2016
N15-2* North-South Residential Traffic Priorities - (Olympic Park)	2016
North Loop Road / Temple Mill Lane (Olympic Park)	2016
OPTEMS - as of 2009 OPTEMS Strategy (Olympic Park)	2016
Park Street / Velodrome Link (Olympic Park)	2016
Ruckholt Road (Olympic Park)	2016
Stratford City (Olympic Park)	2016
SCH047 OPTEMS - TH07 Ailsa Street (Tower Hamlets) (Olympic Park)	2016
SCH048 OPTEMS - TH08 Gillender Street (Tower Hamlets) (Olympic Park)	2016
SCH048 OPTEMS - WF01 Ruckholt Road (Waltham Forest) (Olympic Park)	2016
White Post Lane/E28 link, Waterden Road/Carpenters Road (Olympic Park)	2016
Waterloo IMAX roundabout	2016
CS2 Extension - Bow Roundabout to Stratford	2016
Cycle Superhighway N-S - Elephant and Castle to Farringdon Station	2016
Cycle Superhighway N-S	2016
East-West Cycle Super Highway Inner - Tower Gateway to Eastbourne Terrace	2016
Chiswick RBT & Kew Bridge - remaining elements of CS9	2016
Aldgate Gyratory removal - separate to CSH2	2016
Old Street Better Junctions	2016
Stockwell	2016
Elephant & Castle Northern roundabout	2016
Victoria Nova	2016
Victoria Vision	2016
West End / Tottenham Court Road Project - build stages 1 - 4	2016
Archway	2016

Highway Scheme	**Year Introduced**
Westminster Bridge roundabout	2016
Swiss Cottage	2016
Lewisham Gateway	2016
Apex Corner (Cycle Superhighway Route 1)	2016
CS11 - West Hampstead to Marylebone	2017
Baker Street 2 way	2017
West End / Tottenham Court Road Project - build stage 5	2017
Lambeth Bridge North Roundabout	2017
Lambeth Bridge South Roundabout	2017
Bank junction traffic exclusion	2017
London Bridge Thameslink	2018
M25 J10 (with A3)	2021
A21: Tonbridge to Pembury	2021
Silvertown Tunnel	2024

4. Traffic Flow Difference

The increase/decrease in link flows between 2012 and 2026/2041 are shown in Figure 1 and Figure 2.

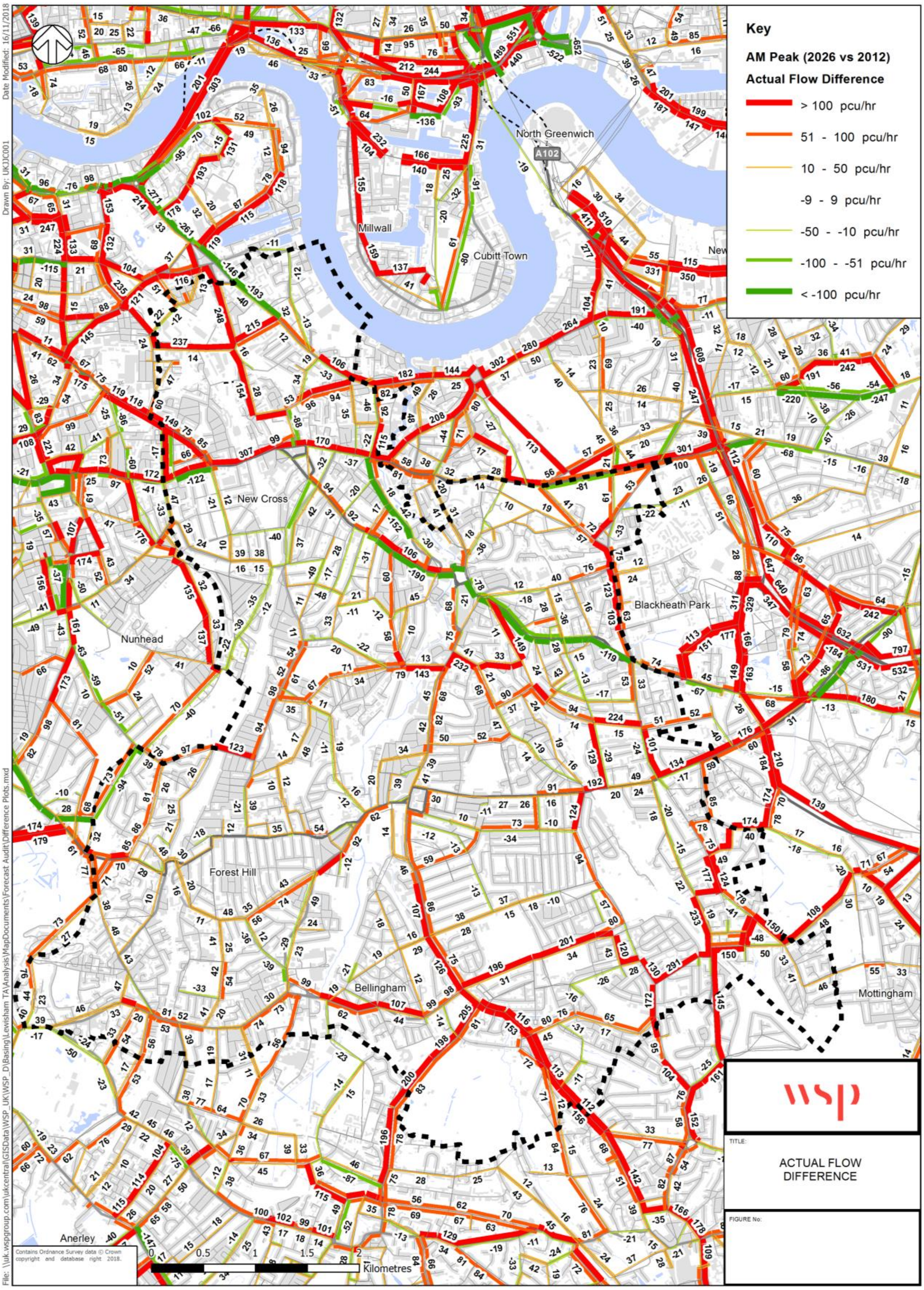


Figure 1: Link Flow Difference (2026 vs 2012)

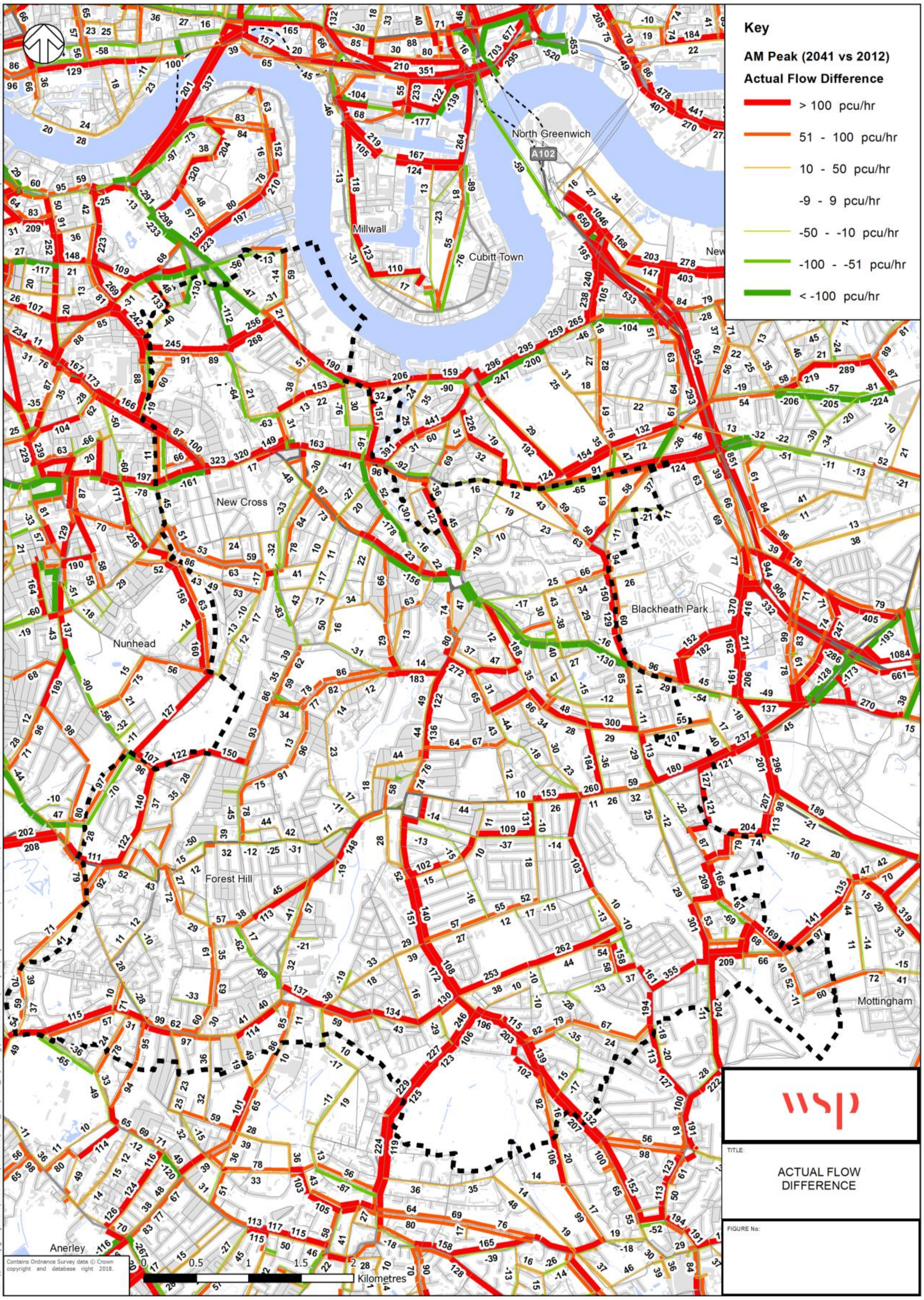


Figure 2: Link Flow Difference (2041 vs 2012)

It is apparent that the largest flow increases are up to approximately 500 PCU (one-way) in 2026 and up to approximately 1,000 PCU (one-way) in 2041. These flow increases occur to the east of the Borough on the **A2 Blackwall Tunnel Southern Approach** road and are a result of the introduction of the Silvertown Tunnel to the forecast year models. The increases extend to the east of the Borough to/from the **A20 Sidcup Road** area in the London Borough of Greenwich and down to the London Borough of Bromley.

Partly as a result of the introduction of Silvertown Tunnel, traffic redistribution occurs between 2012 and 2026/2041. The Silvertown Tunnel attracts trips to the **A2 Blackwall Tunnel Southern Approach** road and as a result, leads to a flow reduction within the Borough on the **A20** through Lewisham as traffic switches to the **A2**. The **A20** through Lewisham sees a flow reduction of up to approximately 200 PCU (one-way) between 2012 and 2026/2041.

Within the Borough itself, there are noticeable flow increases (of up to approximately 200 PCU (one-way) between 2012 and 2026/2041) in the south around Southend and Bellingham on the **A21 Bromley Road**, **Beckenham Hill Road**, **Southend Lane** and **Whitefoot Lane**. The flow increases are far lower in the centre of the Borough, being up to approximately 50 PCU (one-way) on most links.

In the north of the Borough, flow increases are apparent around New Cross on the **A2 New Cross Road** of up to approximately 300 PCU (one-way) between 2012 and 2026/2041. These flow increases extend out of the Borough into the London Borough of Greenwich to/from the **A2 Blackwall Tunnel Southern Approach** road and the Silvertown Tunnel via the **A206** and **Charlton Way** in the London Borough of Greenwich.

It is primarily the north and south of the Borough that see the greatest flow increases between 2012 and 2026/2041.

Traffic Flow Problems and Issues in the Borough

In the north, the largest increases occur on A2 New Cross Road (up to approximately 300 PCU one-way).

In the south, the greatest traffic flow increases (up to approximately 200 PCU one-way) occur on/around A21 Bromley Road, Beckenham Hill Road, Southend Lane and Whitefoot Lane.

5. Traffic Delay Difference

The differences in delays between 2012 and 2026/2041 were plotted, as shown in Figure 3 and Figure 4.

A list of junctions was created (Table 2) to show the junctions within the London Borough of Lewisham where delay differences of >60 seconds occur between 2012 and 2026/2041.

Table 2: Borough Junctions with >60 Second Delay Increase Between 2012 and 2026/2041

Area of Borough	ID	Junction	Delay Difference (seconds) vs 2012 2026	Delay Difference (seconds) vs 2012 2041
Blackheath	1	A2 Shooters Hill Road / Prince Charles Road	136	295
Blackheath	2	A2 Shooters Hill Road / B212 Prince of Wales Road	96	169
Brockley	3	B218 Brockley Cross / B2142 Brockley Cross	<60	74
Forest Hill	4	A205 London Road / Sydenham Rise	<60	69
Forest Hill	5	A205 London Road / Sydenham Hill	67	70
Grove Park	6	A2212 Burnt Ash Lane / Downham Way	72	113
Grove Park	7	A2212 Burnt Ash Lane / B226 Chinbrook Road	<60	67
Honor Oak	8	Forest Hill Road / Wood Vale	82	85
Lee	9	A20 Lee High Road / A2212 Burnt Ash Road / B212 Lee Road	65	110
Lee	10	A205 St Mildreds Road / Verdant Lane / Hither Green Lane	<60	82
Lee	11	A205 St Mildreds Road / Baring Road	<60	61
Lee	12	A205 St Mildreds Road / Burnt Ash Hill	67	98

Area of Borough	ID	Junction	Delay Difference (seconds) vs 2012 2026	Delay Difference (seconds) vs 2012 2041
Lewisham	13	A21 Molesworth Street / A20 Lewisham High Street	91	107
Lewisham	14	A20 Lewisham High Street / A2211 Lewisham High Street	221	232
Lewisham	15	A21 Lewisham High Street / B236 Ladywell Road	78	93
New Cross / Deptford	16	A20 Lewisham Way / Parkfield Road	<60	82
New Cross / Deptford	17	A20 Lewisham Way / Florence Road	<60	68
New Cross / Deptford	18	A2 New Cross Road / Florence Road	135	161
New Cross / Deptford	19	A2 New Cross Road / Amersham Road	92	118
New Cross / Deptford	20	A2 New Cross Road / Pagnell Street	67	102
New Cross / Deptford	21	A2 Deptford Broadway / A2209 Deptford Church Street	220	291
Nunhead	22	A2214 Lausanne Road / A202 Queen's Road	125	150
South Bermondsey	23	Ilderton Road / Surrey Canal Road	121	376
South Bermondsey	24	B207 Trundley's Road / Bestwood Street / Bush Road	<60	84
South Bermondsey	25	A200 Evelyn Street / Abinger Grove	64	<60

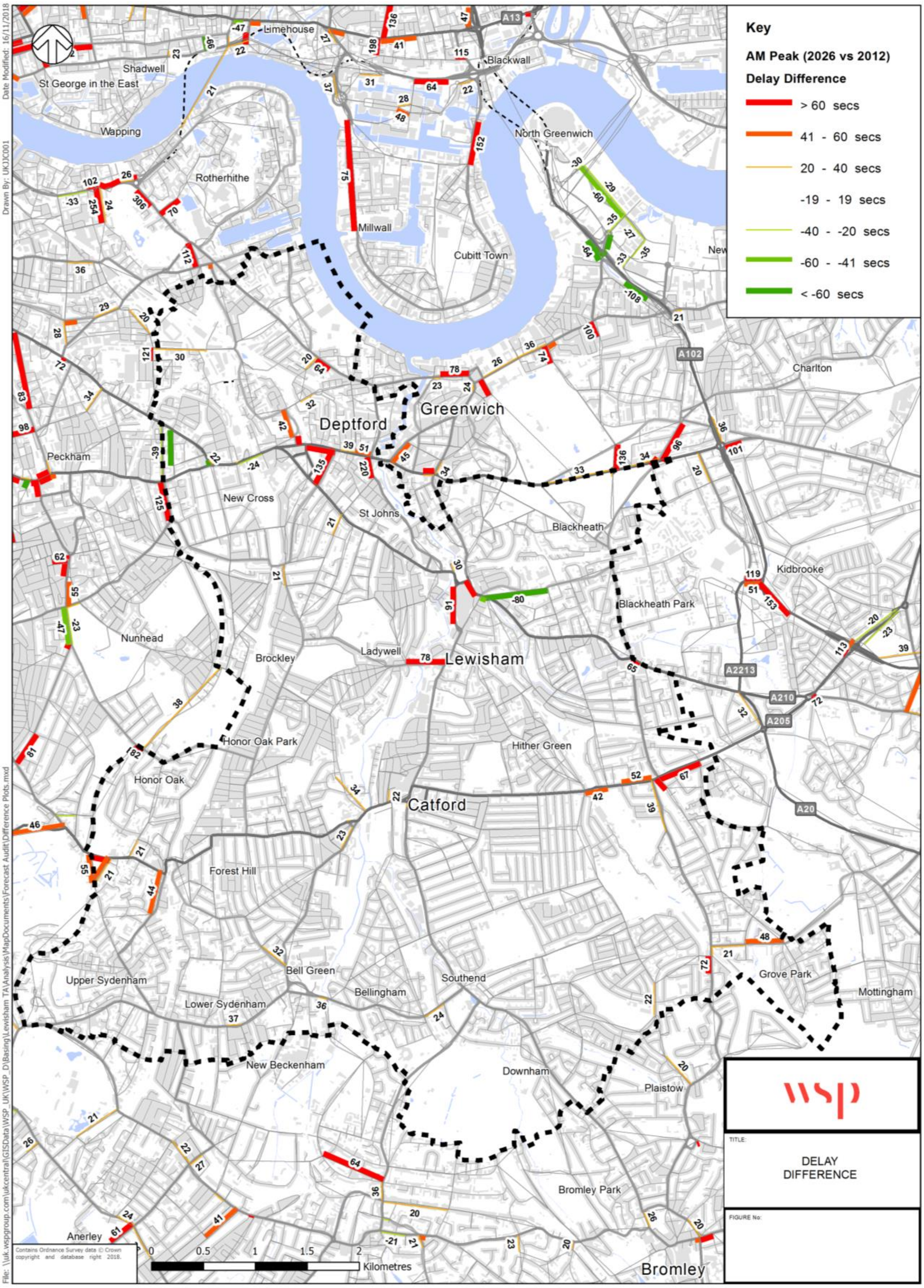


Figure 3: Link Delay Difference (2026 vs 2012)

wsp

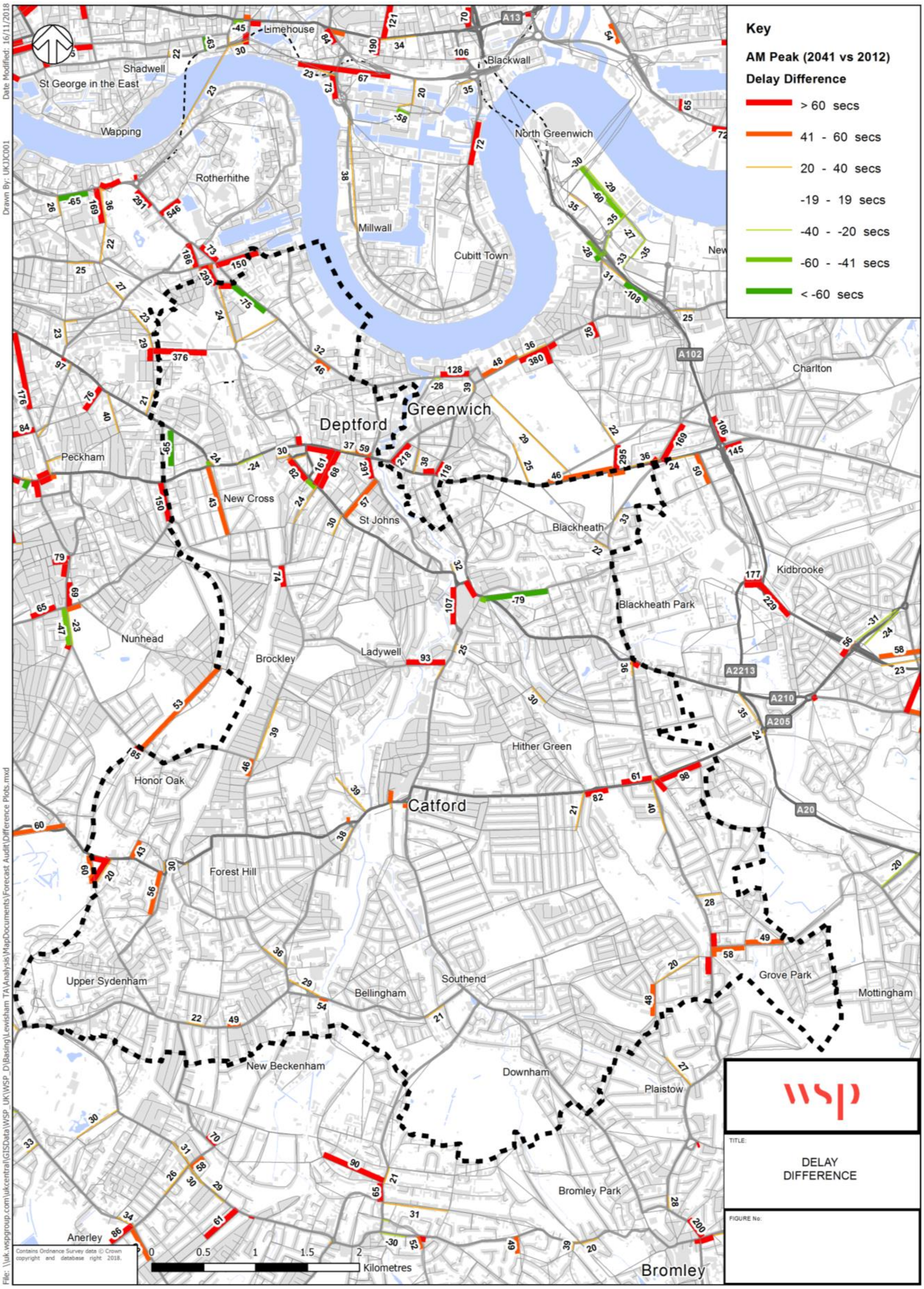


Figure 4: Link Delay Difference (2041 vs 2012)

It is apparent that the greatest concentration of delay differences >60 seconds between 2012 and 2026/2041 is in the New Cross / Deptford area in the north of the Borough. Here, there are particularly large delay increases in excess of >100 seconds, for example at the junction of **A2 New Cross Road with Florence Road (ID 18)** and **A2 New Cross Road with Amersham Road (ID 19)**. The former priority junction exhibits delay increases on the minor arm (Florence Road), but not on the A2. This is as a result a flow increase of between 100-200 PCU/hr on the A2 eastbound, which impedes the flow of vehicles out of Florence Road in the forecast year models. The latter is a signalised junction where the alteration of the signal timings could reduce the delay on the A2 westbound, but a test conducted by WSP to optimise the signals at this junction resulted in no change to the timings within the model.

Also in the New Cross / Deptford area in the north of the Borough, the junction of the **A2 Deptford Broadway** with **A2209 Deptford Church Street (ID 21)** experiences the most significant delay increases in the Borough between 2012 and 2026/2041 of 200-300 seconds. These delays occur on the A2210 Brookmill Road arm of the junction. Here, alterations to the signal timings within the forecast year models may also reduce the delays experienced on the A2210 Brookmill Road arm of the junction, but in a test carried out by WSP, changes to the signal timings did not mitigate the increase in delays to any large extent.

At the very northern edge of the Borough, the area around South Bermondsey sees extremely high delay increases (376 seconds between 2012 and 2041) at the junction of **Ilderton Road with Surrey Canal Road (ID 23)** on the Surrey Canal Road arm. A tweak to the signal timings at this arm may reduce the delay on the Surrey Canal Road arm. In a test carried out by WSP, the delay increase from 2012 was very similar as it is currently in the 2041 Reference Case model, so more refined designs for the junction may be required in the future.

The area around Lewisham also exhibits several delay increases, for example at the junction of the **A20 Lewisham High Street with A2211 Lewisham High Street (ID 14)** where delay increases of >200 seconds are apparent. This is a junction where slight alterations to the signal timings may reduce the delays on the A20 arm.

In the south of the Borough around Lee, there are a few junctions which show increases in delay of up to approximately 100 seconds. These junctions are located along the **A205 St Mildreds Road corridor (ID 10-12)** and so this is a corridor where mitigation might be necessary.

Finally, at the southern edge of the Borough there are a couple of junctions which show increases in delays around **A2212 Burnt Ash Lane (ID 6 and 7)** in the Grove Park area. These two junctions are located adjacent to each other on the A2212 Burnt Ash Lane corridor which means that an amendment to one of the junctions would likely impact the other due their proximity to one another.

Traffic Delay Problems and Issues in the Borough

In the north of the Borough, there are large delay increases in the New Cross / Deptford area, particularly at the junctions of:

- A2 New Cross Road with Florence Road (+135 seconds to 2026 and +161 seconds to 2041)
- A2 New Cross Road with Amersham Road (+92 seconds to 2026 and +118 seconds to 2041)
- A2 Deptford Broadway with A2209 Deptford Church Street (+220 seconds to 2026 and +291 seconds to 2041)

There are also large delay increases around South Bermondsey and Lewisham at:

- Ilderton Road with Surrey Canal Road (+121 seconds to 2026 and +376 seconds to 2041)
- A20 Lewisham High Street with A2211 Lewisham High Street (+221 seconds to 2026 and +232 seconds to 2041)

In the south of the Borough, delays on the A205 St Mildreds Road corridor and delays around A2212 Burnt Ash Lane increase significantly (up to +100 seconds approximately) between 2012 and 2041.

6. Traffic Flow across Screenlines/Enclosures

In the base model audit, a set of screenlines/enclosures were selected in and around the Borough to confirm that the aggregate directional movement of trips across the study area is suitably represented by the models. The 12 screenlines/enclosures selected are shown in Figure 5.

The base year model flows were then compared against the forecast year model flows to identify the increases/decreases in directional movements across the screenlines/enclosures. Table 3 shows this comparison for 2026/2041 compared to 2012.

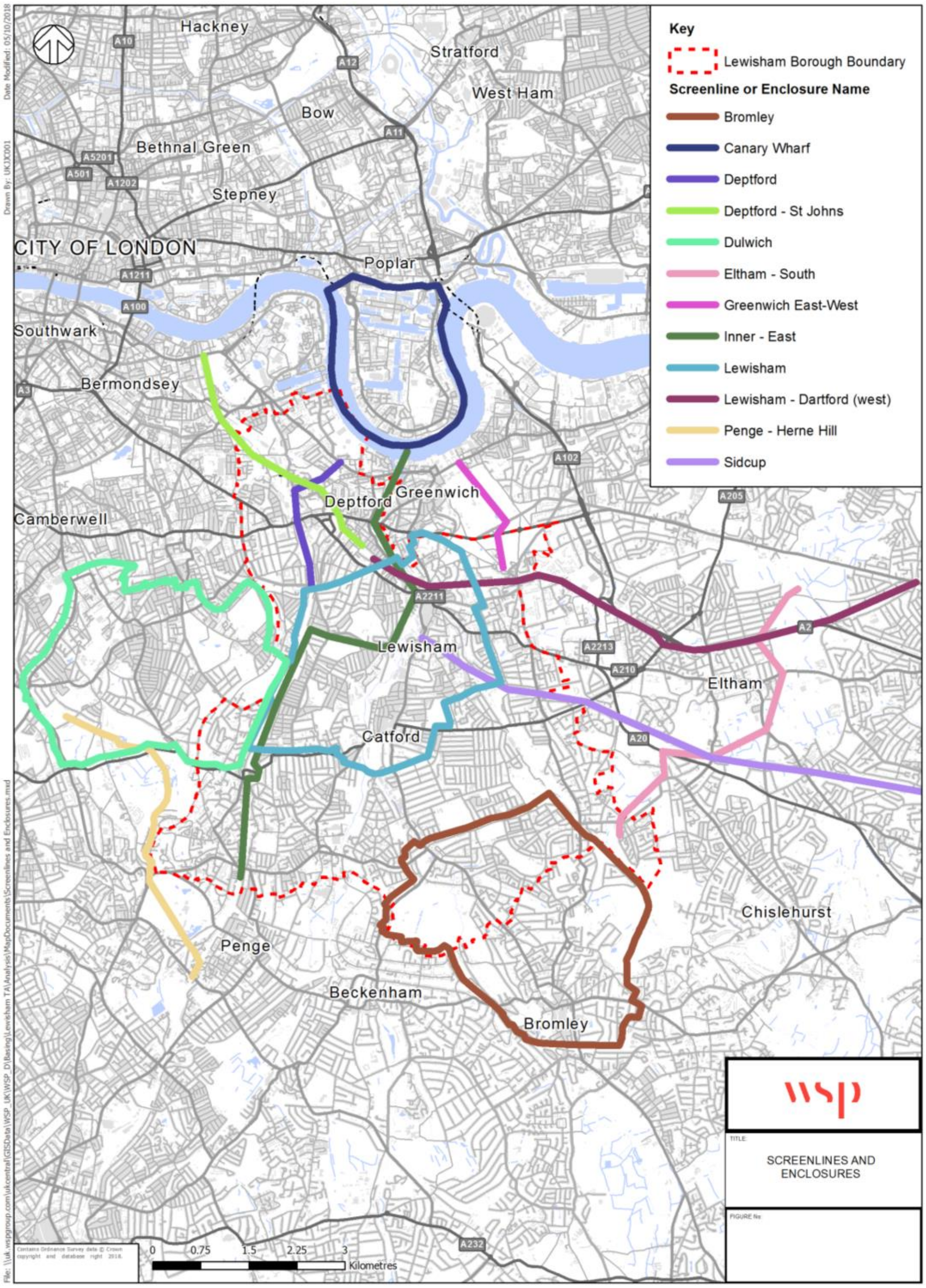


Figure 5: Screenline/Enclosure Locations

Table 3: AM Peak Screenline/Enclosure Modelled Flows (vehicles)

Screenline / Enclosure	Direction text	2012	2026	% Diff (2026 vs 2012)	2041	% Diff (2041 vs 2012)
Bromley	IB	6,719	7,303	9%	7,540	12%
Bromley	OB	6,026	6,688	11%	6,783	13%
Canary Wharf	IB	3,714	4,182	13%	3,921	6%
Canary Wharf	OB	2,124	2,637	24%	2,794	32%
Deptford	WB	3,348	3,424	2%	3,365	0%
Deptford	EB	2,352	2,681	14%	2,812	20%
Deptford - St Johns	EB	2,561	3,159	23%	3,108	21%
Deptford – St Johns	WB	2,820	2,949	5%	2,777	-2%
Dulwich	IB	7,348	7,683	5%	7,857	7%
Dulwich	OB	7,688	7,735	1%	7,836	2%
Eltham - South	EB	5,947	7,064	19%	7,420	25%
Eltham – South	WB	7,902	8,442	7%	8,562	8%
Greenwich East-West	EB	1,838	2,126	16%	2,207	20%
Greenwich East-West	WB	2,746	2,818	3%	2,647	-4%
Inner – East	WB	7,197	7,237	1%	7,232	0%
Inner – East	EB	5,091	5,583	10%	5,720	12%
Lewisham	IB	9,784	9,644	-1%	9,690	-1%
Lewisham	OB	9,251	9,303	1%	9,489	3%
Lewisham – Dartford	NB	9,027	10,136	12%	10,342	15%
Lewisham – Dartford	SB	8,271	9,443	14%	9,827	19%
Penge - Herne Hill	EB	3,475	4,015	16%	4,132	19%

Screenline / Enclosure	Direction text	2012	2026	% Diff (2026 vs 2012)	2041	% Diff (2041 vs 2012)
Penge – Herne Hill	WB	4,059	4,414	9%	4,513	11%
Sidcup	NB	7,178	7,800	9%	7,913	10%
Sidcup	SB	7,700	8,346	8%	8,599	12%
Total	**All**	**134,167**	**144,812**	**8%**	**147,083**	**10%**

In summary, Table 3 shows that the modelled traffic flows across the screenlines/enclosures increase by:

- 8% between 2012 and 2026
- 10% between 2012 and 2041

Taking a closer look at the detail in Table 3, it is evident that **Canary Wharf (outbound)** enclosure, just north of the Borough boundary, experiences the greatest increase in flow across it (24%) between 2012 and 2026, and in terms of flow, this increase is 513 PCU. The **Lewisham (inbound)** enclosure sees the greatest decrease in flow across it between 2012 and 2026 of -1%, which is equivalent to a decrease of -140 PCU. This decrease across the Lewisham (inbound) screenline is also seen in the link flow difference plot for 2026 vs 2012 (Figure 1). The Silvertown Tunnel attracts trips to the A2 Blackwall Tunnel Southern Approach road and as a result, leads to a flow reduction within the Borough on the A20 through Lewisham.

Looking at the numbers for 2041 vs 2012, once again the **Canary Wharf (outbound)** enclosure experiences the greatest increase in flow across it (32%), which in terms of flow is an increase of 670 PCU. Contrastingly, there are three screenlines/enclosures which experience a decrease in flow across them between 2012 and 2041, namely:

- Greenwich East-West westbound (-4% or -99 PCU)
- Deptford - St Johns westbound (-2% or -43 PCU)
- Lewisham inbound (-1% or -94 PCU)

The **Greenwich East-West (westbound)** screenline flow decrease is shown on the link flow difference plot for 2026 vs 2012 (Figure 1) and is likely to be due to the Silvertown Tunnel contributing to the redistribution of traffic in the local area between the base and forecast year models. Link flow decreases are also shown in Figure 1 around South Bermondsey which supports the flow decrease of -2% or -43 PCU over the Deptford - St Johns (westbound) screenline. Once again, the **Lewisham (inbound)** enclosure sees a decrease in flow across it of -1%, which is equivalent to a decrease of -94 PCU for the reasons mentioned above related to the Silvertown Tunnel.

Screenline Problems and Issues

The greatest percentage increase in traffic flow across screenlines occurs on the following three screenlines:

- Canary Wharf outbound (+24% to 2026 and +32% to 2041)
- Deptford – St Johns eastbound (+23% to 2026 and +21% to 2041)
- Eltham – South eastbound (+19% to 2026 and +25% to 2041)

7. Journey Times

In the base model audit, a set of journey time routes were selected in and around the Borough to confirm that journey times across the study area are suitably represented by the models. The journey time routes selected are shown in Figure 6.

The base year journey times were then compared against the forecast year model journey times to identify the increase/decrease along each route. Table 4 shows this comparison.

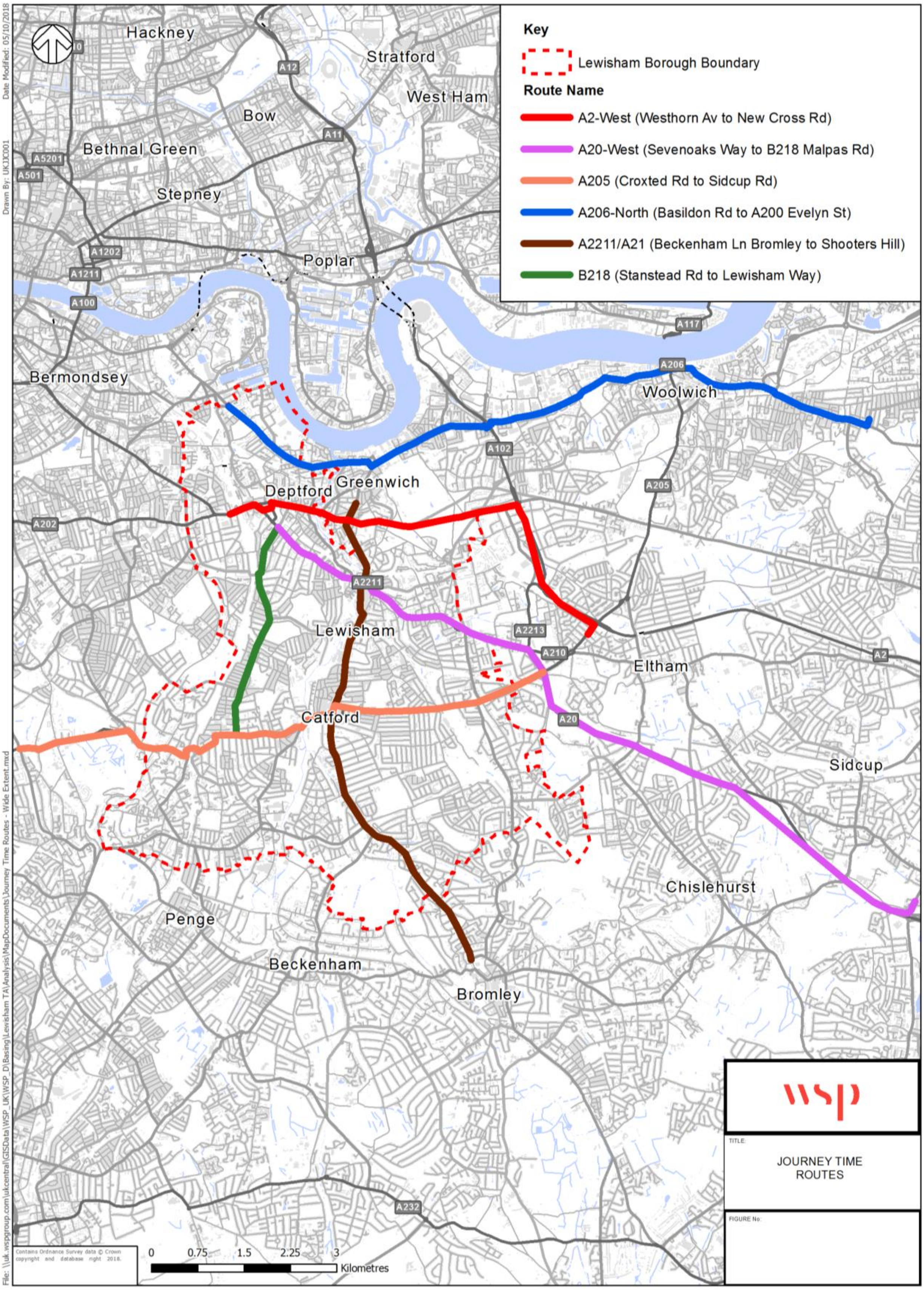


Figure 6: Journey Time Routes

Table 4: AM Peak Modelled Journey Times (Seconds)

Ref.	Description	Direction	2012	2026	% Diff (2026 vs 2012)	2041	% Diff (2041 vs 2012)
R157	B218 (Stanstead Rd to Lewisham Way)	N	1,027	1,086	6%	1,165	13%
R158	B218 (Lewisham Way to Stanstead Rd)	S	868	860	-1%	912	5%
R159	A2211/A21 (Beckenham Ln Bromley to Shooters Hill)	N	1,392	1,618	16%	1,673	20%
R160	A2211/A21 (Shooters Hill to Beckenham Ln Bromley)	S	1,354	1,392	3%	1,519	12%
R183	A206-North (Basildon Rd to A200 Evelyn St)	N	2,744	3,090	13%	3,964	44%
R184	A206-North (A200 Evelyn St to Basildon Rd)	S	1,918	2,132	11%	2,339	22%
R185	A2-West (Westhorn Av to New Cross Rd)	N	1,751	2,022	15%	2,316	32%
R186	A2-West (New Cross Rd to Westhorn Av)	S	1,027	1,349	31%	1,431	39%

Ref.	Description	Direction	2012	2026	% Diff (2026 vs 2012)	2041	% Diff (2041 vs 2012)
R189	A20-West (Sevenoaks Way to B218 Malpas Rd)	E	1,561	2,017	29%	2,158	38%
R190	A20-West (B218 Malpas Rd to Sevenoaks Way)	W	2,226	2,579	16%	2,779	25%
R207	A205 (Croxted Rd to Sidcup Rd)	E	1,891	2,166	15%	2,234	18%
R208	A205 (Sidcup Rd to Croxted Rd)	W	2,333	2,640	13%	2,802	20%
Total	**Total**	**All**	**20,092**	**22,951**	**14%**	**25,293**	**26%**

Table 4 shows that journey times along the routes selected increase by:

- 14% between 2012 and 2026;
- 26% between 2012 and 2041.

Between 2012 and 2026, the journey time route that sees the greatest percentage increase in travel time is **A2-West (New Cross Rd to Westhorn Av) southbound** with a 31% increase. This is in keeping with the flow difference which showed flow increases along the A2 in the north and to the east of the Borough. On the opposite hand, the B218 **(Lewisham Way to Stanstead Rd) southbound** route sees a decrease of -1% in travel time, which means the travel times are more or less the same between 2012 and 2026. Indeed, the flow difference analysis showed no great change to the flows along this route between 2012 and 2026.

Between 2012 and 2041, the **A206-North (Basildon Rd to A200 Evelyn St) northbound** route sees the greatest percentage increase in travel time with a 44% increase. This route is very near to the Silvertown Tunnel and the route experiences an increase in traffic between 2012 and 2041. Once again, the B218 **(Lewisham Way to Stanstead Rd) southbound** route sees the lowest percentage increase in travel time (5%) which is consistent with 2012-2026.

Journey Time Problems and Issues

The journey time routes with the greatest percentage increases in journey time are:

- A2-West: New Cross Road to Westhorn Avenue (+31% to 2026 and +39% to 2041)
- A2-West: Westhorn Avenue to New Cross Road (+15% to 2026 and +32% to 2041)
- A20-West: Sevenoaks Way to B218 Malpas Road (+29% to 2026 and +38% to 2041)
- A206-North: Basildon Road to A200 Evelyn Street (+13% to 2026 and +44% to 2041)

8. Conclusion

WSP has undertaken a review of the adequacy of the 2026 and 2041 forecast year ELHAM models within the London Borough of Lewisham. The review has followed TfL's guidance for the use of the London Highway Assignment Models (HAM), set out in TfL's *"Sub-regional Highway Assignment Model Guidance on Model Use (Version 2.6)"* (TfL, 2017).

Our overall conclusion is that there are several areas, corridors and junctions which experience significant increases in traffic and delay in the future. These identify areas where problems and issues will occur in the future if no mitigation against the growth in traffic occurs. The summary below highlights the key problems and issues in the borough in 2026 and 2041:

Increase in Traffic Flows

- In the north of the Borough, the largest increases occur on A2 New Cross Road (up to approximately 300 PCU one-way).
- In the south of the Borough, the greatest traffic flow increases (up to approximately 200 PCU one-way) occur on/around A21 Bromley Road, Beckenham Hill Road, Southend Lane and Whitefoot Lane.

Increase in Delays

- In the north of the Borough, there are large delay increases in the New Cross / Deptford area, particularly at the junctions of:
    - A2 New Cross Road with Florence Road (+135 seconds to 2026 and +161 seconds to 2041)
    - A2 New Cross Road with Amersham Road (+92 seconds to 2026 and +118 seconds to 2041)

    - A2 Deptford Broadway with A2209 Deptford Church Street (+220 seconds to 2026 and +291 seconds to 2041)
- There are also large delay increases around South Bermondsey and Lewisham at:
    - Ilderton Road with Surrey Canal Road (+121 seconds to 2026 and +376 seconds to 2041)
    - A20 Lewisham High Street with A2211 Lewisham High Street (+221 seconds to 2026 and +232 seconds to 2041)
- In the south of the Borough, delays on the A205 St Mildreds Road corridor and delays around A2212 Burnt Ash Lane increase significantly (up to +100 seconds approximately) between 2012 and 2041.

Increase in Traffic Flow Across Screenlines

- The greatest percentage increase in traffic flow across screenlines occurs on the following three screenlines:
    - Canary Wharf outbound (+24% to 2026 and +32% to 2041)
    - Deptford – St Johns eastbound (+23% to 2026 and +21% to 2041)
    - Eltham – South eastbound (+19% to 2026 and +25% to 2041)

Increase in Journey Times

- The journey time routes with the greatest percentage increases in journey time are:
    - A2-West: New Cross Road to Westhorn Avenue (+31% to 2026 and +39% to 2041)
    - A2-West: Westhorn Avenue to New Cross Road (+15% to 2026 and +32% to 2041)
    - A20-West: Sevenoaks Way to B218 Malpas Road (+29% to 2026 and +38% to 2041)
    - A206-North: Basildon Road to A200 Evelyn Street (+13% to 2026 and +44% to 2041)

Appendix E – Technical Note – Lewisham Railplan Local Plan Future Year Intervention Testing

Date: 30 September 2019

1. Introduction

In August 2018, WSP was appointed by the London Borough of Lewisham (LBL) to provide transport modelling services to support LBL with the preparation of their Local Plan and Local Implementation Plan (LIP). Strategic transport modelling is required to help provide the evidence base for assessing the impacts and the improvements required to support the proposed growth within the Borough.

In October 2018 WSP audited the Railplan 7.0 Base Year (BY) reference case scenario WE001A08A provided by TfL against sources of observed data. Details can be found in the technical note *Lewisham Local Plan_Railplan_Audit_DRAFT 22.10.2018.pdf*. Though there were a few minor issues identified in the audit process, the Base Year model generally validates well against DfT validation criteria. It was agreed by all attendees at the meeting on 1st November 2018 that there was no update required for the BY scenario.

In January 2019 WSP reviewed the Railplan 7.0 Future Year (FY) specific reference case scenarios provided by TfL. 2026 and 2041 AM Railplan scenarios with Funded schemes were reviewed, with the addition of a number of coding updates such as Silvertown Tunnel and the removal of Jubilee and Northern Line Additional Trains (JNAT). Details can be found in the technical note *190109_Lewisham Railplan Local Plan_FY_Review_FINAL.pdf*. The key problems and issues in LBL associated with Public Transport (PT) in 2026 and 2041 identified in the Future Year model review are summarised below:

- Passenger growth on all PT services within LBL, particularly DLR and Overground services are very high.
- In 2026 and 2041 passenger crowding on the DLR increases between Lewisham and Canary Wharf. The Jubilee line is very crowded by 2041. Crowding on the Overground and Southern services increases significantly in the future.
- Growth of passengers at stations within the LBL is high, with Lewisham being the station which experiences the highest increase.

- Out of the two major bus corridors identified in the study area, growth in bus passengers is higher on the North-south corridor. Bus stops experiencing the greatest increases in passenger boardings and alightings are in the vicinity of Lewisham and New Cross Gate stations.

The next stage of the PT assessment is to identify the potential transport interventions which will support growth to 2026 and 2041 and address key pressure points highlighted as part of Stage 2. The assessment is based on the Railplan scenarios developed in Stage 2, which cover the AM peak three-hour morning peak 07:00-10:00.

For context Figure 1 presents the LBL and highlights the network rail and DLR stations within the borough.

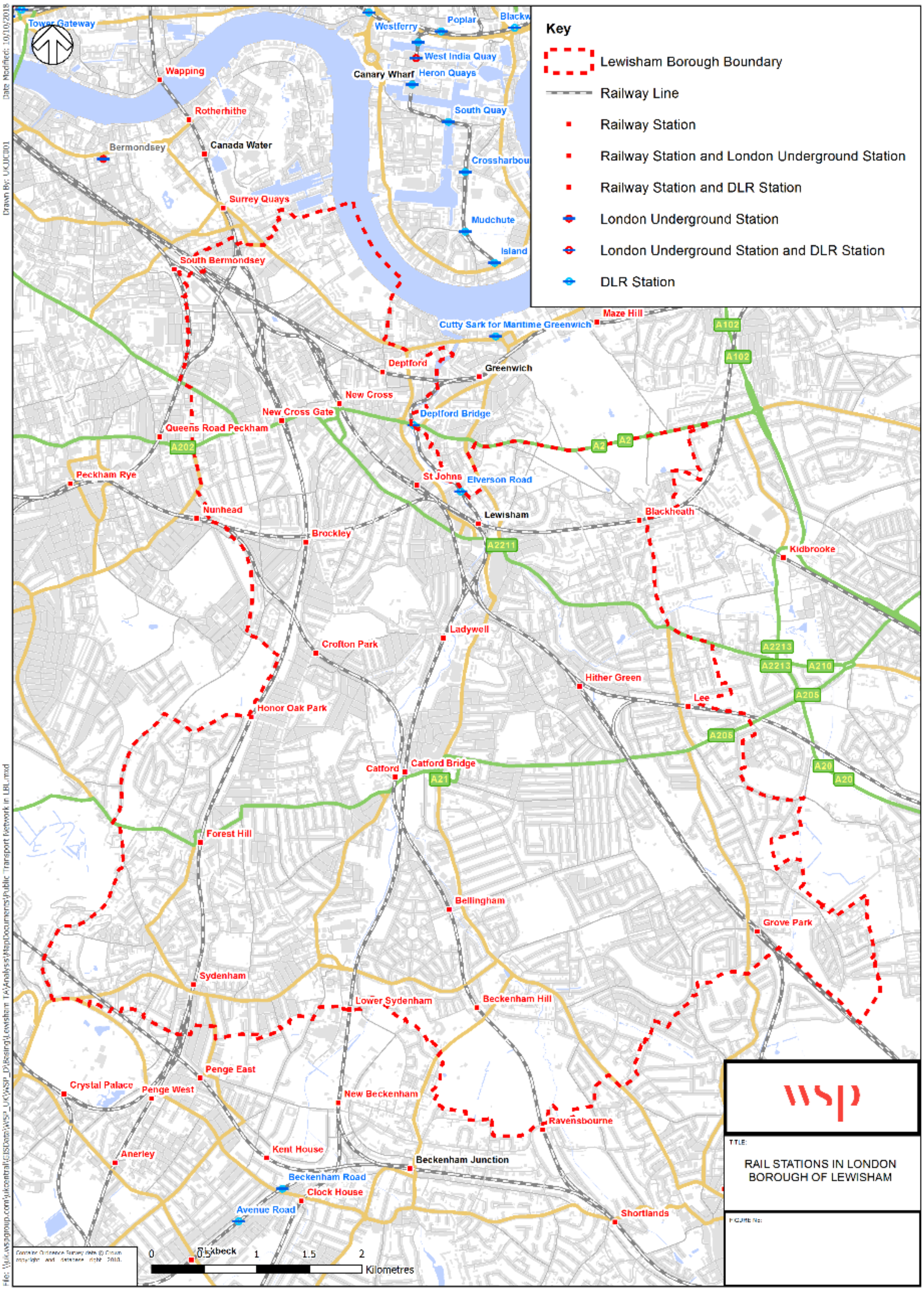


Figure 1: Location of Rail Stations in London Borough of Lewisham

2. Intervention Testing Scenario Development

It was agreed in the proposal that intervention testing will be implemented on both years 2026 and 2041. The funded scenarios without JNAT from Stage 2 will be used as a starting point to develop intervention tests, which are:

- LW004A45D: 2026 AM Funded without JNAT
- LW005A45P: 2041 AM Funded without JNAT

These will be referred too throughout this note as the Do Minimum scenarios.

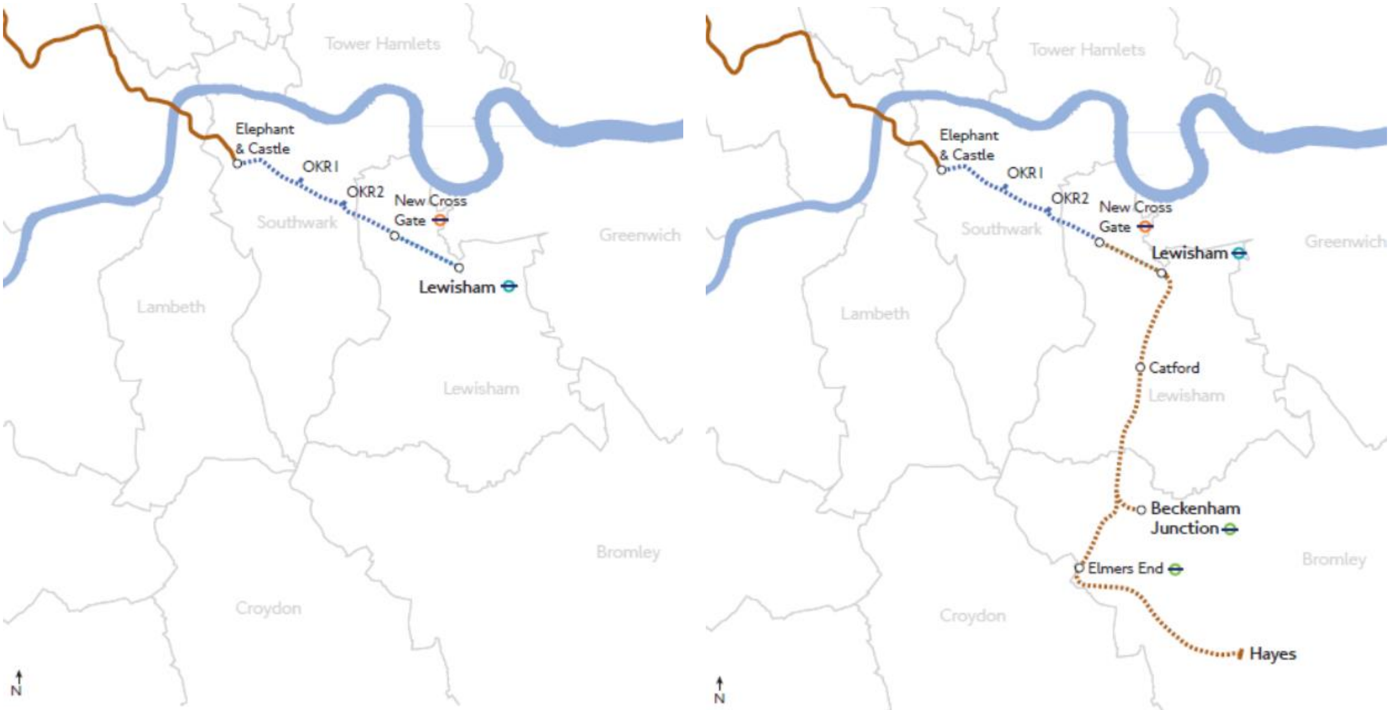
Description of PT Schemes

The PT schemes from this transport assessment are largely drawn from the Canada Water Studies. There are a number of schemes proposed by LBL, as well as sensitivity tests proposed by WSP.

Bakerloo Line Extension

Bakerloo Line Extension (BLE) is a TfL scheme to extend the Bakerloo Line, which currently terminates at Elephant and Castle, to Lewisham. Along the route there will be newly built stations as well as improvements at New Cross Gate station (new interchange from Bakerloo Line to Overground and Southeastern services). There are proposals to extend BLE beyond Lewisham, one of which related to LBL is the extension into south east London, taking over the Hayes branch. Both suggestions of BLE routings will be tested in the Lewisham intervention package, these routes are visualised in Figure 2.

Figure 2: Bakerloo Line Extension to Lewisham (left) and to Hayes (right) – Proposed Route



In terms of positive impacts to the PT network in LBL, not only would BLE improve connectivity at New Cross Gate and Lewisham stations, but the scheme would also provide a connection between Lewisham and central London. Moreover, the extension between Lewisham and Hayes would attract more PT passengers, resulting in alleviating demand along on Southeastern services.

In terms of service frequencies, there will be 27tph on the Bakerloo Line for the extension up to Lewisham. For the Hayes schemes, Bakerloo service frequencies will increase to 36tph up to Lewisham. There are 18tph services continuing beyond Lewisham which terminates at Beckenham Junction (6tph) and Hayes (12tph).

Jubilee 36TPH

In this scheme, the Jubilee Line frequency will be increased to 36tph, which is currently at 34tph in the Reference Case. The purpose is to alleviate crowding currently experience on this line, especially around Canada Water and Canary Wharf areas.

DLR 30TPH

In this scheme, the DLR frequency (to and from Lewisham) will be increased to 30tph, which is currently at 23tph in the Reference Case. The purpose is to alleviate crowding currently experience on this line, especially between Lewisham and Canary Wharf stations.

Lewisham Bus Frequency X2

WSP have also assessed the impacts on the PT network if more buses are to pass through Lewisham station. To do so, bus services that go from/to or pass through Lewisham station were identified then their frequency are to be doubled. These bus services are 21, 47, 54, 75, 89, 108, 122, 136, 178, 180, 181, 185, 199, 208, 225, 261, 273, 284, 312, 380, 436, 484, P4 and are schematically shown in Figure 3.

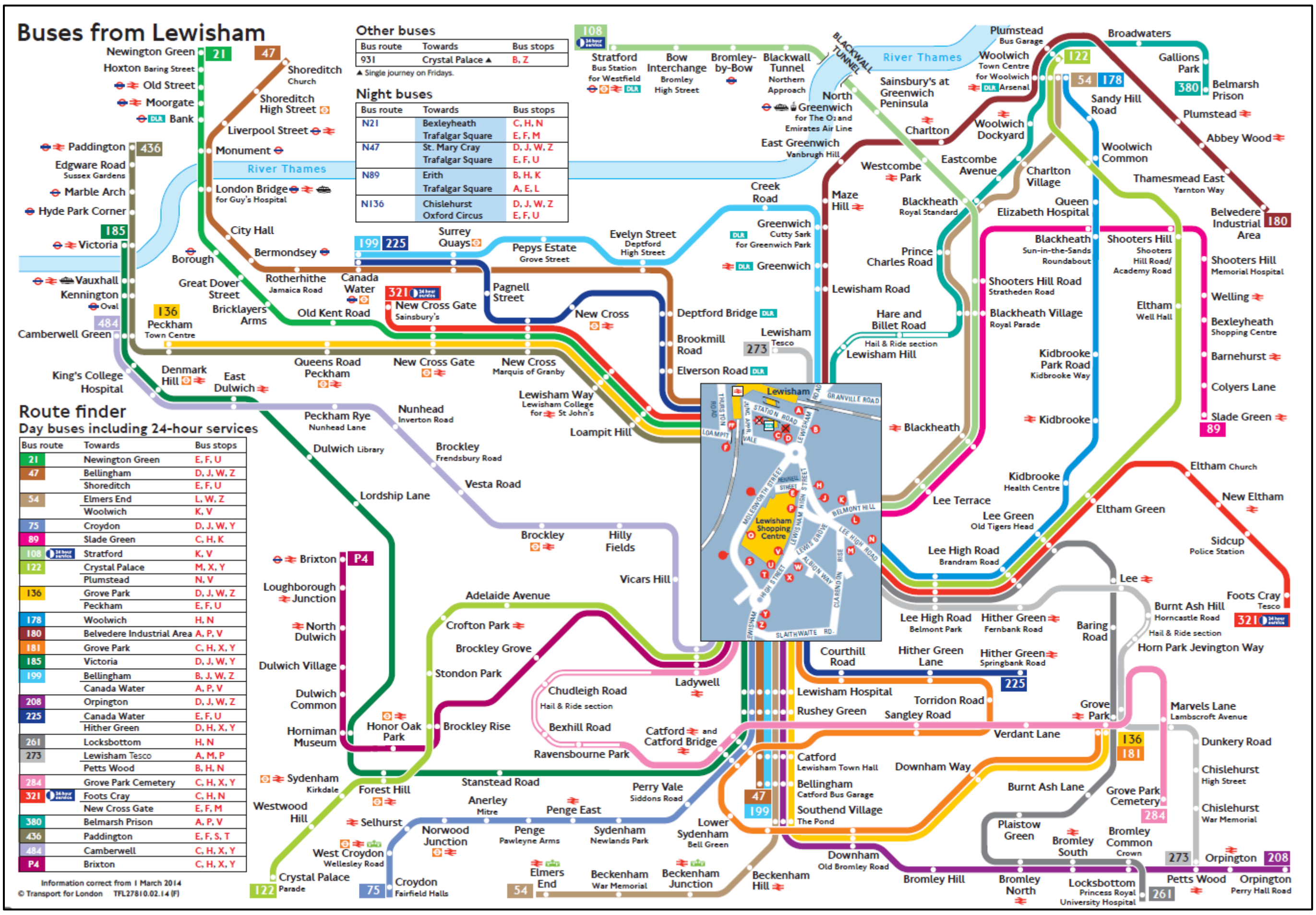


Figure 3: Buses from Lewisham

Cycle Superhighway 4

TfL's Cycle Superhighway schemes aim to provide protected space for cycling on some of London's busiest roads. They connect stations, town centres and key destinations, making them more accessible and easier for people to cycle to.

Cycle Superhighway 4 (CS4) would provide a continuous segregated cycle route between Tower Bridge and Greenwich, along with new pedestrian crossings, improved public spaces and a host of other improvements aimed at creating a more attractive environment for all users and accommodating the area’s future growth. The overview map is shown in Figure 4.

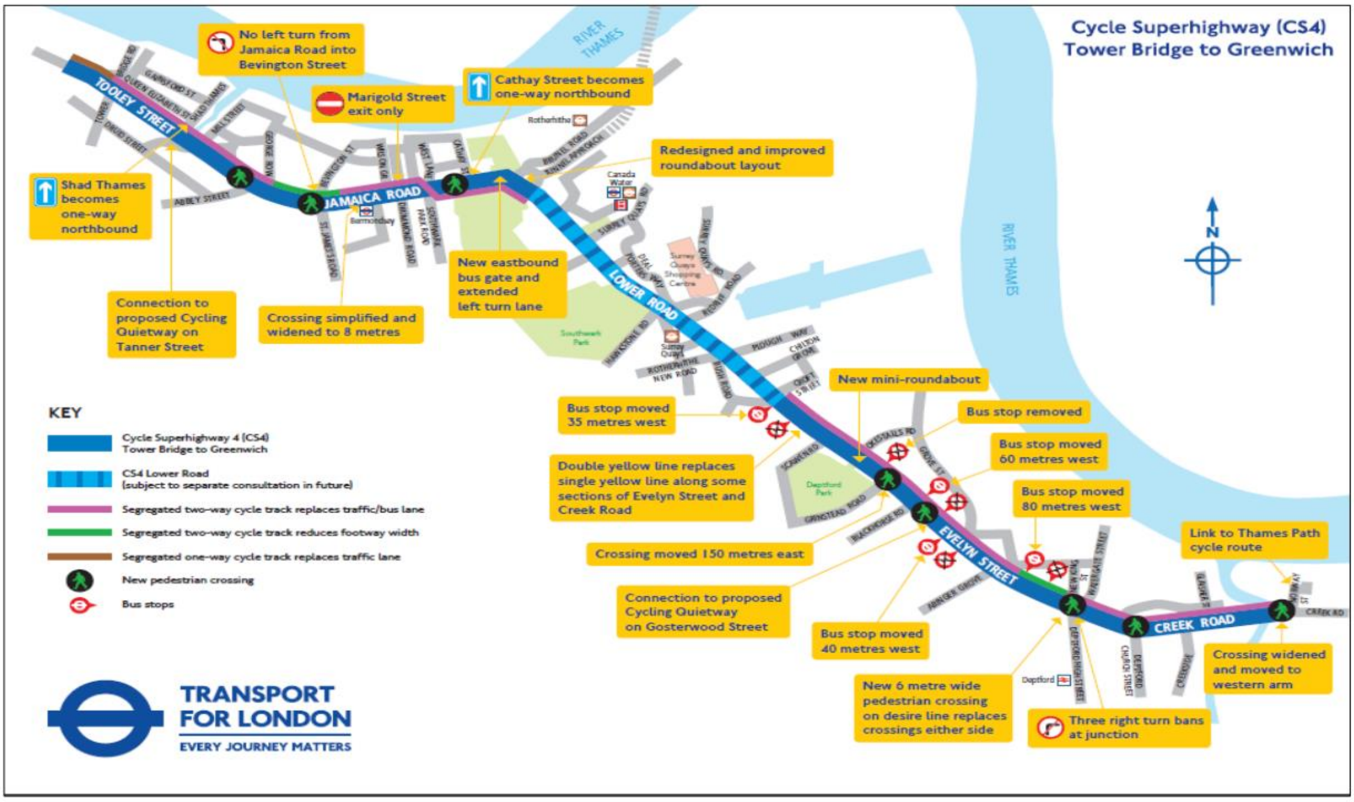


Figure 4: Cycle Superhighway 4 Route Map

Since a section of CS4 (A200 Evelyn Street) goes through LBL, were discussions between WSP and the council whether to include the coding of the scheme into the Railplan model. Following consultants with TfL, it was confirmed that CS4 would have negligible impacts on the PT network in LBL. For this reason, no coding is applied for this scheme.

Lower Sydenham Enhanced Bus Services

WSP have also assessed the impacts on the PT network if more bus services (namely 181, 202, 356 and 450) are to pass through Lower Sydenham train station. The current and proposed frequencies are shown in Table 1.

Table 1: Current and proposed bus frequencies in Lower Sydenham

Route Number	Actual Frequency (TfL Website)	Lower Sydenham Enhanced Services
181	Every 9-13 minutes	Every 6 minutes
202	Every 8-11 minutes	Every 6 minutes
356	Every 15 minutes	Every 6 minutes
450	Every 7-10 minutes	Every 10 minutes

Southeast Riverside Bus Strategy

The Southeast Riverside area is subject to a number of major developments which may exert impacts on the bus network. The extent of the area is shown in Figure 5. Potential developments in the area include;

- Canada Water
- Convoys Wharf
- New Bermondsey (previously Surrey Canal)
- Other developments: The Wharves, Cannon Wharf and Marine Wharf

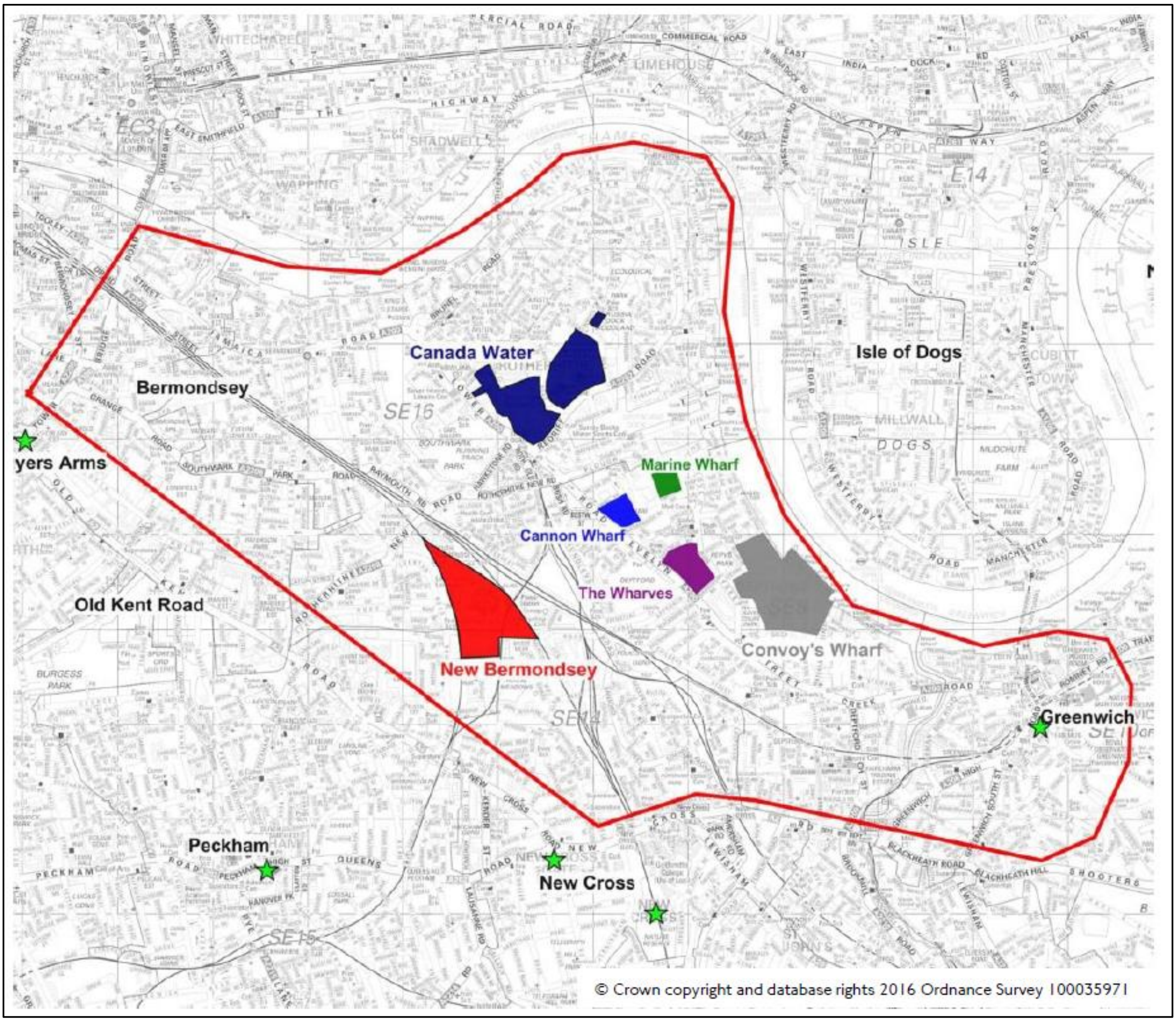


Figure 5: Southeast Riverside area with major developments

As a result of these potential developments, TfL have proposed a number of interventions on the existing bus services. These interventions range from proposing new bus services that pass through the developments to modifying existing bus services, such as restructuring (route 199), shortening (routes 188, 381) or extending (route 415). The purpose of such interventions is to provide sufficient capacity at locations where congestion is predicted to occur due to additional development trips, as well as improving connectivity to and from developments.

Bus Route 225 Extension

Route 225 currently runs between Canada Water and Hither Green via Lewisham Station. It runs at a peak frequency of 4 buses per hour (every 15 mins). The proposal is to extend the service from its current terminus at Hither Green to Bellingham station, to help provide better connections between the north and the south of the borough.

The proposed extension starts from Hither Green Lane, Verdant Lane, Hazelbank Road, Bellingham Road and service terminates on Randlesdown Road, stands and returns via the same routing. Currently in the Railplan model there are no bus routes or bus stops along the section spanning between Hazelbank Road and Randlesdown Road, thus new bus stops are to be proposed assuming 400-500m apart between two consecutive ones. Along Hither Green Lane and Verdant Lane there are some existing bus stops so the extension service can use these. The location of these bus stops is shown in Figure 6. Blue and red routes illustrate existing line and proposed extension, while green and yellow nodes represent the existing and new bus stops, respectively.

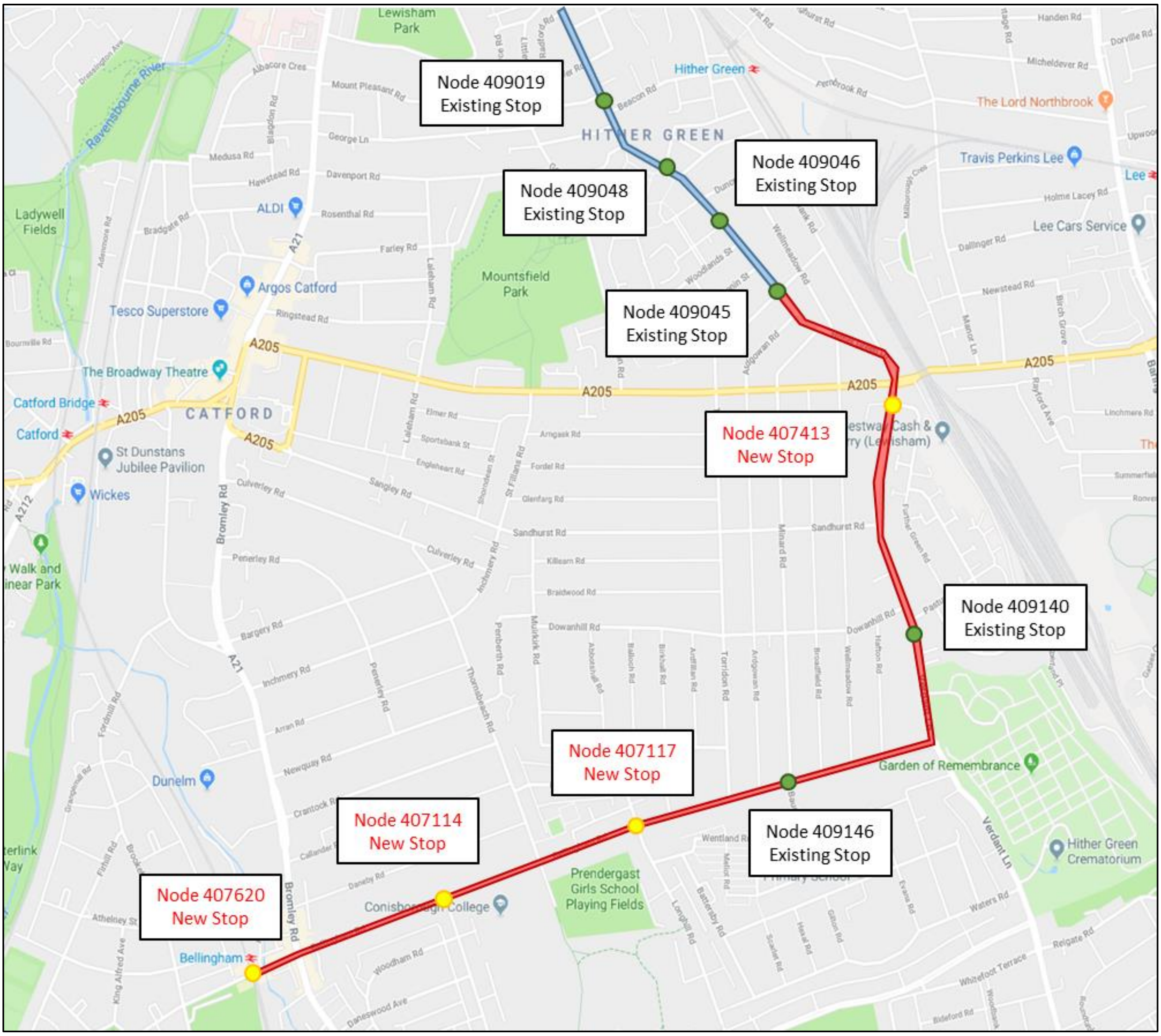


Figure 6: Proposed route and stops for bus service 225 extension

Brockley Interchange

Currently Brockley station serves Overground and Southern services on the East London Line. Southeastern services (terminating at Victoria) pass through Brockley via an overbridge yet do not stop here. The Mayor's Transport Strategy (MTS) recognises the need for improved orbital connections and, with the emerging status of Lewisham as the strategic interchange for south east London it is critical to better link Lewisham into the Overground orbital network.

For this reason, in LBL's Vision for Rail (2017) the Borough welcomes the MTS proposal and wishes to enable interchange between Southeastern (Victoria Line) and the East London Line.

This means creating new platforms at Brockley for Southeastern services to board and alight, and allowing interchange movements between Southeastern services and those on the East London Line. Summary of changes to the Railplan network can be seen in Figure 7.

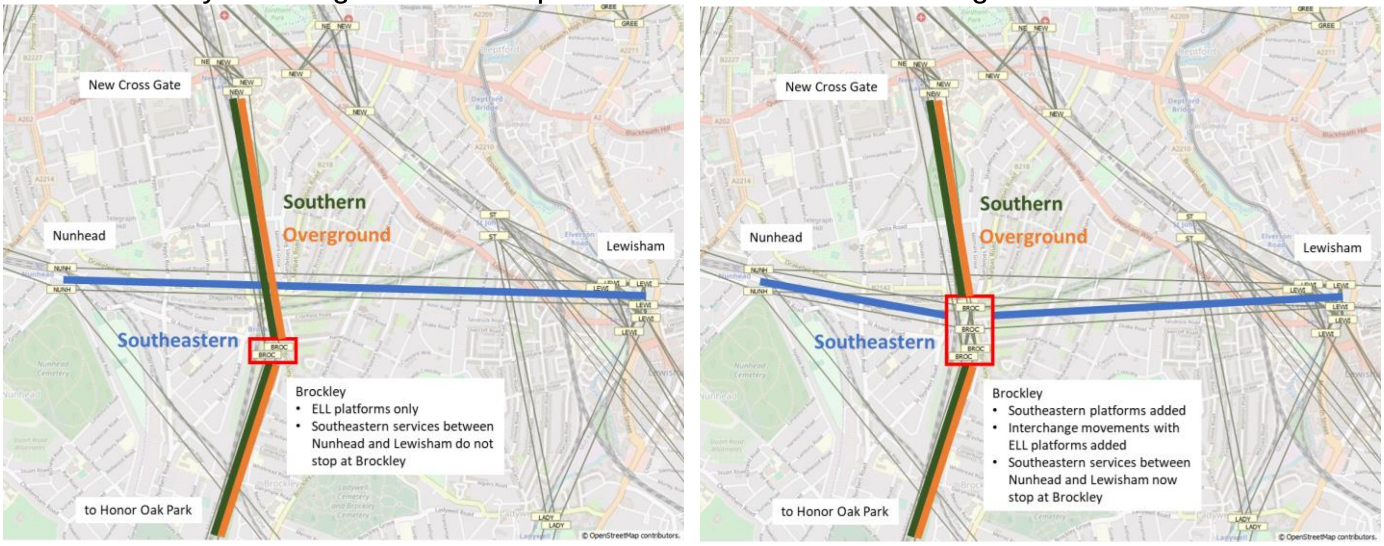


Figure 7: NR network without (left) and with (right) Brockley Interchange

New Bermondsey Station

The New Bermondsey site was first developed following the arrival of the Grand Surrey Canal in 1807. Today it is an underused 30-acre industrial site in the north of LBL. As part of the potential development proposal, the New Bermondsey station will be opened for Overground services. The consequence of this is to provide the local residents a means to connect to the city centre via Rail.

Intervention Test Listing

An Intervention Test is created from a combination of one or more PT schemes identified earlier. WSP have finalised seven PT Intervention Tests for the transport assessment in LBL, which are;

2026 Intervention Tests

- Intervention Test 4: Southeast Riverside Bus Strategy + Cycle Superhighway 4 + Bus route 225 extension
- Intervention Test 5: Lewisham bus frequency x2

2041 Intervention Tests

- Intervention Test 1: BLE to Lewisham 27tph
- Intervention Test 2: BLE to Lewisham 27tph + Jubilee Line 36tph + Lewisham bus frequency x2

- Intervention Test 3: BLE to Hayes 36tph
- Intervention Test 6: Brockley Interchange + New Bermondsey station
- Intervention Test 7: DLR 30tph
- Intervention Test 8: Brockley Interchange frequency x2 + BLE to Hayes 36tph
- Intervention Test 9: Lower Sydenham enhanced bus services + BLE to Hayes 36tph

3. Output Analyses of 2026 Intervention Tests

Standard outputs from Railplan assignments of 2026 Intervention Tests are extracted and compared with the 2026 AM Funded without JNAT scenarios (Railplan scenario LW004A45D). The analyses assess whether the Intervention Test successfully addresses issues identified in the Funded scenarios. Assessment is based on the change in demand and crowding on PT services, growth in total station demand as well as bus demand.

Intervention Test 4 (2026): Southeast Riverside Bus Strategy + Cycle Superhighway 4 + Bus route 225 extension

As a result of the south east riverside bus strategy and the extension of the 225 bus route analysis has been undertaken on the changes to bus patronage this has within the Railplan model.

Figure 8 and Figure 9 show the number of passengers using the 225 bus route along the existing and section which has been extended in Test 4. This shows that the majority of the extended route (between new bus stops along Randlesdown Road and Hither Green Lane) is attracting between 100-400 passengers per direction. Beyond the bus stop along Hither Green Lane, the increase of passenger owing the extension drops to about 100-200 passengers in both directions, when comparing to Do Minimum demand. However, it does show that towards the end of the route extension there are very few passengers using the service, in the northbound direction between Randlesdown Road and Hazelbank Road and in the southbound direction between Randlesdown Road and Bellingham Road.

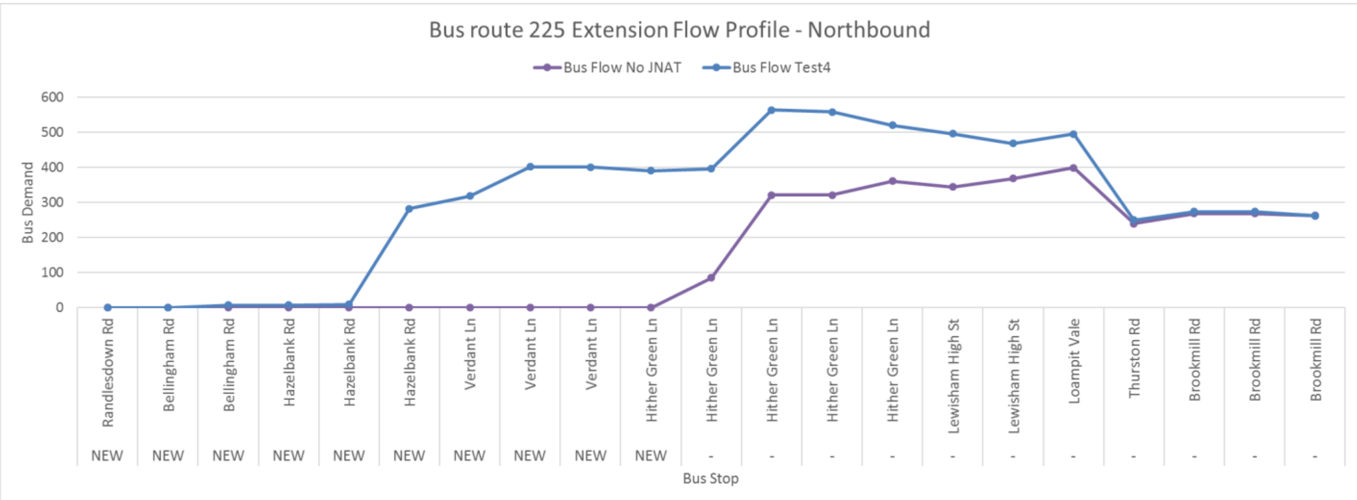


Figure 8: Bus Route 225 Extension Flow Profile Northbound

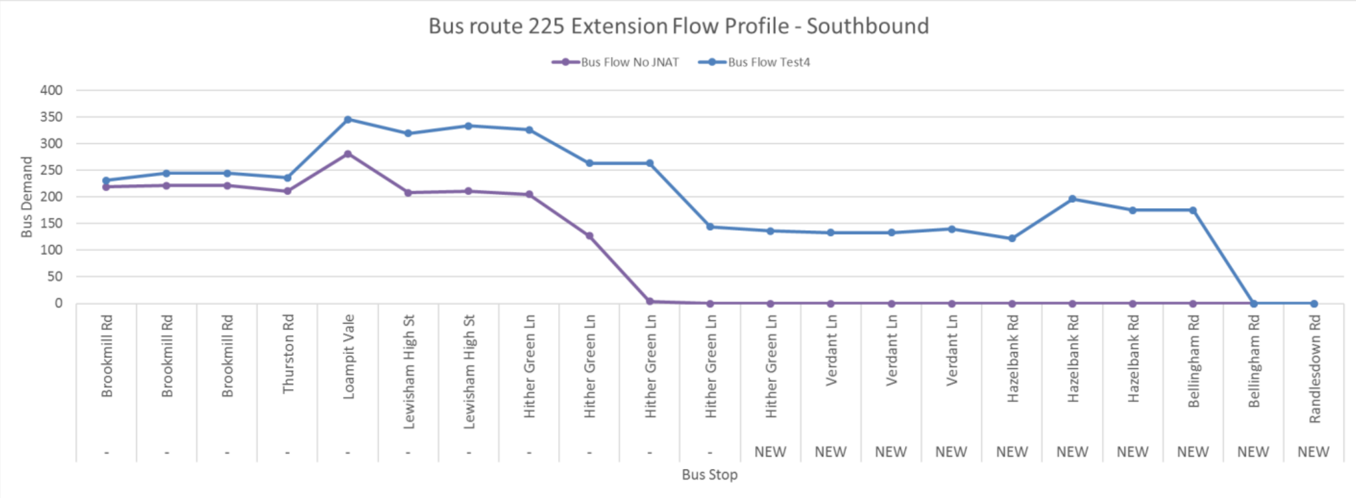


Figure 9: Bus Route 225 Extension Flow Profile Southbound

As a result of the Test 4 improvements the impact this has on bus passengers on the key bus corridor has been considered. For the purpose of comparison the bus demand in both directions along these corridors has been analysed and is presented in Figure 10 to Figure 13. Along both corridors there is very little change in the volume of passengers using the bus route with slight increases around Lewisham in the north -south corridor and New Cross in the east-west corridor.

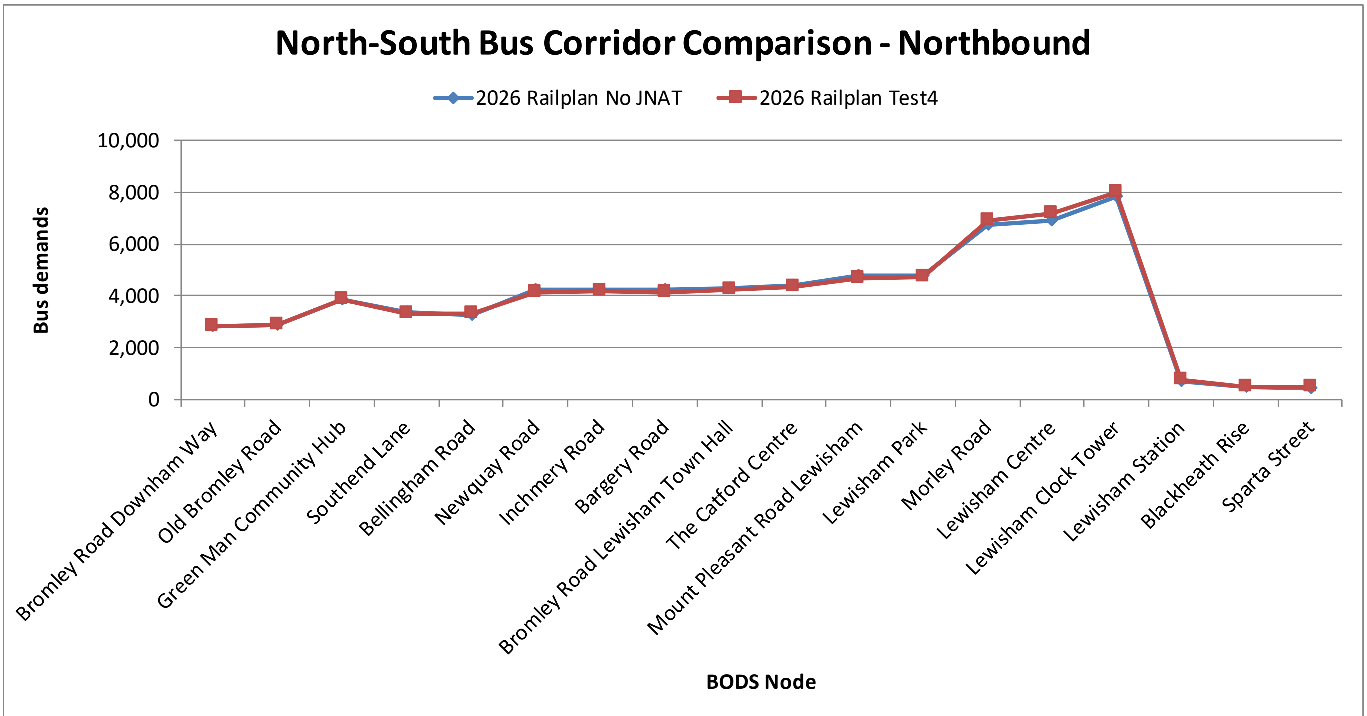


Figure 10: North-South Northbound Bus Corridor Demand Do Minimum and Test 4

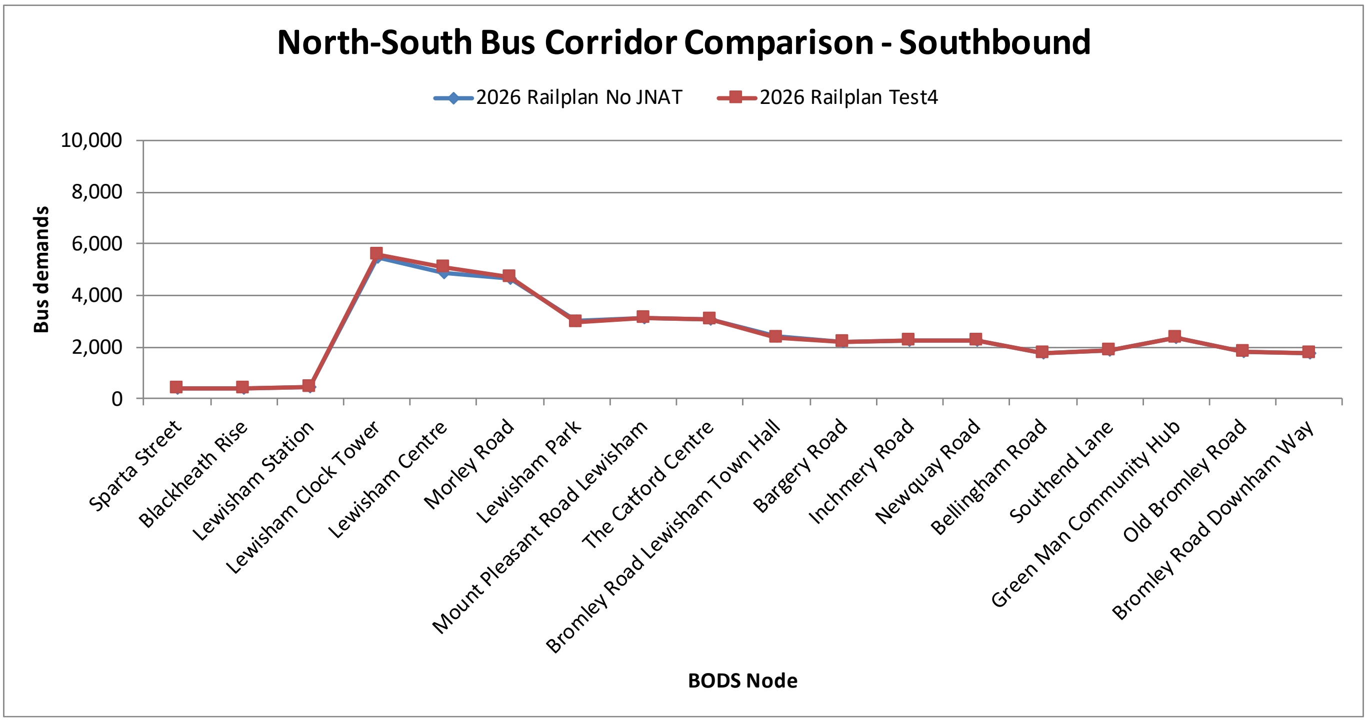


Figure 11: North-South Southbound Bus Corridor Demand Do Minimum and Test 4

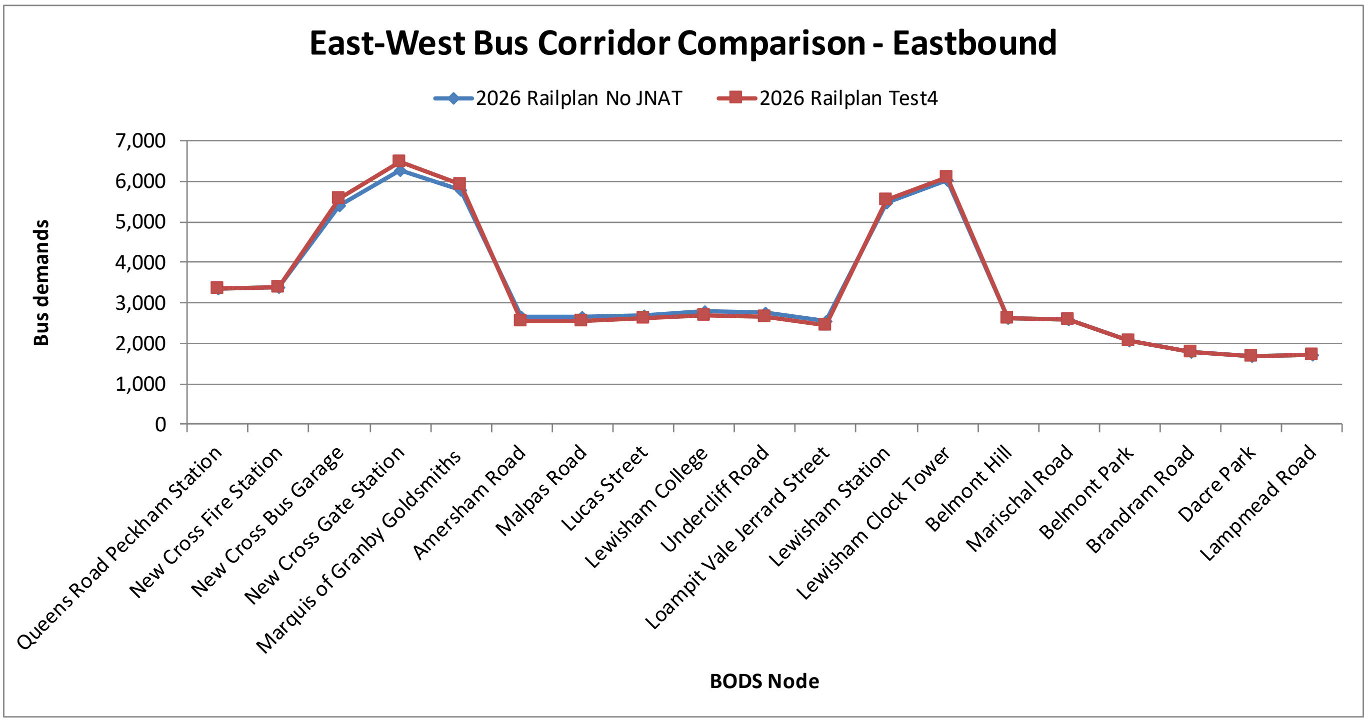


Figure 12: East-West Eastbound Bus Corridor Demand Do Minimum and Test 4

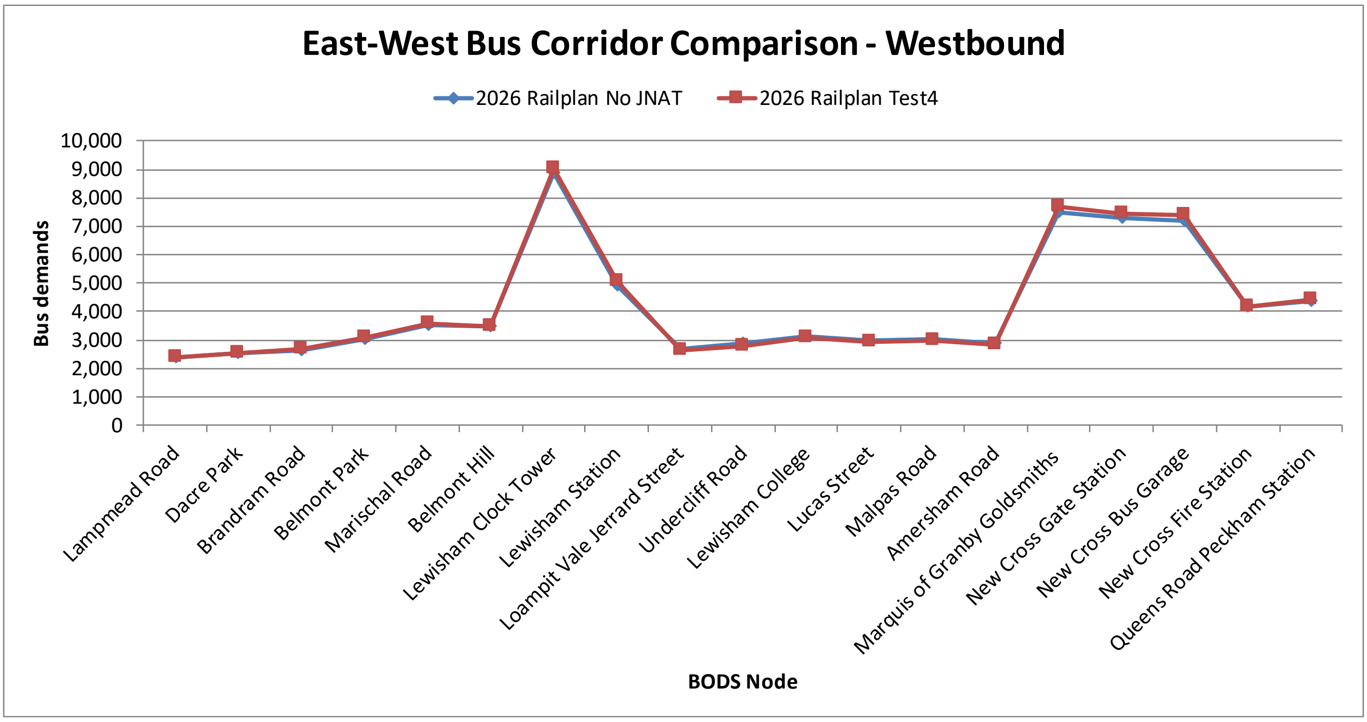


Figure 13: East-West Westbound Bus Corridor Demand Do Minimum and Test 4

Table 2 provides more details of the changes in passengers boarding and alighting specific bus stop on both the corridors. Overall increases in bus patronage are small and less than those experienced in previous tests.

Table 2: Bus Boarders and Alighters Do Minimum and Test 4

Bus Stop Name	Corridor	Boarders 2026 Railplan No JNAT	Boarders 2026 Railplan Test4	Boarders Growth (2026)	Boarders %Growth (2026)	Alighters 2026 Railplan No JNAT	Alighters 2026 Railplan Test4	Alighters Growth (2026)	Alighters %Growth (2026)
Bromley Road Downham Way	North-South	1063	1065	2	0%	344	343	-1	0%
Old Bromley Road	North-South	106	104	-2	-2%	121	120	-1	-1%
Green Man Community Hub	North-South	1046	1039	-7	-1%	629	624	-5	-1%
Southend Lane	North-South	249	243	-6	-2%	116	117	1	1%
Bellingham Road	North-South	498	549	51	10%	507	494	-13	-3%
Newquay Road	North-South	1455	1319	-136	-9%	985	965	-20	-2%
Inchmery Road	North-South	91	86	-5	-5%	58	54	-4	-7%
Bargery Road	North-South	186	170	-16	-9%	208	188	-20	-10%
Bromley Road Lewisham Town Hall	North-South	835	870	35	4%	944	973	29	3%
The Catford Centre	North-South	1182	1177	-5	0%	1023	1013	-10	-1%
Mount Pleasant Road Lewisham	North-South	669	659	-10	-1%	389	385	-4	-1%

Bus Stop Name	Corridor	Boarders 2026 Railplan No JNAT	Boarders 2026 Railplan Test4	Boarders Growth (2026)	Boarders %Growth (2026)	Alighters 2026 Railplan No JNAT	Alighters 2026 Railplan Test4	Alighters Growth (2026)	Alighters %Growth (2026)
Lewisham Park	North-South	743	763	20	3%	602	595	-7	-1%
Morley Road	North-South	405	457	52	13%	188	217	29	15%
Lewisham Cenre	North-South	1592	1663	71	4%	1724	1795	71	4%
Lewisham Clock Tower	North-South	1968	2080	112	6%	2431	2570	139	6%
Lewisham Station	North-South	70	77	7	10%	214	207	-7	-3%
Blackheath Rise	North-South	13	31	18	138%	58	63	5	9%
Sparta Street	North-South	10	11	1	10%	11	21	10	91%
Queens Road Peckham Station	East-West	1174	1159	-15	-1%	1406	1408	2	0%
New Cross Fire Station	East-West	529	526	-3	-1%	277	276	-1	0%
New Cross Bus Garage	East-West	2253	2324	71	3%	1745	1837	92	5%
New Cross Gate Station	East-West	3091	3107	16	1%	2394	2383	-11	0%

Bus Stop Name	Corridor	Boarders 2026 Railplan No JNAT	Boarders 2026 Railplan Test4	Boarders Growth (2026)	Boarders %Growth (2026)	Alighters 2026 Railplan No JNAT	Alighters 2026 Railplan Test4	Alighters Growth (2026)	Alighters %Growth (2026)
Marquis of Granby Goldsmiths	East-West	1635	1521	-114	-7%	303	331	28	9%
Amersham Road	East-West	341	313	-28	-8%	215	215	0	0%
Malpas Road	East-West	285	295	10	4%	407	408	1	0%
Lucas Street	East-West	370	351	-19	-5%	280	256	-24	-9%
Lewisham College	East-West	311	309	-2	-1%	366	359	-7	-2%
Undercliff Road	East-West	640	635	-5	-1%	459	454	-5	-1%
Loampit Vale Jerrard Street	East-West	162	159	-3	-2%	234	266	-8	-3%
Lewisham Station	East-West	3772	3796	24	1%	2887	2931	44	2%
Lewisham Clock Tower	East-West	1968	2080	112	6%	2431	2570	139	6%
Belmont Hill	East-West	97	100	3	3%	134	151	17	13%
Marischal Road	East-West	60	60	0	0%	164	152	-12	-7%

Bus Stop Name	Corridor	Boarders 2026 Railplan No JNAT	Boarders 2026 Railplan Test4	Boarders Growth (2026)	Boarders %Growth (2026)	Alighters 2026 Railplan No JNAT	Alighters 2026 Railplan Test4	Alighters Growth (2026)	Alighters %Growth (2026)
Belmont Park	East-West	704	703	-1	0%	752	748	-4	-1%
Brandram Road	East-West	228	228	0	0%	229	230	1	0%
Dacre Park	East-West	245	250	5	2%	234	236	2	1%
Lampmead Road	East-West	233	238	5	2%	37	37	0	0%
Not applicable	**Total**	**30279**	**30517**	**238**	**1%**	**25506**	**25952**	**446**	**2%**

Intervention Test 5 (2026): Lewisham Bus Frequency x2

Test 5 assesses the impact of increasing the bus frequency for buses that stop at Lewisham station. The change in bus patronage which occurs along the bus corridors as a result of this is presented in Figure 14 and Figure 15.

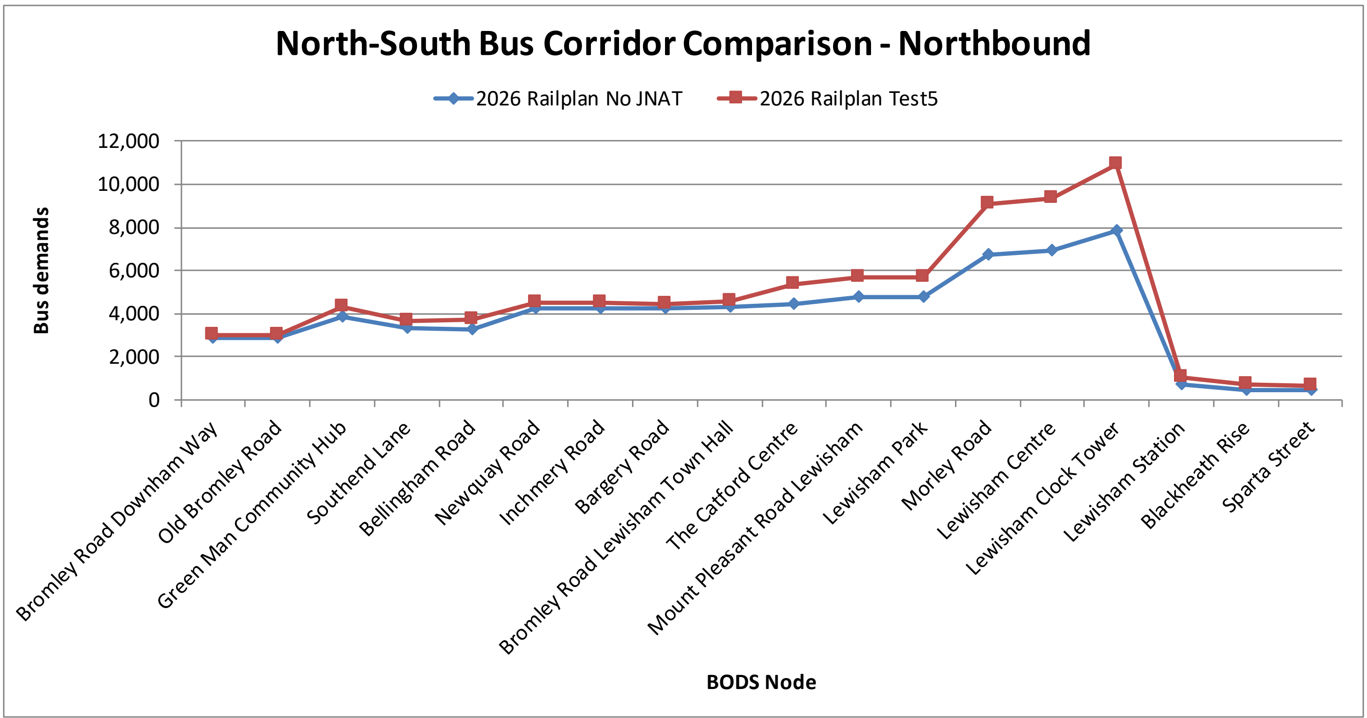


Figure 14: North-South Northbound Bus Corridor Demand Do Minimum and Test 5

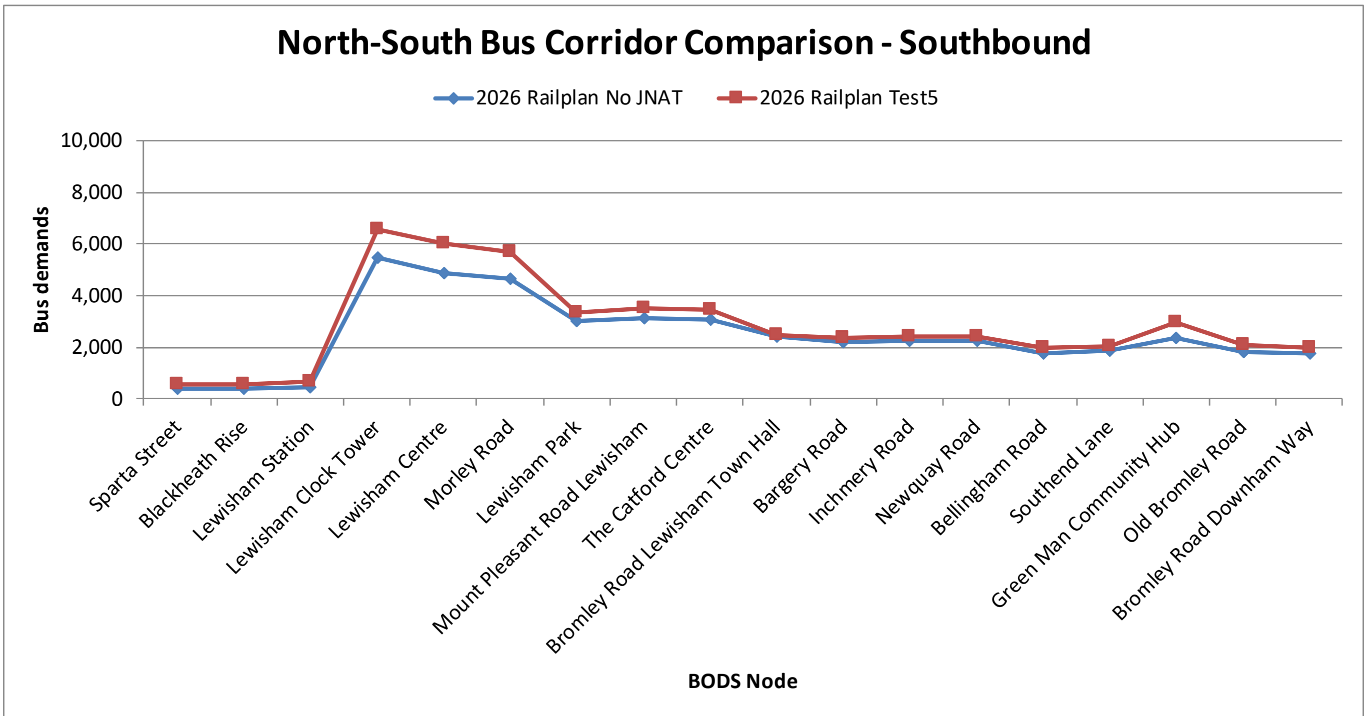


Figure 15: North-South Southbound Bus Corridor Demand Do Minimum and Test 5

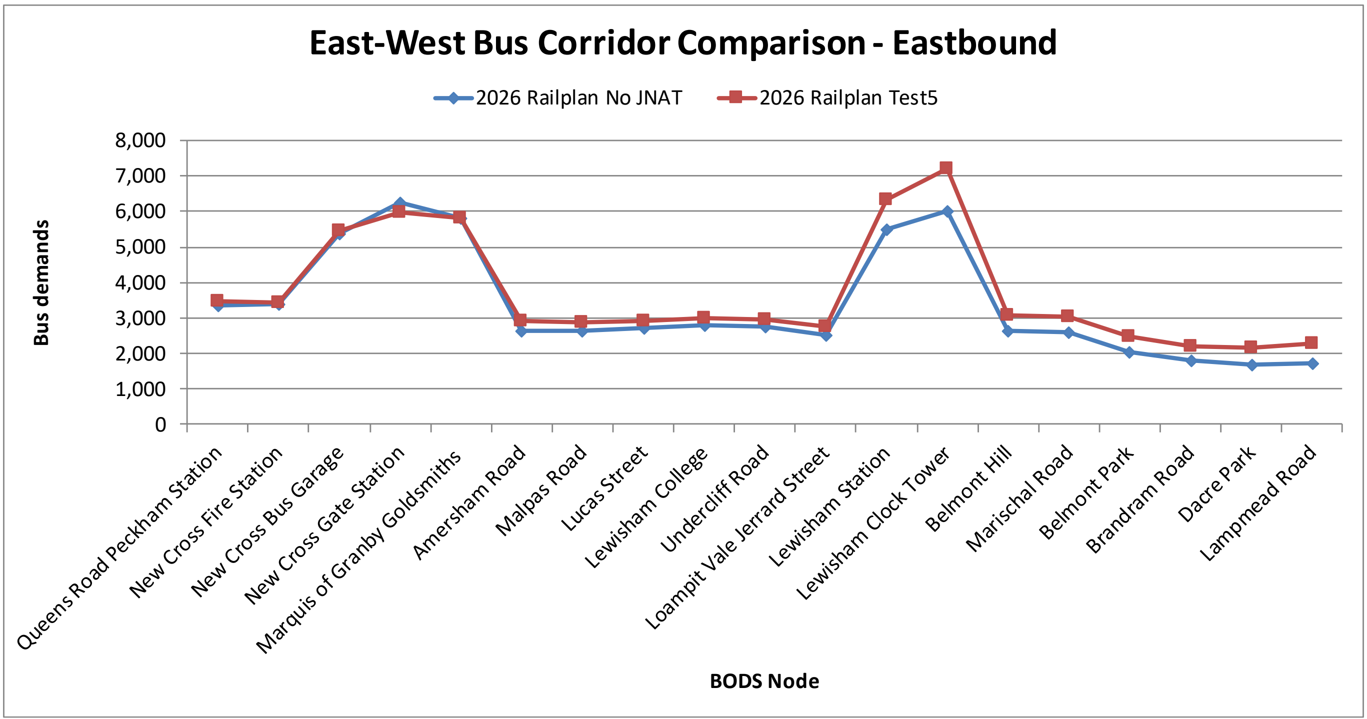


Figure 16: East-West Eastbound Bus Corridor Demand Do Minimum and Test 5

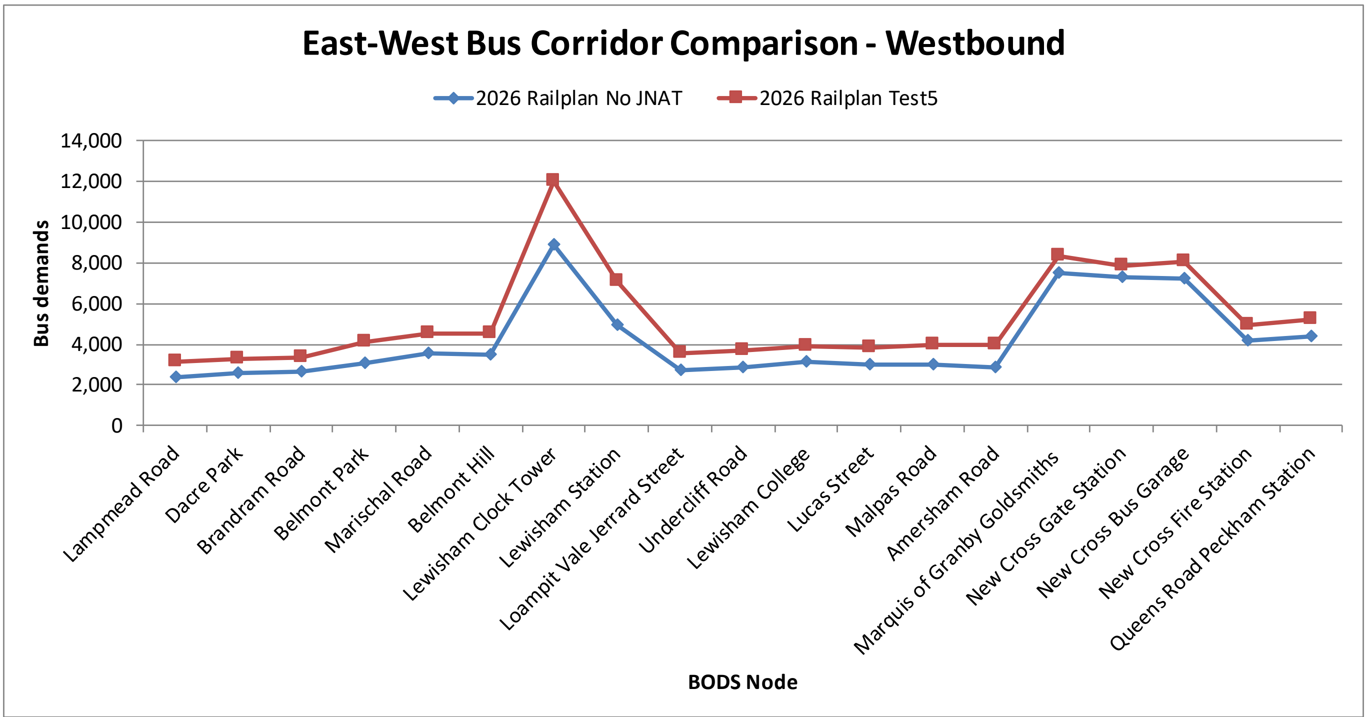


Figure 17: East-West Westbound Bus Corridor Demand Do Minimum and Test 5

Table 3 provides more details of the changes in passengers boarding and alighting specific bus stop on both the corridors. Overall as a result of the change there is an 12% and 15% increase in bus patronage across the two main bus corridors.

Table 3: Bus Boarders and Alighters Do Minimum and Test 5

Bus Stop Name	Corridor	Boarders 2026 Railplan No JNAT	Boarders 2026 Railplan Test5	Boarders Growth (2026)	Boarders %Growth (2026)	Alighters 2026 Railplan No JNAT	Alighters 2026 Railplan Test5	Alighters Growth (2026)	Alighters %Growth (2026)
Bromley Road Downham Way	North-South	1063	1069	6	1%	344	337	-7	-2%
Old Bromley Road	North-South	106	38	-68	-64%	121	155	34	28%
Green Man Community Hub	North-South	1046	1147	101	10%	629	724	95	15%
Southend Lane	North-South	249	265	16	6%	116	145	29	25%
Bellingham Road	North-South	498	594	96	19%	507	510	3	1%
Newquay Road	North-South	1455	1287	-168	-12%	985	950	-35	-4%
Inchmery Road	North-South	91	86	-5	-5%	58	65	7	12%
Bargery Road	North-South	186	183	-3	-2%	208	185	-23	-11%
Bromley Road Lewisham Town Hall	North-South	835	692	-143	-17%	944	665	-279	-30%
The Catford Centre	North-South	1182	1439	257	22%	1023	1274	251	25%
Mount Pleasant Road Lewisham	North-South	669	713	44	7%	389	448	59	15%

Bus Stop Name	Corridor	Boarders 2026 Railplan No JNAT	Boarders 2026 Railplan Test5	Boarders Growth (2026)	Boarders %Growth (2026)	Alighters 2026 Railplan No JNAT	Alighters 2026 Railplan Test5	Alighters Growth (2026)	Alighters %Growth (2026)
Lewisham Park	North-South	743	906	163	22%	602	716	114	19%
Morley Road	North-South	405	478	73	18%	188	247	59	31%
Lewisham Cenre	North-South	1592	2105	513	32%	1724	2231	507	29%
Lewisham Clock Tower	North-South	1968	2702	734	37%	2431	3158	727	30%
Lewisham Station	North-South	70	158	88	126%	214	299	85	40%
Blackheath Rise	North-South	13	80	67	515%	58	80	22	38%
Sparta Street	North-South	10	26	16	160%	11	62	51	464%
Queens Road Peckham Station	East-West	1174	1348	174	15%	1406	1437	31	2%
New Cross Fire Station	East-West	529	600	71	13%	277	416	139	50%
New Cross Bus Garage	East-West	2253	2168	-85	-4%	1745	1482	-263	-15%
New Cross Gate Station	East-West	3091	2871	-220	-7%	2394	2233	-161	-7%

Bus Stop Name	Corridor	Boarders 2026 Railplan No JNAT	Boarders 2026 Railplan Test5	Boarders Growth (2026)	Boarders %Growth (2026)	Alighters 2026 Railplan No JNAT	Alighters 2026 Railplan Test5	Alighters Growth (2026)	Alighters %Growth (2026)
Marquis of Granby Goldsmiths	East-West	1635	1436	-199	-12%	303	234	-69	-23%
Amersham Road	East-West	341	341	0	0%	215	194	-21	-10%
Malpas Road	East-West	285	443	158	55%	407	480	73	18%
Lucas Street	East-West	370	479	109	29%	280	318	38	14%
Lewisham College	East-West	311	364	53	17%	366	355	-11	-3%
Undercliff Road	East-West	640	690	50	8%	459	541	82	18%
Loampit Vale Jerrard Street	East-West	162	184	22	14%	234	218	-16	-7%
Lewisham Station	East-West	3772	4512	740	20%	2887	4340	1453	50%
Lewisham Clock Tower	East-West	1968	2702	734	37%	2431	3158	727	30%
Belmont Hill	East-West	97	133	36	37%	134	38	-96	-72%
Marischal Road	East-West	60	91	31	52%	164	160	-4	-2%

Bus Stop Name	Corridor	Boarders 2026 Railplan No JNAT	Boarders 2026 Railplan Test5	Boarders Growth (2026)	Boarders %Growth (2026)	Alighters 2026 Railplan No JNAT	Alighters 2026 Railplan Test5	Alighters Growth (2026)	Alighters %Growth (2026)
Belmont Park	East-West	704	687	-17	-2%	752	779	27	4%
Brandram Road	East-West	228	272	44	19%	229	231	2	1%
Dacre Park	East-West	245	292	47	19%	234	220	-14	-6%
Lampmead Road	East-West	233	307	74	32%	37	123	86	232%
Not applicable	**Total**	**30279**	**33888**	**3609**	**12%**	**25506**	**29208**	**3702**	**15%**

4. Output Analyses of 2041 Intervention Tests

Standard outputs from Railplan assignments of 2041 Intervention Tests are extracted and compared with 2041 AM Funded without JNAT scenarios (Railplan scenario LW005A45P). The analyses assess whether the Intervention Test successfully addresses issues identified in the Funded scenarios. Assessment is based on the change in demand and crowding on PT services, growth in total station demand as well as bus demand.

Intervention Test 1 (2041): BLE to Lewisham 27tph

As a result of the Bakerloo line being extended to Lewisham, Figure 18 shows the percentage changes in passengers on the Transport for London network. Absolute changes in passengers on these links can be seen in Table 4. As to be expected there are significant increases on the Bakerloo Loo line between Elephant and Castle and Waterloo. There are also reductions in demand on the Jubilee line which is a result of passengers using the Bakerloo line for their journeys. The DLR experiences increase in demand particularly in the southbound direction due to the extension of Bakerloo line with passengers heading south to use the Bakerloo line to travel into central London. The overground is experiencing an increase in passengers in both direction up until New Cross Gate where the line interchanges with the Bakerloo line. This increase is a result of the increased attractiveness for passengers to travel on the overground to get to the Bakerloo line. There is then a reduction in passengers on the overground in both directions between New Cross Gate and New Cross. The change in passenger demand is also reflected in the crowding along NR and LUL lines. Detailed crowding maps of the changes for Rail modes can be found in Appendix A.

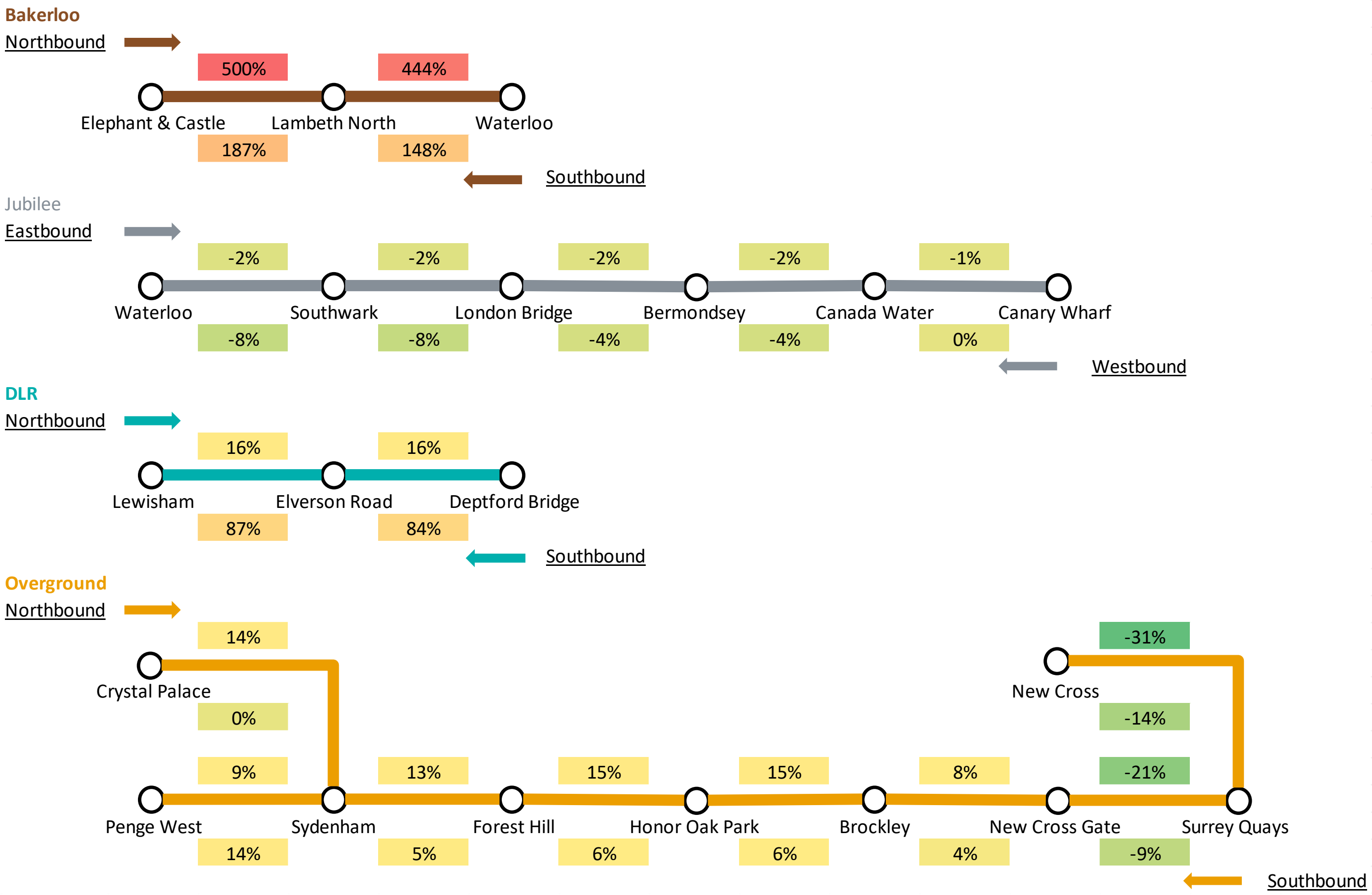


Figure 18: Changes in Passenger Flow on Transport for London Network between Test 1 and Do Minimum

Table 4: Passenger Flow along LUL, DLR and NR network Do Minimum and Test 1

From	To	Direction	Mode	Line(s)	Railplan 2041 No JNAT	Railplan 2041 Test1	Test1 % Growth	Test1 Growth
Elephant & Castle	Lambeth North	NB	LUL	Bakerloo	6107	36613	500%	30506
Lambeth North	Waterloo	NB	LUL	Bakerloo	6610	35970	444%	29360
Waterloo	Lambeth North	SB	LUL	Bakerloo	6660	16508	148%	9848
Lambeth North	Elephant & Castle	SB	LUL	Bakerloo	5411	15535	187%	10124
Waterloo	Southwark	EB	LUL	Jubilee	63731	62292	-2%	-1439
Southwark	London Bridge	EB	LUL	Jubilee	59843	58614	-2%	-1229
London Bridge	Bermondsey	EB	LUL	Jubilee	61285	60240	-2%	-1045
Bermondsey	Canada Water	EB	LUL	Jubilee	60190	59225	-2%	-965
Canada Water	Canary Wharf	EB	LUL	Jubilee	64181	63499	-1%	-682
Canary Wharf	Canada Water	WB	LUL	Jubilee	49930	49779	0%	-151
Canada Water	Bermondsey	WB	LUL	Jubilee	56198	53695	-4%	-2503
Bermondsey	London Bridge	WB	LUL	Jubilee	59098	56493	-4%	-2605
London Bridge	Southwark	WB	LUL	Jubilee	63468	58509	-8%	-4959
Southwark	Waterloo	WB	LUL	Jubilee	59451	54687	-8%	-4764
Not applicable	**Not applicable**	**Not applicable**	**LUL**	**LUL Sub-total**	**622163**	**681659**	**10%**	**59496**
Lewisham	Elverson Road	NB	DLR	DLR	9475	10977	16%	1502
Elverson Road	Deptford Bridge	NB	DLR	DLR	9539	11033	16%	1494
Deptford Bridge	Elverson Road	SB	DLR	DLR	3300	6061	84%	2761
Elverson Road	Lewisham	SB	DLR	DLR	3197	5964	87%	2767
DLR Sub-total	**Not applicable**	**Not applicable**	**DLR**	**DLR Sub-total**	**25511**	**34035**	**33%**	**8524**

From	To	Direction	Mode	Line(s)	Railplan 2041 No JNAT	Railplan 2041 Test1	Test1 % Growth	Test1 Growth
Crystal Palace	Sydenham	NB	NR	Overground	1251	1426	14%	175
Penge West	Sydenham	NB	NR	Overground	2751	3012	9%	261
Sydenham	Forest Hill	NB	NR	Overground	5824	6604	13%	780
Forest Hill	Honor Oak Park	NB	NR	Overground	8734	10027	15%	1293
Honor Oak Park	Brockley	NB	NR	Overground	9317	10671	15%	1354
Brockley	New Cross Gate	NB	NR	Overground	10817	11714	8%	897
New Cross Gate	Surrey Quays	NB	NR	Overground	11829	9374	-21%	-2455
New Cross	Surrey Quays	NB	NR	Overground	287	199	-31%	-88
Surrey Quays	New Cross	SB	NR	Overground	236	203	-14%	-33
Surrey Quays	New Cross Gate	SB	NR	Overground	4403	3997	-9%	-406
New Cross Gate	Brockley	SB	NR	Overground	3783	3920	4%	137
Brockley	Honor Oak Park	SB	NR	Overground	3612	3814	6%	202
Honor Oak Park	Forest Hill	SB	NR	Overground	3549	3753	6%	204
Forest Hill	Sydenham	SB	NR	Overground	2881	3039	5%	158
Sydenham	Crystal Palace	SB	NR	Overground	1186	1186	0%	0
Sydenham	Penge West	SB	NR	Overground	416	473	14%	57
Not applicable	**Not applicable**	**Not applicable**	**NR**	**NR Sub-total**	**70876**	**73412**	**4%**	**2536**
Total	**Total**	**Total**	**Total**	**Total**	**718550**	**789106**	**10%**	**70556**

Figure 19 shows the crowding along the extension of Bakerloo line between Elephant and Castle and Lewisham. As expected the dominant crowding is the inbound direction. Number of people standing per sqm starts from 1 to 2 from Lewisham and gradually increase to 3 to 4 standing per sqm when approaching to Elephant and Castle.

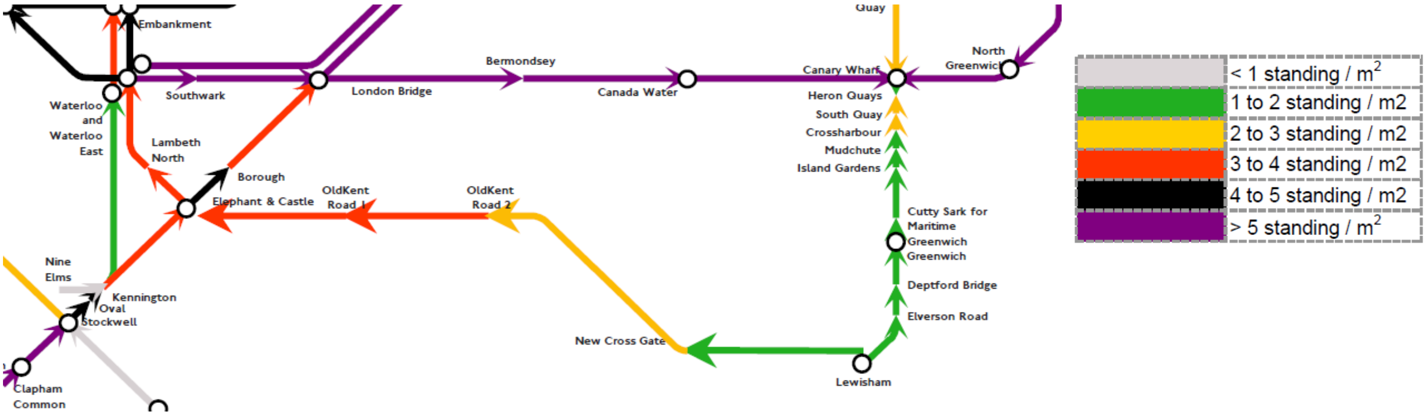


Figure 19: Crowding along Bakerloo Line extension to Lewisham in Test 1

As a result of the Bakerloo line extension the impact this has on bus passengers on the key bus corridor has been considered, see Figure 20.

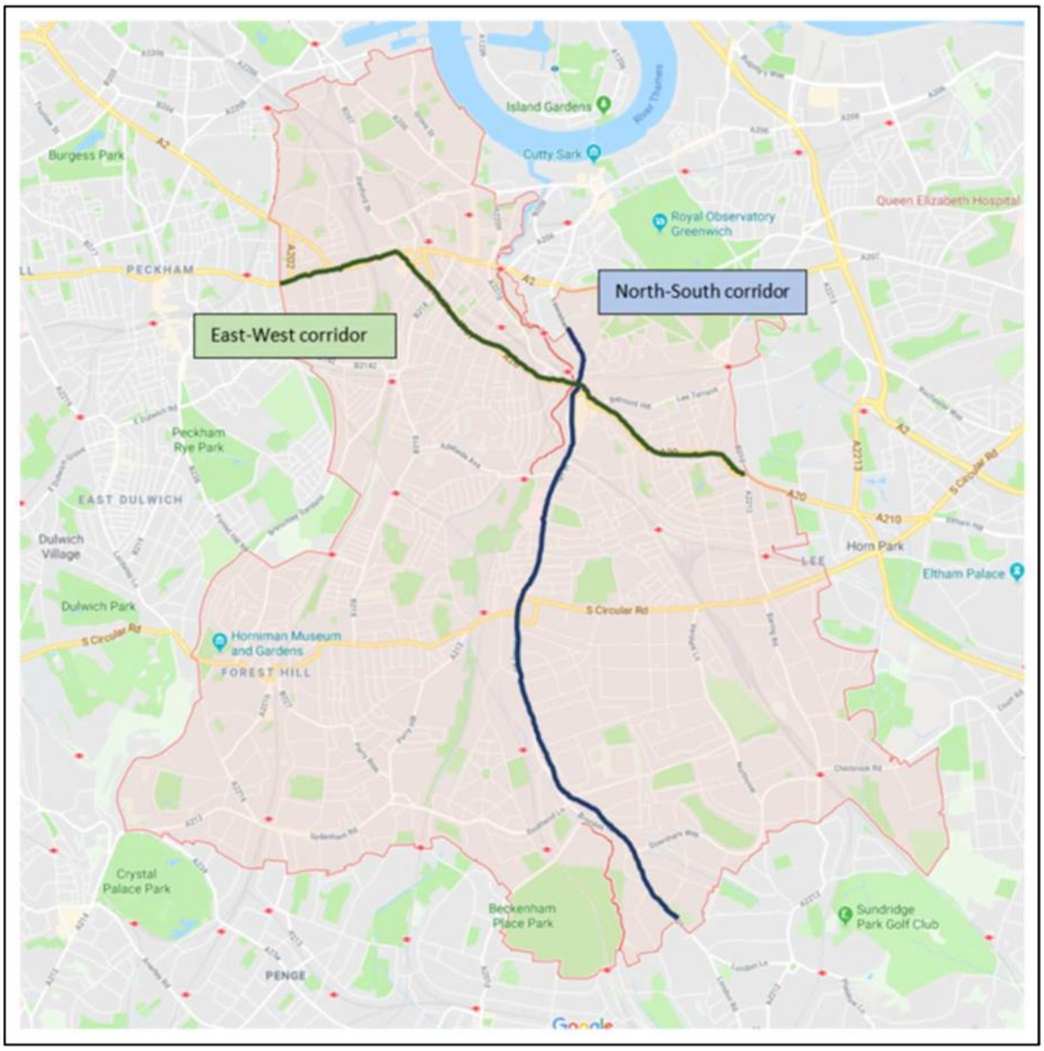


Figure 20: Bus Corridors in London Borough of Lewisham

For the purpose of comparison the bus demand in both directions along these corridors has been analysed and is presented in Figure 21 to Figure 24. Along the north-south bus corridor they show a general increase in bus passengers with the greatest increases around Lewisham station as to be expected. With the east-west corridor there are increases in patronage around Lewisham station however other sections along the corridor do experience a reduction in demand which is probably a result of passengers using the Bakerloo line extension instead of the bus.

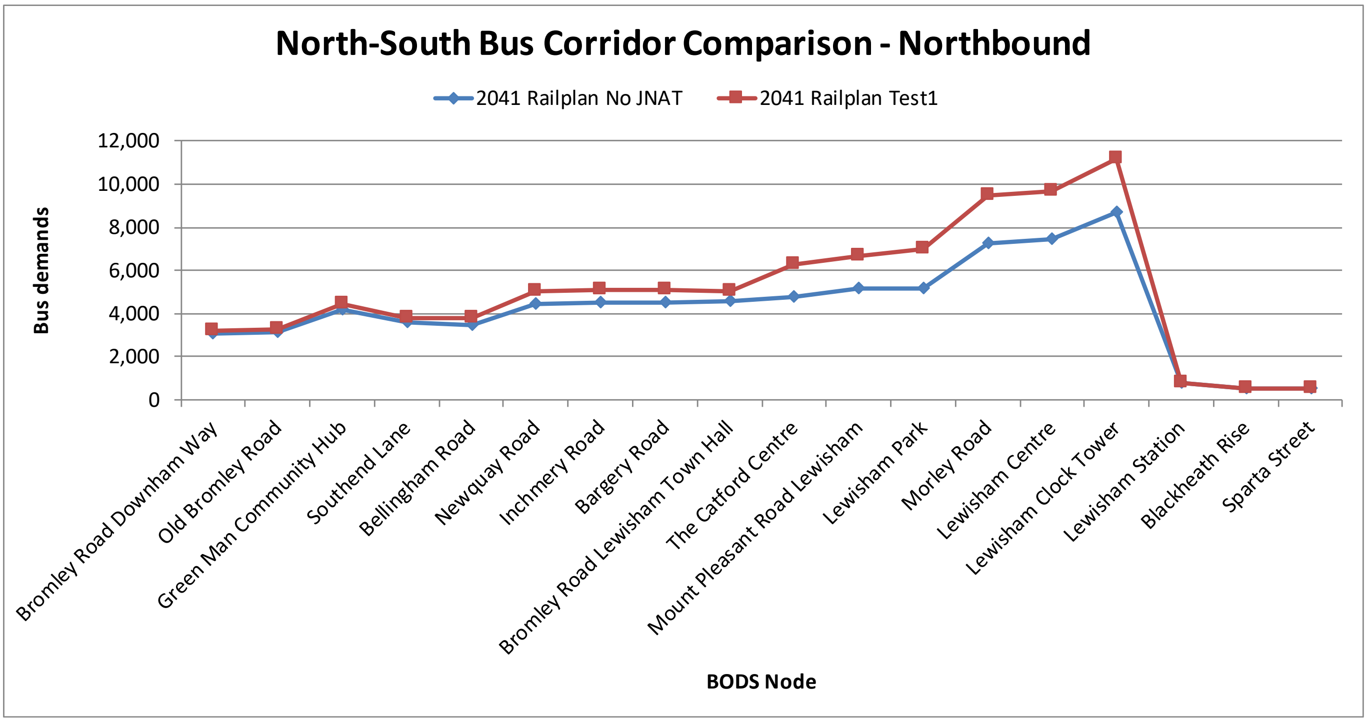


Figure 21: North-South Northbound Bus Corridor Demand Do Minimum and Test 1

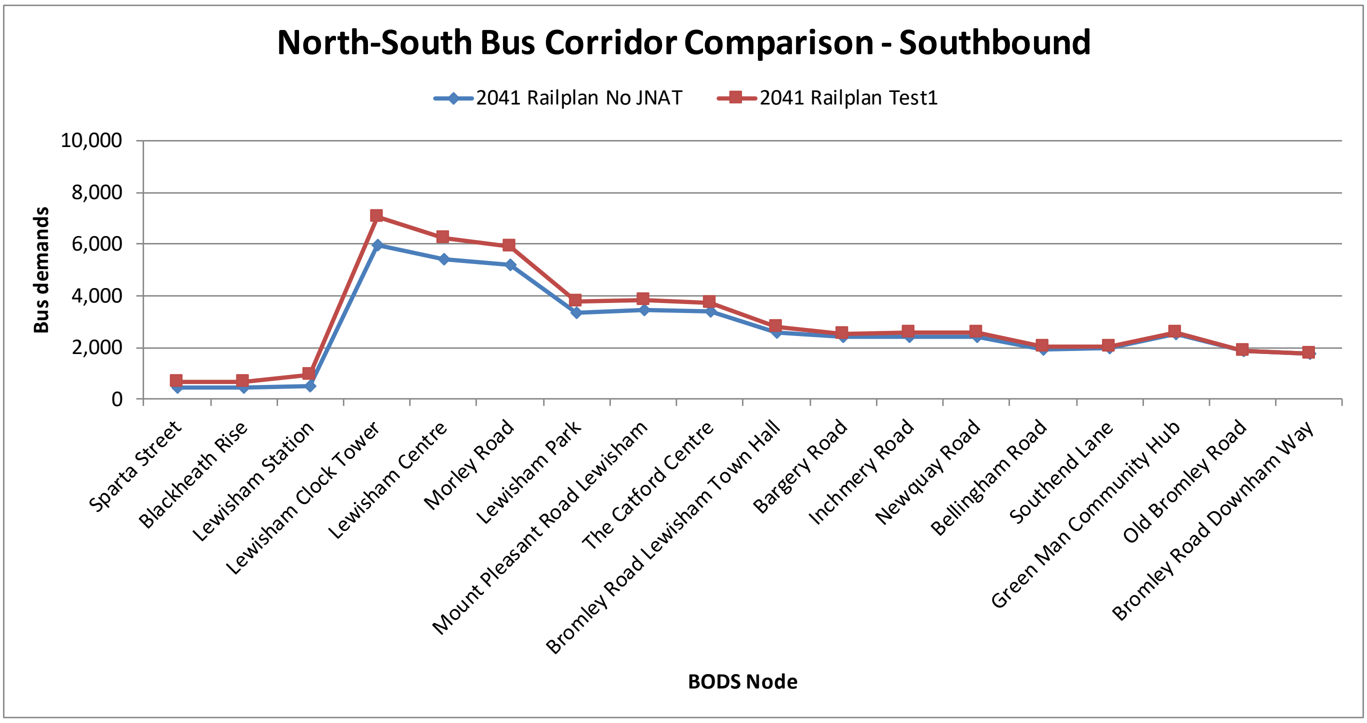


Figure 22: North-South Southbound Bus Corridor Demand Do Minimum and Test 1

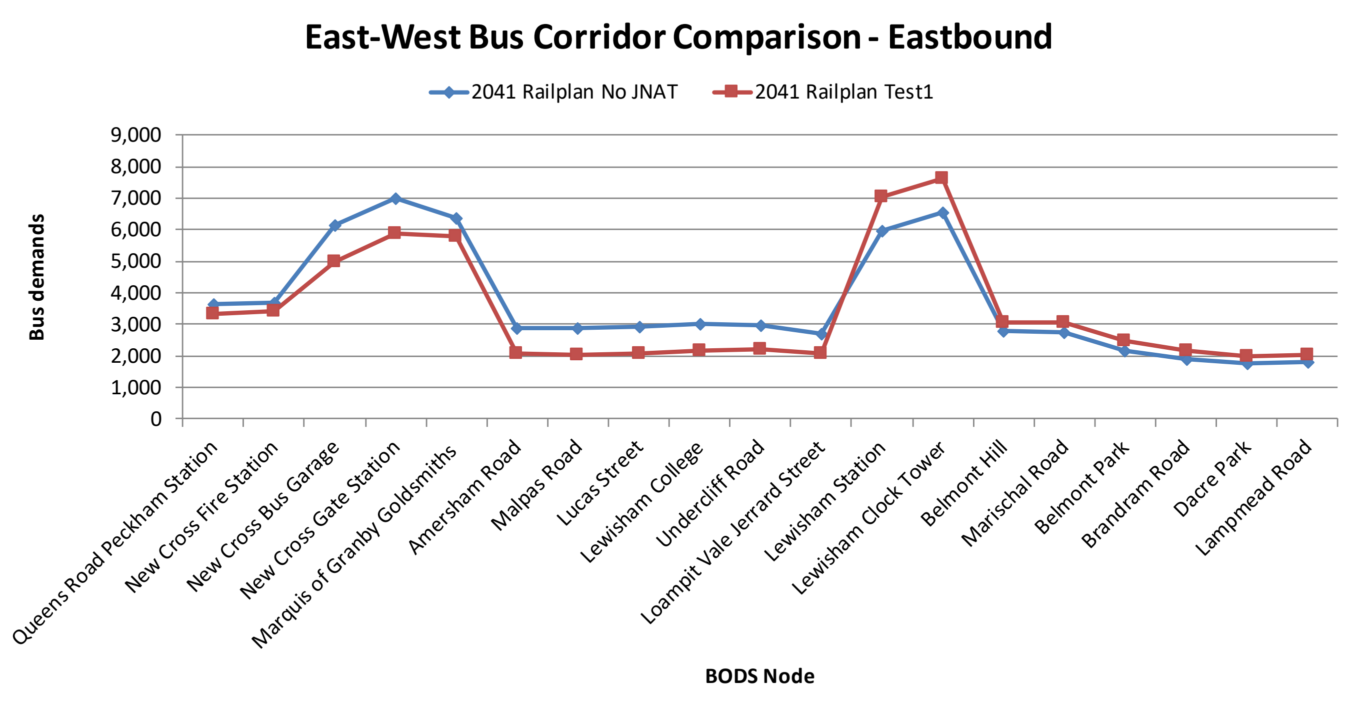


Figure 23: East-West Eastbound Bus Corridor Demand Do Minimum and Test 1

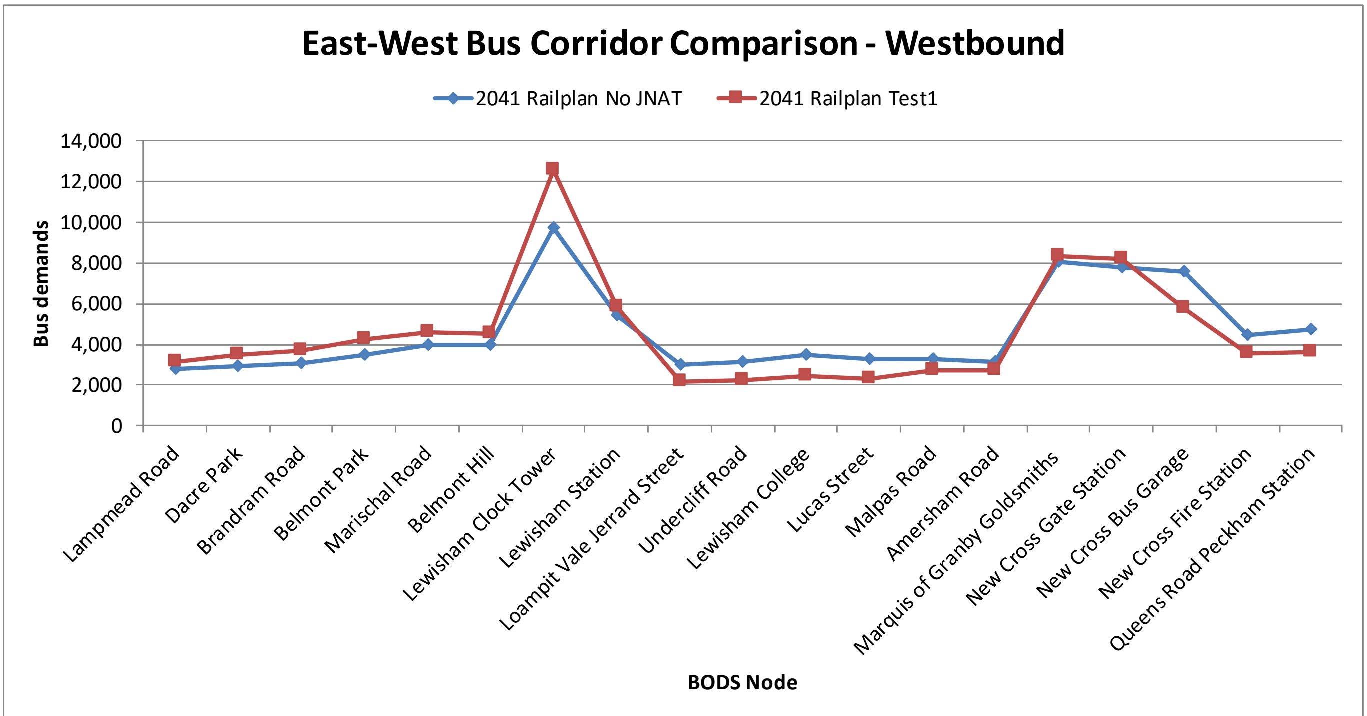


Figure 24: East-West Westbound Bus Corridor Demand Do Minimum and Test 1

Table 5 provides more details of the changes in passengers boarding and alighting specific bus stop on both the corridors.

Table 5: Bus Boarders and Alighters Do Minimum and Test 1

Bus stop name	Corridor	Boarders 2041 Railplan No JNAT	Boarders 2041 Railplan Test1	Boarders Growth (2041)	Boarders %Growth (2041)	Alighters 2041 Railplan No JNAT	Alighters 2041 Railplan Test1	Alighters Growth (2041)	Alighters %Growth (2041)
Bromley Road Downham Way	North-South	1127	1354	227	20%	344	347	3	1%
Old Bromley Road	North-South	77	69	-8	-10%	126	131	5	4%
Green Man Community Hub	North-South	1036	1125	89	9%	666	688	22	3%
Southend Lane	North-South	245	216	-29	-12%	127	136	9	7%
Bellingham Road	North-South	514	548	34	7%	564	507	-57	-10%
Newquay Road	North-South	1526	1785	259	17%	1045	1133	88	8%
Inchmery Road	North-South	107	125	18	17%	72	87	15	21%
Bargery Road	North-South	193	155	-38	-20%	217	179	-38	-18%
Bromley Road Lewisham Town Hall	North-South	909	744	-165	-18%	1026	1032	6	1%
The Catford Centre	North-South	1281	2071	790	62%	1120	1198	78	7%
Mount Pleasant Road Lewisham	North-South	749	737	-12	-2%	430	459	29	7%

Bus stop name	Corridor	Boarders 2041 Railplan No JNAT	Boarders 2041 Railplan Test1	Boarders Growth (2041)	Boarders %Growth (2041)	Alighters 2041 Railplan No JNAT	Alighters 2041 Railplan Test1	Alighters Growth (2041)	Alighters %Growth (2041)
Lewisham Park	North-South	772	1046	274	35%	646	704	58	9%
Morley Road	North-South	476	469	-7	-1%	241	235	-6	-2%
Lewisham Centre	North-South	1751	1470	-281	-16%	1829	1721	-108	-6%
Lewisham Clock Tower	North-South	2150	1935	-215	-10%	2613	2757	144	6%
Lewisham Station	North-South	75	85	10	13%	262	683	421	161%
Blackheath Rise	North-South	15	15	0	0%	68	76	8	12%
Sparta Street	North-South	10	10	0	0%	11	14	3	27%
Queens Road Peckham Station	East-West	1306	1283	-23	-2%	1531	1218	-313	-20%
New Cross Fire Station	East-West	621	422	-199	-32%	292	253	-39	-13%
New Cross Bus Garage	East-West	2348	1700	-648	-28%	1862	1421	-441	-24%
New Cross Gate Station	East-West	3321	3299	-22	-1%	2759	4872	2113	77%

Bus stop name	Corridor	Boarders 2041 Railplan No JNAT	Boarders 2041 Railplan Test1	Boarders Growth (2041)	Boarders %Growth (2041)	Alighters 2041 Railplan No JNAT	Alighters 2041 Railplan Test1	Alighters Growth (2041)	Alighters %Growth (2041)
Marquis of Granby Goldsmiths	East-West	1823	1159	-664	-36%	389	296	-93	-24%
Amersham Road	East-West	361	358	-3	-1%	215	231	16	7%
Malpas Road	East-West	289	431	142	49%	450	417	-33	-7%
Lucas Street	East-West	358	725	367	103%	309	333	24	8%
Lewisham College	East-West	322	348	26	8%	399	367	-32	-8%
Undercliff Road	East-West	695	577	-118	-17%	488	376	-112	-23%
Loampit Vale Jerrard Street	East-West	177	95	-82	-46%	251	127	-124	-49%
Lewisham Station	East-West	4195	5392	1197	29%	3148	3992	844	27%
Lewisham Clock Tower	East-West	2150	1935	-215	-10%	2613	2757	144	6%
Belmont Hill	East-West	95	96	1	1%	233	569	336	144%
Marischal Road	East-West	67	64	-3	-4%	171	143	-28	-16%

Bus stop name	Corridor	Boarders 2041 Railplan No JNAT	Boarders 2041 Railplan Test1	Boarders Growth (2041)	Boarders %Growth (2041)	Alighters 2041 Railplan No JNAT	Alighters 2041 Railplan Test1	Alighters Growth (2041)	Alighters %Growth (2041)
Belmont Park	East-West	776	518	-258	-33%	822	809	-13	-2%
Brandram Road	East-West	258	403	145	56%	247	275	28	11%
Dacre Park	East-West	254	335	81	32%	249	291	42	17%
Lampmead Road	East-West	243	422	179	74%	40	40	0	0%
Not applicable	**Total**	**32672**	**33521**	**849**	**3%**	**27875**	**30874**	**2999**	**11%**

Intervention Test 2 (2041): BLE to Lewisham 27tph + Jubilee Line 36tph + Lewisham bus frequency x2

As a result of the Bakerloo line being extended to Lewisham and the increase in frequency of the Jubilee line Lewisham bus frequency Figure 25 shows the changes in passengers on the Transport for London network. Absolute changes in passengers on these links can be seen in Table 6. As to be expected there are significant increases on the Bakerloo Loo line between Elephant and Castle and Waterloo, greater than those experience in Test 1. There are also reductions in demand on the Jubilee line which is a result of passengers using the Bakerloo line for their journeys, however the reductions are lower than those experienced in Test 1. The DLR experiences increase in demand particularly in the southbound direction due to the extension of Bakerloo line so as to interchange to the city centre. The overground is experiencing an increase in passengers in both direction up until New Cross Gate where the line interchanges with the Bakerloo line. Increases are less than those experienced in Test 1. This increase is a result of the increased attractiveness for passengers to travel on the overground to get to the Bakerloo line. There is then a reduction in passengers on the overground in both directions between New Cross Gate and New Cross. Reduction in passengers are lower in Test 2 compared to Test 1. The change in passenger demand is also reflected in the crowding along NR and LUL lines. Detailed crowding maps of the changes for Rail modes can be found in Appendix A.

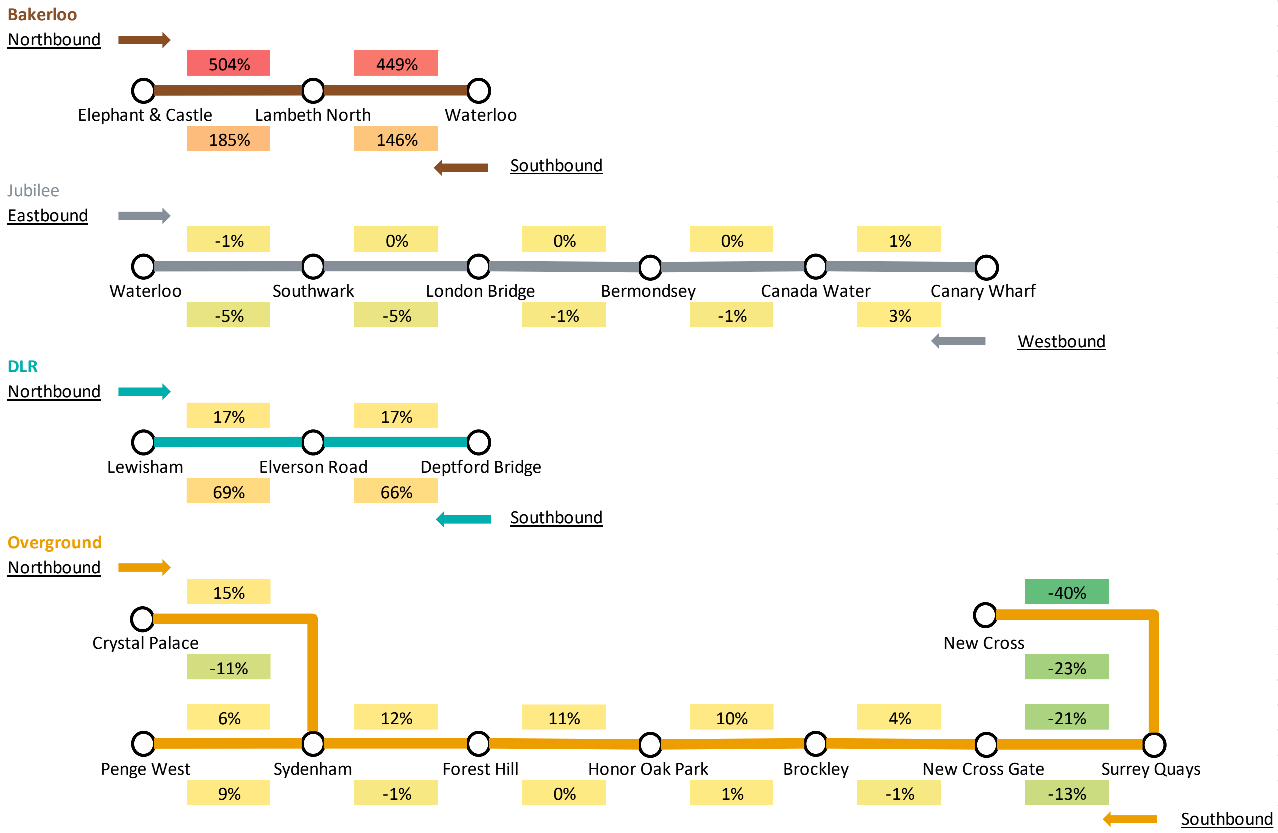


Figure 25: Changes in Passenger Flow on Transport for London Network between Test 2 and Do Minimum

Table 6: Passenger Flow along LUL, DLR and NR network Do Minimum and Test 2

From	To	Direction	Mode	Line(s)	Railplan 2041 No JNAT	Railplan 2041 Test1	Test1 % Growth	Test1 Growth
Elephant & Castle	Lambeth North	NB	LUL	Bakerloo	6107	36889	504%	30782
Lambeth North	Waterloo	NB	LUL	Bakerloo	6610	36284	448%	29647
Waterloo	Lambeth North	SB	LUL	Bakerloo	6660	16393	146%	9733
Lambeth North	Elephant & Castle	SB	LUL	Bakerloo	5411	15427	185%	10016
Waterloo	Southwark	EB	LUL	Jubilee	63731	63401	-1%	-330
Southwark	London Bridge	EB	LUL	Jubilee	59843	59639	0%	-204
London Bridge	Bermondsey	EB	LUL	Jubilee	61285	61328	0%	43
Bermondsey	Canada Water	EB	LUL	Jubilee	60190	60402	0%	212
Canada Water	Canary Wharf	EB	LUL	Jubilee	64181	64783	1%	602
Canary Wharf	Canada Water	WB	LUL	Jubilee	49930	51192	3%	1262
Canada Water	Bermondsey	WB	LUL	Jubilee	56198	55609	-1%	-589
Bermondsey	London Bridge	WB	LUL	Jubilee	59098	58408	-1%	-690
London Bridge	Southwark	WB	LUL	Jubilee	63468	60479	-5%	-2989
Southwark	Waterloo	WB	LUL	Jubilee	59451	56580	-5%	-2871
Not applicable	**Not applicable**	**Not applicable**	**LUL**	**LUL Sub-total**	**622163**	**696814**	**12%**	**74651**
Lewisham	Elverson Road	NB	DLR	DLR	9475	11061	17%	1586
Elverson Road	Deptford Bridge	NB	DLR	DLR	9539	11116	17%	1577
Deptford Bridge	Elverson Road	SB	DLR	DLR	3300	5493	66%	2193
Elverson Road	Lewisham	SB	DLR	DLR	3197	5406	69%	2209
Not applicable	**Not applicable**	**Not applicable**	**DLR**	**DLR Sub-total**	**25511**	**33076**	**30%**	**7565**
Crystal Palace	Sydenham	NB	NR	Overground	1251	1438	15%	187

From	To	Direction	Mode	Line(s)	Railplan 2041 No JNAT	Railplan 2041 Test1	Test1 % Growth	Test1 Growth
Penge West	Sydenham	NB	NR	Overground	2751	2904	6%	153
Sydenham	Forest Hill	NB	NR	Overground	5824	6510	12%	686
Forest Hill	Honor Oak Park	NB	NR	Overground	8734	9662	11%	928
Honor Oak Park	Brockley	NB	NR	Overground	9317	10219	10%	902
Brockley	New Cross Gate	NB	NR	Overground	10817	11297	4%	480
New Cross Gate	Surrey Quays	NB	NR	Overground	11829	9335	-21%	-2494
New Cross	Surrey Quays	NB	NR	Overground	287	171	-40%	-116
Surrey Quays	New Cross	SB	NR	Overground	236	182	-23%	-54
Surrey Quays	New Cross Gate	SB	NR	Overground	4403	3832	-13%	-571
New Cross Gate	Brockley	SB	NR	Overground	3783	3732	-1%	-51
Brockley	Honor Oak Park	SB	NR	Overground	3612	3635	1%	23
Honor Oak Park	Forest Hill	SB	NR	Overground	3549	3565	0%	16
Forest Hill	Sydenham	SB	NR	Overground	2881	2848	-1%	-33
Sydenham	Crystal Palace	SB	NR	Overground	1186	1061	-11%	-125
Sydenham	Penge West	SB	NR	Overground	416	452	9%	36
Not applicable	**Not applicable**	**Not applicable**	**NR**	**NR Sub-total**	**70876**	**70843**	**0%**	**-33**
Not applicable	**Not applicable**	**Not applicable**	**Total**	**Total**	**718550**	**800733**	**11%**	**82183**

Figure 26Figure 26 shows the crowding along the extension of Bakerloo line between Elephant and Castle and Lewisham. As expected the dominant crowding is the inbound direction. Number of people standing per sqm starts from 1 to 2 from Lewisham and gradually increase to 3 to 4 standing per sqm when approaching to Elephant & Castle and beyond. The crowding levels are similar to Test 1.

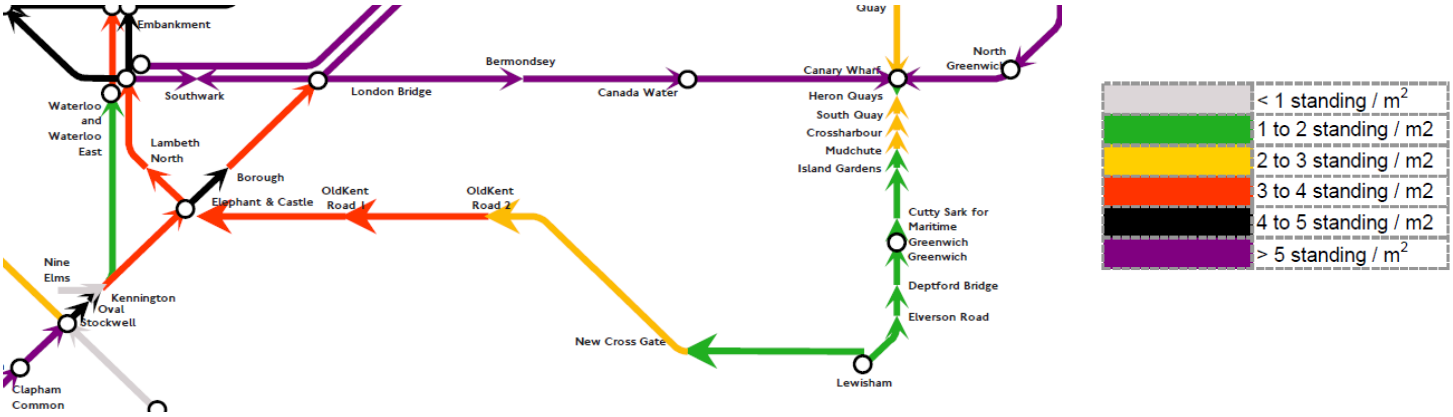


Figure 26: Crowding along Bakerloo Line extension to Lewisham in Test 2

As a result of the Test 2 improvements the impact this has on bus passengers on the key bus corridor has been considered. For the purpose of comparison, the bus demand in both directions along these corridors has been analysed and is presented in Figure 27 to Figure 30. Along the north-south bus corridor they show a large increase in bus passengers with the greatest increases around Lewisham station as to be expected. The increases are significantly higher than those shown in Test 1. With the east-west corridor there are increases in patronage around Lewisham station however other sections along the corridor do experience a reduction in demand which is probably a result of passengers using the Bakerloo line extension instead of the bus.

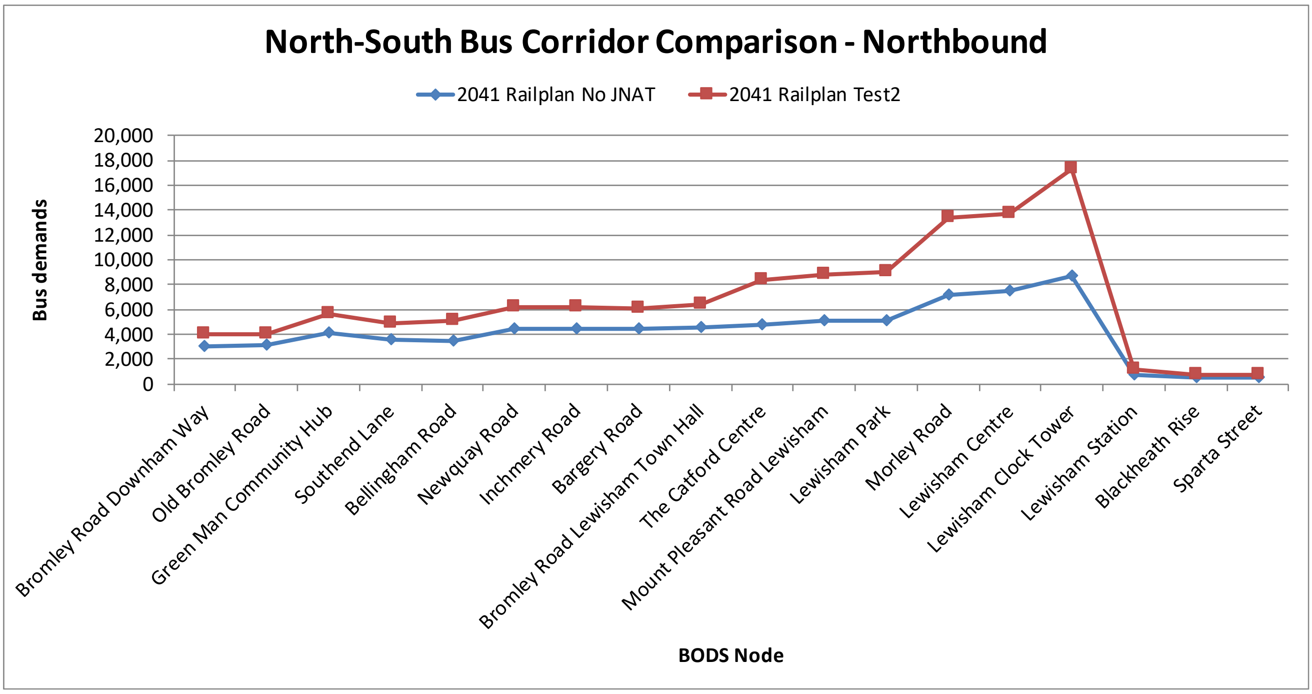


Figure 27: North-South Northbound Bus Corridor Demand Do Minimum and Test 2

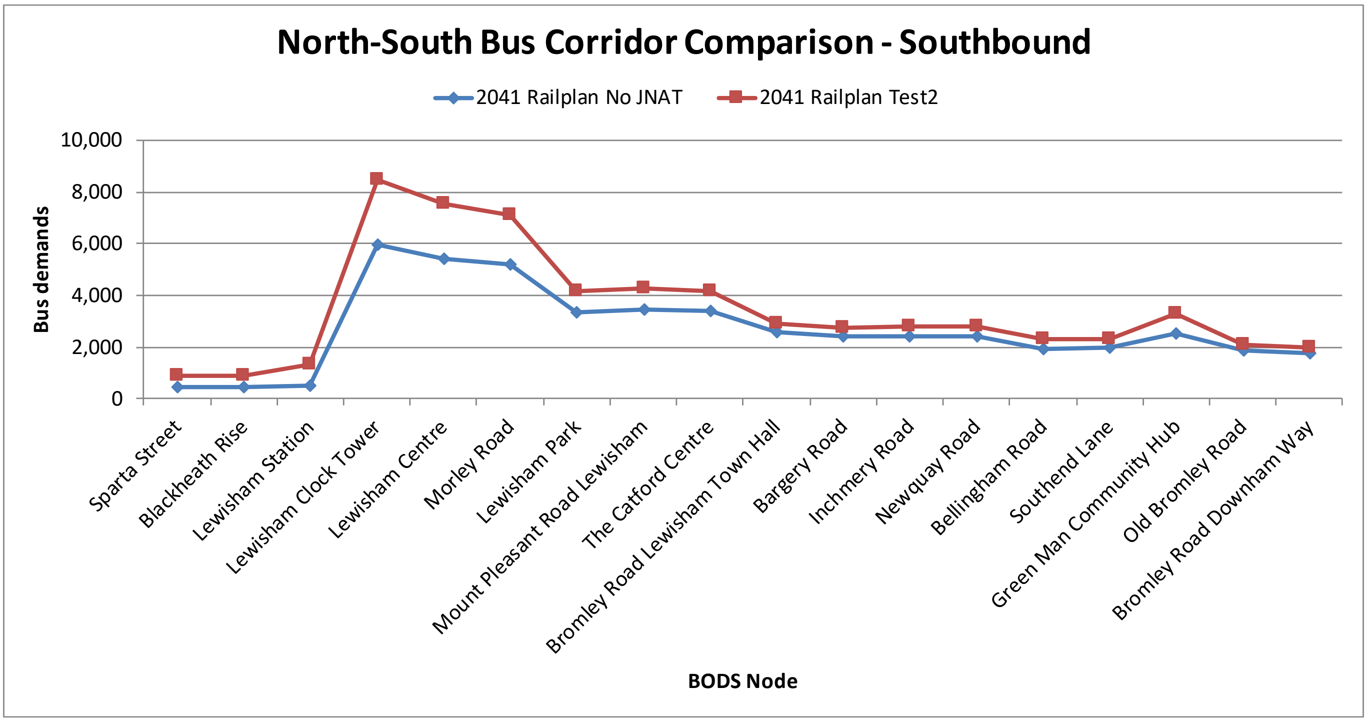


Figure 28: North-South Southbound Bus Corridor Demand Do Minimum and Test 2

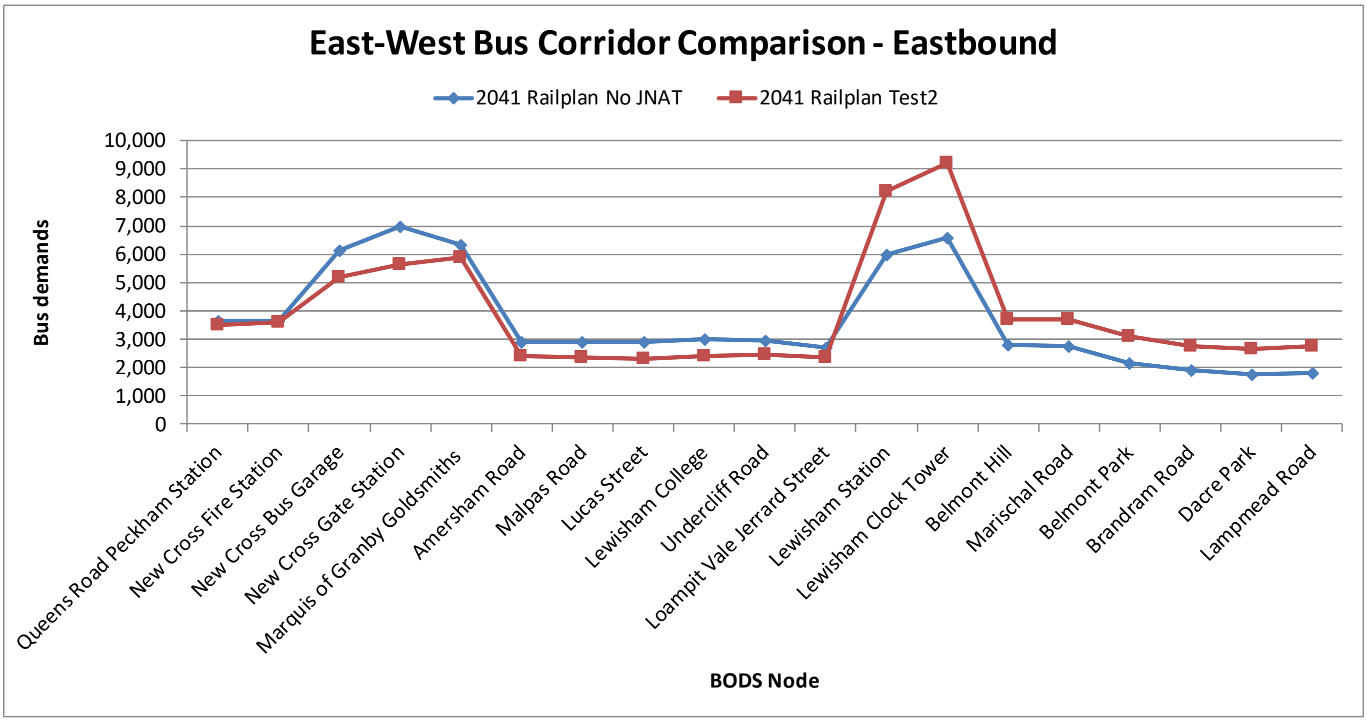


Figure 29: East-West Eastbound Bus Corridor Demand Do Minimum and Test 2

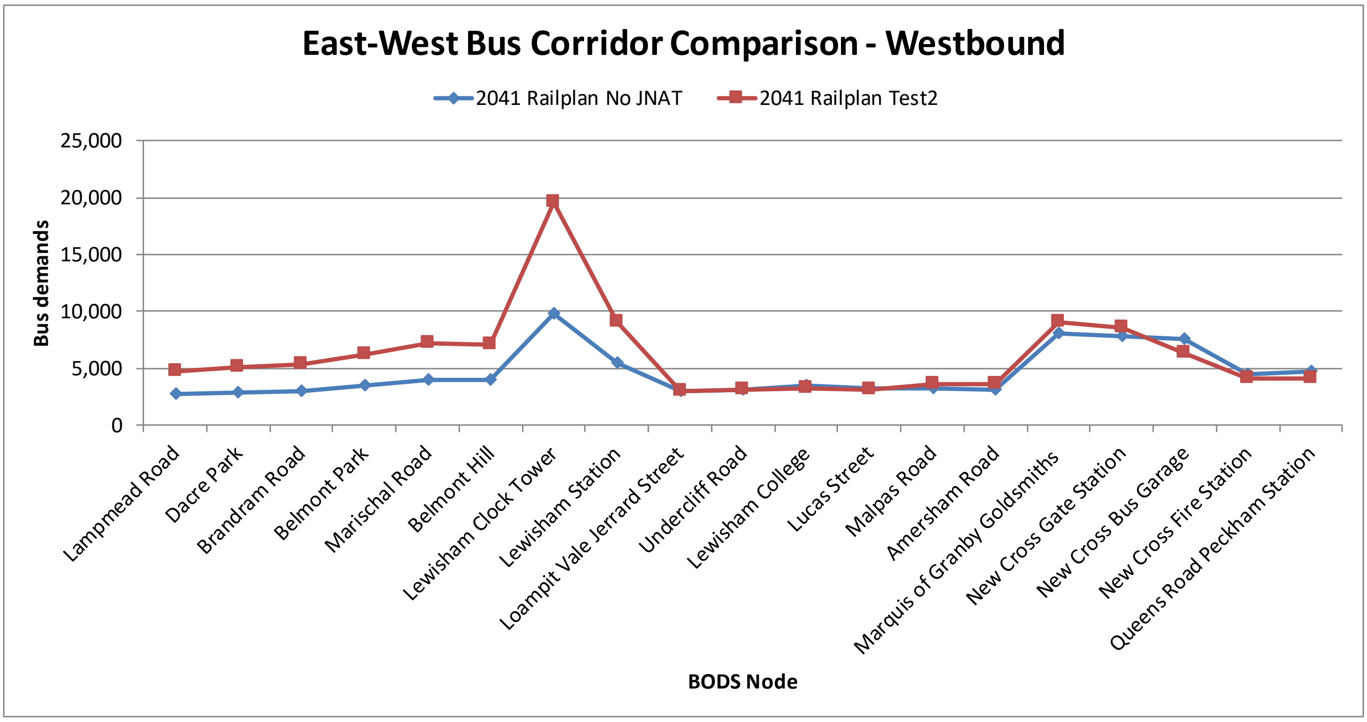


Figure 30: East-West Westbound Bus Corridor Demand Do Minimum and Test 2

Table 7 provides more details of the changes in passengers boarding and alighting specific bus stop on both the corridors. Overall increases in bus patronage are significantly higher than Test 1.

Table 7: Bus Boarders and Alighters Do Minimum and Test 2

Bus stop name	Corridor	Boarders 2041 Railplan No JNAT	Boarders 2041 Railplan Test2	Boarders Growth (2041)	Boarders %Growth (2041)	Alighters 2041 Railplan No JNAT	Alighters 2041 Railplan Test2	Alighters Growth (2041)	Alighters %Growth (2041)
Bromley Road Downham Way	North-South	1127	1470	343	30%	344	330	-14	-4%
Old Bromley Road	North-South	77	39	-38	-49%	126	166	40	32%
Green Man Community Hub	North-South	1036	1272	236	23%	666	794	128	19%
Southend Lane	North-South	245	250	5	2%	127	169	42	33%
Bellingham Road	North-South	514	771	257	50%	564	550	-14	-2%
Newquay Road	North-South	1526	1575	49	3%	1045	1068	23	-2%
Inchmery Road	North-South	107	89	-18	-17%	72	53	-19	-26%
Bargery Road	North-South	193	150	-43	-22%	217	165	-52	-24%
Bromley Road Lewisham Town Hall	North-South	909	1015	106	12%	1026	896	-130	-13%
The Catford Centre	North-South	1281	2192	911	71%	1120	1418	298	27%
Mount Pleasant Road Lewisham	North-South	749	794	45	6%	430	490	60	14%

Bus stop name	Corridor	Boarders 2041 Railplan No JNAT	Boarders 2041 Railplan Test2	Boarders Growth (2041)	Boarders %Growth (2041)	Alighters 2041 Railplan No JNAT	Alighters 2041 Railplan Test2	Alighters Growth (2041)	Alighters %Growth (2041)
Lewisham Park	North-South	772	1185	413	53%	646	847	201	31%
Morley Road	North-South	476	568	92	19%	241	329	88	37%
Lewisham Centre	North-South	1751	2041	290	17%	1829	2246	417	23%
Lewisham Clock Tower	North-South	2150	2718	568	26%	2613	4191	1578	60%
Lewisham Station	North-South	75	233	158	211%	262	956	694	265%
Blackheath Rise	North-South	15	85	70	467%	68	108	40	59%
Sparta Street	North-South	10	26	16	160%	11	67	56	509%
Queens Road Peckham Station	East-West	1306	1448	142	11%	1531	1315	-216	-14%
New Cross Fire Station	East-West	621	512	-109	-18%	292	380	88	30%
New Cross Bus Garage	East-West	2348	1715	-633	-27%	1862	1286	-576	-31%
New Cross Gate Station	East-West	3321	3140	-181	-5%	2759	4974	2215	80%

Bus stop name	Corridor	Boarders 2041 Railplan No JNAT	Boarders 2041 Railplan Test2	Boarders Growth (2041)	Boarders %Growth (2041)	Alighters 2041 Railplan No JNAT	Alighters 2041 Railplan Test2	Alighters Growth (2041)	Alighters %Growth (2041)
Marquis of Granby Goldsmiths	East-West	1823	1095	-728	-40%	389	225	-164	-42%
Amersham Road	East-West	361	326	-35	-10%	215	191	-24	-11%
Malpas Road	East-West	289	543	254	88%	450	524	74	16%
Lucas Street	East-West	358	774	416	116%	309	380	71	23%
Lewisham College	East-West	322	366	44	14%	399	360	-39	-10%
Undercliff Road	East-West	695	613	-82	-12%	488	495	7	1%
Loampit Vale Jerrard Street	East-West	177	107	-70	-40%	251	126	-125	-50%
Lewisham Station	East-West	4195	6490	2295	55%	3148	6479	3331	106%
Lewisham Clock Tower	East-West	2150	2718	568	26%	2613	4191	1578	60%
Belmont Hill	East-West	95	137	42	44%	233	118	-115	-49%
Marischal Road	East-West	67	93	26	39%	171	160	-11	-6%

Bus stop name	Corridor	Boarders 2041 Railplan No JNAT	Boarders 2041 Railplan Test2	Boarders Growth (2041)	Boarders %Growth (2041)	Alighters 2041 Railplan No JNAT	Alighters 2041 Railplan Test2	Alighters Growth (2041)	Alighters %Growth (2041)
Belmont Park	East-West	776	1171	395	51%	822	889	67	8%
Brandram Road	East-West	258	427	169	66%	247	268	21	9%
Dacre Park	East-West	254	470	216	85%	249	304	55	22%
Lampmead Road	East-West	243	507	264	109%	40	123	83	208%
Not applicable	**Total**	**32672**	**39125**	**6453**	**20%**	**27875**	**37631**	**9756**	**35%**

Intervention Test 3 (2041): BLE to Hayes 36tph

As a result of the Bakerloo line being extended to Hayes, Figure 31 shows the changes in passengers on the Transport for London network. Absolute changes in passengers on these links can be seen in Table 8. As to be expected there are significant increases on the Bakerloo Loo line between Elephant and Castle and Waterloo, greater than those experience in Test 1. This is because of the longer extension which consequently attracts more passenger. There are also reductions in demand on the Jubilee line which is a result of passengers using the Bakerloo line for their journeys, the reductions are at the similar level as those experienced in Test 1. The DLR experiences increase in demand particularly in the southbound direction due to the extension of Bakerloo line with passengers travelling to Lewisham and interchanging onto the Bakerloo line extension to go into central London. The overground is experiencing an increase in passengers in northbound direction up until New Cross Gate where the line interchanges with the Bakerloo line. Increases are less than those experienced in Test 1 and Test 2. This increase is a result of the increased attractiveness for passengers to travel on the overground to get to the Bakerloo line. There is then a reduction in passengers on the overground in both directions between New Cross Gate and New Cross. The change in passenger demand is also reflected in the crowding along NR and LUL lines. Detailed crowding maps of the changes for Rail modes can be found in Appendix A.

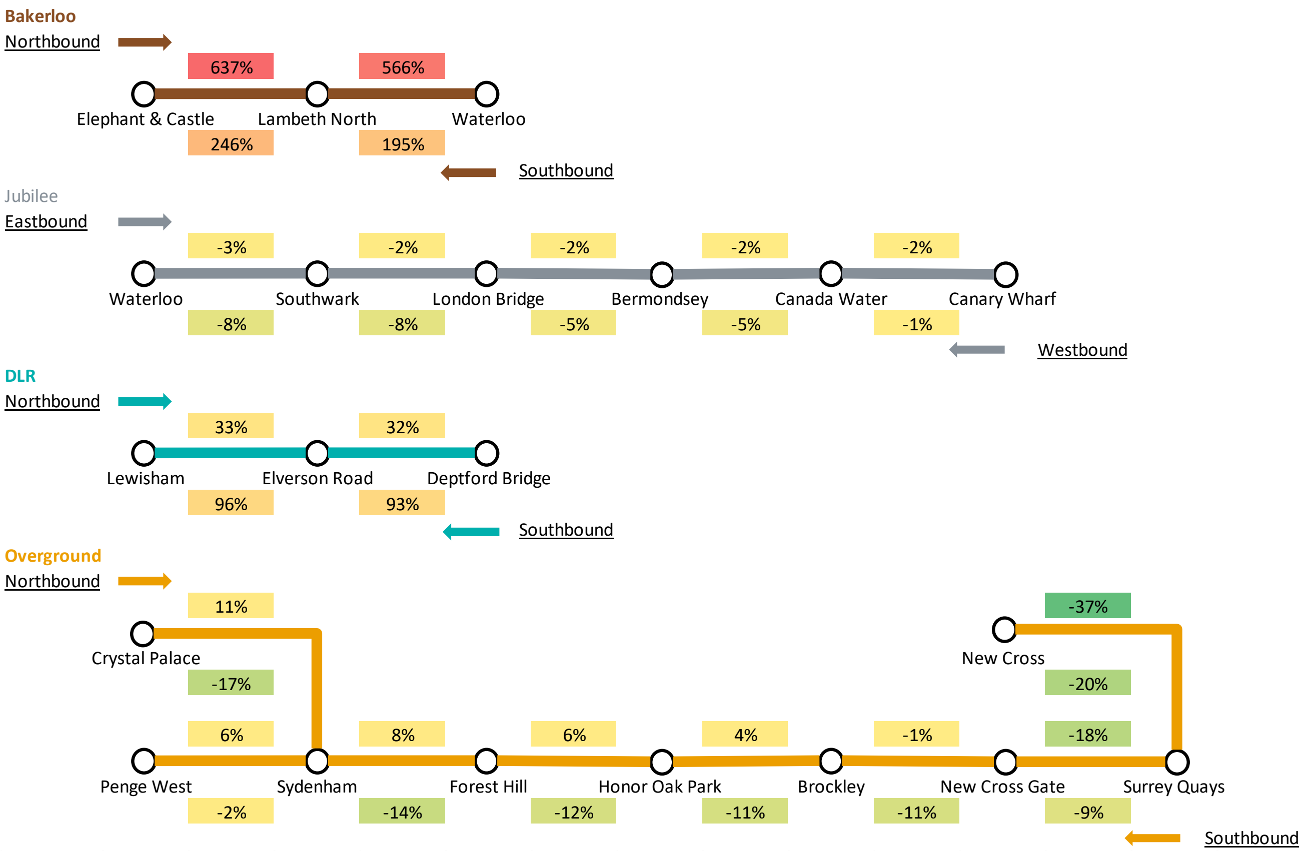


Figure 31: Changes in Passenger Flow on Transport for London Network between Test 3 and Do Minimum

Table 8: Passenger Flow along LUL, DLR and NR network Do Minimum and Test 3

From	To	Direction	Mode	Line(s)	Railplan 2041 No JNAT	Railplan 2041 Test1	Test1 % Growth	Test1 Growth
Elephant & Castle	Lambeth North	NB	LUL	Bakerloo	6107	45035	637%	38928
Lambeth North	Waterloo	NB	LUL	Bakerloo	6610	44045	566%	37435
Waterloo	Lambeth North	SB	LUL	Bakerloo	6660	19654	195%	12994
Lambeth North	Elephant & Castle	SB	LUL	Bakerloo	5411	18749	246%	13338
Waterloo	Southwark	EB	LUL	Jubilee	63731	62116	-3%	-1615
Southwark	London Bridge	EB	LUL	Jubilee	59843	58435	-2%	-1408
London Bridge	Bermondsey	EB	LUL	Jubilee	61285	59877	-2%	-1408
Bermondsey	Canada Water	EB	LUL	Jubilee	60190	58855	-2%	-1335
Canada Water	Canary Wharf	EB	LUL	Jubilee	64181	63141	-2%	-1040
Canary Wharf	Canada Water	WB	LUL	Jubilee	49930	49544	-1%	-386
Canada Water	Bermondsey	WB	LUL	Jubilee	56198	53467	-5%	-2731
Bermondsey	London Bridge	WB	LUL	Jubilee	59098	56282	-5%	-2816
London Bridge	Southwark	WB	LUL	Jubilee	63468	58331	-8%	-5137
Southwark	Waterloo	WB	LUL	Jubilee	59451	54559	-8%	-4892
Not applicable	**Not applicable**	**Not applicable**	**LUL**	**LUL Sub-total**	**622163**	**702090**	**13%**	**79927**
Lewisham	Elverson Road	NB	DLR	DLR	9475	12620	33%	3145
Elverson Road	Deptford Bridge	NB	DLR	DLR	9539	12631	32%	3092
Deptford Bridge	Elverson Road	SB	DLR	DLR	3300	6380	93%	3080
Elverson Road	Lewisham	SB	DLR	DLR	3197	6261	96%	3064
Not applicable	**Not applicable**	**Not applicable**	**DLR**	**DLR Sub-total**	**25511**	**37892**	**49%**	**12381**
Crystal Palace	Sydenham	NB	NR	Overground	1251	1387	11%	136

From	To	Direction	Mode	Line(s)	Railplan 2041 No JNAT	Railplan 2041 Test1	Test1 % Growth	Test1 Growth
Penge West	Sydenham	NB	NR	Overground	2751	2909	6%	158
Sydenham	Forest Hill	NB	NR	Overground	5824	6274	8%	450
Forest Hill	Honor Oak Park	NB	NR	Overground	8734	9240	6%	506
Honor Oak Park	Brockley	NB	NR	Overground	9317	9663	4%	346
Brockley	New Cross Gate	NB	NR	Overground	10817	10740	-1%	-77
New Cross Gate	Surrey Quays	NB	NR	Overground	11829	9743	-18%	-2086
New Cross	Surrey Quays	NB	NR	Overground	287	181	-37%	-106
Surrey Quays	New Cross	SB	NR	Overground	236	189	-20%	-47
Surrey Quays	New Cross Gate	SB	NR	Overground	4403	3998	-9%	-405
New Cross Gate	Brockley	SB	NR	Overground	3783	3354	-11%	-429
Brockley	Honor Oak Park	SB	NR	Overground	3612	3201	-11%	-411
Honor Oak Park	Forest Hill	SB	NR	Overground	3549	3140	-12%	-409
Forest Hill	Sydenham	SB	NR	Overground	2881	2470	-14%	-411
Sydenham	Crystal Palace	SB	NR	Overground	1186	989	-17%	-197
Sydenham	Penge West	SB	NR	Overground	416	406	-2%	-10
Not applicable	**Not applicable**	**Not applicable**	**NR**	**NR Sub-total**	**70876**	**67884**	**-4%**	**-2992**
Not applicable	**Not applicable**	**Not applicable**	**Total**	**Total**	**718550**	**807866**	**12%**	**89316**

Figure 32 shows the crowding along the extension of Bakerloo line between Elephant & Castle and Hayes. As expected the dominant crowding is the inbound direction. Number of people standing per sqm starts from less than 1 from Hayes and gradually increase to 4 to 5 standing per sqm when approaching to Lewisham. Here the crowding value drops as people interchange at Lewisham (to DLR, NR, bus etc.). From Lewisham there are between 2 to 3 standing passengers per sqm until New Cross Gate, then the value increases 3 to 4 standing per sqm until Elephant and Castle. The crowding levels from Lewisham inbound are higher than Test 1 and Test 2.

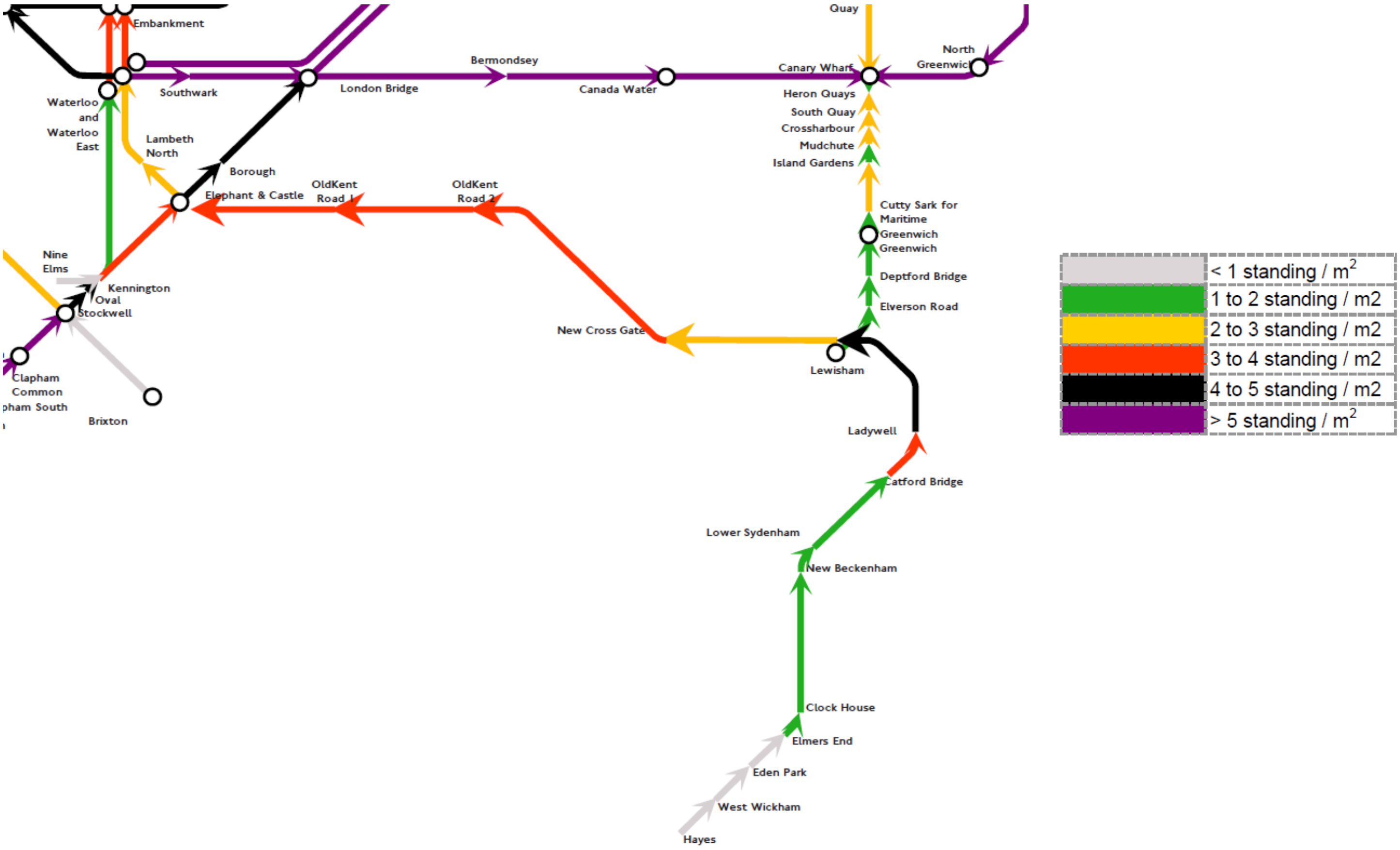


Figure 32: Crowding along Bakerloo Line extension to Hayes in Test 3

As a result of the Test 3 improvements the impact this has on bus passengers on the key bus corridor has been considered. For the purpose of comparison, the bus demand in both directions along these corridors has been analysed and is presented in Figure 33 to Figure 36. Unlike Test 1 and Test 2, there shows a drop-in bus demand along both corridors in Test 3. The largest decrease is observed in the vicinity of Lewisham station, and is expected. The reason behind this decrease may well be due to the shift in mode from bus to LUL as a result of BLE, particularly between Hayes and Lewisham.

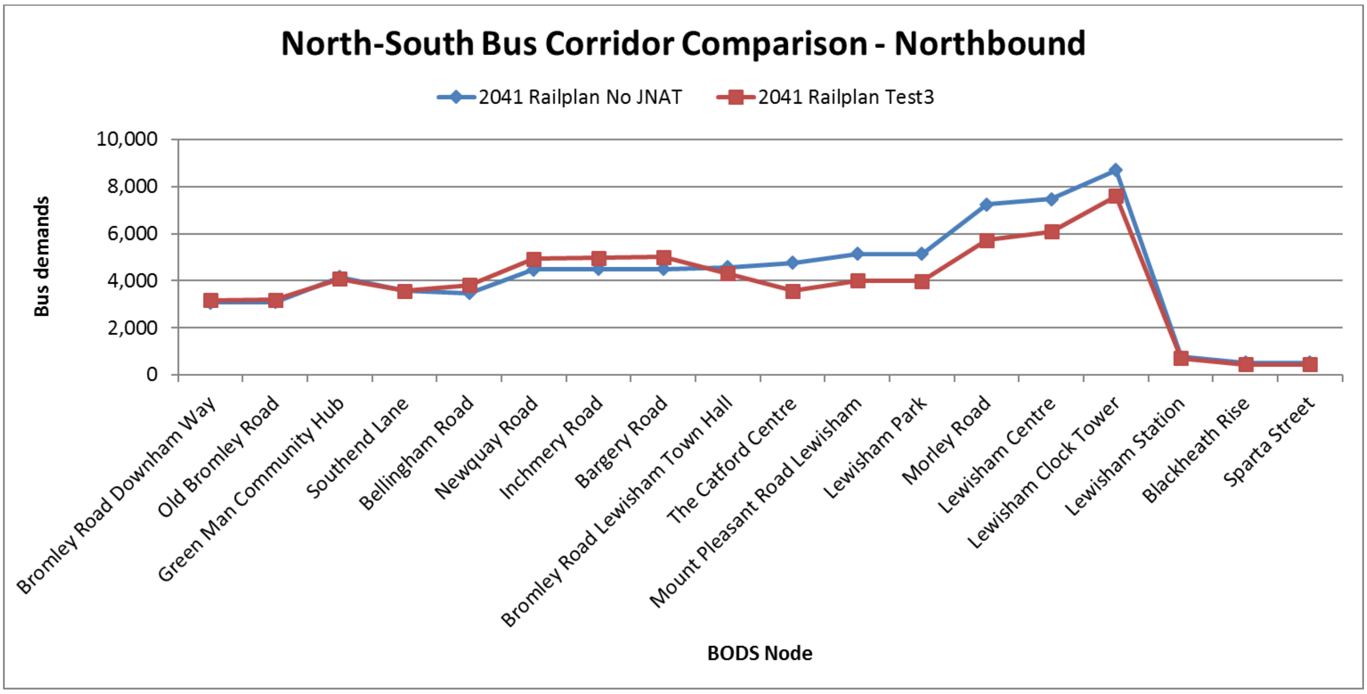


Figure 33: North-South Northbound Bus Corridor Demand Do Minimum and Test 3

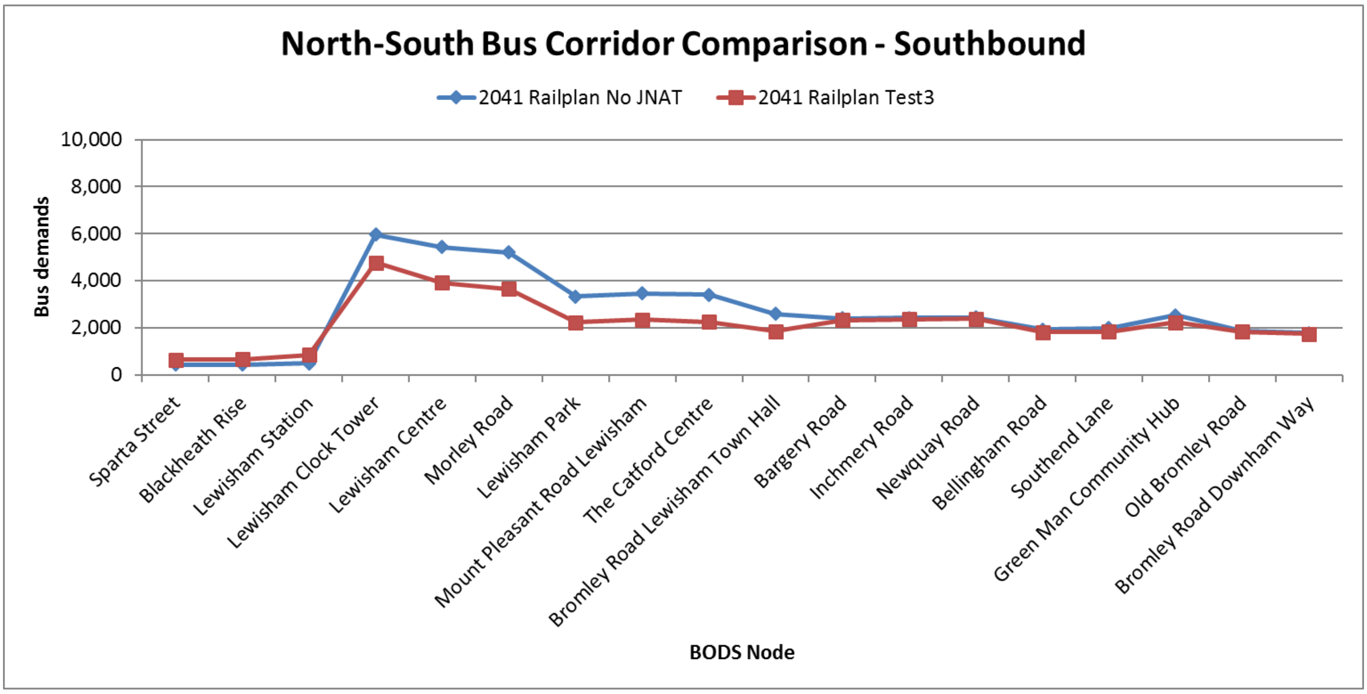


Figure 34: North-South Southbound Bus Corridor Demand Do Minimum and Test 3

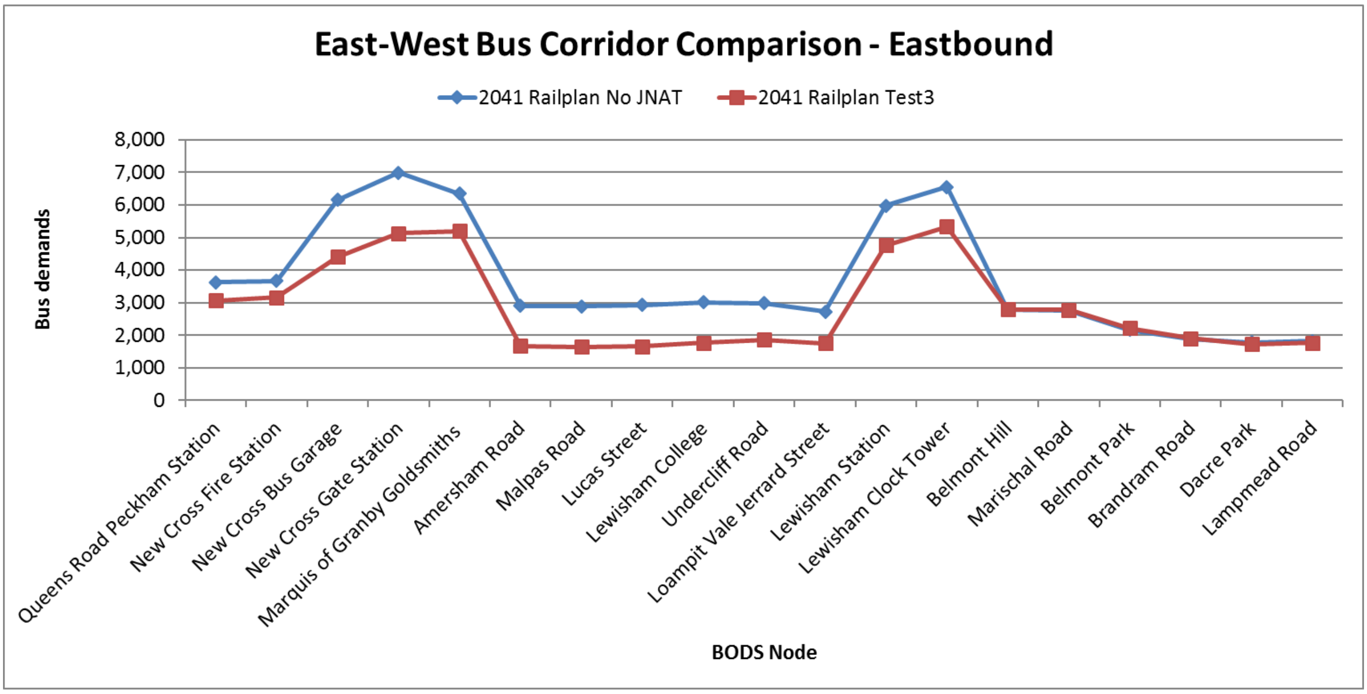


Figure 35: East-West Eastbound Bus Corridor Demand Do Minimum and Test 3

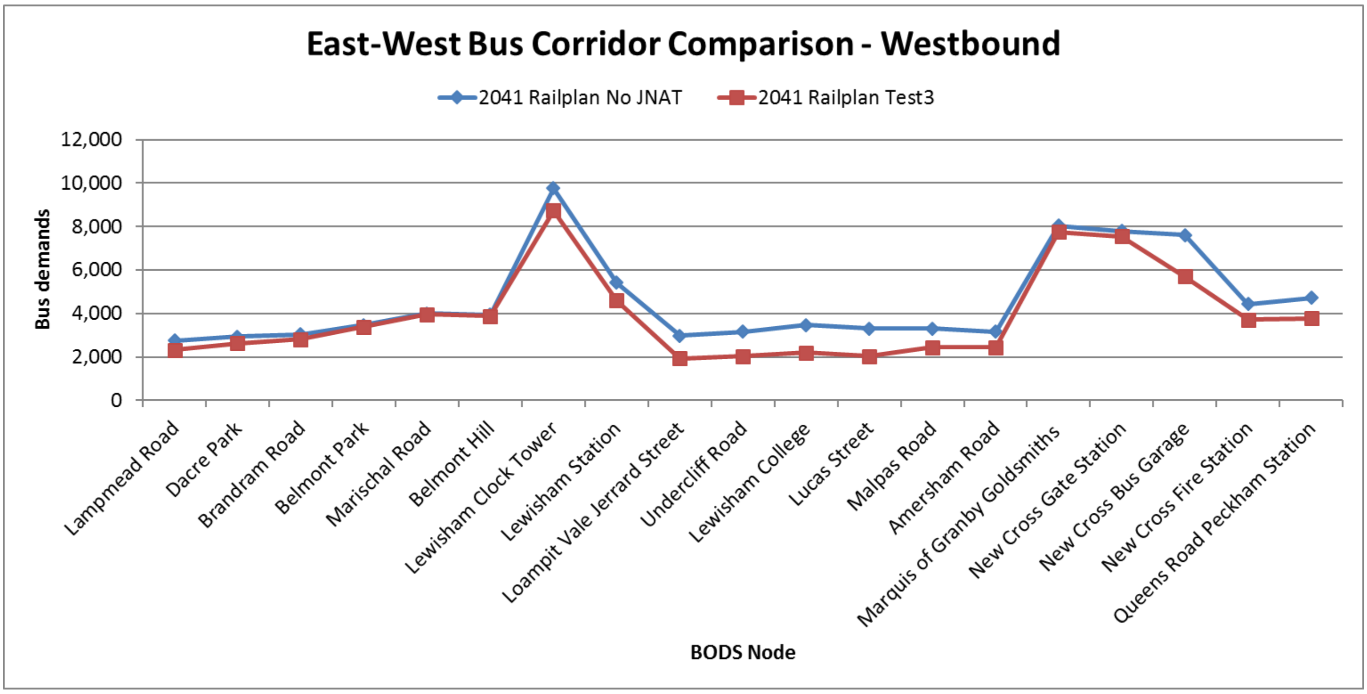


Figure 36: East-West Westbound Bus Corridor Demand Do Minimum and Test 3

Table 9 provides more details of the changes in passengers boarding and alighting specific bus stop on both the corridors. Overall bus patronage decreases for both corridors.

Table 9: Bus Boarders and Alighters Do Minimum and Test 3

Bus stop name	Corridor	Boarders 2041 Railplan No JNAT	Boarders 2041 Railplan Test3	Boarders Growth (2041)	Boarders %Growth (2041)	Alighters 2041 Railplan No JNAT	Alighters 2041 Railplan Test3	Alighters Growth (2041)	Alighters %Growth (2041)
Bromley Road Downham Way	North-South	1127	1304	177	16%	344	365	21	6%
Old Bromley Road	North-South	77	44	-33	-43%	126	128	2	2%
Green Man Community Hub	North-South	1036	1143	107	10%	666	650	-16	-2%
Southend Lane	North-South	245	99	-146	-60%	127	59	-68	-54%
Bellingham Road	North-South	514	641	127	25%	564	372	-192	-34%
Newquay Road	North-South	1526	1644	118	8%	1045	1081	36	3%
Inchmery Road	North-South	107	74	-33	-31%	72	40	-32	-44%
Bargery Road	North-South	193	132	-61	-32%	217	162	-55	-25%
Bromley Road Lewisham Town Hall	North-South	909	926	17	2%	1026	1145	119	12%
The Catford Centre	North-South	1281	991	-290	-23%	1120	725	-395	-35%
Mount Pleasant Road Lewisham	North-South	749	772	23	3%	430	418	-12	-3%

Bus stop name	Corridor	Boarders 2041 Railplan No JNAT	Boarders 2041 Railplan Test3	Boarders Growth (2041)	Boarders %Growth (2041)	Alighters 2041 Railplan No JNAT	Alighters 2041 Railplan Test3	Alighters Growth (2041)	Alighters %Growth (2041)
Lewisham Park	North-South	772	618	-154	-20%	646	532	-114	-18%
Morley Road	North-South	476	414	-62	-13%	241	188	-53	-22%
Lewisham Centre	North-South	1751	1305	-446	-25%	1829	1307	-522	-29%
Lewisham Clock Tower	North-South	2150	1746	-404	-19%	2613	2305	-308	-12%
Lewisham Station	North-South	75	122	47	63%	262	648	386	147%
Blackheath Rise	North-South	15	15	0	0%	68	63	-5	-7%
Sparta Street	North-South	10	10	0	0%	11	10	-1	-9%
Queens Road Peckham Station	East-West	1306	1244	-62	-5%	1531	1278	-253	-17%
New Cross Fire Station	East-West	621	387	-234	-38%	292	238	-54	-18%
New Cross Bus Garage	East-West	2348	1561	-787	-34%	1862	1283	-579	-31%
New Cross Gate Station	East-West	3321	3427	106	3%	2759	4627	1868	68%

Bus stop name	Corridor	Boarders 2041 Railplan No JNAT	Boarders 2041 Railplan Test3	Boarders Growth (2041)	Boarders %Growth (2041)	Alighters 2041 Railplan No JNAT	Alighters 2041 Railplan Test3	Alighters Growth (2041)	Alighters %Growth (2041)
Marquis of Granby Goldsmiths	East-West	1823	543	-1280	-70%	389	193	-196	-50%
Amersham Road	East-West	361	301	-60	-17%	215	214	-1	0%
Malpas Road	East-West	289	451	162	56%	450	453	3	1%
Lucas Street	East-West	358	744	386	108%	309	336	27	9%
Lewisham College	East-West	322	332	10	3%	399	385	-14	-4%
Undercliff Road	East-West	695	534	-161	-23%	488	315	-173	-35%
Loampit Vale Jerrard Street	East-West	177	92	-85	-48%	251	111	-140	-56%
Lewisham Station	East-West	4195	3508	-687	-16%	3148	2995	-153	-5%
Lewisham Clock Tower	East-West	2150	1746	-404	-19%	2613	2305	-308	-12%
Belmont Hill	East-West	95	83	-12	-13%	233	220	-13	-6%
Marischal Road	East-West	67	62	-5	-7%	171	146	-25	-15%

Bus stop name	Corridor	Boarders 2041 Railplan No JNAT	Boarders 2041 Railplan Test3	Boarders Growth (2041)	Boarders %Growth (2041)	Alighters 2041 Railplan No JNAT	Alighters 2041 Railplan Test3	Alighters Growth (2041)	Alighters %Growth (2041)
Belmont Park	East-West	776	789	13	2%	822	769	-53	-6%
Brandram Road	East-West	258	399	141	55%	247	287	40	16%
Dacre Park	East-West	254	334	80	31%	249	304	55	22%
Lampmead Road	East-West	243	366	123	51%	40	35	-5	-13%
Not applicable	**Total**	**32672**	**28903**	**-3769**	**-12%**	**27875**	**26692**	**-1183**	**-4%**

Intervention Test 6 (2041): Brockley Interchange + New Bermondsey Station

Test 6 assesses the impact that Brockley Interchange and New Bermondsey Station has on passenger movements within the London Borough of Lewisham. Table 10 and Table 11 show station demand at Brockley Station in the Do Minimum and Test 6 scenarios. In the Do Minimum scenario, the Southeastern platforms (Railplan nodes 390760/390761) do not exist hence there is no demand from/to these platforms. When the Brockley Station interchange improvements are implemented, there are an additional 433 and 497 trips using the new Southeastern platforms (from and to Railplan nodes 390760/390761 respectively). These trips include movements from and to the station entrance, as well as interchange movements with existing Southern platforms. Table 12 shows the changes in passenger demand as a result of Brockley Station interchange improvements which illustrate an increase in 833 passengers using the station in the AM peak period, this equates to over a 17% increase.

Table 10: Brockley Station Passengers Do Minimum

Platforms	Brockley Coulgate St SE [1]	Brockley Southeastern (Dwn)	Brockley Southeastern (Up)	Brockley Southern (Dwn)	Brockley Southern (Up)	Total
390701	Not applicable	0	0	807	2780	**3587**
390760	0	Not applicable	Not applicable	0	0	**0**
390761	0	Not applicable	Not applicable	0	0	**0**
390762	787	0	0	Not applicable	Not applicable	**787**
390763	435	0	0	Not applicable	Not applicable	**435**
Total	**1222**	**0**	**0**	**807**	**2780**	**4809**

Table 11: Brockley Station Passengers Test 6

Platforms	Brockley Coulgate St SE [1]	Brockley Southeastern (Dwn)	Brockley Southeastern (Up)	Brockley Southern (Dwn)	Brockley Southern (Up)	Total
390701	Not applicable	27	387	805	2688	**3907**
390760	10	Not applicable	Not applicable	17	0	**27**
390761	68	Not applicable	Not applicable	105	233	**406**
390762	787	2	0	Not applicable	Not applicable	**786**
390763	435	42	39	Not applicable	Not applicable	**516**
Total	**1297**	**71**	**426**	**927**	**2921**	**5642**

Table 12: Brockley Station Difference in Passengers Test 6 – Do Minimum

Platforms	Brockley Coulgate St SE [1]	Brockley Southeastern (Dwn)	Brockley Southeastern (Up)	Brockley Southern (Dwn)	Brockley Southern (Up)	Total
390701	Not applicable	27	387	-2	-92	**320**
390760	10	Not applicable	Not applicable	17	0	**27**
390761	68	Not applicable	Not applicable	105	233	**406**
390762	-3	2	0	Not applicable	Not applicable	**-1**
390763	0	42	39	Not applicable	Not applicable	**81**
Total	**75**	**71**	**426**	**120**	**141**	**833**

Table 13 shows that the number of passengers travelling between the stations at Brockley. It shows that with the proposals there are increases in the number of passengers using the southeastern services which is to be expected.

Table 13: Increase in Passengers between Stations

From	To	Direction	Mode	Line(s)	Railplan 2041 No JNAT	Railplan 2041 Test6	2041 % Growth	2041 Growth
Honor Oak Park	Brockley	NB	NR	ELL	77508	77489	0%	-19
Brockley	New Cross Gate	NB	NR	ELL	79854	79893	1%	39
New Cross Gate	Brockley	SB	NR	ELL	16169	16134	-1%	-35
Brockley	Honor Oak Park	SB	NR	ELL	16189	16276	1%	87
Not applicable	**Not applicable**	**Not applicable**	**Not applicable**	**ELL Sub-total**	**189720**	**189792**	**0%**	**72**
Nunhead	Brockley	EB	NR	South-eastern	183	201	10%	18
Brockley	Lewisham	EB	NR	South-eastern	183	245	34%	62
Lewisham	Brockley	WB	NR	South-eastern	5114	5313	4%	199
Brockley	Nunhead	WB	NR	South-eastern	5114	5333	4%	219
Not applicable	**Not applicable**	**Not applicable**	**Not applicable**	**South-eastern Sub-total**	**10594**	**11092**	**5%**	**498**

Regarding peak direction in the AM peak (Northbound for ELL and Westbound for Southeastern services), the increase in ELL trips is negligible while there are approximately 200 additional trips on Southeastern services as a result of the Brockley Interchange enhancement. In terms of crowding, the number of standing passengers per sqm on these services increase from 1.11 to 1.37-1.39, as can be seen in Table 14. Although this is equivalent to an 25% increase in crowding values, the crowding category still stays well in the safe zone i.e. between 1 and 2 standing per sqm. This means that the enhancement encourages more PT trips yet not affects the overall crowding situation issue on the current network.

Table 14: Increase in Passenger Crowding between Stations in AM peak direction

From	To	Direction	Mode	Line(s)	Railplan 2041 No JNAT	Railplan 2041 Test6	2041 %Growth	2041 Growth
Honor Oak Park	Brockley	NB	NR	ELL	2.39	2.38	0%	0.00
Brockley	New Cross Gate	NB	NR	Southern	2.36	2.35	0%	0.00
Brockley	New Cross Gate	NB	NR	Overground	3.68	3.71	1%	0.04
Lewisham	Brockley	WB	NR	Southeastern	1.11	1.37	23%	0.26
Brockley	Nunhead	WB	NR	Southeastern	1.11	1.39	26%	0.28

Intervention Test 7 (2041): DLR 30tph

Test 7 assesses the impact that increasing the DLR frequency to 30tph has. Figure 37 shows the changes in passengers on the Transport for London network. As to be expected there are increases on the DLR in both directions, but particularly the northbound direction towards central London which is to be expected. As a result of the increase in DLR frequency this has no impact on passenger volumes on the Bakerloo line. There is a slight reduction in passengers on the Jubilee line and decreases on the overground particularly between Surrey Quays and New Cross. The change in passenger demand is also reflected in the crowding along NR and LUL lines. Detailed crowding maps of the changes for Rail modes can be found in Appendix A.

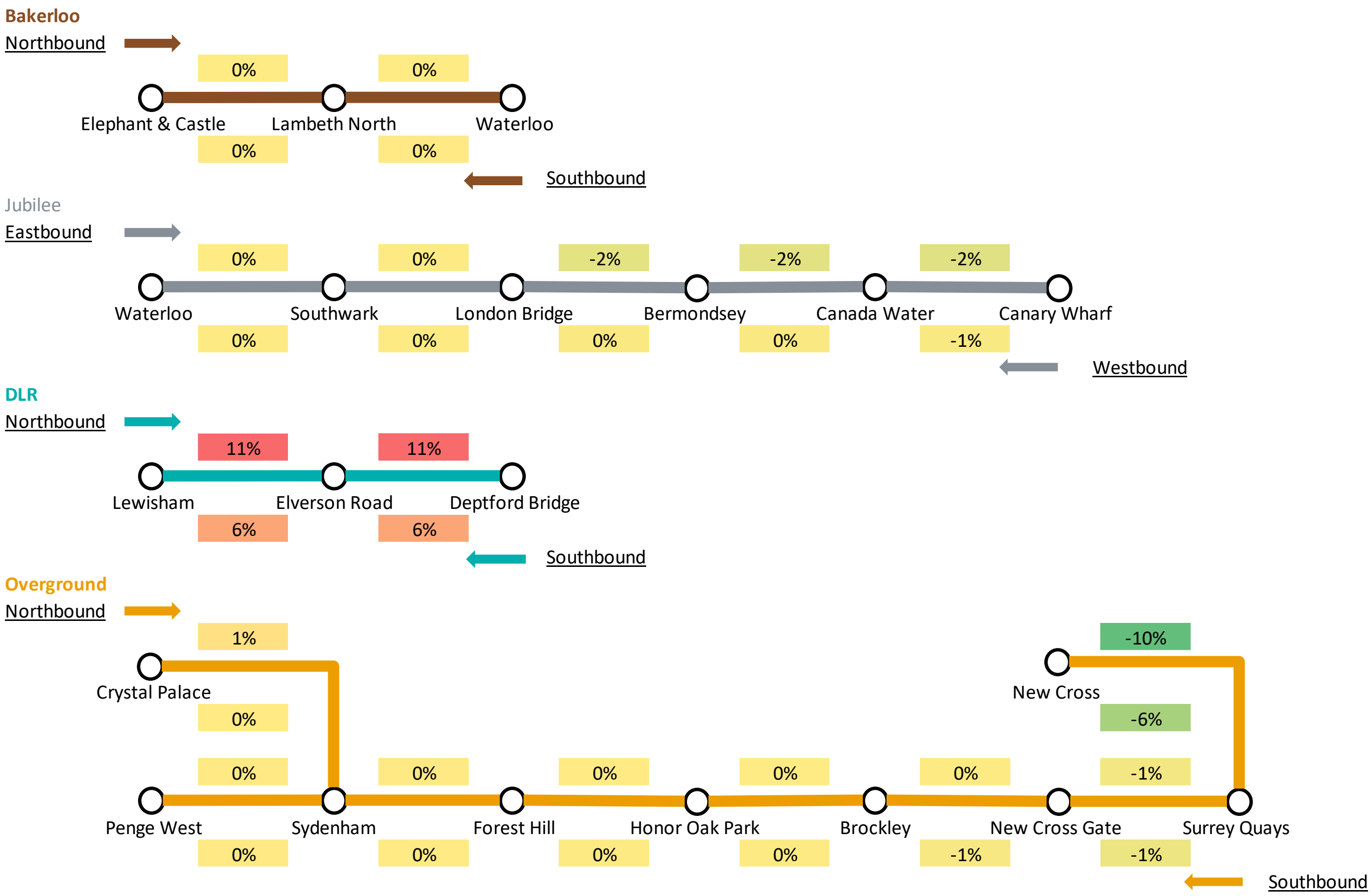


Figure 37: Changes in Passenger Flow on Transport for London Network between Test 7 and Do Minimum

As a result of the Test 7 improvements the impact this has on bus passengers on the key bus corridor has been considered. For the purpose of comparison the bus demand in both directions along these corridors has been analysed and is presented in Figure 38 to Figure 41. Along both corridors there is very little change in the volume of passengers using the bus route along both corridors.

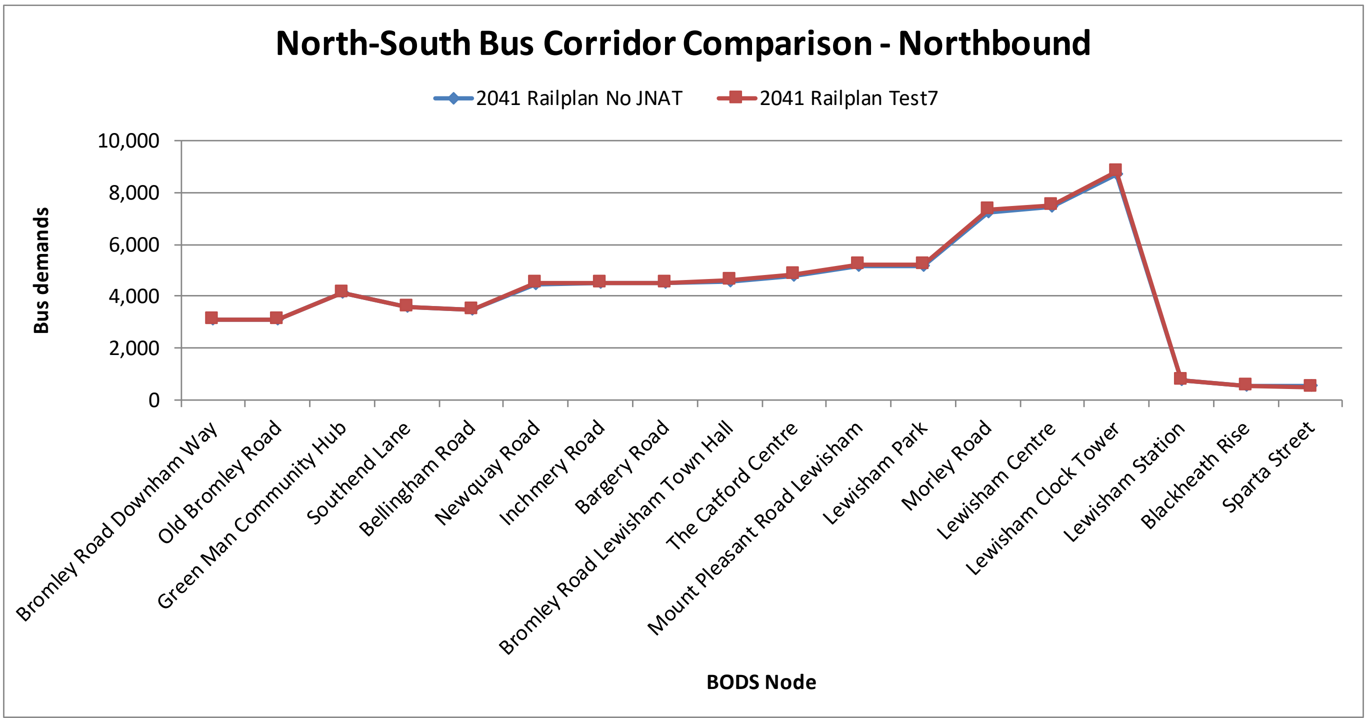


Figure 38: North-South Northbound Bus Corridor Demand Do Minimum and Test 7

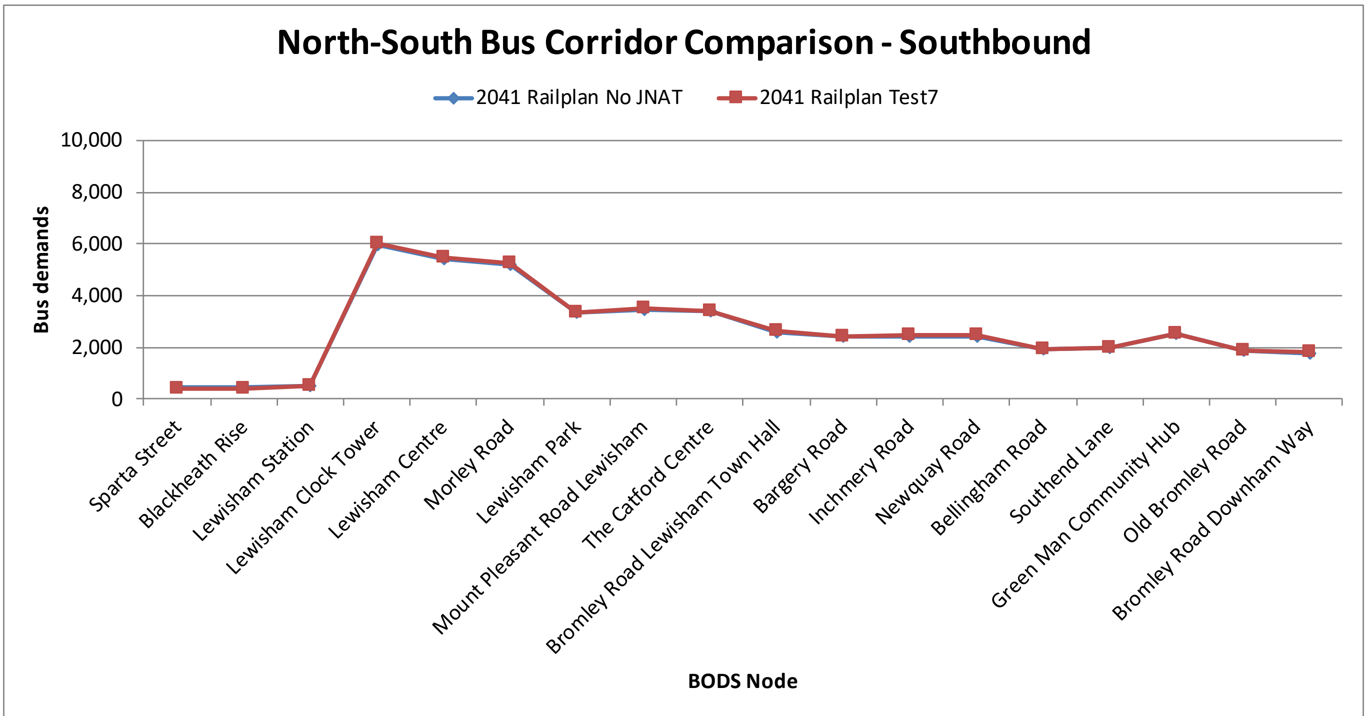


Figure 39: North-South Southbound Bus Corridor Demand Do Minimum and Test 7

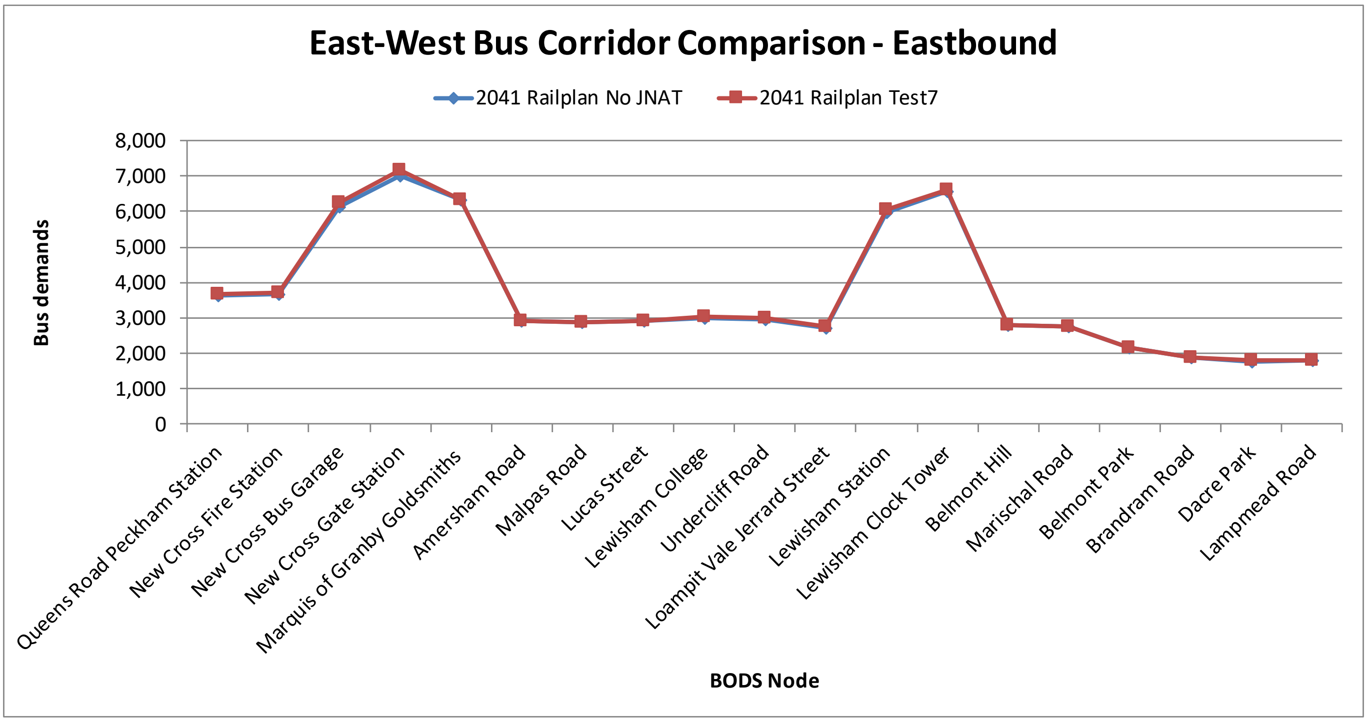


Figure 40: East-West Eastbound Bus Corridor Demand Do Minimum and Test 7

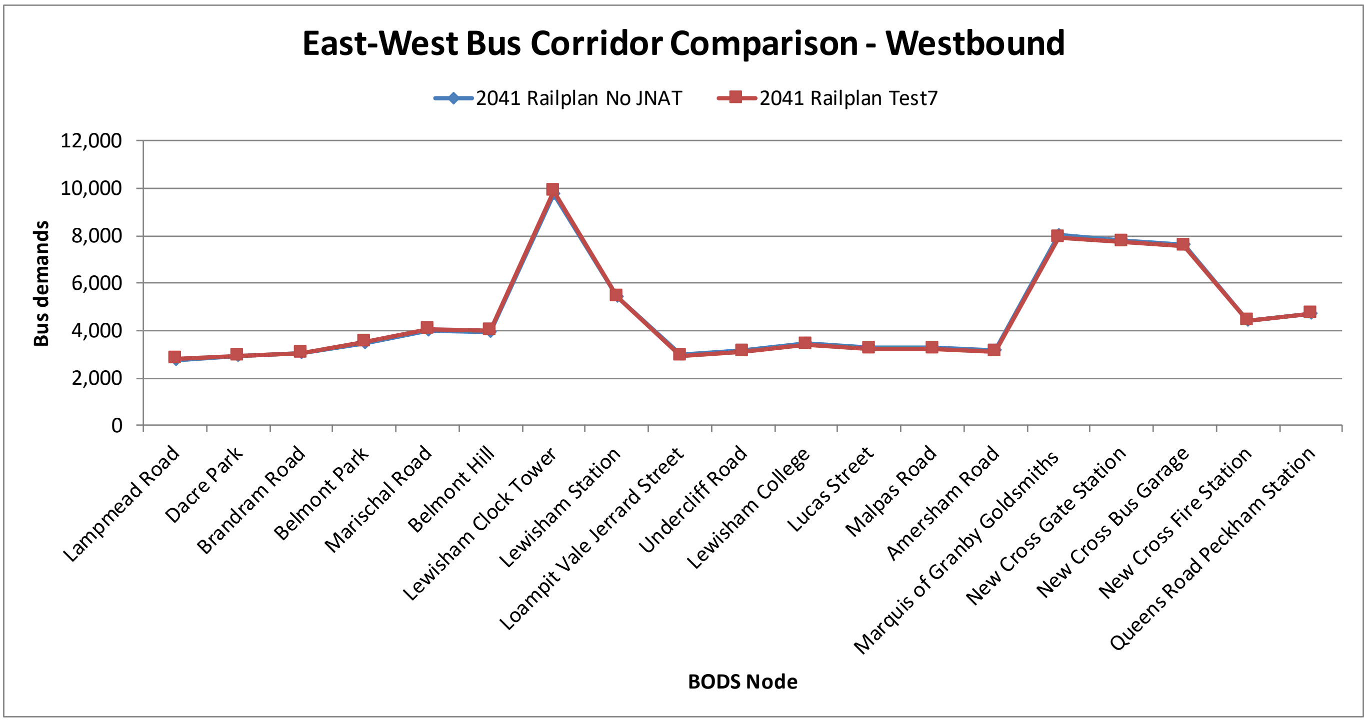


Figure 41: East-West Westbound Bus Corridor Demand Do Minimum and Test 7

Intervention Test 8 (2041): Brockley Interchange frequency x2 + BLE to Hayes 36tph

Test 8 assesses the impact of the enhancements at Brockley station (allowing interchange movements between ELL and Southeastern services, plus doubling frequency between London Victoria and Dartford Southeastern services from 2tph to 4tph) together with the implementation of BLE to Hayes have on passenger movements within the London Borough of Lewisham. Table 15 and Table 16 show station demand at Brockley Station in the Do Minimum and Test 8 scenario. In Test 8 there is higher demand using the new south-eastern platforms (additional 450 and 846 trips compared to Do Minimum). Despite the increase in passenger demand using the new platforms, as seen in

Table 17 17, there is a reduction in trips using the existing platforms, especially movements to and from the station entrance. A possible explanation for this drop-in demand is due to the BLE infrastructure, which may encourage passengers to use that instead. This reduction evens out the increase in the other movements which, in other words, the total station demand in Test 8 compared to Do Minimum is insignificant.

Table 15: Brockley Station Passengers Do Minimum

Platforms	Brockley Coulgate St SE [1]	Brockley Southeastern (Dwn)	Brockley Southeastern (Up)	Brockley Southern (Dwn)	Brockley Southern (Up)	Total
390701	Not applicable	0	0	807	2780	**3587**
390760	0	Not applicable	Not applicable	0	0	**27**
390761	0	Not applicable	Not applicable	0	0	**406**
390762	787	0	0	Not applicable	Not applicable	**787**
390763	435	0	0	Not applicable	Not applicable	**435**
Total	**1222**	**0**	**0**	**807**	**2780**	**4809**

Table 16: Brockley Station Passengers Test 8

Platforms	Brockley Coulgate St SE [1]	Brockley Southeastern (Dwn)	Brockley Southeastern (Up)	Brockley Southern (Dwn)	Brockley Southern (Up)	Total
390701	Not applicable	57	464	743	1711	**2975**
390760	15	Not applicable	Not applicable	16	0	**31**
390761	114	Not applicable	Not applicable	110	195	**419**
390762	686	1	4	Not applicable	Not applicable	**691**
390763	384	97	223	Not applicable	Not applicable	**704**
Total	**1199**	**155**	**691**	**869**	**1906**	**4820**

Table 17: Brockley Station Difference in Passengers Test 8 – Do Minimum

Platforms	Brockley Coulgate St SE [1]	Brockley Southeastern (Dwn)	Brockley Southeastern (Up)	Brockley Southern (Dwn)	Brockley Southern (Up)	Total
390701	Not applicable	57	464	-64	-1069	**-612**
390760	15	Not applicable	Not applicable	16	0	**31**
390761	114	Not applicable	Not applicable	110	195	**419**
390762	-101	1	4	Not applicable	Not applicable	**-96**
390763	-51	97	223	Not applicable	Not applicable	**269**
Total	**-23**	**155**	**691**	**62**	**-874**	**11**

Table 18 shows that the number of passengers travelling between the stations at Brockley. In general there is a reduction in the local demand flow in Test 8 compared to Do Minimum, this is due to the extension of BLE to Hayes that may encourage passengers to use this infrastructure. ELL demand observes a total reduction of just over 5,000 trips (or 3%) while Southeastern demand experiences slight increase in EB direction while a drop of approximately 1,000 trips in the opposite direction (the peak direction).

Table 18: Increase in Passengers between Stations

From	To	Direction	Mode	Line(s)	Railplan 2041 No JNAT	Railplan 2041 Test8	2041 %Growth	2041 Growth
Honor Oak Park	Brockley	NB	NR	ELL	77508	76316	-2%	-1192
Brockley	New Cross Gate	NB	NR	ELL	79854	77518	-4%	-2336
New Cross Gate	Brockley	SB	NR	ELL	16169	15185	-17%	-984
Brockley	Honor Oak Park	SB	NR	ELL	16189	15362	-5%	-827
Not applicable	**Not applicable**	**Not applicable**	**Not applicable**	**ELL Sub-total**	**189720**	**184381**	**-3%**	**-5339**
Nunhead	Brockley	EB	NR	South-eastern	183	438	139%	255
Brockley	Lewisham	EB	NR	South-eastern	183	563	208%	380
Lewisham	Brockley	WB	NR	South-eastern	5114	3952	-23%	-1162
Brockley	Nunhead	WB	NR	South-eastern	5114	4224	-17%	-890
Not applicable	**Not applicable**	**Not applicable**	**Not applicable**	**South-eastern Sub-total**	**10594**	**9177**	**-13%**	**-1417**

Regarding peak direction in the AM peak (Northbound for ELL and Westbound for Southeastern services), the drop in ELL trips results in slight improvement in crowding, despite still staying in the same crowding category (e.g. red category in Overground NB link between Brockley and New Cross Gate). On the other hand, BLE has diverted significant demand on the Southeastern line, which results in the section between Lewisham and Nunhead being no longer crowded (negative value for standing per sqm is equivalent to no people standing inside the train) – as can be seen in Table 19. This means that the Brockley Interchange enhancements (with more frequent trains) may introduce more trips in the local area, yet the BLE scheme would alleviate the current crowding issues in the area.

Table 19: Increase in Passenger Crowding between Stations in AM peak direction

From	To	Direction	Mode	Line(s)	Railplan 2041 No JNAT	Railplan 2041 Test8	2041 %Growth	2041 Growth
Honor Oak Park	Brockley	NB	NR	ELL	2.39	2.31	-3%	-0.08
Brockley	New Cross Gate	NB	NR	Southern	2.36	2.18	-7%	-0.17
Brockley	New Cross Gate	NB	NR	Overground	3.68	3.61	0%	-0.01
Lewisham	Brockley	WB	NR	Southeastern	1.11	-2.66	-340%	-3.77
Brockley	Nunhead	WB	NR	Southeastern	1.11	-2.46	-322%	-3.57

As a result of the Bakerloo line being extended to Hayes, Figure 42 shows the changes in passengers on the Transport for London network. Absolute changes in passengers on these links can be seen in Table 20. Compared to Test 3, the pattern observed in Test 8 is very similar. The only difference is that due to the Brockley Interchange enhancement, there are slight increases in trips on the DLR and Overground. Demand along Bakerloo and Jubilees do not get affected by this scheme. Detailed crowding maps of the changes for Rail modes can be found in Appendix A.

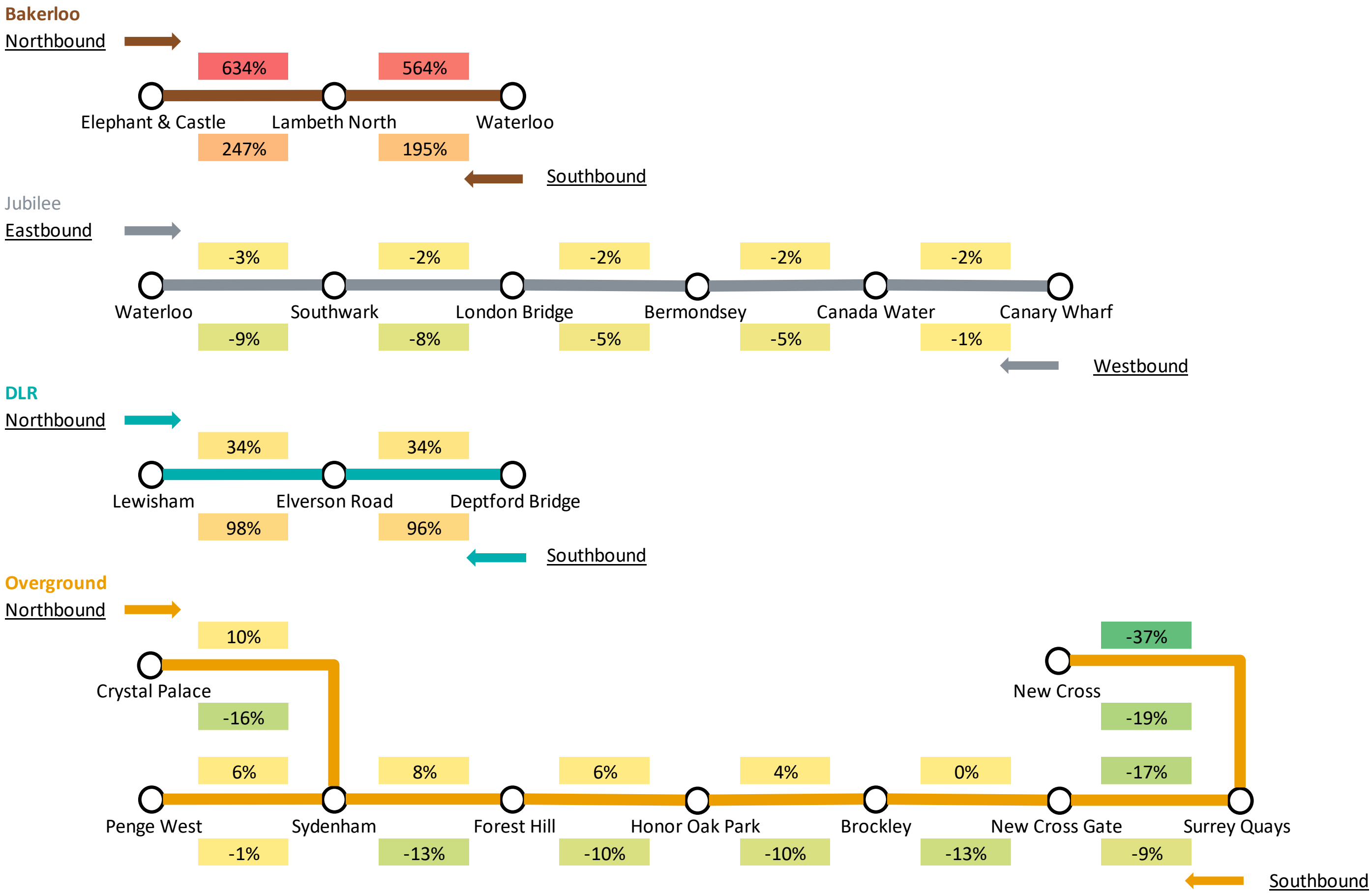


Figure 42: Changes in Passenger Flow on Transport for London Network between Test 8 and Do Minimum

Table 20: Passenger Flow along LUL, DLR and NR network Do Minimum and Test 8

From	To	Direction	Mode	Line(s)	Railplan 2041 No JNAT	Railplan 2041 Test8	2041 % Growth	2041 Growth
Elephant & Castle	Lambeth North	NB	LUL	Bakerloo	6107	44847	634%	38740
Lambeth North	Waterloo	NB	LUL	Bakerloo	6610	43880	564%	37270
Waterloo	Lambeth North	SB	LUL	Bakerloo	6660	19665	195%	13005
Lambeth North	Elephant & Castle	SB	LUL	Bakerloo	5411	18757	247%	13346
Waterloo	Southwark	EB	LUL	Jubilee	63731	62102	-3%	-1629
Southwark	London Bridge	EB	LUL	Jubilee	59843	58413	-2%	-1430
London Bridge	Bermondsey	EB	LUL	Jubilee	61285	59903	-2%	-1382
Bermondsey	Canada Water	EB	LUL	Jubilee	60190	58882	-2%	-1308
Canada Water	Canary Wharf	EB	LUL	Jubilee	64181	63150	-2%	-1031
Canary Wharf	Canada Water	WB	LUL	Jubilee	49930	49431	-1%	-499
Canada Water	Bermondsey	WB	LUL	Jubilee	56198	53323	-5%	-2875
Bermondsey	London Bridge	WB	LUL	Jubilee	59098	56145	-5%	-2953
London Bridge	Southwark	WB	LUL	Jubilee	63468	58165	-8%	-5303
Southwark	Waterloo	WB	LUL	Jubilee	59451	54394	-9%	-5057
Not applicable	**Not applicable**	**Not applicable**	**LUL**	**LUL Sub-total**	**622163**	**701057**	**13%**	**78894**
Lewisham	Elverson Road	NB	DLR	DLR	9475	12733	34%	3258
Elverson Road	Deptford Bridge	NB	DLR	DLR	9539	12744	34%	3205
Deptford Bridge	Elverson Road	SB	DLR	DLR	3300	6457	96%	3157
Elverson Road	Lewisham	SB	DLR	DLR	3197	6338	98%	3141
Not applicable	**Not applicable**	**Not applicable**	**DLR**	**DLR Sub-total**	**25511**	**38272**	**50%**	**12761**
Crystal Palace	Sydenham	NB	NR	Overground	1251	1375	10%	124

From	To	Direction	Mode	Line(s)	Railplan 2041 No JNAT	Railplan 2041 Test8	2041 % Growth	2041 Growth
Penge West	Sydenham	NB	NR	Overground	2751	2914	6%	163
Sydenham	Forest Hill	NB	NR	Overground	5824	6282	8%	458
Forest Hill	Honor Oak Park	NB	NR	Overground	8734	9288	6%	554
Honor Oak Park	Brockley	NB	NR	Overground	9317	9714	4%	397
Brockley	New Cross Gate	NB	NR	Overground	10817	10791	0%	-26
New Cross Gate	Surrey Quays	NB	NR	Overground	11829	9811	-17%	-2018
New Cross	Surrey Quays	NB	NR	Overground	287	182	-37%	-105
Surrey Quays	New Cross	SB	NR	Overground	236	191	-19%	-45
Surrey Quays	New Cross Gate	SB	NR	Overground	4403	4010	-9%	-393
New Cross Gate	Brockley	SB	NR	Overground	3783	3309	-13%	-474
Brockley	Honor Oak Park	SB	NR	Overground	3612	3245	-10%	-367
Honor Oak Park	Forest Hill	SB	NR	Overground	3549	3183	-10%	-366
Forest Hill	Sydenham	SB	NR	Overground	2881	2498	-13%	-383
Sydenham	Crystal Palace	SB	NR	Overground	1186	1001	-16%	-185
Sydenham	Penge West	SB	NR	Overground	416	410	-1%	-6
Not applicable	**Not applicable**	**Not applicable**	**NR**	**NR Sub-total**	**70876**	**68204**	**-4%**	**-2672**
Not applicable	**Not applicable**	**Not applicable**	**TOTAL**	**TOTAL**	**718550**	**807533**	**12%**	**88983**

As a result of the Test 8 improvements the impact this has on bus passengers on the key bus corridor has been considered. For the purpose of comparison, the bus demand in both directions along these corridors has been analysed and is presented in Figure 43 to Figure 46. Compared to Test 3 which only tests the impact of BLE to Hayes, Test 8 shows a further drop in bus demand compared to the pattern observed in Test 3 (despite minimal differences). This is because people are more attracted to Rail Modes as there are more frequent Southeastern services which also stop at Brockley allowing interchange movements to ELL services.

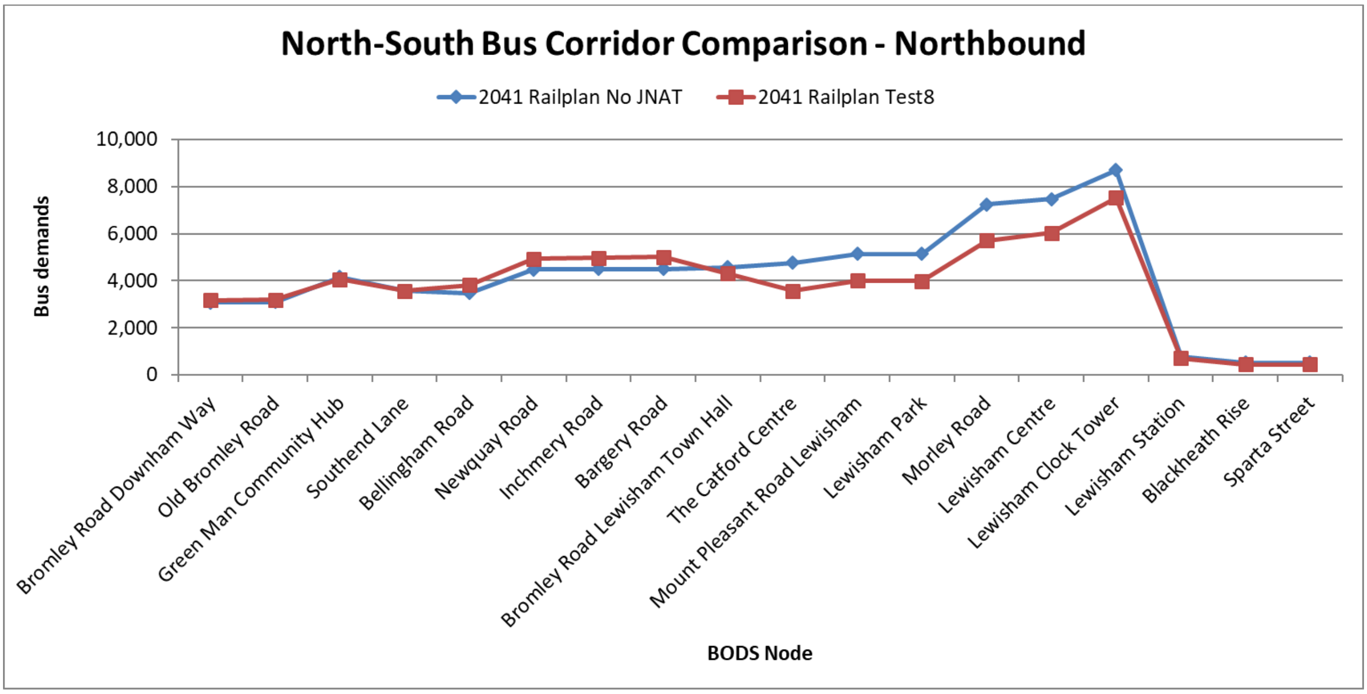


Figure 43: North-South Northbound Bus Corridor Demand Do Minimum and Test 8

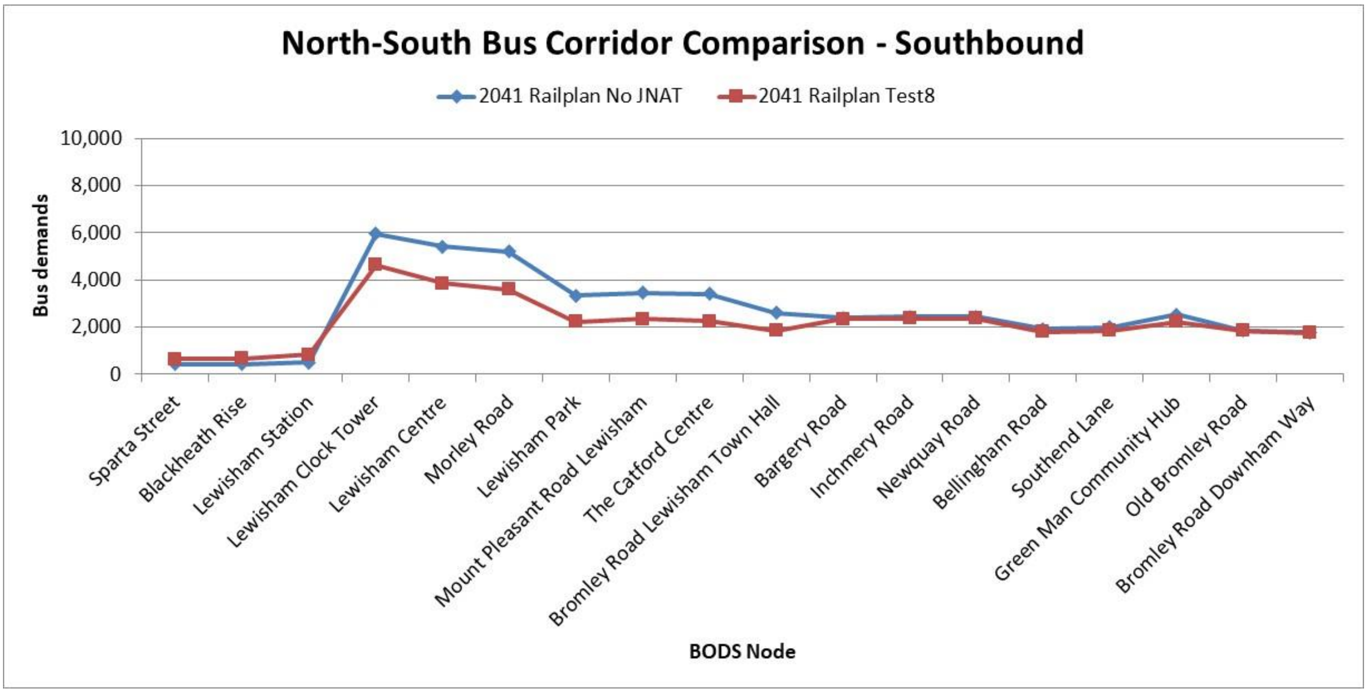


Figure 44: North-South Southbound Bus Corridor Demand Do Minimum and Test 8

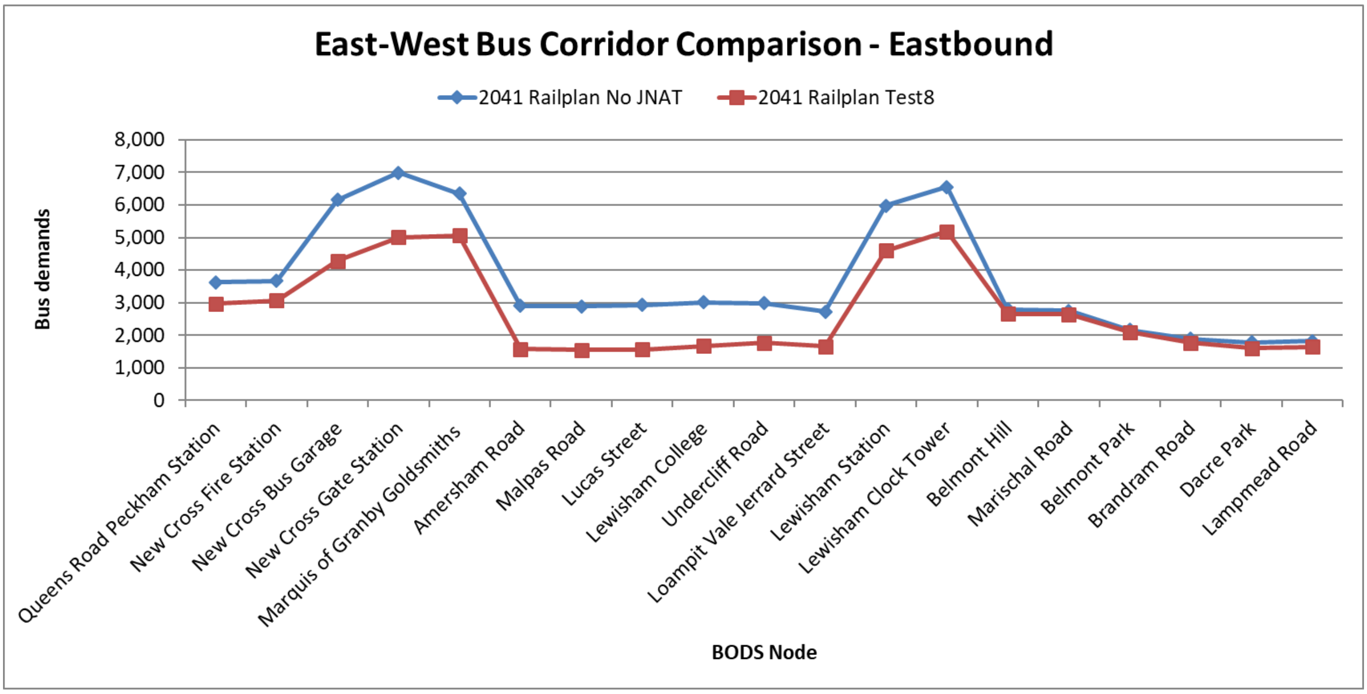


Figure 45: East-West Eastbound Bus Corridor Demand Do Minimum and Test 8

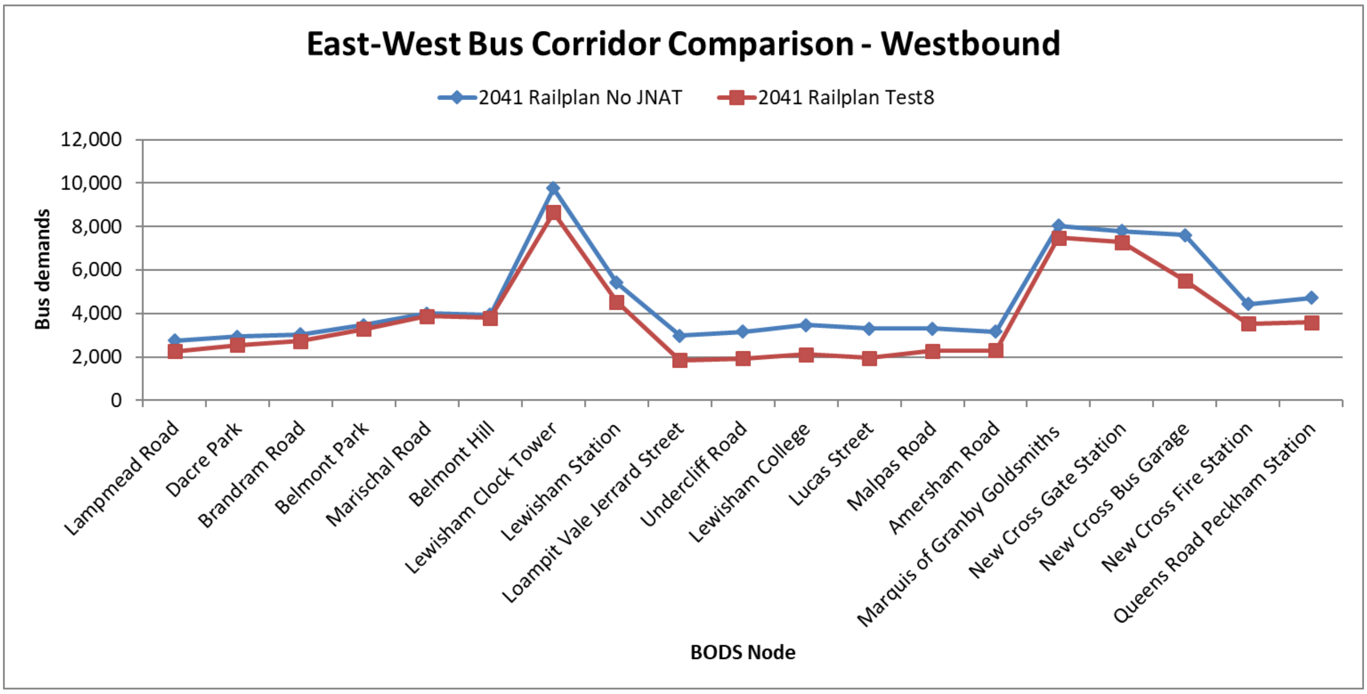


Figure 46: East-West Westbound Bus Corridor Demand Do Minimum and Test 8

Table 21 provides more details of the changes in passengers boarding and alighting specific bus stop on both the corridors. Overall bus patronage decreases for both corridors.

Table 21: Bus Boarders and Alighters Do Minimum and Test 8

Bus stop name	Corridor	Boarders 2041 Railplan No JNAT	Boarders 2041 Railplan Test8	Boarders Growth (2041)	Boarders %Growth (2041)	Alighters 2041 Railplan No JNAT	Alighters 2041 Railplan Test8	Alighters Growth (2041)	Alighters %Growth (2041)
Bromley Road Downham Way	North-South	1127	1304	177	16%	344	365	21	6%
Old Bromley Road	North-South	77	42	-35	-45%	126	126	0	0%
Green Man Community Hub	North-South	1036	1145	109	11%	666	652	-14	-2%
Southend Lane	North-South	245	99	-146	-60%	127	58	-69	-54%
Bellingham Road	North-South	514	640	126	25%	564	370	-194	-34%
Newquay Road	North-South	1526	1638	112	7%	1045	1079	34	3%
Inchmery Road	North-South	107	69	-38	-36%	72	33	-39	-54%
Bargery Road	North-South	193	143	-50	-26%	217	174	-43	-20%
Bromley Road Lewisham Town Hall	North-South	909	923	14	2%	1026	1137	111	11%
The Catford Centre	North-South	1281	992	-289	-23%	1120	725	-395	-35%

Bus stop name	Corridor	Boarders 2041 Railplan No JNAT	Boarders 2041 Railplan Test8	Boarders Growth (2041)	Boarders %Growth (2041)	Alighters 2041 Railplan No JNAT	Alighters 2041 Railplan Test8	Alighters Growth (2041)	Alighters %Growth (2041)
Mount Pleasant Road Lewisham	North-South	749	771	22	3%	430	418	-12	-3%
Lewisham Park	North-South	772	620	-152	-20%	646	533	-113	-17%
Morley Road	North-South	476	407	-69	-14%	241	182	-59	-24%
Lewisham Centre	North-South	1751	1277	-474	-27%	1829	1284	-545	-30%
Lewisham Clock Tower	North-South	2150	1683	-467	-22%	2613	2249	-364	-14%
Lewisham Station	North-South	75	120	45	60%	262	636	374	143%
Blackheath Rise	North-South	15	15	0	0%	68	63	-5	-7%
Sparta Street	North-South	10	10	0	0%	11	10	-1	-9%
Queens Road Peckham Station	East-West	1306	1224	-82	-6%	1531	1281	-250	-16%
New Cross Fire Station	East-West	621	402	-219	-35%	292	237	-55	-19%
New Cross Bus Garage	East-West	2348	1531	-817	-35%	1862	1276	-586	-31%
New Cross Gate Station	East-West	3321	3322	1	0%	2759	4428	1669	60%
Marquis of Granby Goldsmiths	East-West	1823	572	-1251	-69%	389	184	-205	-53%

Bus stop name	**Corridor**	**Boarders 2041 Railplan No JNAT**	**Boarders 2041 Railplan Test8**	**Boarders Growth (2041)**	**Boarders %Growth (2041)**	**Alighters 2041 Railplan No JNAT**	**Alighters 2041 Railplan Test8**	**Alighters Growth (2041)**	**Alighters %Growth (2041)**
Amersham Road	East-West	361	286	-75	-21%	215	191	-24	-11%
Malpas Road	East-West	289	441	152	53%	450	434	-16	-4%
Lucas Street	East-West	358	669	311	87%	309	333	24	8%
Lewisham College	East-West	322	324	2	1%	399	375	24	-6%
Undercliff Road	East-West	695	527	-168	-24%	488	314	-174	-36%
Loampit Vale Jerrard Street	East-West	177	87	-90	-51%	251	107	-144	-57%
Lewisham Station	East-West	4195	3364	-831	-20%	3148	2938	-210	-7%
Lewisham Clock Tower	East-West	2150	1683	-467	-22%	2613	2249	-364	-14%
Belmont Hill	East-West	95	79	-16	-17%	233	215	-18	-8%
Marischal Road	East-West	67	64	-3	-4%	171	148	-23	-13%
Belmont Park	East-West	776	803	27	3%	822	768	-54	-7%
Brandram Road	East-West	258	389	131	51%	247	285	38	15%
Dacre Park	East-West	254	305	51	20%	249	292	43	17%
Lampmead Road	East-West	243	357	114	47%	40	35	-5	-13%
Not applicable	**Total**	**32672**	**28327**	**-4345**	**-13%**	**27875**	**26184**	**-1691**	**-6%**

Intervention Test 9 (2041): Lower Sydenham enhanced bus services + BLE to Hayes 36tph

As a result of the Bakerloo line being extended to Hayes, Figure 47 shows the changes in passengers on the Transport for London network. Absolute changes in passengers on these links can be seen in Table 22. Compared to Test 3, the pattern observed in Test 9 is very similar. The difference due to the enhanced bus services at Lower Sydenham is that there are slight decreases in trips along and Overground. Demand along Bakerloo, Jubilees and DLR do not get affected by this scheme. Detailed crowding maps of the changes for Rail modes can be found in Appendix A.

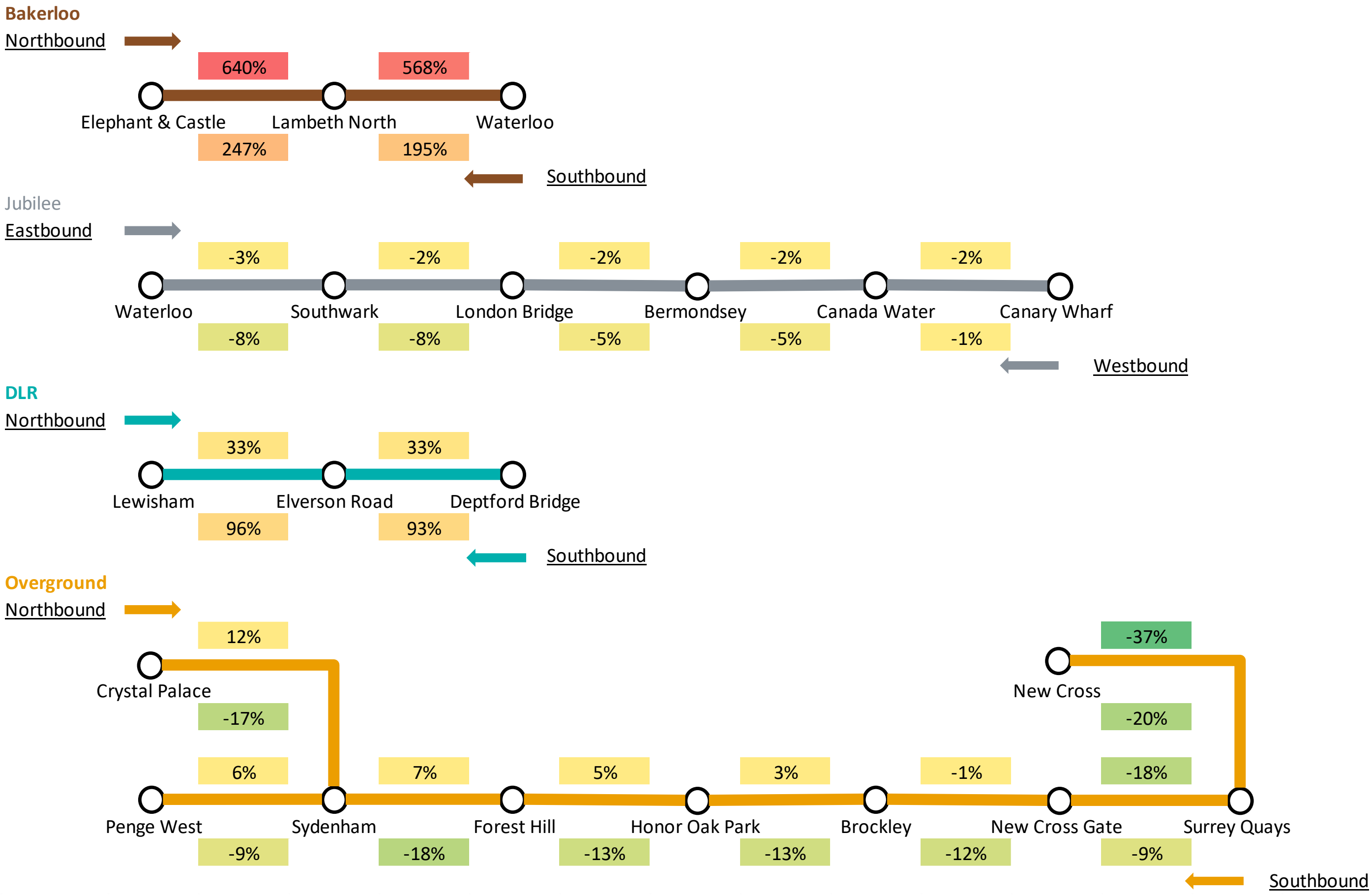


Figure 47: Changes in Passenger Flow on Transport for London Network between Test 9 and Do Minimum

Table 22: Passenger Flow along LUL, DLR and NR network Do Minimum and Test 9

From	To	Direction	Mode	Line(s)	Railplan 2041 No JNAT	Railplan 2041 Test9	2041 % Growth	2041 Growth
Elephant & Castle	Lambeth North	NB	LUL	Bakerloo	6107	45166	640%	39059
Lambeth North	Waterloo	NB	LUL	Bakerloo	6610	44166	568%	37556
Waterloo	Lambeth North	SB	LUL	Bakerloo	6660	19661	195%	13001
Lambeth North	Elephant & Castle	SB	LUL	Bakerloo	5411	18753	247%	13342
Waterloo	Southwark	EB	LUL	Jubilee	63731	62129	-3%	-1602
Southwark	London Bridge	EB	LUL	Jubilee	59843	58439	-2%	-1404
London Bridge	Bermondsey	EB	LUL	Jubilee	61285	59903	-2%	-1382
Bermondsey	Canada Water	EB	LUL	Jubilee	60190	58880	-2%	-1310
Canada Water	Canary Wharf	EB	LUL	Jubilee	64181	63161	-2%	-1020
Canary Wharf	Canada Water	WB	LUL	Jubilee	49930	49523	-1%	-407
Canada Water	Bermondsey	WB	LUL	Jubilee	56198	53468	-5%	-2730
Bermondsey	London Bridge	WB	LUL	Jubilee	59098	56286	-5%	-2812
London Bridge	Southwark	WB	LUL	Jubilee	63468	58327	-8%	-5141
Southwark	Waterloo	WB	LUL	Jubilee	59451	54552	-8%	-4899
Not applicable	**Not applicable**	**Not applicable**	**LUL**	**LUL Sub-total**	**622163**	**702414**	**13%**	**80251**
Lewisham	Elverson Road		DLR	DLR	9475	12641	33%	3166
Elverson Road	Deptford Bridge	NB	DLR	DLR	9539	12651	33%	3112
Deptford Bridge	Elverson Road	SB	DLR	DLR	3300	6382	93%	3082
Elverson Road	Lewisham	SB	DLR	DLR	3197	6264	96%	3067
Not applicable	**Not applicable**	**Not applicable**	**DLR**	**DLR Sub-total**	**25511**	**37938**	**49%**	**12427**
Crystal Palace	Sydenham	NB	NR	Overground	1251	1399	12%	148

From	To	Direction	Mode	Line(s)	Railplan 2041 No JNAT	Railplan 2041 Test9	2041 % Growth	2041 Growth
Penge West	Sydenham	NB	NR	Overground	2751	2909	6%	158
Sydenham	Forest Hill	NB	NR	Overground	5824	6250	7%	426
Forest Hill	Honor Oak Park	NB	NR	Overground	8734	9183	5%	449
Honor Oak Park	Brockley	NB	NR	Overground	9317	9607	3%	290
Brockley	New Cross Gate	NB	NR	Overground	10817	10684	-1%	-133
New Cross Gate	Surrey Quays	NB	NR	Overground	11829	9753	-18%	-2076
New Cross	Surrey Quays	NB	NR	Overground	287	181	-37%	-106
Surrey Quays	New Cross	SB	NR	Overground	236	188	-20%	-48
Surrey Quays	New Cross Gate	SB	NR	Overground	4403	3985	-9%	-418
New Cross Gate	Brockley	SB	NR	Overground	3783	3315	-12%	-468
Brockley	Honor Oak Park	SB	NR	Overground	3612	3157	-13%	-455
Honor Oak Park	Forest Hill	SB	NR	Overground	3549	3090	-13%	-459
Forest Hill	Sydenham	SB	NR	Overground	2881	2362	-18%	-519
Sydenham	Crystal Palace	SB	NR	Overground	1186	985	-17%	-201
Sydenham	Penge West	SB	NR	Overground	416	380	-9%	-36
Not applicable	**Not applicable**	**Not applicable**	**NR**	**NR Sub-total**	**70876**	**67428**	**-5%**	**-3448**
Not applicable	**Not applicable**	**Not applicable**	**TOTAL**	**TOTAL**	**718550**	**807780**	**12%**	**89230**

In order to assess impacts of Lower Sydenham bus enhancement on the PT network, the existing bus corridors defined earlier may not be relevant since they do not cross the area of interest. For this reason, two local bus corridors are defined in the vicinity of Lower Sydenham stations, the extents of which can be seen in Figure 48. The North-South local bus corridor spans along Bell Green, Perry Hill, Catford Hill, Catford Road and ends at Catford Bridge. The East-West local bus corridor starts from Sydenham station and goes along Sydenham Road, Southend Lane and ends at Whitefoot Lane, at the junction with Bromley Road.

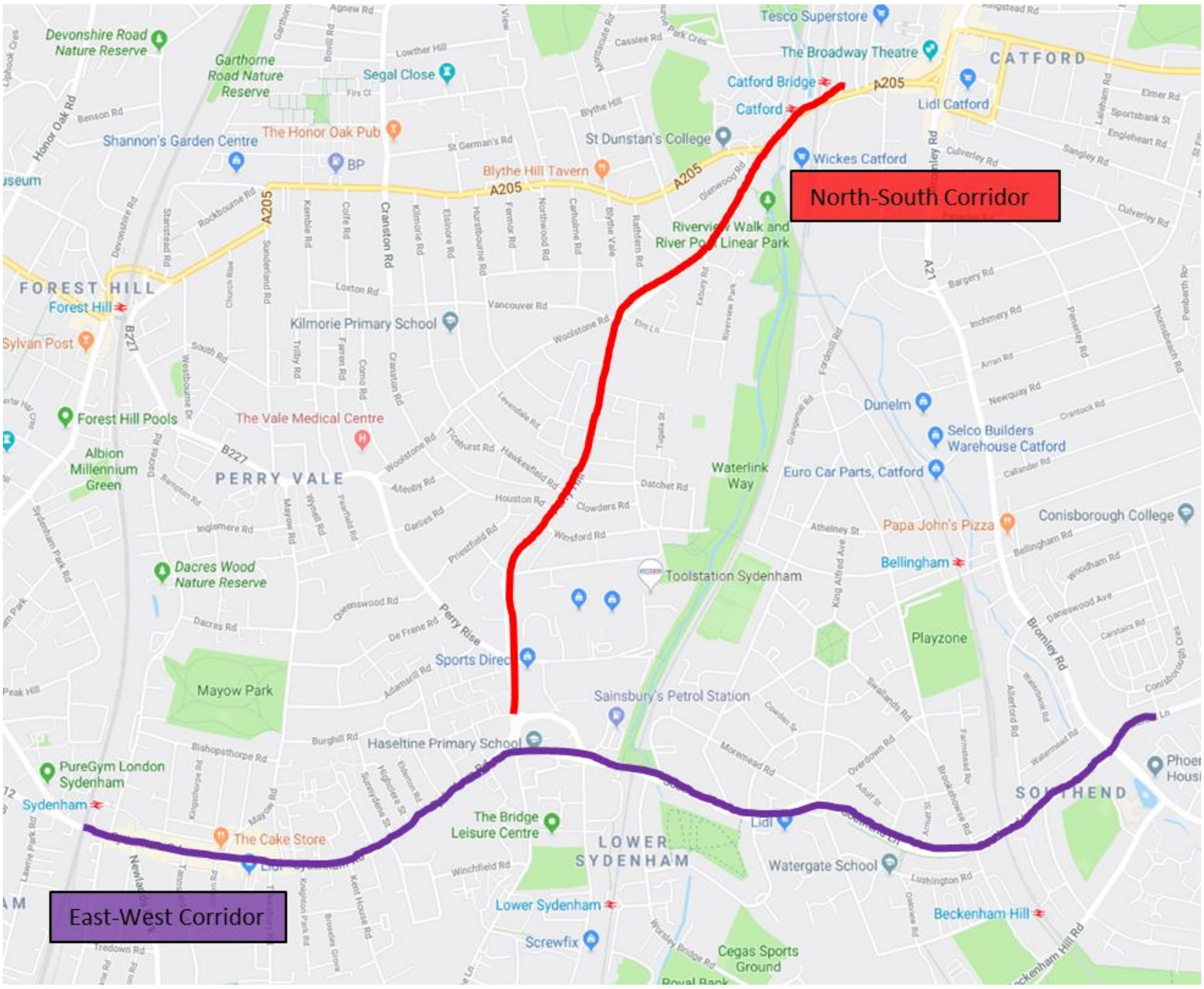


Figure 48: Lower Sydenham bus corridors

The impacts of Intervention Test 9 are best assessed when compared to an Intervention Test that includes BLE to Hayes scheme but without the Lower Sydenham enhanced bus frequency. In other words, Intervention Test 3 (BLE to Hayes 36tph) is adapted instead of the Reference Case for this particular comparison.

Impacts of enhanced bus services will be considered in terms of demand flow along bus corridors as well as boarding and alighting demand at bus stops. Bus demand in both directions along these corridors has been analysed and is presented in Figure 49 to Figure 52. As expected there is an increase in bus patronage along the defined bus corridors due to enhanced frequencies. The increase along North-South corridor is on average 400 trips, which is higher than the demand change along the East-West corridor (vary between 0 and 400 trips).

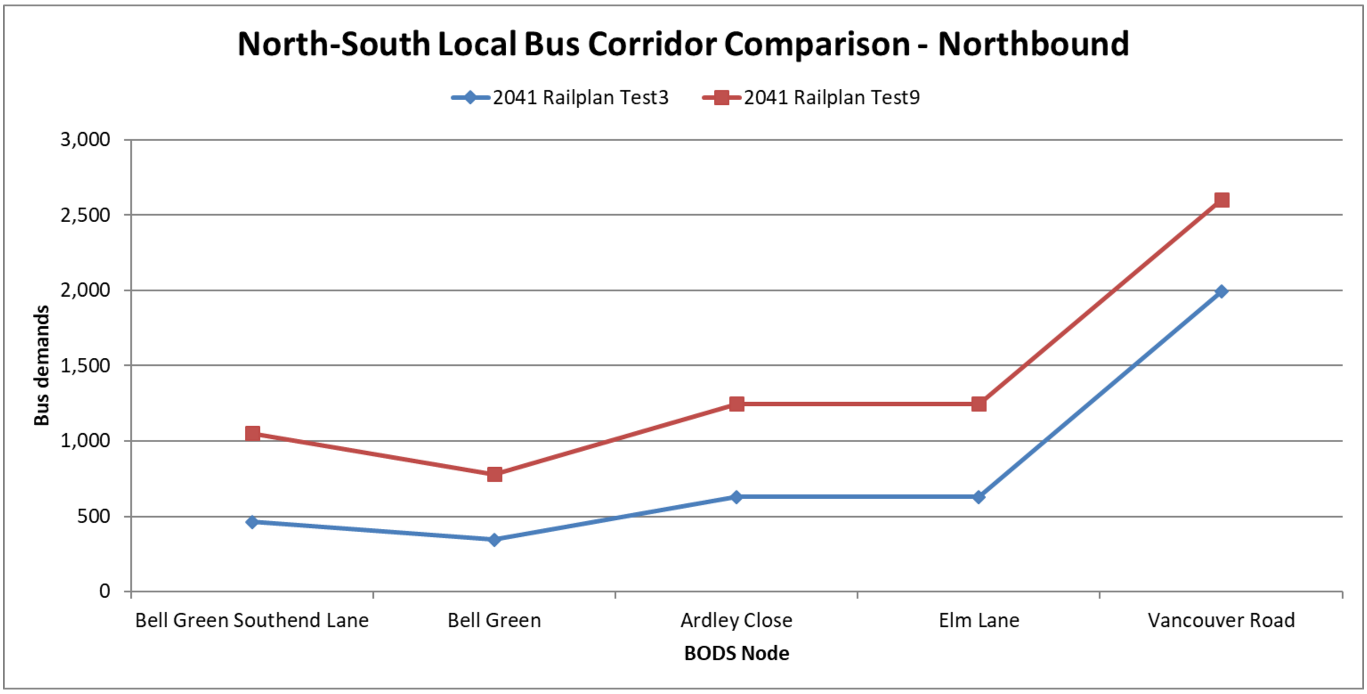


Figure 49: North-South Northbound Bus Corridor Demand Test 3 and Test 9

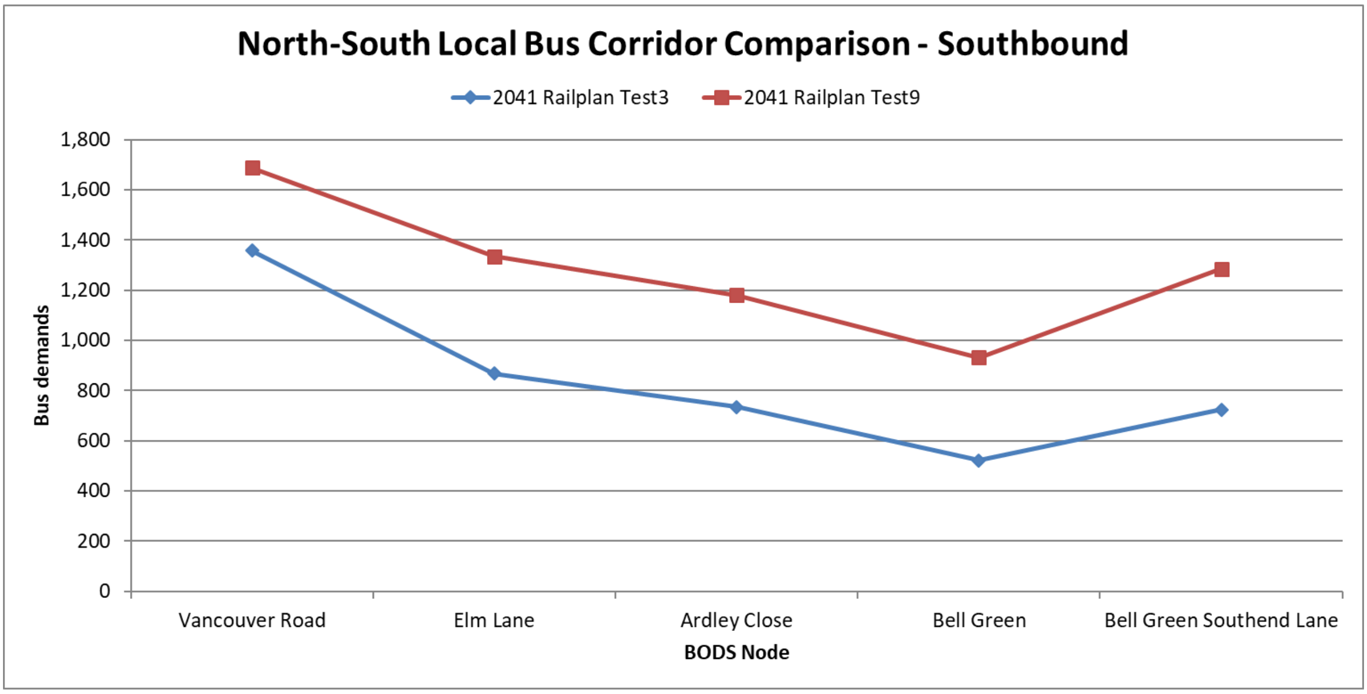


Figure 50: North-South Southbound Bus Corridor Demand Test 3 and Test 9

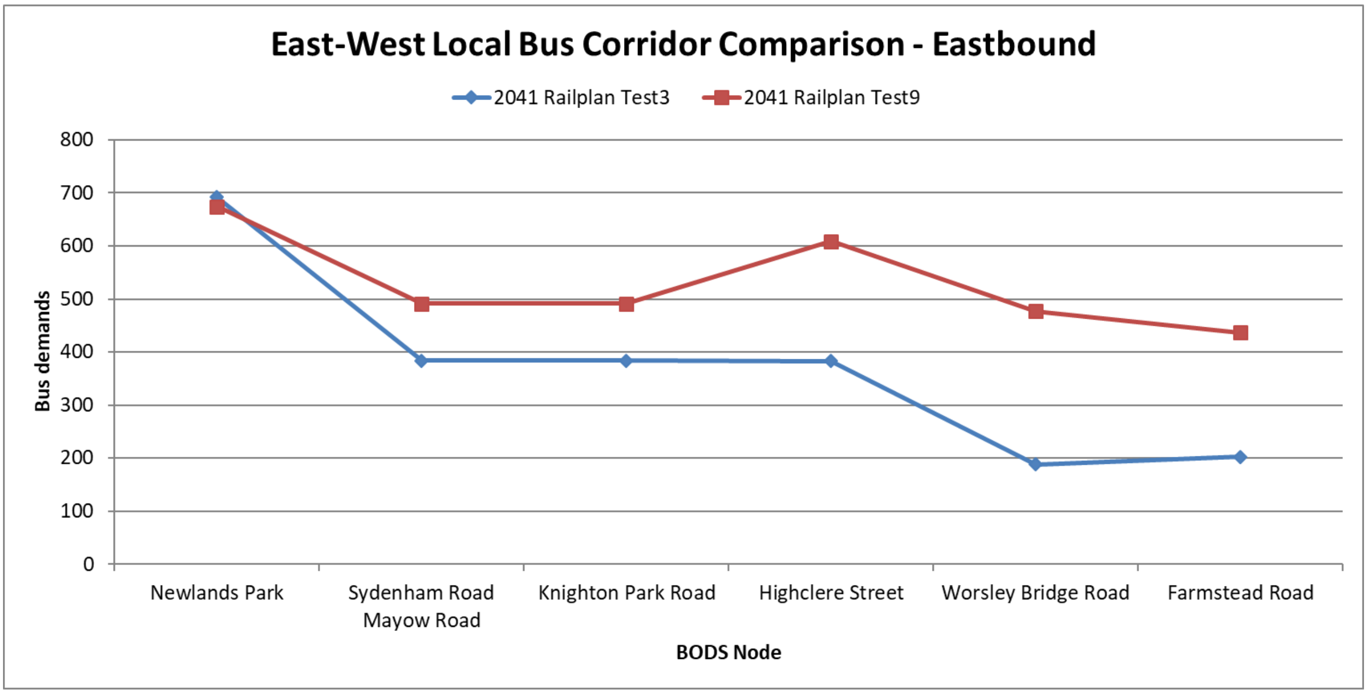


Figure 51: East-West Eastbound Bus Corridor Demand Test 3 and Test 9

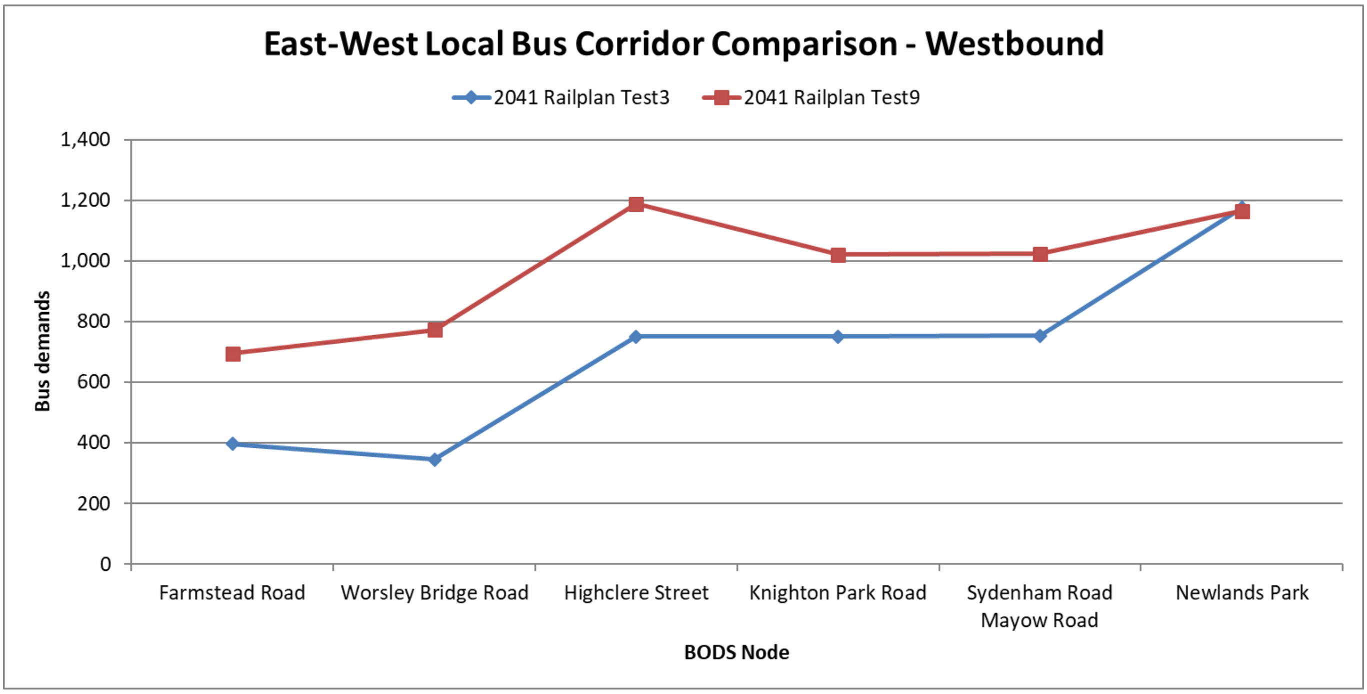


Figure 52: East-West Westbound Bus Corridor Demand Test 3 and Test 9

Table 23 provides more details of the changes in passengers boarding and alighting specific bus stop on both the corridors. Overall there is an increase in total boarding and alighting demand along the both corridors. The greatest boarding demand increase is observed at Bell Green Southend Lane bus stop (481 boarders) while the greatest alighting demand increase is observed at Catford and Catford Bridge Stations bus stop (714 alighters).

Table 23: Bus Boarders and Alighters Test 3 and Test 9

Bus stop name	Corridor	Boarders 2041 Railplan Test3	Boarders 2041 Railplan Test9	Boarders Growth (2041)	Boarders %Growth (2041)	Alighters 2041 Railplan Test3	Alighters 2041 Railplan Test9	Alighters Growth (2041)	Alighters %Growth (2041)
Bell Green Southend Lane	North-South	479	960	481	100%	531	910	379	71%
Bell Green	North-South	113	72	-41	-36%	0	-	0	0%
Ardley Close	North-South	285	468	183	64%	215	250	35	16%
Elm Lane	North-South	78	188	110	141%	211	343	132	63%
Vancouver Road	North-South	1134	1281	147	13%	206	213	7	3%
Catford & Catford Bridge Stations	North-South	2230	2241	11	0%	6325	7039	714	11%
Newlands Park	East-West	311	211	-100	-32%	339	301	-38	-11%
Sydenham Road Mayow Road	East-West	50	108	58	116%	142	226	84	59%
Knighton Park Road	East-West	4	3	-1	-25%	0	0	0	0%
Highclere Street	East-West	71	117	46	65%	59	102	43	73%
Worsley Bridge Road	East-West	3	11	8	267%	17	24	7	41%
Farmstead Road	East-West	85	278	193	227%	102	210	108	106%
Dunfield Road	East-West	0	1	1	0%	4	3	-1	-25%
Not applicable	**Total**	**4843**	**5939**	**1096**	**23%**	**8151**	**9621**	**1470**	**18%**

In terms of station passenger demand in the vicinity of the bus corridors, Table 24 illustrates changes in station entries and exits as a result of the bus service enhancement. There is a reduction in station usage from the walk network (i.e. entering the station and use NR services), except at Carford Bridge where there are additional 366 trips using the station. These trips may be linked to the additional 714 alighters identified earlier at the corresponding bus stop. Station exits seem not to be affected by the scheme. It can be deduced that increasing bus frequency for Lower Sydenham services attract more bus users who pass through but not board or alight within the area, which does no encourage the local trips to use NR services.

Table 24: Station Entries and Exits Test 3 and Test 9

Station	Corridor	Station Entries 2041 Railplan Test3	Station Entries 2041 Railplan Test9	Station Entries Growth (2041)	Station Entries %Growth (2041)	Station Exits 2041 Railplan Test3	Station Exits 2041 Railplan Test9	Station Exits Growth (2041)	Station Exits %Growth (2041)
Catford	North-South	335	330	-5	-1%	197	197	0	0%
Catford Bridge	North-South	10601	10967	366	3%	3181	3154	-27	-1%
Lower Sydenham	East-West	1991	1798	-193	-10%	645	570	-75	-12%
Sydenham	East-West	4366	4297	-69	-2%	1752	1665	-87	-5%
Beckenham Hill	East-West	8	7	-1	-13%	31	30	-1	-3%
Not applicable	**Total**	**6365**	**6102**	**-263**	**-4%**	**2428**	**2265**	**-163**	**-7%**

5. Comparisons of Intervention Test Outputs

This section of the report provides comparisons of the passenger demand at Lewisham station, along the bus corridors and key bus stops as well as the crowding occurring on both LUL and Network Rail services for all scenarios.

Station Demand at Lewisham

Figure 53 shows that with Test 1, the Bakerloo line extension, there is a significant increase in entry and interchanging passengers at Lewisham station and a small increase in exiting passengers. This is then increased further with the increase in bus frequency to Lewisham station and the increase in Jubilee line services in Test 2. Although Test 3, 8 and 9 possess lower entries and exits compared to Test 1 and Test 2, these tests have the highest interchange demand out of all BLE options, due to the fact that Lewisham station becomes even more attractive for interchange movement when the extension is towards Hayes. Lewisham station in all other options (both 2026 and 2041) has no significant impact on passenger numbers.

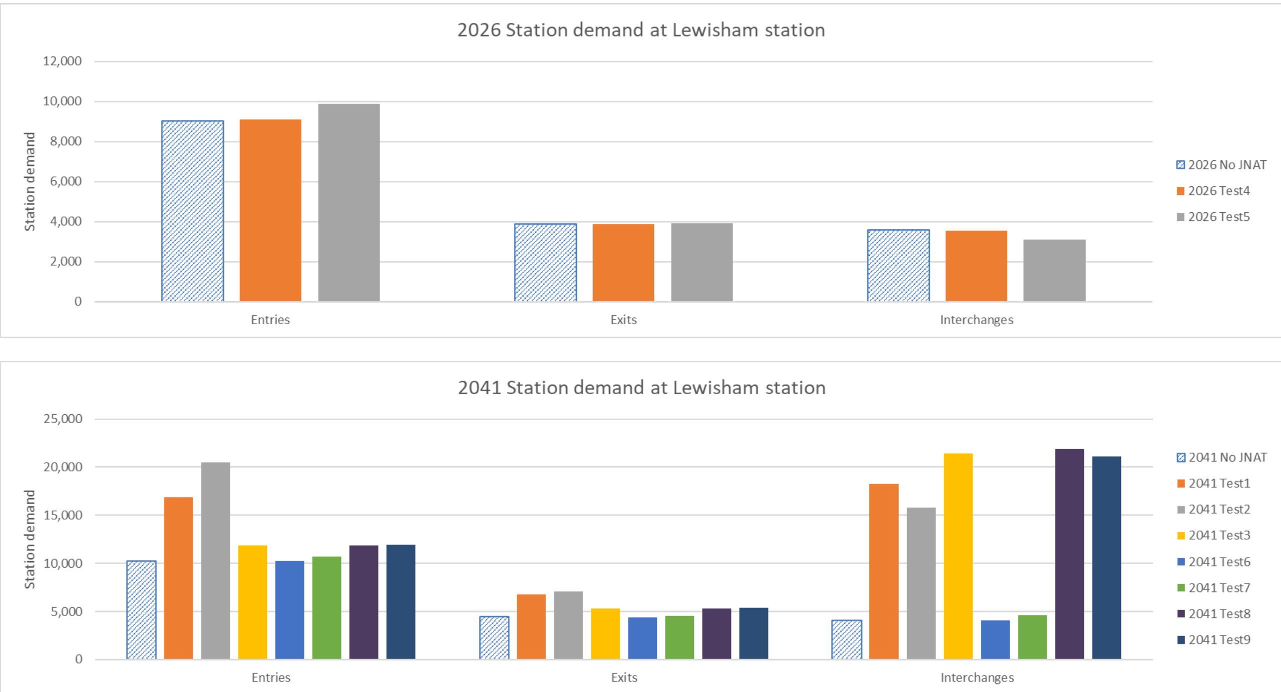


Figure 53: Lewisham Station Demand All Tests in 2026 (top) and 2041 (bottom)

Table 25 shows total demand at Lewisham for all tests as well as the changes in demand from the Do Minimum. Test 1 ,2, 3, 8 and 9 show the highest increases in passenger demand at Lewisham station when the Bakerloo line is extended. Although Test 3 and Test 8 show significant increase in interchange demand compared to Test 1, the total demand is lower as there are fewer passengers entering or exiting the station in Test 3, 8 and 9 – they may now enter the other station further downstream instead. Total increase in demand in Test 4, 5, 6 and 7 is insignificant, the highest change is identified in Test 7 at 1,035 (6%).

Table 25: Lewisham Station Total All Tests

Lewisham Station Demand	2041 No JNAT	2041 Test1	2041 Test2	2041 Test3	2041 Test6	2041 Test7	2041 Test8	2041 Test9	2026 No JNAT	2026 Test4	2026 Test5
Entries	10246	16846	20482	11831	10246	10672	11845	11945	9034	9099	9874
Exits	4447	6742	7096	5348	4401	4577	5283	5417	3872	3868	3922
Interchanges	4104	18286	15775	21387	4074	4583	21907	21134	3588	3556	3086
TOTAL	**18797**	**41874**	**43353**	**38566**	**18721**	**19832**	**39035**	**38496**	**16494**	**16523**	**16882**
Changes with Do Minimum	0	23077	24556	19769	-76	1035	20238	19699	0	29	388

Bus Demand along Key Bus Corridor

Figure 54 shows the change in bus passengers along the key corridors in London Borough of Lewisham. This shows that in 2041 both Test 1 and Test 2 increase the number of passengers travelling northbound towards Lewisham to access the extended Bakerloo line. With Test 2 and the increased bus frequency there is also an increase in passengers travelling westbound along the east-west corridor. Test 3, Test 8 and Test 9 revert the pattern observed in Test 1 and Test 2 due to BLE to Hayes, bus passengers are likely to switch to LUL mode to use the Bakerloo line. In Test 5, due to the increase bus frequency in 2026 there are also increases in bus passengers in all scenarios compared to the 2026 Do Minimum. In all other scenarios the volumes of bus passengers remain very similar to Do Minimum scenario.

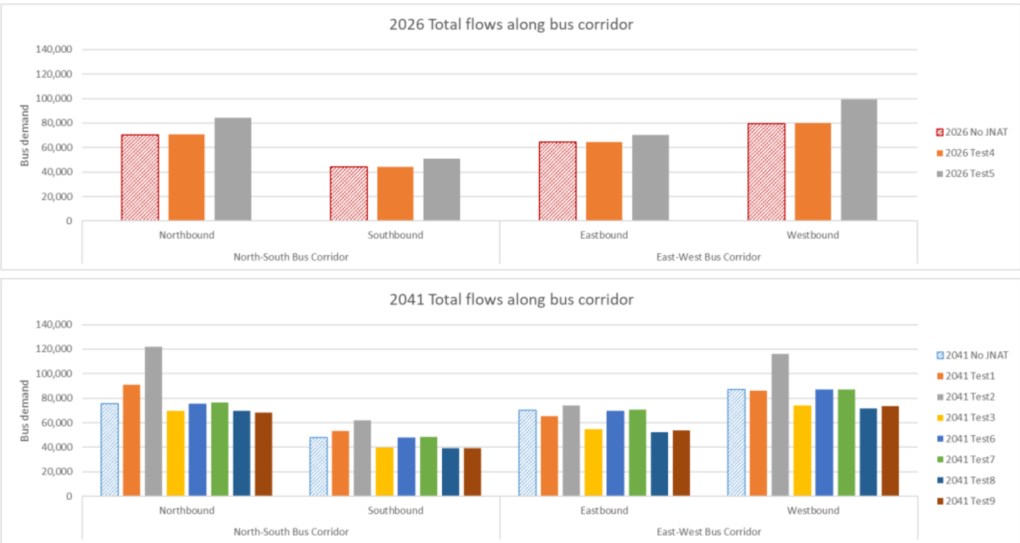


Figure 54: Bus Flows along Lewisham Key Bus Corridors in 2026 (top) and 2041 (bottom)

Figure 55 presents how the number of passengers boarding and alighting at Lewisham and New Cross Station changes across the various Tests. It is clear from the graphs that with both Test 1 and Test 2 in 2041 there is a significant increase in bus demand at these stations as a result of the new Bakerloo line extension and in Test 2 the increased frequency of buses. On the other hand, in Test 3, Test 8 and Test 9 in 2041 there is a drop in bus boarders and alighters compared to Do Minimum. The reason for this is the mode shift from bus to LUL for those passengers in the local area. In 2026 Test 5 there is also an increase in bus boarding and alighting at Lewisham Station which is a result of the increase bus frequency.

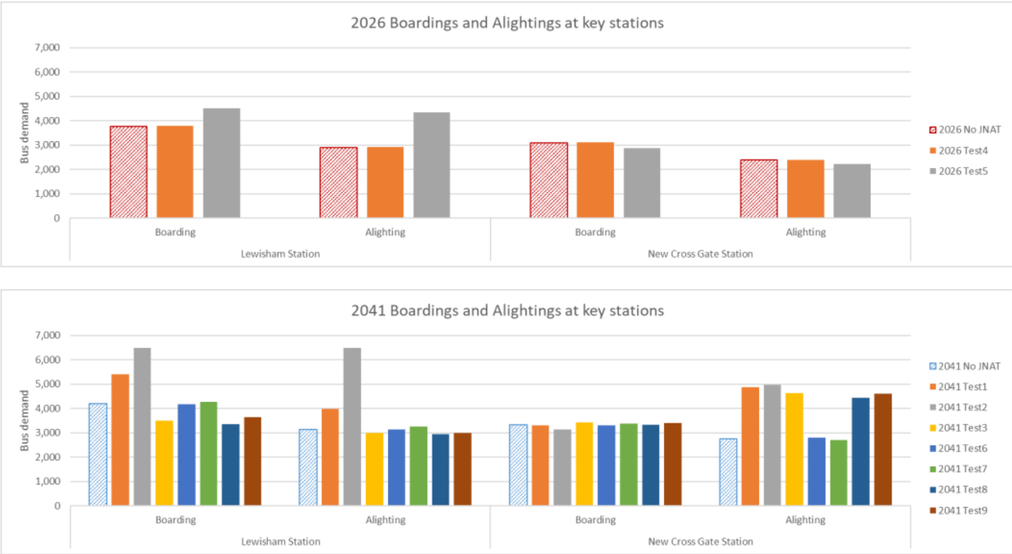


Figure 55: Bus Boarding and Alighting at Key Stations in 2026 (top) and 2041 (bottom)

Crowding Changes for LUL and NR

Table 26 and Table 27 show the changes in crowding which occur within the London Underground network in each scenario for both years 2026 and 2041. They show that Test 1, 2, 3, 7, 8 and 9 have most impact on the network. BLE-related Tests (Test 1, 2, 3, 8 and 9) reduce the capacity available on the DLR in Lewisham due to increase demand into Lewisham station, and increase capacity slightly on the Jubilee line. Test 7 increases capacity on the DLR with the increased frequency of trains.

Table 26: London Underground Crowding Changes in 2026 scenarios

TOC	From	To	No JNAT Difference	Test4 Difference	Test5 Difference
DLR	Lewisham	Elverson Road	0.00	0.00	0.05
DLR	Elverson Road	Deptford Bridge	0.00	0.00	0.05
DLR	Deptford Bridge	Greenwich	0.00	-0.01	0.02
DLR	Greenwich	Cutty Sark	0.00	-0.01	0.01
DLR	Cutty Sark	Island Gardens	0.00	-0.02	0.02
DLR	Island Gardens	Mudchute	0.00	-0.01	0.02
DLR	Mudchute	Crossharbour	0.00	-0.01	0.02
DLR	Crossharbour	South Quay	0.00	-0.01	0.01
DLR	South Quay	Heron Quays	0.00	-0.01	0.00
DLR	Heron Quays	Canary Wharf	0.00	0.00	-0.01
LUL Jubilee	Canada Water	Canary Wharf	0.00	0.01	-0.01

TOC	From	To	No JNAT Difference	Test4 Difference	Test5 Difference
LUL Jubilee	Canning Town	North Greenwich	0.00	0.00	-0.01
LUL Jubilee	North Greenwich	Canary Wharf	0.00	-0.02	-0.03

TOC	From	To	2026 AM No JNAT	2026 AM Test4	2026 AM Test5
DLR	Lewisham	Elverson Road	0.45	0.45	0.50
DLR	Elverson Road	Deptford Bridge	0.46	0.46	0.51
DLR	Deptford Bridge	Greenwich	0.94	0.93	0.96
DLR	Greenwich	Cutty Sark	1.22	1.21	1.23
DLR	Cutty Sark	Island Gardens	1.51	1.49	1.53
DLR	Island Gardens	Mudchute	1.45	1.44	1.47
DLR	Mudchute	Crossharbour	1.84	1.83	1.86
DLR	Crossharbour	South Quay	2.01	2.00	2.02
DLR	South Quay	Heron Quays	2.03	2.02	2.03
DLR	Heron Quays	Canary Wharf	1.67	1.67	1.66
LUL Jubilee	Canada Water	Canary Wharf			
LUL Jubilee	Canning Town	North Greenwich	4.27	4.27	4.26
LUL Jubilee	North Greenwich	Canary Wharf	4.00		

TOC	From	To	No JNAT Difference	Test4 Difference	Test5 Difference
DLR	Lewisham	Elverson Road	0.00	0.00	0.05
DLR	Elverson Road	Deptford Bridge	0.00	0.00	0.05
DLR	Deptford Bridge	Greenwich	0.00	-0.01	0.02
DLR	Greenwich	Cutty Sark	0.00	-0.01	0.01
DLR	Cutty Sark	Island Gardens	0.00	-0.02	0.02
DLR	Island Gardens	Mudchute	0.00	-0.01	0.02
DLR	Mudchute	Crossharbour	0.00	-0.01	0.02

TOC	From	To	No JNAT Difference	Test4 Difference	Test5 Difference
DLR	Crossharbour	South Quay	0.00	-0.01	0.01
DLR	South Quay	Heron Quays	0.00	-0.01	0.00
DLR	Heron Quays	Canary Wharf	0.00	0.00	-0.01
LUL Jubilee	Canada Water	Canary Wharf	0.00	0.01	-0.01
LUL Jubilee	Canning Town	North Greenwich	0.00	0.00	-0.01
LUL Jubilee	North Greenwich	Canary Wharf	0.00	-0.02	-0.03

Table 27: London Underground Crowding Changes in 2041 scenarios

TOC	From	To	2041 AM No JNAT	2041 AM Test1	2041 AM Test2	2041 AM Test3	2041 AM Test6	2041 AM Test7	2041 AM Test8	2041 AM Test9
DLR	Lewisham	Elverson Road	0.71	1.04	1.06	1.40	0.71	0.43	1.43	1.41
DLR	Elverson Road	Deptford Bridge	0.73	1.06	1.07	1.41	0.73	0.44	1.43	1.41
DLR	Deptford Bridge	Greenwich	1.27	1.44	1.46	1.75	1.27	0.93	1.76	1.75
DLR	Greenwich	Cutty Sark	1.58	1.72	1.72	1.96	1.57	1.18	1.98	1.97
DLR	Cutty Sark	Island Gardens	1.89	1.94	1.94	2.14	1.89	1.47	2.15	2.15
DLR	Island Gardens	Mudchute	1.82	1.68	1.70	1.87	1.82	1.41	1.88	1.87
DLR	Mudchute	Crossharbour	2.32	1.98	2.01	2.12	2.31	1.83	2.12	2.12
DLR	Crossharbour	South Quay	2.48	2.04	2.08	2.16	2.48	1.99	2.17	2.17
DLR	South Quay	Heron Quays	2.52	2.09	2.10	2.17	2.51	2.02	2.17	2.18
DLR	Heron Quays	Canary Wharf	1.98	1.89	1.85	1.85	1.98	1.56	1.86	1.85
LUL Jubilee	Canada Water	Canary Wharf	5.80	5.72	5.51	5.68	5.80	5.64	5.68	5.68
LUL Jubilee	Canning Town	North Greenwich	5.19	5.26	5.14	5.24	5.19	5.04	5.23	5.24
LUL Jubilee	North Greenwich	Canary Wharf	5.23	5.24	5.08	5.21	5.23	5.10	5.20	5.21

TOC	From	To	No JNAT Difference	Test1 Difference	Test2 Difference	Test3 Difference	Test6 Difference	Test7 Difference	Test8 Difference	Test9 Difference
DLR	Lewisham	Elverson Road	0.00	0.33	0.35	0.69	0.00	-0.28	0.72	0.70
DLR	Elverson Road	Deptford Bridge	0.00	0.33	0.34	0.68	0.00	-0.29	0.70	0.68
DLR	Deptford Bridge	Greenwich	0.00	0.17	0.19	0.48	0.00	-0.34	0.49	0.48
DLR	Greenwich	Cutty Sark	0.00	0.14	0.14	0.38	-0.01	-0.40	0.40	0.39
DLR	Cutty Sark	Island Gardens	0.00	0.05	0.05	0.25	0.00	-0.42	0.26	0.26
DLR	Island Gardens	Mudchute	0.00	-0.14	-0.12	0.05	0.00	-0.41	0.06	0.05
DLR	Mudchute	Crossharbour	0.00	-0.34	-0.31	-0.20	-0.01	-0.49	-0.20	-0.20
DLR	Crossharbour	South Quay	0.00	-0.44	-0.40	-0.32	0.00	-0.49	-0.31	-0.31
DLR	South Quay	Heron Quays	0.00	-0.43	-0.42	-0.35	-0.01	-0.50	-0.35	-0.34
DLR	Heron Quays	Canary Wharf	0.00	-0.09	-0.13	-0.13	0.00	-0.42	-0.12	-0.13

TOC	From	To	No JNAT Difference	Test1 Difference	Test2 Difference	Test3 Difference	Test6 Difference	Test7 Difference	Test8 Difference	Test9 Difference
LUL Jubilee	Canada Water	Canary Wharf	0.00	-0.08	-0.29	-0.12	0.00	-0.16	-0.12	-0.12
LUL Jubilee	Canning Town	North Greenwich	0.00	0.07	-0.05	0.05	0.00	-0.15	0.04	0.05
LUL Jubilee	North Greenwich	Canary Wharf	0.00	0.01	-0.15	-0.02	0.00	-0.13	-0.03	-0.02

Table 28 and Table 29 show the changes in crowding which occur on the Network Rail in each scenario for both years 2026 and 2041. They show that Test 1, 2, 3, 8 and 9 have most impact on the network. BLE-related Tests (Test 1, 2, 3, 8 and 9) increase the capacity available on all services but particularly on the overground, Thameslink and Southeastern services. Test 8 performs better than Test 3 at Lewisham and Nunhead stations due to the connectivity and frequency enhancement at Brockley. All other tests have very little impact on the crowding on these services.

Table 28: Network Rail Crowding Changes in 2026 scenarios

TOC	From	To	2026 AM No JNAT	2026 AM Test4	2026 AM Test5
Thameslink	Catford	Crofton Park	1.95	1.94	1.85
Thameslink	Crofton Park	Nunhead	1.97	1.96	1.87
Thameslink	Nunhead	Peckham Rye	1.77	1.77	1.67
Thameslink	Beckenham Hill	Bellingham	2.25	2.26	2.24
Thameslink	Bellingham	Catford	1.79	1.79	1.71
Southeastern	London Bridge	Deptford	1.43	1.32	1.27
Southeastern	Greenwich	Deptford	0.98	1.01	0.92
Southeastern	Grove Park	Hither Green	0.94	0.93	0.95
Southeastern	Lee	Hither Green	1.36	1.35	1.29
Southeastern	Hither Green	Lewisham	0.89	0.89	0.89
Southeastern	Blackheath	Lewisham	0.85	0.85	0.72
Southeastern	St Johns	Lewisham	1.32	1.31	1.27
Southeastern	Anerley	Penge West	1.26	1.26	1.22
Southeastern	Ladywell	Catford Bridge	0.98	0.95	0.81
Southeastern	Lewisham	Ladywell	1.09	1.05	0.88
Southeastern	St Johns	Ladywell	2.09	2.05	1.91
Southern / Overground	Anerley	Penge West	1.43	1.43	1.43
Southern / Overground	Penge West	Sydenham	1.48	1.48	1.47

TOC	From	To	2026 AM No JNAT	2026 AM Test4	2026 AM Test5
Southern / Overground	Sydenham	Forest Hill	1.13	1.13	1.11
Southern / Overground	Forest Hill	Honor Oak Park	1.45	1.44	1.40
Southern / Overground	Honor Oak Park	Brockley	1.51	1.50	1.46
Southern	Brockley	New Cross Gate	1.40	1.40	1.36
Southern	New Cross Gate	London Bridge	1.40	1.39	1.35
Overground	New Cross Gate	Surrey Quays	3.41	3.41	3.28
Overground	Surrey Quays	Canada Water	2.69	2.45	2.49
Overground	Brockley	New Cross Gate	3.05	3.07	2.93

TOC	From	To	No JNAT Difference	Test4 Difference	Test5 Difference
Thameslink	Catford	Crofton Park	0.00	-0.01	-0.10
Thameslink	Crofton Park	Nunhead	0.00	-0.01	-0.10
Thameslink	Nunhead	Peckham Rye	0.00	0.00	-0.10
Thameslink	Beckenham Hill	Bellingham	0.00	0.01	-0.01
Thameslink	Bellingham	Catford	0.00	0.00	-0.08
Southeastern	London Bridge	Deptford	0.00	-0.11	-0.16
Southeastern	Greenwich	Deptford	0.00	0.03	-0.06
Southeastern	Grove Park	Hither Green	0.00	-0.01	0.01
Southeastern	Lee	Hither Green	0.00	-0.01	-0.07
Southeastern	Hither Green	Lewisham	0.00	0.00	0.00
Southeastern	Blackheath	Lewisham	0.00	0.00	-0.13
Southeastern	St Johns	Lewisham	0.00	-0.01	-0.05
Southeastern	Anerley	Penge West	0.00	0.00	-0.04
Southeastern	Ladywell	Catford Bridge	0.00	-0.03	-0.17

TOC	From	To	No JNAT Difference	Test4 Difference	Test5 Difference
Southeastern	Lewisham	Ladywell	0.00	-0.04	-0.21
Southeastern	St Johns	Ladywell	0.00	-0.04	-0.18
Southern / Overground	Anerley	Penge West	0.00	0.00	0.00
Southern / Overground	Penge West	Sydenham	0.00	0.00	-0.01
Southern / Overground	Sydenham	Forest Hill	0.00	0.00	-0.02
Southern / Overground	Forest Hill	Honor Oak Park	0.00	-0.01	-0.05
Southern / Overground	Honor Oak Park	Brockley	1.51	-0.01	-0.05
Southern	Brockley	New Cross Gate	1.40	0.00	-0.04
Southern	New Cross Gate	London Bridge	1.40	-0.01	-0.05
Overground	New Cross Gate	Surrey Quays	3.41	0.00	-0.13
Overground	Surrey Quays	Canada Water	2.69	-0.24	-0.20
Overground	Brockley	New Cross Gate	3.05	0.02	-0.12

Table 29: Network Rail Crowding Changes in 2041 scenarios

TOC	From	To	2041 AM No JNAT	2041 AM Test1	2041 AM Test2	2041 AM Test3	2041 AM Test6	2041 AM Test7	2041 AM Test8	2041 AM Test9
Thameslink	Catford	Crofton Park	2.34	2.18	2.02	1.74	2.35	2.34	1.74	1.72
Thameslink	Crofton Park	Nunhead	2.37	2.19	2.04	1.75	2.37	2.36	1.76	1.74
Thameslink	Nunhead	Peckham Rye	2.23	1.59	1.45	1.10	2.18	2.21	0.68	1.09
Thameslink	Beckenham Hill	Bellingham	2.69	2.67	2.62	2.36	2.68	2.68	2.36	2.36
Thameslink	Bellingham	Catford	2.16	2.04	1.91	1.70	2.16	2.15	1.70	1.68
Southeastern	London Bridge	Deptford	2.09	1.67	1.49	1.62	2.09	2.01	1.60	1.62
Southeastern	Greenwich	Deptford	1.64	1.36	1.26	1.29	1.64	1.58	1.27	1.28
Southeastern	Grove Park	Hither Green	1.64	1.62	1.56	0.82	1.64	1.64	0.82	0.82
Southeastern	Lee	Hither Green	2.15	1.89	1.72	0.77	2.15	2.14	0.70	0.77
Southeastern	Hither Green	Lewisham	1.63	1.55	1.51	0.91	1.62	1.62	0.91	0.91
Southeastern	Blackheath	Lewisham	1.72	2.05	1.77	0.95	1.75	1.78	0.35	0.95
Southeastern	St Johns	Lewisham	2.08	1.40	1.31	0.67	2.07	2.05	0.61	0.67
Southeastern	Anerley	Penge West	1.99	0.43	0.38	0.00	1.99	1.94	0.00	0.00
Southeastern	Ladywell	Catford Bridge	1.48	1.52	1.15		1.47	1.50		
Southeastern	Lewisham	Ladywell	1.65	1.44	1.04		1.65	1.68		
Southeastern	St Johns	Ladywell	2.72	2.44	2.05		2.72	2.66		

TOC	From	To	2041 AM No JNAT	2041 AM Test1	2041 AM Test2	2041 AM Test3	2041 AM Test6	2041 AM Test7	2041 AM Test8	2041 AM Test9
Southern / Overground	Anerley	Penge West	2.13	2.13	2.12	2.07	2.13	2.13	2.08	2.07
Southern / Overground	Penge West	Sydenham	2.17	2.20	2.18	2.13	2.17	2.17	2.13	2.12
Southern / Overground	Sydenham	Forest Hill	1.71	1.76	1.75	1.69	1.71	1.71	1.69	1.68
Southern / Overground	Forest Hill	Honor Oak Park	2.05	2.13	2.07	2.00	2.05	2.05	2.00	1.99
Southern / Overground	Honor Oak Park	Brockley	2.12	2.19	2.13	2.04	2.12	2.12	2.05	2.04
Southern	Brockley	New Cross Gate	2.09	2.02	1.98	1.93	2.09	2.09	1.93	1.93
Southern	New Cross Gate	London Bridge	2.09	1.84	1.83	1.80	2.09	2.08	1.79	1.79
Overground	New Cross Gate	Surrey Quays	3.81	2.73	2.71	2.89	3.86	3.76	2.92	2.90
Overground	Surrey Quays	Canada Water	3.19	2.40	2.26	2.47	3.18	3.12	2.47	2.47
Overground	Brockley	New Cross Gate	3.37	3.76	3.58	3.33	3.40	3.35	3.35	3.31

TOC	From	To	No JNAT Difference	Test1 Difference	Test2 Difference	Test3 Difference	Test6 Difference	Test7 Difference	Test8 Difference	Test9 Difference
Thameslink	Catford	Crofton Park	0.00	-0.16	-0.32	-0.60	0.01	0.00	-0.60	-0.62
Thameslink	Crofton Park	Nunhead	0.00	-0.18	-0.33	-0.62	0.00	-0.01	-0.61	-0.63
Thameslink	Nunhead	Peckham Rye	0.00	-0.64	-0.78	-1.13	-0.05	-0.02	-1.55	-1.14
Thameslink	Beckenham Hill	Bellingham	0.00	-0.02	-0.07	-0.33	-0.01	-0.01	-0.33	-0.33
Thameslink	Bellingham	Catford	0.00	-0.12	-0.25	-0.46	0.00	-0.01	-0.46	-0.48
Southeastern	London Bridge	Deptford	0.00	-0.42	-0.60	-0.47	0.00	-0.08	-0.49	-0.47
Southeastern	Greenwich	Deptford	0.00	-0.28	-0.38	-0.35	0.00	-0.06	-0.37	-0.36
Southeastern	Grove Park	Hither Green	0.00	-0.02	-0.08	-0.82	0.00	0.00	-0.82	-0.82
Southeastern	Lee	Hither Green	0.00	-0.26	-0.43	-1.38	0.00	-0.01	-1.45	-1.38
Southeastern	Hither Green	Lewisham	0.00	-0.08	-0.12	-0.72	-0.01	-0.01	-0.72	-0.72

TOC	From	To	No JNAT Difference	Test1 Difference	Test2 Difference	Test3 Difference	Test6 Difference	Test7 Difference	Test8 Difference	Test9 Difference
Southeastern	Blackheath	Lewisham	0.00	0.33	0.05	-0.77	0.03	0.06	-1.37	-0.77
Southeastern	St Johns	Lewisham	0.00	-0.68	-0.77	-1.41	-0.01	-0.03	-1.47	-1.41
Southeastern	Anerley	Penge West	0.00	-1.56	-1.61	-1.99	0.00	-0.05	-1.99	-1.99
Southeastern	Ladywell	Catford Bridge	0.00	0.04	-0.33		0.00	0.02		
Southeastern	Lewisham	Ladywell	0.00	-0.21	-0.61		0.00	0.03		
Southeastern	St Johns	Ladywell	0.00	-0.28	-0.67		0.00	-0.06		
Southern / Overground	Anerley	Penge West	0.00	0.00	-0.01	-0.06	0.00	0.00	-0.05	-0.06
Southern / Overground	Penge West	Sydenham	0.00	0.03	0.01	-0.04	0.00	0.00	-0.04	-0.05
Southern / Overground	Sydenham	Forest Hill	0.00	0.05	0.04	-0.02	0.00	0.00	-0.02	-0.03
Southern / Overground	Forest Hill	Honor Oak Park	0.00	0.08	0.02	-0.05	0.00	0.00	-0.05	-0.06
Southern / Overground	Honor Oak Park	Brockley	0.00	0.07	0.01	-0.08	0.00	0.00	-0.07	-0.08

TOC	From	To	No JNAT Difference	Test1 Difference	Test2 Difference	Test3 Difference	Test6 Difference	Test7 Difference	Test8 Difference	Test9 Difference
Southern	Brockley	New Cross Gate	0.00	-0.07	-0.11	-0.16	0.00	0.00	-0.16	-0.16
Southern	New Cross Gate	London Bridge	0.00	-0.25	-0.26	-0.29	0.00	-0.01	-0.30	-0.30
Overground	New Cross Gate	Surrey Quays	0.00	-1.08	-1.10	-0.92	0.05	-0.05	-0.89	-0.91
Overground	Surrey Quays	Canada Water	0.00	-0.79	-0.93	-0.72	-0.01	-0.07	-0.72	-0.72
Overground	Brockley	New Cross Gate	0.00	0.39	0.21	-0.04	0.03	-0.02	-0.02	-0.06

6. Conclusions

This section summarises the impacts of each of the tests undertaken:

2026 Intervention Tests

Intervention Test 4: Southeast Riverside Bus Strategy + Cycle Superhighway 4 + Bus route 225 extension

- Increases in bus passenger demand for 225 route extensions except for the end section of the route
- No significant change in bus passenger demand on key corridors (1-2%)

Intervention Test 5: Lewisham bus frequency x2

- Increases in bus passenger demand on key corridors (12-15%)

2041 Intervention Tests

Intervention Test 1: BLE to Lewisham 27tph

- Increase in passengers using the Bakerloo Line & DLR
- Reductions in passengers using Jubilee line
- Increase in passengers on overground between Sydenham and New Cross Gate
- Reductions in passengers on overground between New Cross Gate and New Cross
- Increases in bus passengers on both main bus corridors (3-11%)
- Increases in passengers at Lewisham Station (23,077)
- Increases in passengers boarding and alighting at Lewisham and New Cross Gate Station
- Reduce capacity on DLR near Lewisham

Intervention Test 2: BLE to Lewisham 27tph + Jubilee Line 36tph + Lewisham bus frequency x2

- Increase in passengers using the Bakerloo Line & DLR
- Reductions in passengers using Jubilee line
- Increase in passengers on overground between Sydenham and New Cross Gate
- Reductions in passengers on overground between New Cross Gate and New Cross
- Increases in bus passengers on both main bus corridors (20-35%)

- Increases in passengers at Lewisham Station (24,556)
- Increases in passengers boarding and alighting at Lewisham and New Cross Gate Station
- Reduce capacity on DLR near Lewisham

Intervention Test 3: BLE to Hayes 36tph

- Increase in passengers using the Bakerloo Line & DLR
- Reductions in passengers using Jubilee line
- Increase in passengers on overground between Sydenham and New Cross Gate (northbound)
- Reductions in passengers on overground between New Cross Gate and New Cross
- Decreases in bus passengers on both main bus corridors (4-12%)
- Increases in passengers at Lewisham Station (19,769)
- Decreases in passengers boarding and alighting at Lewisham and New Cross Gate Station
- Reduce capacity on DLR near Lewisham

Intervention Test 6: Brockley Interchange + New Bermondsey station

- Increases in rail passengers at Brockley Station (17%)

Intervention Test 7: DLR 30tph

- Increases in passengers using DLR
- Slight reduction in passengers on the Jubilee line
- Reductions in passengers on overground between New Cross Gate and New Cross
- Increase capacity on the DLR

Intervention Test 8: Brockley Interchange frequency x2 + BLE to Hayes 36tph

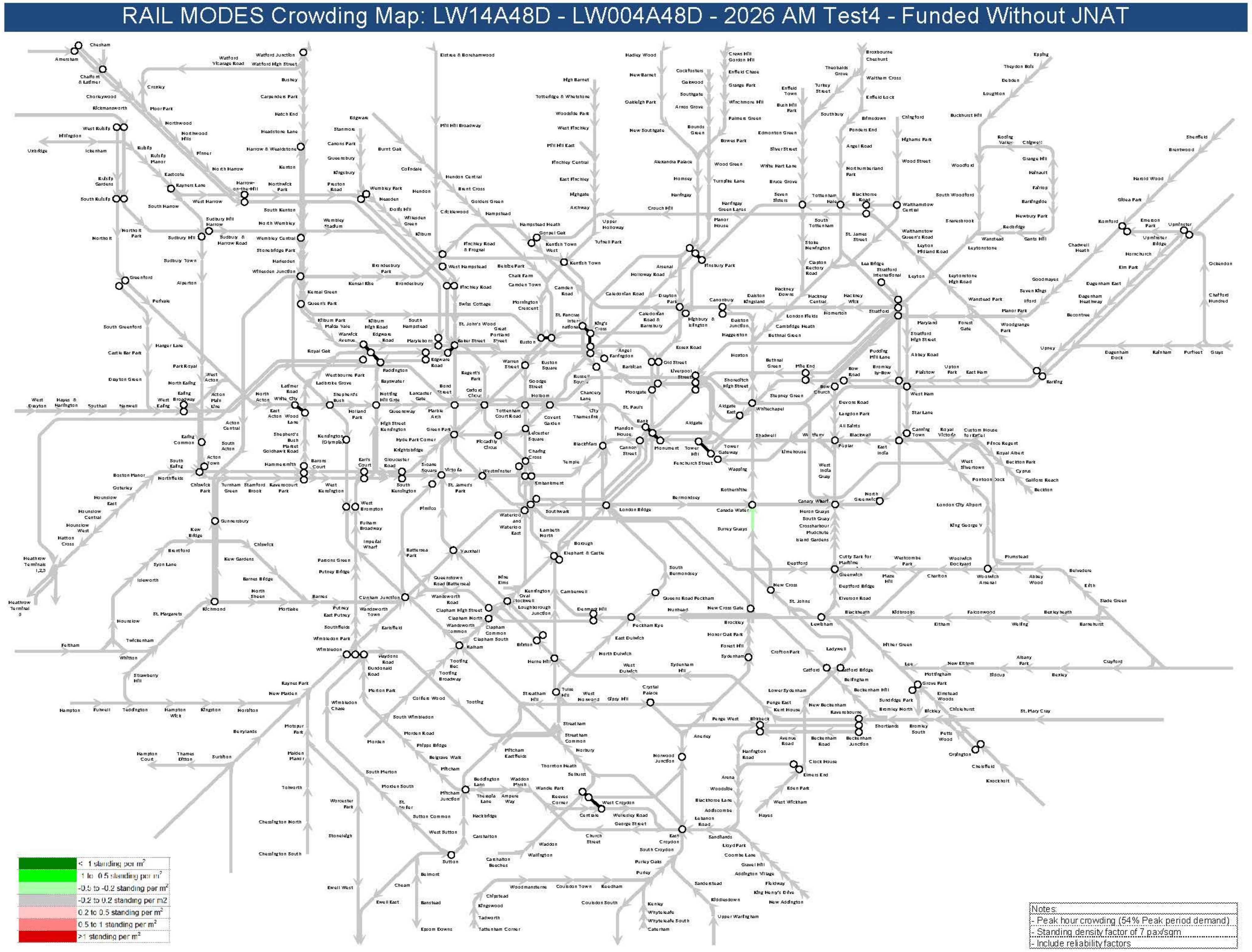
- Increase in passengers using the Bakerloo Line & DLR
- Reductions in passengers using Jubilee line
- Increase in passengers on overground between Sydenham and New Cross Gate (northbound)
- Reductions in passengers on overground between New Cross Gate and New Cross
- Decreases in bus passengers on both main bus corridors (6-13%)
- Increases in passengers at Lewisham Station (20,238)
- Decreases in passengers boarding and alighting at Lewisham and New Cross Gate Station
- Reduce capacity on DLR near Lewisham
- Insignificant changes in total number of passengers at Brockley Station

- Crowding improves significantly between Lewisham and Nunhead stations along the Southeastern line

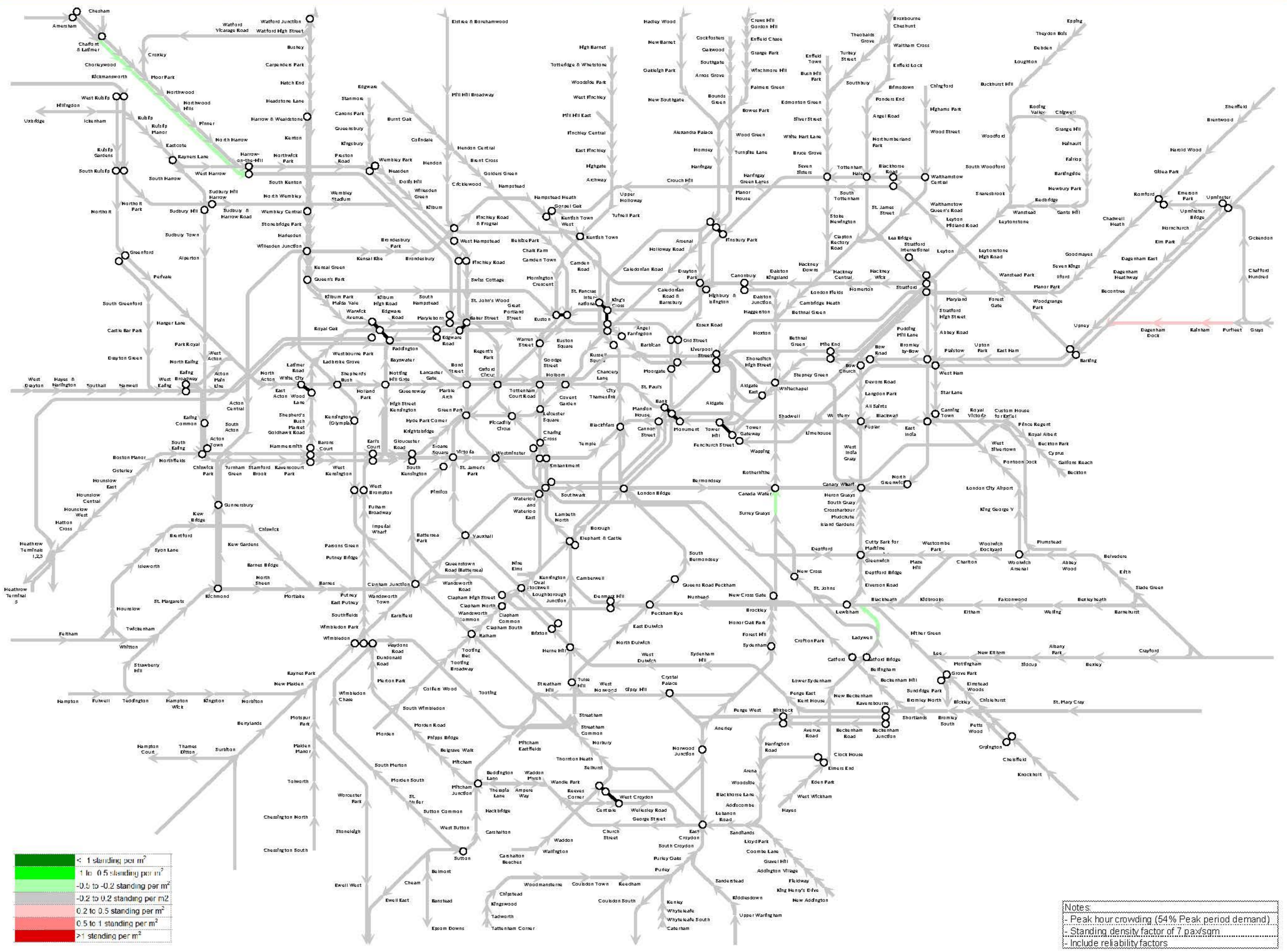
Intervention Test 9: Lower Sydenham enhanced bus services + BLE to Hayes 36tph

- Increase in passengers using the Bakerloo Line & DLR
- Reductions in passengers using Jubilee line
- Increase in passengers on overground between Sydenham and New Cross Gate (northbound)
- Reductions in passengers on overground between New Cross Gate and New Cross
- Increases in bus passengers on both local bus corridors (18-23%)
- Reductions in passenger station usages in the vicinity of Lower Sydenham stations
- Increases in passengers at Lewisham Station (19,699)
- Decreases in passengers boarding and alighting at Lewisham and New Cross Gate Station
- Reduce capacity on DLR near Lewisham

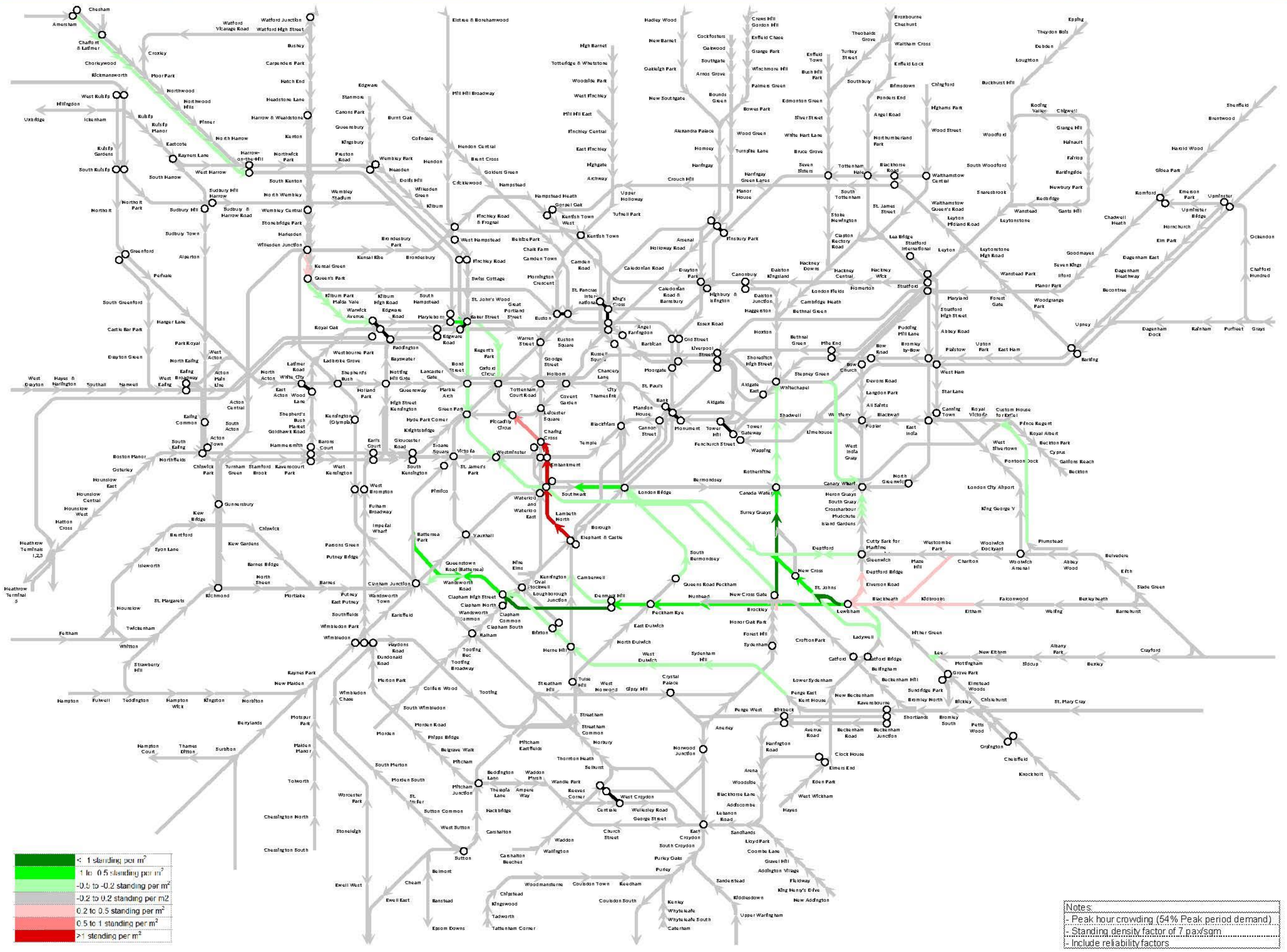
Annex A – Crowding Map Difference Plots for Rail Modes



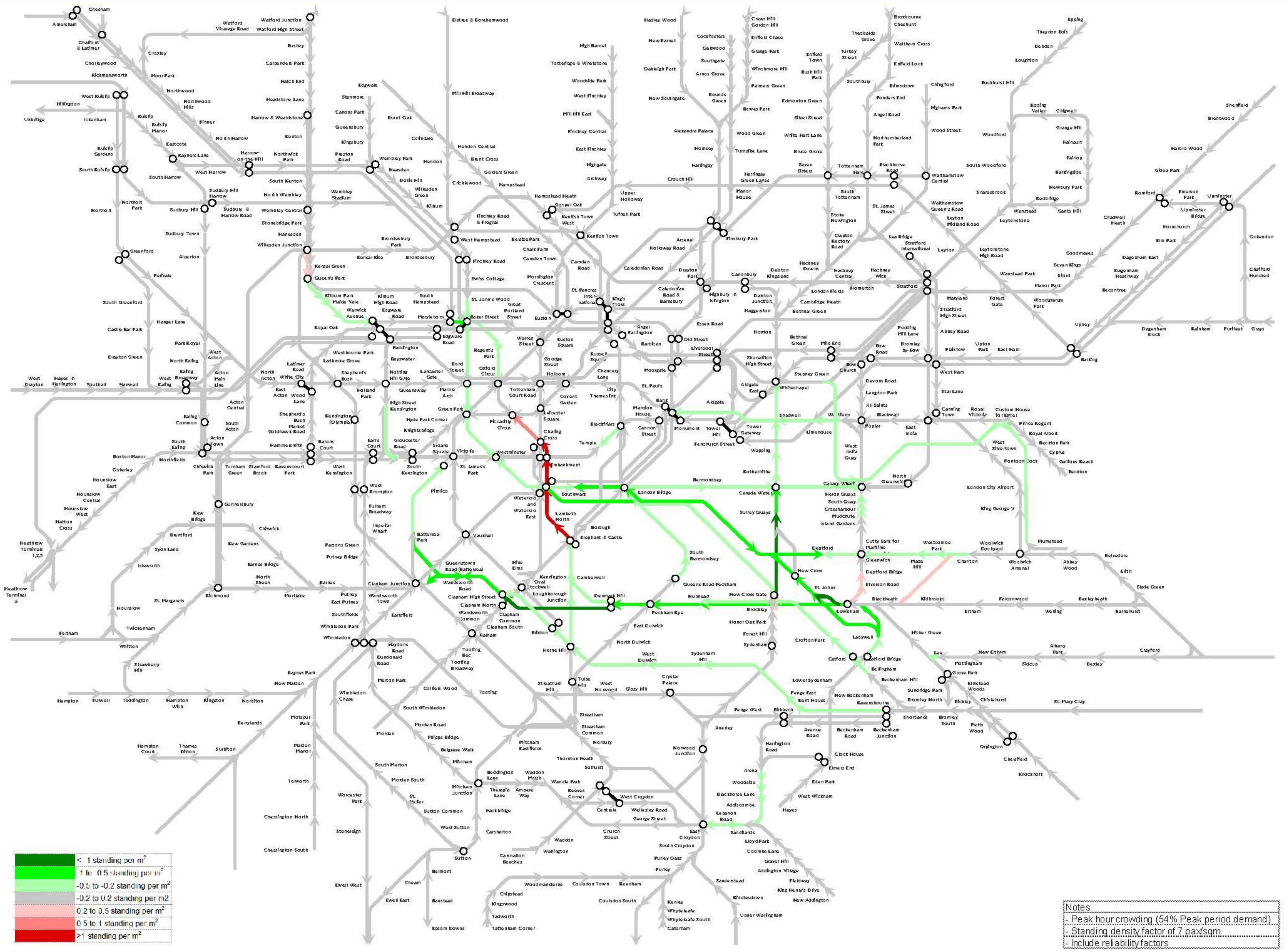
RAIL MODES Crowding Map: LW15A48D - LW004A48D - 2026 AM Test5 - Funded Without JNAT



RAIL MODES Crowding Map: LW11A48P - LW005A48P - 2041 AM Test1 - Funded Without JNAT

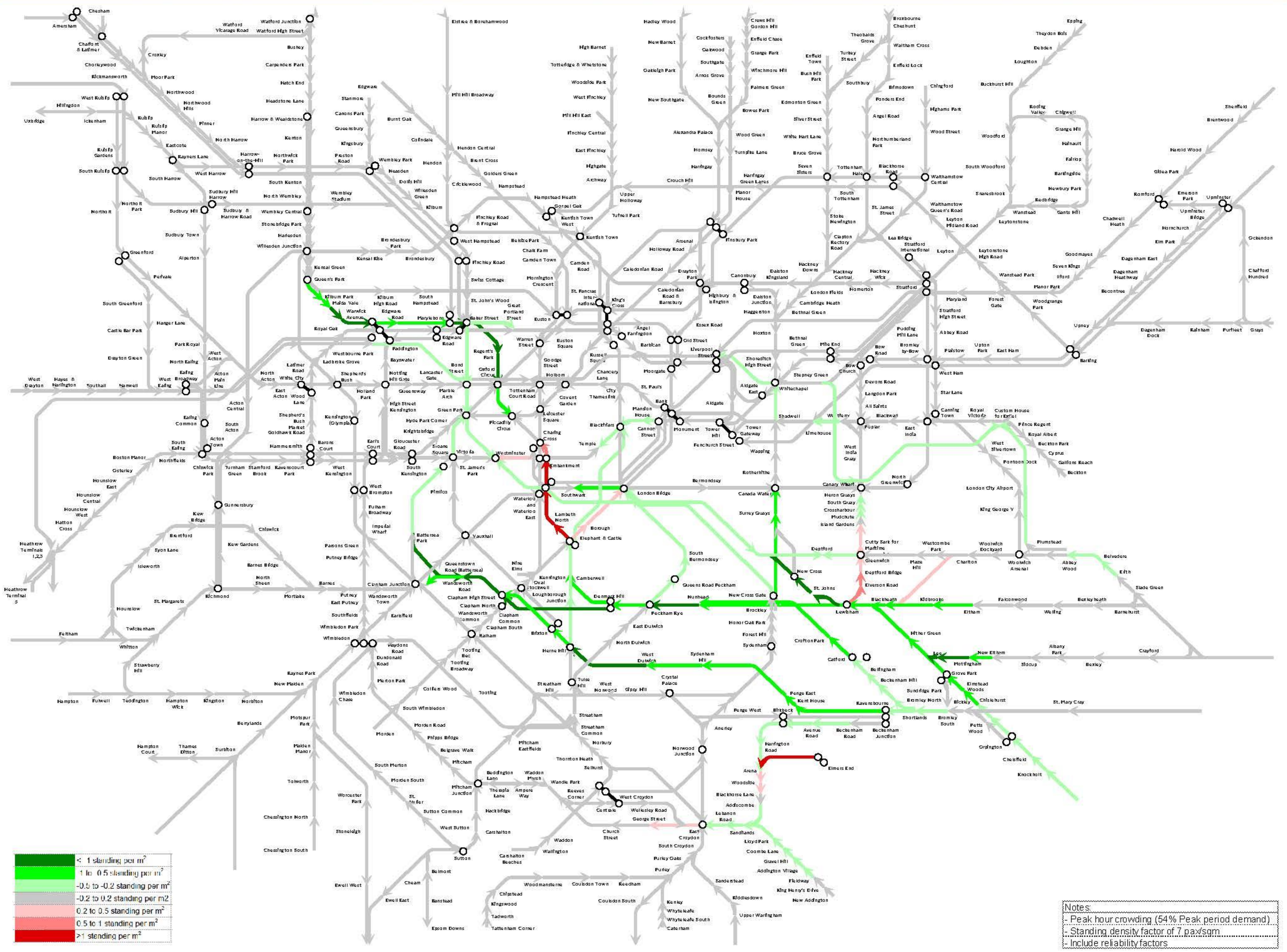


RAIL MODES Crowding Map: LW12A48P - LW005A48P - 2041 AM Test2 - Funded Without JNAT

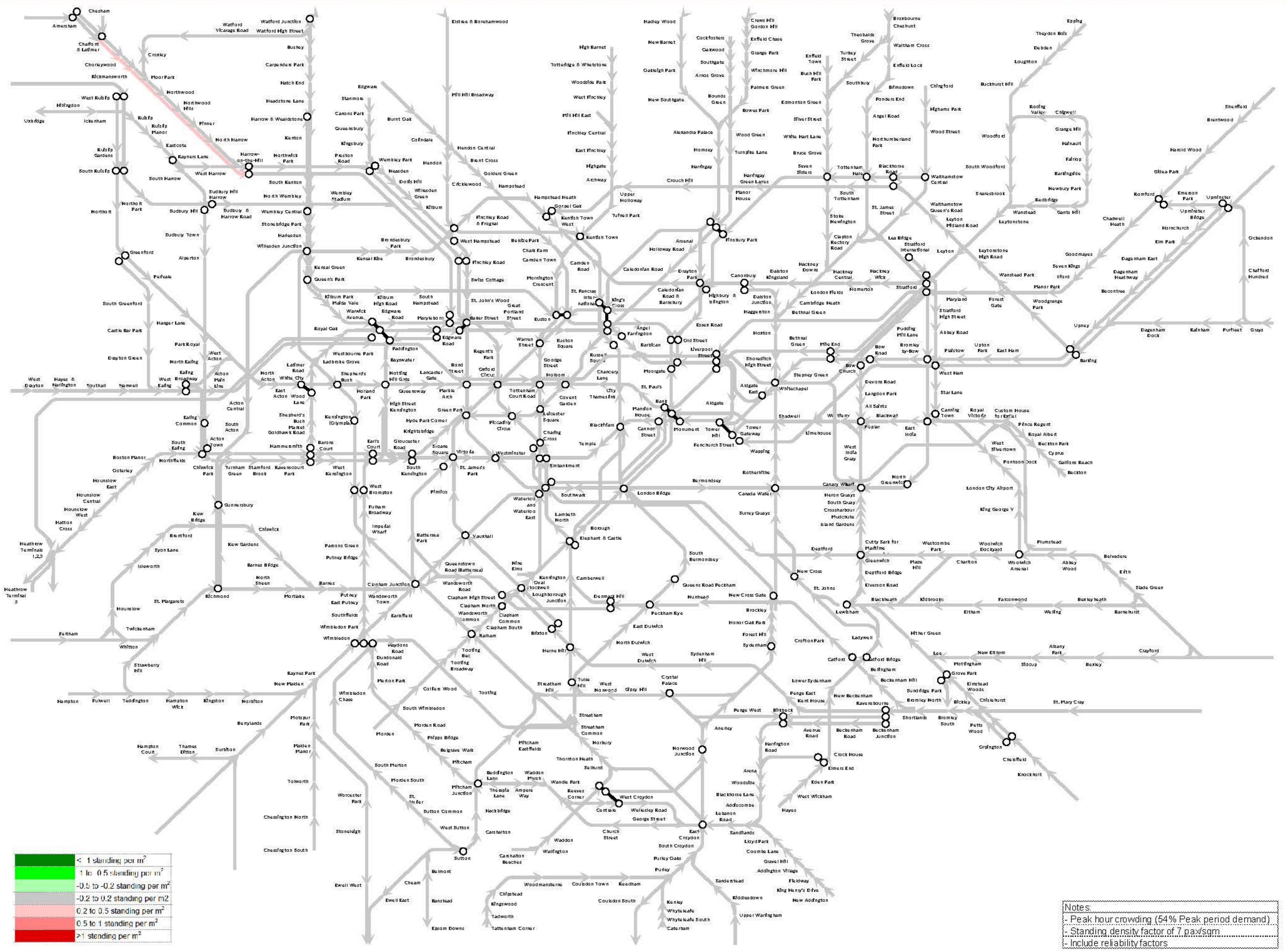


wsp

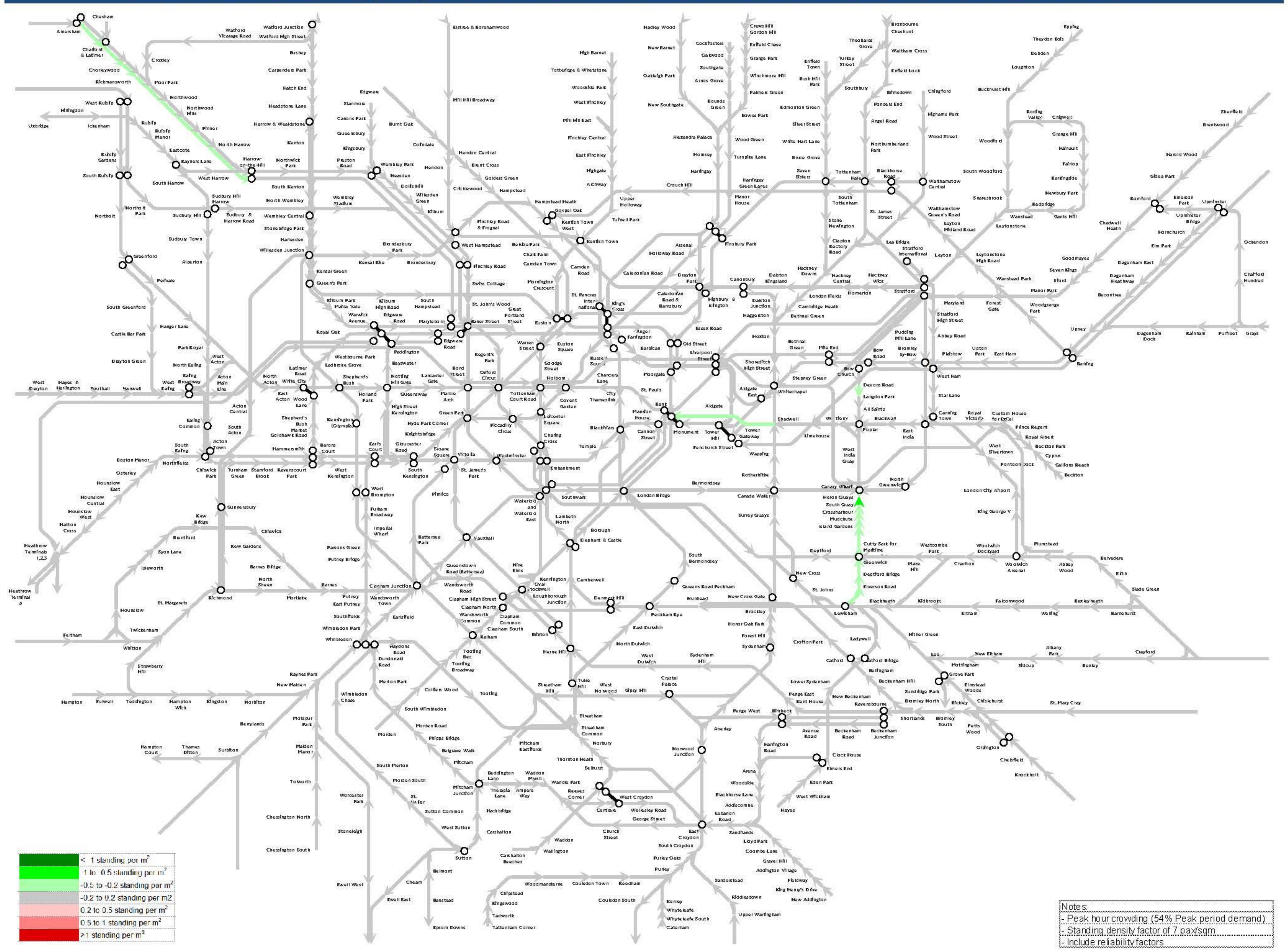
RAIL MODES Crowding Map: LW13A48P - LW005A48P - 2041 AM Test3 - Funded Without JNAT



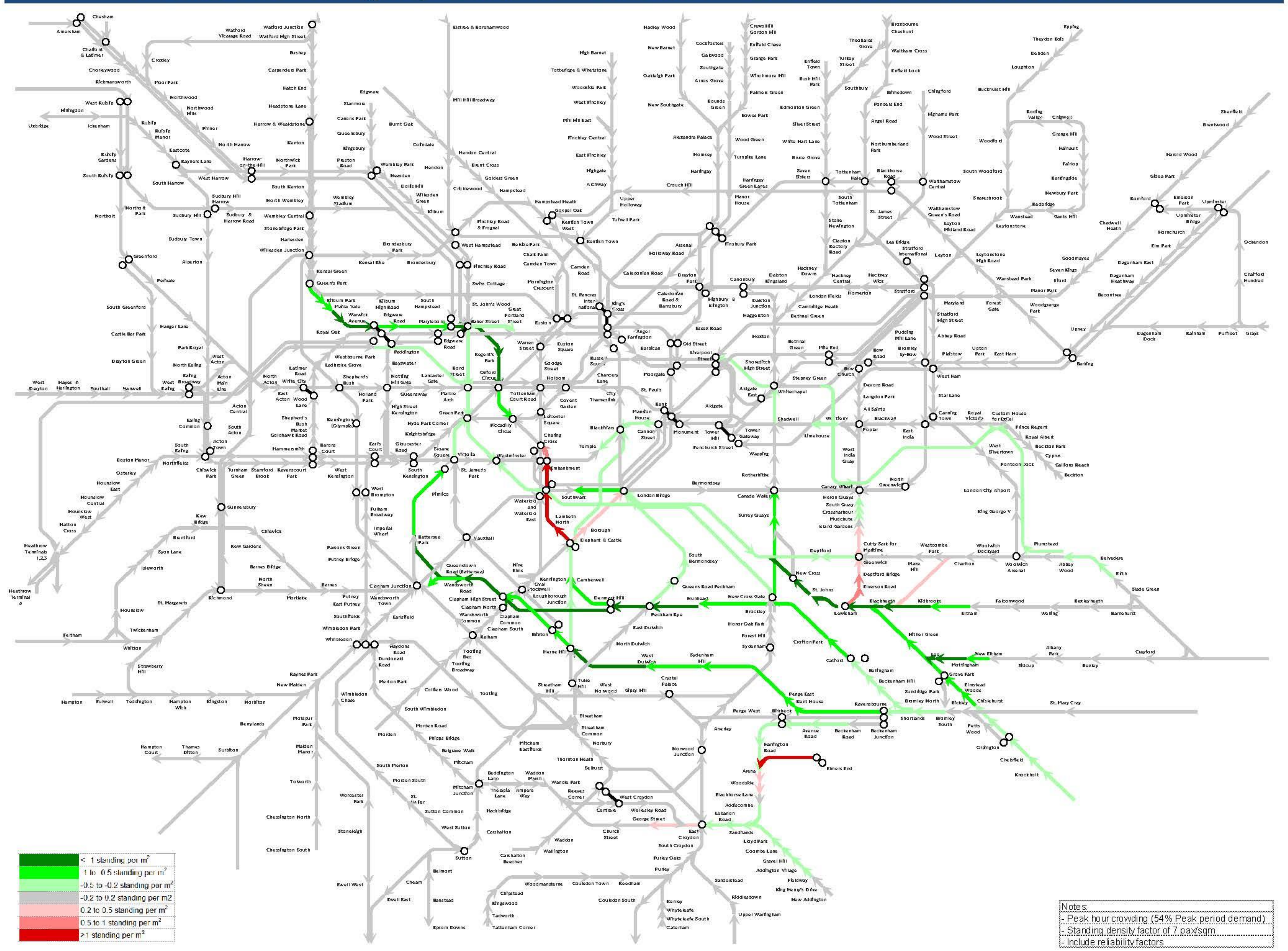
RAIL MODES Crowding Map: LW16A48P - LW005A48P - 2041 AM Test6 - Funded Without JNAT



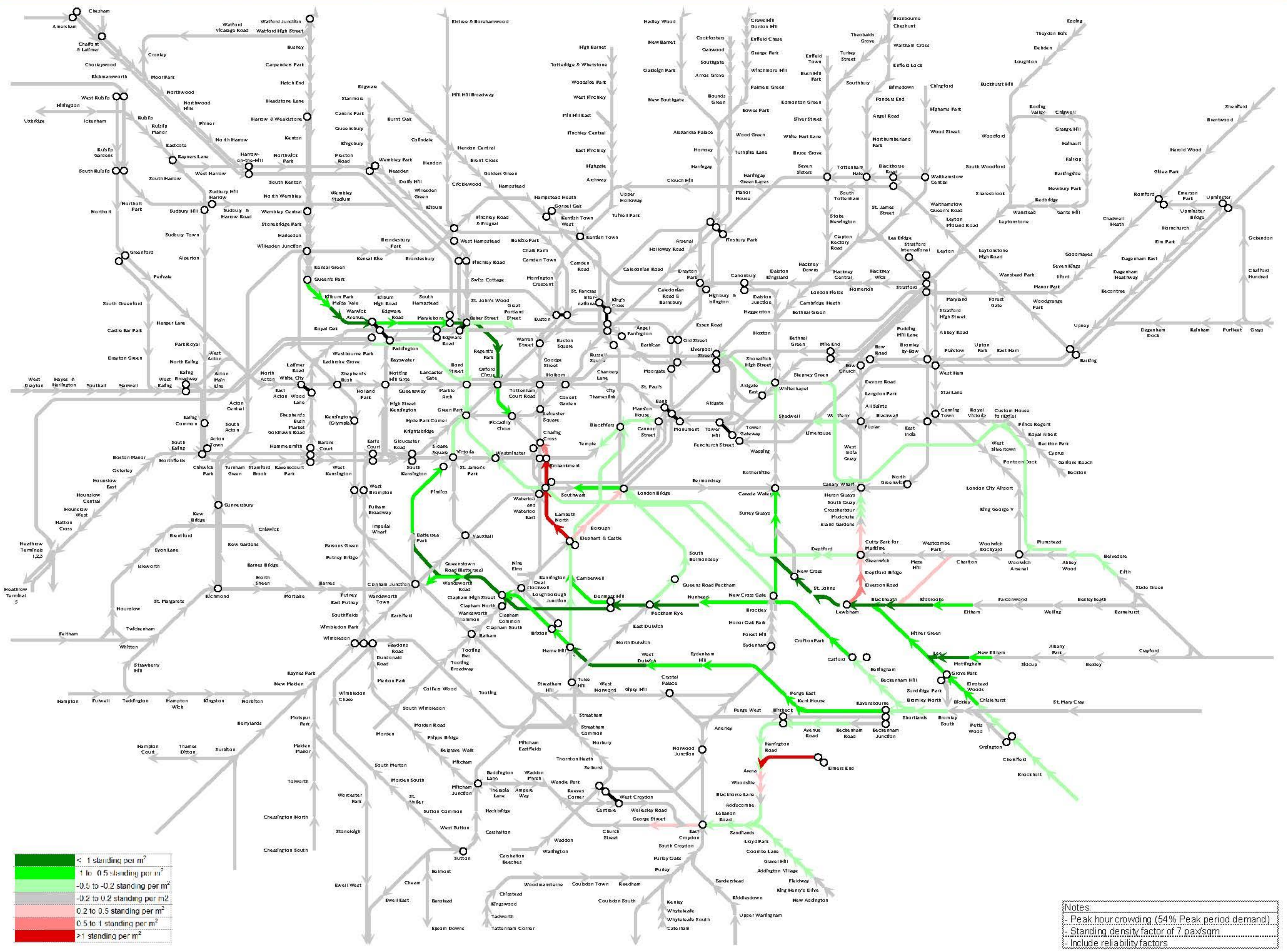
RAIL MODES Crowding Map: LW17A48P - LW005A48P - 2041 AM Test7 - Funded Without JNAT



RAIL MODES Crowding Map: LW18A48P - LW005A48P - 2041 AM Test8 - Funded Without JNAT



RAIL MODES Crowding Map: LW19A48P - LW005A48P - 2041 AM Test9 - Funded Without JNAT



Appendix F – Technical Note – ELHAM Road Space Reallocation Technical Note – Lewisham Local Plan Transport Assessment

Date 03 July 2019

1. Introduction

In January 2019, WSP was tasked by the London Borough of Lewisham (LBL) to model the impact of three road space reallocation schemes across the Borough. Strategic transport modelling is required to help provide the evidence base to assess the impact on the highway network.

The latest version of Transport for London's (TfL's) 2041 West London Highway Assignment Model (ELHAM) has been used to model the impacts in the AM peak. It reflects 2041 network conditions and traffic. This model is referred to hereon in as the Do Minimum model, since it does not include road space reallocation schemes.

The model containing the road space reallocation schemes is referred to hereon in as the Do Something Model. It was created by adding the schemes to the Do Minimum model (TfL's 2041 Reference Case model).

To assess the impact of the scheme, this forecast year model audit report considers:

- Flow differences between the Do Minimum and Do Something models.
- Delay differences between the Do Minimum and Do Something models.
- Journey time differences between the Do Minimum and Do Something models.

2. Model Files

The 2041 forecast year ELHAM files (version E3.09) were provided to WSP by TfL and included the following AM peak highway assignment files:

- E3_FY41_V149NET_LP08_AM.UFS
- E3_FY41_V149NET_LP08_AMq.UFS

As outlined in the *"ELHAM Base Year Model Fact Sheet v3.9a"* (TfL) the model with 'q' in its title represent the PASSQ assignment which is a pre-load assignment.

3. The Scheme

Figure 1 illustrates the location of road space reallocation schemes against the 2041 ELHAM network. The scheme involves road space reallocation along the following roads:

- A2
- A21 / A2209 / A2210
- Whitefoot Lane and Southend Lane

The details of the road space reallocation along each route are discussed in Figure 1.

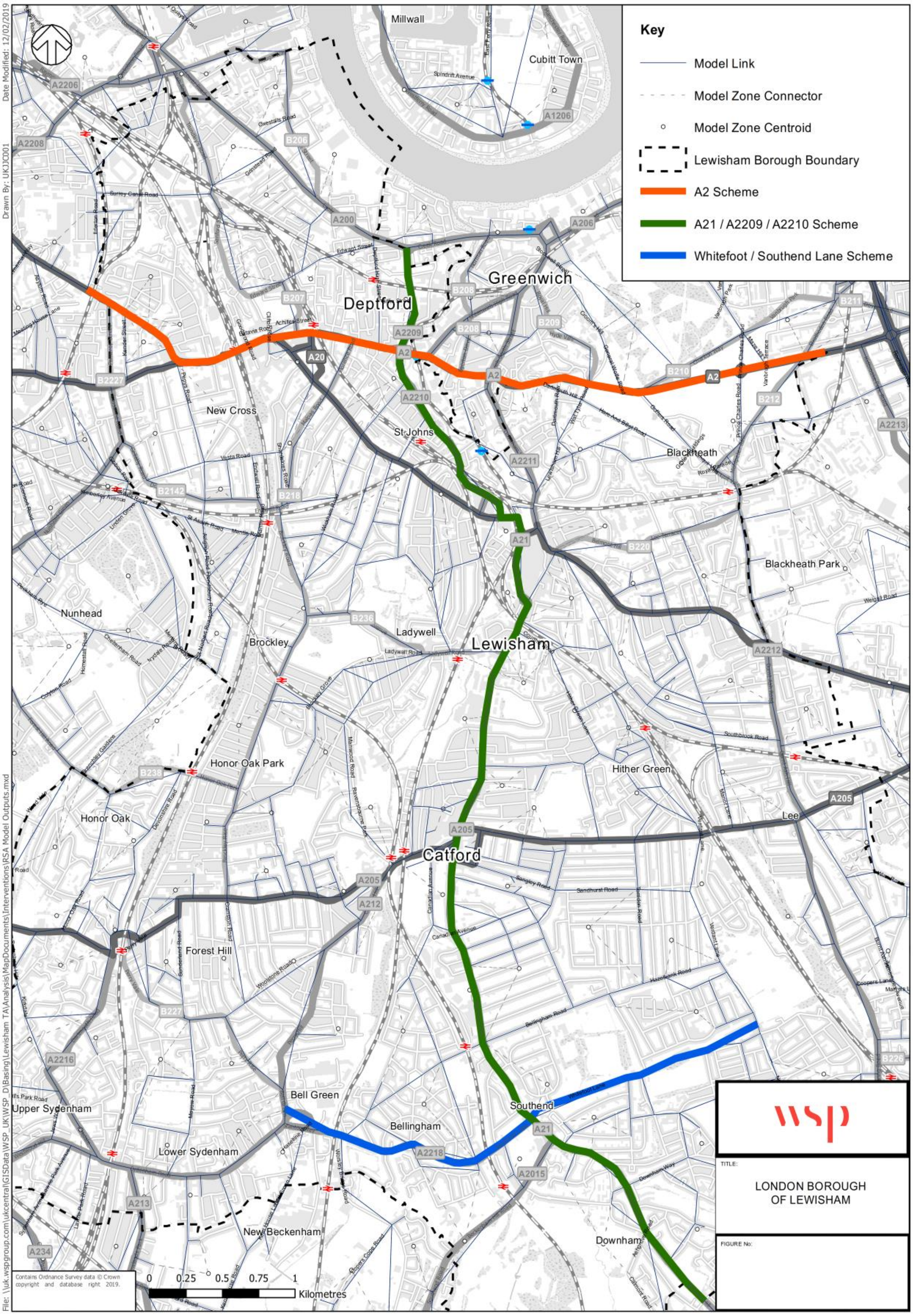


Figure 1: Locations of Road Space Reallocation

A2

As shown in Figure 1, the A2 runs east-west/west-east across the north of the Borough through Deptford. Much of the route currently features two lanes in either direction. Under the road space reallocation scheme, the road space would be relocated to form a single lane of carriageway plus in either direction, with 24-hour bus lanes, the latter of which would be wide enough to accommodate cyclists and enable them to pass buses easily.

The gyratory at New Cross might also be reconfigured, with two-way working for general traffic and buses along the northern arm. This has also been coded into the Do Something models, although the scheme is likely to evolve.

A21 / A2209 / A2210

The A21 / A2209 / A2210 corridor runs from the north of the Borough at CS4 all the way to the south of the Borough boundary with Bromley. Road space reallocation would convert the corridor to having a single lane of carriageway in each direction. There would also be continuous segregated cycle provision and bus lanes in both directions, except at junctions which may be more constrained and, where ideally cycle provision would take priority over bus provision.

Whitefoot Lane and Southend Lane

Whitefoot Lane and Southend Lane run east-west/west-east across the south of the Borough. The proposals are for a single lane of carriageway and continuous segregated cycle provision in each direction. There would be no bus lanes, except on the approaches to the A21 junction. There may be pinch points at railway bridges.

4. Actual Flow

Figures 2 and 3 show modelled actual flows in the 2041 AM peak Do Minimum and Do Something models, respectively.

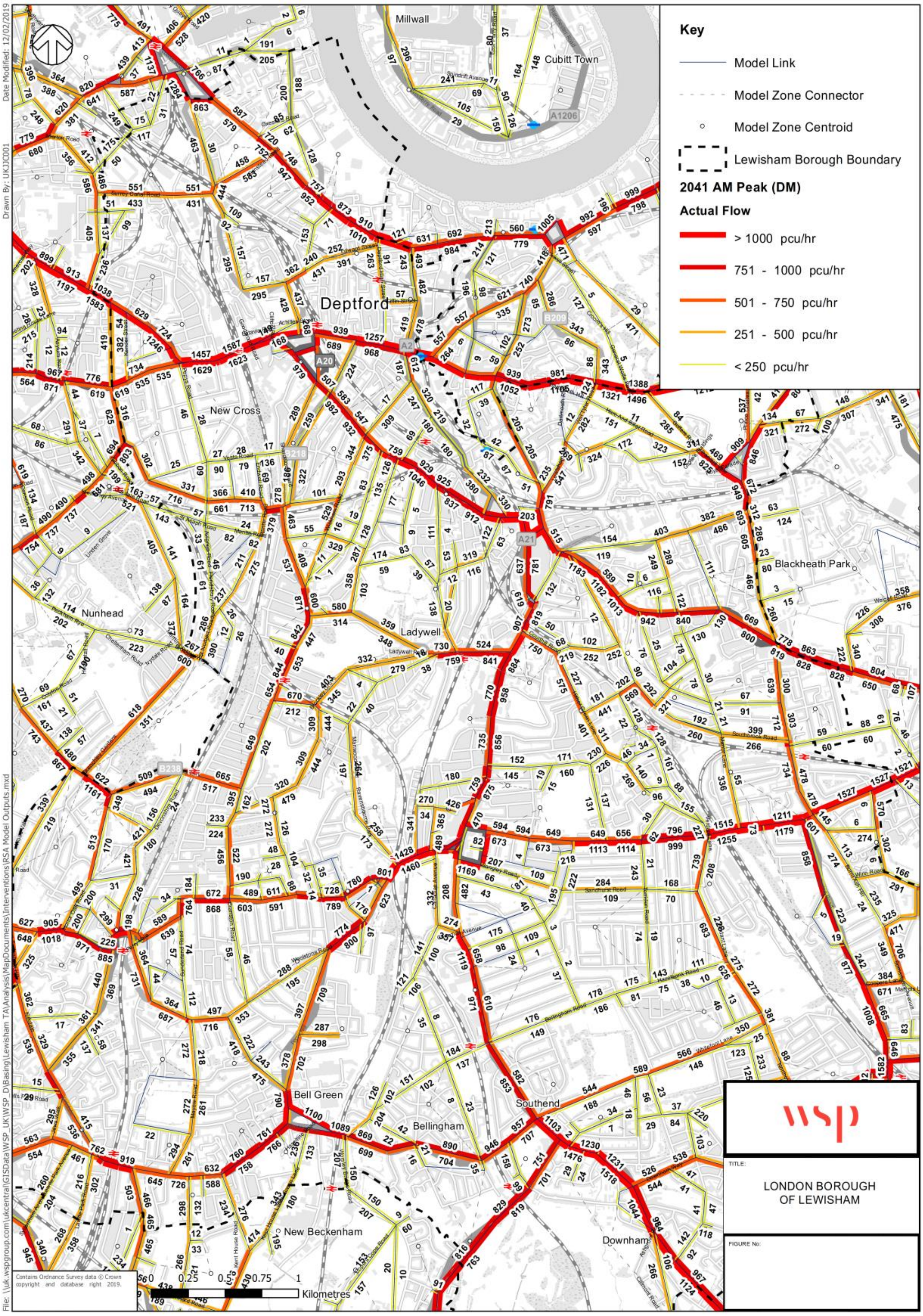


Figure 2: Actual Flow (Do Minimum)

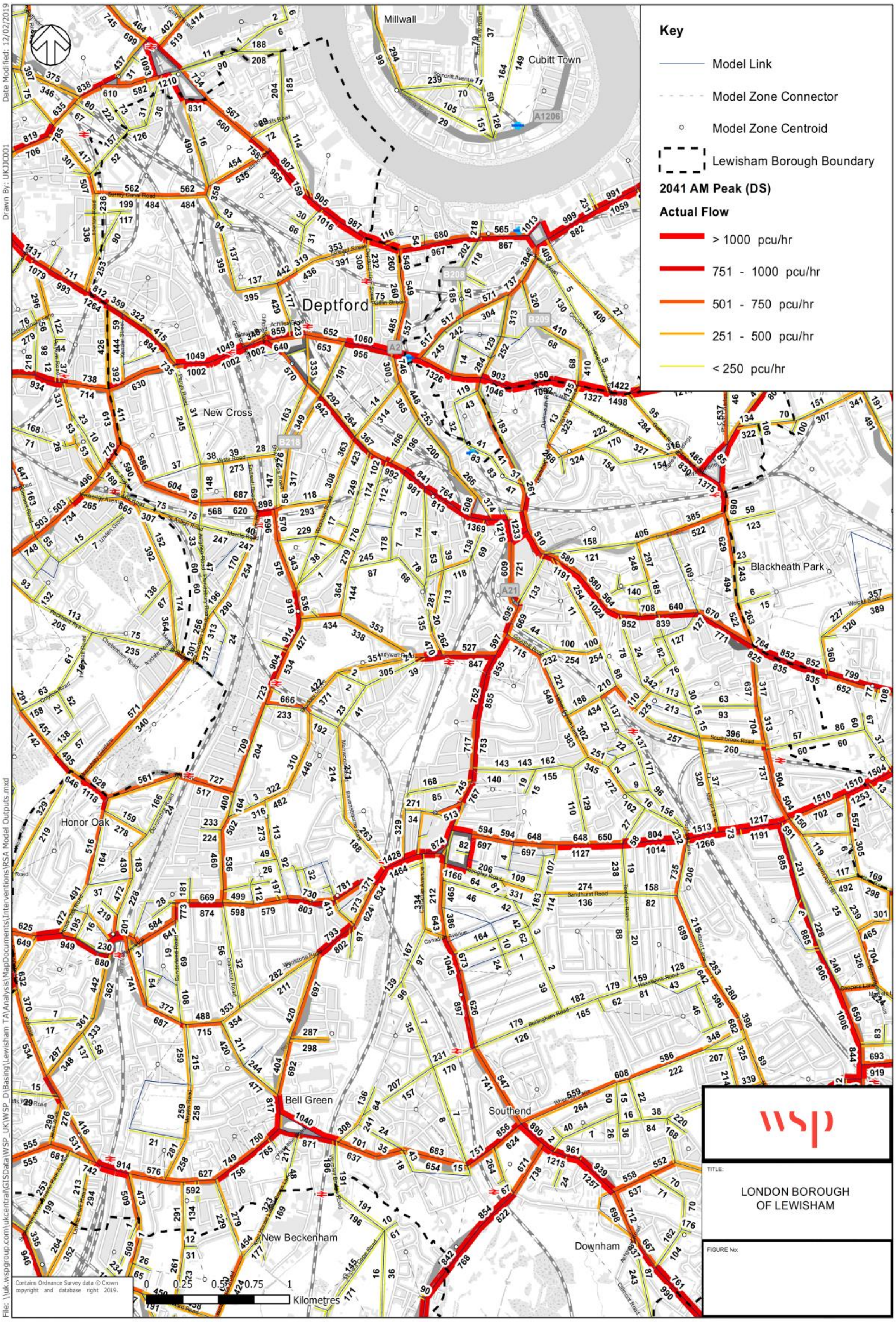


Figure 3: Actual Flow (Do Something)

5. Actual Flow Difference

Figures 4 and 5 show actual traffic flow and actual percentage difference between the 2041 AM peak Do Minimum and Do Something models, respectively. The actual flow differences are discussed below.

A2

The impact of road space allocation on traffic flows along the A2 is particularly evident on the A2 in the north-west of the Borough where there are actual traffic flow reductions as low as **-620 pcu/hr**. In the Do Minimum model, much of this stretch has two lanes in both directions, which would be converted to one lane and a bus lane in each direction under the scheme’s proposals.

The impact of the scheme is less in the north-east of the Borough on the A2, as much of this section is single carriageway in both directions in the Do Minimum model already. Traffic flow reductions here are approximately **-50 pcu/hr**.

A21 / A2209 / A2210

The impact of the scheme on the A21 / A2209 / A2210 corridor is mixed, depending on location in the Borough.

In the north of the Borough around Deptford, traffic flow increases as high as **130 pcu/hr** are present on the A21, with no traffic flow decreases on the A21 (just increases).

In the centre and south of the Borough on the A2209 / A2210, traffic flow decreases as low as **-350 pcu/hr** occur, although in the centre of the Borough, the traffic flow decreases are more subdued at around **-100 pcu/hr**. It is the very south of the Borough near the boundary with Bromley that experiences the greatest decreases in traffic flow, therefore.

Whitefoot Lane and Southend Lane

On Whitefoot Lane, there are traffic flow increases of up to approximately **85 pcu/hr**. In contrast, on Southend Lane, traffic flow decreases, with the lowest decrease being approximately **-210 pcu/hr**.

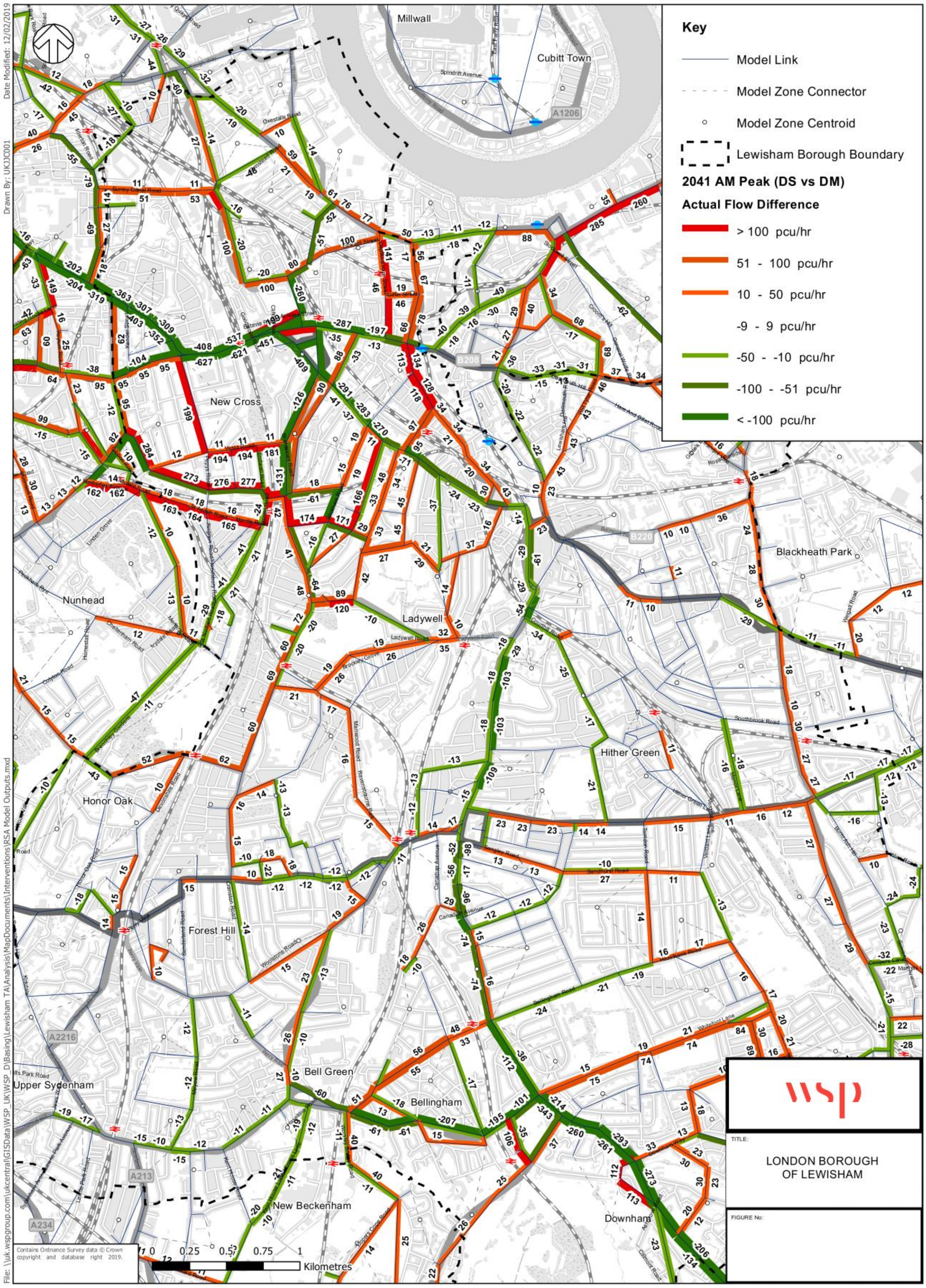


Figure 4: Actual Flow Difference (Do Something vs Do Minimum)

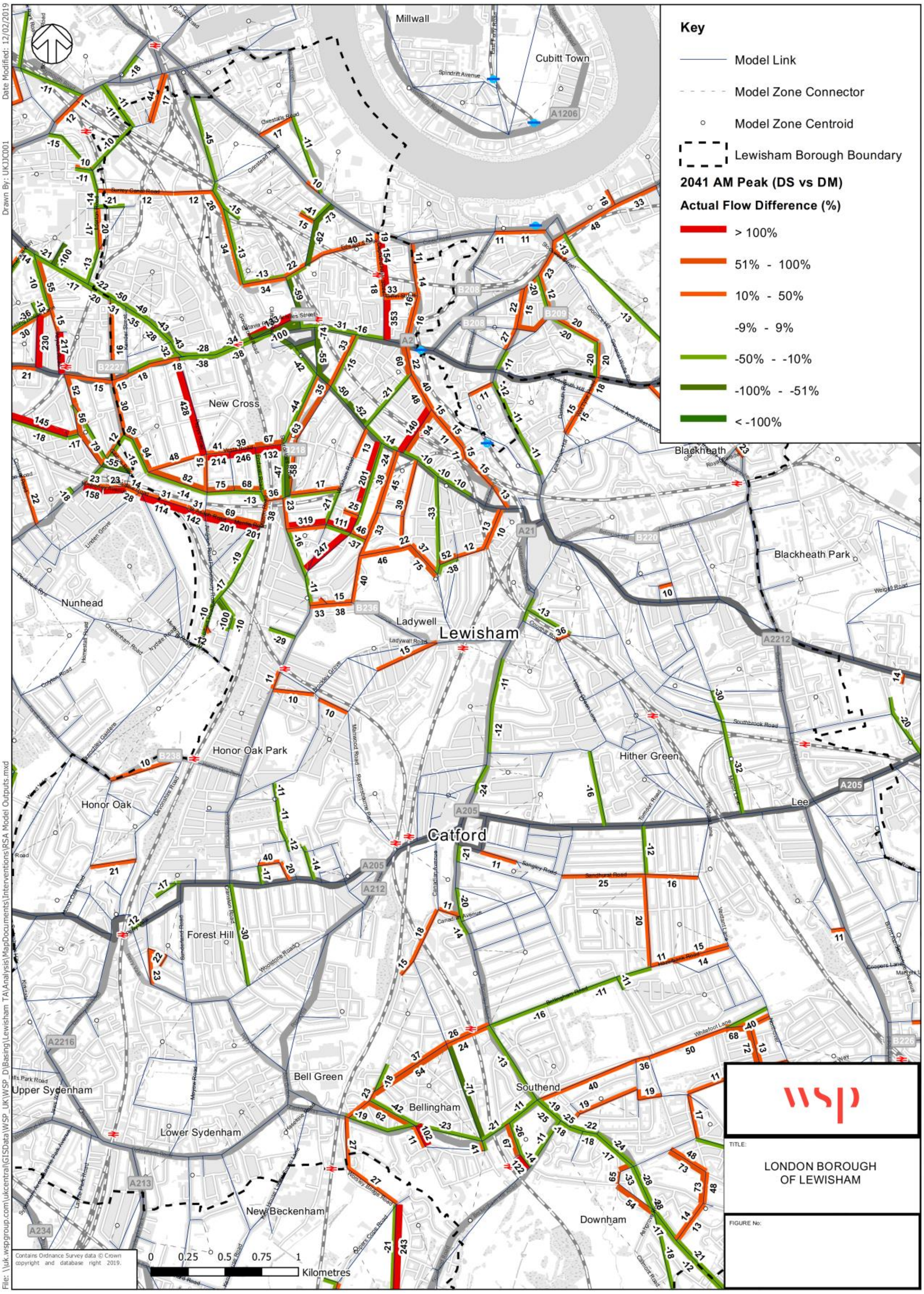


Figure 5: Actual Flow % Difference (Do Something vs Do Minimum)

6. Delay

Figures 6 and 7 show modelled delays in the 2041 AM peak Do Minimum and Do Something models, respectively.

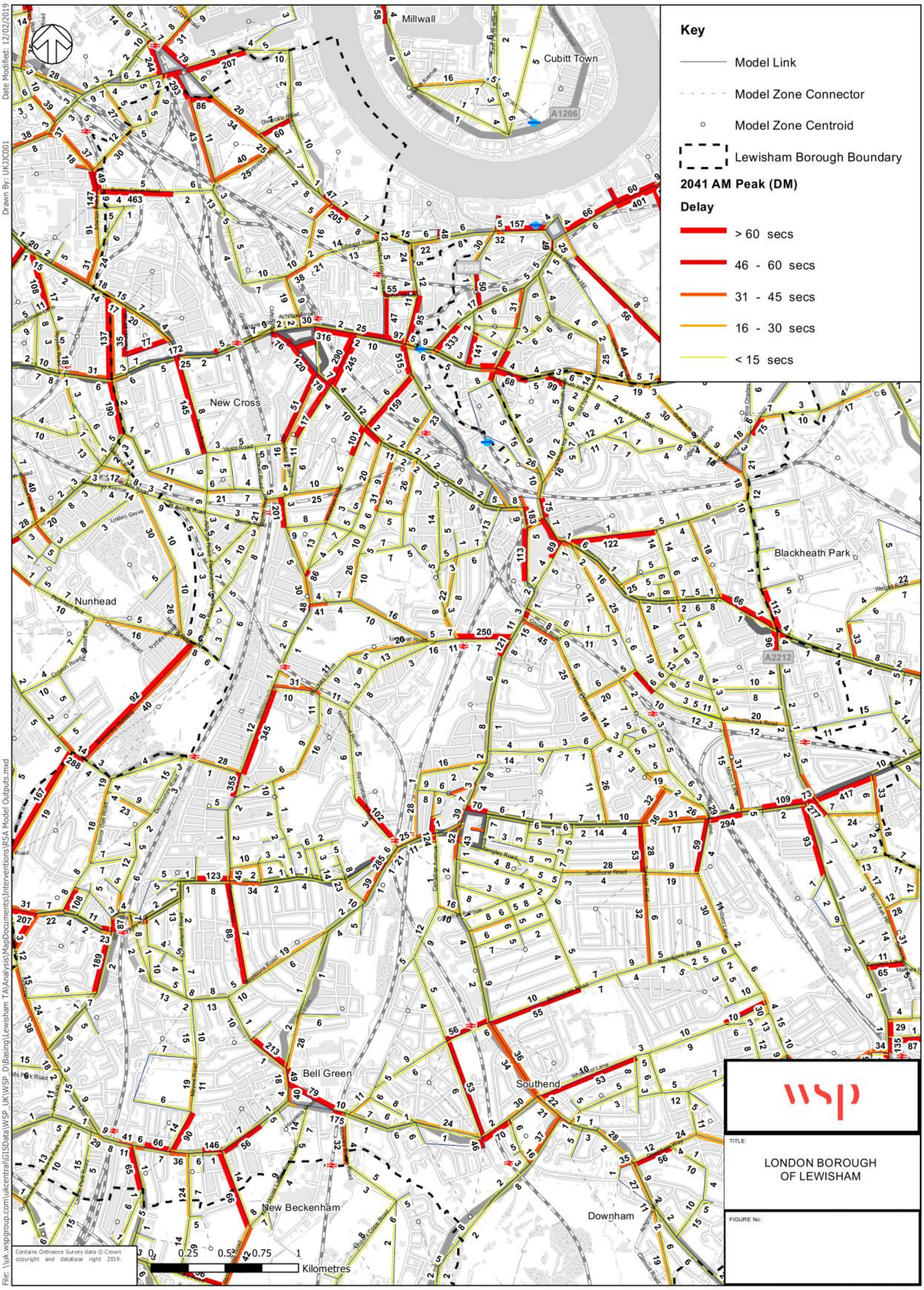


Figure 6: Delay (Do Minimum)

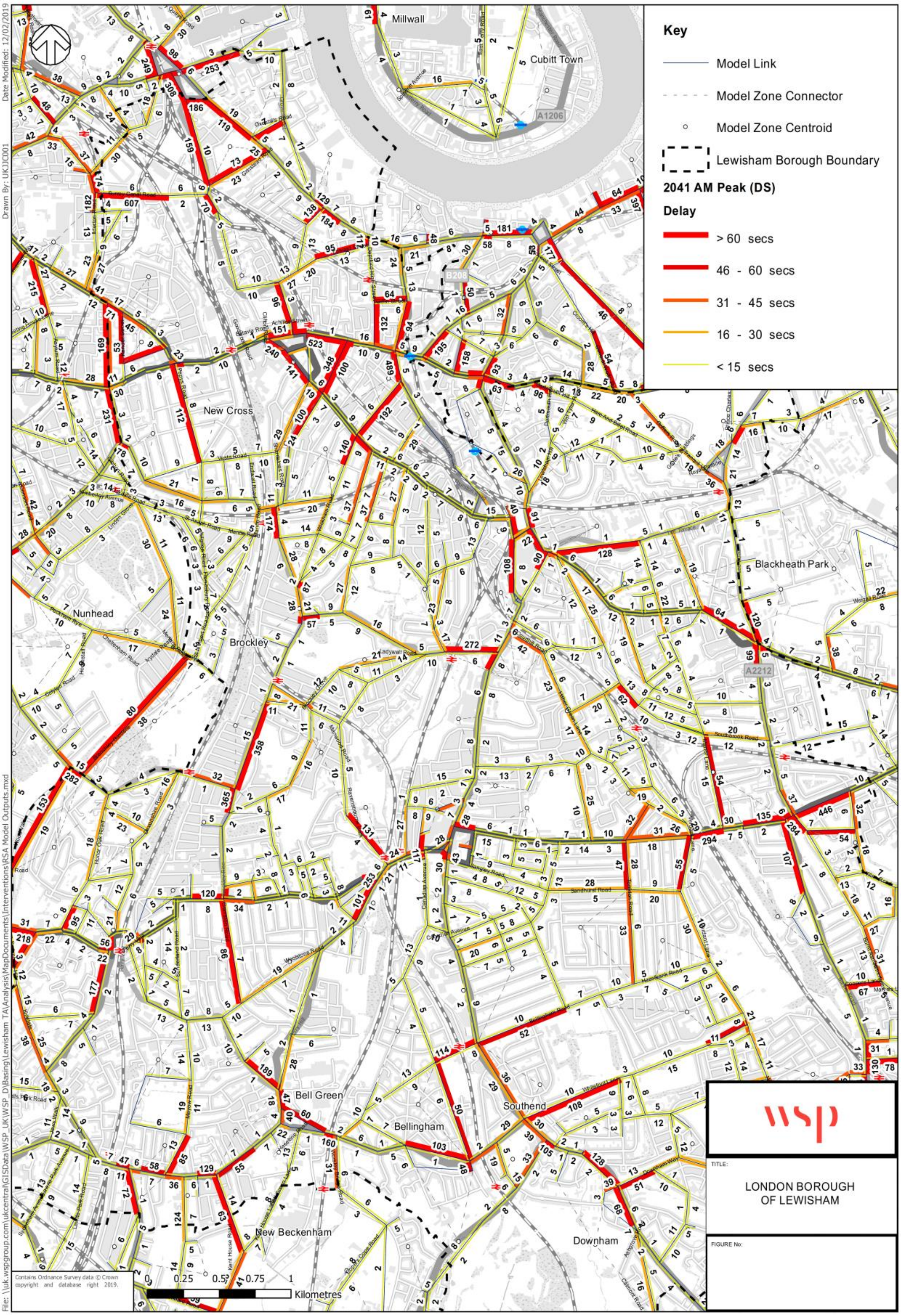


Figure 7: Delay (Do Something)

7. Delay Difference

Figure 8 shows delay difference between the 2041 AM peak Do Minimum and Do Something models.

Delay differences across the Borough are mainly present in the north around Deptford, where due to the New Cross gyratory being reconfigured in the Do Something models to feature two-way working along the northern arm, delays occur at the signalised junctions here. Signal optimisation was completed in the Do Something models, but even so, the maximum delay increase is **207 seconds,** down to a decrease of **-145 seconds**. This is evidence that further refinements to the New Cross gyratory scheme are recommended to reduce the negative effects on journey times in the area.

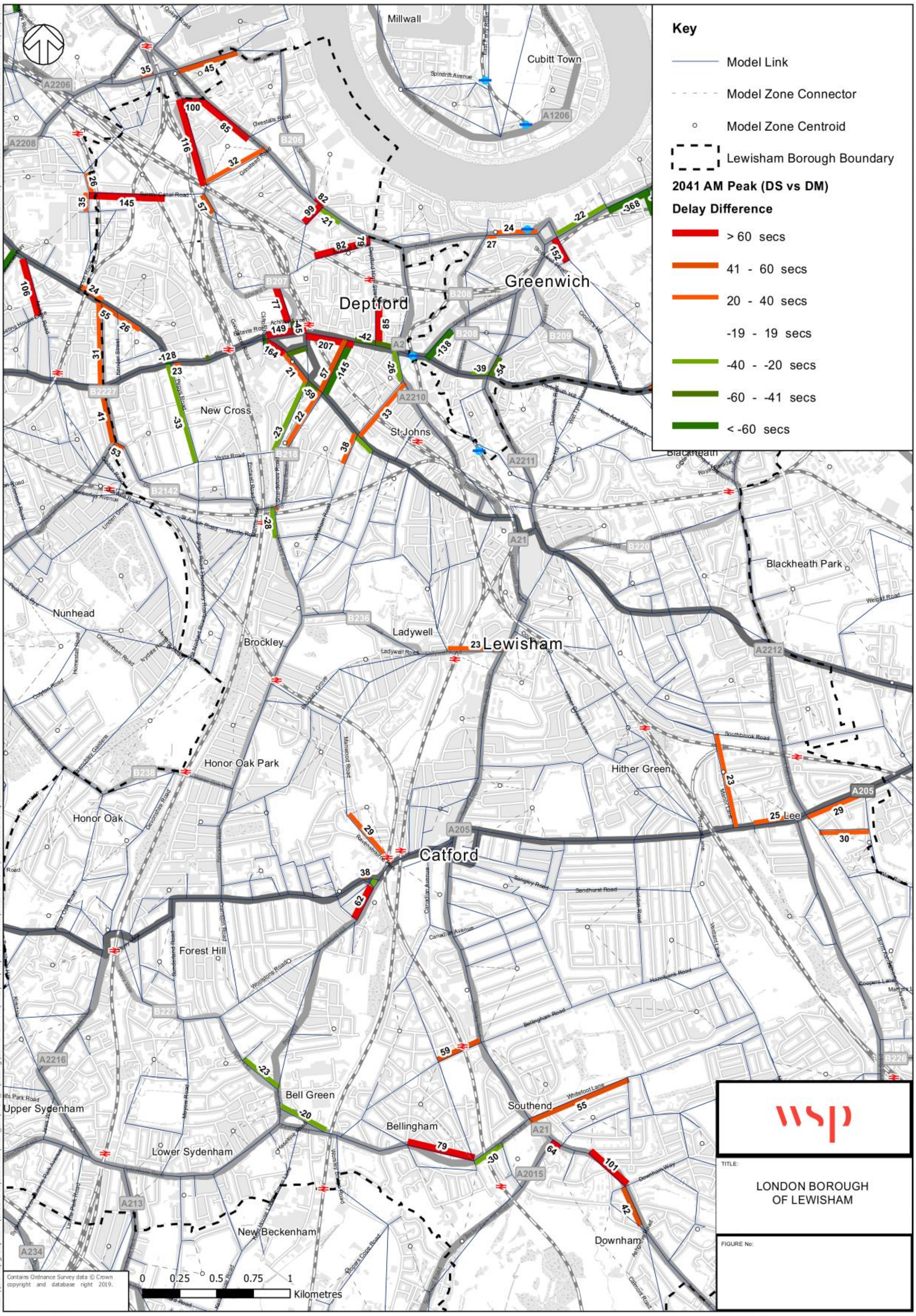


Figure 8: Delay Difference (Do Something vs Do Minimum)

8. Journey Times

TfL's ELHAM journey time routes have been selected to ascertain the extent to which journey times change because of flow increases/decreases across the Borough. A new bespoke route has also been created for this study along Whitefoot Lane and Southend Lane. The routes are shown in Figure 11.

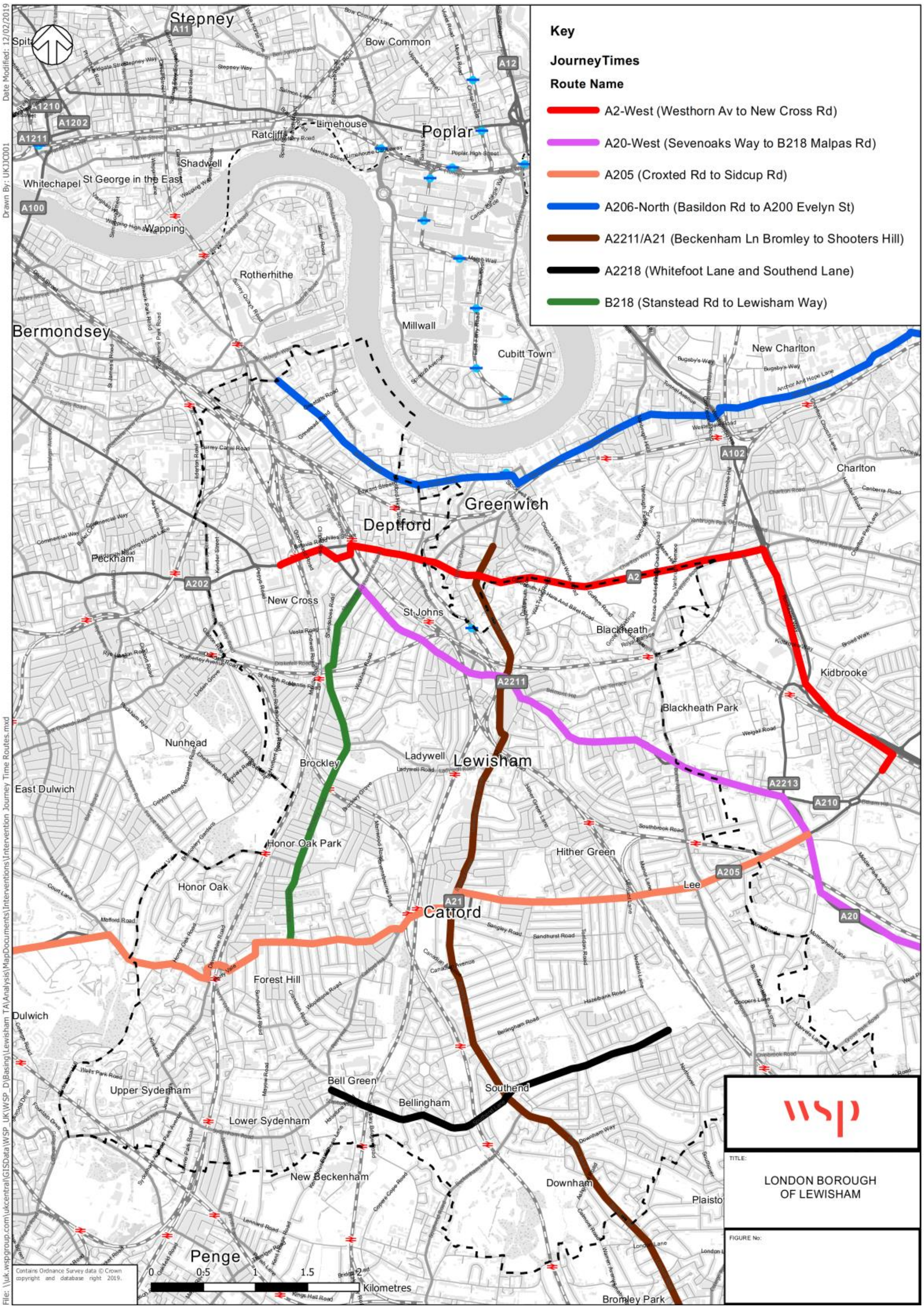


Figure 9: Journey Time Routes

Table 1 shows a comparison of the journey times along these routes in the Do Minimum and Do Something models.

Table 1: Modelled Journey Times

Route	Direction	Modelled Journey Time (s) DM	Modelled Journey Time (s) DS	Modelled Journey Time (s) Diff. (DS vs DM)	Modelled Journey Time (s) % Diff. (DS vs DM)
B218 (Stanstead Rd to Lewisham Way)	NB	1165	1175	**10**	**1%**
B218 (Stanstead Rd to Lewisham Way)	SB	912	965	**54**	**6%**
A2211/A21 (Beckenham Ln Bromley to Shooters Hill)	NB	1673	1775	**102**	**6%**
A2211/A21 (Beckenham Ln Bromley to Shooters Hill)	SB	1519	1601	**82**	**5%**
A206-North (Basildon Rd to A200 Evelyn St)	NB	3964	3205	**-759**	**-19%**
A206-North (Basildon Rd to A200 Evelyn St)	SB	2339	2430	**91**	**4%**
A2-West (Westhorn Av to New Cross Rd)	NB	2316	2856	**540**	**23%**
A2-West (Westhorn Av to New Cross Rd)	SB	1431	1658	**227**	**16%**
A20-West (Sevenoaks Way to B218 Malpas Rd)	EB	2158	2134	**-24**	**-1%**
A20-West (Sevenoaks Way to B218 Malpas Rd)	WB	2779	2773	**-5**	**0%**
A205 (Croxted Rd to Sidcup Rd)	EB	2234	2261	**27**	**1%**
A205 (Croxted Rd to Sidcup Rd)	WB	2802	2839	**36**	**1%**
A2218 (Whitefoot Lane and Southend Lane)	EB	670	726	**56**	**8%**
A2218 (Whitefoot Lane and Southend Lane)	WB	794	820	**26**	**3%**
Total	**All**	**26,757**	**27,218**	461	2%

Table 1 shows that all of the routes experience a journey time increase between the Do Minimum and Do Something models. The total increases across all routes is **+2%**. Due to the delays introduced around the New Cross area in the Do Something model, the A2 experiences journey time increases as high as **+23%**.

9. Conclusion

WSP has undertaken a highway impact assessment from implementing three road space reallocation schemes into the 2041 forecast year ELHAM within the London Borough of Lewisham.

The overall conclusion is that refinements to the New Cross gyratory scheme are recommended in order to reduce the negative effects on journey times here. In doing so, traffic flows on the A2 would likely increase as delays reduce.

The impact of the scheme on the A21 / A2209 / A2210 corridor is mixed, depending on location in the Borough, with traffic flow increases in the north, but traffic flow decreases in the centre and south of the Borough.

On Whitefoot Lane, there are traffic flow increases of up to approximately 85 pcu/hr. In contrast, on Southend Lane, traffic flow decreases, with the lowest decrease being approximately -210 pcu/hr.

Appendix F – Technical Note – ELHAM CS4 and Catford Gyratory Technical Note – Lewisham Local Plan Transport Assessment

Date: 12 August 2019

1. Introduction

In June 2019, WSP was tasked by the London Borough of Lewisham (LBL) to model the impact of Cycle Superhighway 4 (CS4) and the proposed June 2019 Catford Gyratory scheme in Catford Town Centre. Strategic transport modelling is required to help provide the evidence base to assess the impact on the highway network.

The latest version of Transport for London's (TfL's) 2026 West London Highway Assignment Model (ELHAM) has been used to model the impacts in the AM peak. It reflects 2026 network conditions and traffic. This model is referred to hereon in as the Do Minimum model, since it does not include CS4 or the Catford Gyratory scheme.

The model containing CS4 and the Catford Gyratory scheme is referred to hereon in as the Do Something Model. It was created by adding both schemes to the Do Minimum model (TfL's 2026 Reference Case model).

To assess the impact of the scheme, this forecast year model audit report considers:

- Flow differences between the Do Minimum and Do Something models.
- Delay differences between the Do Minimum and Do Something models.
- Journey time differences between the Do Minimum and Do Something models.

2. Model Files

The 2026 forecast year ELHAM files (version E3.09) were provided to WSP by TfL and included the following AM peak highway assignment files:

- E3_FY26_V149NET_LP01_AM.UFS
- E3_FY26_V149NET_LP01_AMq.UFS

As outlined in the *“ELHAM Base Year Model Fact Sheet v3.9a”* (TfL) the model with ‘q’ in its title represent the PASSQ assignment which is a pre-load assignment.

3. The Scheme

Figure 1 illustrates the location of CS4 and the Catford Gyratory scheme against the 2026 ELHAM network.

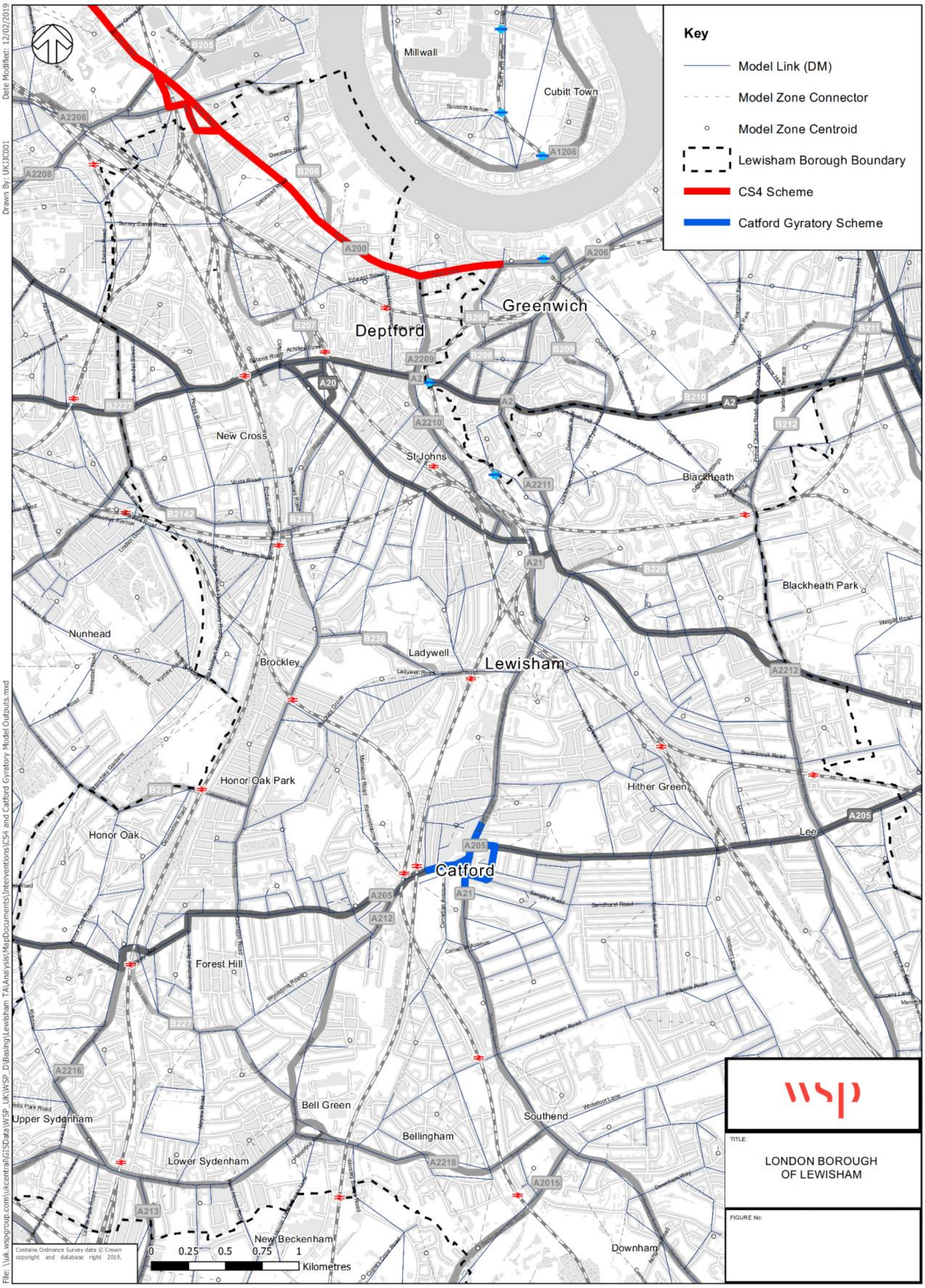


Figure 1: Locations of CS4 and the Catford Gyratory Scheme

Cycle Superhighway 4 (CS4)

TfL's Cycle Superhighway scheme aims to provide protected space for cycling on some of London's busiest roads. The Cycle Superhighways connect stations, town centres and key destinations, making them more accessible and easier for people to cycle to.

Cycle Superhighway 4 (CS4) would provide a continuous segregated cycle route between Tower Bridge and Greenwich, along with new pedestrian crossings, improved public spaces and a host of other improvements aimed at creating a more attractive environment for all users and accommodating the area's future growth. The overview map is shown in Figure 2.

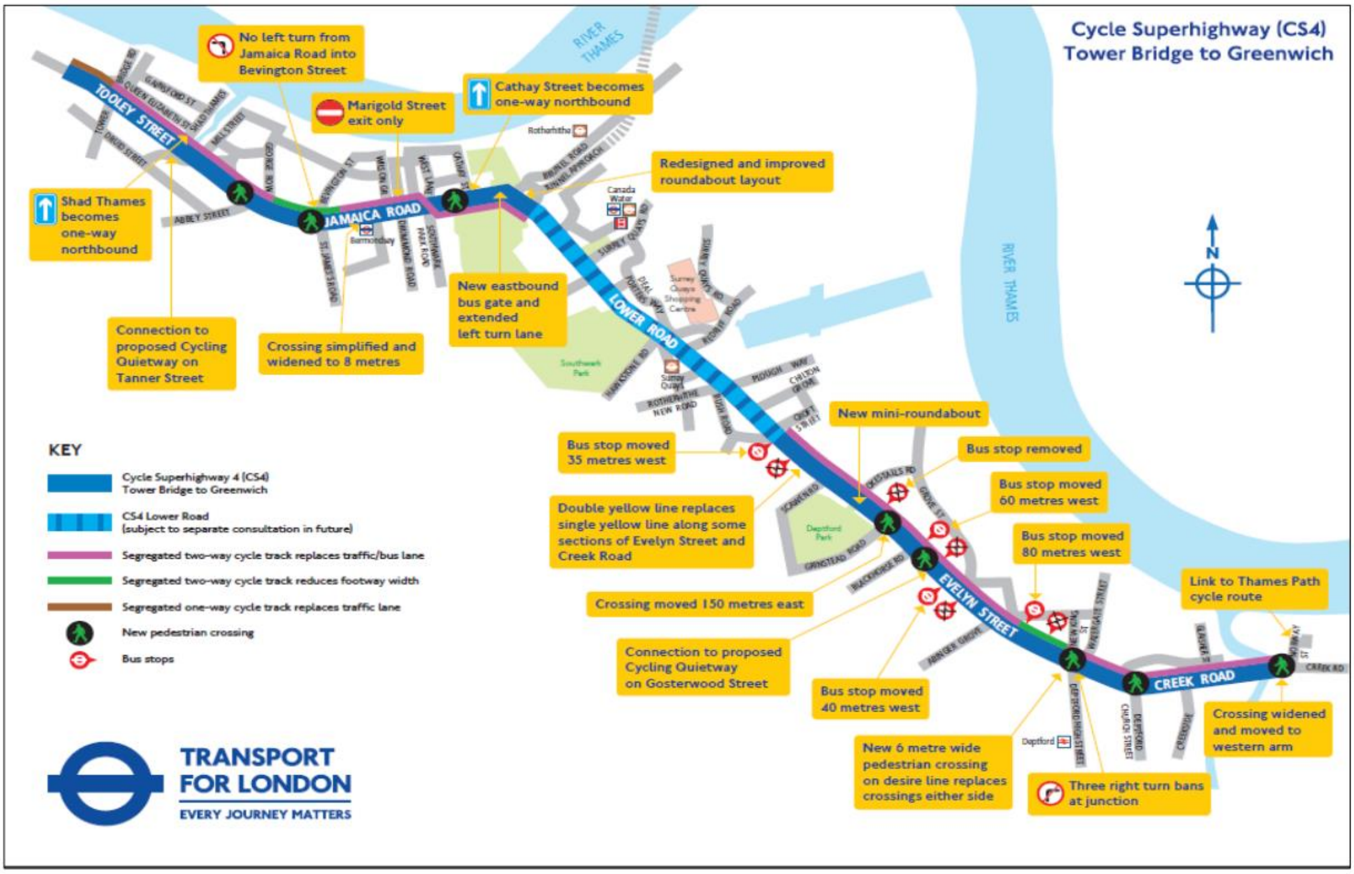


Figure 2: Cycle Superhighway 4

A section of CS4 (A200 Evelyn Street) goes through the London Borough of Lewisham.

Regarding modelling technicalities, all pre-loaded cycling flows in the model on Jamaica Road, Lower Road and into Lewisham and Greenwich were removed from the main carriageway, as the cycle superhighway is segregated. Initial assignment was undertaken before signal optimisation and re-assignment took place.

Catford Gyratory Scheme

A draft version (Version 1) of the Catford Gyratory scheme in Catford Town Centre was coded into the 2026 ELHAM model in January 2019, based upon the design received from TfL in January 2019 (see Figure 3a). Broadly, it involved converting the existing one-way gyratory system into a two-way system and creating a new larger junction between the A205 and A21, with space for cyclists to manoeuvre safely.

In June 2019, Version 2 of the design was received and this is now the version of the scheme coded into ELHAM and reported on in this Technical Note (see Figure 3b).

- The only change between Version 1 and Version 2 of the scheme is that the arm to the west of the main 4-arm junction has reduced from 2 lanes in Version 1 of the design to 1 lane up to Doggett Road (westbound).

There is a likelihood that the design proposal will evolve further from Version 2 and as and when this happens it would be prudent to reflect the changes within the ELHAM model to advise LBL of the impacts.

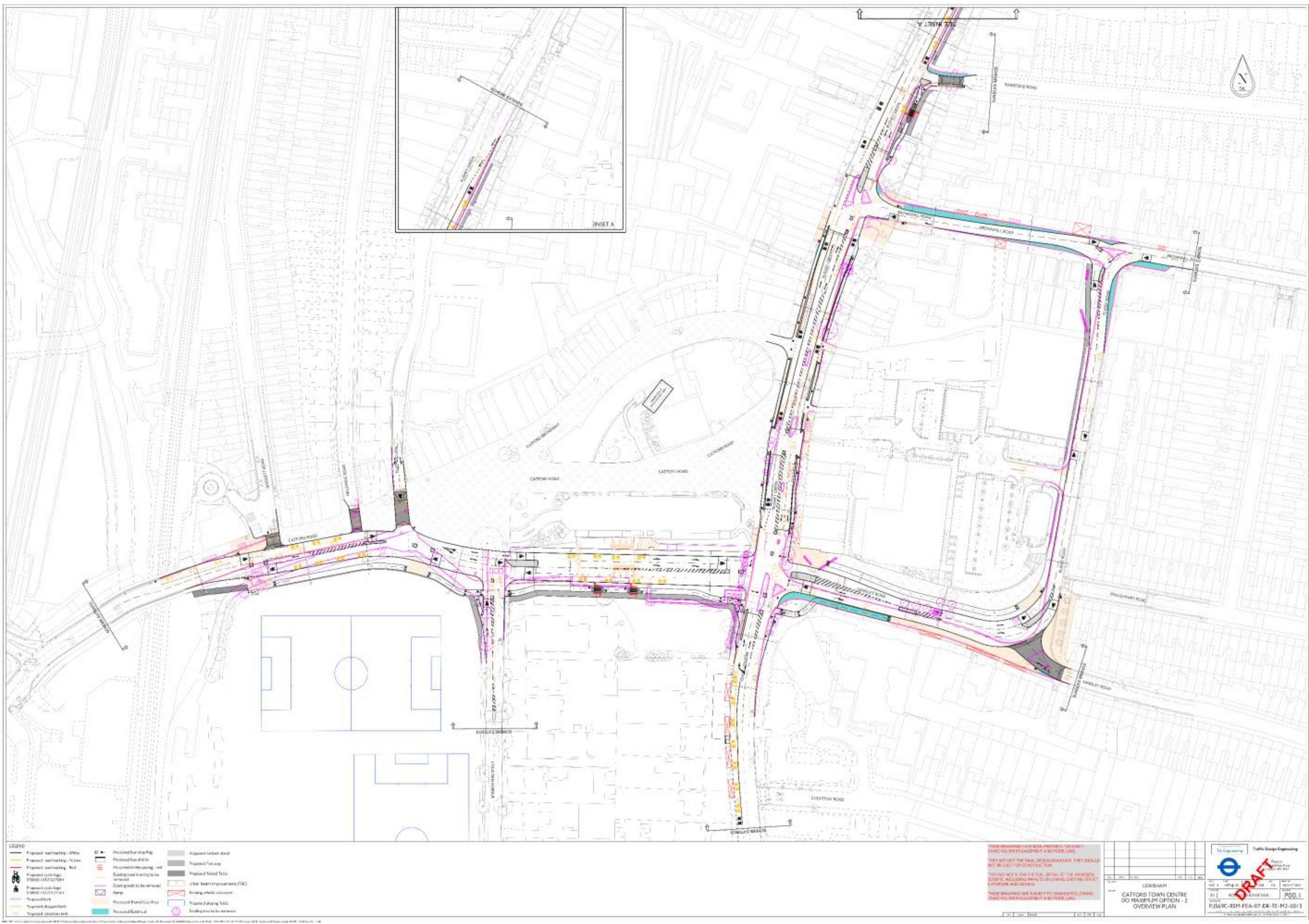


Figure 3a: Catford Gyratory Scheme (Version 1)

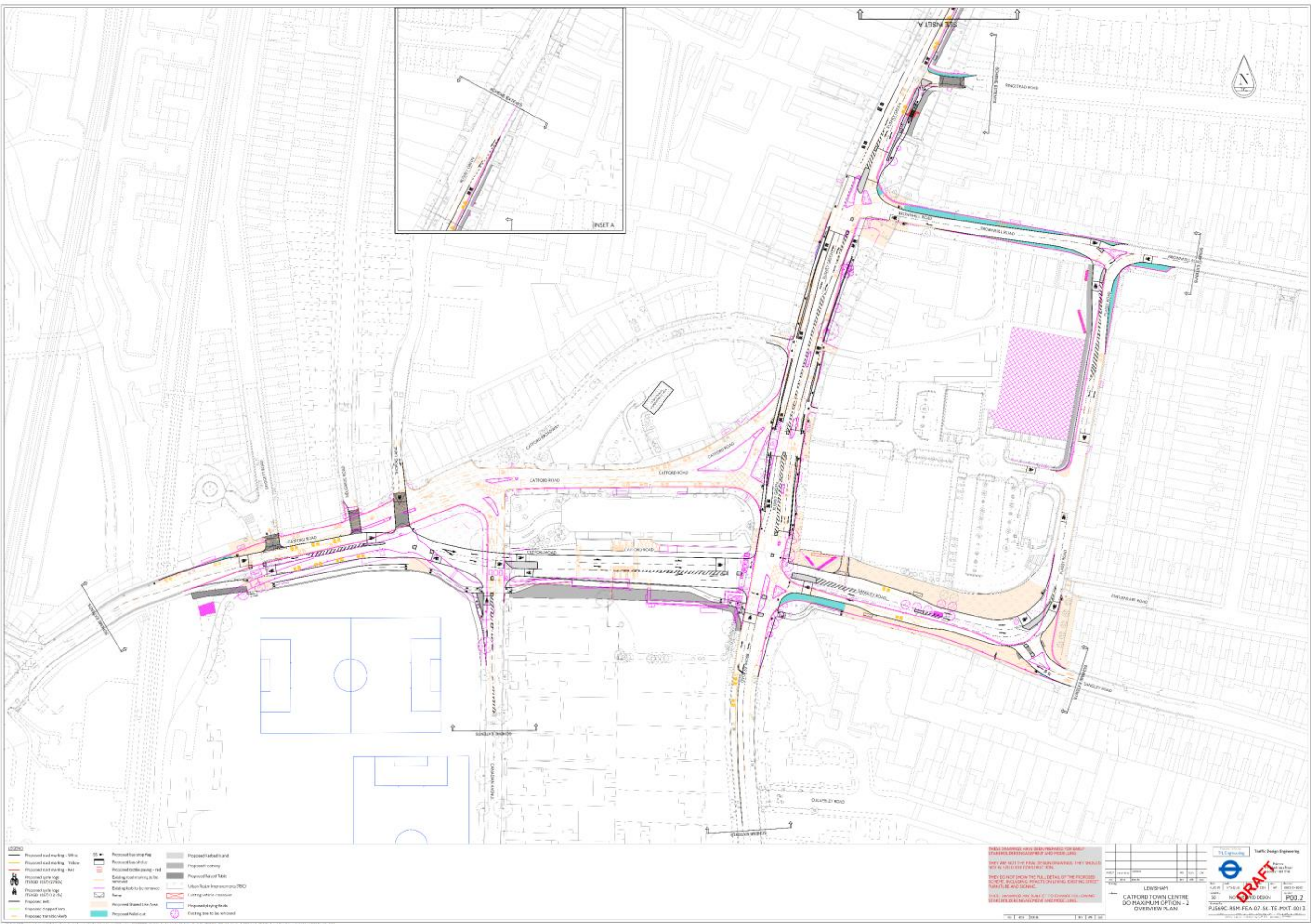


Figure 3b: Catford Gyratory Scheme (Version 2)

4. Actual Flow

Figures 4 and 5 show modelled actual flows in the 2026 AM peak Do Minimum and Do Something models, respectively.

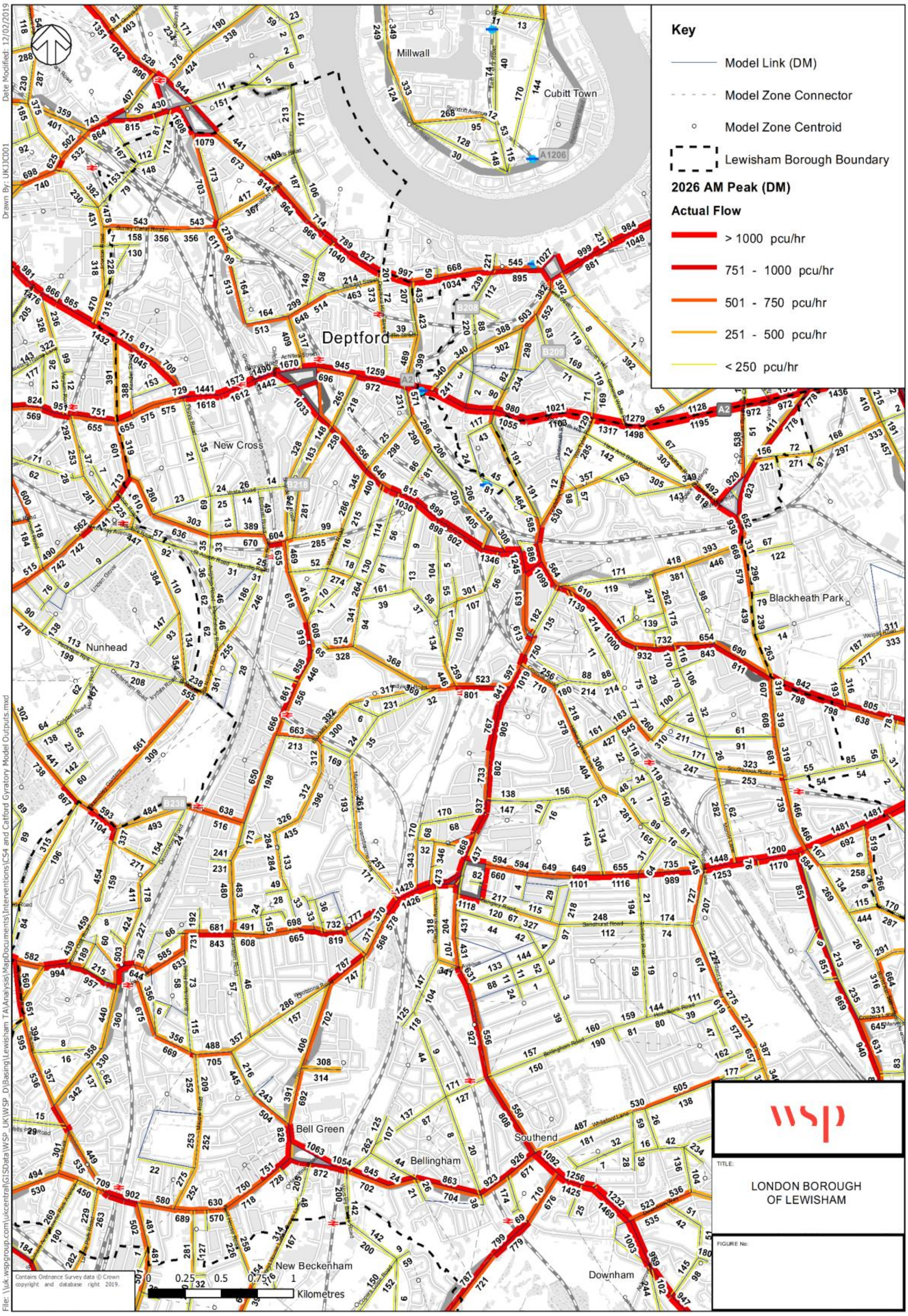


Figure 4: Actual Flow (Do Minimum)

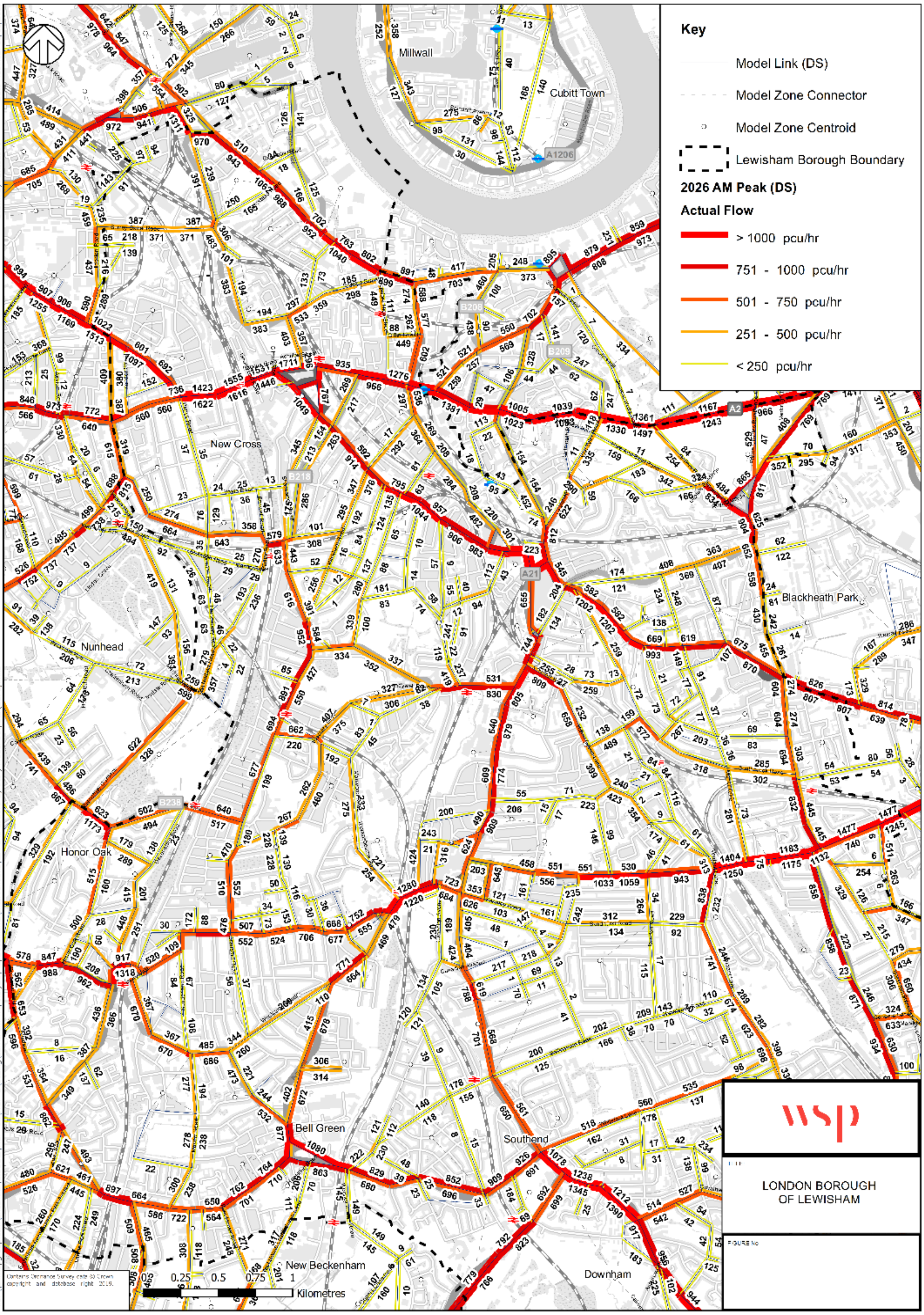


Figure 5: Actual Flow (Do Something)

5. Actual Flow Difference

Figures 6 and 7 show actual traffic flow and actual percentage difference between the 2026 AM peak Do Minimum and Do Something models, respectively. The actual flow differences are discussed below.

Appendix A shows traffic flow differences between Catford Gyratory June 2019 Design 2 and January 2019 Design 1.

Cycle Superhighway 4 Area

Due to improvements to cycling infrastructure along the route of CS4, there have been corresponding reductions in road capacity. These reductions in road capacity have led to some reductions in traffic flow on Jamaica Road, Lower Road and into the London Borough of Lewisham because of the road space re-allocation. Traffic flow reductions as low as **-520 pcu/hr** can be seen along the CS4 route.

The impact of this is that traffic is 'squeezed' off the strategic routes and re-routed, particularly along Needleman Street, Salter Road, Southwark Park Road, Grinstead Road and other minor roads in the London Borough of Lewisham.

If there was already spare capacity in the network, no additional delays have been created, as the delay analysis shows later in this Technical Note.

Catford Gyratory Area

High delays can be seen in the Catford Gyratory area at the main junction between the A205 and A21 (due to its 6-stage method of control). At the moment, there are large flow reductions on many of the strategic routes in the area (as low as **-1,100 pcu/hr**) as traffic re-routes to avoid delays. TfL may wish to make some tweaks to the Catford design to see if delays can be reduced. However, this will need to be balanced against the strong desire to see provision for pedestrian and cyclists prioritised over traffic movement, in line with the healthy streets approach. It should also be noted that this modelling exercise, as presented, assumes a simple reassignment of traffic to alternative routes, rather than any more complex behavioural change that may take place as a result of the increased journey times such as retiming of journeys, transfer of trips to other modes or the trip not being made at all. This will be picked up at a later stage in the study when the LTS runs are undertaken.

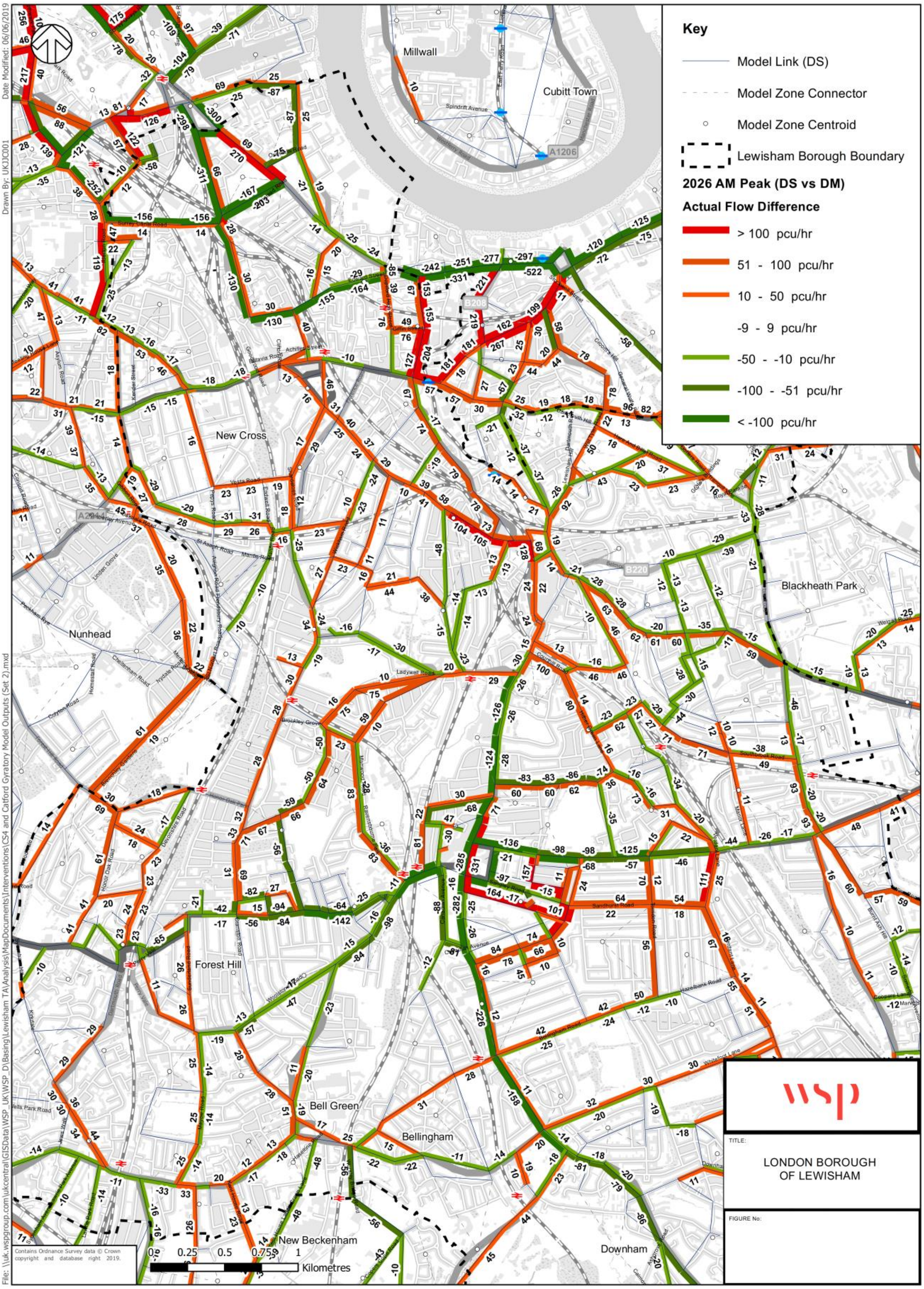


Figure 6: Actual Flow Difference (Do Something vs Do Minimum)

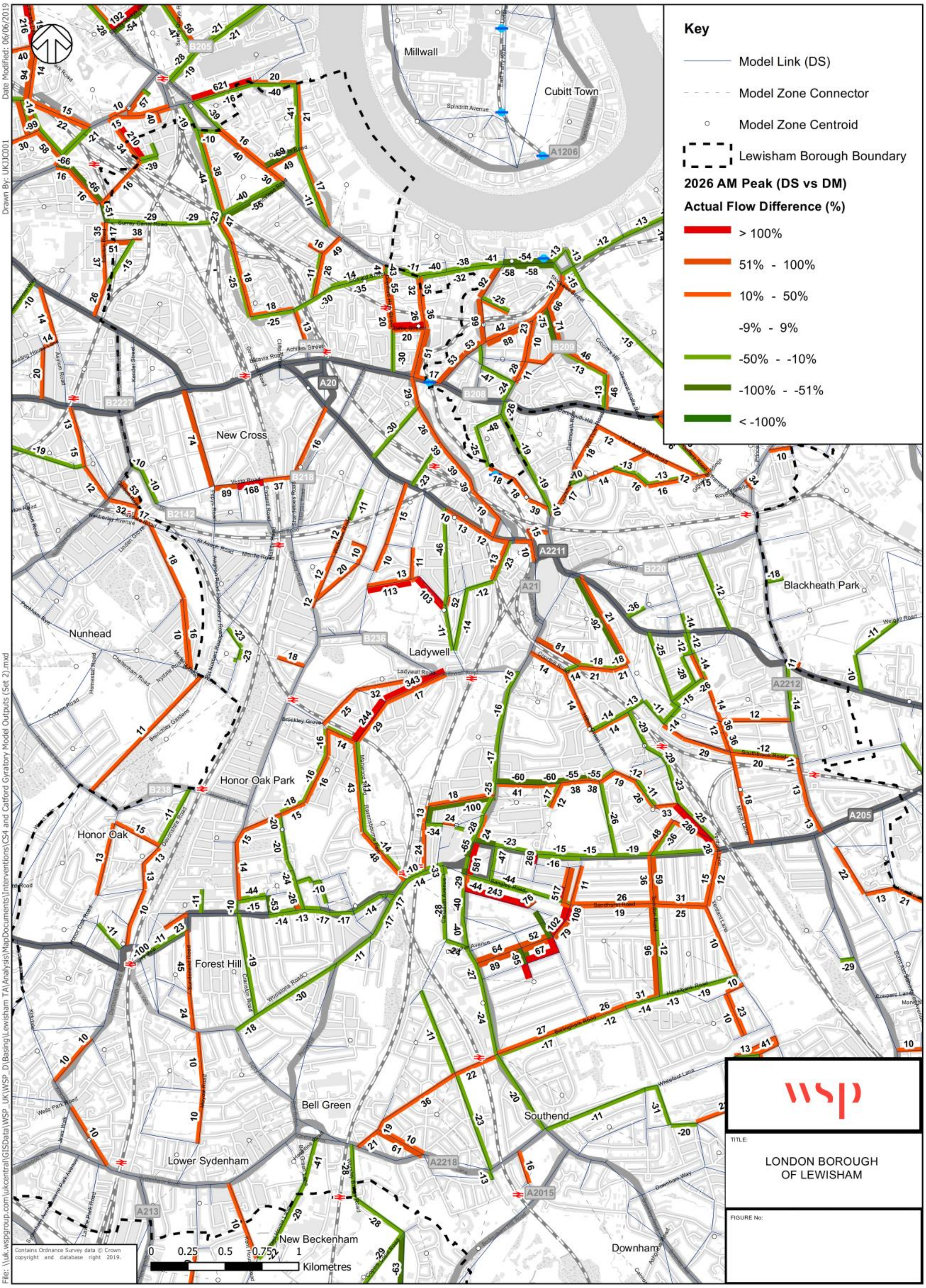


Figure 7: Actual Flow % Difference (Do Something vs Do Minimum)

6. Delay

Figures 8 and 9 show modelled delays in the 2026 AM peak Do Minimum and Do Something models, respectively.

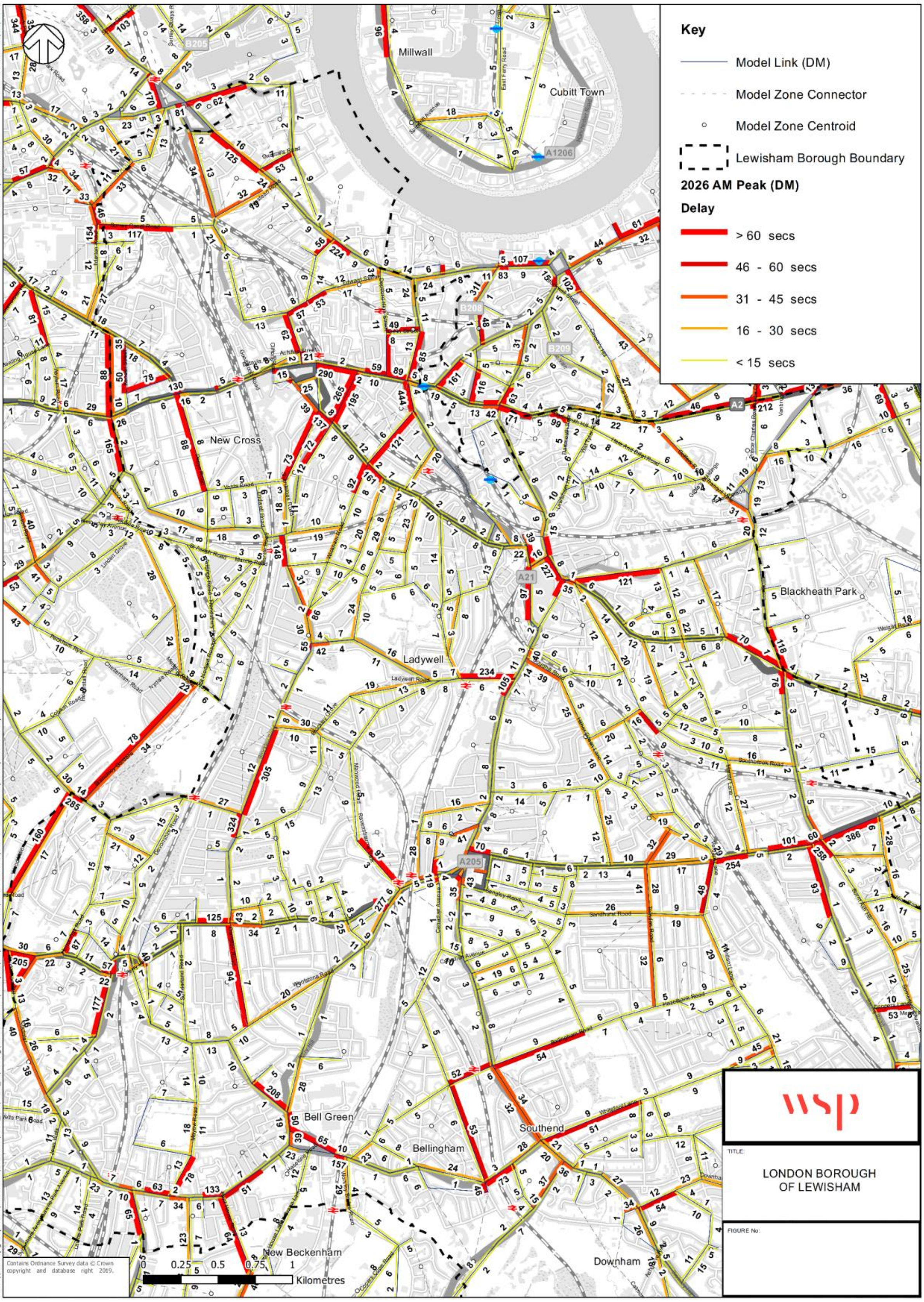


Figure 8: Delay (Do Minimum)

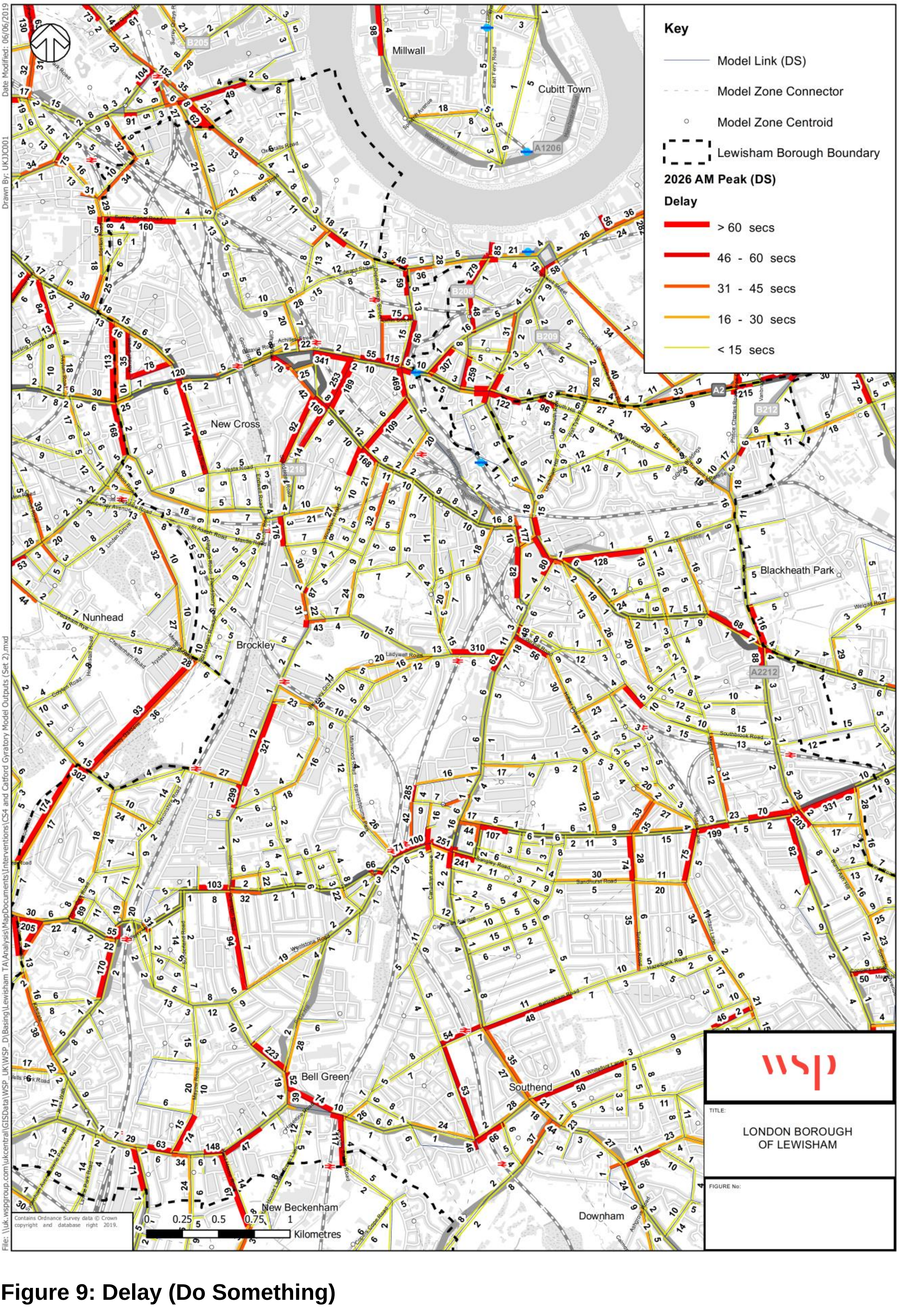


Figure 9: Delay (Do Something)

7. Delay Difference

Figure 10 shows delay difference between the 2026 AM peak Do Minimum and Do Something models. The delay differences are discussed below.

Appendix B shows delay differences between Catford Gyratory June 2019 Design 2 and January 2019 Design 1.

Cycle Superhighway 4 Area

Due to there already being some spare capacity in the network, few additional delays have been created because of the road space re-allocation along the route of CS4. There are isolated delay reductions of up to **-141 seconds** along small sections of the CS4 route, but these reductions are not widespread. In Greenwich, there are also isolated occurrences of delay increases due to sensitive signal timings but once again, these are not widespread.

Catford Gyratory Area

As mentioned previously the 6-stage method of control at the main junction between the A205 and A21 has created large delays of up to an additional **+230 seconds**.

- A comparison of the delays between Version 1 and Version 2 of the design shows that the delays are lower with the Version 2 scheme, by up to approximately **-60 seconds**.

However, journey times in the area are much the same between the two versions of the design. For example, a vehicle travelling westbound from the Catford Gyratory towards Catford Bridge station (about 0.5km) would find it approximately **15-20 seconds** quicker in Version 2 of the scheme than in Version 1 of the scheme, despite there only being 1 lane in this section of the network in Version 2.

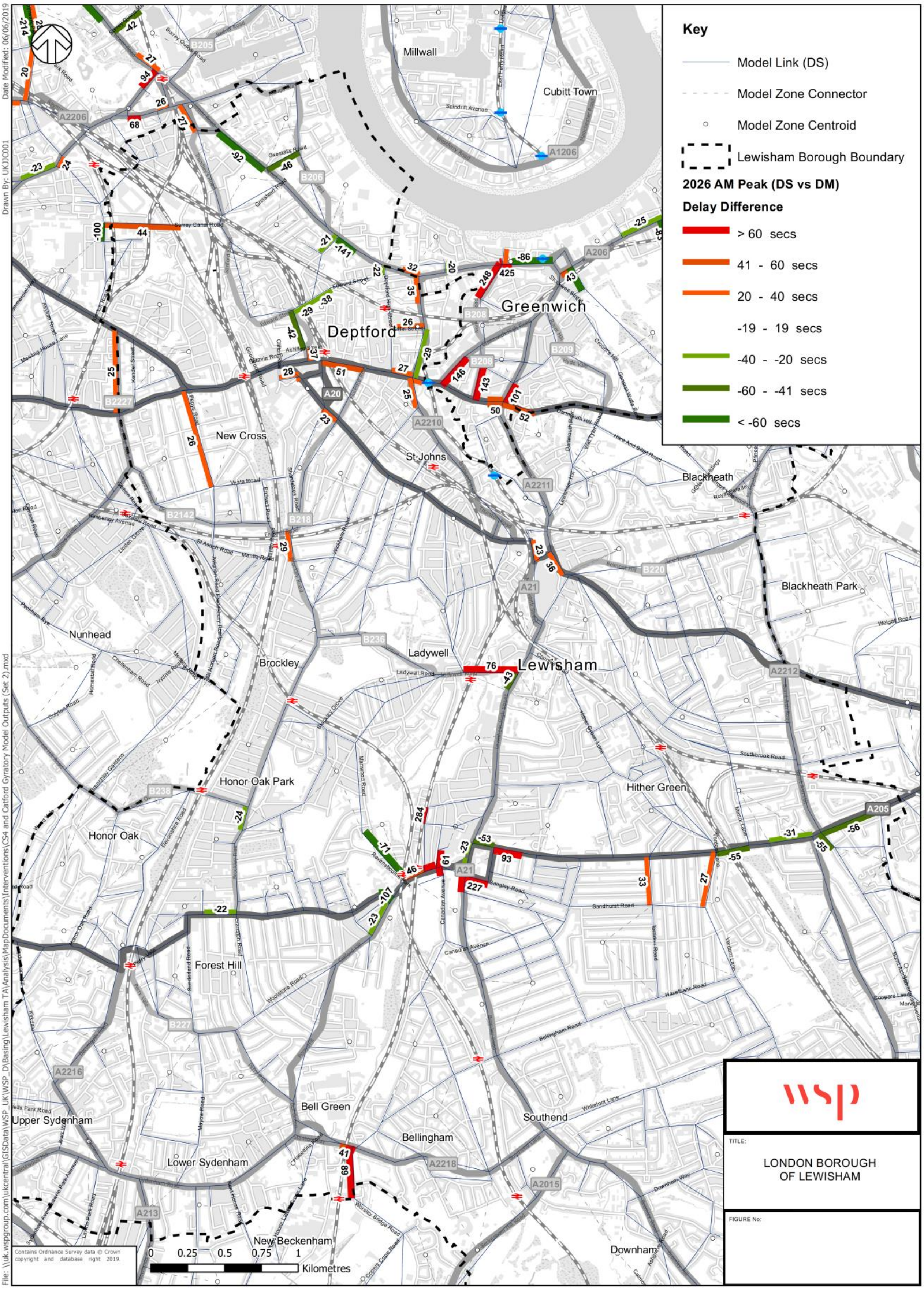


Figure 10: Delay Difference (Do Something vs Do Minimum)

8. Journey Times

TfL's ELHAM journey time routes have been selected to ascertain the extent to which journey times change because of flow increases/decreases across the Borough. A new bespoke route has also been created for this study along Whitefoot Lane and Southend Lane. The routes are shown in Figure 11.

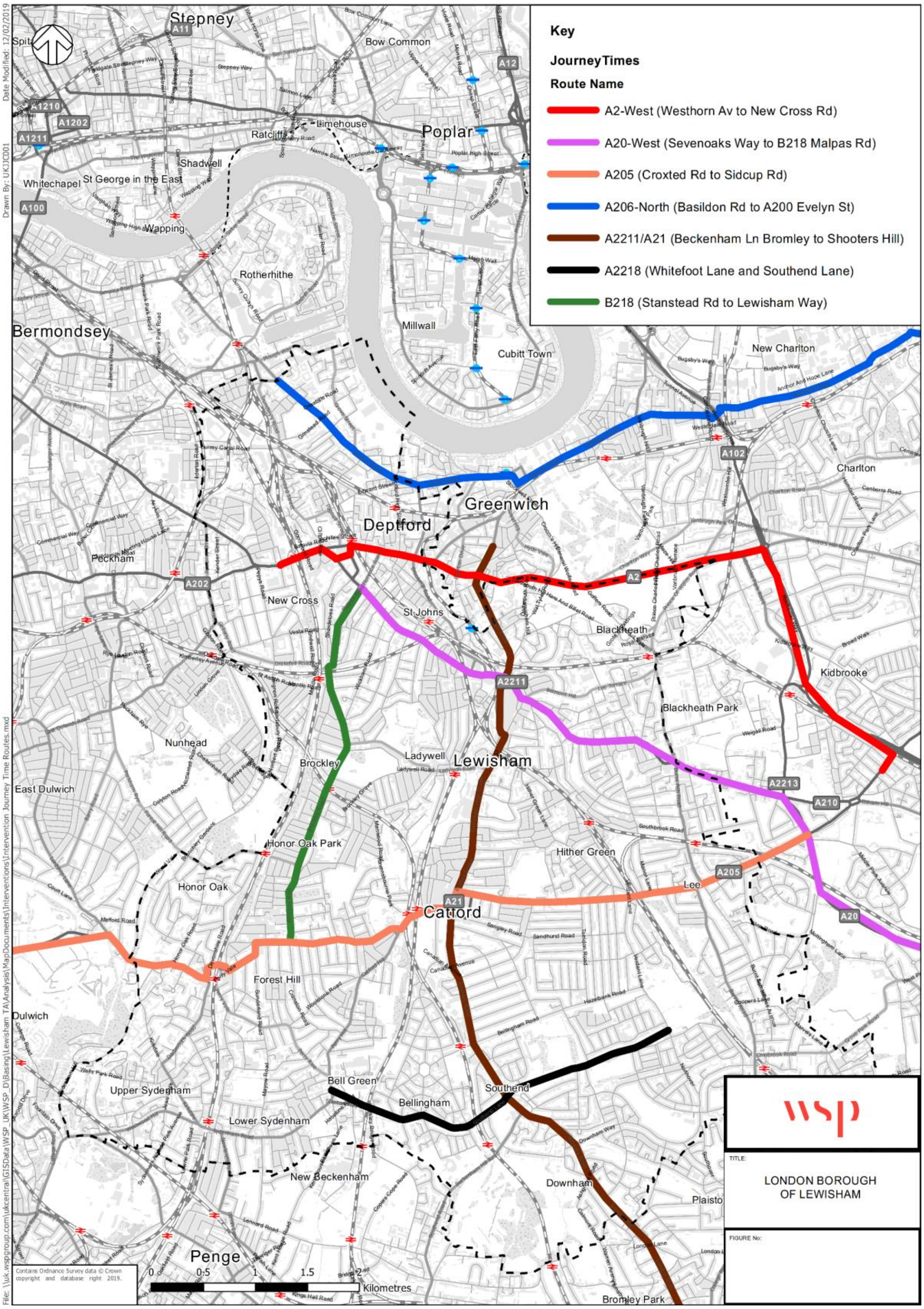


Figure 11: Journey Time Routes

Table 1 shows a comparison of the journey times along these routes in the Do Minimum and Do Something models.

Table 1: Modelled Journey Times

Route	Direction	Modelled Journey Time (s) DM	Modelled Journey Time (s) DS	Modelled Journey Time (s) Diff. (DS vs DM)	Modelled Journey Time (s) % Diff. (DS vs DM)
B218 (Stanstead Rd to Lewisham Way)	NB	1,086	1,104	**+18**	**+2%**
B218 (Stanstead Rd to Lewisham Way)	SB	860	880	**+20**	**+2%**
A2211/A21 (Beckenham Ln Bromley to Shooters Hill)	NB	1,618	1,768	**+150**	**+9%**
A2211/A21 (Beckenham Ln Bromley to Shooters Hill)	SB	1,392	1,729	**+337**	**+24%**
A206-North (Basildon Rd to A200 Evelyn St)	NB	3,090	3,212	**+122**	**+4%**
A206-North (Basildon Rd to A200 Evelyn St)	SB	2,132	2,363	**+231**	**+11%**
A2-West (Westhorn Av to New Cross Rd)	NB	2,022	2,226	**+205**	**+10%**
A2-West (Westhorn Av to New Cross Rd)	SB	1,349	1,408	**+59**	**+4%**
A20-West (Sevenoaks Way to B218 Malpas Rd)	EB	2,017	2,041	**+24**	**+1%**
A20-West (Sevenoaks Way to B218 Malpas Rd)	WB	2,579	2,629	**+50**	**+2%**

Route	Direction	Modelled Journey Time (s) DM	Modelled Journey Time (s) DS	Modelled Journey Time (s) Diff. (DS vs DM)	Modelled Journey Time (s) % Diff. (DS vs DM)
A205 (Croxted Rd to Sidcup Rd)	EB	2,166	2,261	**+95**	**+4%**
A205 (Croxted Rd to Sidcup Rd)	WB	2,640	2,703	**+63**	**+2%**
A2218 (Whitefoot Lane and Southend Lane)	EB	646	658	**+12**	**+2%**
A2218 (Whitefoot Lane and Southend Lane)	WB	775	882	**+107**	**+14%**
Total	**All**	24,372	25,863	+1,491	**+6%**

Table 1 shows that all of the routes experience a journey time increase between the Do Minimum and Do Something models. The total increases across all routes is **+6%**.

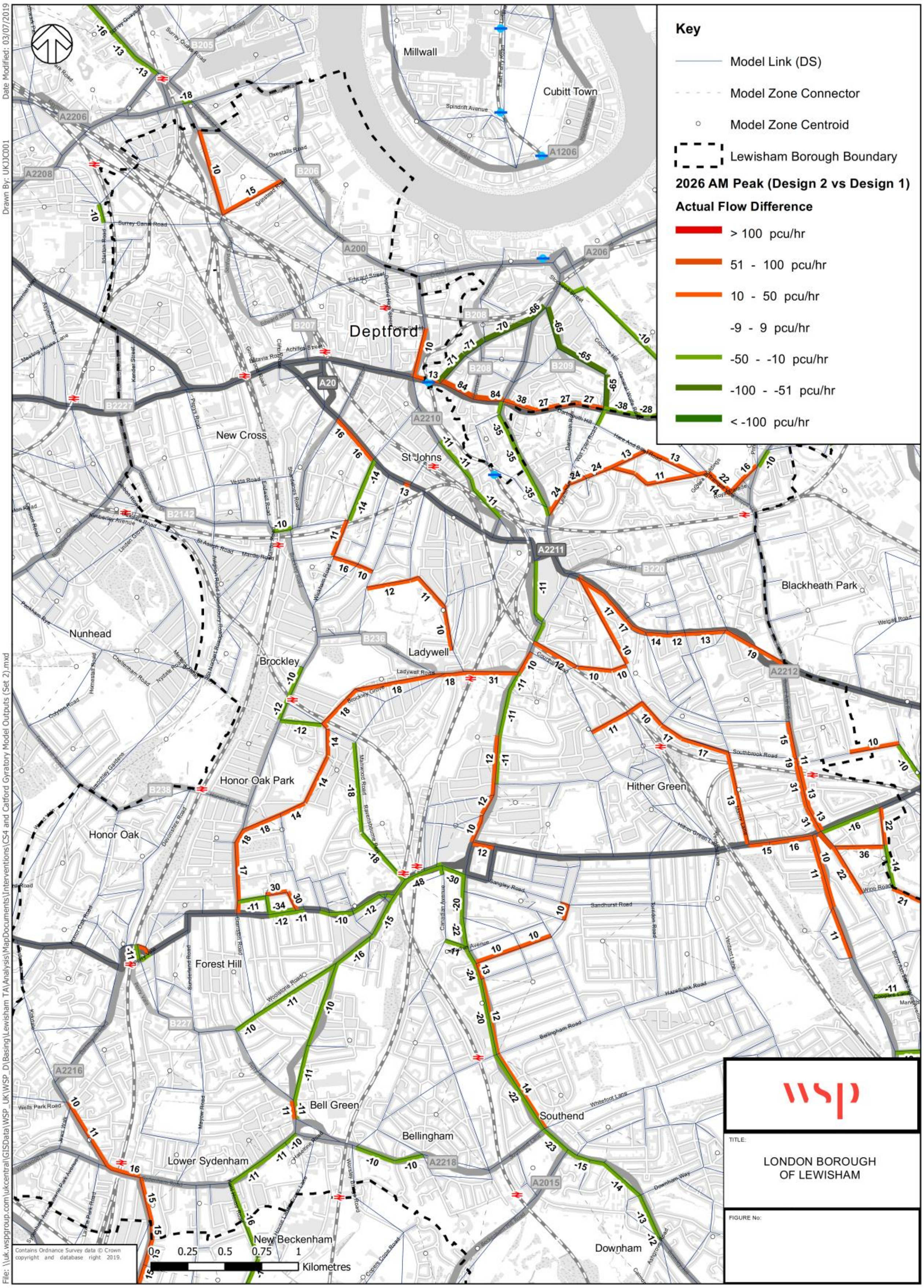
9. Conclusion

WSP has undertaken a highway impact assessment from implementing CS4 and the Catford Gyratory scheme into the 2026 forecast year ELHAM within the London Borough of Lewisham.

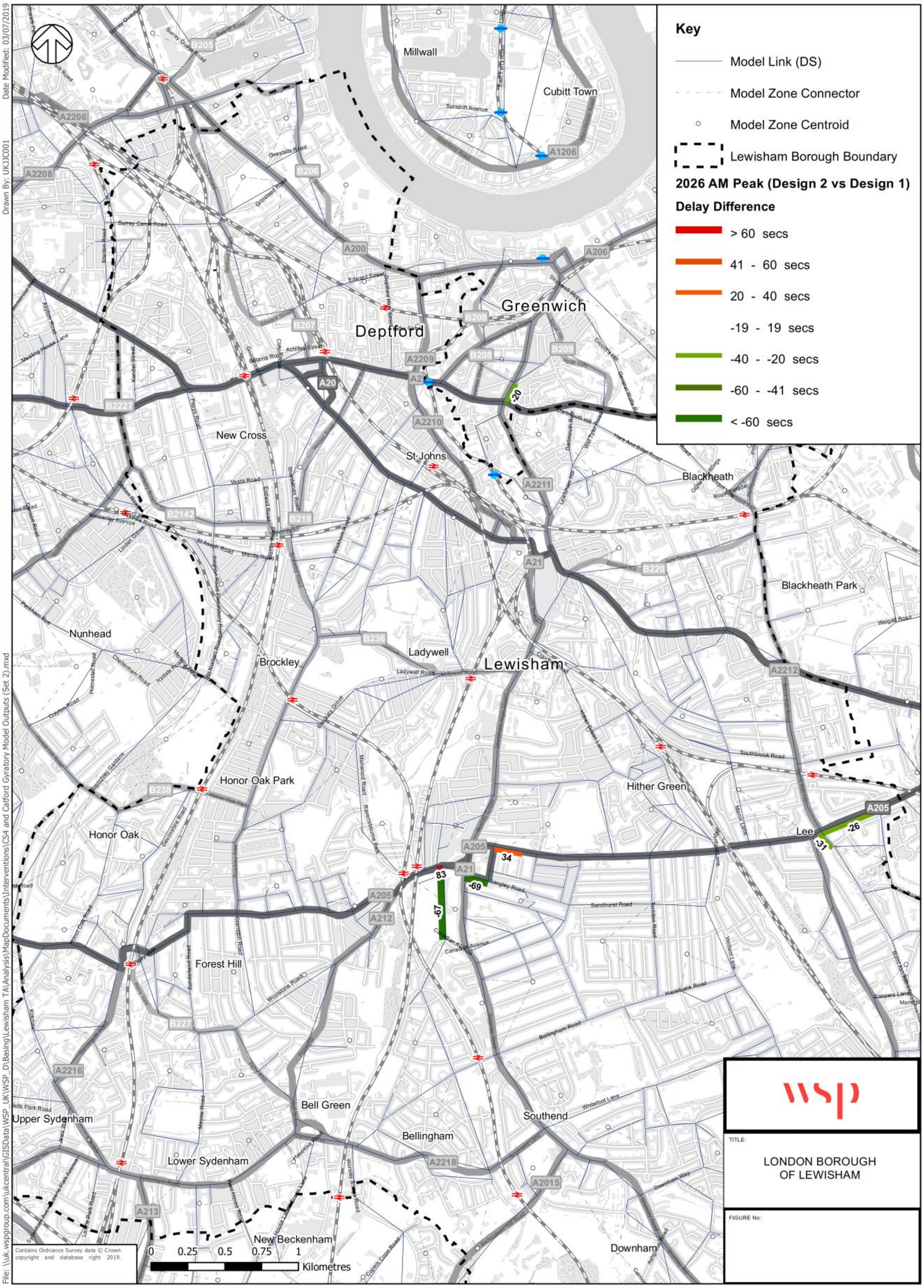
The overall conclusion is that generally traffic flow is pushed from strategic roads along the CS4 route because of the scheme. However due traffic taking up existing capacity on alternative routes, the scheme does not result in many additional delays.

The Catford Gyratory scheme results in significant vehicle delays at the main junction of the A205 and A21 and further design refinements would be required to reduce the negative impacts of the scheme. Traffic will currently re-route away from the area to avoid delays.

Annex A – Actual Flow Difference (Catford Gyratory June 2019 Design 2 vs January 2019 Design 1)


Key
Model Link (DS)
Model Zone Connector
Model Zone Centroid
Lewisham Borough Boundary
2026 AM Peak (Design 2 vs Design 1)
Actual Flow Difference
> 100 pcu/hr
51 - 100 pcu/hr
10 - 50 pcu/hr
-9 - 9 pcu/hr
-50 - -10 pcu/hr
-100 - -51 pcu/hr
< -100 pcu/hr
Millwall
Cubitt Town
Deptford
New Cross
St Johns
Blackheath Park
Nunhead
Brockley
Ladywell
Honor Oak Park
Hither Green
Honor Oak
Forest Hill
Bell Green
Bellingham
Lower Sydenham
Southend
New Beckenham
Downham
0 0.25 0.5 0.75 1 Kilometres
Contains Ordnance Survey data © Crown copyright and database right 2019.
TITLE:
LONDON BOROUGH OF LEWISHAM
FIGURE No:

Annex B – Delay Difference (Catford Gyratory June 2019 Design 2 vs January 2019 Design 1)



Key
Model Link (DS)
Model Zone Connector
Model Zone Centroid
Lewisham Borough Boundary
2026 AM Peak (Design 2 vs Design 1)
Delay Difference
> 60 secs
41 - 60 secs
20 - 40 secs
-19 - 19 secs
-40 - -20 secs
-60 - -41 secs
< -60 secs
Millwall
Cubitt Town
Greenwich
Deptford
New Cross
St Johns
Blackheath
Blackheath Park
Nunhead
Brockley
Ladywell
Lewisham
Honor Oak Park
Honor Oak
Hither Green
Lee
Forest Hill
Bell Green
Upper Sydenham
Lower Sydenham
Bellingham
Southend
New Beckenham
Downham
Contains Ordnance Survey data © Crown copyright and database right 2019.
0 0.25 0.5 0.75 1 Kilometres
TITLE:
LONDON BOROUGH OF LEWISHAM
FIGURE No:
Date Modified: 03/07/2019
Drawn By: UKJJC001

Appendix F – Technical Note – ELHAM Vehicle Filter

Technical Note 1 – Lewisham Local Plan Transport Assessment

Date: 12 August 2019

1. Introduction

In January 2019, WSP was tasked by the London Borough of Lewisham (LBL) to model the impact of several vehicle filters, proposed as part of the Borough's Healthy Neighbourhood's strategy and its forthcoming Local Plan and Local Implementation Plan (LIP). Strategic transport modelling is required to help provide the evidence base for the closure of several "rat-runs" across the Borough's highway network.

The latest version of Transport for London's (TfL's) 2026 West London Highway Assignment Model (ELHAM) has been used to model the impacts in the AM peak. It reflects 2026 network conditions and traffic. This model is referred to hereon in as the Do Minimum model, since it does not include LBL's proposed vehicle filters (the scheme).

The model containing the vehicle filters is referred to hereon in as the Do Something Model. It was created by adding the scheme to the Do Minimum model (TfL's 2026 Reference Case model).

To assess the impact of the scheme, this forecast year model audit report considers:

- Flow differences between the Do Minimum and Do Something models.
- Delay differences between the Do Minimum and Do Something models.
- Journey time differences between the Do Minimum and Do Something models.

2. Model Files

The 2026 forecast year ELHAM files (version E3.09) were provided to WSP by TfL and included the following AM peak highway assignment files:

- E3_FY26_V149NET_LP01_AM.UFS
- E3_FY26_V149NET_LP01_AMq.UFS

As outlined in the *"ELHAM Base Year Model Fact Sheet v3.9a"* (TfL) the model with 'q' in its title represent the PASSQ assignment which is a pre-load assignment.

3. The Scheme

Figure 1 illustrates the location of the 11 proposed vehicle filters, as part the Borough's Healthy Neighbourhood's strategy. These locations are indicative only, for the purposes of the modelling exercise, and they are subject to engagement with the communities affected. At these locations, "rat-running" traffic would be thwarted by placing vehicle filters, only allowing pedestrians, cyclists, emergency services, and TfL buses through. The passage of cars, taxis, LGVs and HGVs would be banned.

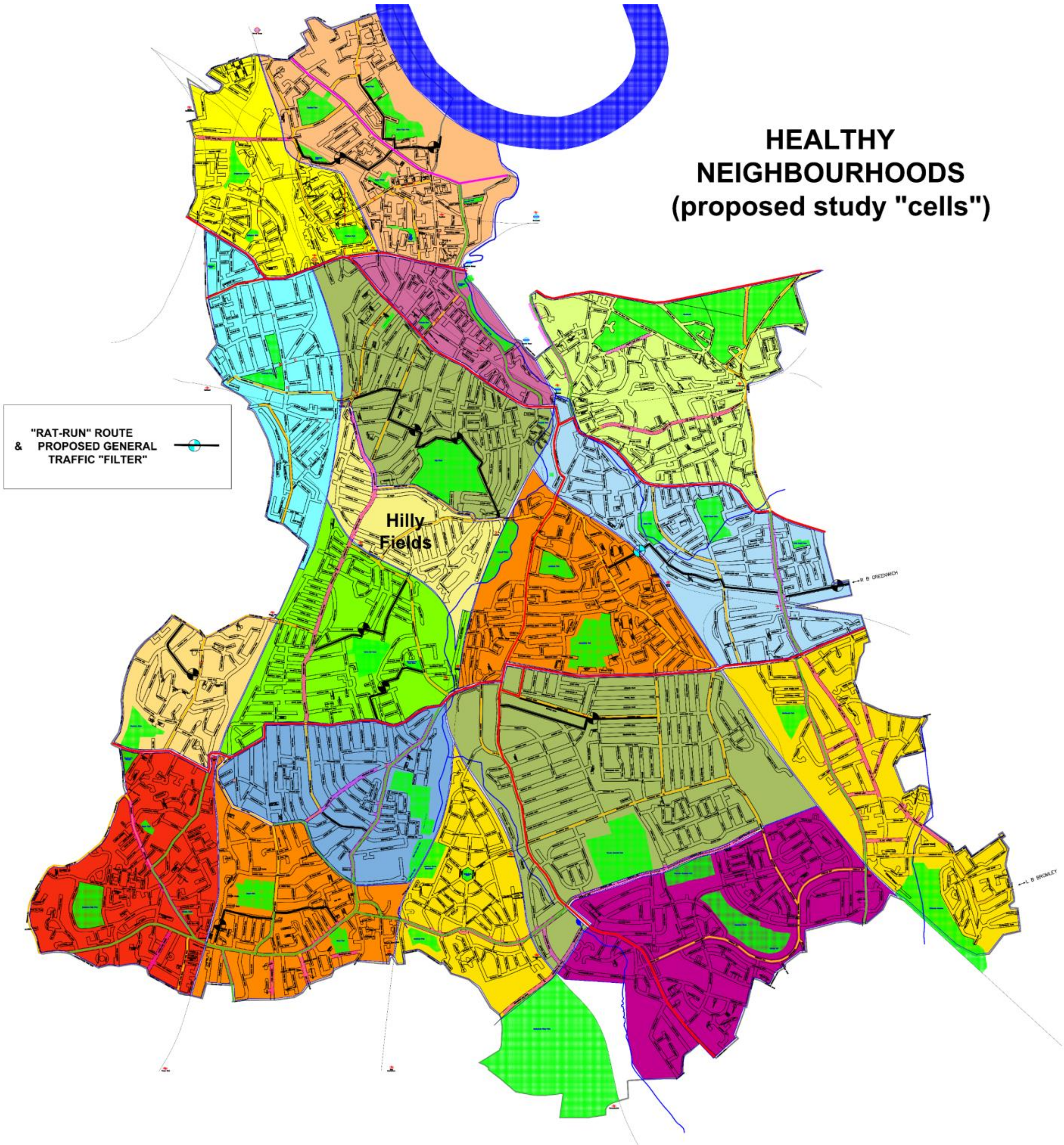


Figure 1: Locations of Proposed Vehicle Filters

Five of the 11 vehicle filters cannot be modelled in ELHAM due to the necessary links not being included. Six of the 11 vehicle filters can be modelled however, and their locations are illustrated in Figure 2 against the 2026 ELHAM network.

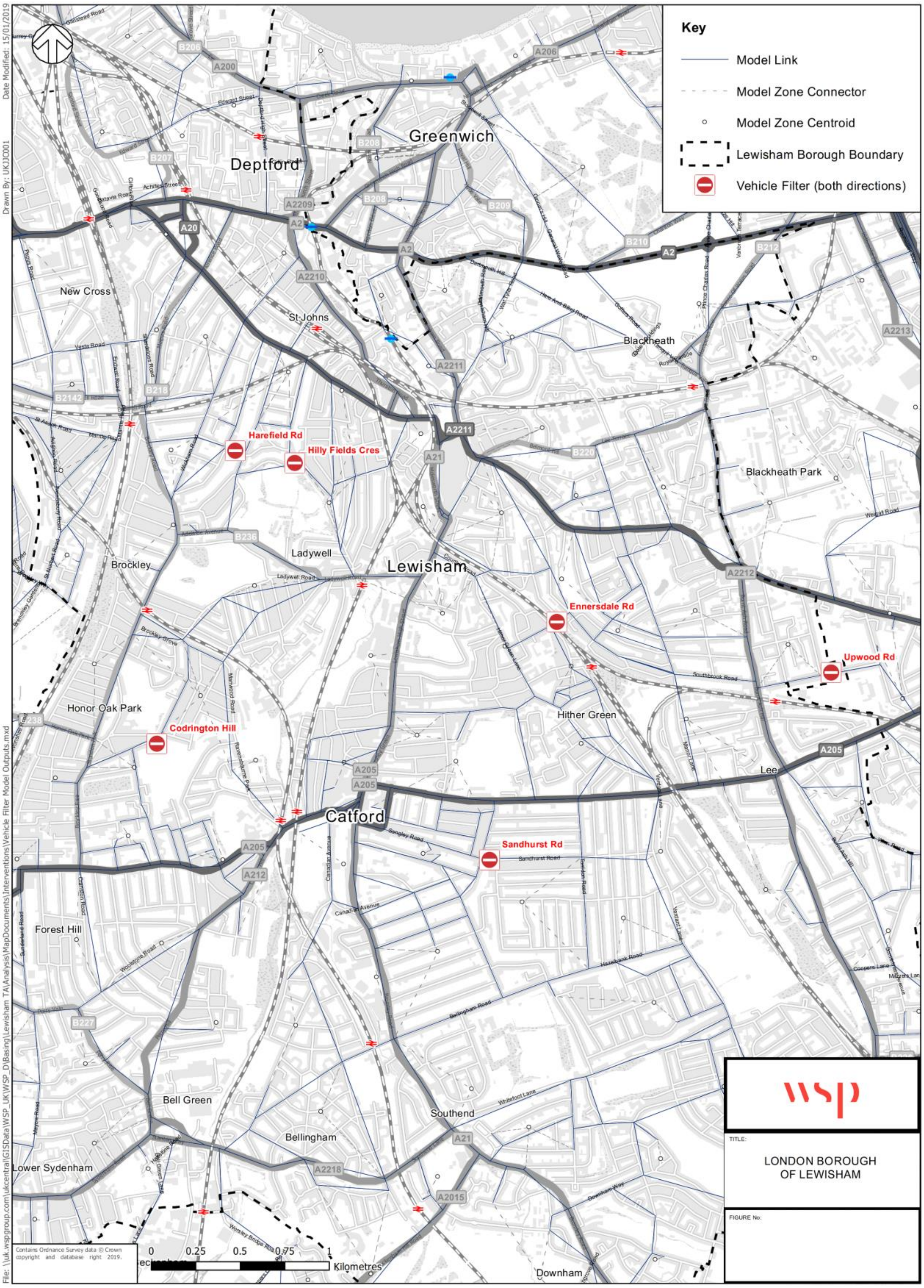


Figure 2: Locations of Modelled Vehicle Filters

4. Actual Flow

Figures 3 and 4 show modelled actual flows in the 2026 AM peak Do Minimum and Do Something models, respectively.

On Figure 3, links have been highlighted in yellow where the actual flow in the Do Minimum model is >300 pcu/hr along a residential link. Some of these links may be “rat-runs” for vehicles, seeking to bypass queues and delays on more major roads. The proposed vehicle filters (Figure 1) may go some way to alleviating such “rat-running”, but further vehicle filters may be desirable as part of the Healthy Neighbourhood’s strategy.

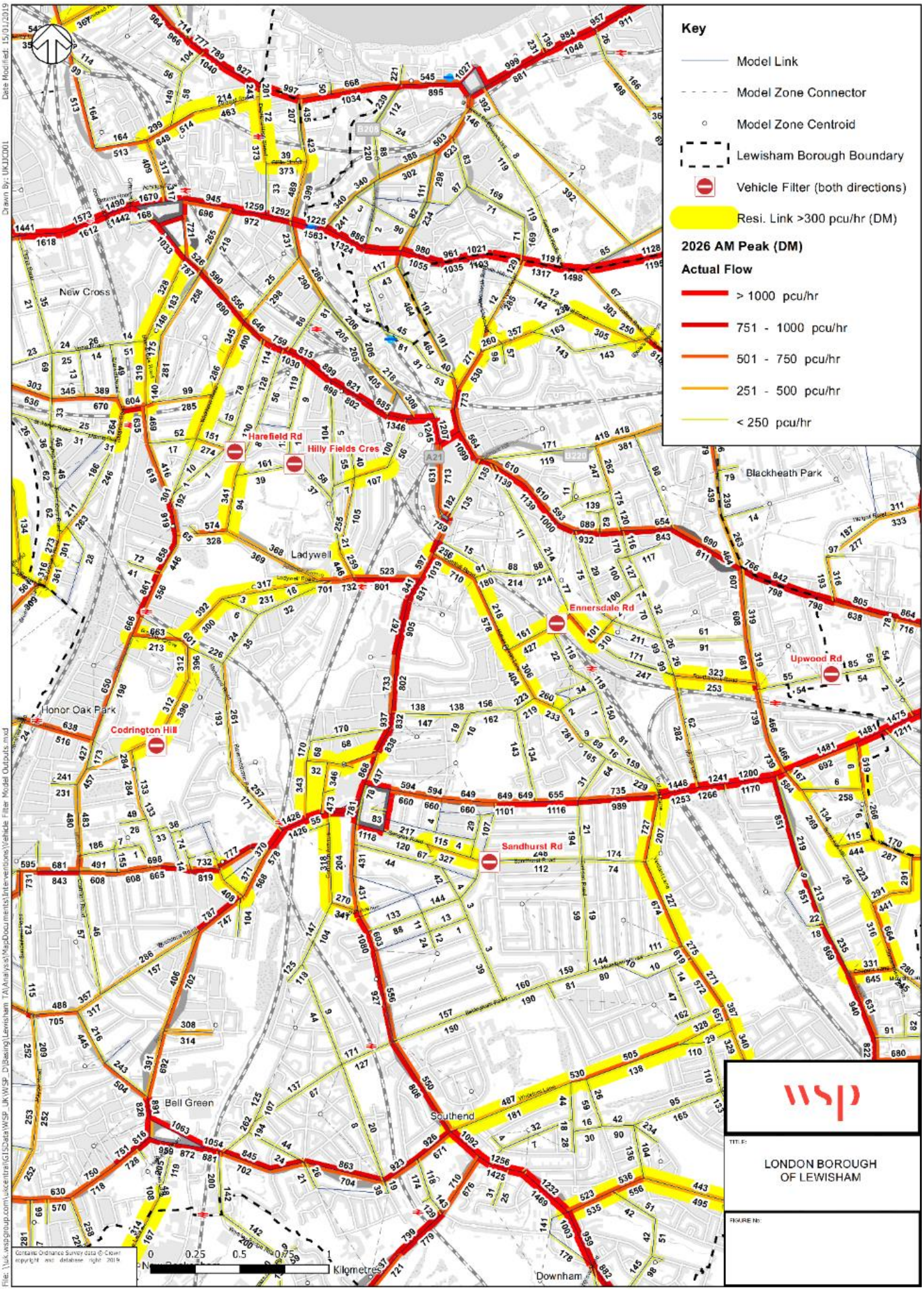


Figure 3: Actual Flow (Do Minimum)

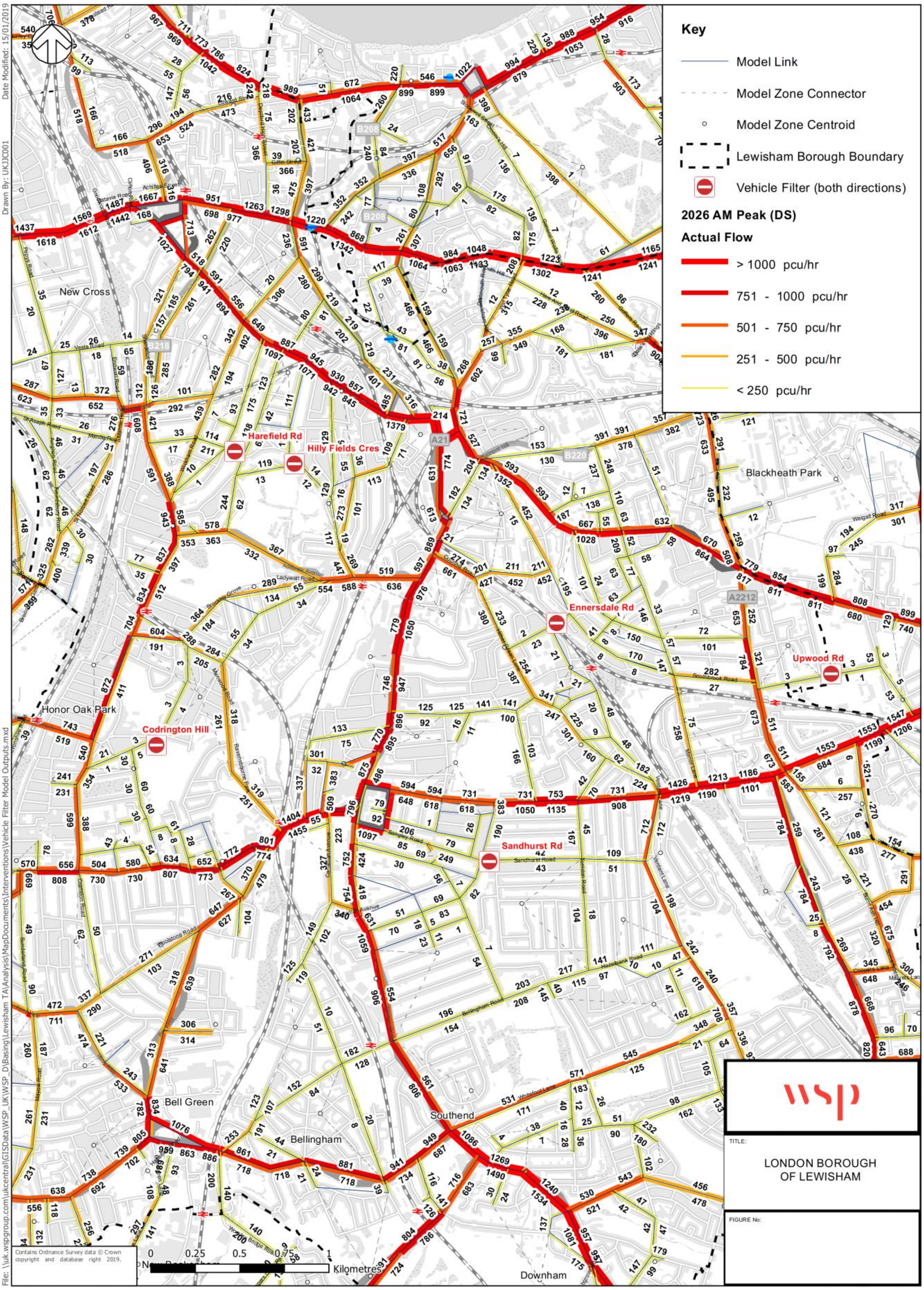


Figure 4: Actual Flow (Do Something)

5. Actual Flow Difference

Figures 5 and 6 show actual traffic flow and actual percentage difference between the 2026 AM peak Do Minimum and Do Something models, respectively.

Codrington Hill (Honor Oak Park)

As a result of the vehicle filter on Codrington Hill, vehicle flow is pushed from nearby residential roads, such as Crofton Park Road, Stillness Road and Brockley View, onto the B218 Brockley Road. Here, traffic flow increases of up to **220 pcu/hr** are seen and traffic flow decreases as low as **-390 pcu/hr** are seen on nearby residential roads, particularly Crofton Park Road. Some additional traffic flow (up to **80 pcu/hr**) is pushed onto Ravensbourne Park to bypass Codrington Hill.

Sandhurst Road (Catford)

The vehicle filter on Sandhurst Road in Catford has the effect of reducing the traffic flow on local residential roads, such as Inchmery Road and Sangley Road, and increasing the traffic flow slightly on A205 Brownhill Road and A21 Bromley Road. On the A21 Bromley Road, traffic flow increases of up to **140 pcu/hr** are modelled, and on the local residential roads, traffic flow decreases as low as **-85 pcu/hr** are seen, namely on Inchmery Road.

Ennersdale Road (Hither Green)

As a result of the vehicle filter on Ennersdale Road in Hither Green, traffic flow decreases as low as **-405 pcu/hr** are modelled on local residential roads, particularly on Ennersdale Road itself, but also on Fernbrook Road / Leahurst Road and Nightingale Grove. Traffic is however pushed onto other local residential roads, such as Dermody Road, Morley Road and Eastdown Park, due to the need for traffic to access the model zone connected to the junction of Courthill Road with Hither Green Lane. On Morley Road / Dermody Road, flow increases of up to **240 pcu/hr** are apparent. On the strategic road network, flow increases of up to **235 pcu/hr** are seen on A20 Lee High Road.

Upwood Road (Lee)

The vehicle filter on Upwood Road (in combination with the nearby filter on Ennersdale Road) has the effect of reducing flow on residential roads such as Southbrook Road and Fernbrook Road / Leahurst Road, where a traffic flow reduction of **-240 pcu/hr** is seen. Some of the flow (up to **105 pcu/hr**) is pushed onto A2212 Burnt Ash Road and A205 Westhorne Avenue (up to **75 pcu/hr**).

Harefield Road (Brockley) / Hilly Fields Crescent (Ladywell)

The vehicle filters on Harefield Road and Hilly Fields Crescent, which have been grouped together due to their proximity to one another, result in a traffic flow reduction of **-100 pcu/hr** on local residential roads such as Montague Avenue, and a slight flow increase of up to **70 pcu/hr** on the A20 Loampit Hill and Breakspears Road.

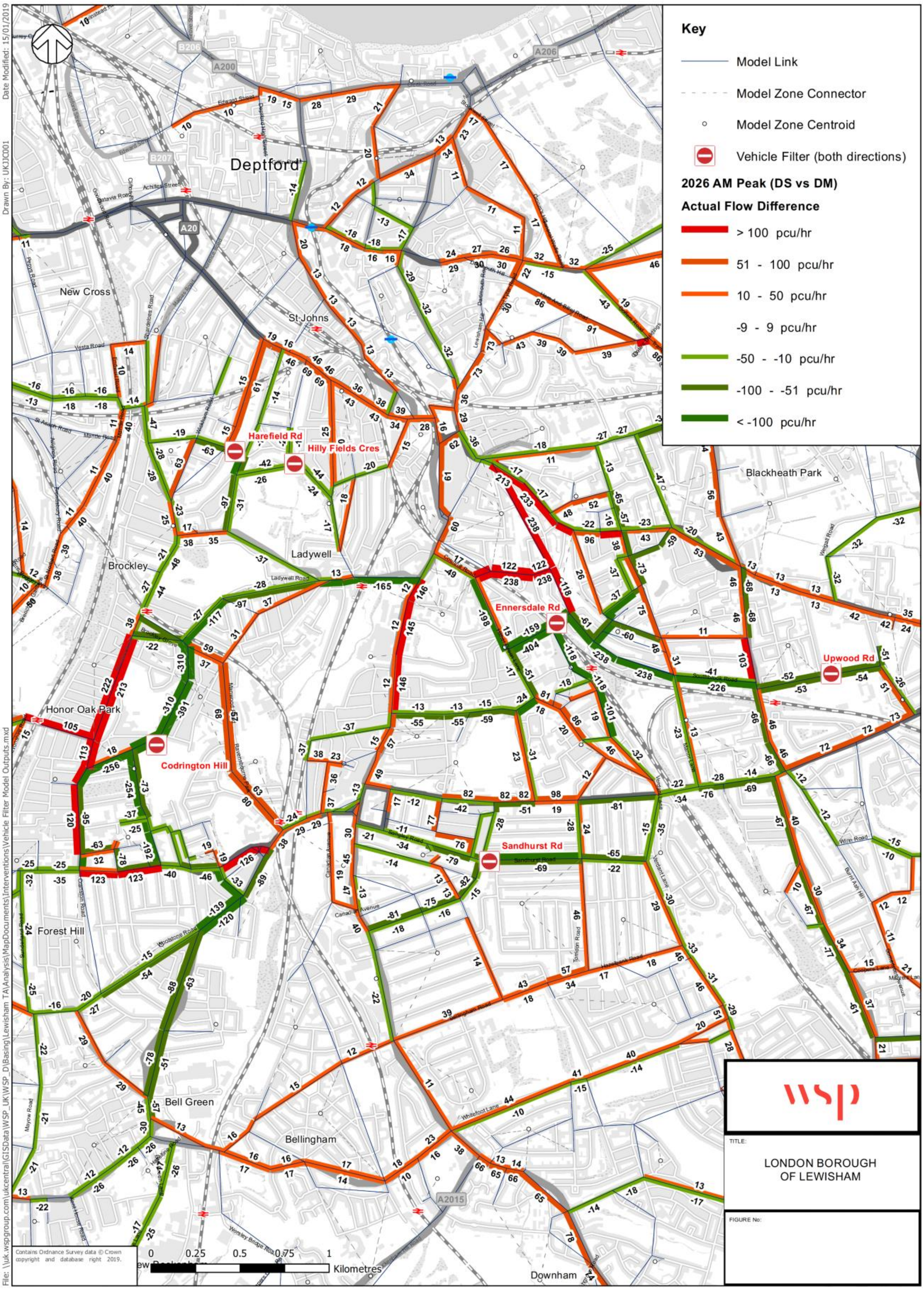


Figure 5: Actual Flow Difference (Do Something vs Do Minimum)

wsp

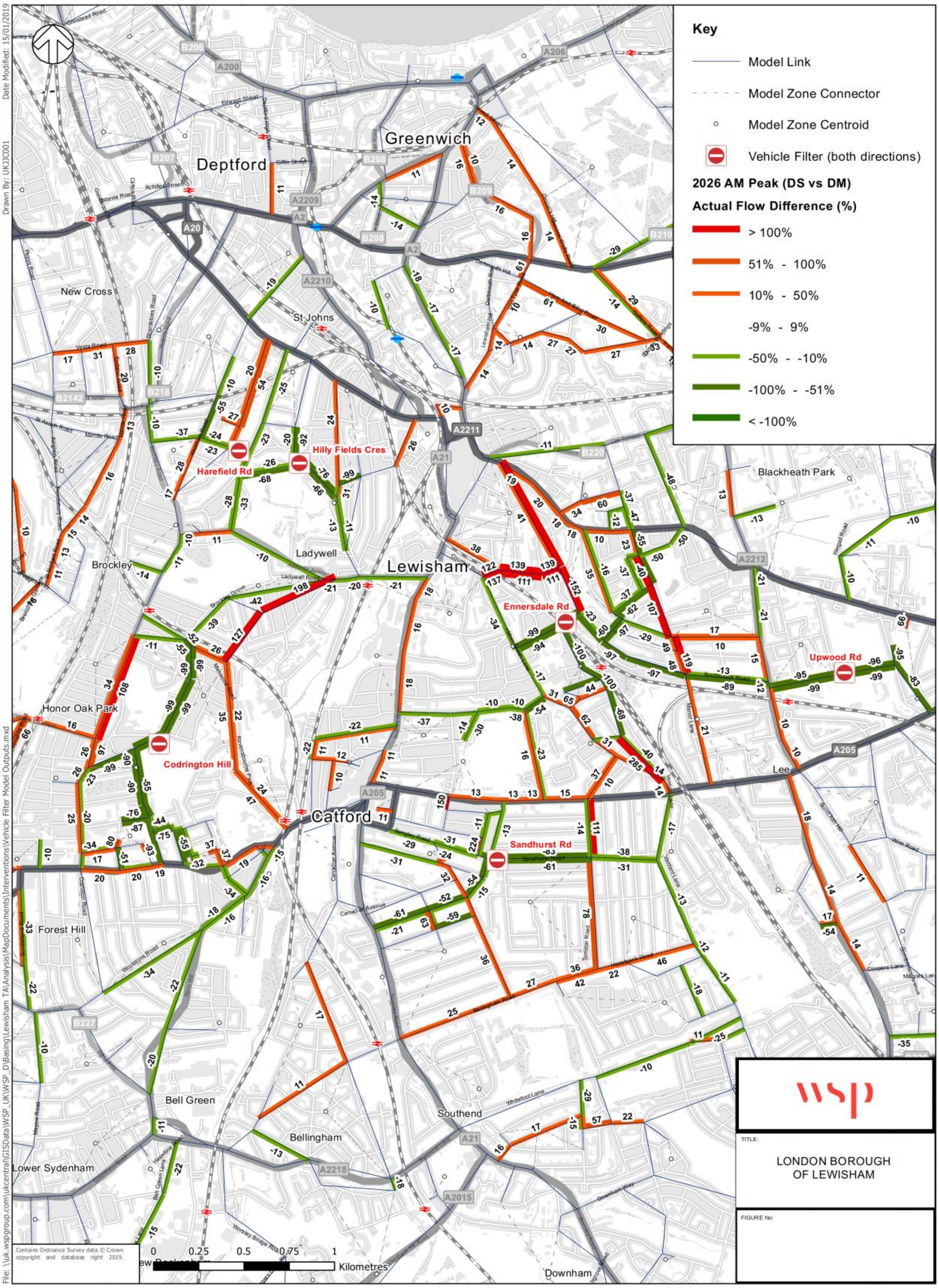


Figure 6: Actual Flow % Difference (Do Something vs Do Minimum)

6. Delay

Figures 7 and 8 show modelled delays in the 2026 AM peak Do Minimum and Do Something models, respectively.

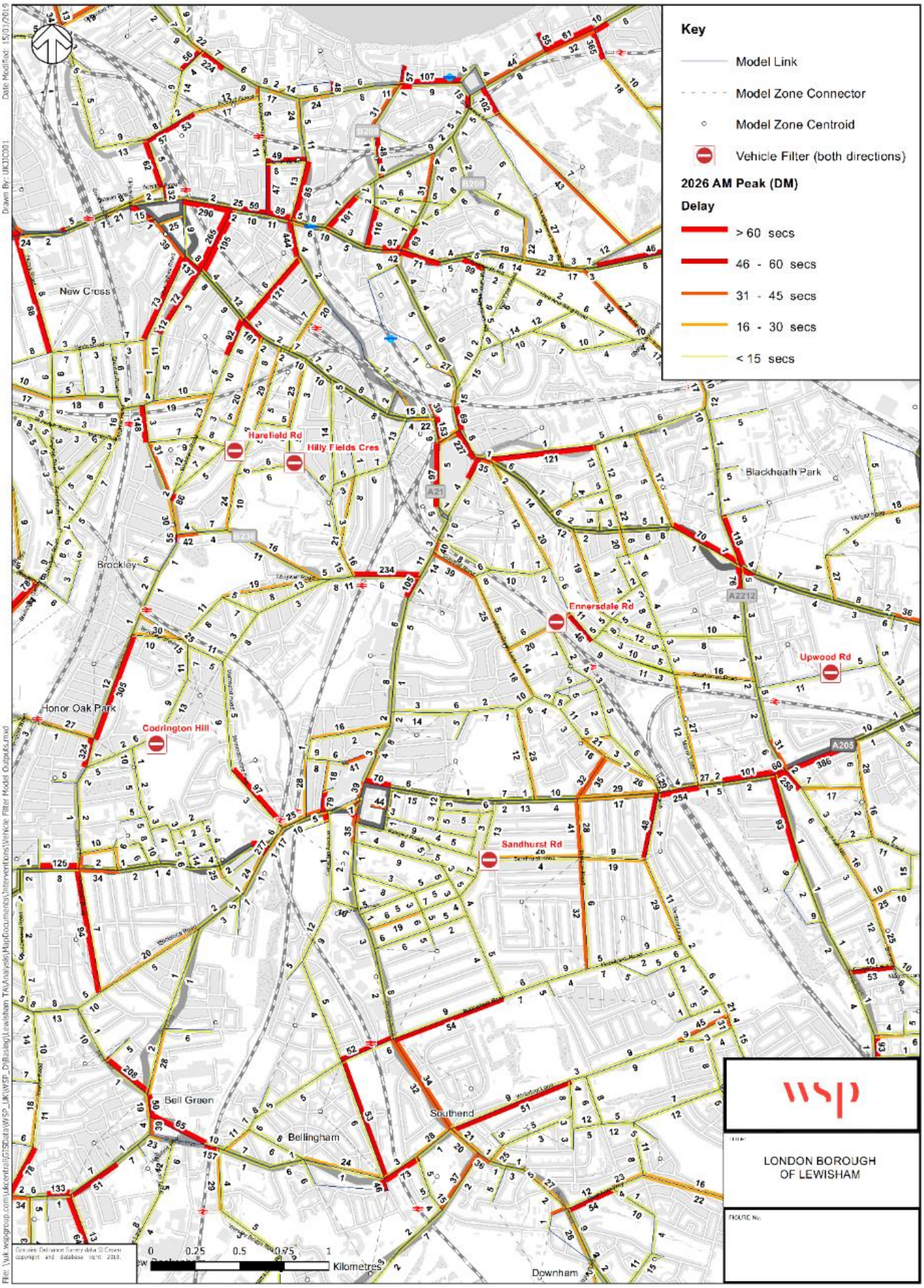


Figure 7: Delay (Do Minimum)

wsp

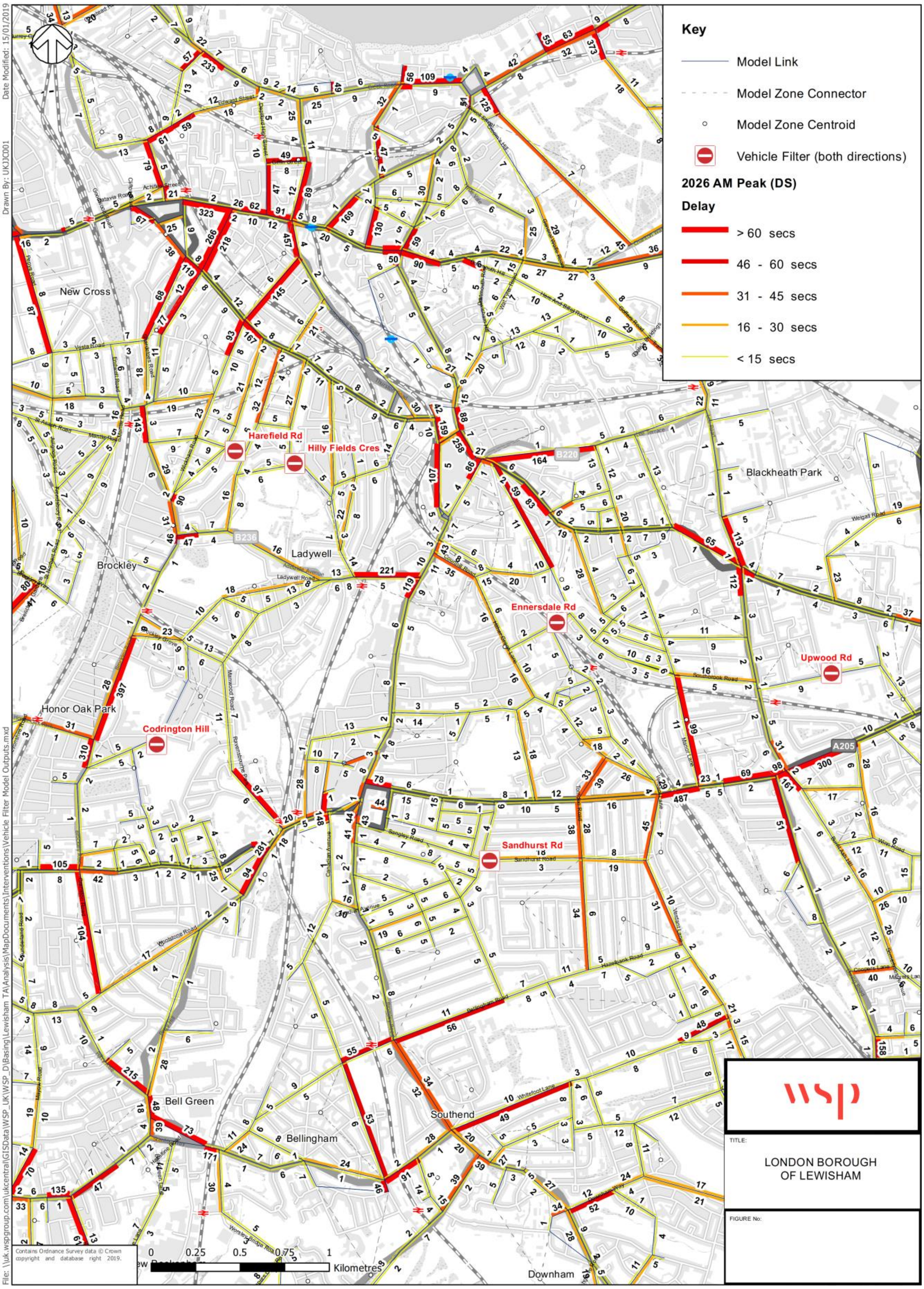


Figure 8: Delay (Do Something)

7. Delay Difference

Figure 9 shows delay difference between the 2026 AM peak Do Minimum and Do Something models.

In general, the vast majority of links in the Borough exhibit a delay change of between **-19 and 19 seconds** and therefore, most links are not highlighted on Figure 9.

The links that see a delay increase in particular are Manor Lane (**+75 seconds**) and the adjacent A205 St Mildreds Road (**+230 seconds**). Here, the delay increases are not due to an increase/decrease in flow per se, but rather due to very sensitive signal timings in ELHAM. A number of tests conducted by WSP using variable signal timings has identified this.

Elsewhere in the Borough, the increases/decreases in delays can be put largely down to increases/decrease in flow, as the two measures are intrinsically linked. For example, the 215 pcu/hr flow increase on the B218 Brockley Road results in an additional delay southbound of **90 seconds**. The same is true on the A20 around Lewisham where flow increases result in an increase in delay of up to **70 seconds** on the A20 Lee High Road.

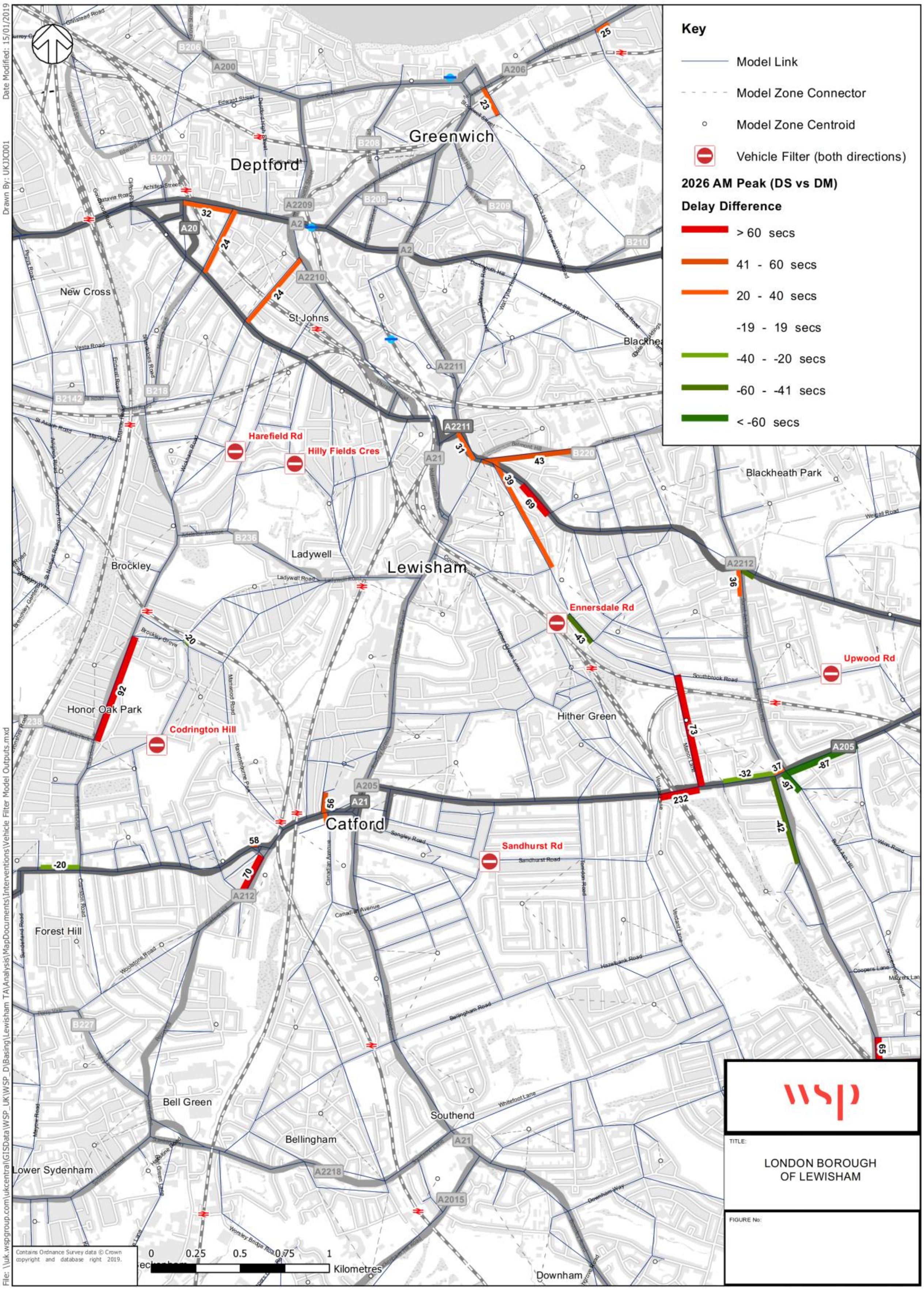


Figure 9: Delay Difference (Do Something vs Do Minimum)

8. Journey Times

Based upon the actual flow difference between the Do Minimum and Do Something models (Figure 6), a set of journey time routes have been selected to ascertain the extent to which journey times change as a result of flow increases/decreases. The four routes selected are shown in Figure 10 and these were chosen due to the flow changes on these routes being particularly prominent in Figure 6.

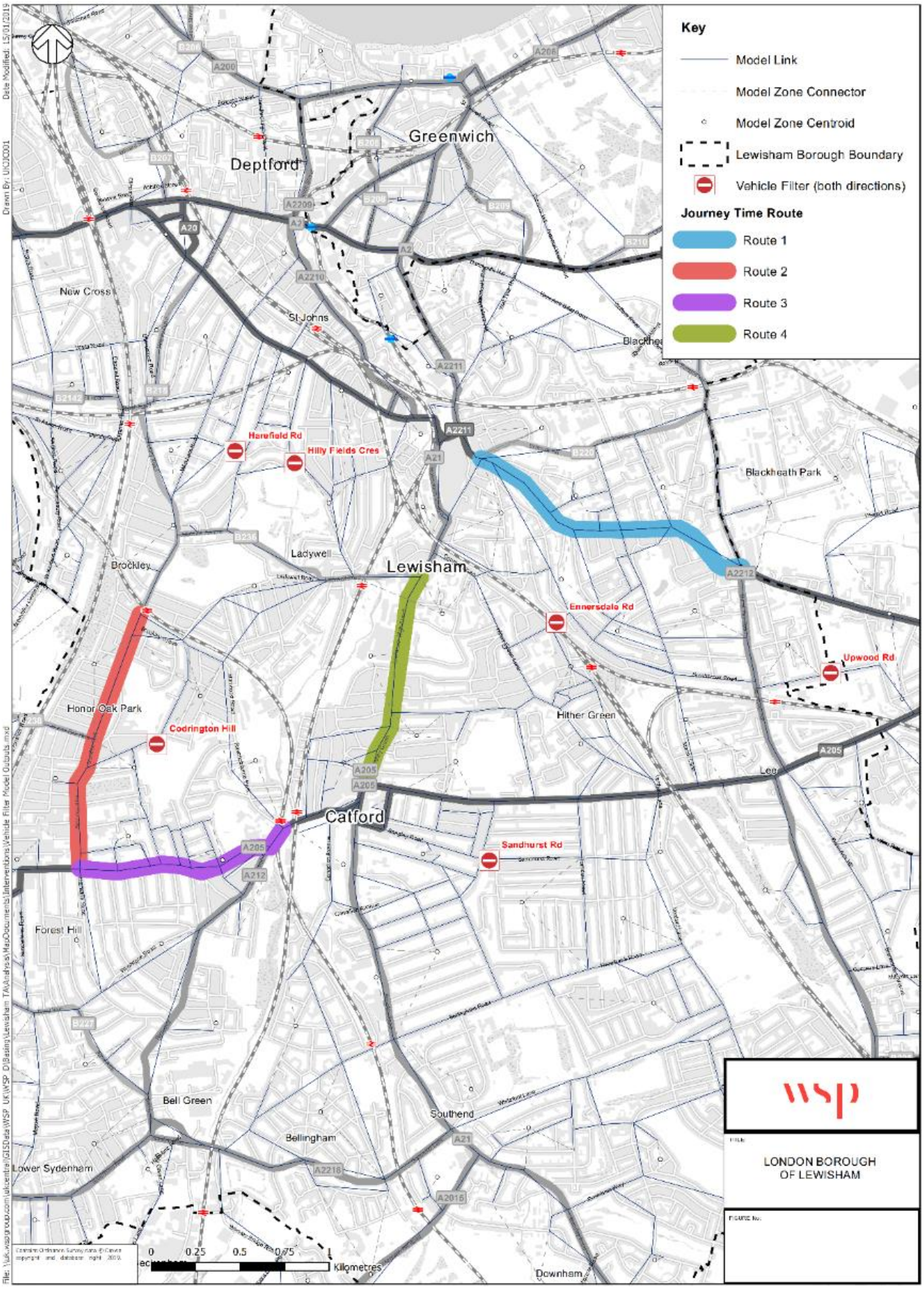


Figure 10: Journey Time Routes

Table 1 shows a comparison of the journey times along these routes in the Do Minimum and Do Something models.

Table 1: Modelled Journey Times

Route	Name	Direction	Modelled Journey Time (seconds) DM	Modelled Journey Time (seconds) DS	Modelled Journey Time (seconds) Diff. (DS vs DM)	Modelled Journey Time (seconds) % Diff. (DS vs DM)
1	A20 Lee High Road	NB	249	325	**+76**	**+30%**
1	A20 Lee High Road	SB	268	262	**-6**	**-2%**
2	B218 Brockley Road	NB	493	496	**+2**	**0%**
2	B218 Brockley Road	SB	499	594	**+94**	**+19%**
3	A205 Stanstead Road	EB	367	425	**+58**	**+16%**
3	A205 Stanstead Road	WB	191	205	**+14**	**+7%**
4	A21 Lewisham High Street	NB	255	269	**+14**	**+6%**
4	A21 Lewisham High Street	SB	170	175	**+5**	**+3%**

Table 1 shows that a **30%** increase in journey time on Route 1 northbound (A20 Lee High Road) occurs between the Do Minimum and Do Something models. Increases/decreases in journey times of **<20%** are seen on the other routes.

9. Conclusion

WSP has undertaken a highway impact assessment from implementing a series of vehicle filters into the 2026 forecast year ELHAM within the London Borough of Lewisham.

The overall conclusion is that generally traffic flow is pushed from local residential roads onto strategic roads as a result of the vehicle filters. However, this comes at the cost of increasing journey times along some of these routes, for example the A20 Lee High Road. Nonetheless, the vehicle filters do tend to have the desired effect of reducing traffic flow on residential roads within the Borough.

It should also be noted that this modelling exercise, as presented, assumes a simple reassignment of traffic to alternative routes, rather than any more complex behavioural change that may take place as a result of the increased journey times such as retiming of journeys, transfer of trips to other modes or the trip not being made at all. This will be picked up at a later stage in the study when the LTS runs are undertaken.

Appendix F – Technical Note – ELHAM Vehicle Filter

Technical Note 2 – Lewisham Local Plan Transport Assessment

Date: 12 August 2019

1. Introduction

In May 2019, WSP was tasked by the London Borough of Lewisham (LBL) to model the impact of additional vehicle filters, proposed as part of the Borough's Healthy Neighbourhood's strategy and its forthcoming Local Plan / Local Implementation Plan (LIP). Strategic transport modelling is required to help provide the evidence base for the closure of several "rat-runs" across the Borough's highway network.

The latest version of Transport for London's (TfL's) 2026 West London Highway Assignment Model (ELHAM) has been used to model the impacts in the AM peak. It reflects 2026 network conditions and traffic. This model is referred to hereon in as the Do Minimum model, since it does not include LBL's proposed vehicle filters (the Scheme).

The model containing the vehicle filters is referred to hereon in as the Do Something Model. It was created by adding the scheme to the Do Minimum model (TfL's 2026 Reference Case model).

To assess the impact of the scheme, this forecast year model audit report considers:

- Flow differences between the Do Minimum and Do Something models.
- Delay differences between the Do Minimum and Do Something models.
- Journey time differences between the Do Minimum and Do Something models.

2. Model Files

The 2026 forecast year ELHAM files (version E3.09) were provided to WSP by TfL and included the following AM peak highway assignment files:

- E3_FY26_V149NET_LP01_AM.UFS
- E3_FY26_V149NET_LP01_AMq.UFS

As outlined in the *"ELHAM Base Year Model Fact Sheet v3.9a"* (TfL) the model with 'q' in its title represent the PASSQ assignment which is a pre-load assignment.

3. The Scheme

Figure 1 illustrates the location of the proposed vehicle filters, as part the Borough's Healthy Neighbourhood's strategy. These are indicative only, for the purposes of the modelling exercise, and they are subject to engagement with the communities affected. At these locations, "rat-running" traffic would be thwarted by placing vehicle filters, only allowing pedestrians, cyclists, emergency services, and TfL buses through. The passage of cars, taxis, LGVs and HGVs would be banned.

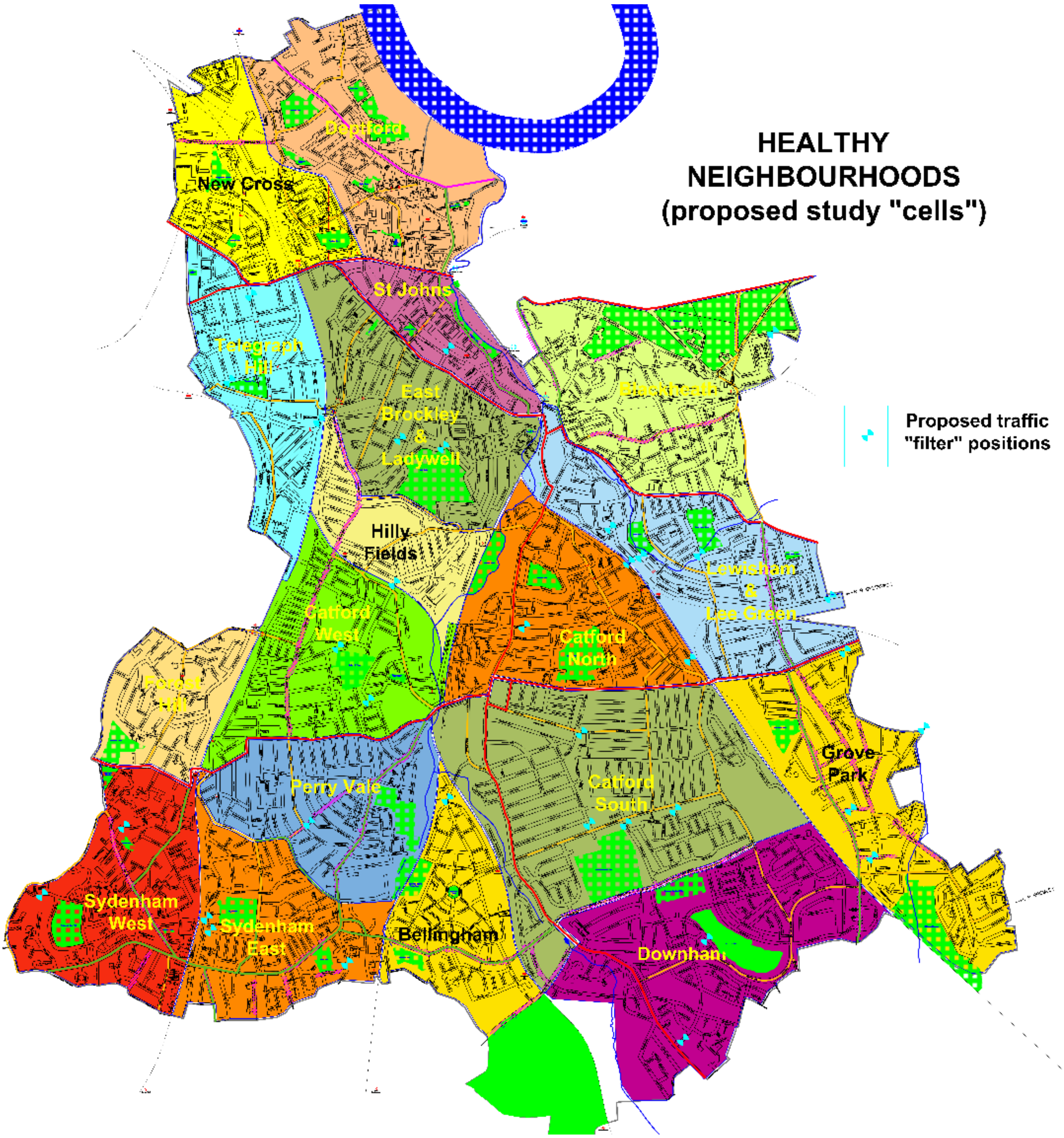


Figure 1: Locations of Proposed Vehicle Filters

The locations of the vehicle filters are shown in Figure 2 against the 2026 ELHAM network.

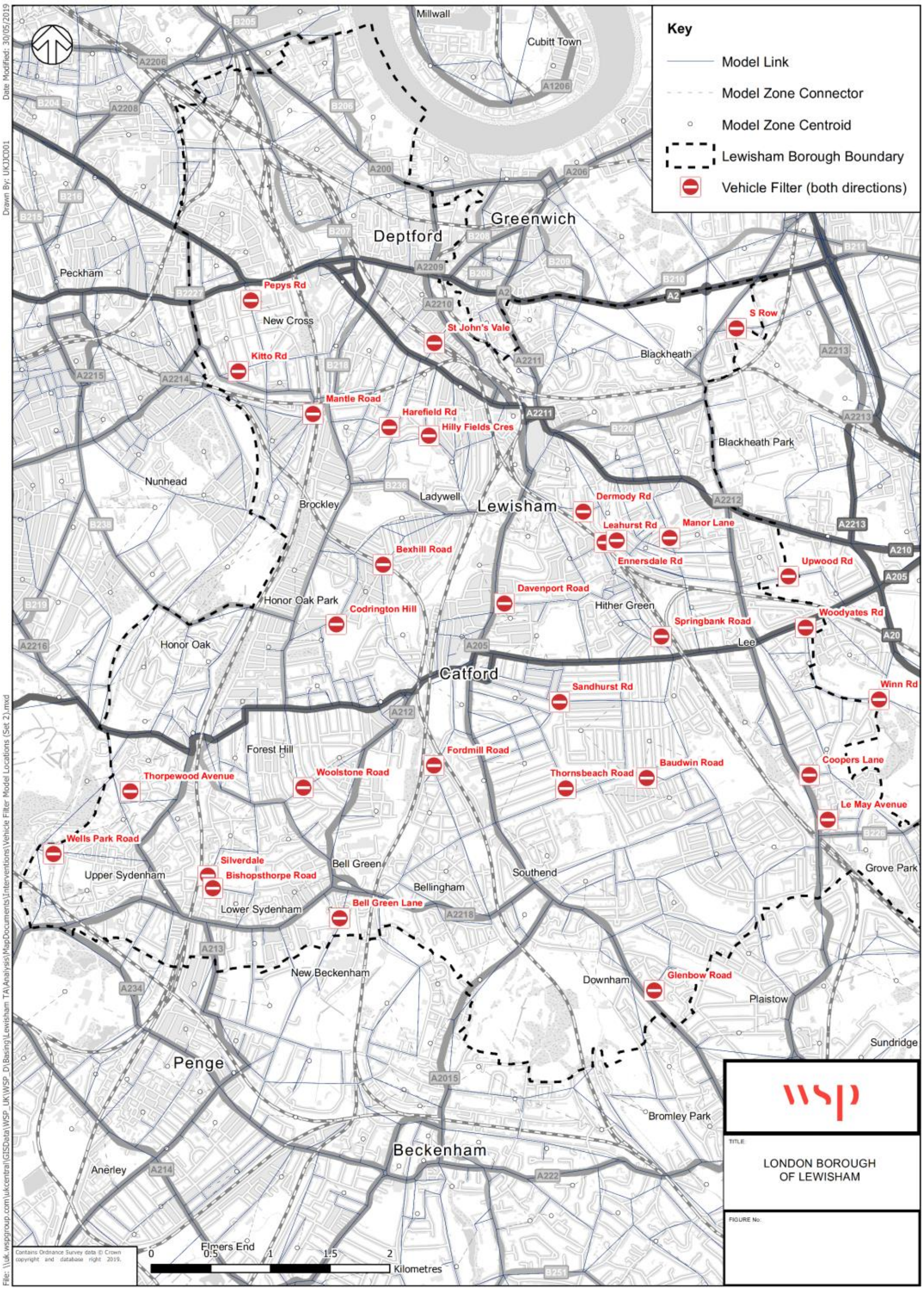


Figure 2: Locations of Modelled Vehicle Filters

In addition to the vehicle filters, Giffin Street has been made one-way eastbound in the Do Something model between its junctions with Deptford Church Street and Frankham Street. To prevent northbound traffic using it as a “rat-run”.

4. Actual Flow

Figures 3 and 4 show modelled flows in the 2026 AM peak Do Minimum and Do Something models, respectively.

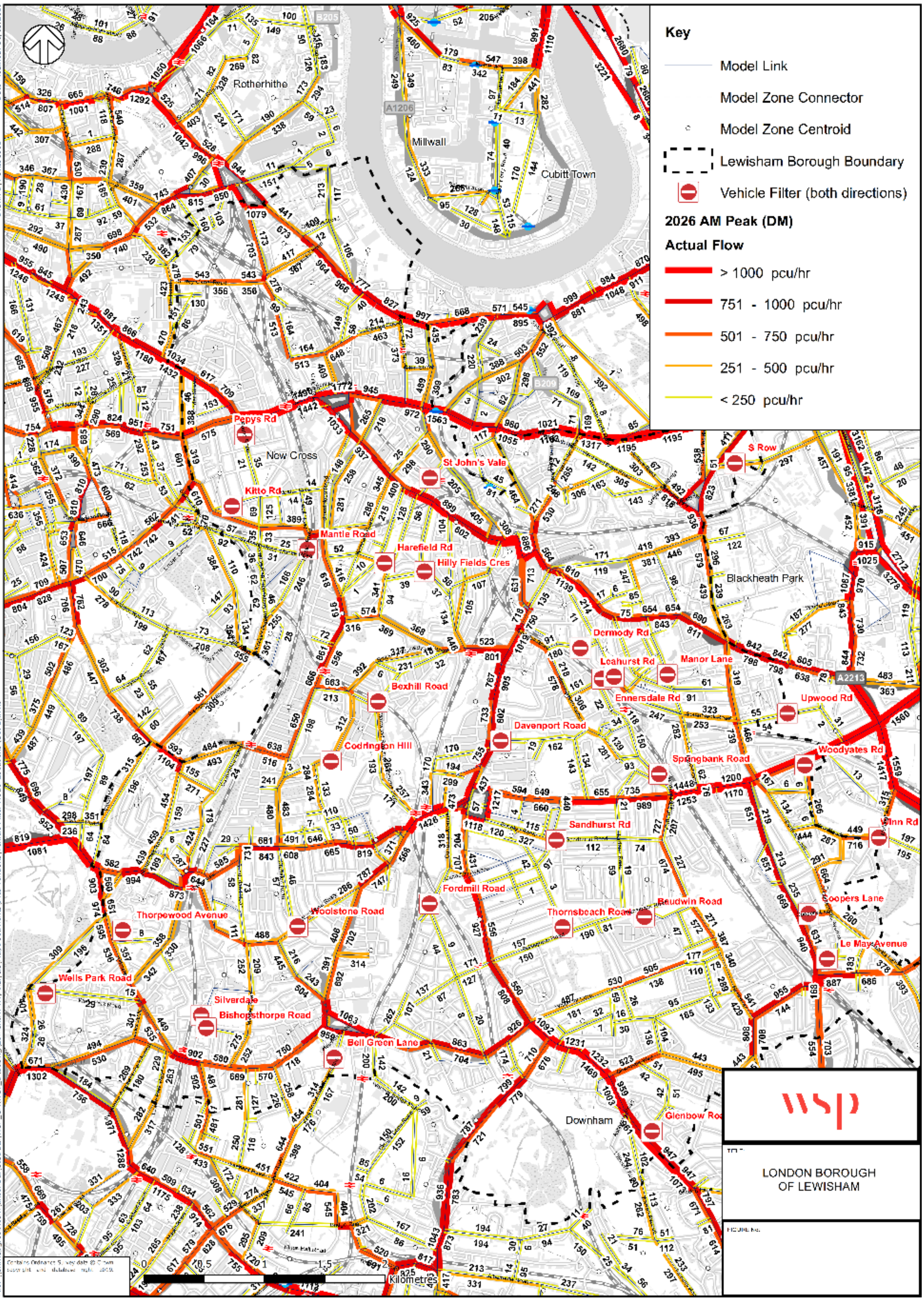


Figure 3: Actual Flow (Do Minimum)

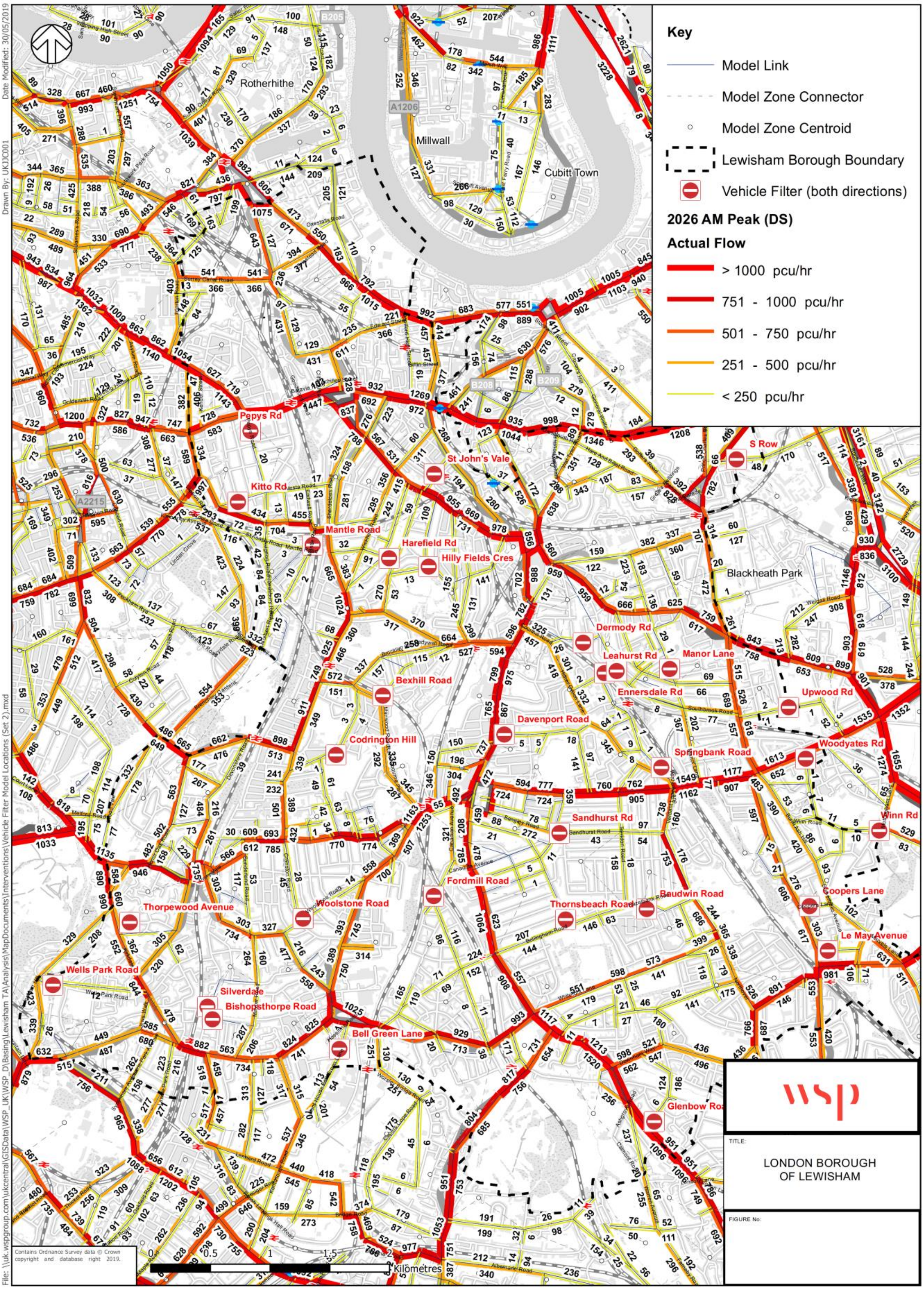


Figure 4: Actual Flow (Do Something)

5. Actual Flow Difference

Figures 5a and 6a show actual traffic flow and actual percentage difference between the 2026 AM peak Do Minimum and Do Something models, respectively. For clarity, Figures 5b and 6b have been produced which only show the most major changes in traffic flow (i.e. +/- 100 pcu/hr).

From the analysis of Figure 5b, in the centre-east of the Borough (Hither Green) traffic flow is reduced on several local residential roads, for example:

- Davenport Road: **-140 pcu/hr** in each direction;
- Ennersdale Road: **-420 pcu/hr** westbound and **-160 pcu/hr** eastbound;
- Leahurst Road: **-540 pcu/hr** northbound and **-160 pcu/hr** southbound;
- Hither Green Lane (northern section): **-160 pcu/hr** southbound;
- Courthill Road: **-250 pcu/hr** westbound;
- Morley Road / Dermody Road / Gilmore Road corridor: **-210 pcu/hr** southbound/westbound;
- Springbank Road: **-150 pcu/hr** southbound.

In contrast, there are just two residential roads in the Hither Green area which exhibit an increase in traffic flow:

- Hither Green Lane (southern section): **+150 pcu/hr** southbound;
- Manor Lane: **+140 pcu/hr** southbound.

Due to traffic re-routing, there are traffic flow increases of up to **+200 pcu/hr** on A2212 Burnt Ash Hill and A205 Brownhill Road.

In the centre-west of the Borough around Brockley, traffic flow reduces on the local residential roads of **Brockley View**, **Montem Road, Codrington Hill, Crofton Park Road, Ladywell Road and Brockley Grove** by up to **-400 pcu/hr**. Traffic flows increase on the B218 and the B238 Honor Oak Park by up to **+260 pcu/hr** because of traffic reassignment.

In the south of the Borough there is a notable traffic flow decrease along **Kent House Lane** of up to -**200 pcu/hr** in each direction and along **Woolstone Road** of up to **-300 pcu/hr** in each direction. Because of traffic reassignment in the south of the Borough, traffic flow increases are evident on **A21 Bromley Road** (**+140 pcu/hr** northbound).

In the southeast of the Borough around Grove Park, traffic reassignment and the vehicle filter on Coopers Lane causes a flow decrease of **-200 pcu/hr** each direction on **Coopers Lane** and a flow decrease of up to -**320 pcu/hr** northbound on **A2212 Baring Road**. Traffic reassigns onto **Burnt Ash Hill**, where a flow increase of up to **+400 pcu/hr** is evident. Because of other vehicle filters in the area (Woodyates Road and Winn Road), traffic reassignment reduces the traffic flow on local residential roads e.g. on **Guibal Road** and **Winn Road** (up to **-250 pcu/hr**).

In the north of the Borough, the impact of the vehicle filters is less widespread and apparent. The largest traffic flow changes occur around New Cross where reductions of up to **-240 pcu/hr** occur on **St Norbert Road**. Traffic flow increases of up to **+170 pcu/hr** occur on **B2142 Drakefell Road** because of traffic reassignment.

Conclusion

In general, it is concluded that the vehicle filters have the effect of reducing the traffic flow on local residential roads and reassigning it to more major 'A' and 'B' roads. This is most prevalent in the south and centre of the Borough with far less traffic reassignment in the north of the Borough.

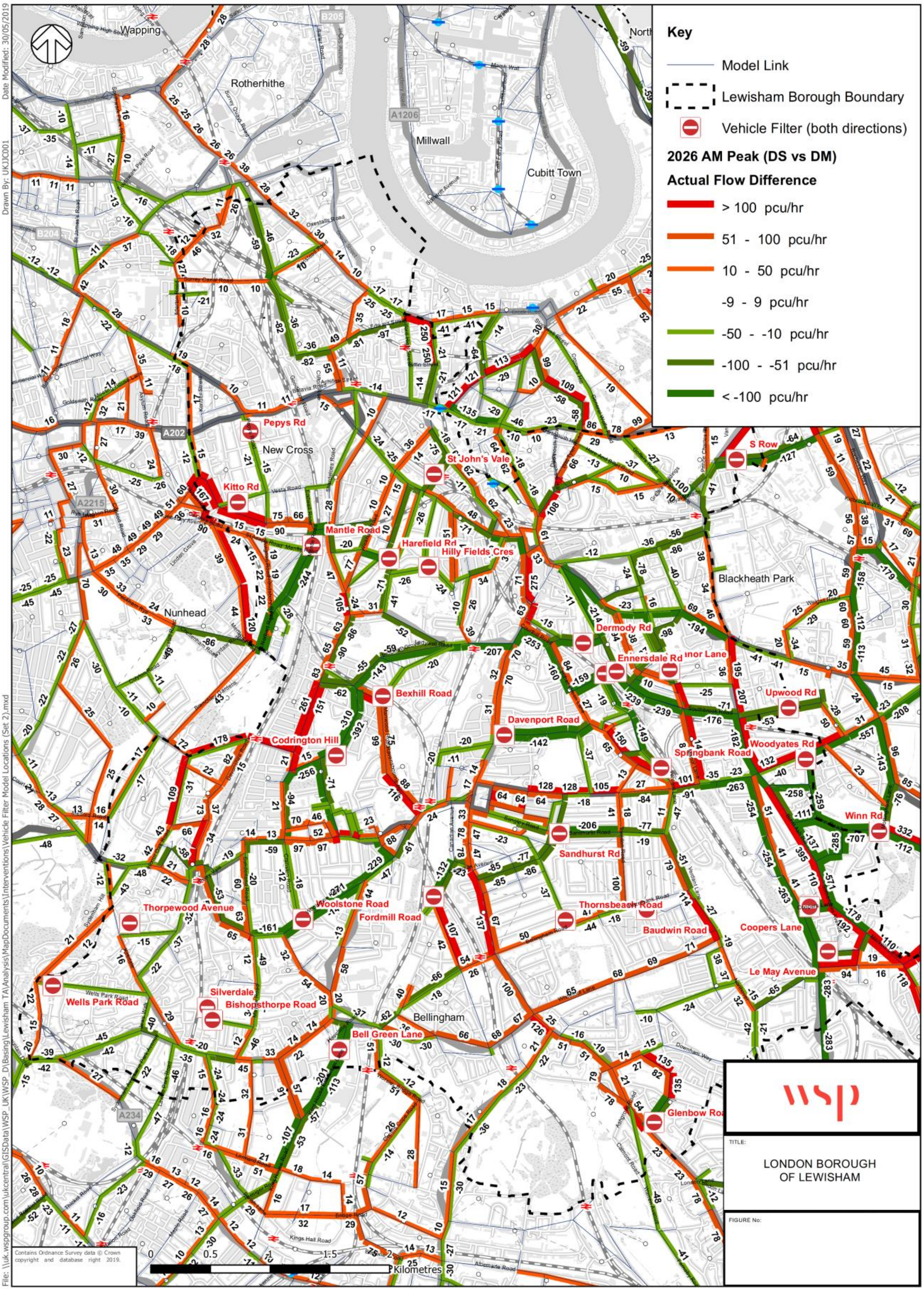


Figure 5a: Actual Flow Difference (Do Something vs Do Minimum)

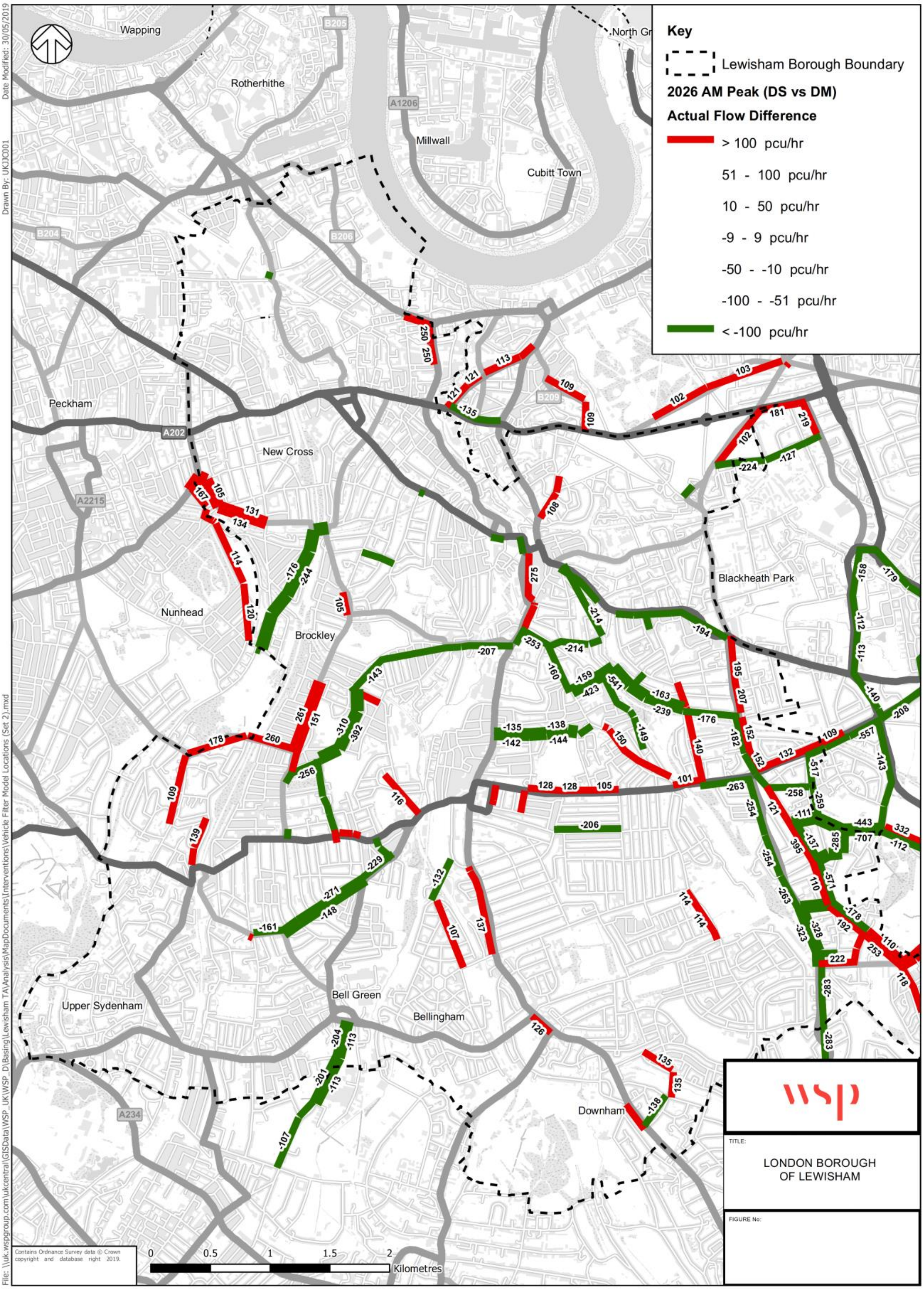


Figure 5b: Actual Flow Difference (Do Something vs Do Minimum)

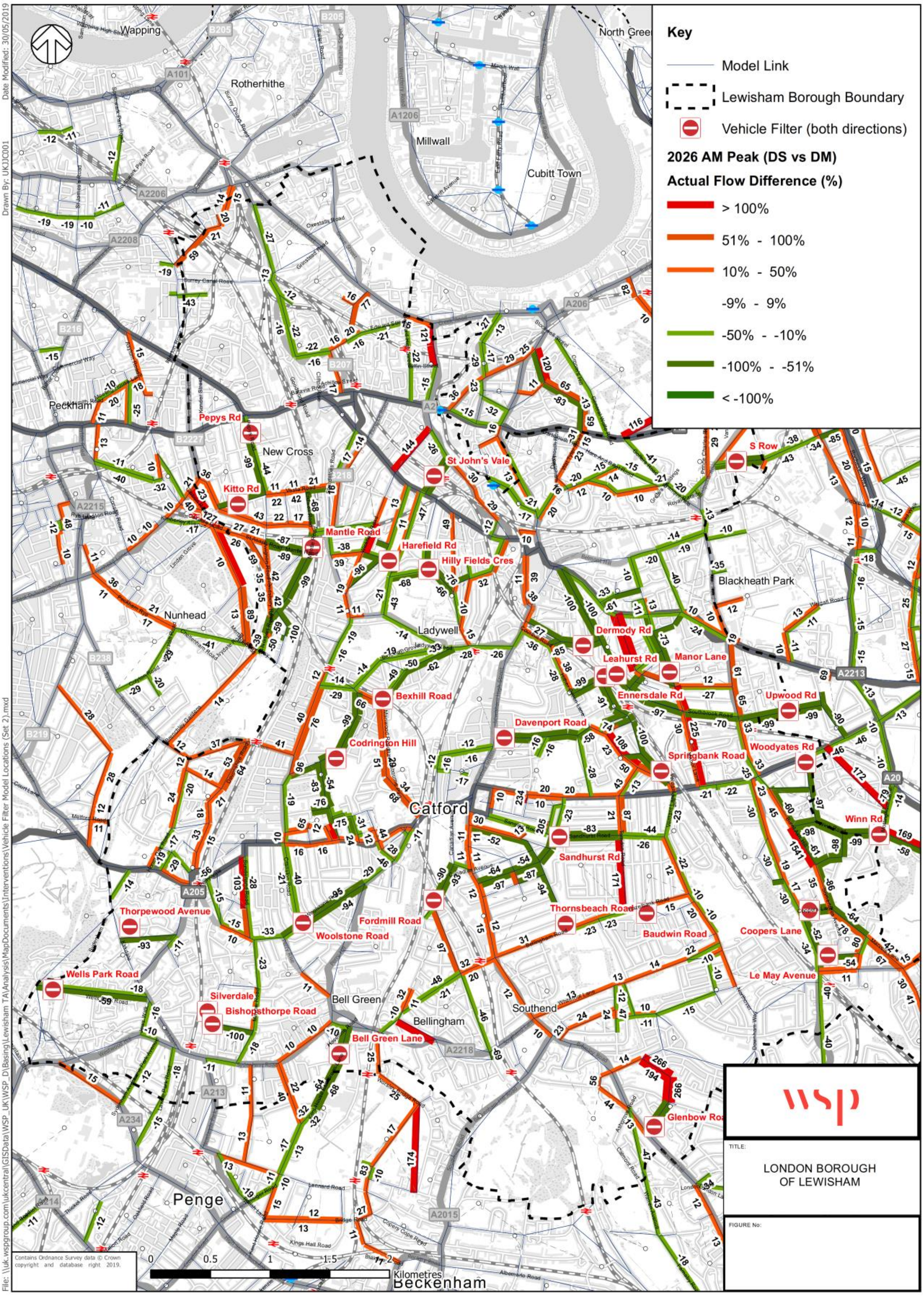


Figure 6a: Actual Flow % Difference (Do Something vs Do Minimum)

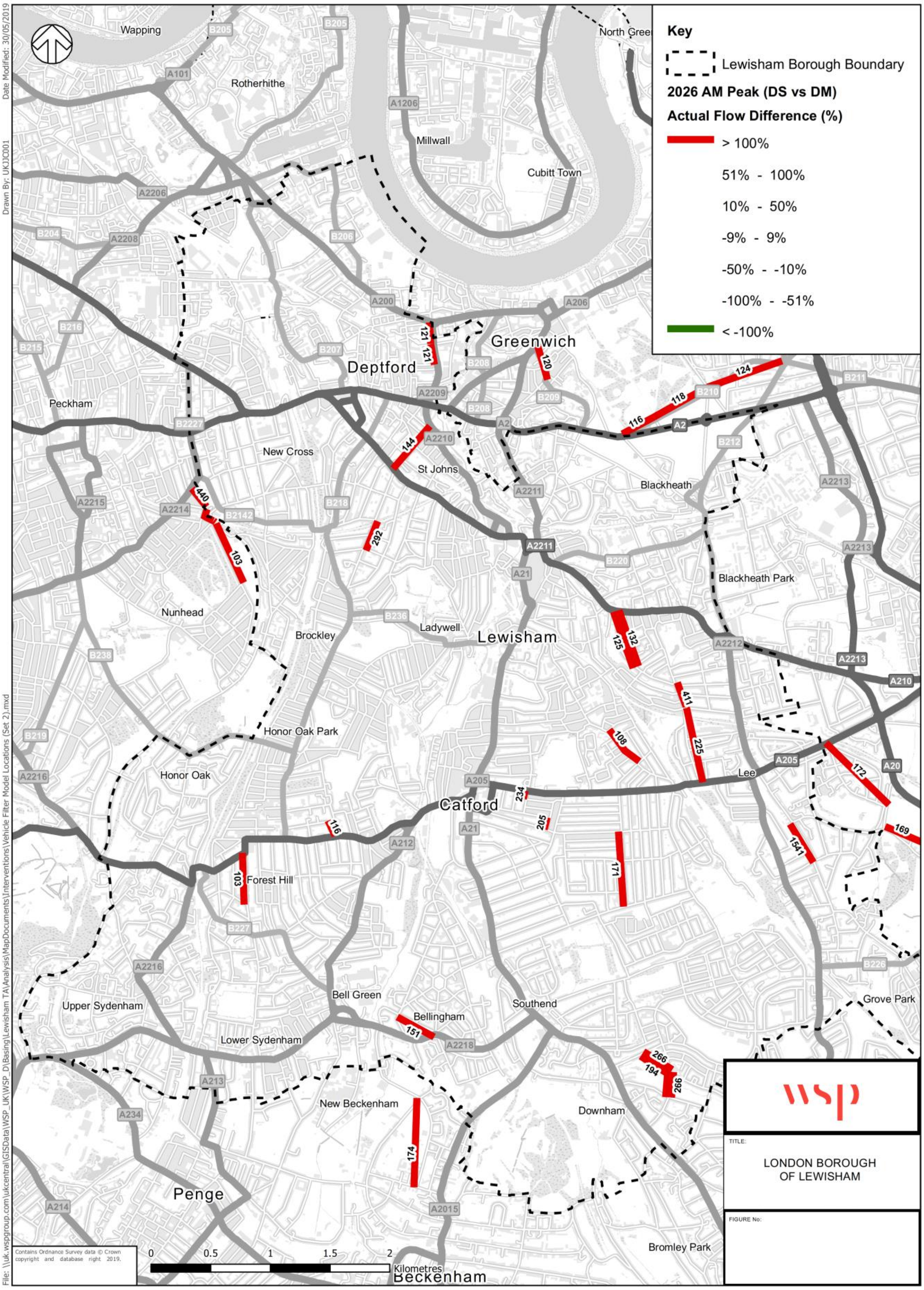


Figure 6b: Actual Flow % Difference (Do Something vs Do Minimum)

6. Delay

Figures 7 and 8 show modelled delays in the 2026 AM peak Do Minimum and Do Something models, respectively.

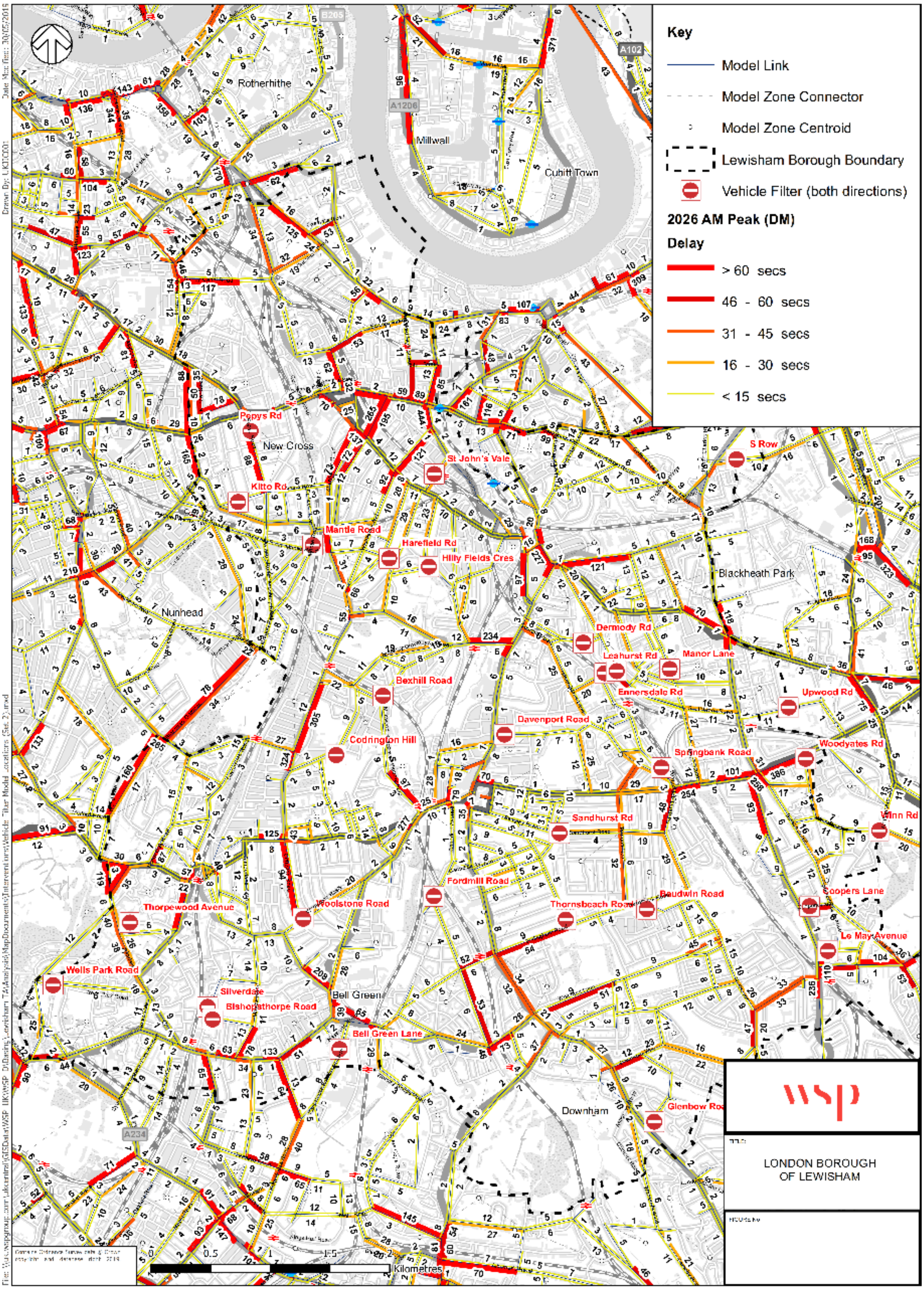


Figure 7: Delay (Do Minimum)

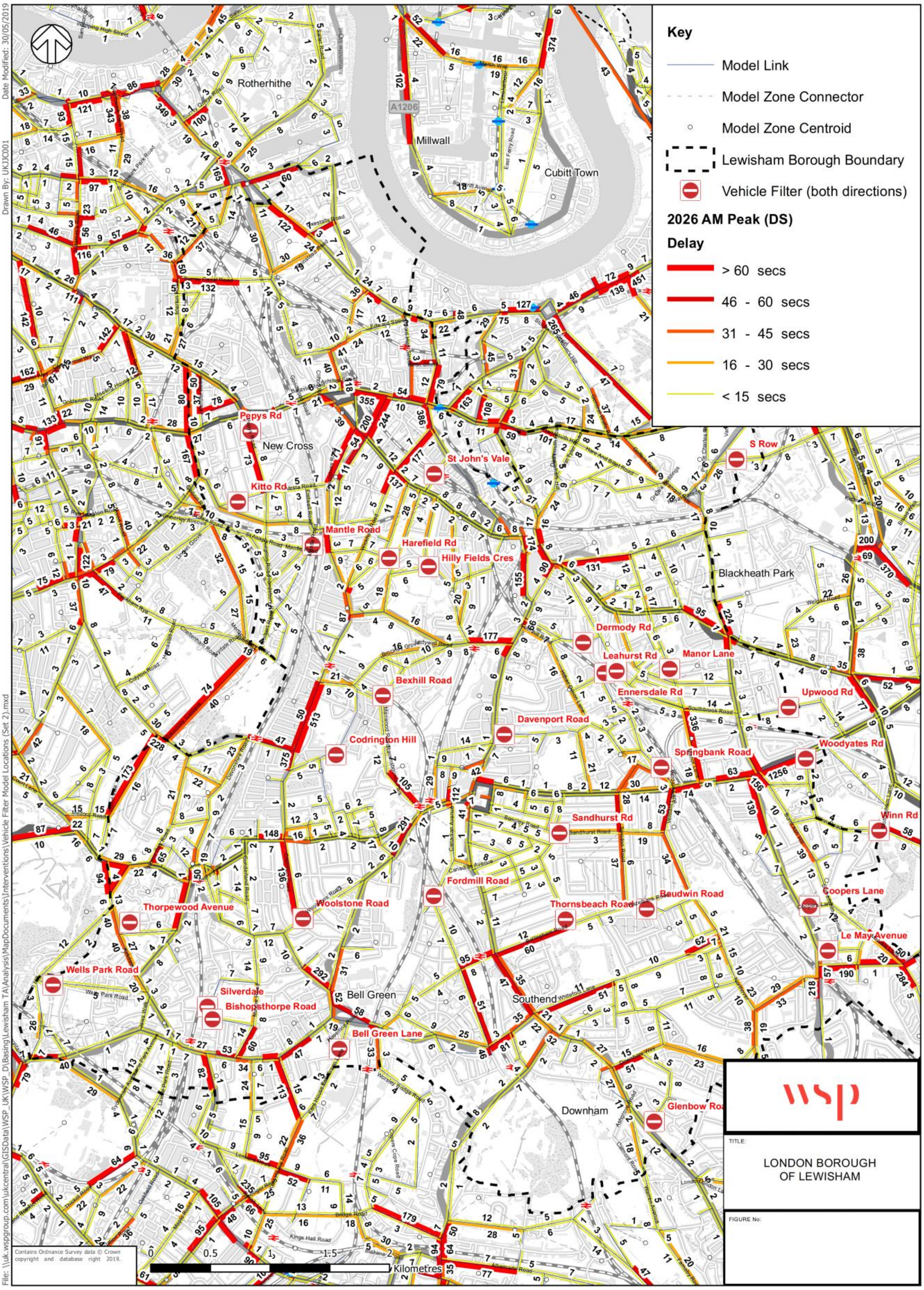


Figure 8: Delay (Do Something)

7. Delay Difference

Figure 9 shows delay difference between the 2026 AM peak Do Minimum and Do Something models.

In general, most links in the Borough exhibit a delay change of between **-19 and 19 seconds** and therefore, most links are not highlighted on Figure 9.

The links that see a delay increase in particular are B218 Stondon Park (**+209 seconds**), Manor Lane (**+309 seconds**) and the adjacent A205 St Mildreds Road (**+869 seconds**). Here, the delay increases are not due to an increase/decrease in flow, but rather due to sensitive signal timings in ELHAM, resulting in an unrealistic level of delay.

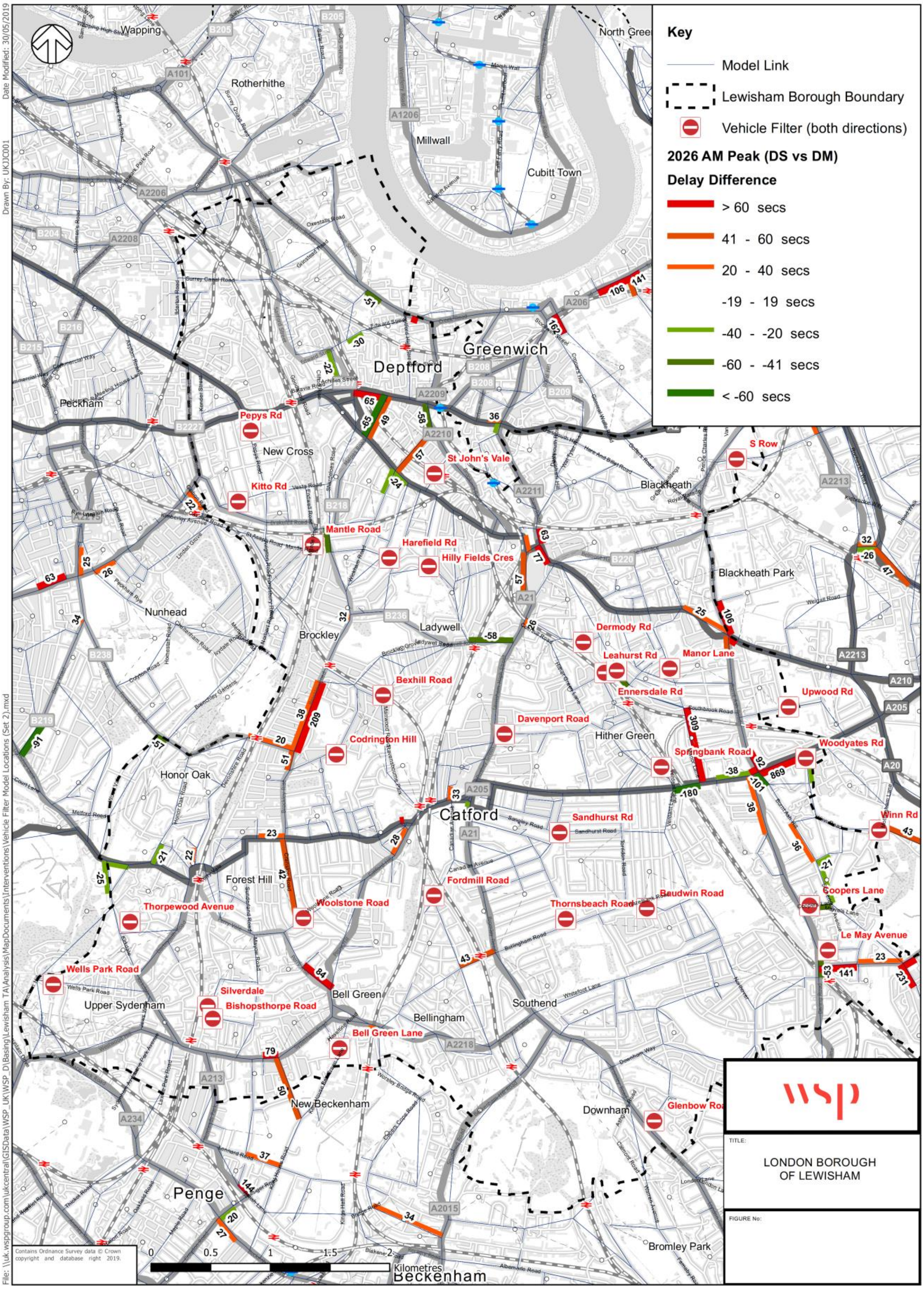


Figure 9: Delay Difference (Do Something vs Do Minimum)

8. Journey Times

TfL's ELHAM journey time routes have been selected to ascertain the extent to which journey times change because of flow increases/decreases across the Borough. A new bespoke route has also been created for this study along Whitefoot Lane and Southend Lane. The routes are shown in Figure 10.

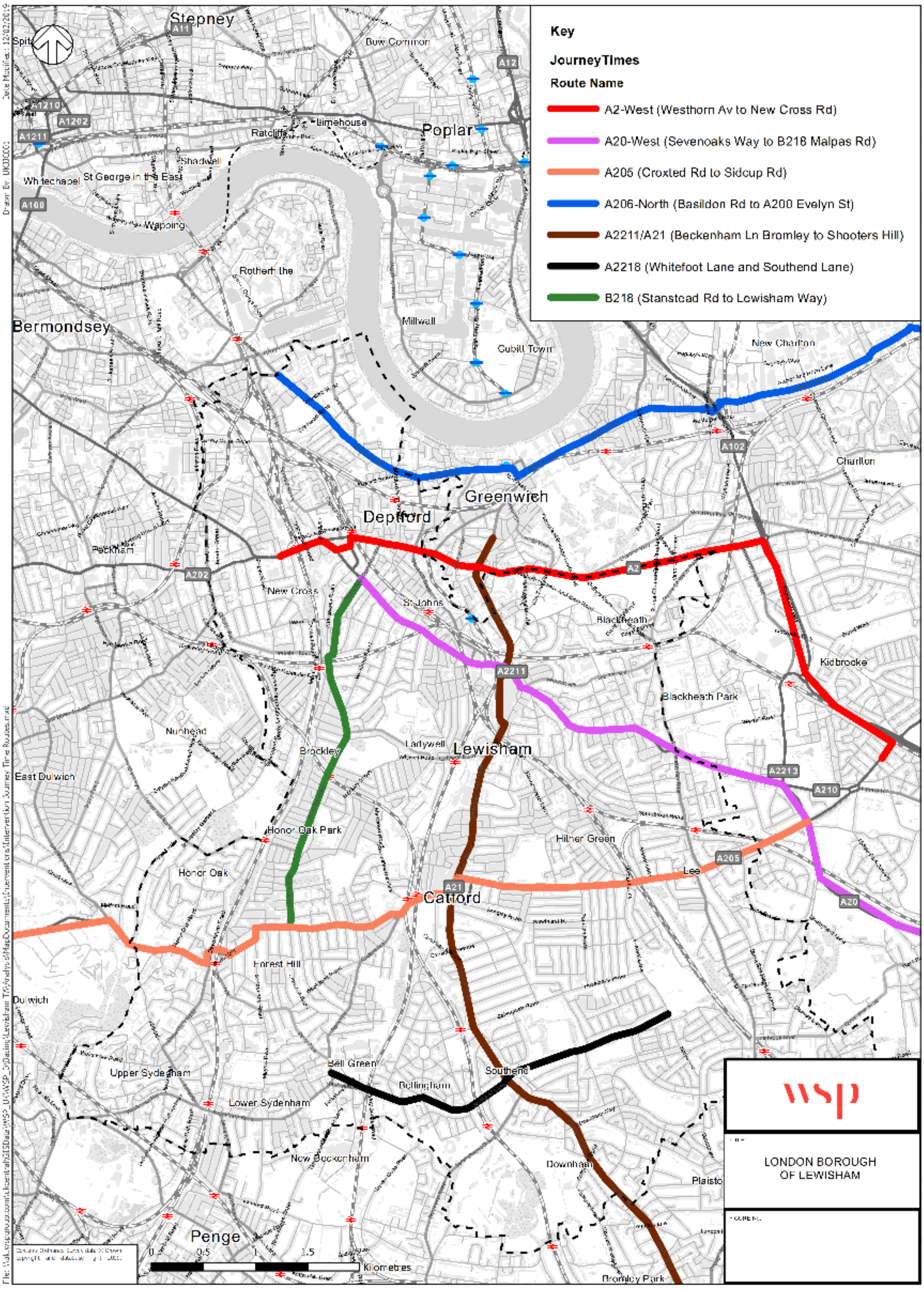


Figure 10: Journey Time Routes

Table 1 shows a comparison of the journey times along these routes in the Do Minimum and Do Something models.

Table 1: Modelled Journey Times

Route	Direction	Modelled Journey Time (s) DM	Modelled Journey Time (s) DS	Modelled Journey Time (s) Diff. (DS vs DM)	Modelled Journey Time (s) % Diff. (DS vs DM)
B218 (Stanstead Rd to Lewisham Way)	NB	1,086	1,154	**+68**	**+6%**
B218 (Stanstead Rd to Lewisham Way)	SB	860	1,063	**+203**	**+24%**
A2211/A21 (Beckenham Ln Bromley to Shooters Hill)	NB	1,618	1,689	**+71**	**+4%**
A2211/A21 (Beckenham Ln Bromley to Shooters Hill)	SB	1,392	1,519	**+126**	**+9%**
A206-North (Basildon Rd to A200 Evelyn St)	NB	3,090	3,403	**+313**	**+10%**
A206-North (Basildon Rd to A200 Evelyn St)	SB	2,132	2,171	**+40**	**+2%**
A2-West (Westhorn Av to New Cross Rd)	NB	2,022	2,410	**+389**	**+19%**
A2-West (Westhorn Av to New Cross Rd)	SB	1,349	1,409	**+60**	**+4%**
A20-West (Sevenoaks Way to B218 Malpas Rd)	EB	2,017	2,070	**+53**	**+3%**
A20-West (Sevenoaks Way to B218 Malpas Rd)	WB	2,579	2,957	**+379**	**+15%**
A205 (Croxted Rd to Sidcup Rd)	EB	2,166	2,318	**+153**	**+7%**
A205 (Croxted Rd to Sidcup Rd)	WB	2,640	3,197	**+557**	**+21%**
A2218 (Whitefoot Lane and Southend Lane)	EB	646	665	**+19**	**+3%**
A2218 (Whitefoot Lane and Southend Lane)	WB	775	804	**+28**	**+4%**
Total	**All**	**24,372**	**26,829**	+2,457	**+10%**

Table 1 shows that all the routes experience a journey time increase between the Do Minimum and Do Something models. The total increases across all routes is **+10%**.

9. Conclusion

WSP has undertaken a highway impact assessment from implementing a series of vehicle filters into the 2026 forecast year ELHAM within the London Borough of Lewisham.

The overall conclusion is that generally traffic flow is pushed from local residential roads onto strategic roads as a result of the vehicle filters. This is most prevalent in the south and centre of the Borough, with far less traffic reassignment in the north of the Borough.

It should also be noted that this modelling exercise, as presented, assumes a simple reassignment of traffic to alternative routes, rather than any more complex behavioural change that may take place as a result of the increased journey times such as retiming of journeys, transfer of trips to other modes or the trip not being made at all. This will be picked up at a later stage in the study when the LTS runs are undertaken.

Appendix F – Technical Note – ELHAM All Interventions Combined Technical Note – Lewisham Local Plan Transport Assessment

Date: 12 August 2019

1. Introduction

In January 2019, WSP was tasked by the London Borough of Lewisham (LBL) to model the impact of a series of highway schemes across the Borough.

The latest version of Transport for London's (TfL's) 2041 West London Highway Assignment Model (ELHAM) has been used to model the impact if all the schemes were combined. It reflects 2041 AM peak network conditions and traffic. This model is referred to hereon in as the Do Minimum model, since it does not include any of the schemes being tested.

The model containing the schemes is referred to hereon in as the Do Something Model. It was created by adding the schemes to the Do Minimum model (TfL's 2041 Reference Case model).

To assess the impact of the scheme, this forecast year model audit report considers:

- Flow differences between the Do Minimum and Do Something models.
- Delay differences between the Do Minimum and Do Something models.
- Journey time differences between the Do Minimum and Do Something models.

2. Model Files

The 2041 forecast year ELHAM files (version E3.09) were provided to WSP by TfL and included the following AM peak highway assignment files:

- E3_FY41_V149NET_LP08_AM.UFS
- E3_FY41_V149NET_LP08_AMq.UFS

As outlined in the *"ELHAM Base Year Model Fact Sheet v3.9a"* (TfL) the model with 'q' in its title represent the PASSQ assignment which is a pre-load assignment.

3. The Schemes

Figure 1 illustrates the location of all the schemes being tested. The schemes are:

- Vehicle filters, proposed as part the Borough's Healthy Neighbourhood's strategy, only allowing pedestrians, cyclists, emergency services, and TfL buses through.
- Cycle Superhighway 4 (CS4)
- Catford Gyratory improvement scheme
- Road space reallocation along the:
  - A2 (and associated reconfiguration of New Cross gyratory)
  - A21 / A2209 / A2210
  - Whitefoot Lane and Southend Lane

Further details on each of the schemes are provided in their associated Technical Notes, which look at the impact of each scheme individually.

This Technical Note details the cumulative impact on the highway network of all the schemes combined in 2041.

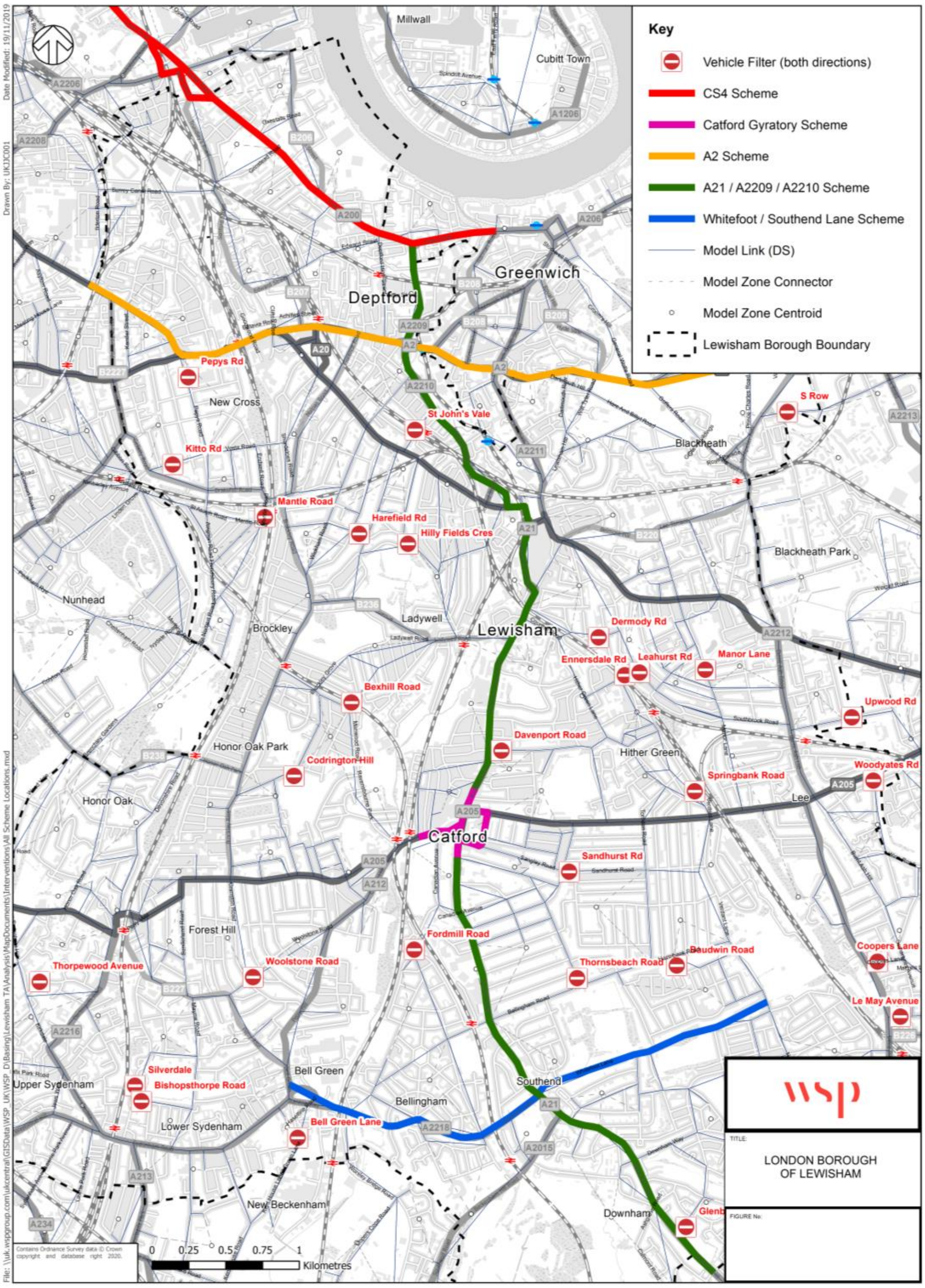


Figure 1: Location of Schemes

4. Actual Flow

Figures 2 and 3 show modelled actual flows in the 2041 AM peak Do Minimum and Do Something models, respectively.

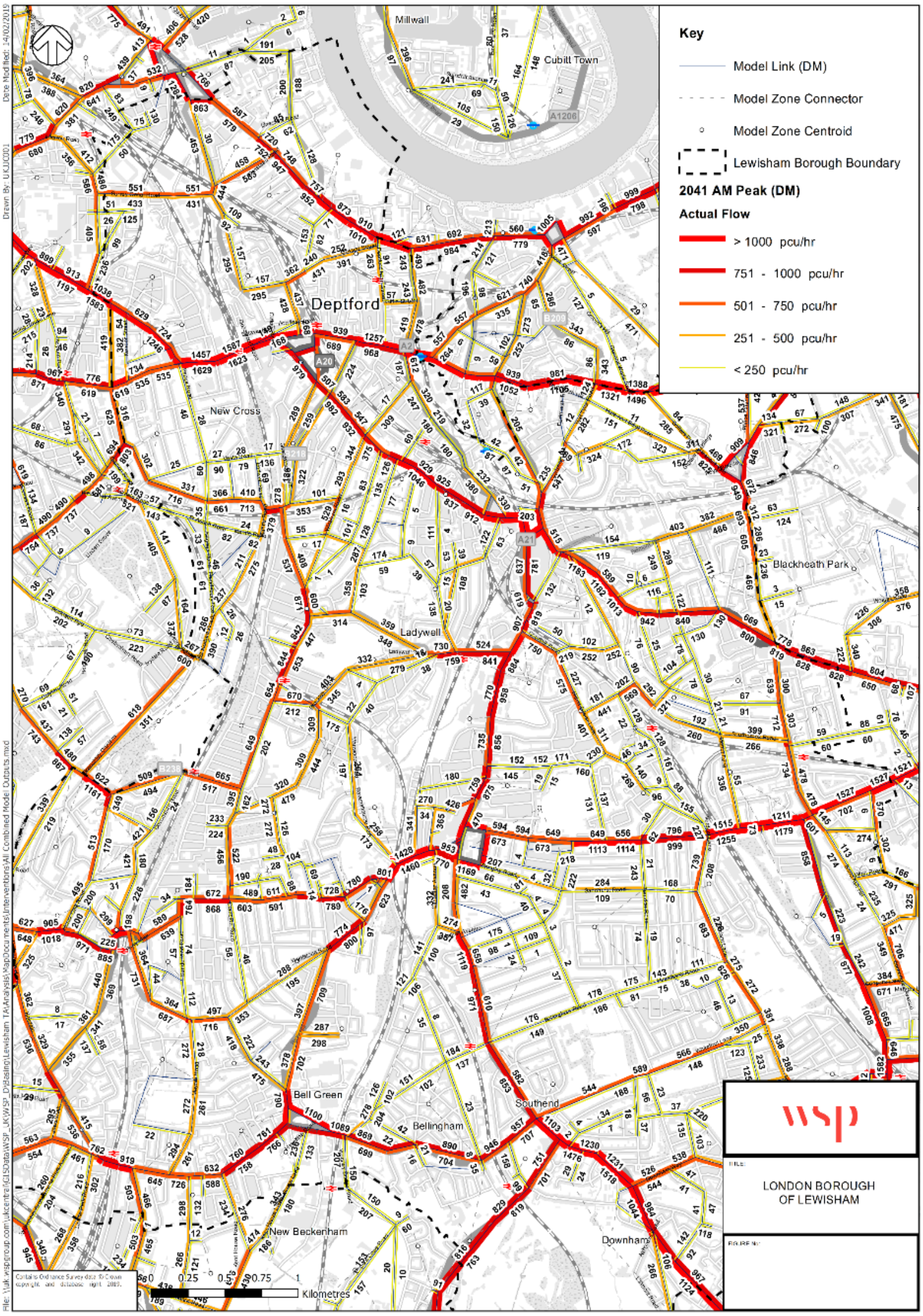


Figure 2: Actual Flow (Do Minimum)

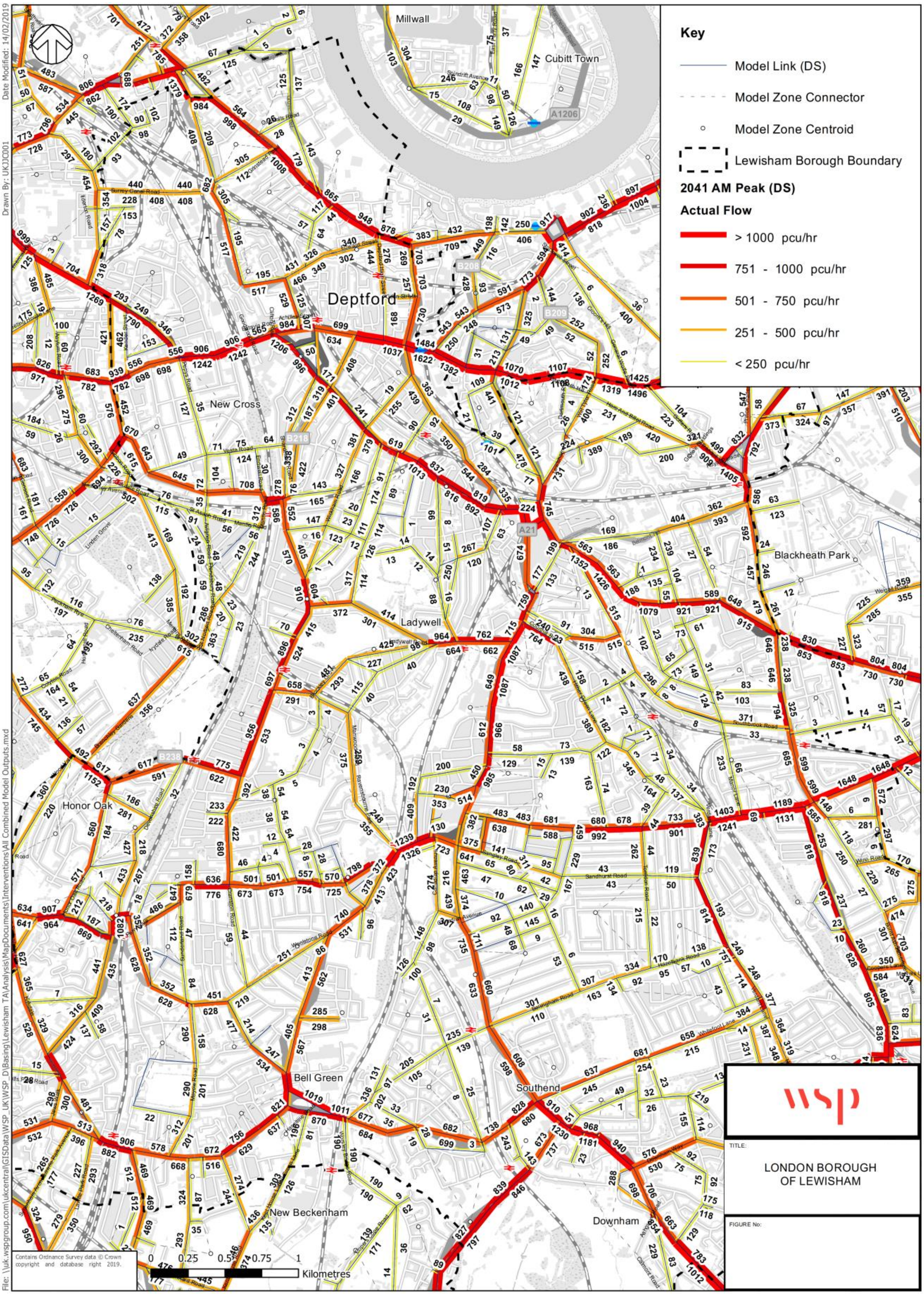


Figure 3: Actual Flow (Do Something)

5. Actual Flow Difference

Figures 4 and 5 show actual traffic flow and actual percentage difference between the 2041 AM peak Do Minimum and Do Something models, respectively.

The impact of all the schemes combined is more pronounced in the north of the Borough than in the south, where road space reallocation along the A2 and A21, the associated reconfiguration of the New Cross gyratory and CS4 are located. Here, flow decreases as low as **-680 pcu/hr** can be seen on the A2 in the Deptford area, and flow increases as high as **250 pcu/hr** can be seen on the A21 due to the road space reallocation scheme and the consequential redistribution of traffic in the area.

In the centre of the Borough, there are generally traffic flow reductions due to road space reallocation along the A2209 and A2210 as traffic is rerouted around the corridor. The Catford Gyratory scheme results in traffic flow reductions due to the consequential delays created by the 6-stage signals at its main junction. Flow reductions as low as **-270 pcu/hr** can be seen around Catford. There are isolated occurrences of traffic flow increases. The increases around Catford Gyratory (up to **375 pcu/hr**) are due to the gyratory being converted from one-way to two-way working (the traffic flow is zero in one direction in the Do Minimum model).

In the south of the Borough, most of the traffic flow changes occur on the A2209 and A2210 corridor once again due to road space reallocation here. Traffic flow reductions as low as **-340 pcu/hr** can be seen. There are also flow reductions in the region of **-200 pcu/hr** along Southend Lane. The road space reallocation scheme along Whitefoot Lane results in localised traffic flow increases of up to **160 pcu/hr** along Bellingham Road to the north of Whitefoot Lane and of up to **95 pcu/hr** along Whitefoot Lane itself.

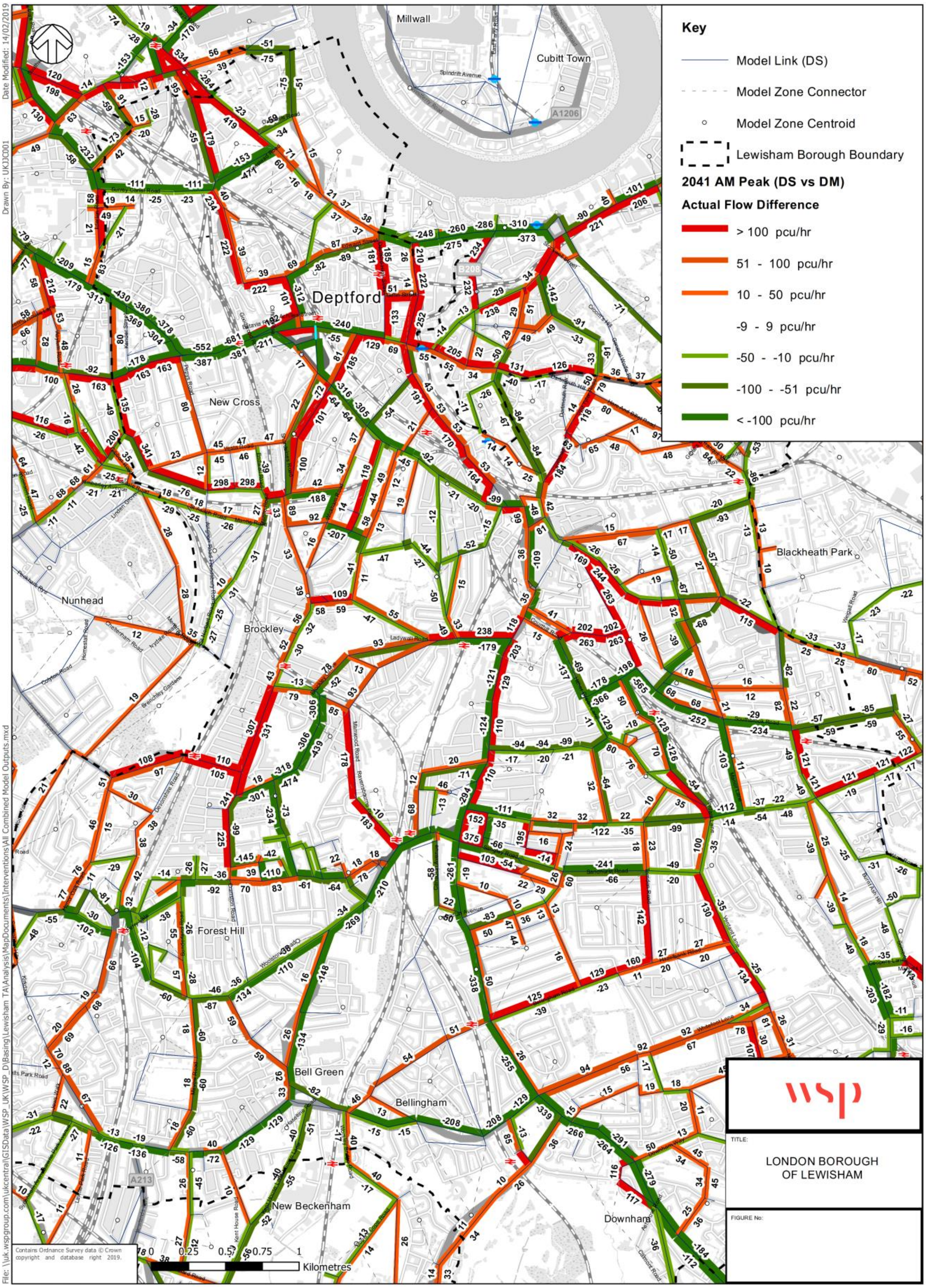


Figure 4: Actual Flow Difference (Do Something vs Do Minimum)

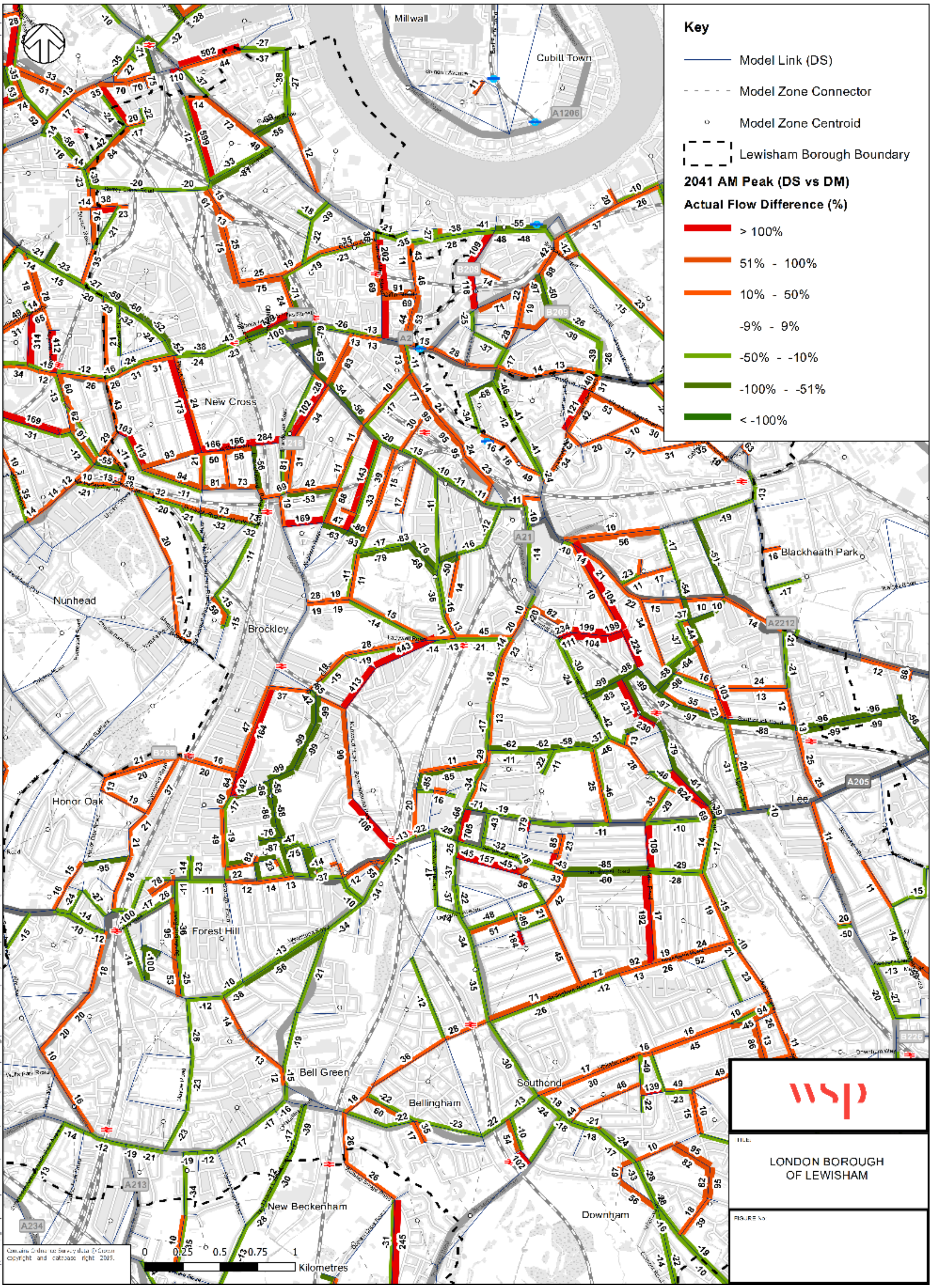


Figure 5: Actual Flow % Difference (Do Something vs Do Minimum)

6. Delay

Figures 6 and 7 show modelled delays in the 2041 AM peak Do Minimum and Do Something models, respectively.

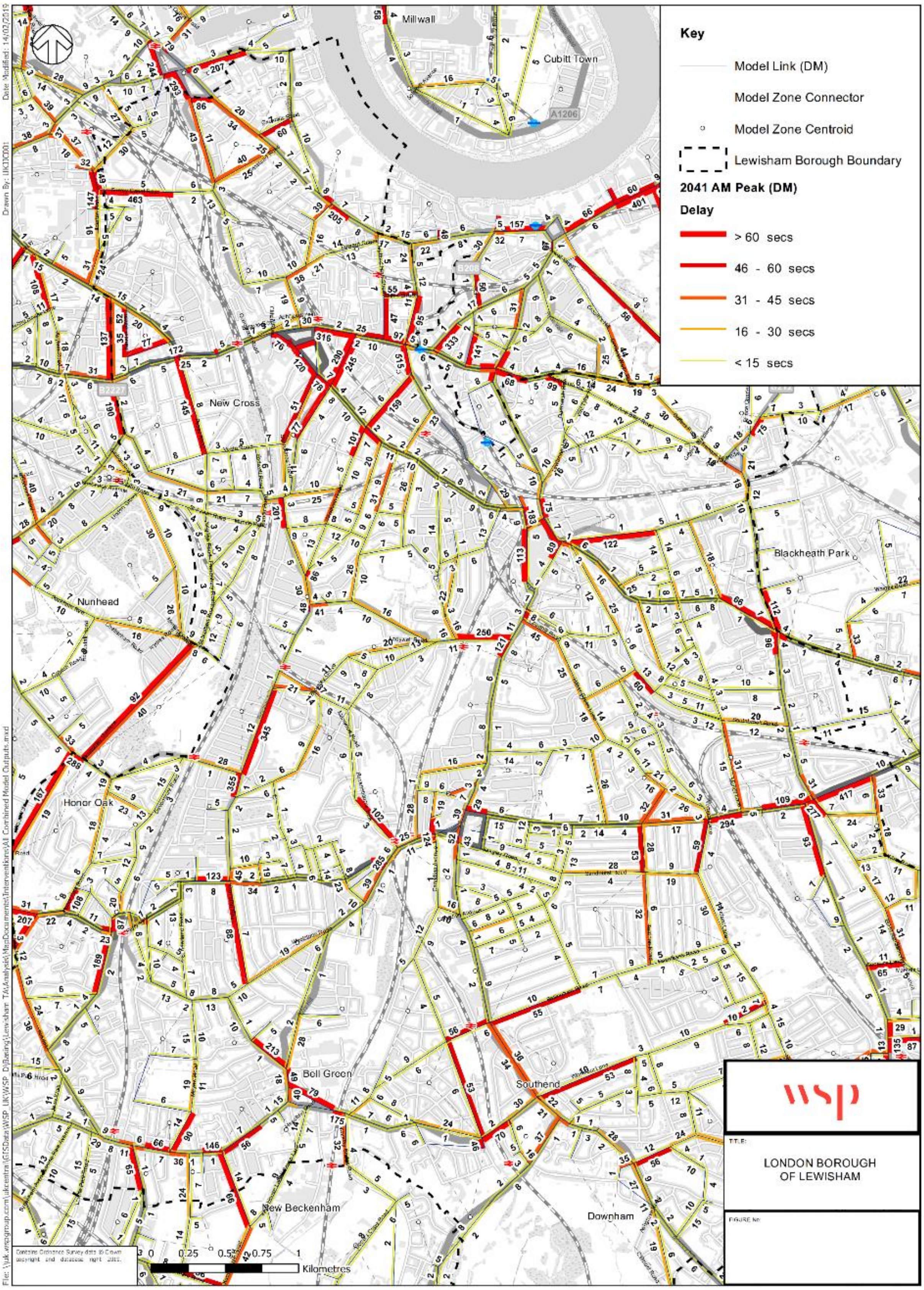


Figure 6: Delay (Do Minimum)

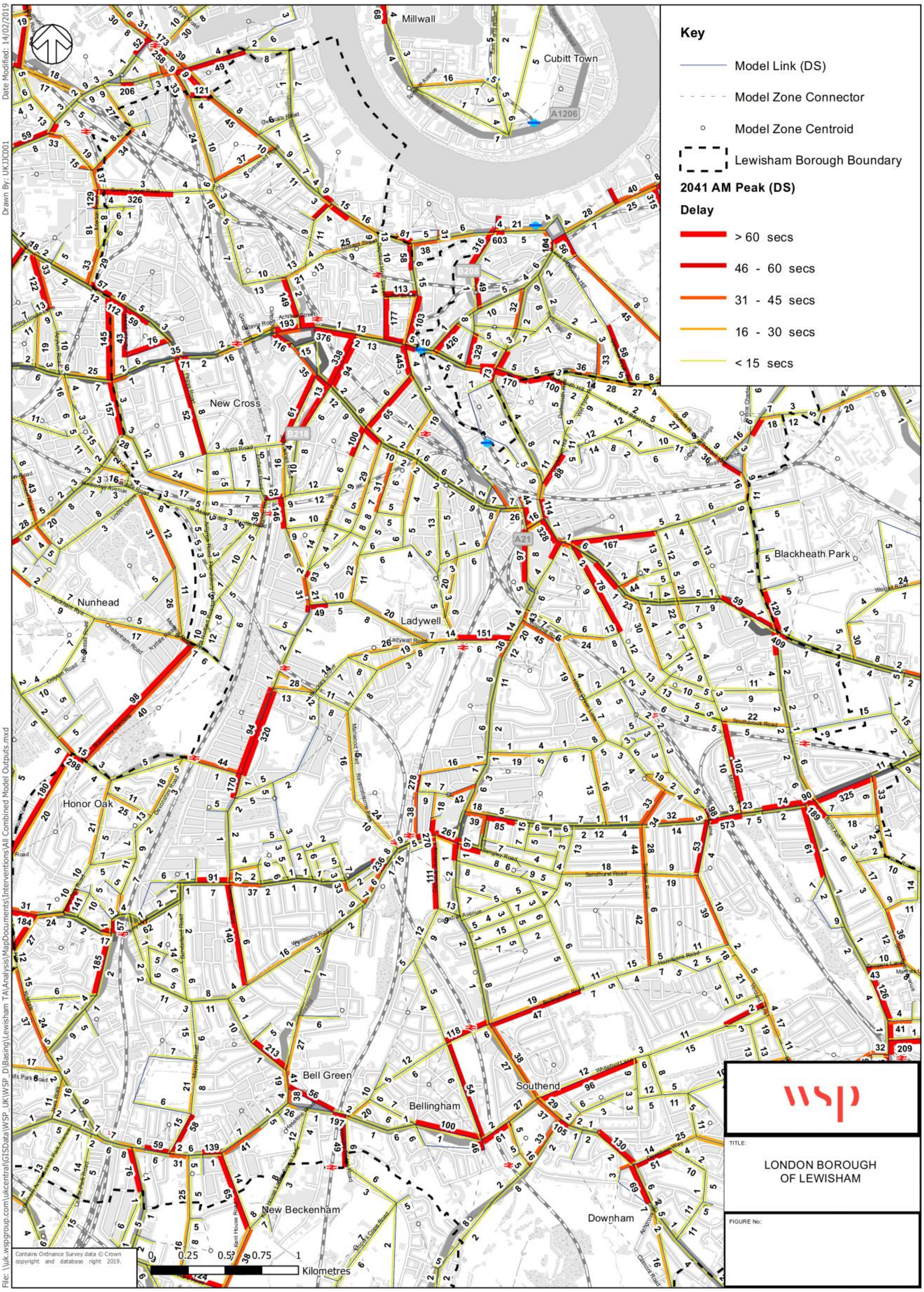


Figure 7: Delay (Do Something)

7. Delay Difference

Figure 8 shows delay difference between the 2041 AM peak Do Minimum and Do Something models.

Delay differences across the Borough are mainly present in two distinct locations.

In the north of the Borough around Deptford, due to the New Cross gyratory being reconfigured in the Do Something models to feature two-way working along the northern arm, increased delays occur at its signalised junctions. The maximum delay increase is **200 seconds**, down to a decrease of **-150 seconds**. Further refinements to the New Cross gyratory scheme are recommended.

A concentration of delay increases is also observed around the Catford Gyratory, where as previously discussed, the 6-stage method of control at the main Catford Gyratory junction results on increased delays in the local area of up to an additional **300 seconds** delay. Further refinements to the scheme are recommended here too.

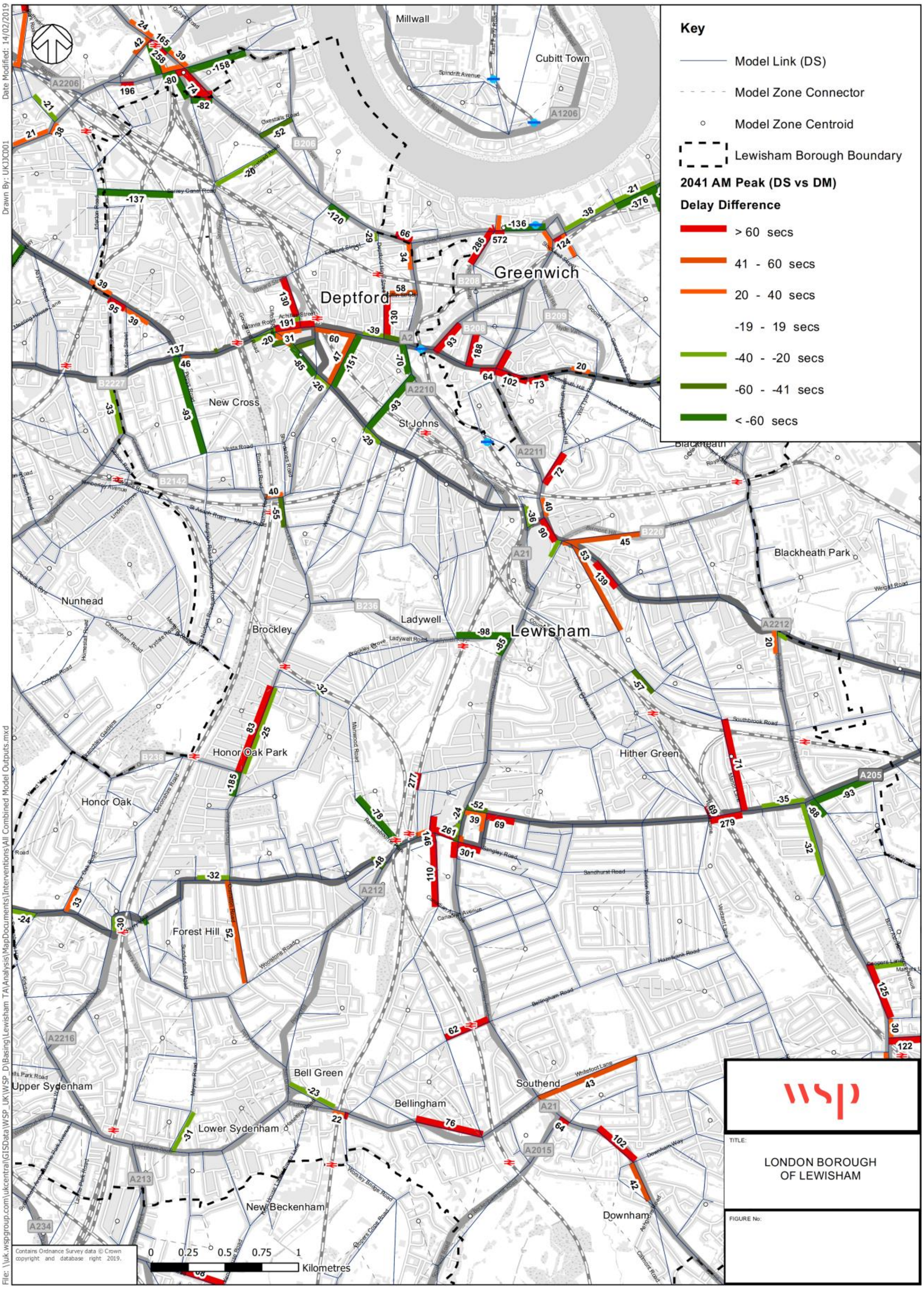


Figure 8: Delay Difference (Do Something vs Do Minimum)

8. Journey Times

TfL's ELHAM journey time routes have been selected to ascertain the extent to which journey times change because of flow increases/decreases across the Borough. A new bespoke route has also been created for this study along Whitefoot Lane and Southend Lane. The routes are shown in Figure 11.

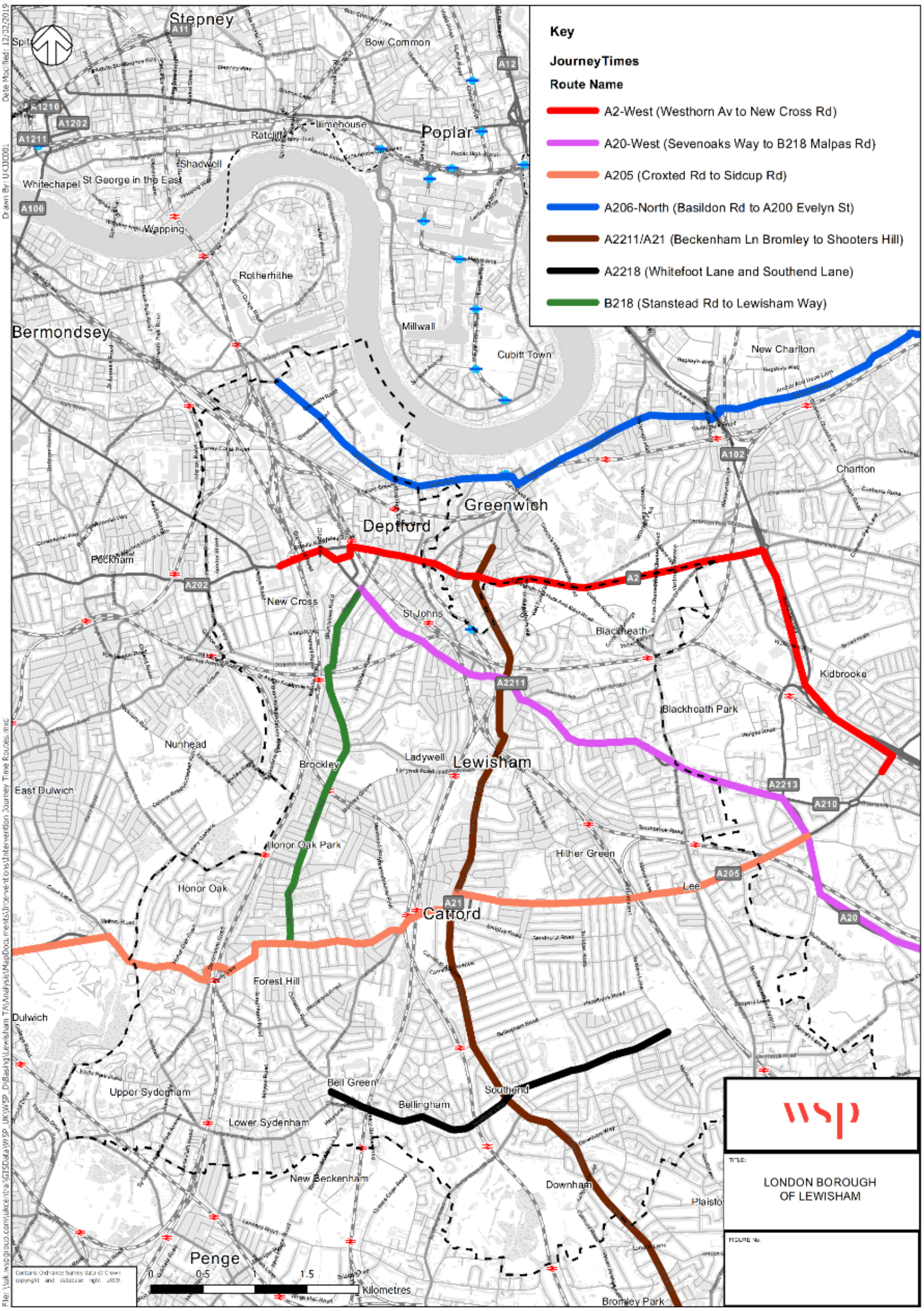


Figure 9: Journey Time Routes

Table 1 shows a comparison of the journey times along these routes in the Do Minimum and Do Something models.

Table 1: Modelled Journey Times

Route	Direction	Modelled Journey Time (s) DM	Modelled Journey Time (s) DS	Modelled Journey Time (s) Diff. (DS vs DM)	Modelled Journey Time (s) % Diff. (DS vs DM)
B218 (Stanstead Rd to Lewisham Way)	NB	1,165	1,013	**-152**	**-13%**
B218 (Stanstead Rd to Lewisham Way)	SB	912	906	**-6**	**-1%**
A2211/A21 (Beckenham Ln Bromley to Shooters Hill)	NB	1,673	1,899	**226**	**14%**
A2211/A21 (Beckenham Ln Bromley to Shooters Hill)	SB	1,519	2,128	**609**	**40%**
A206-North (Basildon Rd to A200 Evelyn St)	NB	3,964	3,583	**-381**	**-10%**
A206-North (Basildon Rd to A200 Evelyn St)	SB	2,339	2,602	**263**	**11%**
A2-West (Westhorn Av to New Cross Rd)	NB	2,316	2,653	**337**	**15%**
A2-West (Westhorn Av to New Cross Rd)	SB	1,431	1,747	**317**	**22%**
A20-West (Sevenoaks Way to B218 Malpas Rd)	EB	2,158	2,088	**-71**	**-3%**
A20-West (Sevenoaks Way to B218 Malpas Rd)	WB	2,779	3,003	**225**	**8%**

Route	Direction	Modelled Journey Time (s) DM	Modelled Journey Time (s) DS	Modelled Journey Time (s) Diff. (DS vs DM)	Modelled Journey Time (s) % Diff. (DS vs DM)
A205 (Croxted Rd to Sidcup Rd)	EB	2,234	2,331	**96**	**4%**
A205 (Croxted Rd to Sidcup Rd)	WB	2,802	2,996	**194**	**7%**
A2218 (Whitefoot Lane and Southend Lane)	EB	670	730	**60**	**9%**
A2218 (Whitefoot Lane and Southend Lane)	WB	794	947	**153**	**19%**
Total	**All**	**26,757**	**28,627**	**1,870**	**7%**

Table 1 shows that 10 out of 14 of the routes experience a journey time increase between the Do Minimum and Do Something models. The total increases across all routes is **+7%**. Due to the delays introduced around the New Cross area in the Do Something model, the A2 experiences journey time increases as high as **+22%**. Larger still, the A21 corridor sees a journey time increase as high as +**40%** due to the negative impact of the Catford Gyratory scheme on journey times.

9. Conclusion

WSP has undertaken a highway impact assessment from implementing a series of schemes into the 2041 forecast year ELHAM within the London Borough of Lewisham.

The overall conclusion is that refinements to the New Cross gyratory scheme and the Catford Gyratory scheme are recommended to reduce the negative effects on journey times at these locations. It is these two schemes that have the greatest impact of traffic flows and journey times in the Borough.

It should also be noted that this modelling exercise, as presented, assumes a simple reassignment of traffic to alternative routes, rather than any more complex behavioural change that may take place as a result of the increased journey times such as retiming of journeys, transfer of trips to other modes or the trip not being made at all. This will be picked up at a later stage in the study when the LTS runs are undertaken.

Appendix G – Technical Note – Lewisham Intervention Package and MTS Technical Note – Lewisham Local Plan Transport Assessment

Date: 27 August 2020

1. Introduction

In August 2018, WSP was appointed by the London Borough of Lewisham (LBL) to provide transport modelling services to support LBL with the preparation of their Local Plan and Local Implementation Plan (LIP). Strategic transport modelling is required to help provide the evidence base for assessing the impacts and the improvements required to support the proposed growth within the Borough.

To assess the impacts of Local Plan on both highway and Public Transport network, WSP developed a number of intervention tests which aim at addressing key pressure points highlighted in the review of existing scenarios. The latest TfL transport modelling suite was used to conduct these intervention tests, this includes LTS, Railplan and East London Highway Assignment Model (ELHAM).

This included an audit of the base year Railplan and ELHAM models, followed by the review of future year models to identify potential problems and issues which occur as a result of the Local Plan growth. Following the review process, a range of mitigation measures were then assessed to understand how these would address the problem and issues in the future. Details can be found in the technical notes 190930_Lewisham Railplan Local Plan_FY_Intervention_Testing_v5_FINAL.pdf and ELHAM All Interventions Combined Technical Note FINAL_2.pdf.

Following the individual assessment of the range of mitigation measures in Railplan and ELHAM, a package of measures was developed for both 2026 and 2041 within LTS model to facilitate the Local Plan growth. This technical note will document the schemes that are incorporated in the LTS Local Plan Intervention Package for the future years of 2026 and 2041. It documents the results of the LTS model runs as well as assessing the impacts that these packages have on both public and highway transport movements in the borough compared to a scenario without the interventions. It also compares in 2041 the impact that the Majors Transport Strategy (MTS) has on further impacting the transport network within Lewisham.

This technical note is structured into the following chapters:

- Chapter 2: Lewisham Local Plan Intervention Package Development
- Chapter 3: 2026 LTS Analysis
- Chapter 4: 2026 Railplan Analysis
- Chapter 5: 2026 ELHAM Analysis
- Chapter 6: 2041 LTS Analysis
- Chapter 7: 2041 Railplan Analysis
- Chapter 8: 2041 ELHAM Analysis (without MTS)
- Chapter 9: 2041 ELHAM Analysis (with MTS)

2. Lewisham Local Plan Intervention Package Development

The LTS London Plan Funded scenarios for 2026 and 2041 were used as a starting point to develop the Lewisham Local Plan Intervention Package Test. Their LTS scenario names are A126lp01 and A141lp01 respectively and these will be referred to throughout this note as the Do Minimum scenarios.

Lewisham Local Plan Intervention Package

The Local Plan Intervention Package of measures was agreed with LBL and TfL for 2026 and 2041 generated from a combination PT and highway schemes previously assessed. Table 1 illustrates the schemes included in 2026 and 2041 Lewisham Intervention Package LTS runs.

Table 1: LTS Lewisham Intervention Packages

Add Text	Scheme Name	LTS 2026 Lewisham Intervention Package	LTS 2041 Lewisham Intervention Package
Public Transport	BLE to Lewisham 27tph	No	No

Add Text	Scheme Name	LTS 2026 Lewisham Intervention Package	LTS 2041 Lewisham Intervention Package
Public Transport	BLE to Hayes 36tph	No	Yes
Public Transport	DLR 30tph	No	Yes
Public Transport	Jubilee 36tph	No	Yes
Public Transport	Southeast Riverside bus strategy	Yes	Yes
Public Transport	Bus 225 extension	Yes	Yes
Public Transport	Brockley Interchange	No	Yes
Public Transport	New Bermondsey station	Yes	Yes
Public Transport	Lewisham bus frequency x2	No	Yes
Public Transport	Lower Sydenham enhanced bus services	No	Yes
Public Transport	Cycle Superhighway	Yes	Yes
Public Transport	Road space allocation	Yes	Yes
Public Transport	Vehicle filters	Yes	Yes
Public Transport	Catford Gyratory improvement scheme	Yes	Yes

Highway and PT matrix outputs from the LTS 2026 and 2041 Lewisham Intervention Package scenario runs, undergo adjustment procedures (CHAMP and PLANET processes) to be converted into the appropriate matrix format for subsequent traffic and transit assignment i.e. ELHAM and Railplan assignments.

Description of Public Transport Schemes

The public transport interventions from this transport assessment are largely drawn from the Canada Water project as well as a number of schemes proposed by LBL and sensitivity tests proposed by the project team.

BAKERLOO LINE Extension

The Bakerloo Line Extension (BLE) is a TfL scheme to extend the Bakerloo Line, which currently terminates at Elephant and Castle, to Lewisham. Along the route there will be newly built stations as well as improvements at New Cross Gate station (new interchange from Bakerloo Line to Overground and Southeastern services). There are also proposals to extend BLE beyond Lewisham, one of which is the extension into south east London, to Hayes. In 2041 the BLE to Hayes will be tested in the Lewisham intervention package, the route is shown in Figure 1.

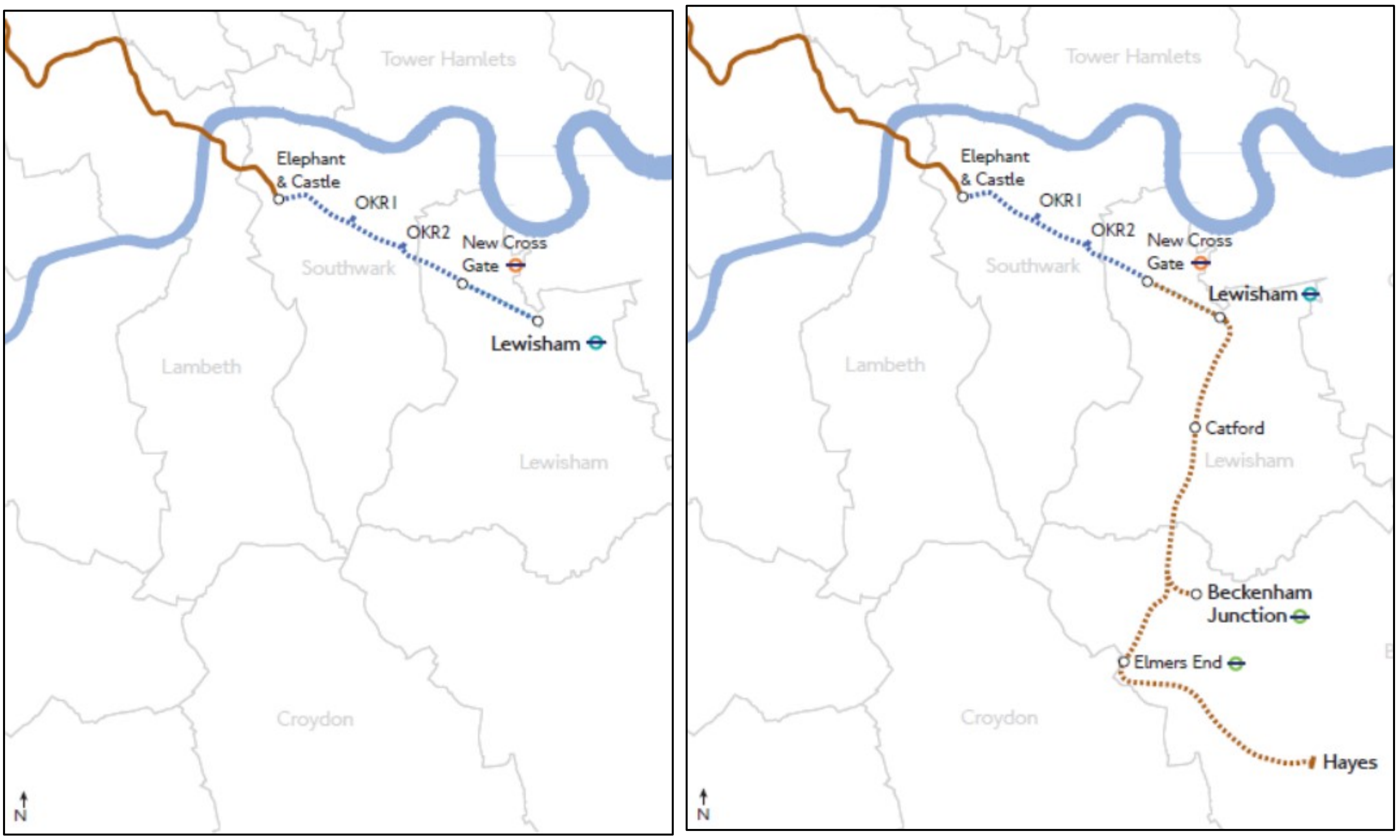


Figure 1: Bakerloo Line Extension to Lewisham (left) and to Hayes (right) – Proposed Route

In terms of positive impacts to the public transport network in LBL, the BLE would improve connectivity at both New Cross Gate and Lewisham stations, but the scheme would also provide a connection between Lewisham and central London. Moreover, the extension between Lewisham and Hayes would attract more public transport passengers, resulting in alleviating demand along on Southeastern services.

In terms of service frequencies, the Bakerloo service frequencies will be 36tph up to Lewisham and then 18tph continuing beyond Lewisham; 6tph which terminate at Beckenham Junction and 12tph at Hayes.

Jubilee 36tph

In this scheme, the Jubilee Line frequency will be increased from 34tfp in the Do Minimum, to 36tph. The purpose is to alleviate crowding currently experienced on this line, especially around the Canada Water and Canary Wharf areas.

DLR 30tph

In this scheme, the DLR frequency (to and from Lewisham) will be increased from 23tph in the Do Minimum, to 30tph. The purpose is to alleviate crowding currently experienced on this line, especially between Lewisham and Canary Wharf stations.

Brockley Interchange

Currently Brockley station serves Overground and Southern services on the East London Line. Southeastern services (terminating at Victoria) pass through Brockley via an overbridge, yet do not stop here. The Mayor's Transport Strategy (MTS) recognises the need for improved orbital connections and, with the emerging status of Lewisham as the strategic interchange for south east London, it is critical to better link Lewisham into the Overground orbital network.

For this reason, in LBL's Vision for Rail (2017) the Borough welcomes the MTS proposal and wishes to enable interchange between Southeastern (Victoria Line) and the East London Line. This means creating new platforms at Brockley for Southeastern services to board and alight, and allowing interchange movements between Southeastern services and those on the East London Line. Summary of changes to the Railplan network can be seen in Figure 2.

Figure 2: NR network without (left) and with (right) Brockley Interchange

New Bermondsey Station

The New Bermondsey site was first developed following the arrival of the Grand Surrey Canal in 1807. Today it is an underused 30-acre industrial site in the north of LBL. As part of the potential development proposal, the New Bermondsey station will be opened for Overground services. The consequence of this is to provide the local residents with a means to connect to the city centre via Rail.

Southeast Riverside Bus Strategy

The Southeast Riverside area is subject to a number of major developments which may impact on the bus network. The extent of the area is shown in Figure 3. Potential developments in the area include:

- Canada Water
- Convoys Wharf
- New Bermondsey (previously Surrey Canal)
- Other developments: The Wharves, Cannon Wharf and Marine Wharf

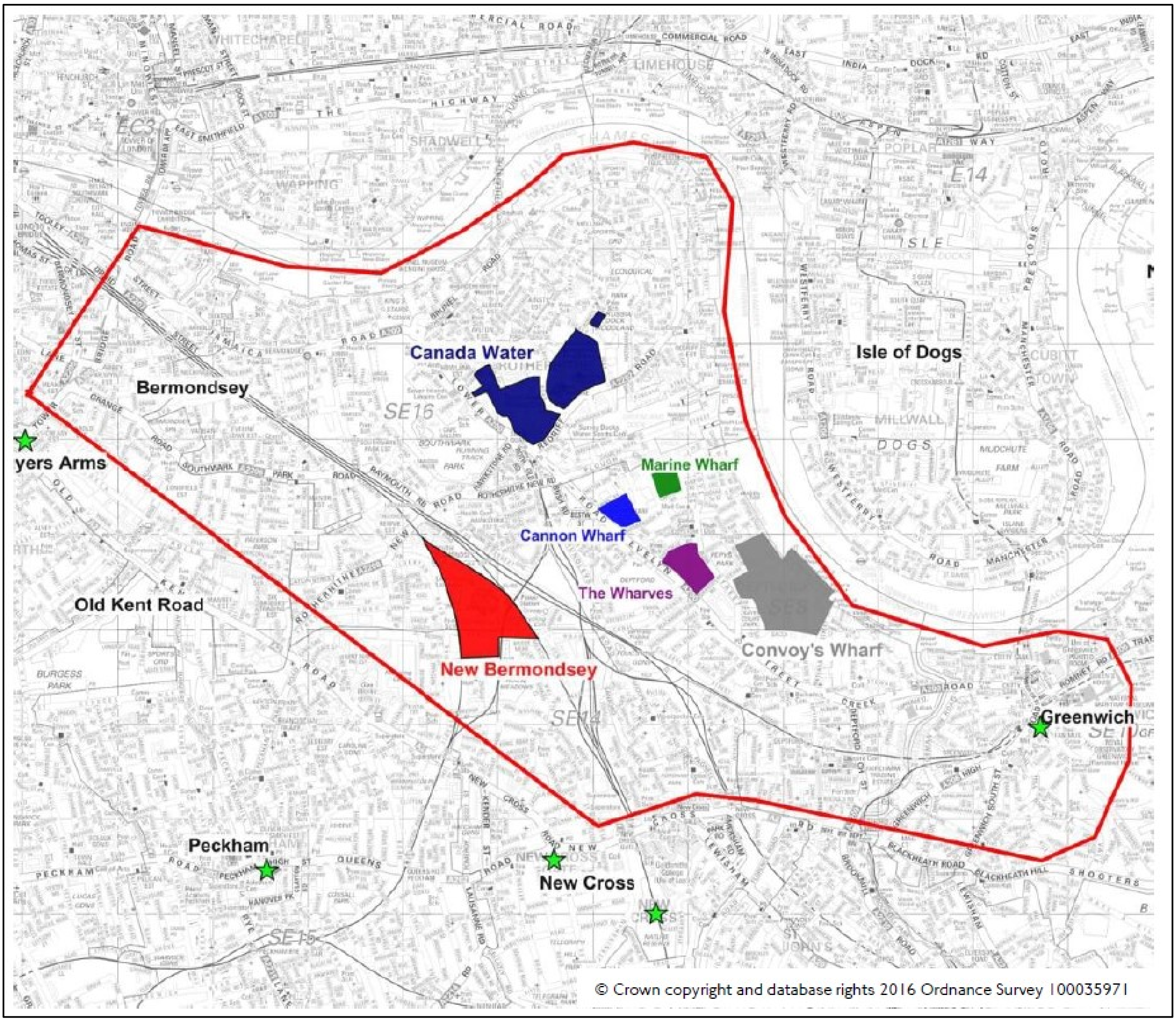


Figure 3: Southeast Riverside Area Major Developments

As a result of these potential developments, TfL have proposed a number of interventions on the existing bus services. These interventions range from proposing new bus services that pass through the developments to modifying existing bus services, such as restructuring (route 199), shortening (routes 188, 381) or extending (route 415). The purpose of such interventions is to provide sufficient capacity at locations where congestion is predicted to occur due to additional development trips, as well as improving connectivity to and from developments.

Bus Route 225 Extension

Route 225 currently runs between Canada Water and Hither Green via Lewisham Station. It runs at a peak frequency of 4 buses per hour (every 15 mins). The proposal is to extend the service from its current terminus at Hither Green to Bellingham station, to help provide better connections between the north and the south of the borough.

The proposed extension starts from Hither Green Lane, Verdant Lane, Hazelbank Road, Bellingham Road and the service terminates on Randlesdown Road, stands and returns via the same routing. Currently in the LTS/ Railplan model there are no bus routes or bus stops along the section spanning between Hazelbank Road and Randlesdown Road, thus new bus stops are to be proposed assuming 400-500m between two consecutive ones. Along Hither Green Lane and Verdant Lane there are some existing bus stops so the extension service can use these. The location of these bus stops is shown in Figure 4. Blue and red routes illustrate existing line and proposed extension, while green and yellow nodes represent the existing and new bus stops, respectively.

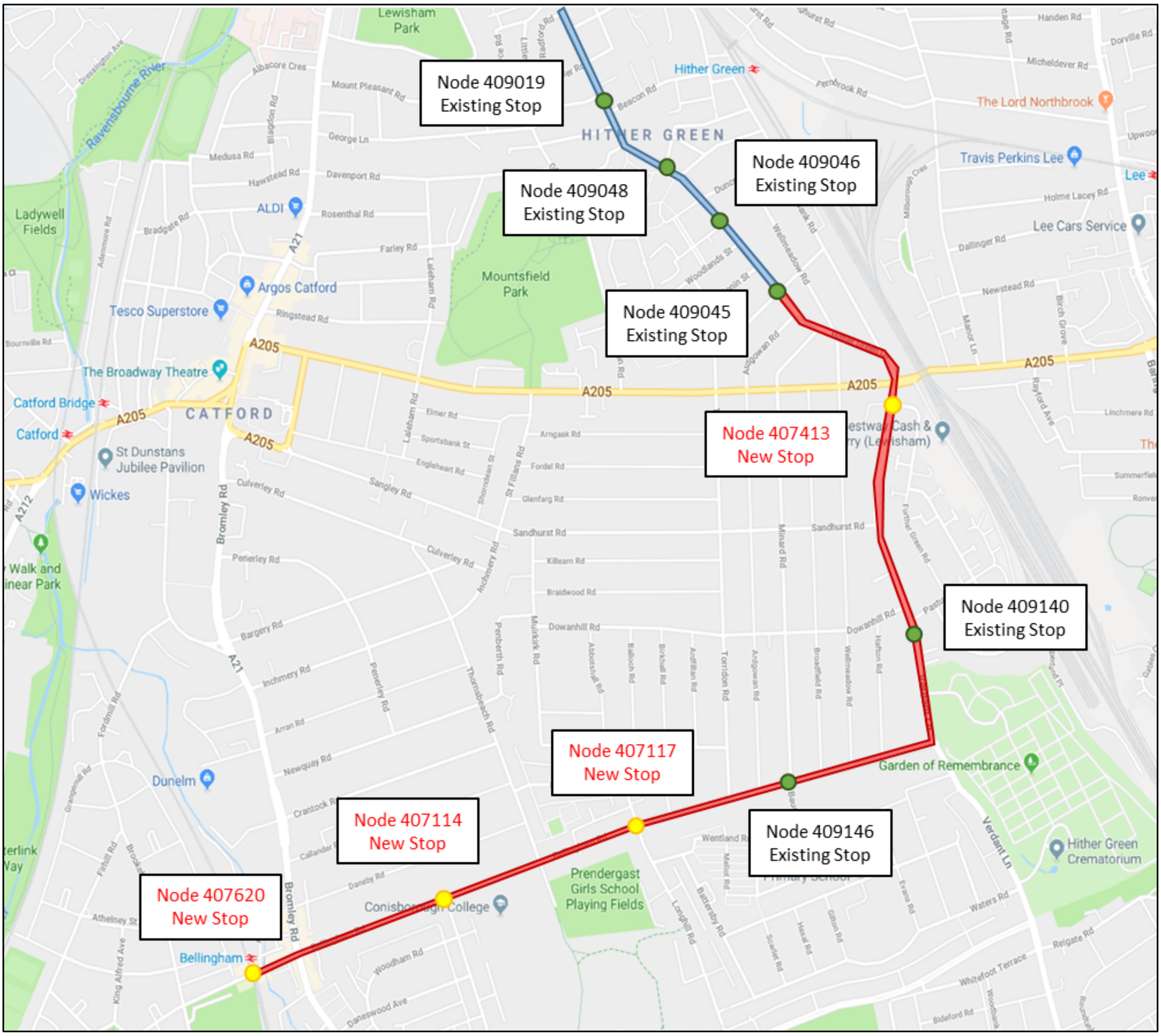


Figure 4: Proposed Route and Stops for Bus Service 225 Extension

Lewisham Bus Frequency x2

WSP have also assessed the impacts on the public transport network if more buses are to pass through Lewisham station. To do so, bus services that go from/to or pass through Lewisham station were identified, then their frequency was doubled. These bus services are 21, 47, 54, 75, 89, 108, 122, 136, 178, 180, 181, 185, 199, 208, 225, 261, 273, 284, 312, 380, 436, 484, P4 and are schematically shown in Figure 5.

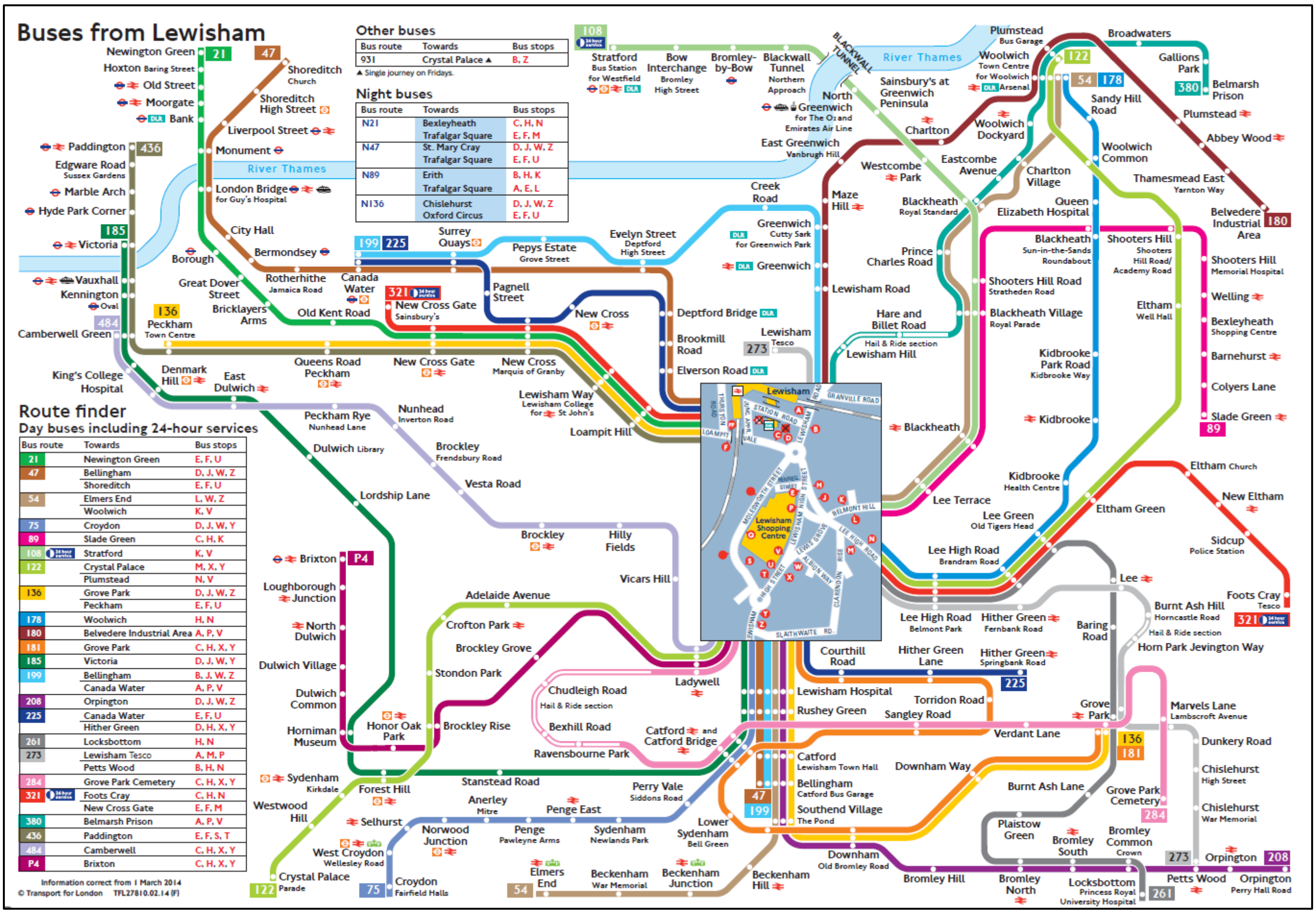


Figure 5: Buses from Lewisham

Lower Sydenham Enhanced Bus Services

WSP have also assessed the impacts on the public transport network if more bus services (namely 181, 202, 356 and 450) were to pass through Lower Sydenham train station. The current and proposed frequencies are shown in Table 2.

Table 2: Current and Proposed Bus Frequencies in Lower Sydenham

Route Number	Actual Frequency (TfL Website)	Lower Sydenham Enhanced services
181	Every 9-13 minutes	Every 6 minutes
202	Every 8-11 minutes	Every 6 minutes
356	Every 15 minutes	Every 6 minutes
450	Every 7-10 minutes	Every 10 minutes

Descriptions of Highway Interventions

Catford Gyratory

The Catford Gyratory improvement scheme in Catford Town Centre involves converting the existing one-way gyratory system into a two-way system and creating a new larger junction between the A205 and A21, with space for cyclists to manoeuvre safely. There is a likelihood that the design proposal will evolve further from the current proposal and when this happens it would be prudent to reflect the changes within the ELHAM model to advise LBL of the impacts. Figure 6 illustrates the scheme's proposed layout.

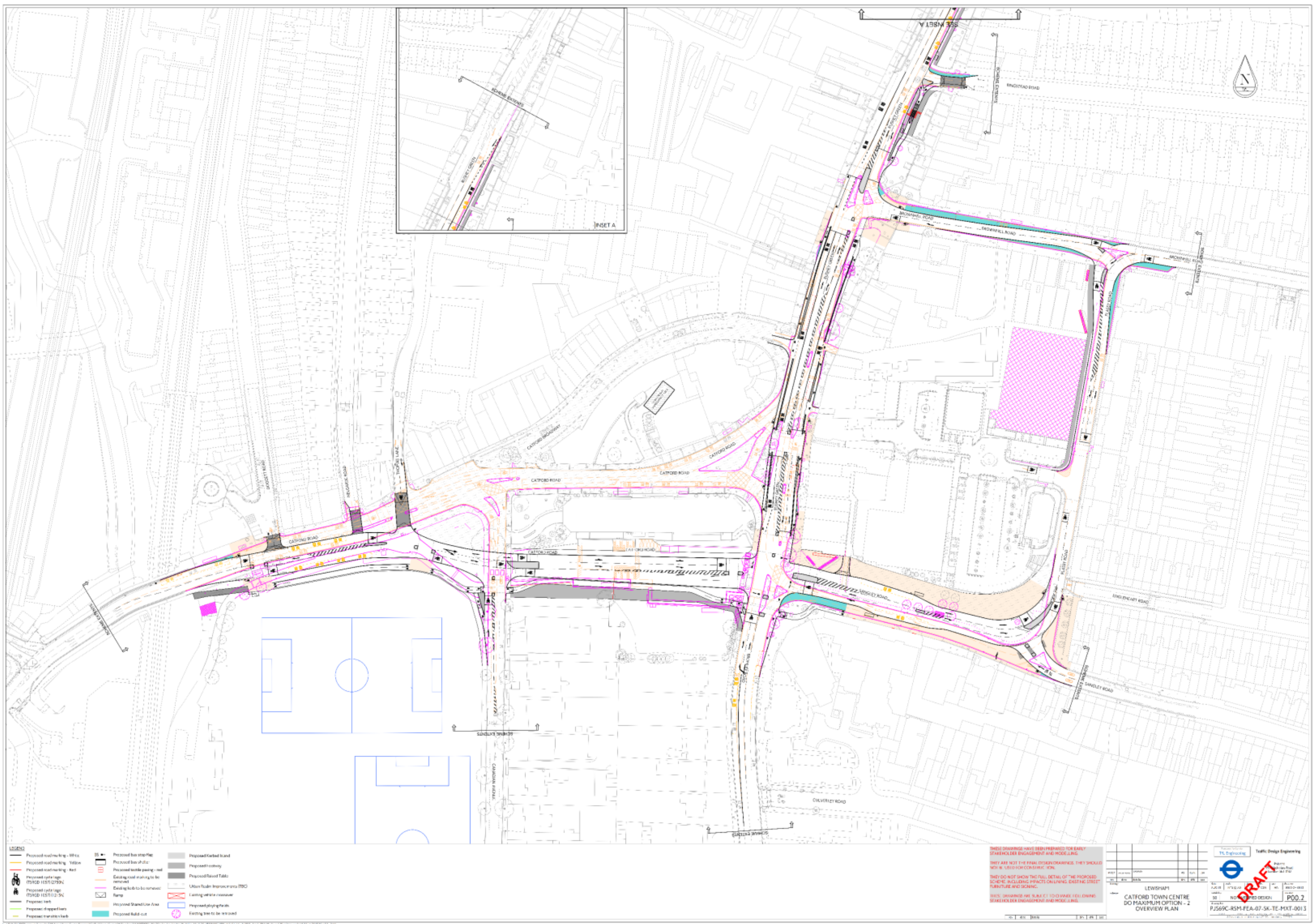


Figure 6: Catford Gyratory Improvement Scheme

Cycle Superhighway 4

TfL's Cycle Superhighway schemes aim to provide protected space for cycling on some of London's busiest roads. They connect stations, town centres and key destinations, making them more accessible and easier for people to cycle to.

Cycle Superhighway 4 (CS4) would provide a continuous segregated cycle route between Tower Bridge and Greenwich, along with new pedestrian crossings, improved public spaces and a host of other improvements aimed at creating a more attractive environment for all users and accommodating the area’s future growth. The overview map is shown in Figure 7.

Figure 7: Cycle Superhighway 4 Route Map

A section of CS4 (A200 Evelyn Street) goes through the London Borough of Lewisham.

Road Space Reallocation

The road space reallocation scheme applies along the following roads:

- A2
- A21 / A2209 / A2210
- Whitefoot Lane and Southend Lane

A2

The A2 runs east-west/west-east across the north of the Borough through Deptford. Much of the route currently features two lanes in either direction. Under the road space reallocation scheme, the road space would be reallocated to form a single lane of carriageway in each direction, with 24-hour bus lanes, the latter of which would be wide enough to accommodate cyclists and enable them to pass buses easily.

The gyratory at New Cross might also be reconfigured, with two-way working for general traffic and buses along the northern arm. This has also been coded into the Do Something models, although the scheme is likely to evolve.

A21 / A2209 / A2210

The A21 / A2209 / A2210 corridor runs from the north of the Borough at CS4 to the south of the Borough boundary with Bromley. Road space reallocation would convert the corridor to having a single lane of carriageway in each direction. There would also be continuous segregated cycle provision and bus lanes in both directions, except at junctions which may be more constrained and, where possible cycle provision would take priority over bus provision.

Whitefoot Lane and Southend Lane

Whitefoot Lane and Southend Lane run east-west/west-east across the south of the Borough. The proposals are for a single lane of carriageway and continuous segregated cycle provision in each direction. There would be no bus lanes, except on the approaches to the A21 junction. There may be pinch points at railway bridges.

Vehicle Filters

Figure 8 illustrates the location of the proposed vehicle filters, as part the Borough's Healthy Neighbourhoods strategy. These are indicative only, for the purposes of the modelling exercise, and they are subject to engagement with the communities affected. At these locations, "rat-running" traffic would be thwarted by placing vehicle filters, only allowing pedestrians, cyclists, emergency services, and TfL buses through. The passage of cars, taxis, LGVs and HGVs would be banned.

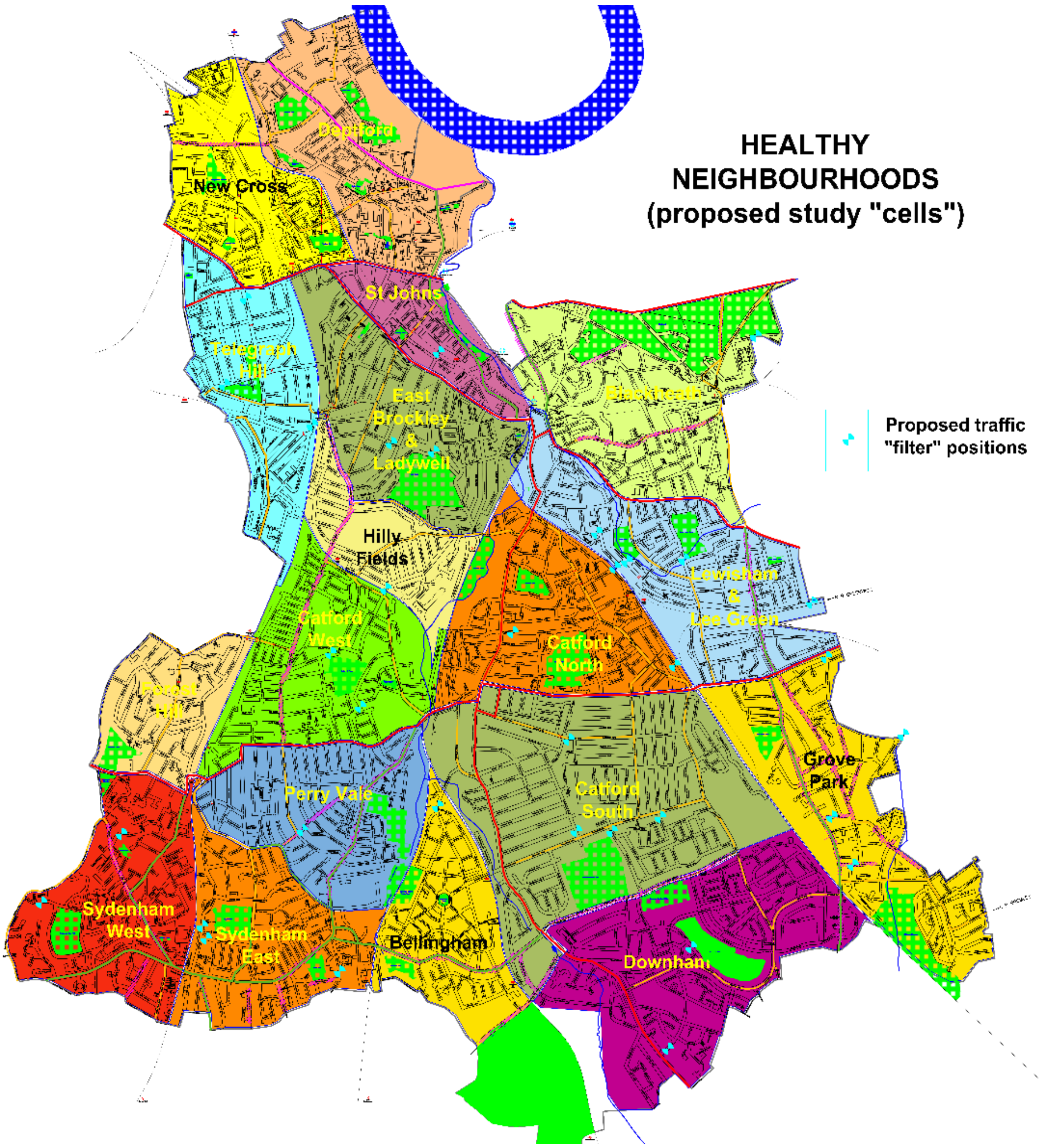


Figure 8: Locations of Proposed Vehicle Filters

In addition to the vehicle filters, Griffin Street has been made one-way eastbound in the Do Something model between its junctions with Deptford Church Street and Frankham Street, to prevent northbound traffic using it as a “rat-run”.

Figure 9 illustrates the location of all highway schemes being tested.

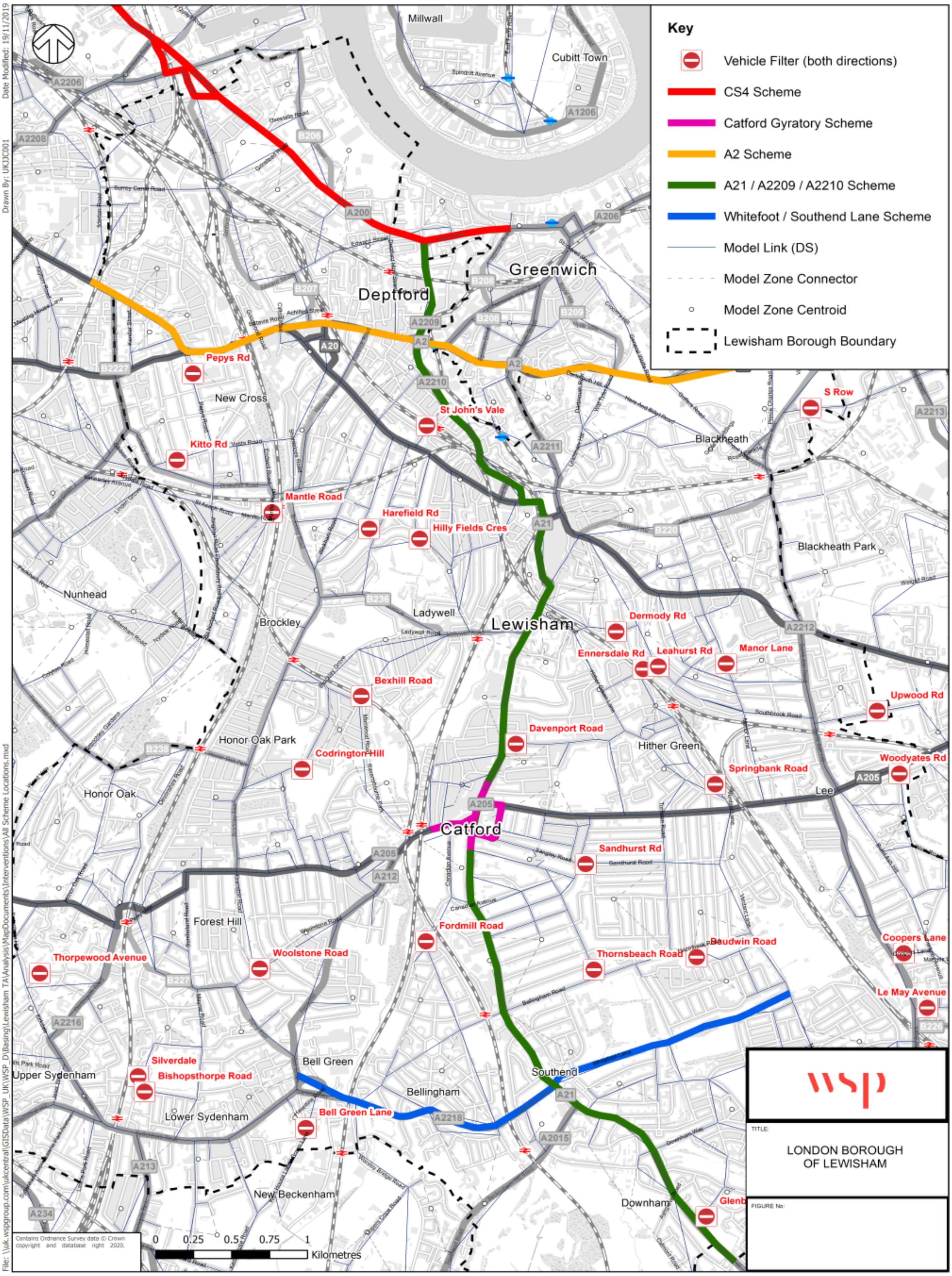


Figure 9: Locations of Highway Intervention Schemes

3. Analysis of 2026 LTS Lewisham Intervention Package

Standard outputs from LTS assignment of 2026 Lewisham Intervention Package were extracted and compared with the 2026 Do Minimum scenario (LTS scenario A126lp01). Since the population and employment information are the same for both scenarios, the analyses focus on the shift in mode choice between Highway, PT and Active modes.

Top Line Statistics

Table 3 to Table 5 illustrate total trips by mode associated with the Greater London Authority area for all peak periods.

Table 3: Morning Peak Period Distribution and Mode Split (3 Hour Total)

Mode	To/From/Intra GLA LTS 7.1 2026 A126lp01	To/From/Intra GLA LTS 7.1 2026 A126lw02	To/From/Intra GLA Change from Run1 to Run2 Absolute	To/From/Intra GLA Change from Run1 to Run2 Percentage
Car	1,875,268	1,874,675	-593	0.0%
PT	3,130,548	3,132,982	2,434	0.1%
Slow	1,747,404	1,744,690	-2,713	-0.52&
All	**6,753,219**	**6,752,346**	**-873**	**0.0**

Table 4: Inter Peak Period Distribution and Mode Split (6 Hour Total)

Mode	To/From/Intra GLA LTS 7.1 2026 A126lp01	To/From/Intra GLA LTS 7.1 2026 A126lw02	To/From/Intra GLA Change from Run1 to Run2 Absolute	To/From/Intra GLA Change from Run1 to Run2 Percentage
Car	3,129,877	3,129,056	-821	0.0%
PT	3,987,974	3,994,039	6,065	0.2%
Slow	2,969,064	2,964,219	-4,845	-0.2%
All	**10,086,914**	**10,087,313**	**399**	**0.0%**

Table 5: Evening Peak Period Distribution and Mode Split (3 Hour Total)

Mode	To/From/Intra GLA LTS 7.1 2026 A126lp01	To/From/Intra GLA LTS 7.1 2026 A126lw02	To/From/Intra GLA Change from Run1 to Run2 Absolute	To/From/Intra GLA Change from Run1 to Run2 Percentage
Car	1,921,749	1,921,253	-496	0.0%
PT	3,269,758	3,272,993	3,235	0.2%
Slow	1,149,350	1,147,421	-1,929	-0.2%
All	**6,340,857**	**6,341,667**	**810**	**0.0%**

The above tables illustrate a shift in mode from Car and Slow towards PT trips across all peak periods. This pattern corresponds with the PT schemes which enhance the infrastructure as well as the Highway schemes discouraging car users to make trips. The percentage change stays insignificant, between -0.2% and 0.2%.

Table 6 presents the changes in total trips in the peak period within the LBL. It shows as a result of the intervention package there is between 1.2%-3.0% increase in public transport trips and a corresponding decrease of between 0.2% and 0.4% in car usage. This suggests there is also a reduction in slow trips in LBL.

Table 6: LB Lewisham Total Trip Ends Peak Period Distribution by Mode Split

LB Lewisham	2026 Do minimum (A126lp01) AM	2026 Do minimum (A126lp01) IP	2026 Do minimum (A126lp01) PM	2026 Do Something (A126lw02) AM	2026 Do Something (A126lw02) IP	2026 Do Something (A126lw02) PM	Absolute Change DS minus DM AM	Absolute Change DS minus DM IP	Absolute Change DS minus DM PM	Absolute Change DS minus DM AM	Absolute Change DS minus DM IP	Absolute Change DS minus DM PM
PT Origins	108,227	119,546	69,471	109,605	122,762	71,002	1,378	3,216	1,532	1.3%	3.0%	1.4%
PT Destinations	50,134	116,668	108,898	51,409	119,766	110,612	1,276	3,098	1,713	1.2%	2.9%	1.6%
Highway Origins	40,474	74,174	38,893	40,298	73,724	38,639	-176	-450	-254	-0.2%	-0.4%	-0.2%
Highway Destinations	40,838	71,497	36,808	40,556	71,110	36,602	-282	-387	-206	-0.3%	-0.4%	-0.2%

PT Trip End Comparisons

Figure 10 and Figure 11 illustrate differences in public transport trip ends within LBL and its vicinity for origins and destinations, when compared with the 2026 Do Minimum trip ends. The general increase pattern matches spatially with the location of the public transport improvement schemes, for instance the Riverside Bus Strategy at the north-west corner of LBL plus some areas of London Borough of Southwark. The increase in public transport trips in the south of the borough is associated with the extension of bus route 225 towards Bellingham. It is worth noting that for 2026 Intervention Package, the magnitude of changes (either increase or decrease) is relatively small, ranging between -50 and 50 trip differences in a three-hour period in each zone. Public transport trip end differences for Inter Peak and Evening Peak periods are shown in Appendix A.

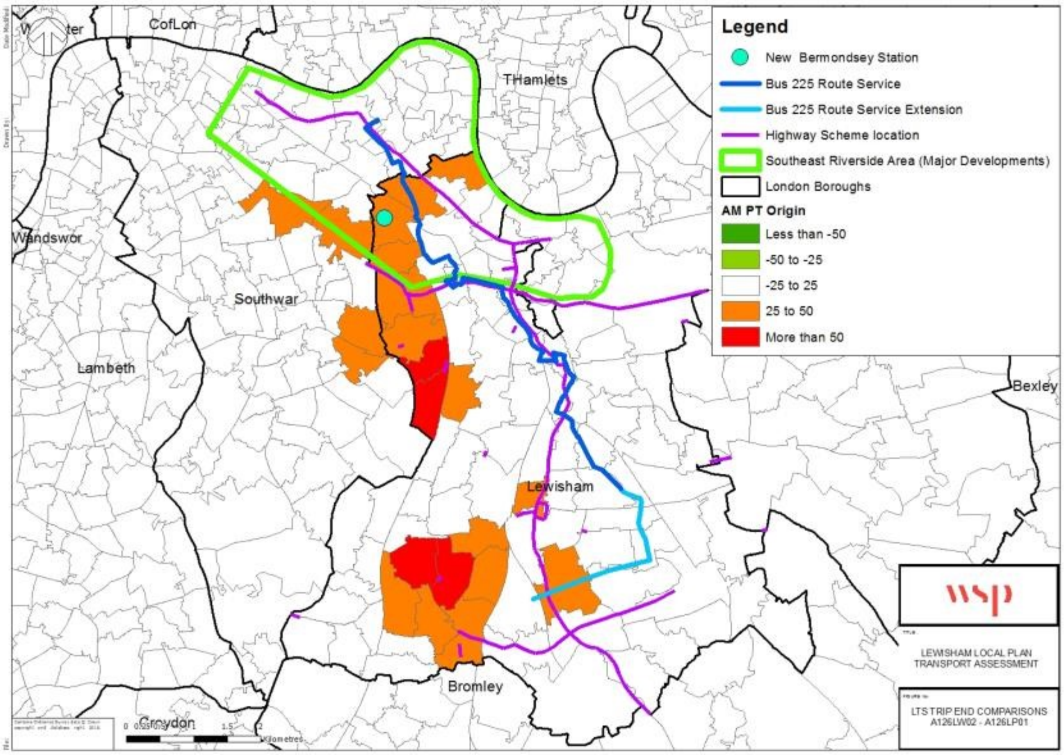


Figure 10: 2026 AM Public Transport Origin Trip End Differences

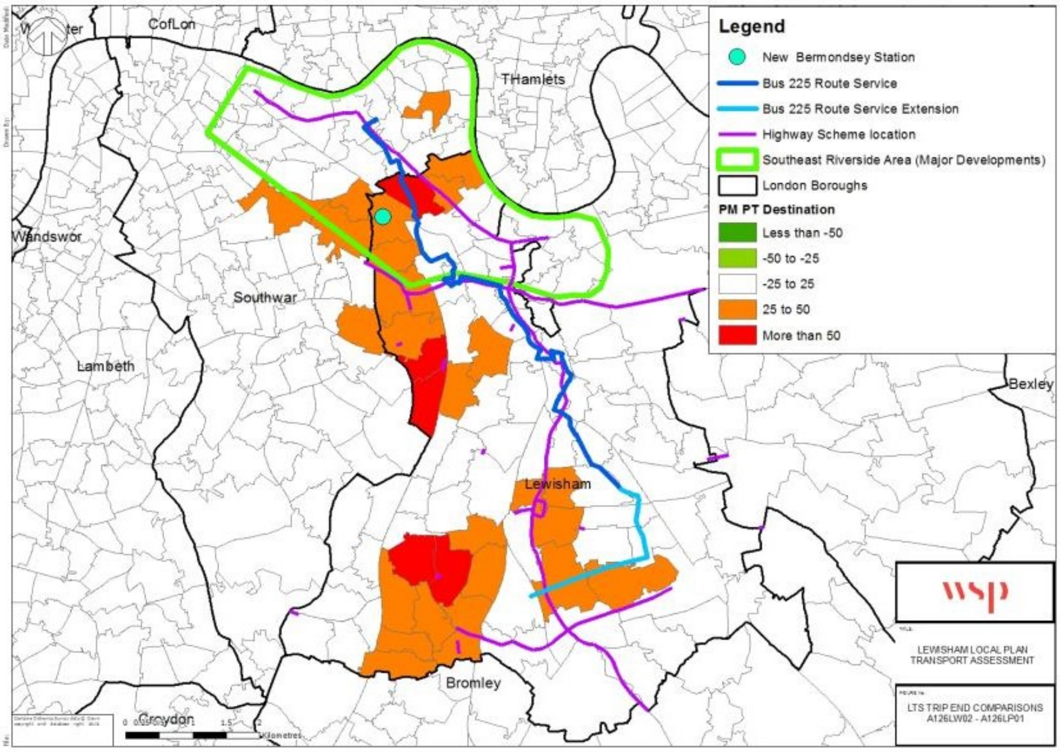


Figure 11: 2026 AM Public Transport Destination Trip End Differences

Highway Trip End Comparisons

Figure 12 and Figure 13 illustrate differences in highway trip ends within LBL and its vicinity for origins and destinations when compared with to 2026 Do Minimum. The general reduction pattern matches spatially with the location of the highway intervention schemes, particularly locations related to Healthy Neighbourhoods (i.e. vehicle filters). The increase in highway trips in the south of the borough is associated with Catford Gyratory improvement scheme attracting slightly more Highway trips and providing greater capacity. It is worth noting that for the 2026 Intervention Package, the magnitude of changes (either increase or decrease) is very small, ranging between -10 and 10 trip differences in each zone over a three-hour period. Highway trip end differences for Inter Peak and Evening Peak periods are shown in Appendix A.

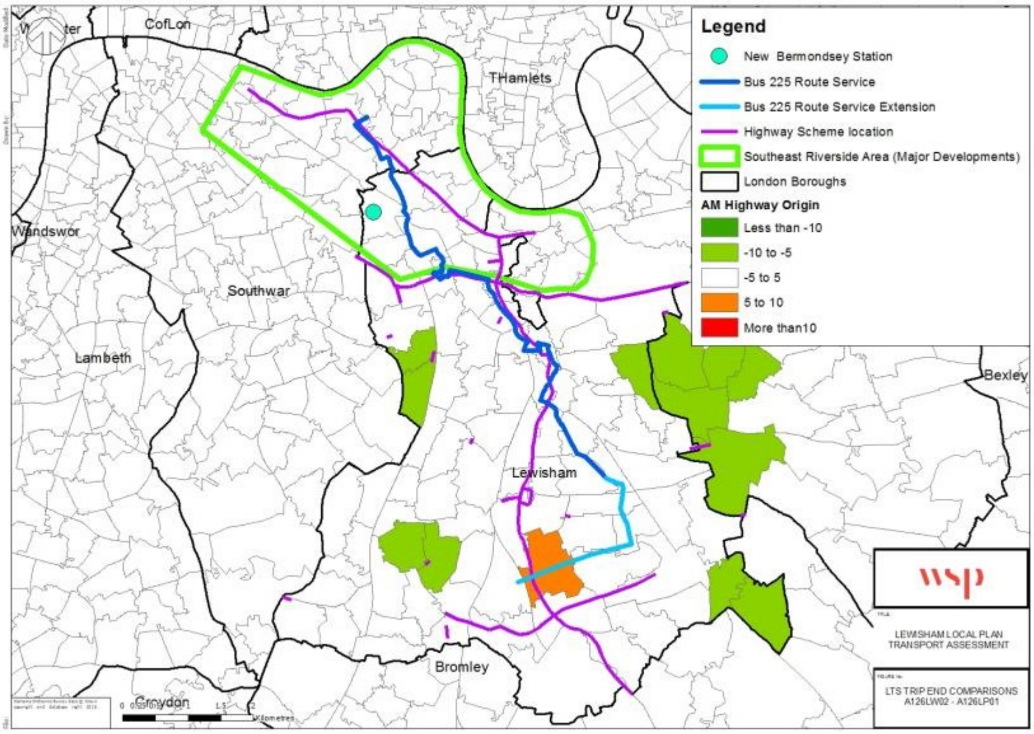


Figure 12: 2026 AM Highway Origin Trip End Differences

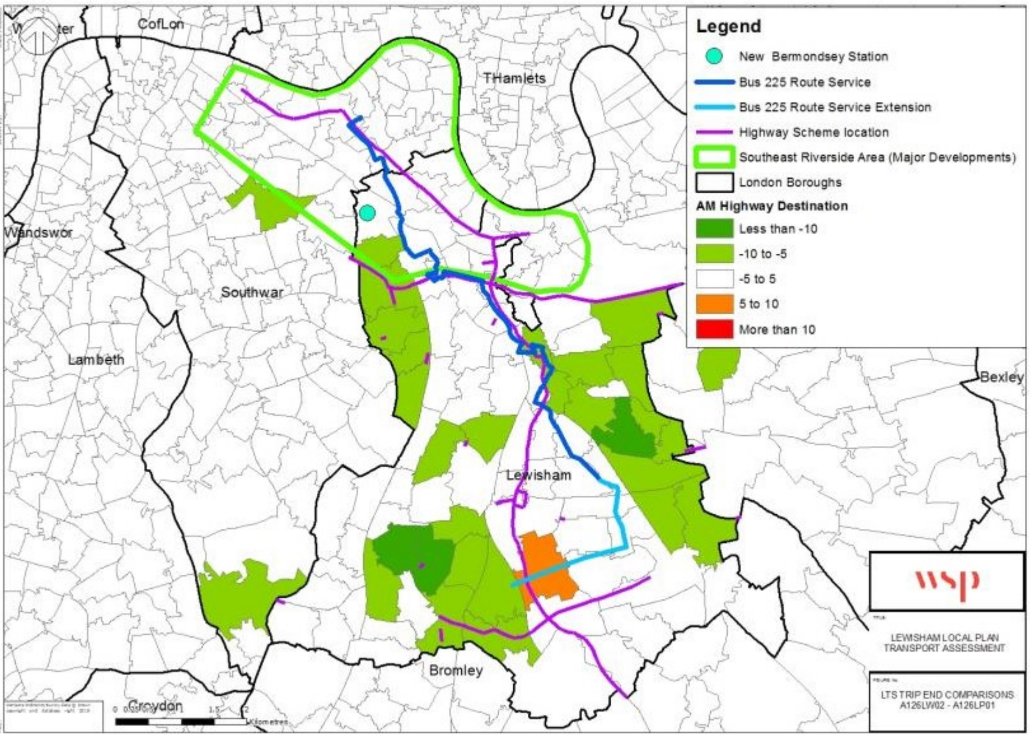


Figure 13: 2026 AM Highway Destination Trip End Differences

4. 2026 Railplan Analyses of Lewisham Interchange

Standard outputs from Railplan assignments of 2026 Intervention Tests are extracted and compared with 2026 AM Do Minimum Scenario (Railplan scenario LW004A45D). We have analysed the change in public transport demand and crowding on public transport services, growth in total station demand as well as bus demand.

Line Flows

Figure 14 shows the percentage change in passengers on the Transport for London network. Absolute changes in passengers on these links can be seen in Table 7. Demand along Jubilee and DLR lines experiences nearly zero changes as a result of the 2026 Intervention Package. The Bakerloo Line shows a 5% and 1% increase in demand in the northbound and southbound direction, respectively. Demand variation along the Overground fluctuates between -2% and 7%. This is insignificant as the absolute change is only within 100 trips over the 3-hour peak period. The negligible change in passenger demand is also reflected in the crowding along NR and LUL lines. A detailed crowding map of the changes for Rail modes can be found in Appendix B.

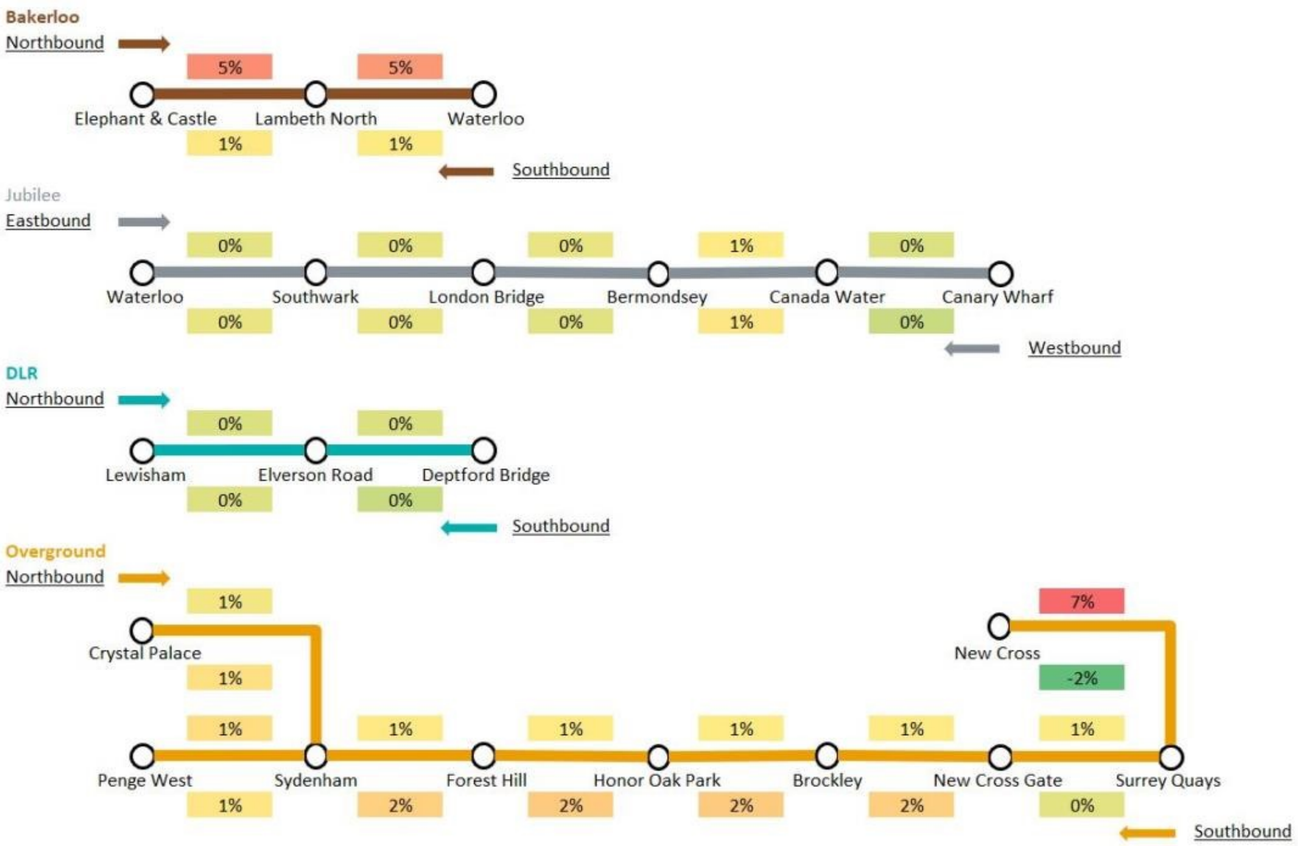


Figure 14: Changes in Passenger Flow on Transport for London Network between 2026 Intervention Package and Do Minimum

Table 7: Passenger Flow along LUL, DLR and NR network Do Minimum and 2026 Intervention Package

From	To	Direction	Mode	Line(s)	AM 2026 Do Minimum	AM2026 Do Something LBL Intervention Package	Intervention Package %Growth	Intervention Package Growth
Elephant & Castle	Lambeth North	NB	LUL	Bakerloo	5,095	5,359	5%	264
Lamberth North	Waterloo	NB	LUL	Bakerloo	5,550	5,809	5%	259
Waterloo	Lamberth North	SB	LUL	Bakerloo	5,911	5,956	1%	45
Lambeth North	Elephant & Castle	SB	LUL	Bakerloo	4,792	4,839	1%	47
Waterloo	Southwark	EB	LUL	Jubilee	59,836	60,028	0%	192
Southwark	London Bridge	EB	LUL	Jubilee	55,836	60,028	0%	224
London Bridge	Bermondsey	EB	LUL	Jubilee	55.561	55,791	0%	230
Bermondsey	Canada Water	EB	LUL	Jubilee	54,391	54,861	1%	470
Canary Water	Canary Wharf	EB	LUL	Jubilee	57,527	57,616	0%	470
Canary Wharf	Canada Water	WB	LUL	Jubilee	41,266	41,184	0%	-82
Canada Water	Bermondsey	WB	LUL	Jubilee	48,181	48,675	1%	494
Bermondsey	London Bridge	WB	LUL	Jubilee	51,029	51,154	0%	125
London Bridge	Southwark	WB	LUL	Jubilee	56,933	57,168	0%	235
Southwark	Waterloo	WB	LUL	Jubilee	53,874	54,100	0%	226
Not applicable	**Not applicable**	**Not applicable**	**LUL**	**LUL Sub-total**	**555,937**	**558,755**	**1%**	**2,818**
Lewisham	Elverson Road	NB	DLR	DLR	8,278	8,290	0%	12
Elverson Road	Deptford Bridge	NB	DLR	DLR	8,331	8,343	0%	12
Deptford Bridge	Elverson Road	SB	DLR	DLR	2,907	2,901	0%	-6
Elverson Road	Lewisham	SB	DLR	DLR	2,842	2,829	0%	5
Not applicable	**Not applicable**	**Not applicable**	**DLR**	**DLR Sub Total**	**22,340**	**22,363**	**0%**	**23**
Crystal Palace	Sydenham	NB	NR	Overground	1,178	1,185	1%	7
Penge West	Sydenham	NB	NR	Overground	2,293	2,325	1%	32
Sydenham	Forest Hill	NB	NR	Overground	5,450	5,499	1%	49
Forest Hill	Honor Oak Park	NB	NR	Overground	8,202	8,273	1%	71
Honor Oak Park	Brockley	NB	NR	Overground	8,748	8,819	1%	71

From	To	Direction	Mode	Line(s)	AM 2026 Do Minimum	AM2026 Do Something LBL Intervention Package	Intervention Package %Growth	Intervention Package Growth
Brockley	New Cross Gate	NB	NR	Overground	10,111	10,198	1%	87
New Cross Gate	Surrey Quays	NB	NR	Overground	10,924	11,005	1%	81
New Cross	Surrey Quays	NB	NR	Overground	175	187	7%	12
Surrey Quays	New Cross	SB	NR	Overground	193	189	-2%	-4%
Surrey Quays	New Cross Gate	SB	NR	Overground	3,738	3,749	0%	11
New Cross Gate	Brockley	SB	NR	Overground	3,198	3,265	2%	67
Brockley	Honor Oak Park	SB	NR	Overground	3,092	3,164	2%	52
Honor Oak Park	Forest Hill	SB	NR	Overground	3,050	3,122	2%	72
Forest Hill	Sydenham	SB	NR	Overground	2,493	2,545	2%	52
Sydenham	Crystal Palace	SB	NR	Overground	1,022	1,035	1%	13
Sydenham	Penge West	SB	NR	Overground	360	364	1%	4
Not applicable	**Not applicable**	**Not applicable**	**NR**	**NR Sub Total**	**64,227**	**64,924**	**1%**	**697**
Not applicable	**Not applicable**	**Not applicable**	**Total**	**Total**	**642,504**	**646,042**	**1%**	**3,538**

Crowding Changes for LUL and NR

Table 8 and Table 9 show the changes in crowding which occur within the London Underground and National Rail networks in the 2026 Intervention Package scenario when compared with the Do Minimum. The tables illustrate that 2026 PT intervention schemes would not affect current crowding in the Reference Case. Crowding categories remain unchanged for almost all PT links with the Intervention Package implemented. The most notable decrease is observed between the Surrey Quays and Canada Water (from 2.69 to 2.45 standing per sqm) which is associated with the improvement of New Bermondsey station nearby.

Table 8: London Underground Crowding Changes in 2026 Intervention Package Scenario

TOC	From	To	AM 2026 Do Minimum	AM2026 Do Something LBL Intervention Package
DLR	Lewisham	Elverson Road	0.45	0.45
DLR	Elverson Road	Deptford Bridge	0.46	0.47
DLR	Deptford Bridge	Greenwich	0.94	0.95
DLR	Greenwich	Cutty Sark	1.22	1.22
DLR	Cutty Sark	Island Gardens	1.51	1.51
DLR	Island Gardens	Mudchute	1.45	1.45
DLR	Mudchute	Crossharbour	1.84	1.84
DLR	Crossharbour	South Quay	2.01	2.01
DLR	South Quay	Heron Quays	2.03	2.03
DLR	Heron Quays	Canary Wharf	1.67	1.68
LUL Jubilee	Canada Water	Canary Wharf		
LUL Jubilee	Canning Town	North Greenwich	4.27	4.27
LUL Jubilee	North Greenwich	Canary Wharf	4.00	3.99

TOC	From	To	AM 2026 Do Minimum	AM2026 Do Something LBL Intervention Package Differnece
DLR	Lewisham	Elverson Road	0.00	0.00
DLR	Elverson Road	Deptford Bridge	0.00	0.01
DLR	Deptford Bridge	Greenwich	0.00	0.01
DLR	Greenwich	Cutty Sark	0.00	0.00
DLR	Cutty Sark	Island Gardens	0.00	0.00
DLR	Island Gardens	Mudchute	0.00	0.00
DLR	Mudchute	Crossharbour	0.00	0.00
DLR	Crossharbour	South Quay	0.00	0.00
DLR	South Quay	Heron Quays	0.00	0.00
DLR	Heron Quays	Canary Wharf	0.00	0.01
LUL Jubilee	Canada Water	Canary Wharf	0.00	0.01
LUL Jubilee	Canning Town	North Greenwich	0.00	0.00
LUL Jubilee	North Greenwich	Canary Wharf	0.00	-0.01

Table 9: Network Rail Crowding Changes in 2026 Intervention Package scenario

TOC	From	To	AM 2026 Do Minimum	AM 2026 Do Something LBL Intervention Package
Thameslink	Catford	Crofton Park	1.95	1.95
Thameslink	Crofton Park	Nunhead	1.97	1.97
Thameslink	Nunhead	Peckham Rye	1.77	1.78
Thameslink	Beckenham Hill	Bellingham	2.25	2.26
Thameslink	Bellingham	Catford	1.79	1.79
Southeastern	London Bridge	Deptford	1.43	1.32
Southeastern	Greenwich	Deptford	0.98	1.01
Southeastern	Grove Park	Hither Green	0.94	0.94
Southeastern	Lee	Hither Green	1.36	1.36
Southeastern	Hither Green	Lewisham	0.89	0.89
Southeastern	Blackheath	Lewisham	0.85	0.86
Southeastern	St Johns	Lewisham	1.32	1.32
Southeastern	Anerley	Penge West	1.26	1.27
Southeastern	Ladywell	Catford Bridge	0.98	0.97
Southeastern	Lewisham	Ladywell	1.09	1.07
Southeastern	St Johns	Ladywell	2.09	2.07
Southern / Overground	Anerley	Penge West	1.43	1.43
Southern / Overground	Penge West	Sydenham	1.48	1.48
Southern / Overground	Sydenham	Forest Hill	1.13	1.13
Southern / Overground	Forest Hill	Honor Oak Park	1.45	1.45

TOC	From	To	AM 2026 Do Minimum	AM 2026 Do Something LBL Intervention Package
Southern / Overground	Honor Oak Park	Brockley	1.51	1.51
Southern	Brockley	New Cross Gate	1.40	1.40
Southern	New Cross Gate	London Bridge	1.40	1.40
Overground	New Cross Gate	Surrey Quays		
Overground	Surrey Quays	Canada Water	2.69	2.45
Overground	Brockley	New Cross Gate		

TOC	From	To	AM 2026 Do Minimum	AM 2026 Do Something LBL Intervention Package
Thameslink	Catford	Crofton Park	0.00	0.00
Thameslink	Crofton Park	Nunhead	0.00	0.00
Thameslink	Nunhead	Peckham Rye	0.00	0.01
Thameslink	Beckenham Hill	Bellingham	0.00	0.01
Thameslink	Bellingham	Catford	0.00	0.00
Southeastern	London Bridge	Deptford	0.00	-0.11
Southeastern	Greenwich	Deptford	0.00	0.03
Southeastern	Grove Park	Hither Green	0.00	0.00
Southeastern	Lee	Hither Green	0.00	0.00
Southeastern	Hither Green	Lewisham	0.00	0.00
Southeastern	Blackheath	Lewisham	0.00	0.01

TOC	From	To	AM 2026 Do Minimum	AM 2026 Do Something LBL Intervention Package
Southeastern	St Johns	Lewisham	0.00	0.00
Southeastern	Anerley	Penge West	0.00	0.01
Southeastern	Ladywell	Catford Bridge	0.00	-0.01
Southeastern	Lewisham	Ladywell	0.00	-0.02
Southeastern	St Johns	Ladywell	0.00	-0.02
Southern / Overground	Anerley	Penge West	0.00	0.00
Southern / Overground	Penge West	Sydenham	0.00	0.00
Southern / Overground	Sydenham	Forest Hill	0.00	0.00
Southern / Overground	Forest Hill	Honor Oak Park	0.00	0.00
Southern / Overground	Honor Oak Park	Brockley	0.00	0.00
Southern	Brockley	New Cross Gate	0.00	0.00
Southern	New Cross Gate	London Bridge	0.00	0.00
Overground	New Cross Gate	Surrey Quays	0.00	0.04
Overground	Surrey Quays	Canada Water	0.00	-0.24
Overground	Brockley	New Cross Gate	0.00	0.04

Bus Demand along Key Bus Corridors

Figure 15 illustrates the extent of key bus corridors within London Borough of Lewisham.

Figure 15: Bus Corridors in London Borough of Lewisham

For the purpose of comparison, bus demand in both directions along these corridors has been analysed and is presented in Figure 16 to Figure 19. For all bus corridors in both directions, generally there is no significant changes in bus demand. Some slight increases can be observed in the vicinity of Lewisham, New Cross and New Cross Gate stations.

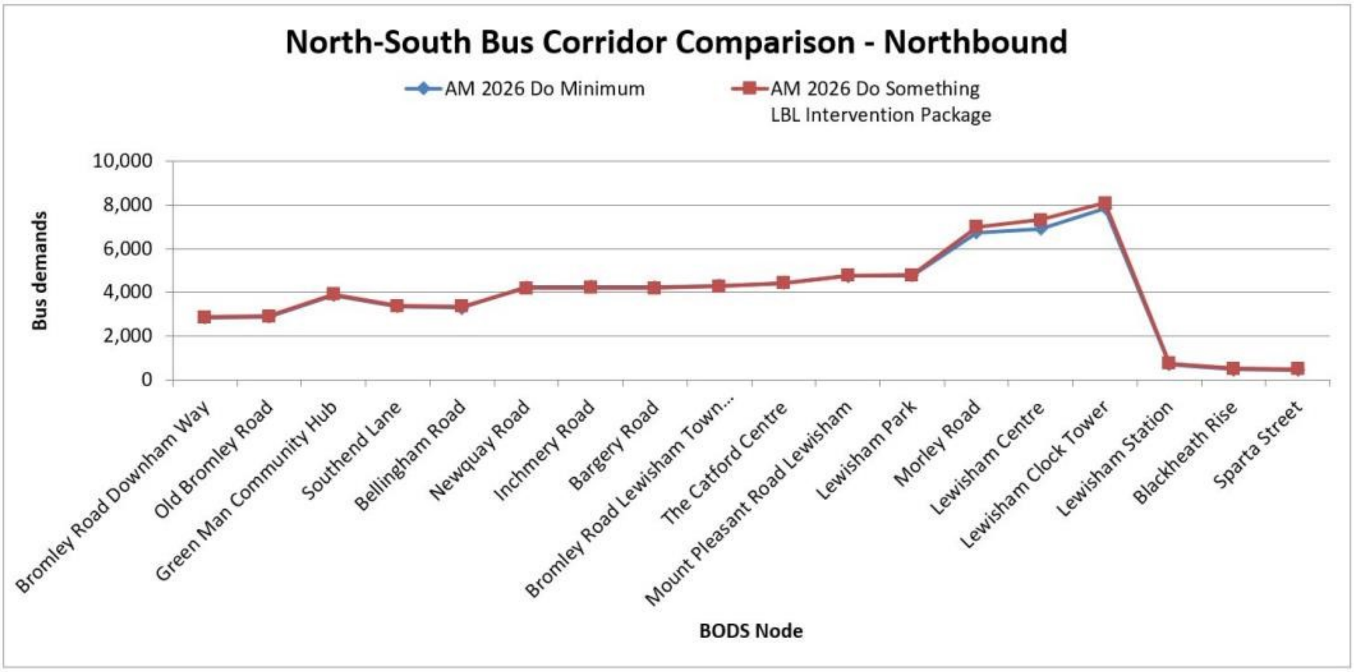


Figure 16: North-South Northbound Bus Corridor Demand Do Minimum and 2026 Intervention Package

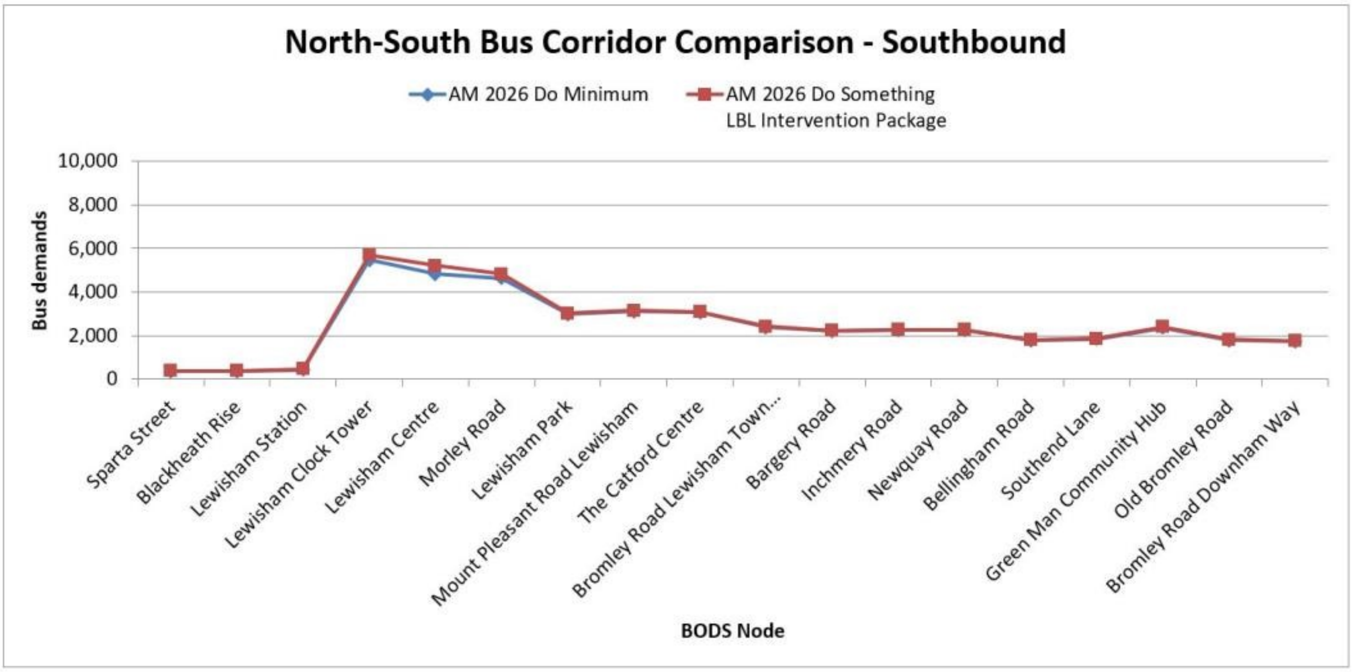


Figure 17: North-South Southbound Bus Corridor Demand Do Minimum and 2026 Intervention Package

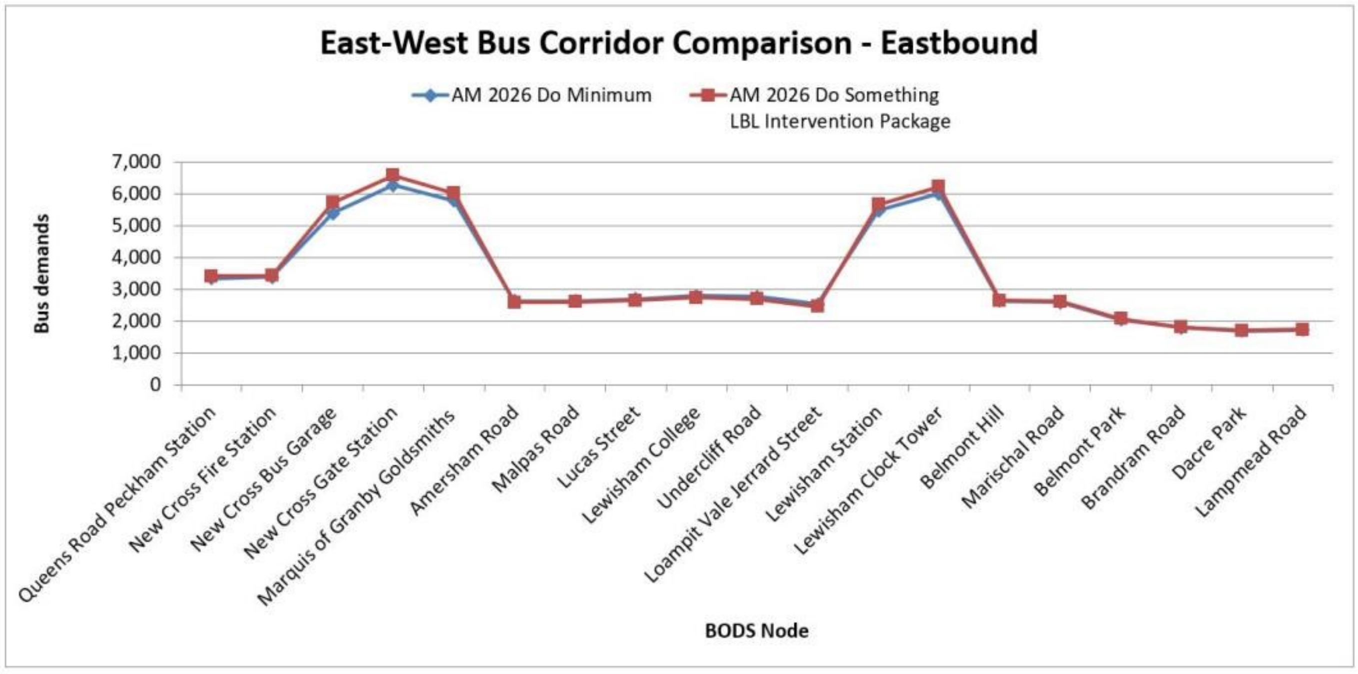


Figure 18: East-West Eastbound Bus Corridor Demand Do Minimum and 2026 Intervention Package

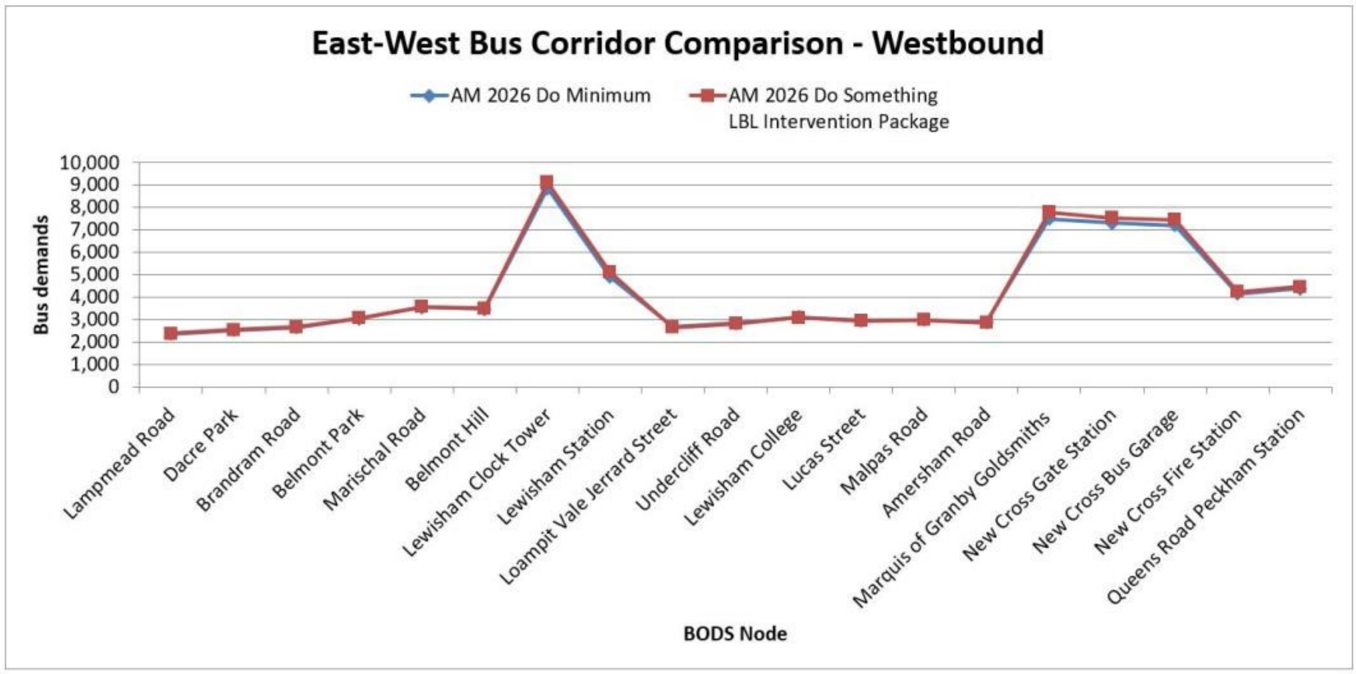


Figure 19: East-West Westbound Bus Corridor Demand Do Minimum and 2026 Intervention Package

Table 10 provides further detail of the changes in passengers boarding and alighting at specific bus stops on both the corridors. Overall there is an increase of 2% and 4% in the total boarding and alighting demand across both bus corridors. Bus demand increases at almost all bus stops which correspond to the enhancements in PT interventions in 2026, namely Riverside Bus Strategy and Bus 225 extension. Blackheath Rise and Sparta Street bus stops show more than 100% increase in boarding and alighting demand. In absolute terms, the increases are within 10-20 trips.

Table 10: Bus Boarders and Alighters Do Minimum and 2026 Intervention Package

Bus Stop Name	Corridor	Boarders AM2026 Do Minimum	Boarders AM2026 Do Something LBL Intervention Package	Boarders Growth (2026)	Boarders %Growth (2026)	Alighters AM2026 Do Minimum	Alighters AM2026 Do Something LBL Intervention Package	Alighters Growth (2026)	Alighters %Growth (2026)
Bromey Road Downham Way	North-South	1,063	1,070	7	1%	344	335	-9	-3%
Old Bromey Road	North-South	106	107	1	1%	121	124	3	2%
Green Man Community	North-South	1,046	1,059	13	1%	629	642	13	2%
Southend Lane	North-South	249	243	-6	-2%	116	121	5	4%
Bellingham Road	North-South	498	556	58	12%	507	502	-5	-1%
Newquay Road	North-South	1,455	1,346	-109	-7%	985	99.3	8	1%
Inchmery Road	North-South	91	112	21	23%	58	79	21	36%
Bargery Riad	North-South	186	174	-12	-6%	208	193	-15	-7%
Bromley Road Lewisham Town Hall	North-South	835	872	37	4%	944	97.3	29	0.30%
The Catford Centre	North-South	1,182	1,202	20	2%	1,023	1,037	14	1%
Mount Pleasant Road Lewisham	North-South	669	663	-6	-1%	0.389	391	2	1%
Lewisham Park	North-South	743	767	24	3%	602	606	4	1%
Morley Road	North-South	405	462	57	14%	188	221	33	18%
Lewisham Centre	North-South	1,592	1,692	100	6%	1,724	1,831	107	6%
Lewisham Clock Tower	North-South	1,968	2,097	129	7%	2,431	2,589	158	6%
Lewisham Station	North-South	70	78	8	11%	214	210	-4	-2%
Blackheath Rise	North-South	13	32	19	146%	58	64	6	10%
Sparta Street	North-South	10	12	2	20%	11	22	11	100%
Queens Road Peckham Station	East-West	1,174	1,174	0	0%	1,406	1,452	46	3%
New Cross Fire Station	East-West	529	547	18	3%	277	295	18	6%
New Cross Bus Garage	East-West	2,253	2,396	143	6%	1,745	1,930	185	11%
New Cross Gate Station	East-West	3,091	3,149	58	2%	2,394	2,455	61	3%
Marquis of Granby Goldsmiths	East-West	1,635	1,545	-90	-6%	0.303	335	32	11%
Amersham Road	East-West	341	0.319	-22	-6%	215	220	5	2%
Malpas Road	East-West	285	298	13	5%	407	417	10	2%

Bus Stop Name	Corridor	Boarders AM2026 Do Minimum	Boarders AM2026 Do Something LBL Intervention Package	Boarders Growth (2026)	Boarders %Growth (2026)	Alighters AM2026 Do Minimum	Alighters AM2026 Do Something LBL Intervention Package	Alighters Growth (2026)	Alighters %Growth (2026)
Lucas Street	East-West	370	356	-14	-4	280	261	-19	-7%
Lewisham College	East-West	311	0.314	3	1%	366	367	1	0%
Undercliff Road	East-West	640	641	1	0%	459	458	-1	0%
Loampit Vale Jerrard Street	East-West	162	161	-1	-1%	234	228	-6	-0.30%
Lewisham Station	East-West	3,772	3,878	106	3%	2,887	2,968	81	0.30%
Lewisham Clock Tower	East-West	1,968	2,097	129	7%	281	2,589	158	6%
Belmont Hill	East-West	97	101	4	4%	134	153	19	14%
Marischal Road	East-West	60	59	-1	-2%	164	152	-12	-7%
Belmont Park	East-West	704	707	3	0%	752	757	5	1%
Brandram Road	East-West	228	2.3	2	1%	229	233	4	2%
Dacre Park	East-West	245	248	0.3	1%	234	240	6	3%
Lampmead Road	East-West	233	240	7	3%	37	37	0	0%
Total	**Total**	**30,279**	**31,004**	**725**	**2%**	**25,506**	**26,480**	**974**	**4%**

Station Demand at Lewisham

Figure 20 shows that in the 2026 Lewisham Intervention Package, station demand in Lewisham does not differ significantly when compared with the Do Minimum. Total numbers of entries and exits increase slightly, whereas there is a slight reduction in interchange movements. This is because the PT interventions in 2026 are not associated with improvements to Lewisham station or to any services that traverse through Lewisham. There will be some changes expected in 2041 when Lewisham station-related interventions will be implemented.

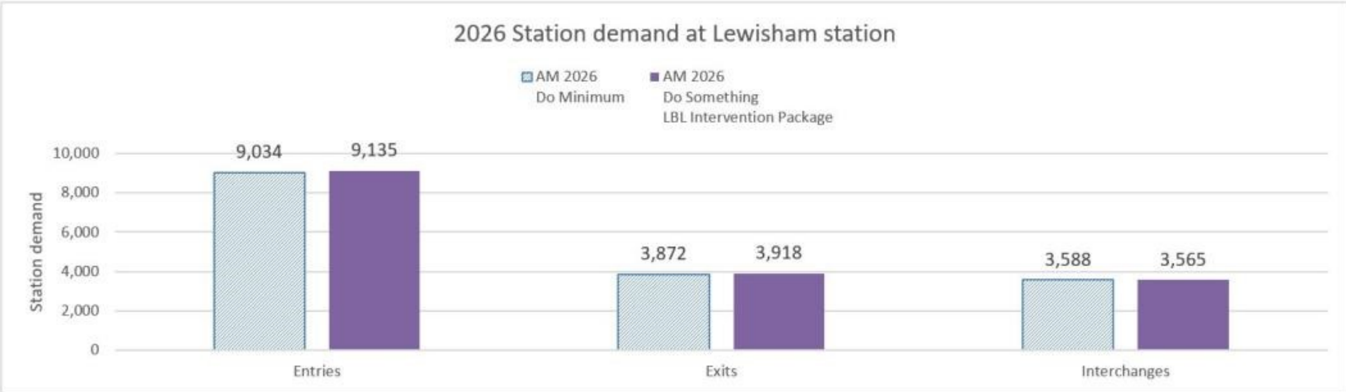


Figure 20: Lewisham Station Demand in 2026 Lewisham Intervention Test

5. Elham Analyses of 2026 Lewisham Intervention Package

Standard outputs from ELHAM assignments of 2026 Intervention Tests are extracted and compared with 2026 AM Do Minimum scenario. The analyses assess whether the Intervention Package successfully addresses issues identified in the Funded scenarios. Assessment is based on the change in actual flow, delay and journey times.

Actual Flow

Figure 21 and Figure 22 show actual traffic flow difference and actual flow percentage difference between the 2026 AM peak Do Minimum and Do Something LBL Intervention Package scenarios, respectively.

In the north of the Borough the impacts of the schemes vary. Generally, there is a reduction in traffic flow on the roads altered by the proposed schemes. Notable reductions in traffic flow are observed on the A2 and the A200, where capacity is restricted due to changes in road space allocation and the CS4 scheme. At the most affected point, the reduction in two-way traffic flow is high. Changes of **-790 pcu/hr** and **-1,010 pcu/hr** are observed at points on each road, respectively. Increases in traffic flow are most prominent on the local road network linking to the A2 and A200; namely, Deptford High Street, Deptford Church Street and the B218. The increase in traffic flow on these roads ranges between **50 pcu/hr** to **290 pcu/hr** as a result of traffic rerouting from the A2 and A200.

In the centre of the Borough, the majority of the decreases in traffic flow occur on the A21, namely Lewisham High Street, and the local roads in Hither Green and Crofton Park. The reallocation of road space and the additional vehicle filters in place results in a significant decrease in two-way traffic flow at these locations. Notable reductions include a **-790 pcu/hr** reduction on Leahurst Road and a **-750 pcu/hr** reduction on Codrington Hill. As a consequence, traffic flow increases on alternative routes, such as Hither Green Lane and the B218 and B236 in Crofton Park. A notable increase exists on the B218, where a two-way increase of **600 pcu/hr** is observed as a result of a vehicle filter lane on an adjacent road.

In the south of the Borough, there is a general traffic flow reduction on the A21 and Southend Lane due to road space reallocation. There are flow reductions in the region of **-140 pcu/hr** and **-180 pcu/hr** on each road, respectively. There are also decreases in traffic flow on the A205 and A212, which connect to Southend Lane. The road space reallocation scheme along Whitefoot Lane results in localised traffic flow increases of up to **110 pcu/hr** along Bellingham Road and of up to **200 pcu/hr** along Whitefoot Lane itself.

The Catford Gyratory scheme results in traffic flow reductions due to the consequential delays created by the 6-stage signals at its main junction. Flow reductions as low as **-1,100 pcu/hr** are observed on the northbound gyratory. There are isolated occurrences of traffic flow increases on the Catford Gyratory, where increases of up to **360 pcu/hr** are observed. This change is a result of the gyratory being converted from one-way to two-way working; therefore, the traffic flow is zero in one direction in the Do Minimum model.

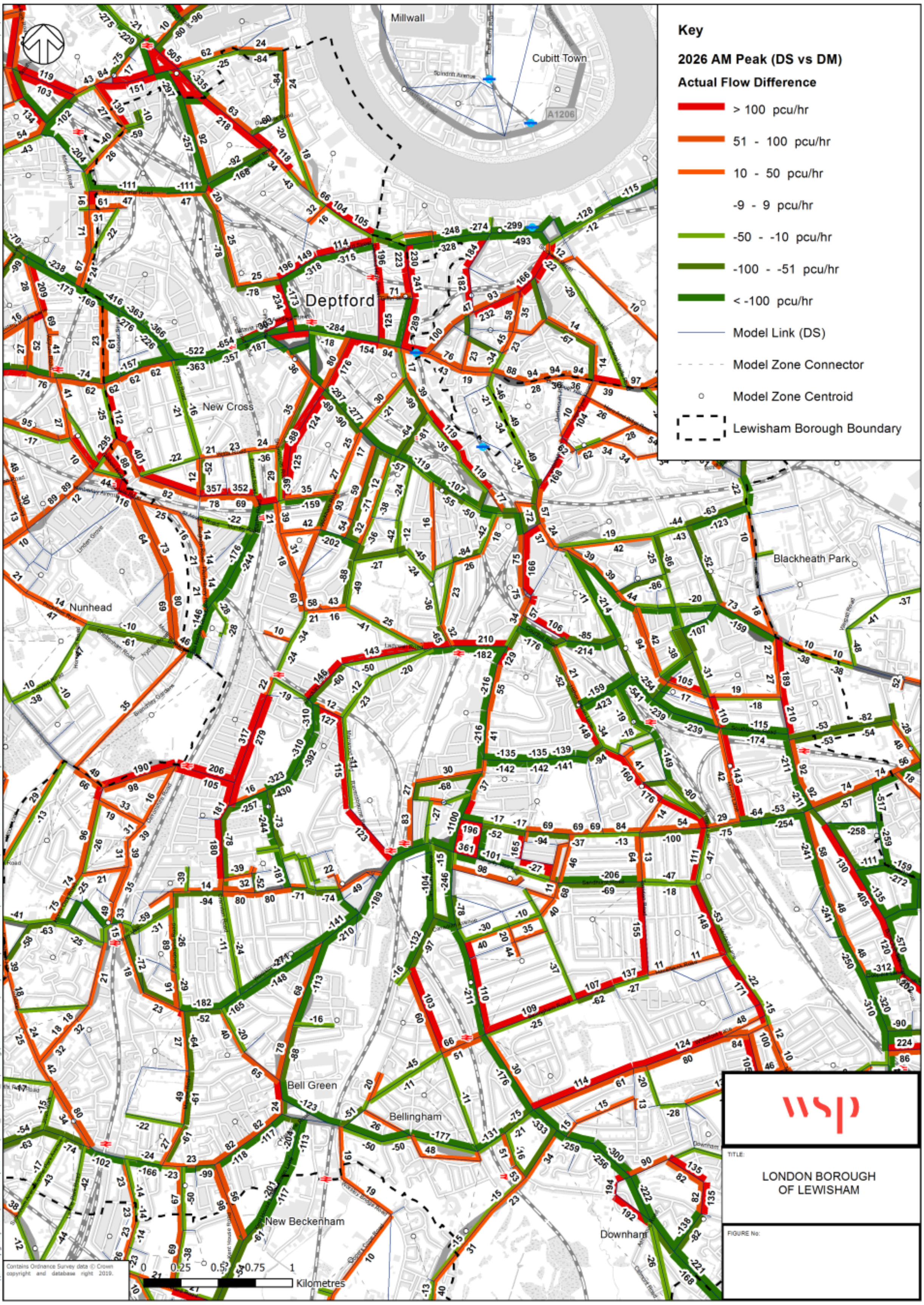


Figure 21: Actual Flow Difference (Do Something vs Do Minimum)

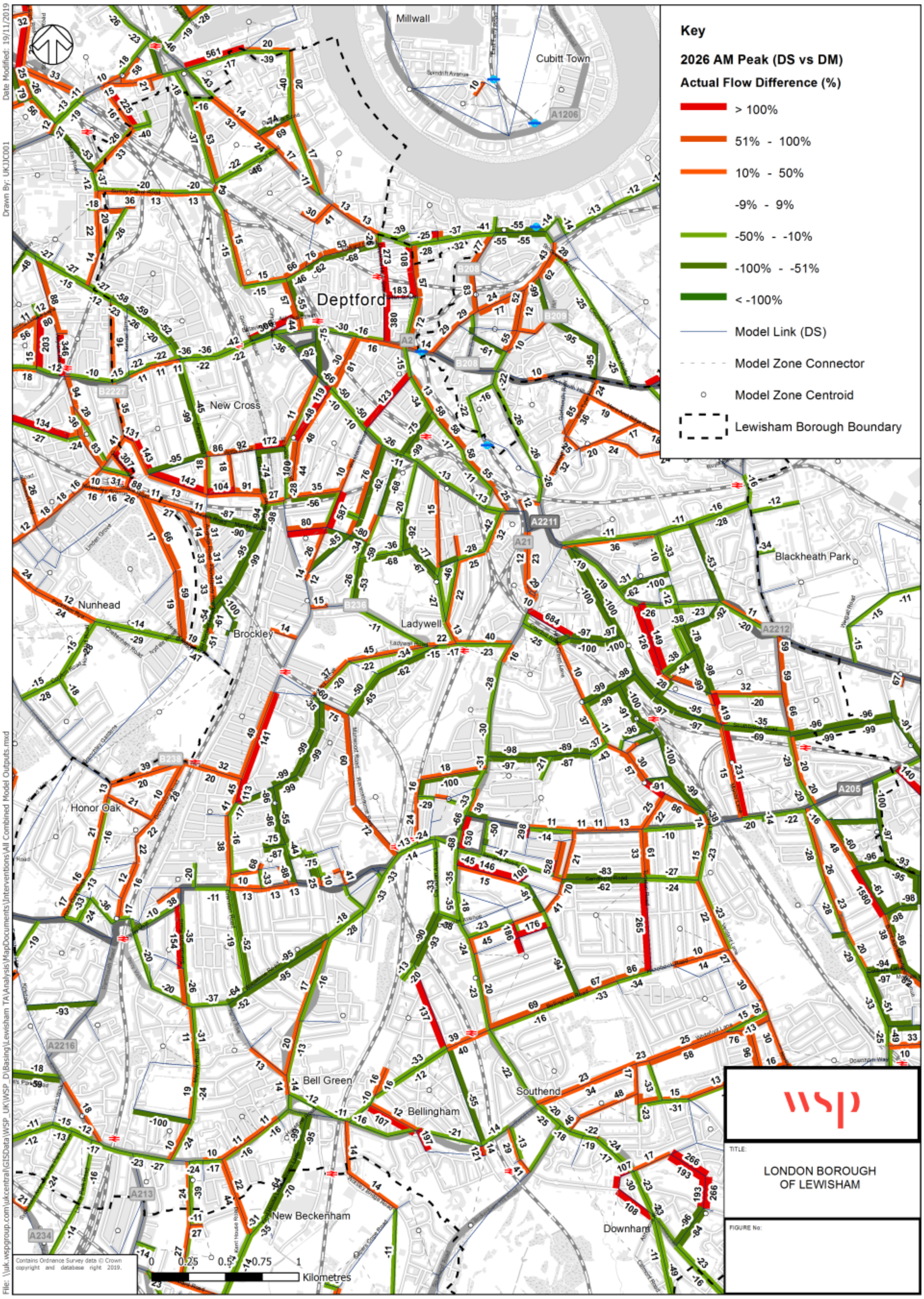


Figure 22: Actual Flow % Difference (Do Something vs Do Minimum)

Delay

Figure 23 shows delay difference between the 2026 AM peak Do Minimum and Do Something models.

Delay differences across the Borough are mainly present in three distinct locations, which include the New Cross gyratory in Deptford, the Catford Gyratory, and the A205 in Lee. There are also a number of roads where increased delays occur in Southend, Bell Green and Honour Oak.

The reconfiguration of the New Cross gyratory in Deptford in the Do Something models features a two-way working system on the northern arm. As a result, the reconfiguration has increased delays at the signalised junctions around the gyratory. The maximum delay increase observed on the gyratory is **150 seconds**. The A2 scheme, which connects to the New Cross gyratory, also causes delays on a number of the connecting roads in the area. The model results indicate that further refinements to the A2 and the New Cross gyratory scheme are required.

A concentration of delay increases is observed around the Catford Gyratory where, as previously discussed, the 6-stage method of control at the main Catford Gyratory junction results in increased delays in the local area. Delays of up to an additional **240 seconds** are observed on the A205 eastbound towards the junction gyratory. There are some slight decreases in journey time on the northbound and eastbound gyratory; however, these decreases are relatively minor when compared with overall junction delay. This indicates that further refinements to the Catford Gyratory scheme are required.

Significant delay occurs on the A205 in Lee in the Do Something models where a vehicle filter has been put in place. As a result, a delay of **840 seconds** is observed on the A205 near the junctions with the A2212. The filter also causes a delay on various other roads connecting to the A205 in the Lee area. It is considered that further analyses of signal timings are required at the A205/A2212 junctions.

The locations where increased delay occurs in Southend, Bell Green and Honour Oak are attributed to the Whitefoot and Southend Lane scheme and the additional vehicle filters in each respective area. The reallocation of road space on Whitefoot Lane results in an increase in delay of **90 seconds** on the most affected section of the road. Discussed previously in terms of increases in actual traffic flow, the vehicle filter on Codrington Hill results in a combined two-way delay increase of **170 seconds** on the B218, which acts as the closest alternative route. This highlights the impact that the reallocation of road space and vehicle rerouting has on the surrounding highway network.

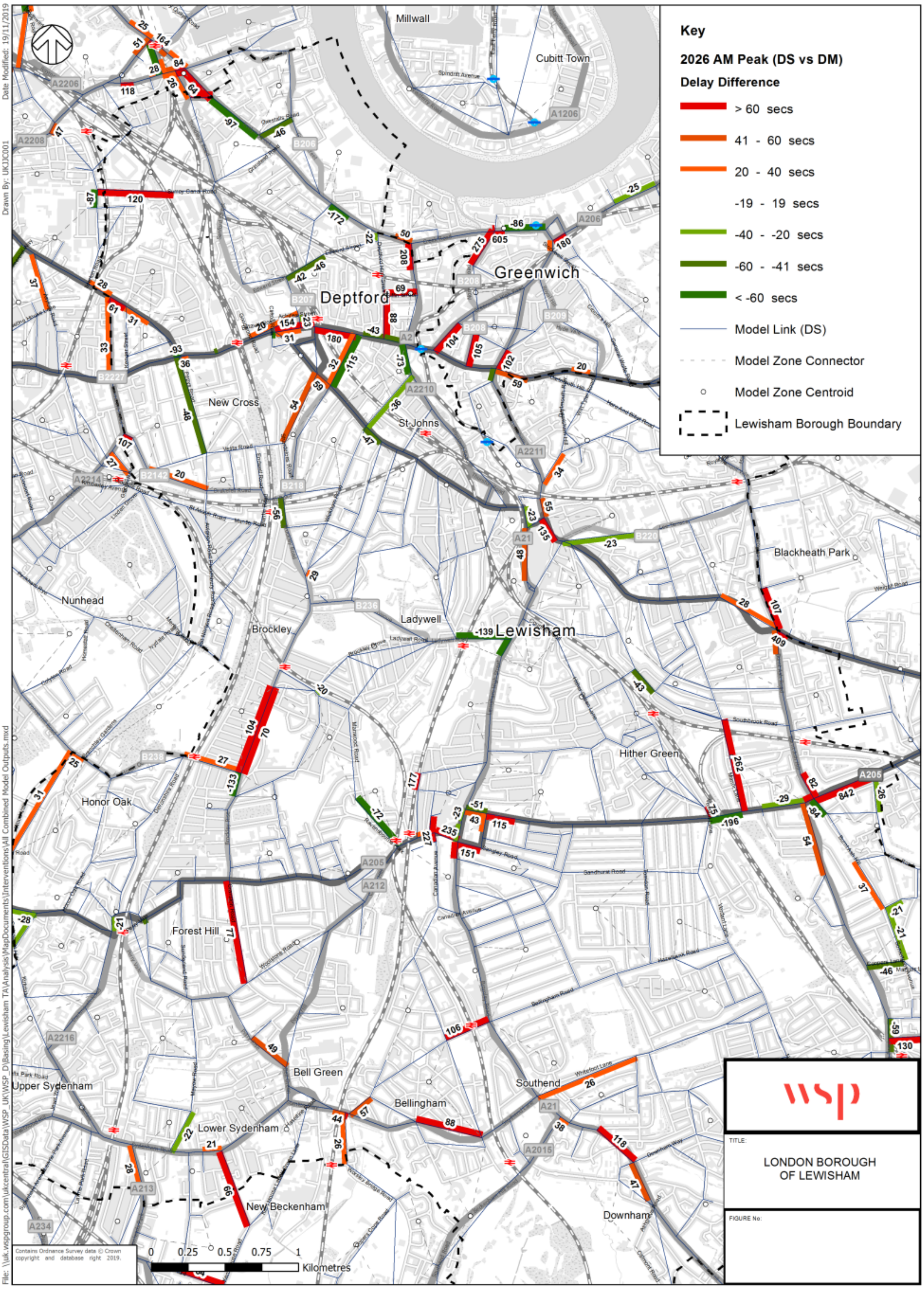


Figure 23: Delay Difference (Do Something vs Do Minimum)

Journey Times

TfL's ELHAM journey time routes have been selected to ascertain the extent to which journey times change because of flow increases/decreases across the Borough. A new bespoke route has also been created for this study along Whitefoot Lane and Southend Lane. The routes are shown in Figure 24.

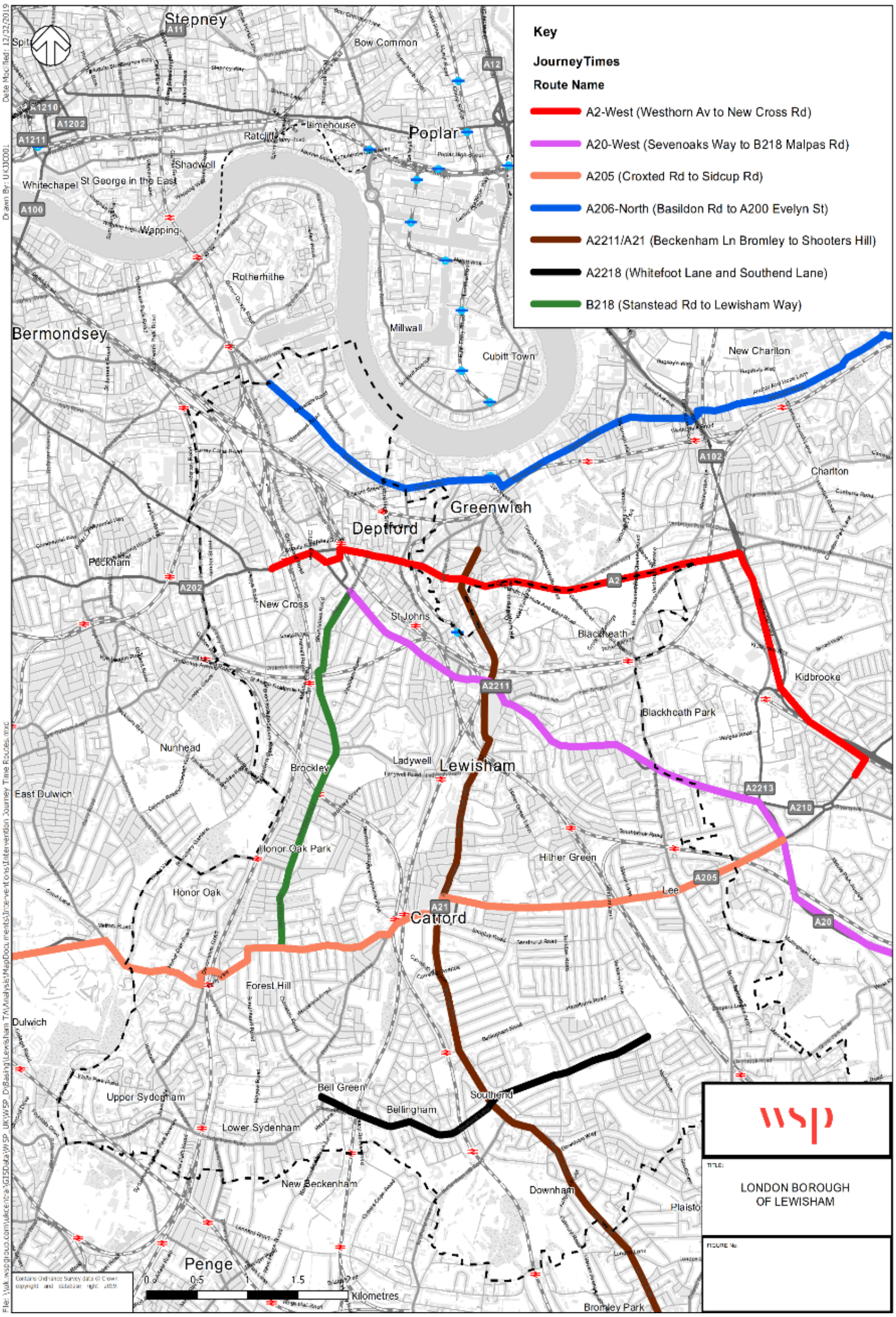


Figure 24: Journey Time Routes

Table 11 shows a comparison of the journey times along these routes in the Do Minimum and Do Something models.

Table 11: Modelled Journey Times

Route	Direction	Modelled Journey Time (s) DM	Modelled Journey Time (s) DS	Modelled Journey Time (s) #Diff. (DS vs DM)	Modelled Journey Time (s) % Diff. (DS vs DM)
B218 (Stanstead Rd to Lewisham Way)	NB	1,086	1,012	**-74**	**-7%**
B218 (Stanstead Rd to Lewisham Way)	SB	860	941	**81**	**9%**
A2211/A21 (Beckenham Ln Bromley to Shooters Hill)	NB	1,618	1,965	**347**	**21%**
A2211/A21 (Beckenham Ln Bromley to Shooters Hill)	SB	1,392	1,897	**504**	**36%**
A206-North (Basildon Rd to A200 Evelyn St)	NB	3,090	3,504	**414**	**13%**
A206-North (Basildon Rd to A200 Evelyn St)	SB	2,132	2,428	**296**	**14%**
A2-West (Westhorn Av to New Cross Rd)	NB	2,022	2,725	**704**	**35%**
A2-West (Westhorn Av to New Cross Rd)	SB	1,349	1,678	**328**	**24%**
A20-West (Sevenoaks Way to B218 Malpas Rd)	EB	2,017	2,005	**-13**	**-1%**
A20-West (Sevenoaks Way to B218 Malpas Rd)	WB	2,579	3,029	**450**	**17%**
A205 (Croxted Rd to Sidcup Rd)	EB	2,166	2,379	**214**	**10%**
A205 (Croxted Rd to Sidcup Rd)	WB	2,640	3,303	**663**	**25%**
A2218 (Whitefoot Lane and Southend Lane)	EB	646	729	**83**	**13%**
A2218 (Whitefoot Lane and Southend Lane)	WB	775	934	**159**	**20%**
Total	**All**	24,372	28,528	**4,156**	**17%**

Table 11 shows that 12 out of the 14 routes experience a journey time increase between the Do Minimum and Do Something models. The total increase across all routes is **+17%.** Due to the delays introduced around the New Cross area in the Do Something model, the A2 experiences journey time increases as high as **35%.** Larger still, the A21 corridor sees a journey time increase as high as **36%** due to the negative impact of the Catford Gyratory scheme on journey times.

6. ITS Analyses of 2041 Lewisham Intervention Package

Standard outputs from LTS assignment of 2041 Lewisham Intervention Package are extracted and compared with the 2041 Do Minimum scenario (LTS scenario A141lp08). Since the same matrices are applied to both scenarios, the analyses would focus on the shift in mode choices between Highway, PT and active modes.

Top Line Statistics

Table 3 to Table 5 illustrate total trips by mode associated with Greater London Authority area for all peak periods.

Table 12: Morning Peak Period Distribution and Mode Split (3 Hour Total)

Mode	**Person Trips** **To/From/Intra GLA** **LTS 7.1 2026 A126lp01**	**Person Trips** **To/From/Intra GLA** **LTS 7.1 2026 A126lw02**	**Person Trips** **To/From/Intra GLA.** **Change from Run1 to Run2 Absolute**	**Person Trips** **To/From/Intra GLA** **Change from Run1 to Run2 Percentage**
Car	1,834,019	1,824,504	-9,514	-0.5%
PT	3,447,661	3,480,751	33,090	1.0%
Slow	1,999,489	1,967,233	-32,256	-1.6%
All	**7,281,168**	**7,272,488**	**-8,680**	**-0.1%**

Table 13: Inter Peak Period Distribution and Mode Split (6 Hour Total)

Mode	Person Trips To/From/Intra GLA LTS 7.1 2026 A126Ip01	Person Trips To/From/Intra GLA LTS 7.1 2026 A126Iw02	Person Trips To/From/Intra GLA. Change from Run1 to Run2 Absolute	Person Trips To/From/Intra GLA Change from Run1 to Run2 Percentage
Car	3,151,933	3,138,695	-13,238	-0.40%
PT	4,529,463	4,600,132	70,669	1.60%
Slow	3,460,862	3,408,664	-52,198	-1.50%
All	**11 142258**	**11 147490**	**5232**	**0%**

Table 14: Evening Peak Period Distribution and Mode Split (3 Hour Total)

Mode	Person Trips To/From/Intra GLA LTS 7.1 2026 A126Ip01	Person Trips To/From/Intra GLA LTS 7.1 2026 A126Iw02	Person Trips To/From/Intra GLA. Change from Run1 to Run2 Absolute	Person Trips To/From/Intra GLA Change from Run1 to Run2 Percentage
Car	1,935,959	1,926,966	-8,993	-0.5%
PT	3,683,381	3,724,536	41,155	1.1%
Slow	1,375,239	1,351,418	-23,821	-1.7%
All	**6,994,578**	**7,002,920**	**8,341**	**0.1%**

The above tables illustrate a shift in mode from Car and Slow towards PT trips across all peak periods. This pattern corresponds with the PT schemes which enhance the infrastructure as well as Highway schemes discouraging car users to make trips. As expected, the percentage changes are higher than 2026, ranging between -1.7% to 1.6%.

Table 15 presents the changes in total trips in the peak period. Just within the LBL it shows that as a result of the intervention package, there is between 7.8%-20.4% increase in public transport trips and a corresponding decrease of between 0.8% and 1.6% reduction in car usage. This suggests there is also a reduction in slow trips in LBL.

Table 15: LB Lewisham Total Trip Ends Peak Period Distribution by Mode Split

LB Lewisham	2041 Do Minimum AM	2041 Do Minimum IP	2041 Do Minimum PM	2041 Do Something AM	2041 Do Something IP	2041 Do Something PM	Absolute Difference DS minus DM AM	Absolute Difference DS minus DM IP	Absolute Difference DS minus DM PM	Difference DS minus DM (%)	Difference DS minus DM (%)	Difference DS minus DM (%)
PT Origins	114,911	132,780	77,524	124,551	156,190	89,748	9,640	23,410	12,224	8.4%	20.4%	10.6%
PT Destinations	54,806	129,013	119,191	63,805	152,019	132,273	8,999	23,007	13,083	7.8%	20.0%	11.4%
Highway Origins	39,527	74,473	38,766	38,116	72,684	37,830	-1,411	-1,789	-936	-1.2%	-1.6%	-0.8%
Highway Destinations	40,160	71,562	36,461	39,036	69,877	35,272	-1,123	-1,685	-1,189	-1.0%	-1.5%	-1.0%

PT Trip End Comparisons

Figure 25 and Figure 26 illustrate the differences in public transport trip ends within LBL and its vicinity for origins and destinations, when compared with the 2041 Do Minimum trip ends. The general increase pattern matches spatially with the location of the public transport improvement schemes. The increase in public transport usage as a result of the Bakerloo Line Extension is evident. It is worth noting that for the 2041 Intervention Package, the magnitude of changes (either increase or decrease) are a larger than 2026, ranging between 25 and 300 trip differences in a three-hour period in each zone. Public transport trip end differences for Inter Peak and Evening Peak periods are shown in Appendix C.

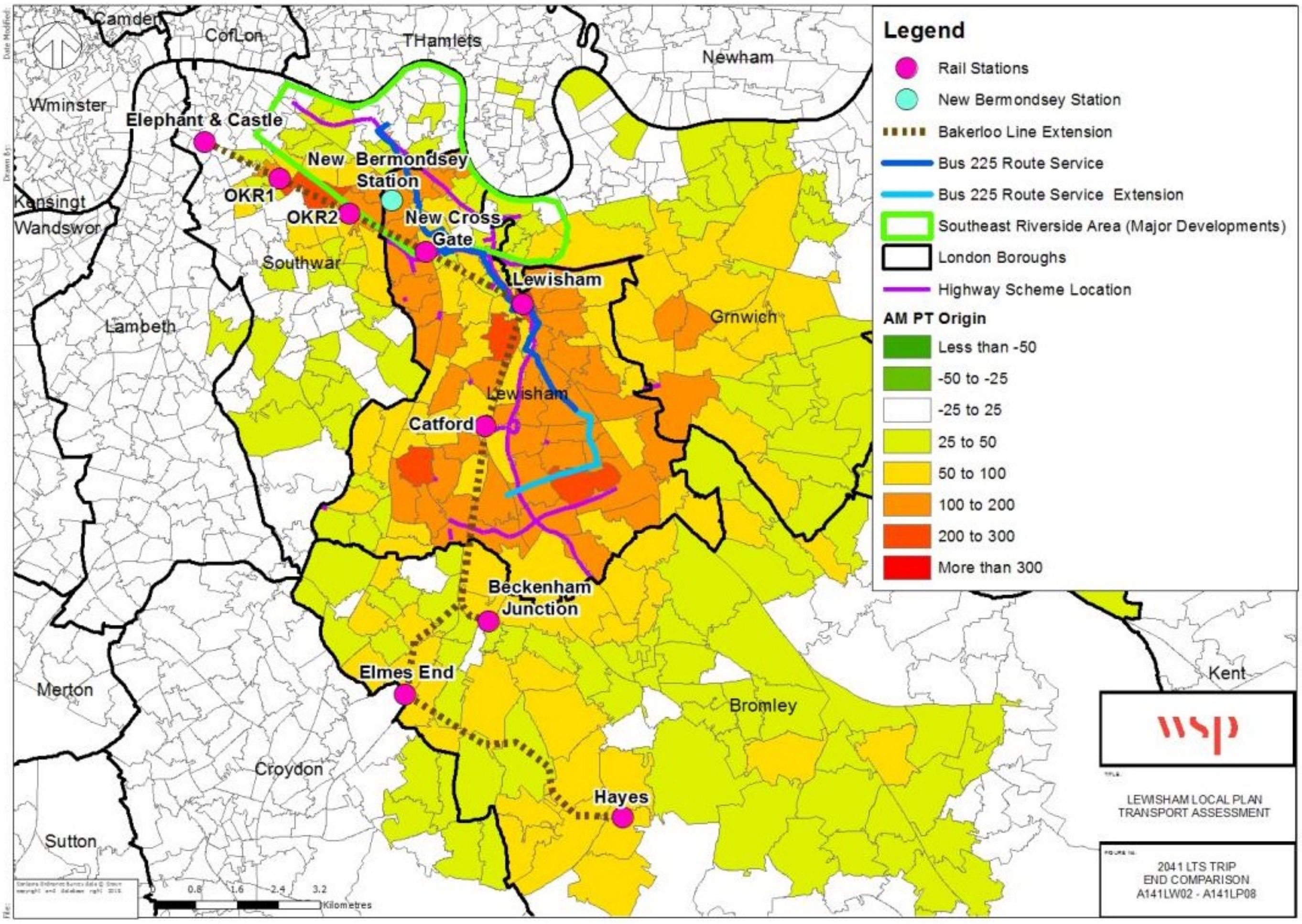


Figure 25: 2041 AM Public Transport Origin Trip End Differences

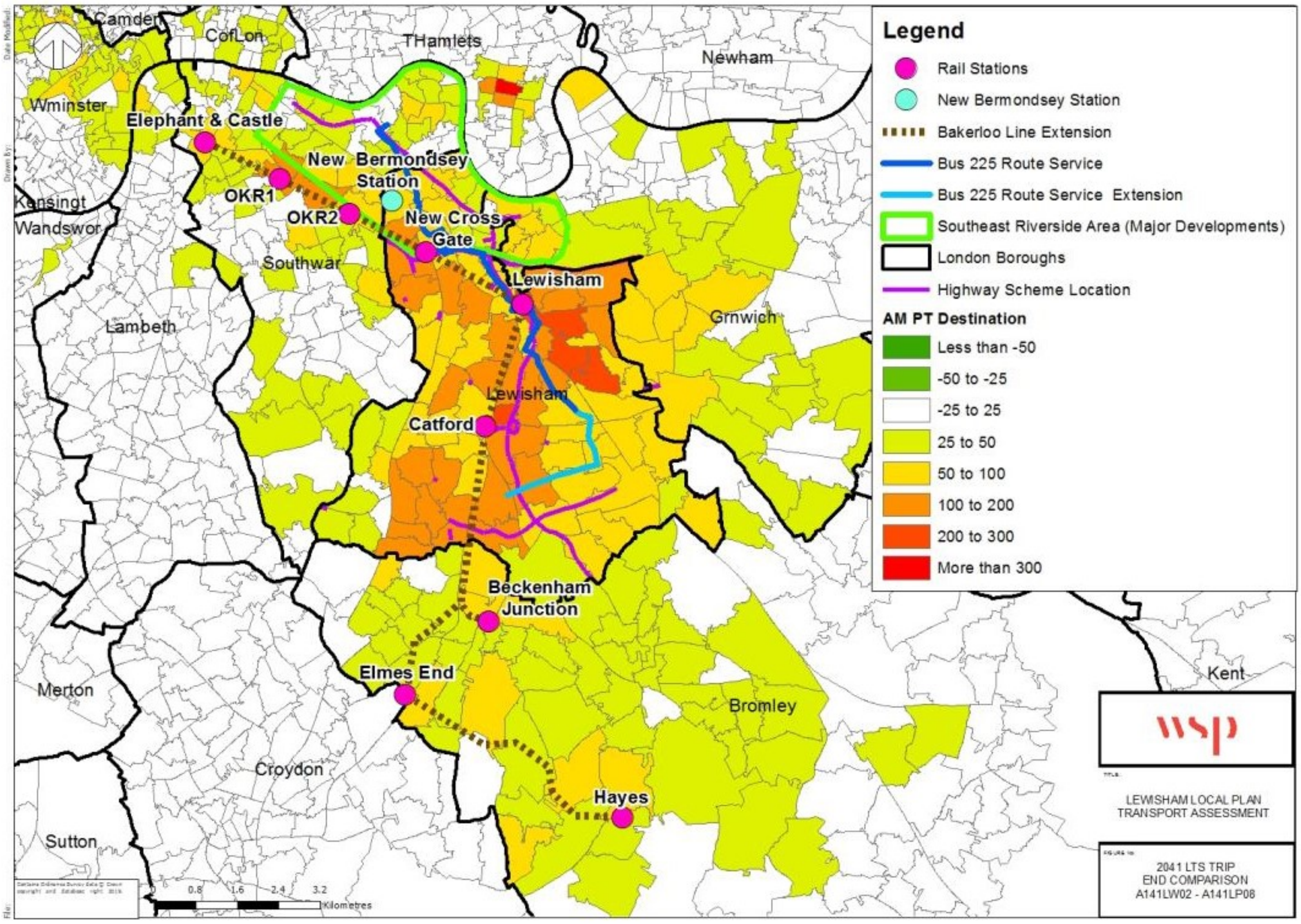


Figure 26: 2041 AM Public Transport Destination Trip End Differences

Highway Trip End Comparisons

Figure 27 and Figure 28 illustrate the differences in highway trip ends within LBL and its vicinity for origins and destinations when compared with the 2041 Do Minimum. The general reduction patterns match spatially with the location of the public transport improvement schemes, and the wide impact of increased public transport usage as a result of the Bakerloo Line Extension is evident. It is worth noting that for the 2041 Intervention Package, the magnitude of changes (either increase or decrease) is larger than 2026, with up to -50 trip differences in each zone over a three hour period. Highway trip end differences for Inter Peak and Evening Peak periods are shown in Appendix C.

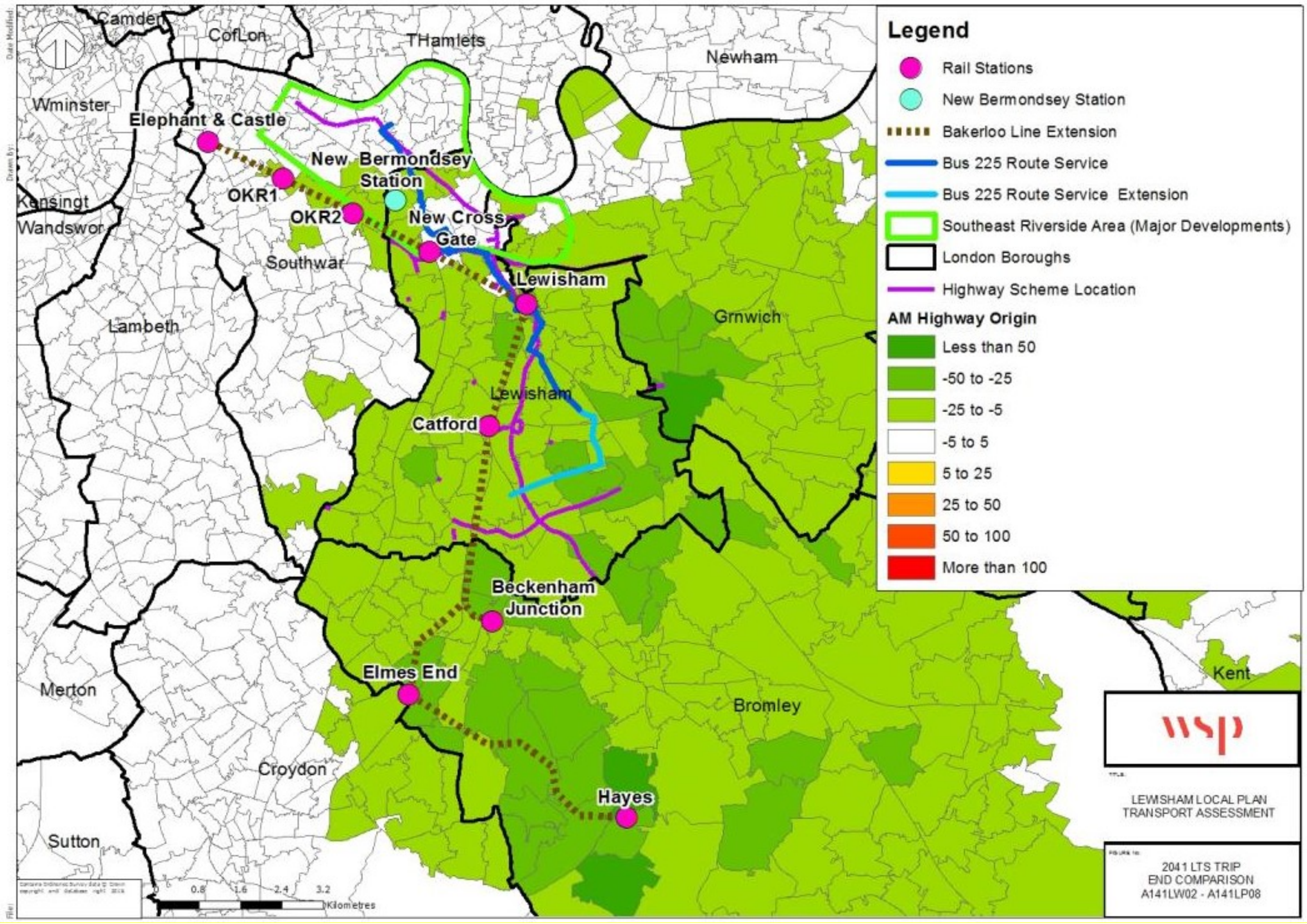


Figure 27: 2041 AM Highway Origin Trip End Differences

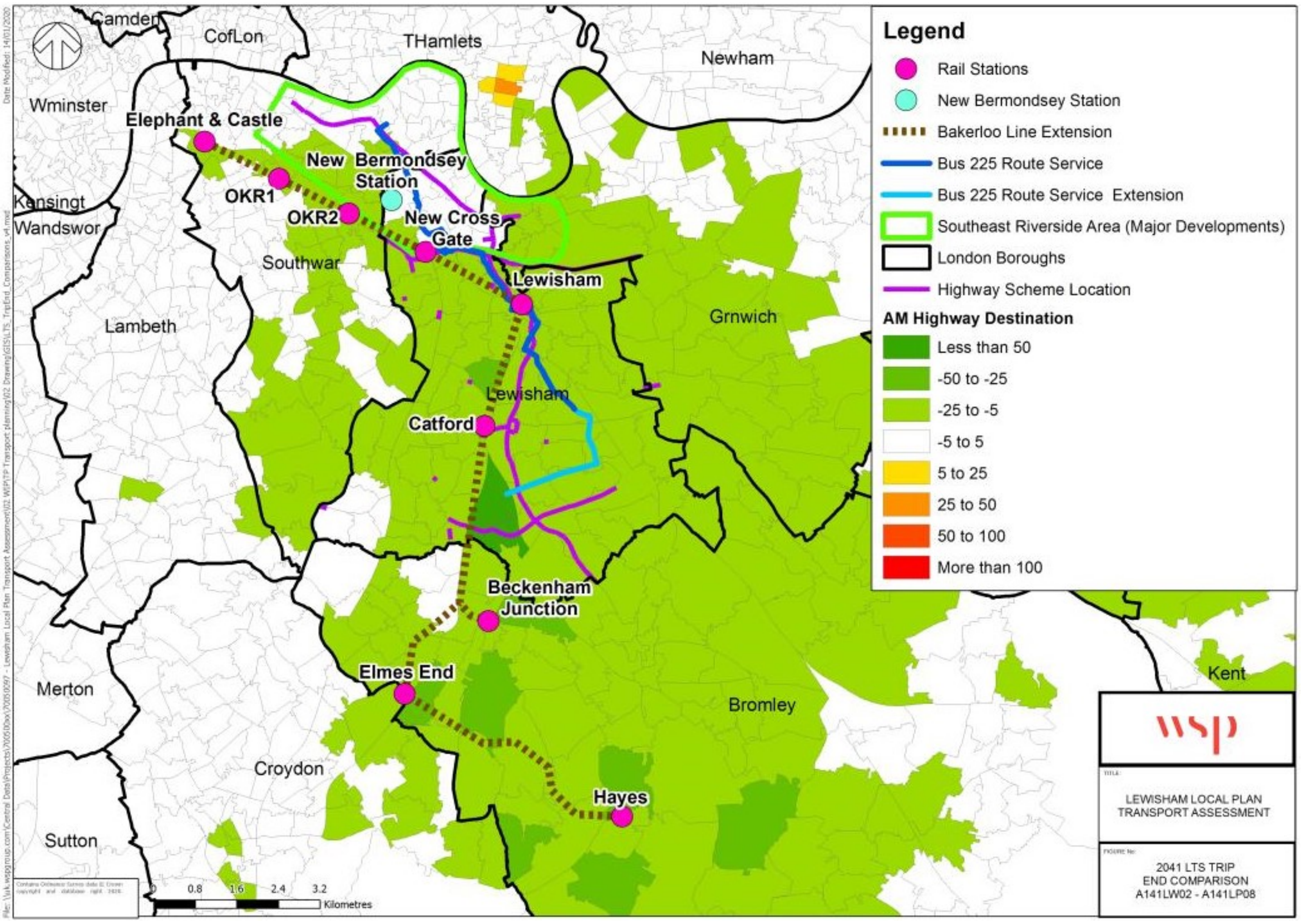


Figure 28: 2041 AM Highway Destination Trip End Differences

7. Railplan Analyses of 2041 Lewisham Intervention Packages

Standard outputs from Railplan assignments of 2041 Intervention Tests (with and without MTS) are extracted and compared with 2041 AM Funded without JNAT scenarios (Railplan scenario LW005A45P). TfL provided WSP with the Metroisation coding which they incorporated into the Lewisham Intervention Package Railplan model to generate the MTS scenario. The analyses assess whether the Intervention Package successfully addresses issues identified in the Funded scenarios. Assessment is based on the change in demand and crowding on PT services, growth in total station demand as well as bus demand.

Line Flows

Figure 29 shows the percentage change in passengers on the Transport for London network with the Lewisham Intervention Package without MTS. Absolute changes in passengers on these links can be seen in Table 16.

As shown in Figure 29 and Table 16, demand on the Jubilee Line experiences very small changes as a result of the 2041 Intervention Package without MTS. As expected, the Bakerloo Line shows large increases as a result of the Bakerloo Line extension with up to 689% increase in demand between Elephant and Castle and Waterloo. There are also significant increases in patronage on the DLR as a result of the Bakerloo Line Extension with up to 100% increases in demand. Demand variation along the Overground fluctuates between -40% and 15%. The changes in passenger demand is also reflected in the crowding along NR and LUL lines. Detailed crowding maps of the changes for Rail modes can be found in Appendix D.

Figure 30 and Table 17 show the percentage change in passengers on the Transport for London network, and the absolute changes in passengers on these links respectively, for the 2041 Intervention Package including MTS.

As shown in Figure 30 and Table 17, demand on the Jubilee Line experiences increases in passenger flows of between 3% and 12% as a result of the 2041 Intervention Package including MTS. As expected, the Bakerloo Line shows large increases as a result of the Bakerloo Line extension, with up to 824% increase in demand between Elephant and Castle and Waterloo. There are also significant increases in patronage on the DLR as a result of the Bakerloo Line Extension with up to 154% increase in demand. Demand variation along the Overground varies between 77% and 2753%. The changes in passenger demand is also reflected in the crowding along NR and LUL lines. Overall with the MTS interventions passenger demand increases on these routes. Detailed crowding maps of the changes for Rail modes can be found in Appendix D.

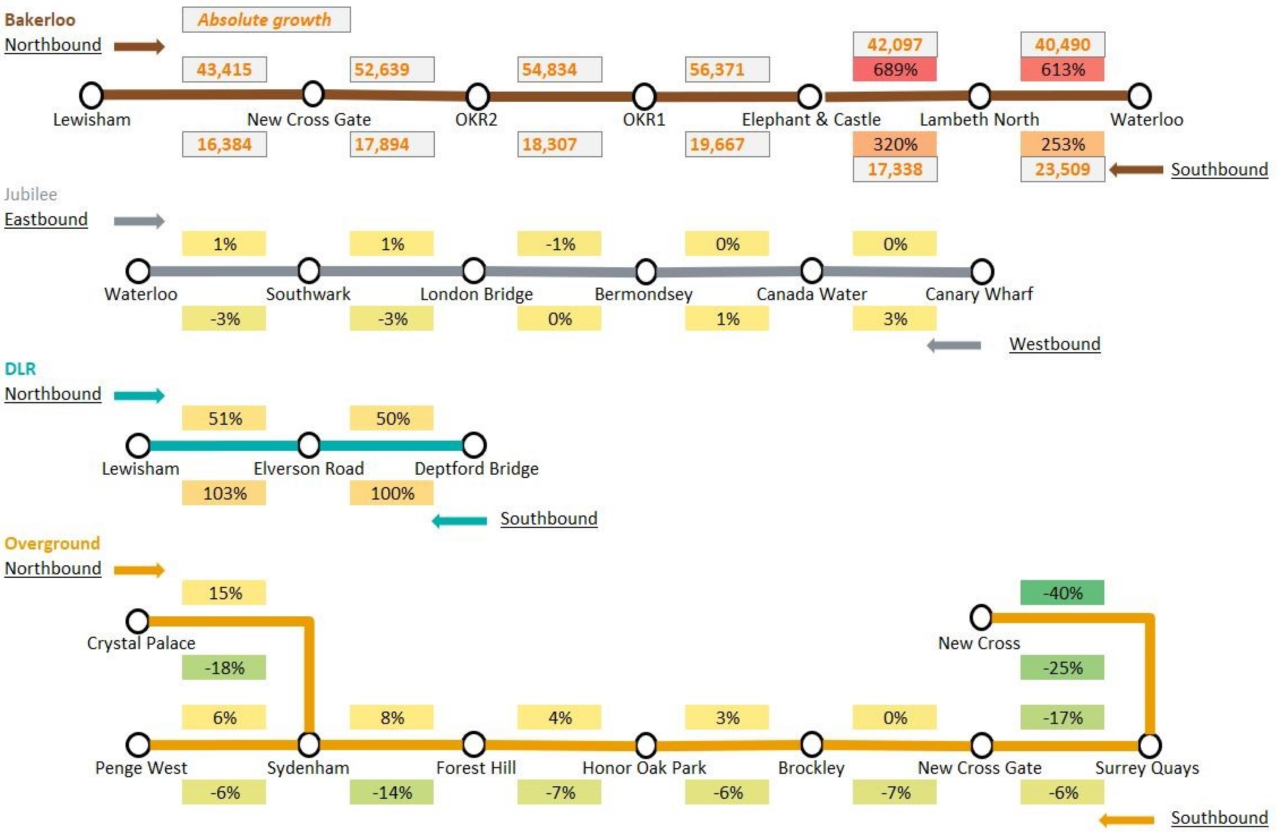


Figure 29: Changes in Passenger Flow on Transport for London Network between 2041 Do Something LBL Intervention Package and Do Minimum

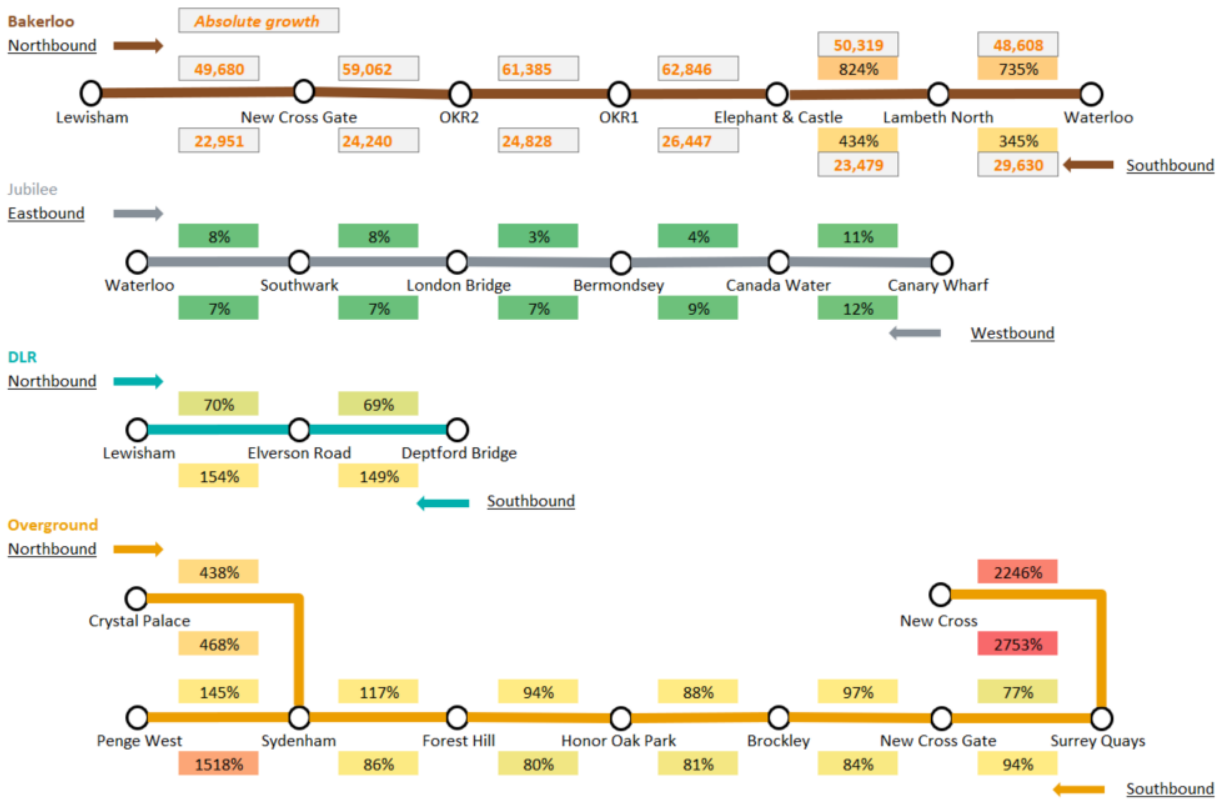


Figure 30: Changes in Passenger Flow on Transport for London Network between 2041 Do Something LBL Intervention Package Plus MTS and Do Minimum

Table 16: Passenger Flow along LUL, DLR and NR network Do Minimum and 2041 Do Something LBL Intervention Package

From	To	Direction	Mode	Line(s)	AM 2041 Do Minimum	AM 2041 Do Something LBL Intervention Package	2041 %Growth	2041 Growth
Lewisham	New Cross Gate	NB	LUL	Bakerloo	0	43,415	0	43,415
New Cross Gate	Old Kent Road 2	NB	LUL	Bakerloo	0	52,639	0	52,639
Old Kent Road 2	Od Kent Road 1	NB	LUL	Bakerloo	0	54,834	0	54,834
Old Kent Road 1	Elephant & Castle	NB	LUL	Bakerloo	0	56,371	0	56,371
Elephant & Castle	Lambeth North	NB	LUL	Bakerloo	6,107	48,204	689%	42,097
Lambeth North	Waterloo	NB	LUL	Bakerloo	6,610	47,100	613%	40,490
Waterloo	Lambeth North	SB	LUL	Bakerloo	6,660	23,509	253%	16,849
Lambeth North	Elephant & Castle	SB	LUL	Bakerloo	5,411	22,749	320%	17,338
Elephant & Castle	Old Kent Road 1	SB	LUL	Bakerloo	0	19,667	0%	19,667
Old Kent Road 1	Old Kent Road 2	SB	LUL	Bakerloo	0	18,307	0%	18,307
Old Kent Road 2	New Cross Gate	SB	LUL	Bakerloo	0	17,894	0%	17,894
New Cross Gate	Lewisham	SB	LUL	Bakerloo	0	16,384	0%	16,384
Waterloo	Southwark	EB	LUL	Jubilee	63,731	64,451	1%	720
Southwark	London Bridge	EB	LUL	Jubilee	59,843	60,636	1%	793
London Bridge	Bermondsey	EB	LUL	Jubilee	61,285	60,897	-1%	-388
Bermondsey	Canada Water	EB	LUL	Jubilee	60,190	60,389	0%	199
Canada Water	Canary Wharf	EB	LUL	Jubilee	64,181	64,072	0%	-109
Canary Wharf	Canada Water	WB	LUL	Jubilee	49,930	51,543	3%	1,613
Canada Water	Bermondsey	WB	LUL	Jubilee	56,198	56,634	1%	436
Bermondsey	London Bridge	WB	LUL	Jubilee	59,098	59,083	0%	-15
London Bridge	Southwark	WB	LUL	Jubilee	63,468	61,601	-3%	-1,867
Southwark	Waterloo	WB	LUL	Jubilee	59,451	57,751	-3%	-1,700
Not applicable	**Not applicable**	**Not applicable**	**LUL**	**LUL Sub-total**	**622,163**	**1,019,130**	**64%**	**395,967**
Lewisham	Elverson Road	NB	DLR	DLR	9,475	14,286	51%	4,811
Everson Road	Deptford Bridge	NB	DLR	DLR	9,539	14,351	50%	4,812
Deptford Bridge	Elverson Road	SB	DLR	DLR	3,300	6,590	100%	3,290
Everson Road	Lewisham	SB	DLR	DLR	3,197	6,475	103%	3,278
Not applicable	**Not applicable**	**Not applicable**	**DLR**	**DLR sub-total**	**25,511**	**41,702**	**63%**	**16,191**

From	To	Direction	Mode	Line(s)	AM 2041 Do Minimum	AM 2041 Do Something LBL Intervention Package	2041 %Growth	2041 Growth
Crystal Palace	Sydenham	NB	N R	Overground	1,251	1,442	15%	191
Penge West	Sydenham	NB	N R	Overground	2,751	2,915	6%	164
Sydenham	Forest Hill	NB	N R	Overground	5,824	6,274	8%	450
Forest Hill	Honor Oak Park	NB	N R	Overground	8,734	9,122	4%	388
Honor Oak Park	Brockley	NB	N R	Overground	9,317	9,552	3%	235
Brockley	New Cross Gate	NB	N R	Overground	10,817	10,774	0%	-43
New Cross Gate	Surrey Quays	NB	N R	Overground	11,829	9,855	-17%	-1,974
New Cross	Surrey Quays	NB	N R	Overground	287	173	-40%	-114
Surrey Quays	New Cross	SB	N R	Overground	236	177	-25%	-59
Surrey Quays	New Cross Gate	SB	N R	Overground	4,403	4,133	-6%	-270
New Cross Gate	Brockley	SB	N R	Overground	3,783	3,508	-7%	-275
Brockley	Honor Oak Park	SB	N R	Overground	3,612	3,388	-6%	-224
Honor Oak Park	Forest Hill	SB	N R	Overground	3,549	3,283	-7%	-266
Forest Hill	Sydenham	SB	N R	Overground	2,881	2,480	-14%	-401
Sydenham	Crystal Palace	SB	N R	Overground	1,186	970	-18%	-216
Sydenham	Penge West	SB	N R	Overground	416	393	-6%	-23
Not applicable	**Not applicable**	**Not applicable**	**NR**	**NR Sub-total**	**70,876**	**68,439**	**-3%**	**-2,437**
Not applicable	**Not applicable**	**Not applicable**	**TOTAL**	**TOTAL**	**718,550**	**1,128,271**	**57%**	**409,721**

Table 17: Passenger Flow along LUL, DLR and NR network Do Minimum and 2041 Do Something LBL Intervention Package Plus MTS

From	To	Direction	Mode	Line(s)	AM 2041 Do Minimum	AM 2041 Do Something LBL Intervention Package	2041 %Growth	2041 Growth
Lewisham	New Cross Gate	NB	LUL	Bakerloo	0	49,680	0	49,680
New Cross Gate	Old Kent Road 2	NB	LUL	Bakerloo	0	59,062	0	59,062
Old Kent Road 2	Od Kent Road 1	NB	LUL	Bakerloo	0	61,385	0	61,385
Old Kent Road 1	Elephant & Castle	NB	LUL	Bakerloo	0	62,846	0	62,846
Elephant & Castle	Lambeth North	NB	LUL	Bakerloo	6,107	56,426	824%	50,319
Lambeth North	Waterloo	NB	LUL	Bakerloo	6,610	55,218	735%	48,608
Waterloo	Lambeth North	SB	LUL	Bakerloo	6,660	29,630	345%	22,970
Lambeth North	Elephant & Castle	SB	LUL	Bakerloo	5,411	28,890	434%	23,479
Elephant & Castle	Old Kent Road 1	SB	LUL	Bakerloo	0	26,447	0%	26,447
Old Kent Road 1	Old Kent Road 2	SB	LUL	Bakerloo	0	24,828	0%	24,828
Old Kent Road 2	New Cross Gate	SB	LUL	Bakerloo	0	24,240	0%	24,240
New Cross Gate	Lewisham	SB	LUL	Bakerloo	0	22,951	0%	22,951
Waterloo	Southwark	EB	LUL	Jubilee	63,731	68,580	8%	4,849
Southwark	London Bridge	EB	LUL	Jubilee	59,843	64,396	8%	4,553
London Bridge	Bermondsey	EB	LUL	Jubilee	61,285	63,022	3%	1,737
Bermondsey	Canada Water	EB	LUL	Jubilee	60,190	62,539	4%	2,349
Canada Water	Canary Wharf	EB	LUL	Jubilee	64,181	71,366	11%	7,185
Canary Wharf	Canada Water	WB	LUL	Jubilee	49,930	55,746	12%	5,816
Canada Water	Bermondsey	WB	LUL	Jubilee	56,198	60,984	9%	4,786
Bermondsey	London Bridge	WB	LUL	Jubilee	59,098	63,342	7%	4,244
London Bridge	Southwark	WB	LUL	Jubilee	63,468	67,877	7%	4,409
Southwark	Waterloo	WB	LUL	Jubilee	59,451	63,605	7%	4,154
Not applicable	**Not applicable**	**Not applicable**	**LUL**	**LUL Sub-total**	**622,163**	**1,143,060**	**84%**	**520,897**
Lewisham	Elverson Road	NB	DLR	DLR	9,475	16,097	70%	6,622
Everson Road	Deptford Bridge	NB	DLR	DLR	9,539	16,105	69%	6,566
Deptford Bridge	Elverson Road	SB	DLR	DLR	3,300	8,219	149%	4,919
Everson Road	Lewisham	SB	DLR	DLR	3,197	8,129	154%	4,932
Not applicable	**Not applicable**	**Not applicable**	**DLR**	**DLR sub-total**	**25,511**	**48,550**	**90%**	**23,039**

From	To	Direction	Mode	Line(s)	AM 2041 Do Minimum	AM 2041 Do Something LBL Intervention Package	2041 %Growth	2041 Growth
Crystal Palace	Sydenham	NB	N R	Overground	1,251	6,732	438%	5,481
Penge West	Sydenham	NB	N R	Overground	2,751	6,732	145%	3,981
Sydenham	Forest Hill	NB	N R	Overground	5,824	12,619	117%	6,795
Forest Hill	Honor Oak Park	NB	N R	Overground	8,734	16,970	94%	8,236
Honor Oak Park	Brockley	NB	N R	Overground	9,317	17,544	88%	8,227
Brockley	New Cross Gate	NB	N R	Overground	10,817	21,311	97%	10,494
New Cross Gate	Surrey Quays	NB	N R	Overground	11,829	20,986	77%	9,157
New Cross	Surrey Quays	NB	N R	Overground	287	6,732	2,246%	6,445
Surrey Quays	New Cross	SB	N R	Overground	236	6,732	2,753%	6,496
Surrey Quays	New Cross Gate	SB	N R	Overground	4,403	8,555	94%	4,152
New Cross Gate	Brockley	SB	N R	Overground	3,783	6,975	84%	3,192
Brockley	Honor Oak Park	SB	N R	Overground	3,612	6,553	81%	2,941
Honor Oak Park	Forest Hill	SB	N R	Overground	3,549	6,374	80%	2,825
Forest Hill	Sydenham	SB	N R	Overground	2,881	5,357	86%	2,476
Sydenham	Crystal Palace	SB	N R	Overground	1,186	6,732	468%	5,546
Sydenham	Penge West	SB	N R	Overground	416	6,732	1,518%	6,316
Not applicable	**Not applicable**	**Not applicable**	**NR**	**NR Sub-total**	**70,876**	**163,636**	**131%**	**92,760**
Not applicable	**Not applicable**	**Not applicable**	**TOTAL**	**TOTAL**	**718,550**	**1,355,246**	**89%**	**636,696**

Crowding Changes for LUL and NR

Table 18 and Table 19 show the changes in crowding which occur on the London Underground and National Rail networks as a result of the 2041 LBL Intervention Package scenarios (with and without MTS), when compared with the Do Minimum.

The tables illustrate that the 2041 PT without MTS intervention will increase crowding levels on the Bakerloo Line and DLR as would be expected, with the Jubilee line and sections of the DLR experiencing reductions in crowding. Meanwhile, the intervention package including MTS results in an increase in crowding on the Bakerloo Line, as well as sections of the DLR and Jubilee Line.

All Network Rail services experience reductions in crowding as a result of the 2041 Intervention Package excluding MTS. However, the 2041 Intervention Package including MTS results in an increase in crowding on the Southern/Overground, Southern and Overground Lines, as well as sections of the Southeastern Line. The Thameslink experiences a reduction in crowding.

Table 18: London Underground Crowding Changes in 2041 LBL Intervention Package Scenario Plus MTS

TOC	From	To	AM 2041 Do Minimum	AM 2041 Do Something LBL Intervention package	AM 2041 Do Something LBL Intervention package plus MTS
DLR	Lewisham	Elverson Road	0.71	1.06	1.37
DLR	Elverson Road	Deptford Bridge	0.73	1.08	1.37
DLR	Deptford Bridge	Greenwich	1.27	1.36	1.57
DLR	Greenwich	Cutty Sark	1.58	1.50	1.84
DLR	Cutty Sark	Island Gardens	1.89	1.68	2.03

TOC	From	To	AM 2041 Do Minimum	AM 2041 Do Something LBL Intervention package	AM 2041 Do Something LBL Intervention package plus MTS
DLR	Island Gardens	Mudchute	1.82	1.47	1.80
DLR	Mudchute	Crossharbour	2.32	1.73	2.11
DLR	Crossharbour	South Quay	2.48	1.79	2.13
DLR	South Quay	Heron Quays	2.52	1.80	2.07
DLR	Heron Quays	Canary Wharf	1 .98	1.50	1.95
LUL Jubilee	Canada Water	Canary Wharf	5.80	5.43	6.23
LUL Jubilee	Canning Town	North Greenwich	5.19	5.05	5.92
LUL Jubilee	North Greenwich	Canary Wharf	5.23	5.00	5.67
Bakerloo	Lewisham	New Cross Gate	No data	2.77	3.40
Bakerloo	New Cross Gate	Old Kent Road 2	No data		
Bakerloo	Old Kent Road 2	Old Kent Road 1	No data		
Bakerloo	Old Kent Road 1	Elephant & Castle	No data		
Bakerloo	Elephant & Castle	Lambeth North	0		
Bakerloo	Lambeth North	Waterloo	0		
BLE to Hayes	Lewisham	New Cross Gate	No data	2.77	
BLE to Hayes	Ladywell	Lewisham	No data	4.54	

TOC	From	To	AM 2041 Do Minimum	AM 2041 Do Something LBL Intervention package	AM 2041 Do Something LBL Intervention package plus MTS
BLE to Hayes	New Cross Gate	Old Kent Road	No data		
BLE to Hayes	Lower Sydenham	Catford Bridge	No data	2.00	
BLE to Hayes	Catford Bridge	Ladywell	No data		

TOC	From	To	AM 2041 Do Minimum	AM 2041 Do Something LBL Intervention Package Difference	AM 2041 Do Something LBL Intervention package plus MTS Difference
DLR	Lewisham	Elverson Road	0.00	0.35	0.66
DLR	Elverson Road	Deptford Bridge	0.00	0.35	0.64
DLR	Deptford Bridge	Greenwich	0.00	0.09	0.30
DLR	Greenwich	Cutty Sark	0.00	-0.08	0.26
DLR	Cutty Sark	Island Gardens	0.00	-0.21	0.14
DLR	Island Gardens	Mudchute	0.00	-0.35	-0.02
DLR	Mudchute	Crossharbour	0.00	-0.59	-0.21
DLR	Crossharbour	South Quay	0.00	-0.69	-0.35
DLR	South Quay	Heron Quays	0.00	-0.72	-0.45
DLR	Heron Quays	Canary Wharf	0.00	-0.48	-0.03

TOC	From	To	AM 2041 Do Minimum	AM 2041 Do Something LBL Intervention Package Difference	AM 2041 Do Something LBL Intervention package plus MTS Difference
LUL Jubilee	Canada Water	Canary Wharf	0.00	-0.37	0.43
LUL Jubilee	Canning Town	North Greenwich	0.00	-0.14	0.73
LUL Jubilee	North Greenwich	Canary Wharf	0.00	-0.23	0.44
Bakerloo	Lewisham	New Cross Gate	No data	No data	No data
Bakerloo	New Cross Gate	Old Kent Road 2	No data	No data	No data
Bakerloo	Old Kent Road 2	Old Kent Road 1	No data	No data	No data
Bakerloo	Old Kent Road 1	Elephant & Castle	No data	No data	No data
Bakerloo	Elephant & Castle	Lambeth North	0.00		
Bakerloo	Lambeth North	Waterloo	0.00		
BLE to Hayes	Lewisham	New Cross Gate	No data	No data	No data
BLE to Hayes	Ladywell	Lewisham	No data	No data	No data
BLE to Hayes	New Cross Gate	Old Kent Road	No data	No data	No data
BLE to Hayes	Lower Sydenham	Catford Bridge	No data	No data	No data

TOC	From	To	AM 2041 Do Minimum	AM 2041 Do Something LBL Intervention Package Difference	AM 2041 Do Something LBL Intervention package plus MTS Difference
BLE to Hayes	Catford Bridge	Ladywell	No data	No data	No data

Table 19: Network Rail Crowding Changes in 2041 LBL Intervention Package scenario Plus MTS

TOC	From	To	AM 2041 Do Minimum	AM 2041 Do Something LBL Intervention Package	AM 2041 Do Something LBL Intervention package plus MTS
Thameslink	Catford	Crofton Park	2.34	1.77	1.68
Thameslink	Crofton Park	Nunhead	2.37	1.79	1.78
Thameslink	Nunhead	Peckham Rye	2.23	1.15	0.37
Thameslink	Beckenham Hill	Bellingham	2.69	2.44	2.74
Thameslink	Bellingham	Catford	2.16	1.74	1.70
Southeastern	London Bridge	Deptford	2.09	1.43	2.21
Southeastern	Greenwich	Deptford	1.64	1.22	2.16
Southeastern	Grove Park	Hither Green	1.64	0.99	1.42
Southeastern	Lee	Hither Green	2.15	1.04	2.19
Southeastern	Hither Green	Lewisham	1.63	1.02	1.31
Southeastern	Blackheath	Lewisham	1.72	1.25	2.99
Southeastern	New Cross	St Johns	2.08	0.90	1.45
Southeastern	St Johns	Lewisham	1.99	0.29	1.43
Southeastern	Ladywell	Catford Brid	1.48	0.00	0.00
Southeastern	Lewisham	Ladywell	1.65	0.00	0.00
Southeastern	St Johns	Ladywell	2.72	0.00	0.00
Southern / Overground	Anerley	Penge West	2.13	2.10	2.45
Southern / Overground	Penge West	Sydenham	2.17	2.15	2.56
Southern / Overground	Sydenham	Forest Hill	1.71	1.71	2.45

TOC	From	To	AM 2041 Do Minimum	AM 2041 Do Something LBL Intervention Package	AM 2041 Do Something LBL Intervention package plus MTS
Southern / Overground	Forest Hill	Honor Oak Park	2.05	2.01	2.93
Southern / Overground	Honor Oak Park	Brockley	2.12	2.06	2.99
Southern	Brockley	New Cross Gate	2.09	1.96	2.52
Southern	New Cross Gate	London Bridge	2.09	1.82	2.00
Overground	New Cross Gate	Surrey Quays		2.94	
Overground	Surrey Quays	Canada Water		2.17	
Overground	Brockley	New Cross Gate			

TOC	From	To	AM 2041 Do Minimum	AM 2041 Do Something LBL Intervention Package Difference	AM 2041 Do Something LBL Intervention package plus MTS Difference
Thameslink	Catford	Crofton Park	0.00	-0.57	-0.66
Thameslink	Crofton Park	Nunhead	0.00	-0.58	-0.59
Thameslink	Nunhead	Peckham Rye	0.00		
Thameslink	Beckenham Hill	Bellingham	0.00	0.25	0.05
Thameslink	Bellingham	Catford	0.00	-0.42	-0.46

TOC	From	To	AM 2041 Do Minimum	AM 2041 Do Something LBL Intervention Package Difference	AM 2041 Do Something LBL Intervention package plus MTS Difference
Southeastern	London Bridge	Deptford	0.00	-0.66	0.12
Southeastern	Greenwich	Deptford	0.00	-0.42	0.52
Southeastern	Grove Park	Hither Green	0.00	-0.65	-0.22
Southeastern	Lee	Hither Green	0.00		0.04
Southeastern	Hither Green	Lewisham	0.00	-0.61	-0.32
Southeastern	Blackheath	Lewisham	0.00	-0.47	
Southeastern	New Cross	St Johns	0.00		-0.63
Southeastern	St Johns	Lewisham	0.00		-0.56
Southeastern	Ladywell	Catford Brid	0.00		
Southeastern	Lewisham	Ladywell	0.00		
Southeastern	St Johns	Ladywell	0.00		
Southern / Overground	Anerley	Penge West	0.00	-0.03	0.32
Southern / Overground	Penge West	Sydenham	0.00	-0.02	0.39
Southern / Overground	Sydenham	Forest Hill	0.00	0.00	0.74
Southern / Overground	Forest Hill	Honor Oak Park	0.00	-0.04	0.88
Southern / Overground	Honor Oak Park	Brockley	0.00	-0.06	0.87
Southern	Brockley	New Cross Gate	0.00	-0.13	0.43
Southern	New Cross Gate	London Bridge	0.00	-0.27	-0.09

TOC	From	To	AM 2041 Do Minimum	AM 2041 Do Something LBL Intervention Package Difference	AM 2041 Do Something LBL Intervention package plus MTS Difference
Overground	New Cross Gate	Surrey Quays	0.00	-0.87	
Overground	Surrey Quays	Canada Water	0.00		0.20
Overground	Brockley	New Cross Gate	0.00	-0.02	

Bus Demand along Key Bus Corridors

Figure 31 illustrates the extent of key bus corridors within London Borough of Lewisham.

Figure 31: Bus Corridors in London Borough of Lewisham

For the purpose of comparison, bus demand in both directions along these corridors has been analysed and is presented in Figure 32 to Figure 35. For all bus corridors in both directions generally there are increases in bus demand.

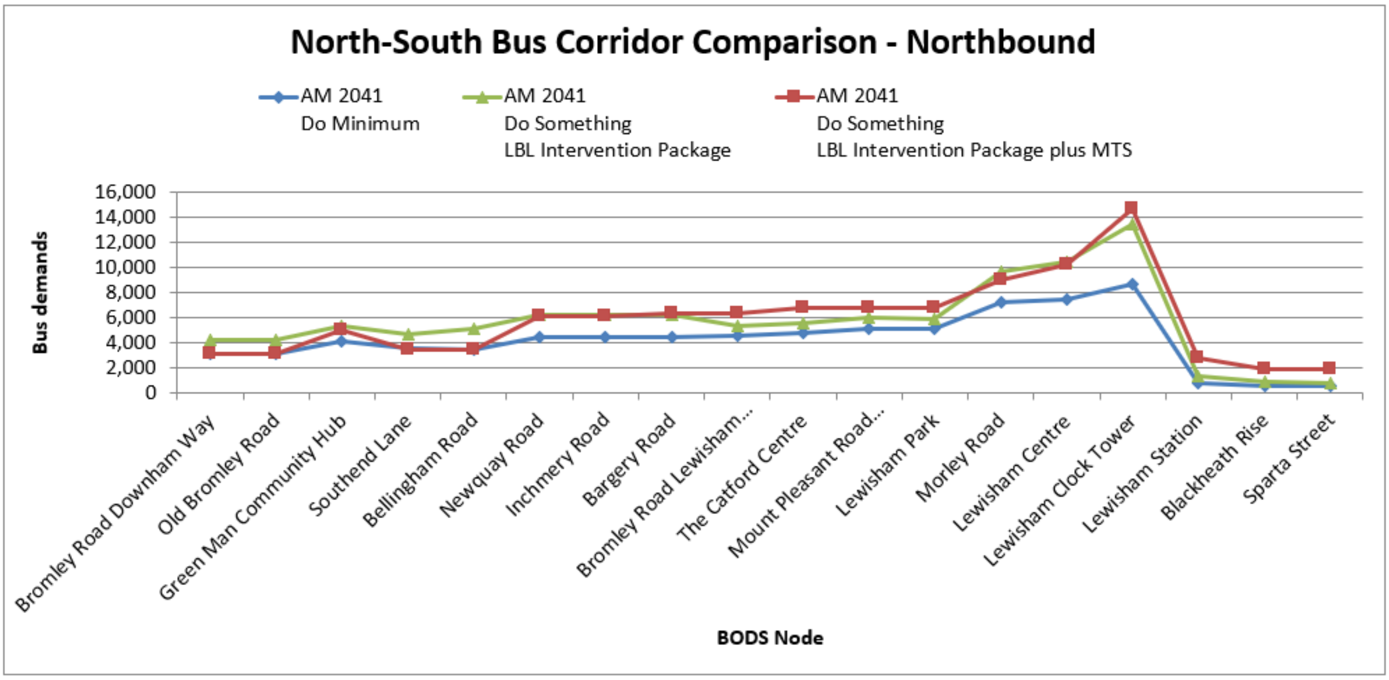


Figure 32: North-South Northbound Bus Corridor Demand Do Minimum and 2041 LBL Intervention Package with and without MTS

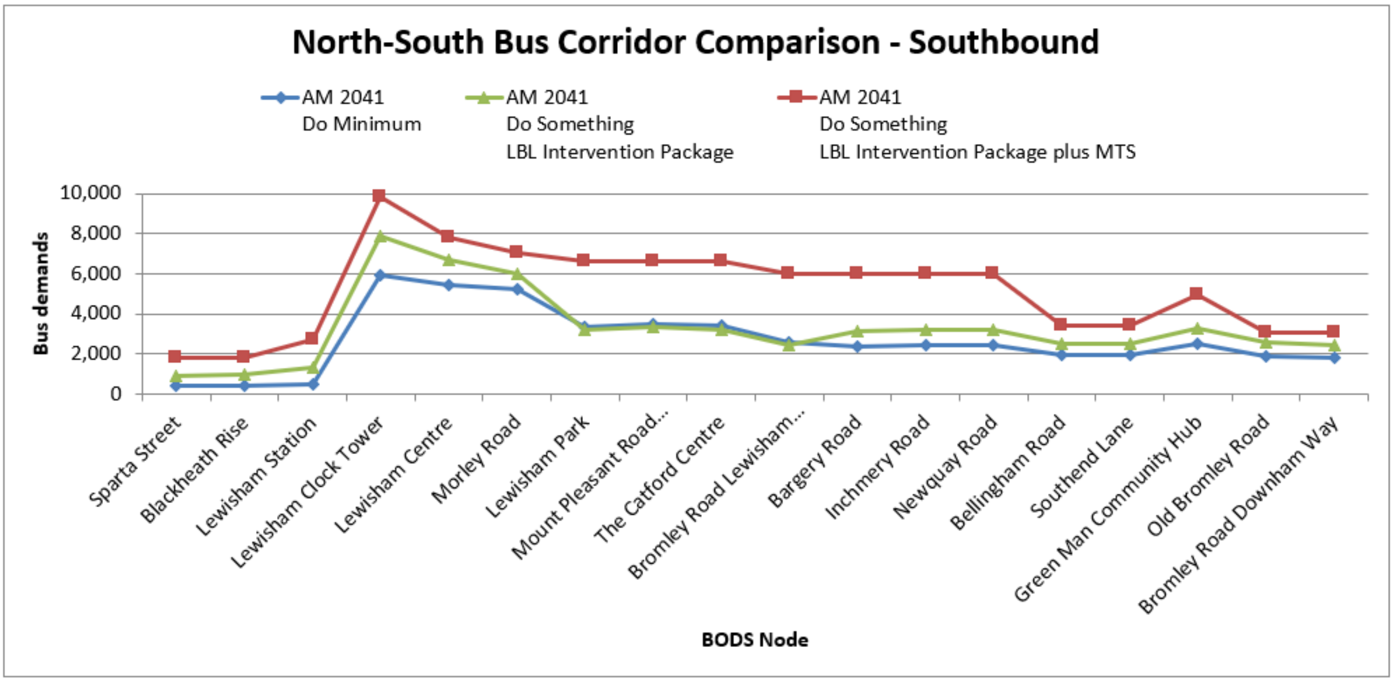


Figure 33: North-South Southbound Bus Corridor Demand Do Minimum and 2041 LBL Intervention Package with and without MTS

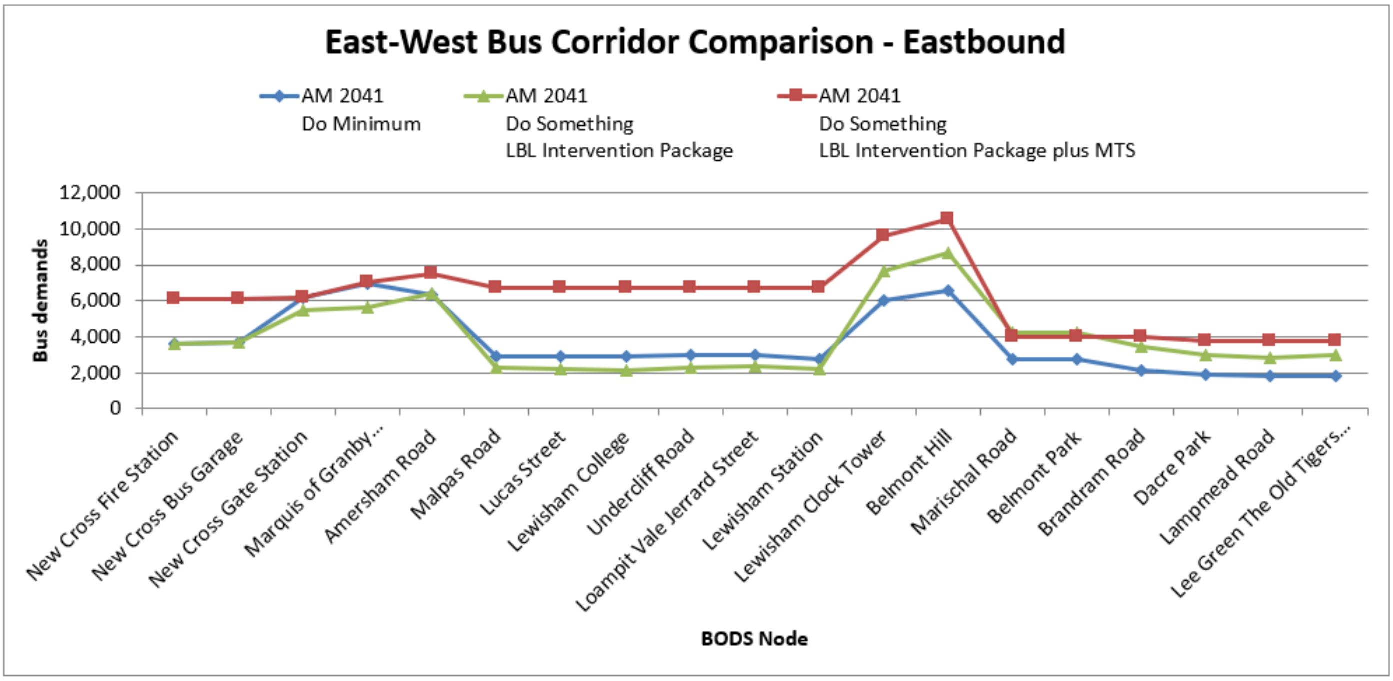


Figure 34: East-West Eastbound Bus Corridor Demand Do Minimum and 2041 LBL Intervention Package with and without MTS

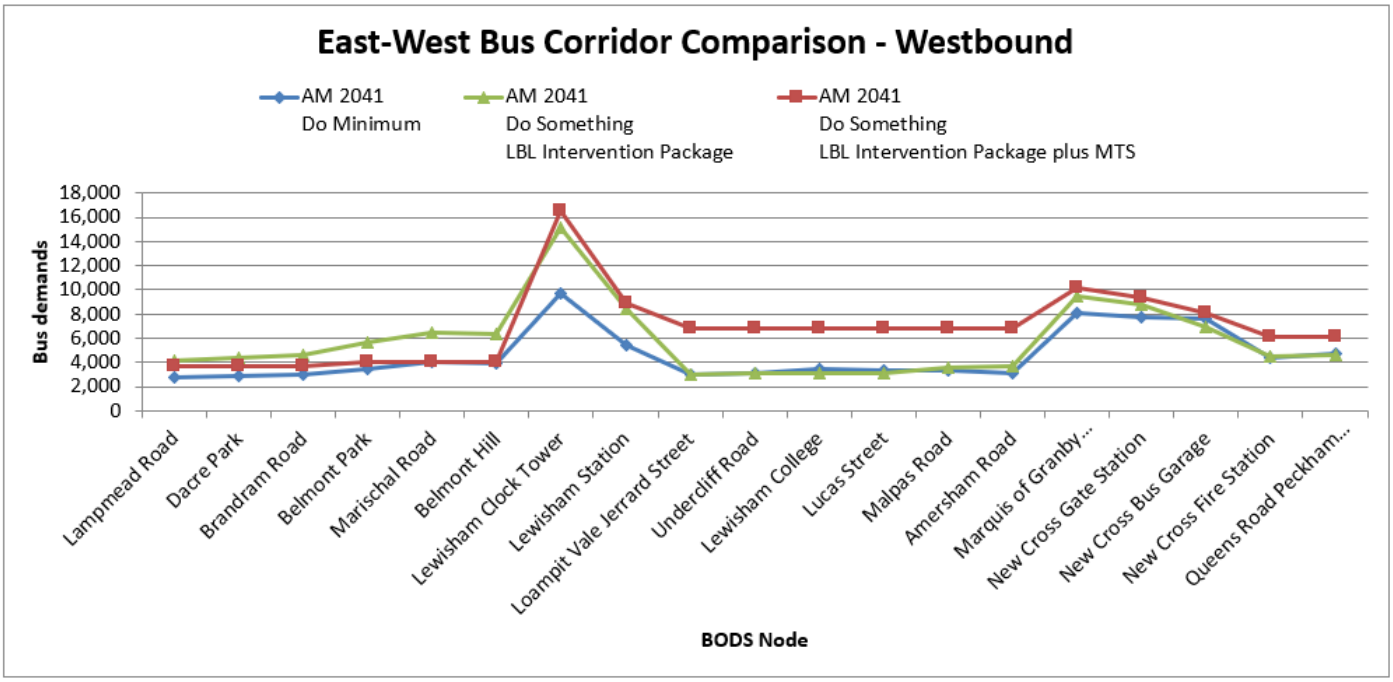


Figure 35: East-West Westbound Bus Corridor Demand Do Minimum and 2041 LBL Intervention Package with and without MTS

Table 20 provides further details of the changes in passengers boarding and alighting at specific bus stops on both the corridors as a result of the 2041 Intervention Package excluding MTS. Overall there is an increase of 17% and 32% in the total boarding and alighting demand across both bus corridors. Bus demand increases at almost all bus stops which correspond to the enhancements in PT interventions in 2041. Lewisham Station has the greatest percentage increase in passengers associated with the increased attractiveness of the station as a result of the Bakerloo Line Extension.

Table 20: Bus Boarders and Alighters Do Minimum and 2041 Do Something LBL Intervention Package

Bus Stop Name	Corridor	Boarders AM 2041 Do Minimum	Boarders AM 2041 Do Something LBL Intervention Package	Boarders Growth (2041)	Boarders %Growth (2041)	Alighters AM 2041 Do Minimum	Alighters AM 2041 Do Something LBL Intervention Package	Alighters Growth (2041)	Alighters %Growth (2041)
Bromley Road Downham Way	North-South	1,127	1,488	361	32%	344	347	3	1%
Old Bromley Road	North-South	77	41	-36	-47%	126	191	65	52%
Green Man Community Hub	North-South	1,036	1,360	324	31%	666	848	182	27%
Southen Lane	North-South	245	137	-108	-44%	127	82	-45	-35%
Bellingham Road	North-South	514	858	344	67%	564	468	-96	-17%
Newquay Road	North-South	1,526	1,667	141	9%	1,045	1,228	183	18%
Inchmery Road	North-South	107	61	-46	-43%	72	42	-30	-42%
Bargery Road	North-South	193	137	-56	-29%	217	155	-62	-29%
Bromley Road Lewisham Town Hall	North-South	909	1,206	297	33%	1,026	1,322	296	29%
The Catford Centre	North-South	1,281	1,392	111	9%	1,120	1,118	-2	0%
Mount Pleasant Road Lewisham	North-South	749	891	142	19%	430	607	177	41%
Lewisham Park	North-South	772	794	22	3%	646	735	89	14%
Morley Road	North-South	476	569	93	20%	241	311	70	29%
Lewisham Centre	North-South	1,751	1,905	154	9%	1,829	2,030	201	11%
Lewisham Clock Tower	North-South	2,150	2,827	677	31%	2,613	3,710	1,097	42%
Lewisham Station	North-South	75	341	266	355%	262	957	695	265%
Blackheath Rise	North-South	15	89	74	493%	68	92	24	35%
Sparta Street	North-South	10	26	16	160%	11	66	55	500%
Queens Road Peckham Station	East-West	1,306	1,486	180	14%	1,531	1,469	-62	-4%
New Cross Fire Station	East-West	621	548	-73	-12%	292	398	106	36%
New Cross Bus Garage	East-West	2,348	1,794	-554	-24%	1,862	1,371	-491	-26%
New Cross Gate Station	East-West	3,321	3,541	220	7%	2,759	5,285	2,526	92%
Marquis of Granby Goldsmiths	East-West	1,823	480	-1343	-74%	389	191	-198	-51%
Amersham Road	East-West	361	299	-62	-17%	215	167	-48	-22%
Malpas Road	East-West	289	656	367	127%	450	597	147	33%

Bus Stop Name	Corridor	Boarders AM 2041 Do Minimum	Boarders AM 2041 Do Something LBL Intervention Package	Boarders Growth (2041)	Boarders %Growth (2041)	Alighters AM 2041 Do Minimum	Alighters AM 2041 Do Something LBL Intervention Package	Alighters Growth (2041)	Alighters %Growth (2041)
Lucas Street	East-West	358	869	511	143%	309	445	136	44%
Lewisham College	East-West	322	399	77	24%	399	370	-29	-7%
Undercliffe Road	East-West	695	635	-60	-9%	488	487	-1	0%
Loampit Vale Jerrard Street	East-West	177	110	-67	-38%	251	123	-128	-51%
Lewisham Station	East-West	4,195	6,084	1,889	45%	3,148	5,897	2,749	87%
Lewisham Clock Tower	East-West	2,150	2,827	677	31%	2,613	3,710	1,097	42%
Belmont Hill	East-West	95	130	35	37%	233	48	-185	-79%
Marischal Road	East-West	67	105	38	57%	171	174	3	2%
Belmont Park	East-West	776	1,068	292	38%	822	1,028	206	25%
Brandram Road	East-West	258	470	212	82%	247	370	123	50%
Dacre Park	East-West	254	471	217	85%	249	366	117	47%
Lampmead Road	East-West	243	504	261	107%	40	127	87	218%
Not applicable	**Total**	**32,672**	**38,265**	**5,593**	**17%**	**27,875**	**36,932**	**9,057**	**32%**

Table 21 provides further details of the changes in passengers boarding and alighting at specific bus stops on both the corridors as a result of the 2041 Intervention Package including MTS. Overall there is an increase of 38% and 50% in the total boarding and alighting demand across both bus corridors. Bus demand increases at almost all bus stops which correspond to the enhancements in PT interventions in 2041. Lewisham Station has the greatest percentage increase in passengers associated with the increased attractiveness of the station as a result of the Bakerloo Line Extension. The increases in bus passengers with MTS are significantly higher compared the scenario without it.

Table 21: Bus Boarders and Alighters Do Minimum and 2041 Do Something LBL Intervention Package Plus MTS

Bus Stop Name	Corridor	Boarders AM 2041 Do Minimum	Boarders AM 2041 Do Something LBL Intervention Package	Boarders Growth (2041)	Boarders %Growth (2041)	Alighters AM 2041 Do Minimum	Alighters AM 2041 Do Something LBL Intervention Package	Alighters Growth (2041)	Alighters %Growth (2041)
Bromley Road Downham Way	North-South	1,127	1,749	622	55%	344	421	77	22%
Old Bromley Road	North-South	77	32	-45	-58%	126	192	66	52%
Green Man Community Hub	North-South	1,036	1,443	407	39%	666	917	251	38%
Southen Lane	North-South	245	134	-111	-45%	127	90	-37	-29%
Bellingham Road	North-South	514	857	343	67%	564	664	100	18%
Newquay Road	North-South	1,526	1,655	129	8%	1,045	1,214	169	16%
Inchmery Road	North-South	107	56	-51	-48%	72	38	-34	-47%
Bargery Road	North-South	193	152	-41	-21%	217	170	-47	-22%
Bromley Road Lewisham Town Hall	North-South	909	1,164	255	28%	1,026	1,950	924	90%
The Catford Centre	North-South	1,281	1,325	44	3%	1,120	1,168	48	4%
Mount Pleasant Road Lewisham	North-South	749	924	175	23%	430	633	203	47%
Lewisham Park	North-South	772	779	7	1%	646	712	66	10%
Morley Road	North-South	476	651	175	37%	241	383	142	59%
Lewisham Centre	North-South	1,751	2,106	355	20%	1,829	1,951	122	7%
Lewisham Clock Tower	North-South	2,150	3,081	931	43%	2,613	4,283	1,670	645
Lewisham Station	North-South	75	529	454	605%	262	1,468	1,206	460%
Blackheath Rise	North-South	15	91	76	507%	68	99	31	46%
Sparta Street	North-South	10	25	15	150%	11	68	57	518%
Queens Road Peckham Station	East-West	1,306	1,749	443	34%	1,531	1,742	211	14%
New Cross Fire Station	East-West	621	571	-50	-8%	292	427	125	43%
New Cross Bus Garage	East-West	2,348	1,864	-484	-21%	1,862	1,399	-463	-25%
New Cross Gate Station	East-West	3,321	5,233	1,912	58%	2,759	5,742	2,983	108%
Marquis of Granby Goldsmiths	East-West	1,823	1,874	51	3%	389	658	269	69%
Amersham Road	East-West	361	315	-46	-13%	215	245	30	14%
Malpas Road	East-West	289	538	249	86%	450	626	176	39%

Bus Stop Name	Corridor	Boarders AM 2041 Do Minimum	Boarders AM 2041 Do Something LBL Intervention Package	Boarders Growth (2041)	Boarders %Growth (2041)	Alighters AM 2041 Do Minimum	Alighters AM 2041 Do Something LBL Intervention Package	Alighters Growth (2041)	Alighters %Growth (2041)
Lucas Street	East-West	358	676	318	89%	309	422	113	37%
Lewisham College	East-West	322	392	70	22%	399	447	48	12%
Undercliffe Road	East-West	695	618	-77	-11%	488	522	34	7%
Loampit Vale Jerrard Street	East-West	177	122	-55	-31%	251	119	-132	-53%
Lewisham Station	East-West	4,195	7,834	3,39	87%	3,148	6,220	3,072	98%
Lewisham Clock Tower	East-West	2,150	3,081	931	43%	2,613	4,283	1,670	64%
Belmont Hill	East-West	95	103	8	8%	233	159	-74	-32%
Marischal Road	East-West	67	113	46	69%	171	183	12	7%
Belmont Park	East-West	776	1,149	373	48%	822	1,139	317	39%
Brandram Road	East-West	258	551	293	114%	247	433	186	75%
Dacre Park	East-West	254	716	462	182%	249	476	227	91%
Lampmead Road	East-West	243	682	439	181%	40	180	140	350%
Not applicable	**Total**	**32,672**	**44,934**	**12,262**	**38%**	**27,875**	**41,833**	**13,958**	**50%**

Station Demand at Lewisham

Figure 36 shows that in the 2041 LBL Intervention Packages, with and without MTS, station demand in Lewisham increases significantly when compared with the Do Minimum. This is a result of the Bakerloo Line Extension which is increasing passenger demand at the station, especially entries and interchangers in the AM peak. With MTS passengers at Lewisham Station increase and most significantly the passengers interchanging which is a result of the MTS metroisation improvements.

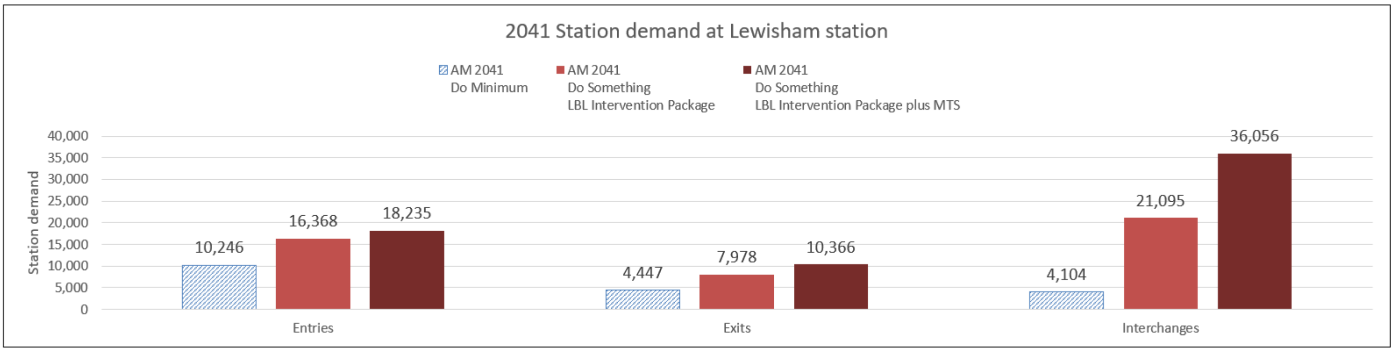


Figure 36: Lewisham Station Demand in 2041 Do Something LBL Intervention Test with and without MTS

8. ELHAM Analyses of 2041 Lewisham Intervention Package (No MTS)

Standard outputs from ELHAM assignments of 2041 Intervention Tests are extracted and compared with 2041 AM Reference Case scenario. The analyses assess whether the Intervention Package successfully addresses issues identified in the Funded scenarios. Assessment is based on the change in actual flow, delay and journey times.

Actual Flow

Figure 37 and Figure 38 show actual traffic flow difference and actual flow percentage difference between the 2041 AM peak Do Minimum and Do Something LBL Intervention Package scenarios (No MTS), respectively.

In the north of the Borough the impact of the schemes varies. Generally, there is a reduction in traffic flow on the roads altered by the proposed schemes. Notable reductions in traffic flow are observed on the A2 New Cross Road, where capacity is restricted due to changes in road space allocation and the CS4 scheme. At the most affected point, the reduction in two-way traffic flow is high. Changes of **-615 pcu/hr** are observed on the A2. Increases in traffic flow are most prominent on the local road network linking to the A2 and A200; namely, Deptford High Street, Deptford Church Street and the B218. The increase in traffic flow on these roads ranges between **+60 pcu/hr** to **+247 pcu/hr** as a result of traffic rerouting from the A2 and A200.

In the centre of the Borough, the majority of decreases in traffic flow occur on the A20 around Lewisham High Street, and the local roads in Hither Green, Crofton Park and Perry Vale. The reallocation of road space and the additional vehicle filters in place results in a significant decrease in two-way traffic flow at these locations. Notable reductions include a **-565 pcu/hr** reduction on Leahurst Road and a **-439 pcu/hr** reduction on Crofton Park Road. Consequently, traffic flow increases on alternative routes, such as Hither Green Lane and the B218 and B236 in Crofton Park. A notable increase exists on the B218, where a two-way increase of **+592 pcu/hr** is observed as a result of a vehicle filter lane on an adjacent road.

In the south of the Borough, there is a general traffic flow reduction on the A21 and Southend Lane due to road space reallocation. There are flow reductions in the region of **-334 pcu/hr** and **-204 pcu/hr** on each road, respectively. There are also decreases in traffic flow on the A205 around Manor Lane and A212, which connect to Southend Lane. The road space reallocation scheme along Whitefoot Lane results in localised traffic flow increases of up to **+152 pcu/hr** along Bellingham Road and of up to **+118 pcu/hr** along Whitefoot Lane itself.

The Catford Gyratory scheme results in traffic flow reductions due to the consequential delays created by the 6-stage signals at its main junction. Flow reductions as high as **-747 pcu/hr** are observed on the eastbound gyratory. There are isolated occurrences of traffic flow increases on the Catford Gyratory, where increases of up to **+365 pcu/hr** are observed. This change is a result of the gyratory being converted from one-way to two-way working; therefore, the traffic flow is zero in one direction in the Do Minimum model.

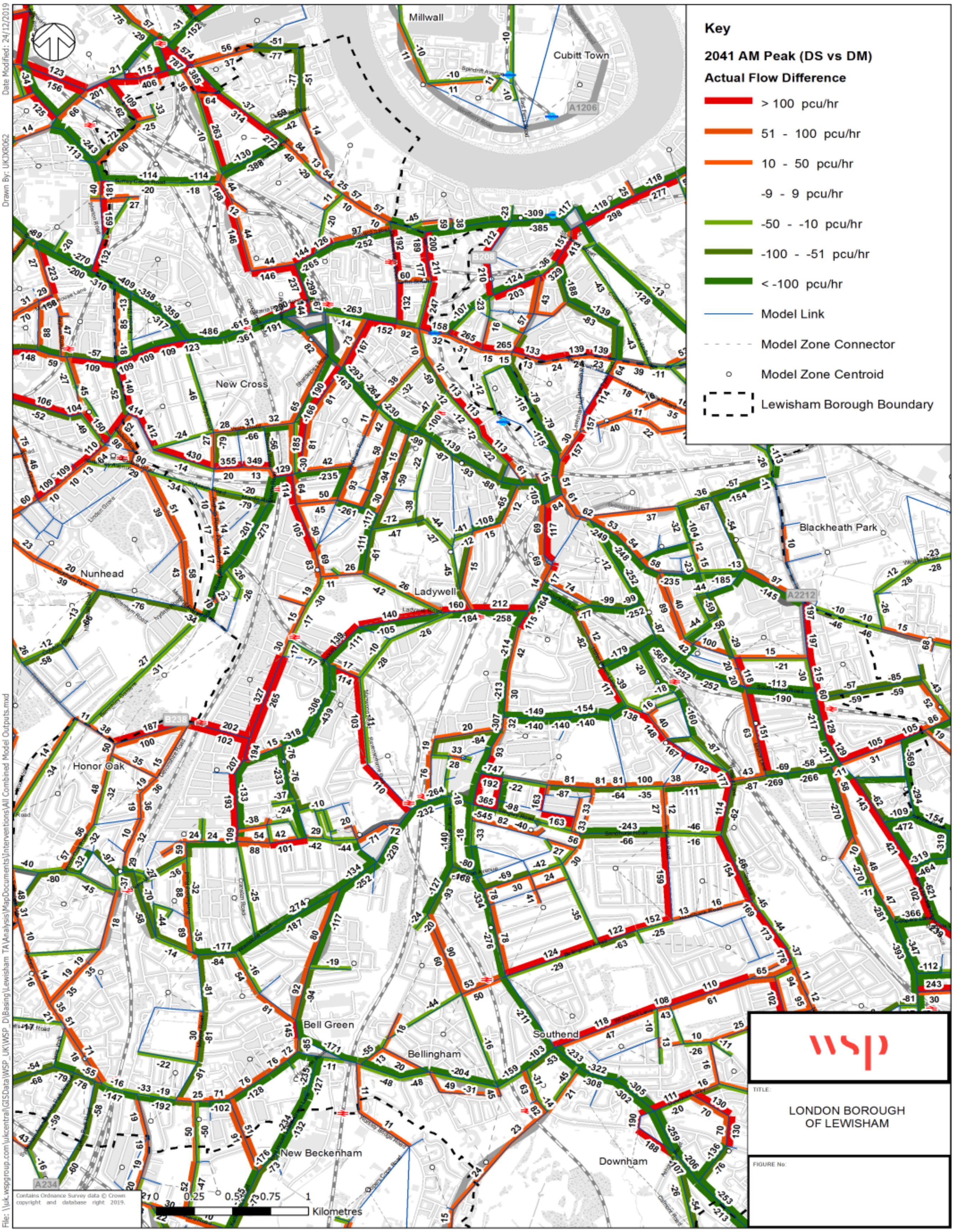


Figure 37: Actual Flow Difference (Do Something (No MTS) vs Do Minimum)

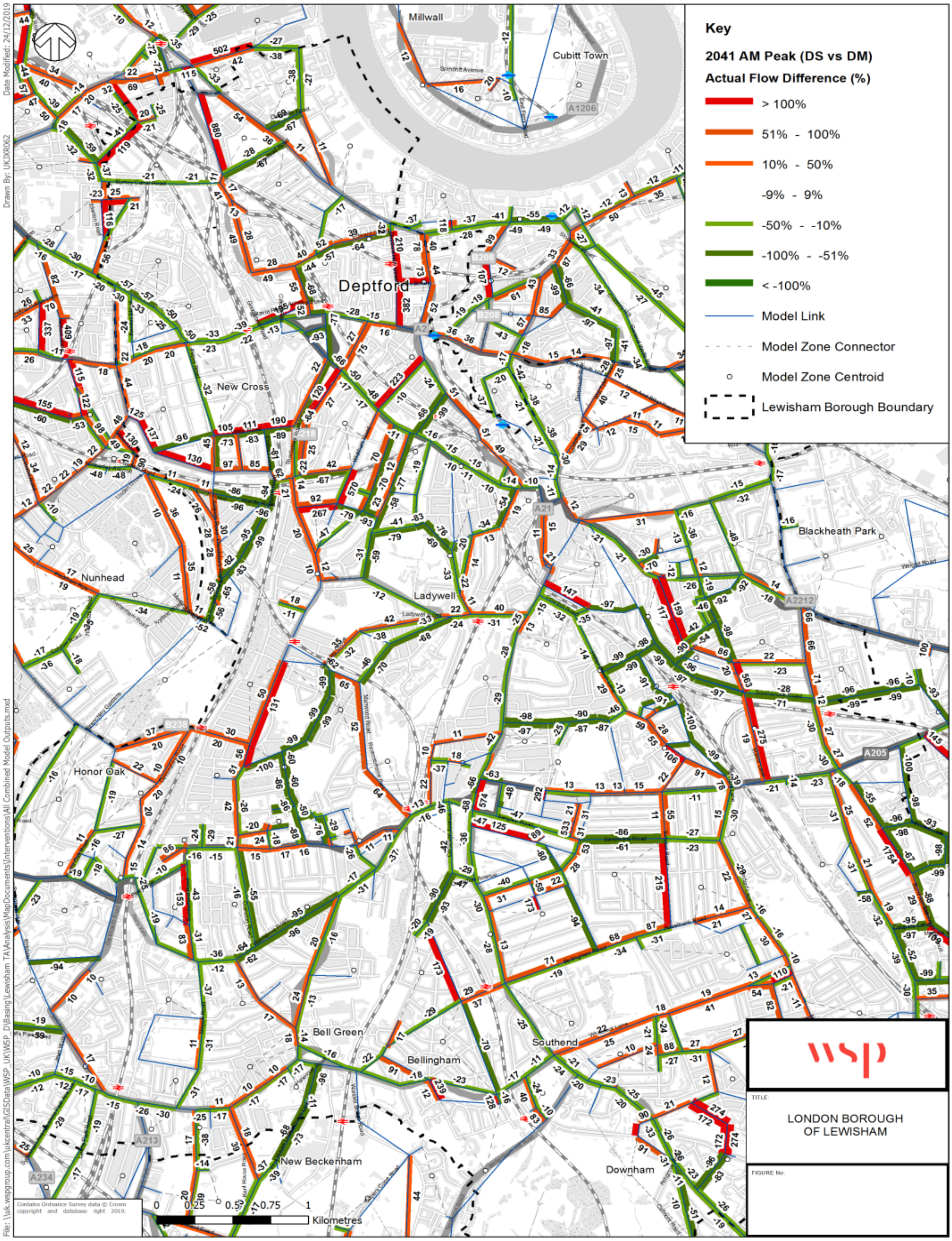


Figure 38: Actual Flow % Difference (Do Something (No MTS) vs Do Minimum)

Delay

Figure 39 shows the delay difference between the 2041 AM peak Do Minimum and Do Something (No MTS) models.

Delay differences across the Borough are mainly present in four distinct locations, which include the New Cross gyratory in Deptford, the Catford Gyratory, and the A205 in Lee. There are also a number of roads where increased delay occurs in Southend, Bell Green, and Honour Oak.

The reconfiguration of the New Cross gyratory in Deptford in the Do Something models features a two-way working system on the northern arm. As a result, the reconfiguration has increased delays at the signalised junctions around the gyratory. The maximum delay increase observed on the gyratory is +**202 seconds**. The A2 scheme, which connects to the New Cross gyratory, also causes delays on a number of the connecting roads in the area. The model results indicate that further refinements to the A2 and the New Cross gyratory scheme are required.

A concentration of delay increases is observed around the Catford Gyratory, where as previously discussed, the 6-stage method of control at the main Catford Gyratory junction results in increased delays in the local area. Delays of up to an additional **+246 seconds** are observed on the A205 eastbound towards the junction gyratory. There are some slight decreases in journey time on the northbound and eastbound gyratory; however, these decreases are relatively minor when compared with overall junction delay. This indicates that further refinements to the Catford Gyratory scheme are required.

Significant delay occurs on the A205 in Lee in the Do Something models where a vehicle filter has been put in place. As a result, a delay of **+855 seconds** is observed on the A205 near the junctions with the A2212. The filter also causes a delay on various other roads connecting to the A205 in the Lee area. It is considered that further analyses of signal timings are required at the A205/A2212 junctions.

The locations where increased delay occurs in Southend, Bell Green and Honour Oak are attributed to the Whitefoot and Southend Lane scheme and the additional vehicle filters in each respective area. The reallocation of road space on Whitefoot Lane results in an increase in delay of **+27 seconds** on the most affected section of the road. Discussed previously in terms of increases in actual traffic flow, the vehicle filter on Codrington Hill results in a combined two-way delay increase of **+163 seconds** on the B218, which acts as the closest alternative route. This highlights the impact the reallocation of road space and vehicle rerouting has on the surrounding highway network.

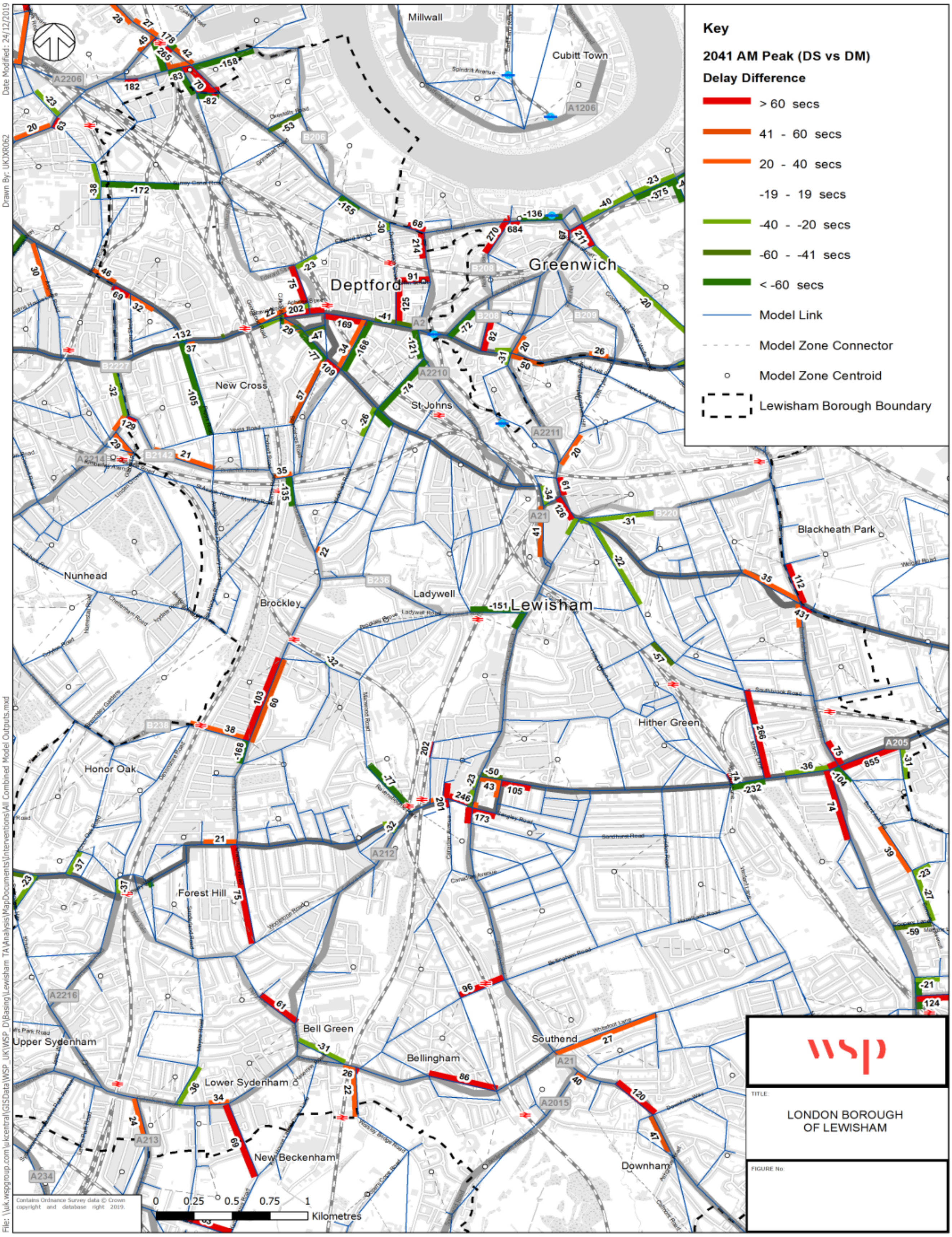


Figure 39: Delay Difference (Do Something (No MTS) vs Do Minimum)

Journey Times

TfL's ELHAM journey time routes have been selected to ascertain the extent to which journey times change because of flow increases/decreases across the Borough. A new bespoke route has also been created for this study along Whitefoot Lane and Southend Lane. The routes are shown in Figure 40.

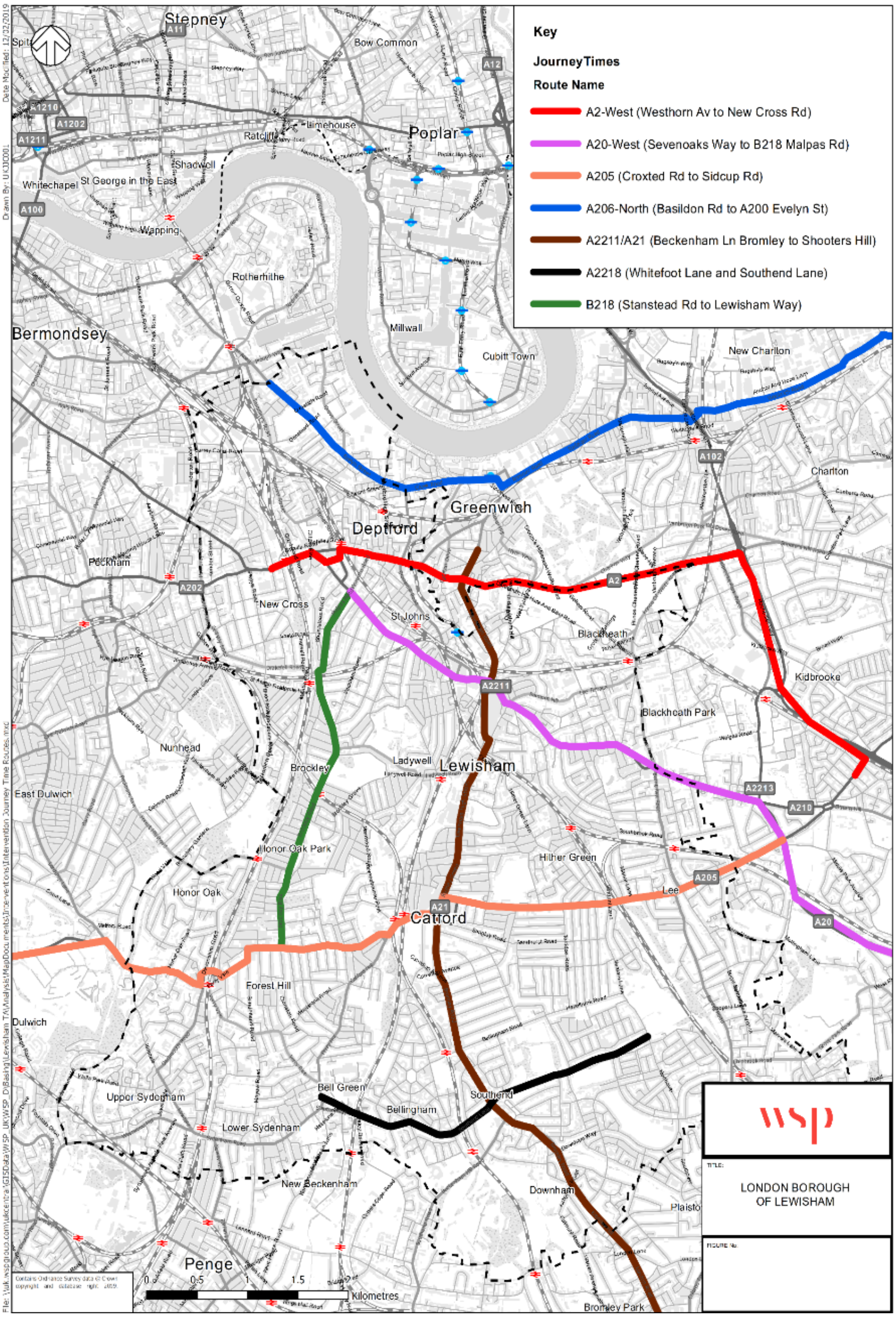


Figure 40: Journey Time Routes

Table 22 shows a comparison of the journey times along these routes in the Do Minimum and Do Something models.

Table 22: Modelled Journey Times

Route	Direction	Modelled Journey Time (s) DM	Modelled Journey Time (s) DS (No MTS)	Modelled Journey Time (s) Diff. (DS (No MTS) vs DM)	Modelled Journey Time (s) % Diff. (DS (No MTS) vs DM)
B218 (Stanstead Rd to Lewisham Way)	NB	1,165	987	**-178**	**-15%**
B218 (Stanstead Rd to Lewisham Way)	SB	912	971	**+59**	**+6%**
A2211/A21 (Beckenham Ln Bromley to Shooters Hill)	NB	1,673	1,979	**+306**	**+18%**
A2211/A21 (Beckenham Ln Bromley to Shooters Hill)	SB	1,519	1,948	**+429**	**+28%**
A206-North (Basildon Rd to A200 Evelyn St)	NB	3,964	3,686	**-278**	**-7%**
A206-North (Basildon Rd to A200 Evelyn St)	SB	2,339	2,616	**+276**	**+12%**
A2-West (Westhorn Av to New Cross Rd)	NB	2,316	2,878	**+562**	**+24%**
A2-West (Westhorn Av to New Cross Rd)	SB	1,431	1,764	**+334**	**+23%**
A20-West (Sevenoaks Way to B218 Malpas Rd)	EB	2,158	2,106	**-52**	**-2%**
A20-West (Sevenoaks Way to B218 Malpas Rd)	WB	2,779	3,205	**+426**	**+15%**
A205 (Croxted Rd to Sidcup Rd)	EB	2,234	2,427	**+192**	**+9%**
A205 (Croxted Rd to Sidcup Rd)	WB	2,802	3,372	**+570**	**+20%**
A2218 (Whitefoot Lane and Southend Lane)	EB	670	737	**+67**	**+10%**
A2218 (Whitefoot Lane and Southend Lane)	WB	794	924	**+130**	**+16%**

Route	Direction	Modelled Journey Time (s) DM	Modelled Journey Time (s) DS (No MTS)	Modelled Journey Time (s) Diff. (DS (No MTS) vs DM)	Modelled Journey Time (s) % Diff. (DS (No MTS) vs DM)
Total	**All**	**26,757**	**29,600**	+2,843	**+11%**

Table 22 shows that 11 out of the 14 routes experience a journey time increase between the Do Minimum and Do Something models. The total increase across all routes is **+11%.** Due to the delays introduced around the New Cross area in the Do Something model, the A2 experiences journey time increases as high as **24%.** Larger still, the A21 corridor sees a journey time increase as high as **28%** due to the negative impact of the Catford Gyratory scheme on journey times.

9. ELHAM Analyses of 2041 Lewisham Intervention Package (with MTS)

Introduction

In February 2020, WSP was tasked by the London Borough of Lewisham (LBL) to carry out Stage 4 of the study, which similarly to previous stages, looks at the highway impact of a series of interventions across the Borough, but this time also using highway matrices from a scenario with Road User Charging (RUC) as part of the Mayor's Transport Strategy (MTS). This scenario is referred to hereon in as the MTS scenario and contains all the highway interventions being tested in the Do Something (No MTS) scenario (discussed in Chapter 8).

As before, the latest version of Transport for London's (TfL's) 2041 West London Highway Assignment Model (ELHAM) has been used to model the impact if all the schemes were combined. It reflects 2041 AM peak network conditions and traffic. This model is referred to hereon in as the Do Minimum scenario, since it does not include any of the highway interventions being tested and nor does it include RUC.

The scenario containing the schemes (but with no RUC) is referred to hereon in as the Do Something (No MTS) scenario. It was created by adding the schemes to the Do Minimum model (TfL's 2041 Reference Case model).

To assess the impact of the scheme, this chapter considers:

- Flow differences between the MTS and Do Something (No MTS), and between the MTS and Do Minimum models.
- Delay differences between the MTS and Do Something (No MTS), and between the MTS and Do Minimum models.
- Journey time differences between the MTS and Do Something (No MTS), and between the MTS and Do Minimum models.

Model Files

The 2041 forecast year ELHAM network files (version E3.09) were provided to WSP by TfL and included the following AM peak highway assignment files:

- E3_FY41_V149NET_LP08_AM.UFS

- E3_FY41_V149NET_LP08_AMq.UFS

As outlined in the *"ELHAM Base Year Model Fact Sheet v3.9a"* (TfL) the model with 'q' in its title represent the PASSQ assignment which is a pre-load assignment.

Matrix Totals

Table 23 presents the matrix totals for the AM peak i.e. the size of the matrices. Note, that these are the matrix totals for whole model and not specifically for the London Borough of Lewisham since this is not a headline statistic that the software, SATURN, can provide i.e. matrix totals at Borough level.

Table 23: Matrix Totals

Modelling Scenario	Matrix Total	Difference	% Difference
2041 Reference Case (Do Minimum)	6,245,725	Not applicable	Not applicable
2041 Do Something (No MTS)	6,242,680	Ref. Case: - 3,045	Ref. Case: - 0.05%
2041 MTS	6,013,067	Ref. Case: - 232,658 DS: - 229,613	Ref. Case: - 3.73% DS: -3.68%

Table 23 shows that the matrices behind the MTS scenario are approximately 3.7% smaller than the matrices behind the Do Minimum and Do Something scenarios which makes sense given that the MTS scenario includes RUC and hence a lower number of vehicles on the highway network.

The Highway Schemes

The highway schemes included are consistent with that shown in Figure 9 with the additional of the MTS RUC proposals.

Actual Flow Difference

2041 MTS Scenario vs Do Minimum

Figure 41 shows actual traffic flow difference between the 2041 MTS and the Do Minimum scenario, relative to the Do Minimum scenario i.e. a negative traffic flow difference on a certain link means that the flow in the MTS scenario is lower than that in the Do Minimum scenario.

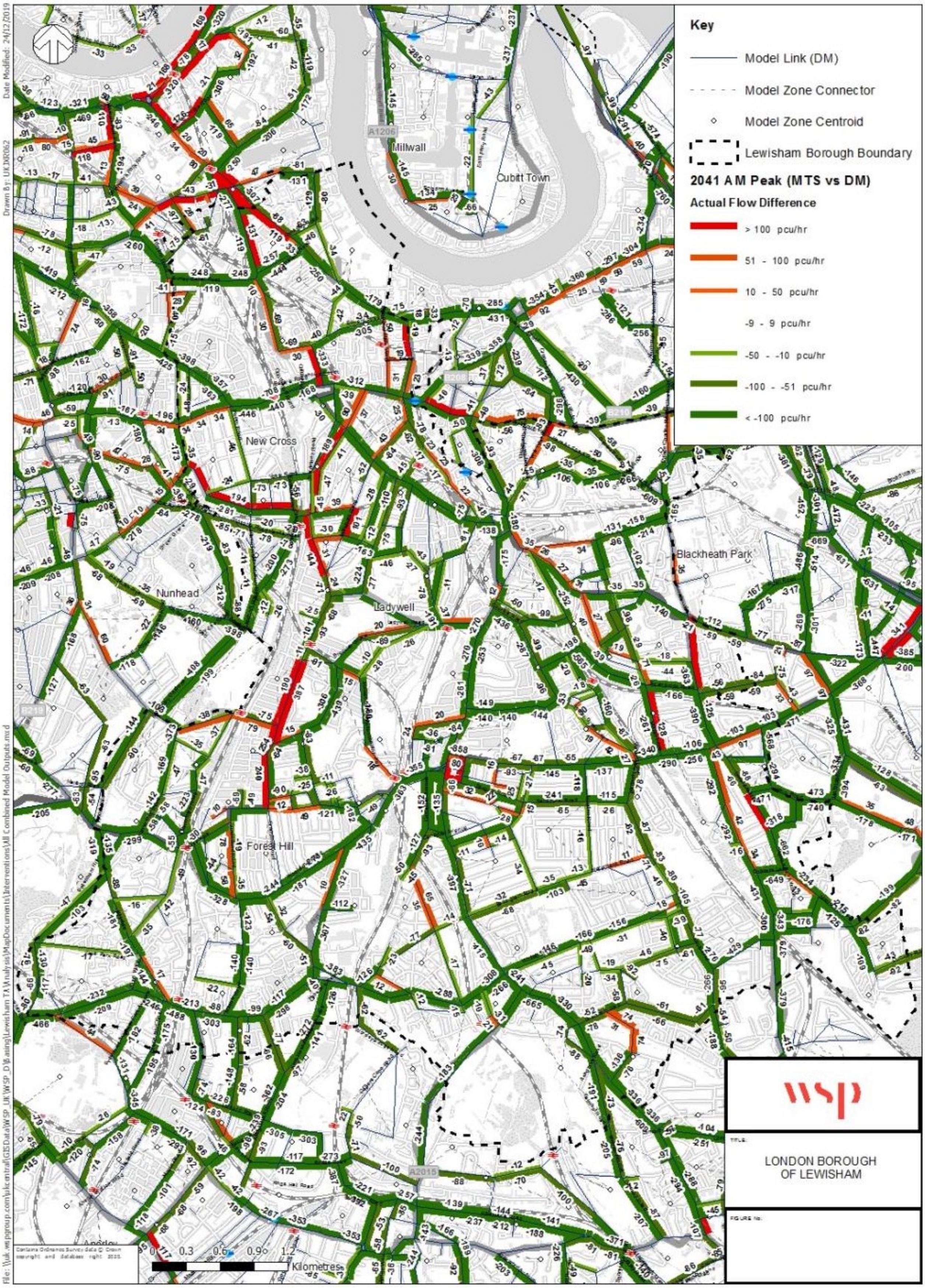


Figure 41: Actual Flow Difference (2041 MTS Scenario vs Do Minimum)

In general, there is a reduction in actual flow between the MTS and the Do Minimum scenario across the whole Borough. However, there are areas on the network in the north of the borough which experience an increase in traffic flow between the two scenarios. The RUC contained within the MTS scenario results in a significant decrease in flow on key routes within the Borough including, the A21, the A20 and the A2. Furthermore, a decrease in flow is observed at the Catford Gyratory and at the New Cross Gyratory.

In the north of the Borough, traffic flow reductions up to **-716 pcu/hr** are observed on the A200. Although not visualised on the figure, there are traffic flow decrease which exceed **-500 pcu/hr** on the A20. Furthermore, there are significant decreases which exceed **-1,000 pcu/hr** on the A2 to the west of the New Cross gyratory**;** however, to the east of the gyratory the traffic reduction is far less pronounced, and there are also some sections of the A2 where traffic low marginally increases between the two scenarios.

Traffic flow decreases up to **-858 pcu/hr** are observed on the Catford Gyratory and up to **-573 pcu/hr** on the A21 to the north of the gyratory. There are some increases in traffic flow on the clockwise movement of the gyratory; however, these are marginal when the overall actual flow increase is considered. The majority of the unclassified residential roads in the Brockley, Hither Green, Deptford and Blackheath areas in the north of the Borough experience a decrease in actual traffic flow between the two scenarios. However, a significant increase in traffic flow of **577 pcu/hr** is observed on the B218, which acts as an alternative route for traffic diverting from the A21.

In the south of the Borough, generally traffic flow decreases on all routes between the two scenarios. Only minor increases in traffic flow are observed on isolated roads within the area. Significant reductions in traffic flow occur on the A21 to the south of the Catford Gyratory, where traffic flow decreases up to **-945 pcu/hr.** Further reductions in traffic flow are also observed on the Whitefoot/Southend Lane corridor, where traffic flow decreases up to **-215 pcu/hr** and **-574 pcu/hr** are observed on each route, respectively.

2041 MTS Scenario vs Do Something

Figure 42 shows actual traffic flow difference between the 2041 MTS and the Do Something scenario, relative to the Do Something scenario i.e. a negative traffic flow difference on a certain link means that the flow in the MTS scenario is lower than that in the Do Something scenario.

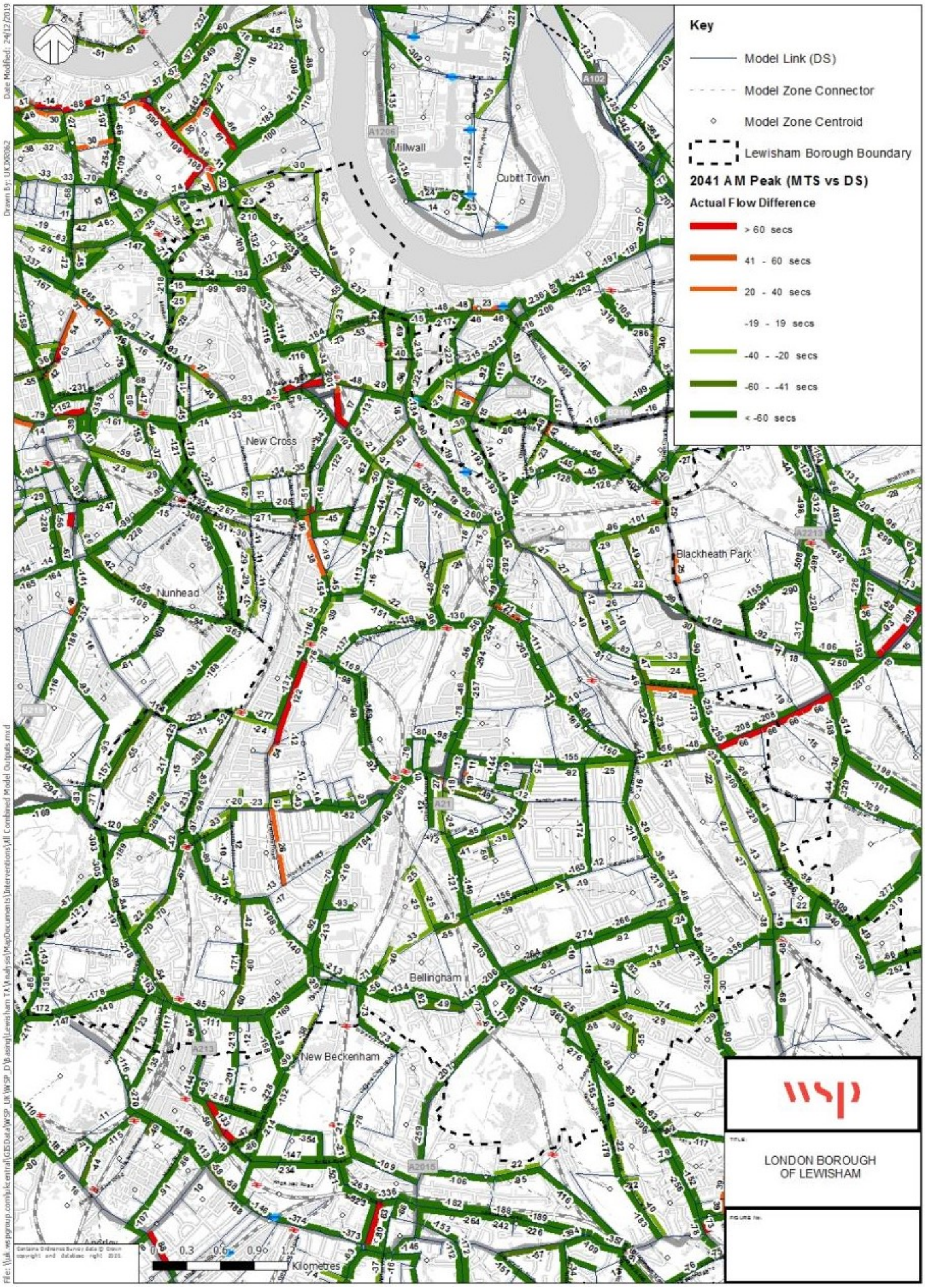


Figure 42: Actual Flow Difference (2041 MTS Scenario vs Do Something)

In general, there is a reduction in actual flow between the MTS and the Do Something scenario across the whole Borough. The only increases in traffic flow between the two scenarios are minor increases in isolated roads within the borough. As a result, there is a reduction in traffic flow on all the roads altered by the proposed schemes in the Do Something scenario. However, there is an decrease in flow on the Catford Gyratory.

In the north of the Borough, there are traffic flow reductions between the MTS Scenario and the Do Something scenario. The road space reallocation along the A2209, A2210 and A21 results in traffic flow reductions along the route. Traffic flow decreases up to **-494 pcu/hr** are observed on the A200, and although they are not visualised on the corresponding figure, there are traffic flow decreases up to **-500 pcu/hr** and **-341 pcu/hr** on the A2 and A20, respectively. There is a notable increase in traffic flow along New Cross Road, where reconfiguration to the gyratory is proposed as part of the A2 scheme. As a result of the proposals traffic flow is anticipated to increase between the two scenarios by up to **188 pcu/hr** on the section of New Cross Road which forms part of the gyratory. However, no further increases are observed along the A2 beyond this section.

Traffic flow decreases are observed on all movements on the Catford Gyratory. Although not visualised on the figure, there are decreases up to **-223 pcu/hr** on the gyratory itself and decreases up to **-350 pcu/hr** on the A21 to the north of the gyratory. The changes in traffic flow between the two scenarios are a result of the junction being converted from one-way to two-way working in the Do Something scenario. The majority of the unclassified residential roads in the area surrounding the gyratory experience a decrease in actual traffic flow between the two scenarios. As a result, any increases in flow on the roads contained within the Brockley, Hither Green, Deptford and Blackheath areas of the borough are isolated events.

In the south of the Borough, traffic flow generally decreases between the two scenarios on the routes altered by the tested schemes. Significant decreases in flow are observed on the A21 and Whitefoot/Southend Lane corridors. Although not visualised in the corresponding figure, traffic flow decreases up to **-419 pcu/hr** and **-412 pcu/hr** are observed on each route, respectively. Traffic on the adjacent roads to each scheme in the wider Perry Green and Bell Green areas of Lewisham also experience a reduction in traffic flow. Isolated pockets of traffic flow increase exist within the south of the Borough; however, the observed increases are very low and sporadic in nature.

Delay Difference

2041 MTS Scenario vs Do Minimum

Figure 43 shows delay difference between the 2041 MTS and the Do Minimum scenario, relative to the Do Minimum scenario i.e. a negative delay difference on a certain link means that the delay in the MTS scenario is lower than that in the Do Minimum scenario.

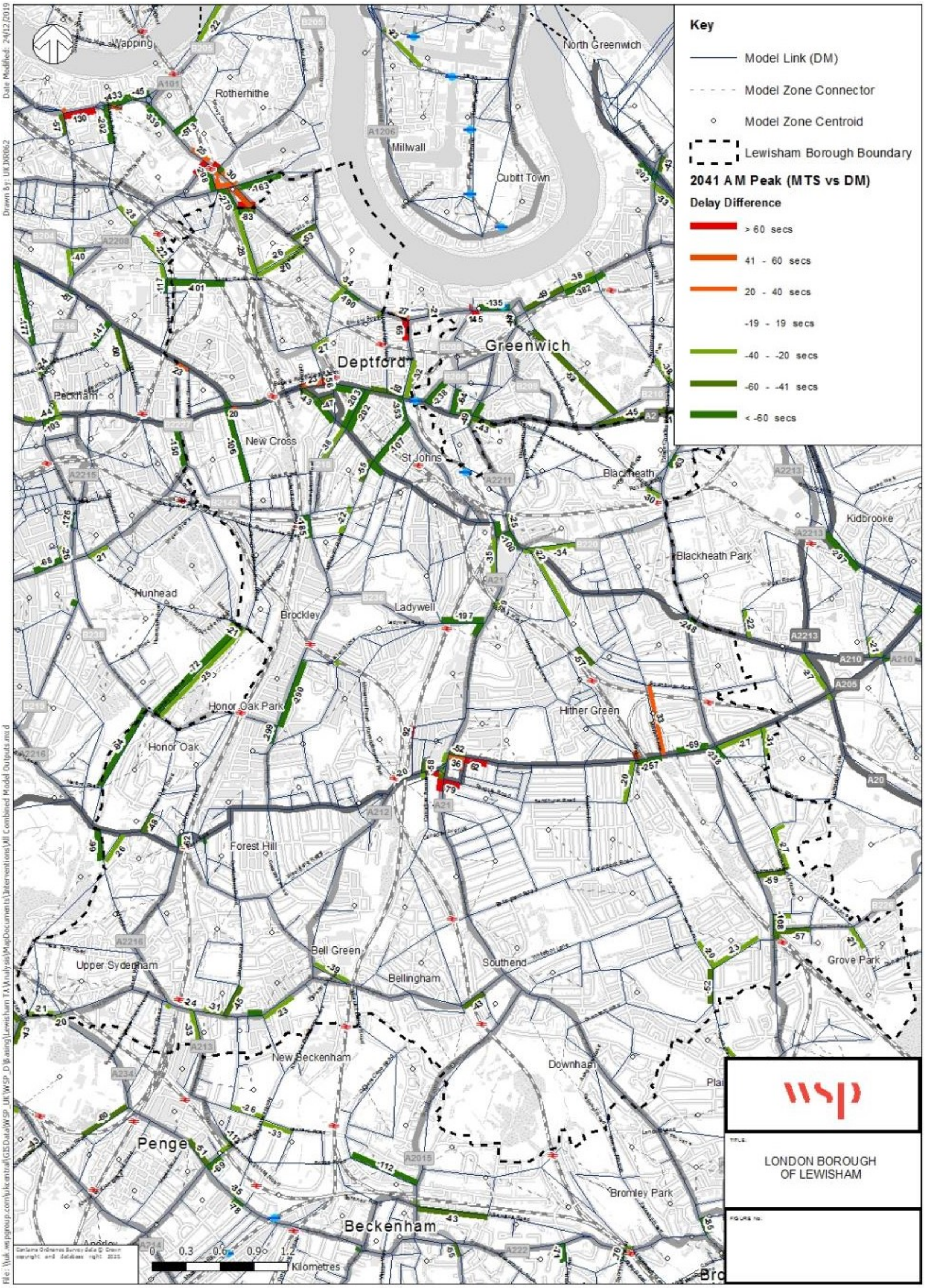


Figure 43: Delay Difference (2041 MTS Scenario vs Do Minimum)

Delay differences across the Borough are mainly present in two distinct locations; the New Cross Gyratory and the Catford Gyratory. At the New Cross Gyratory delay generally decreases on the gyratory itself and on the adjacent road network. A delay decrease of **-47 seconds** and **-405 seconds** is observed on the gyratory itself and on an adjacent road which connects the A2 and the A20, respectively. There is also a marginal amount of delay on the northern most arm of the gyratory, where a delay increases up to **56 seconds** is observed.

Changes in delay also occur on the Catford Gyratory between the two scenarios, where a 6-stage method of control is implemented in the MTS scenario, which incorporates the proposals contained within the Do Something scenario. The highest increase in delay occurs on the southern junction arm in the clockwise direction, where a **73 second** increase in delay is observed. There are also decreases in delay on the junction between the two scenarios, the largest of which is a **-52 second** delay decrease on the northern junction arm in the clockwise direction. Overall, it is considered that there is an increase in delay on the Catford Gyratory between the two scenarios.

Furthermore, there isolated roads throughout the borough where decreases in delay occur. Notable delay decreases are observed on the B218 in Honour Oak, where a delay decrease of **-290 seconds** is observed, and the A205 in Lee, where a delay decrease of **-257 seconds** is observed.

2041 MTS Scenario vs Do Something

Figure 44 shows delay difference between the 2041 MTS Scenario and the Do Something, relative to the Do Something scenario i.e. a negative delay difference on a certain link means that the delay in the MTS scenario is lower than that in the Do Something scenario.

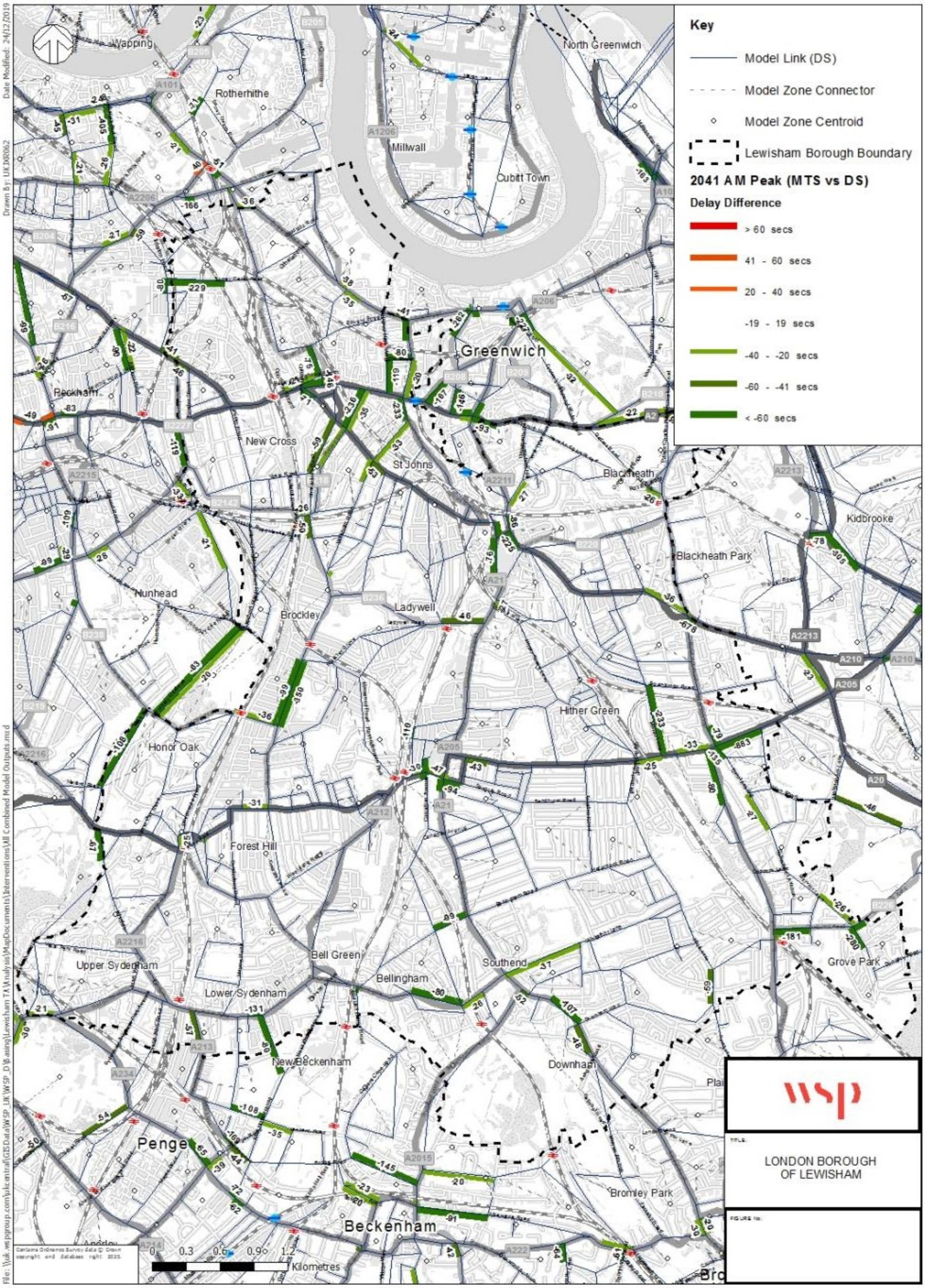


Figure 44: Delay Difference (2041 MTS Scenario vs Do Something)

Delay generally decreases across the Borough between the two scenarios. The decreases in delay are mainly present in three distinct locations; the New Cross Gyratory, the Catford Gyratory and the A205 in Lee. Delay decreases up to **-71 seconds** are observed on the gyratory itself, and delay decreases up to **-271 seconds** are observed on the roads adjacent to the gyratory. Furthermore, decreases in delay are also observed along the roads which connect to the A2, the largest of which results in a decrease of **-233 seconds**. There are no increases in delay on the New Cross Gyratory or the surrounding areas.

Decreases in delay also occur on the Catford Gyratory between the two scenarios, where a 6-stage method of control is implemented in the MTS scenario, which incorporates the proposals contained within the Do Something scenario. The highest increase in delay occurs on the southern junction arm in the clockwise direction, where a **94 second** increase in delay is observed.

A concentration of delay decrease is observed around the A205 in Lee near the junctions with Burnt Ash Hill and Baring Road. The largest reduction in delay in this area occurs on the A205 itself, where a **-883 second** delay decrease is observed. High differences in delay are also observed on the B218 in the Honour Oak area of Lewisham, where a delay decrease of **-449 seconds** is observed. Furthermore, isolated pockets of delay decrease occur on Southend Lane, the largest of which results in a **-80 second** decrease in delay.

Journey Times

TfL's ELHAM journey time routes have been selected to ascertain the extent to which journey times change because of flow increases/decreases across the Borough. A new bespoke route has also been created for this study along Whitefoot Lane and Southend Lane. The routes are shown in Figure 24.

Table 24 shows a comparison of the modelled journey times along these routes in each scenario.

Table 24: Modelled Journey Times

Route	Direction	Modelled Journey Time (s) DM	Modelled Journey Time (s) DS	Modelled Journey Time (s) MTS	Modelled Journey Time (s) Diff. (MTS vs DM)	Modelled Journey Time (s) % Diff. (MTS vs DM)	Modelled Journey Time (s) Diff. (MTS vs DS)	Modelled Journey Time (s) % Diff. (MTS vs DS)
B218 (Stanstead Rd to Lewisham Way)	NB	1,165	987	686	-479	-41%	-301	-30%
B218 (Stanstead Rd to Lewisham Way)	SB	912	971	605	-306	-34%	-366	-38%
A2211/A21 (Beckenham Ln Bromley to Shooters Hill)	NB	1,673	1,979	1,415	-258	-15%	-564	-28%
A2211/A21 (Beckenham Ln Bromley to Shooters Hill)	SB	1,519	1,948	1,423	-96	-6%	-525	-27%
A206-North (Basildon Rd to A200 Evelyn St)	NB	3,964	3,686	2,140	-1825	-46%	-1546	-42%
A206-North (Basildon Rd to A200 Evelyn St)	SB	2,339	2,616	2,086	-253	-11%	-529	-20%
A2-West (Westhorn Av to New Cross Rd)	NB	2,316	2,878	1,336	-980	-42%	-1542	-54%
A2-West (Westhorn Av to New Cross Rd)	SB	1,431	1,764	1,319	-112	-8%	-446	-25%
A20-West (Sevenoaks Way to B218 Malpas Rd)	EB	2,158	2,106	1,640	-519	-24%	-467	-22%
A20-West (Sevenoaks Way to B218 Malpas Rd)	WB	2,779	3,205	1,721	-1057	-38%	-1484	-46%
A205 (Croxted Rd to Sidcup Rd)	EB	2,234	2,427	1,937	-297	-13%	-490	-20%
A205 (Croxted Rd to Sidcup Rd)	WB	2,802	3,372	2,042	-761	-27%	-1331	-39%
A2218 (Whitefoot Lane and Southend Lane)	EB	670	737	614	-56	-8%	-122	-17%
A2218 (Whitefoot Lane and Southend Lane)	WB	794	924	612	-182	-23%	-312	-34%
Total	**All**	**26,757**	**29,600**	**19,576**	**-7,180**	**-27%**	**-10024**	**-34%**

Table 24 shows that all the routes experience a journey time decrease between the MTS scenario and the Do Minimum and the Do Something models. A total decrease of **-27%** and **-34%** occurs between the MTS and the Do Minimum and Do something, respectively which makes sense given the lower traffic flows present on the network in the MTS scenario.

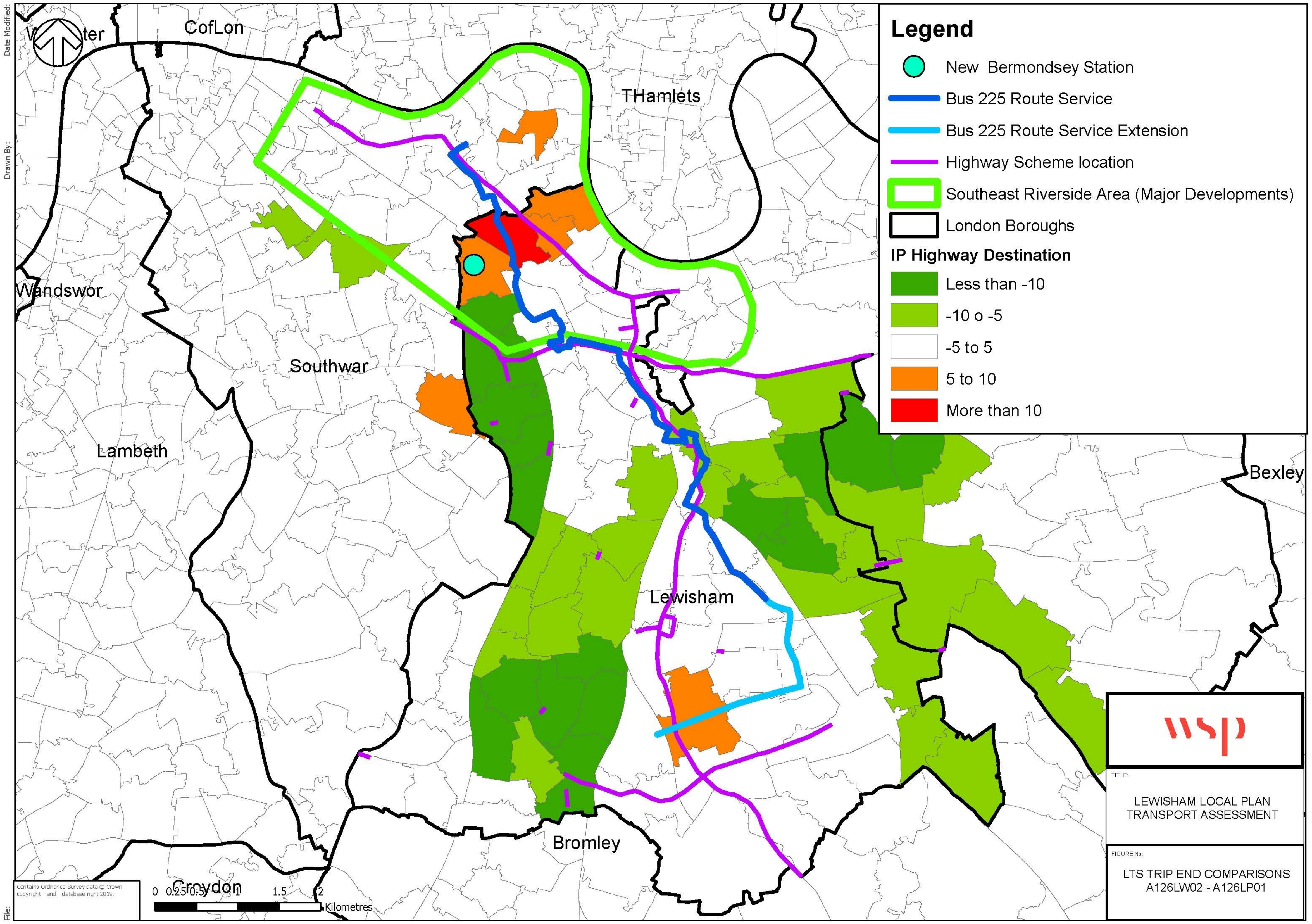
10. Conclusion

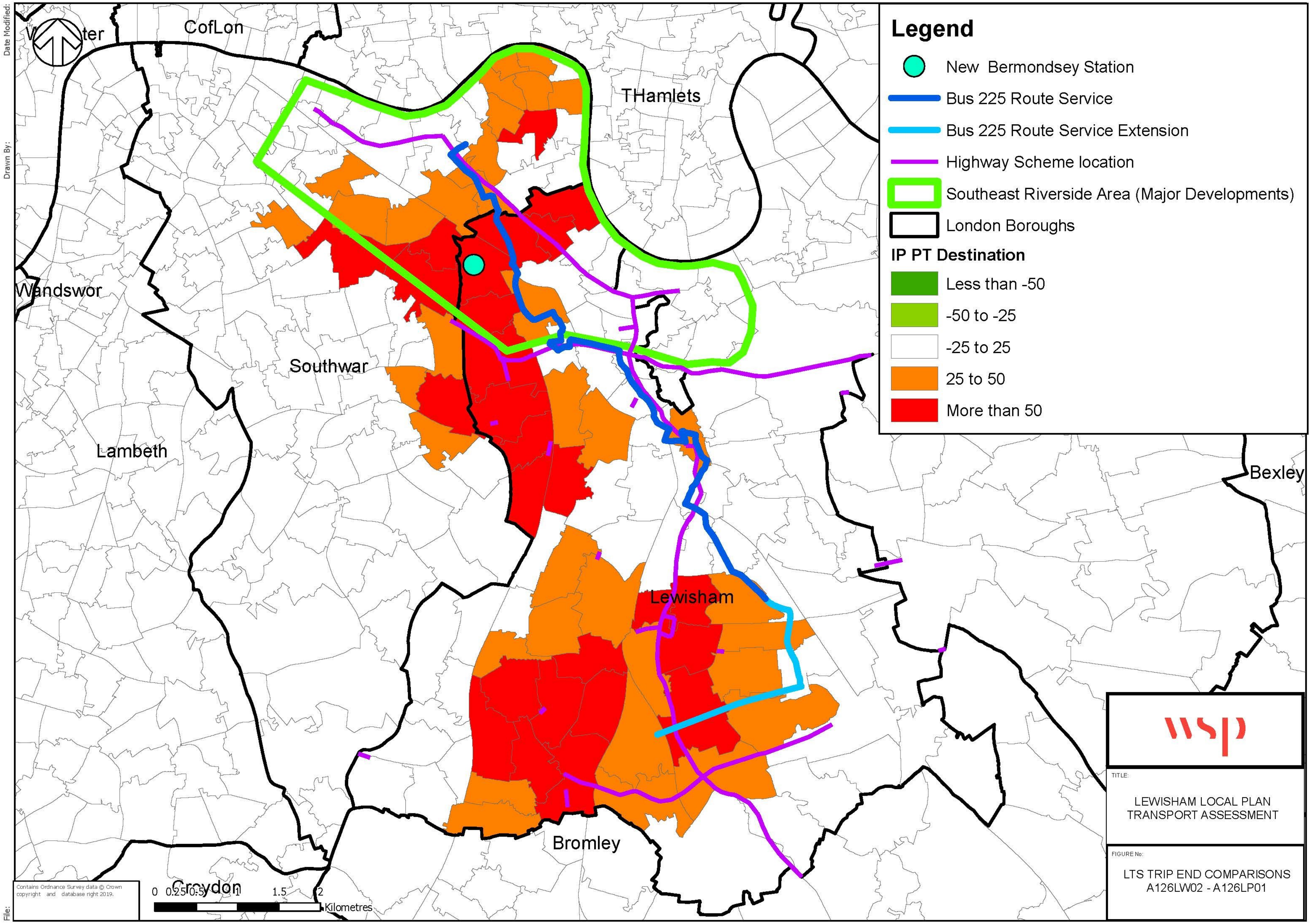
WSP has undertaken a highway impact assessment which compares the 2041 forecast year Do Minimum and Do Something ELHAM assignments against a modelling scenario which incorporates RUC contained within the MTS.

The overall conclusion is that the proposals contained within the MTS scenario result in a reduction in actual traffic flow and delay across the Borough of Lewisham when compared against the Do Minimum and Do Something scenario. Although increases in actual traffic flow and delay are observed in the MTS and Do Minimum comparisons, it is considered that the comparison highlights overall reduction between the two scenarios. Journey times and delays are lower in the MTS scenario than in both the Do Minimum and Do Something scenarios.

The assessment highlights that the MTS proposals have a significant impact on reducing traffic volumes in the London Borough of Lewisham which is quite a step change compared to the impacts that the Lewisham Intervention package has.

Annex A – 2026 PT and Highway Trip End Differences in London Borough of Lewisham For Inter Peak And Evening Peak Periods

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THamlets
Wandswor
Southwar
Lambeth
Lewisham
Bexley
Bromley
Croydon
Legend
New Bermondsey Station
Bus 225 Route Service
Bus 225 Route Service Extension
Highway Scheme location
Southeast Riverside Area (Major Developments)
London Boroughs
IP PT Destination
Less than -50
-50 to -25
-25 to 25
25 to 50
More than 50
0 0.25 0.5 1 1.5 2
Kilometres
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LEWISHAM LOCAL PLAN
TRANSPORT ASSESSMENT
FIGURE No:
LTS TRIP END COMPARISONS
A126LW02 - A126LP01

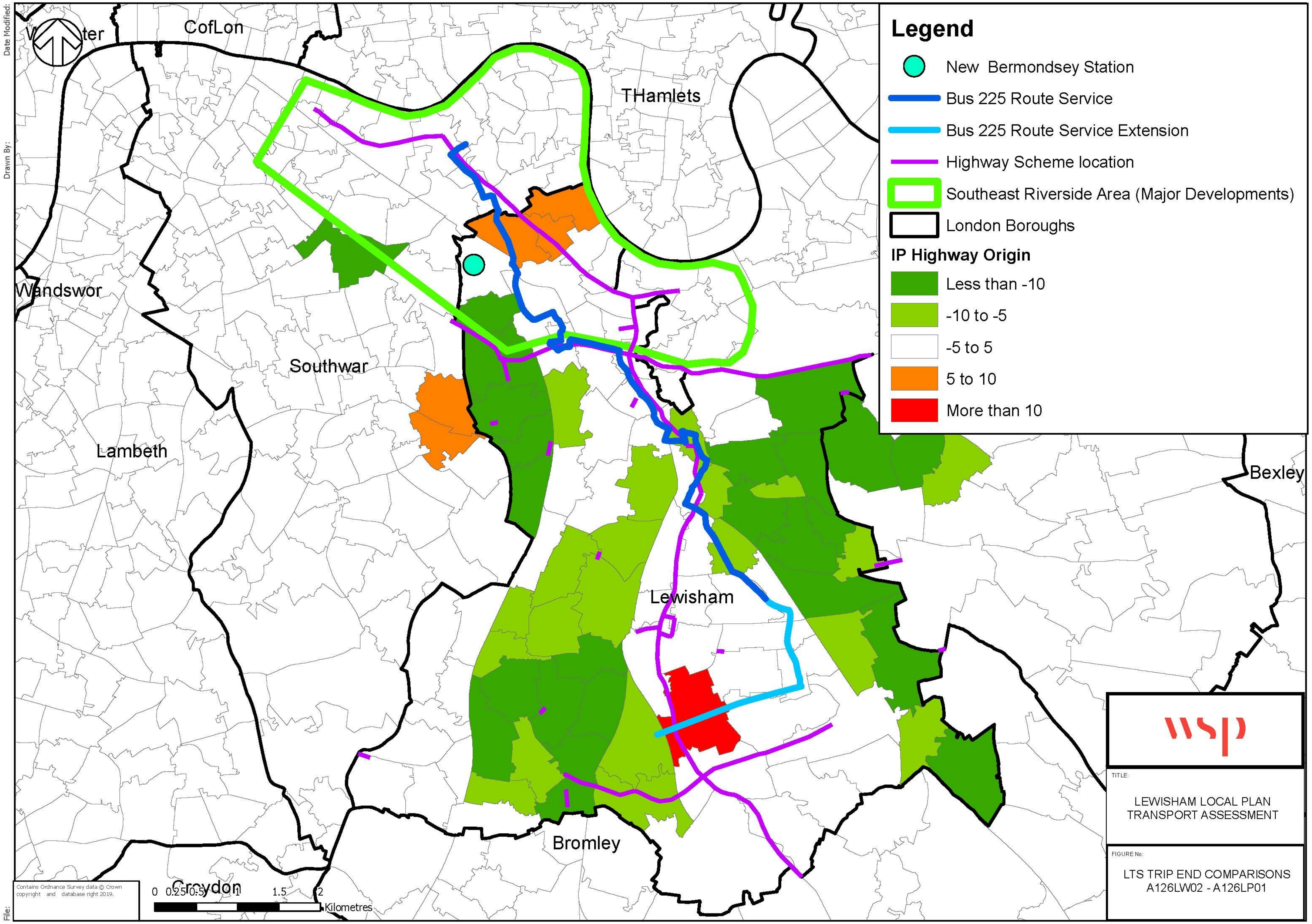
Legend
New Bermondsey Station
Bus 225 Route Service
Bus 225 Route Service Extension
Highway Scheme location
Southeast Riverside Area (Major Developments)
London Boroughs
IP Highway Origin
Less than -10
-10 to -5
-5 to 5
5 to 10
More than 10
CofLon
THamlets
Wandswor
Southwar
Lambeth
Lewisham
Bexley
Bromley
Croydon
0 0.25 0.5 1 1.5 2
Kilometres
Contains Ordnance Survey data © Crown copyright and database right 2019.
TITLE:
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FIGURE No:
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A126LW02 - A126LP01
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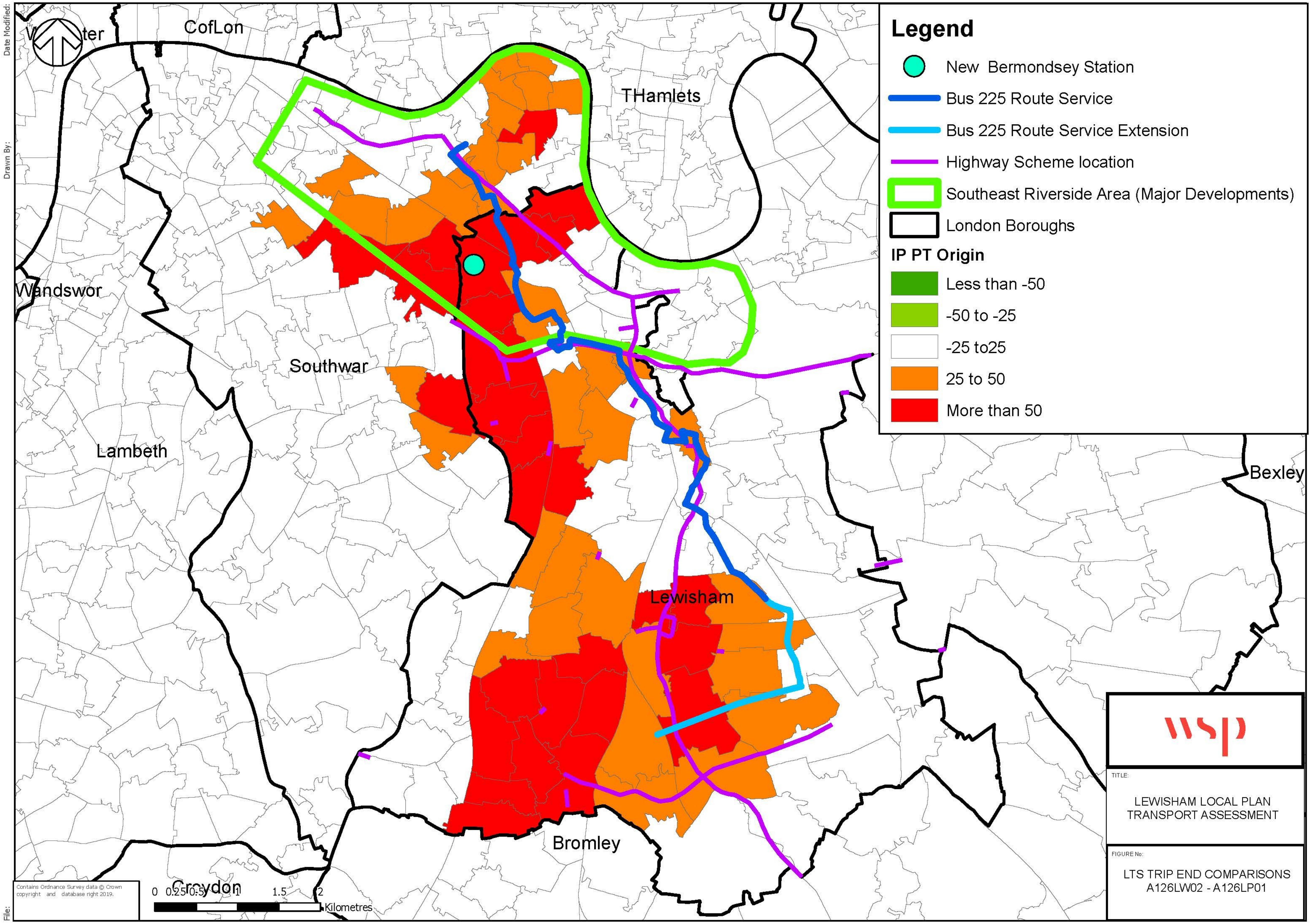

Legend
New Bermondsey Station
Bus 225 Route Service
Bus 225 Route Service Extension
Highway Scheme location
Southeast Riverside Area (Major Developments)
London Boroughs
IP PT Origin
Less than -50
-50 to -25
-25 to25
25 to 50
More than 50
CofLon
THamlets
Wandswor
Southwar
Lambeth
Lewisham
Bexley
Bromley
Croydon
0 0.25 0.5 1 1.5 2
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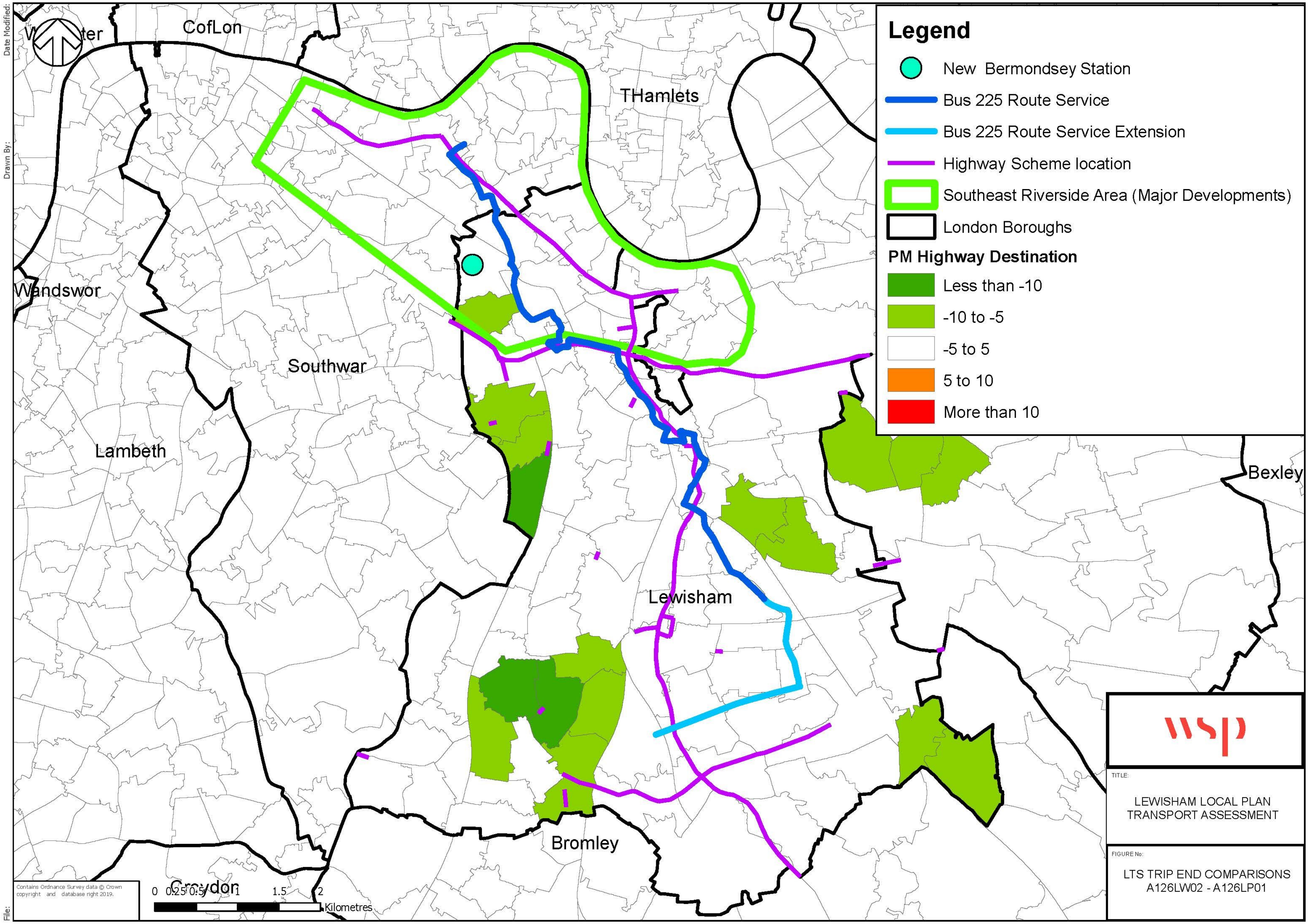
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THamlets
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Southwar
Lambeth
Lewisham
Bexley
Bromley
Croydon
Legend
New Bermondsey Station
Bus 225 Route Service
Bus 225 Route Service Extension
Highway Scheme location
Southeast Riverside Area (Major Developments)
London Boroughs
PM Highway Destination
Less than -10
-10 to -5
-5 to 5
5 to 10
More than 10
TITLE:
LEWISHAM LOCAL PLAN
TRANSPORT ASSESSMENT
FIGURE No:
LTS TRIP END COMPARISONS
A126LW02 - A126LP01
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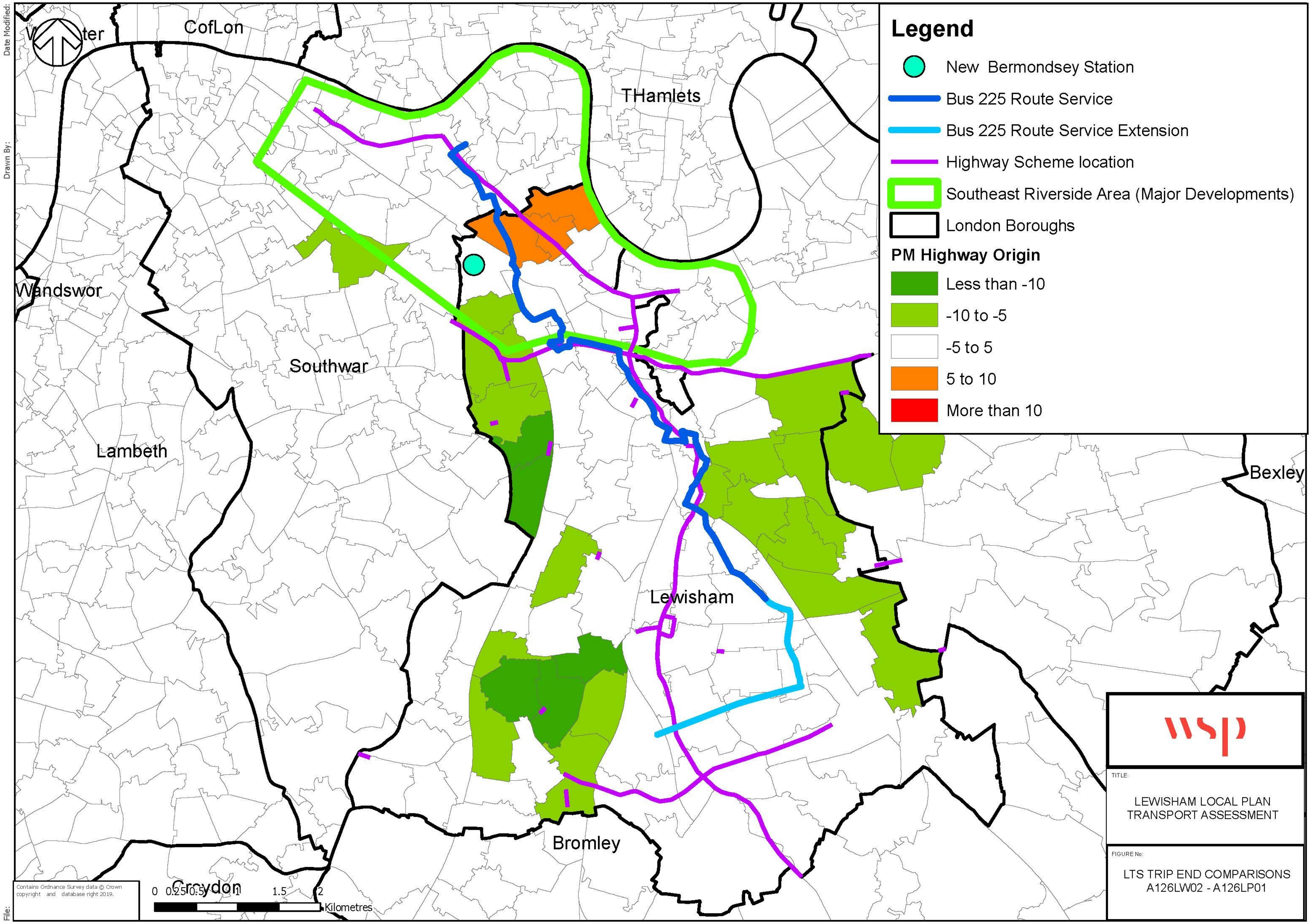
Kilometres


Legend
New Bermondsey Station
Bus 225 Route Service
Bus 225 Route Service Extension
Highway Scheme location
Southeast Riverside Area (Major Developments)
London Boroughs
PM Highway Origin
Less than -10
-10 to -5
-5 to 5
5 to 10
More than 10
CofLon
THamlets
Wandswor
Southwar
Lambeth
Lewisham
Bexley
Bromley
Croydon
0 0.25 0.5 1 1.5 2
Kilometres
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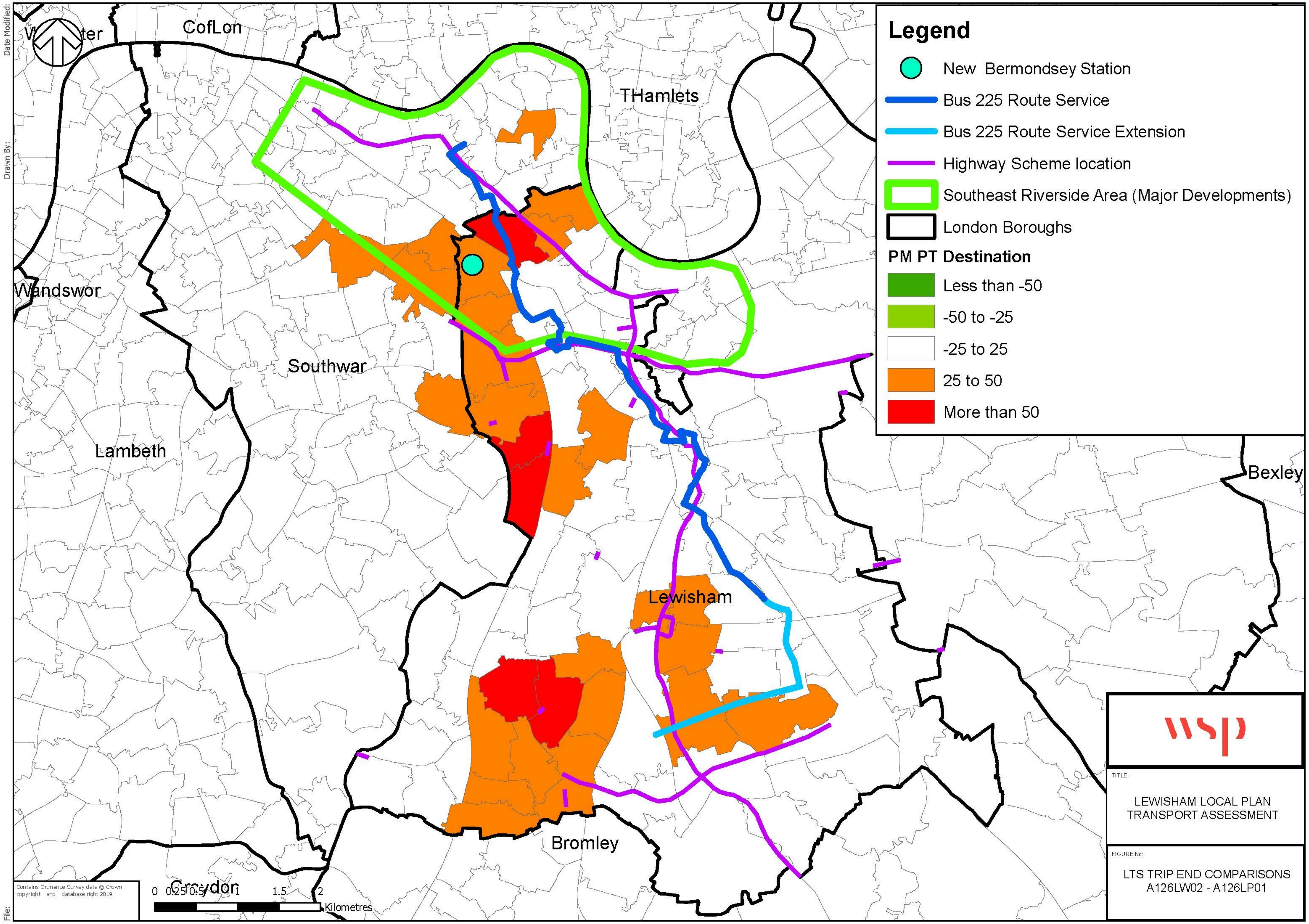
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THamlets
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Southwar
Lambeth
Lewisham
Bromley
Croydon
Bexley
Legend
New Bermondsey Station
Bus 225 Route Service
Bus 225 Route Service Extension
Highway Scheme location
Southeast Riverside Area (Major Developments)
London Boroughs
PM PT Destination
Less than -50
-50 to -25
-25 to 25
25 to 50
More than 50
0 0.25 0.5 1 1.5 2
Kilometres
Contains Ordnance Survey data © Crown copyright and database right 2019.
TITLE:
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TRANSPORT ASSESSMENT
FIGURE No:
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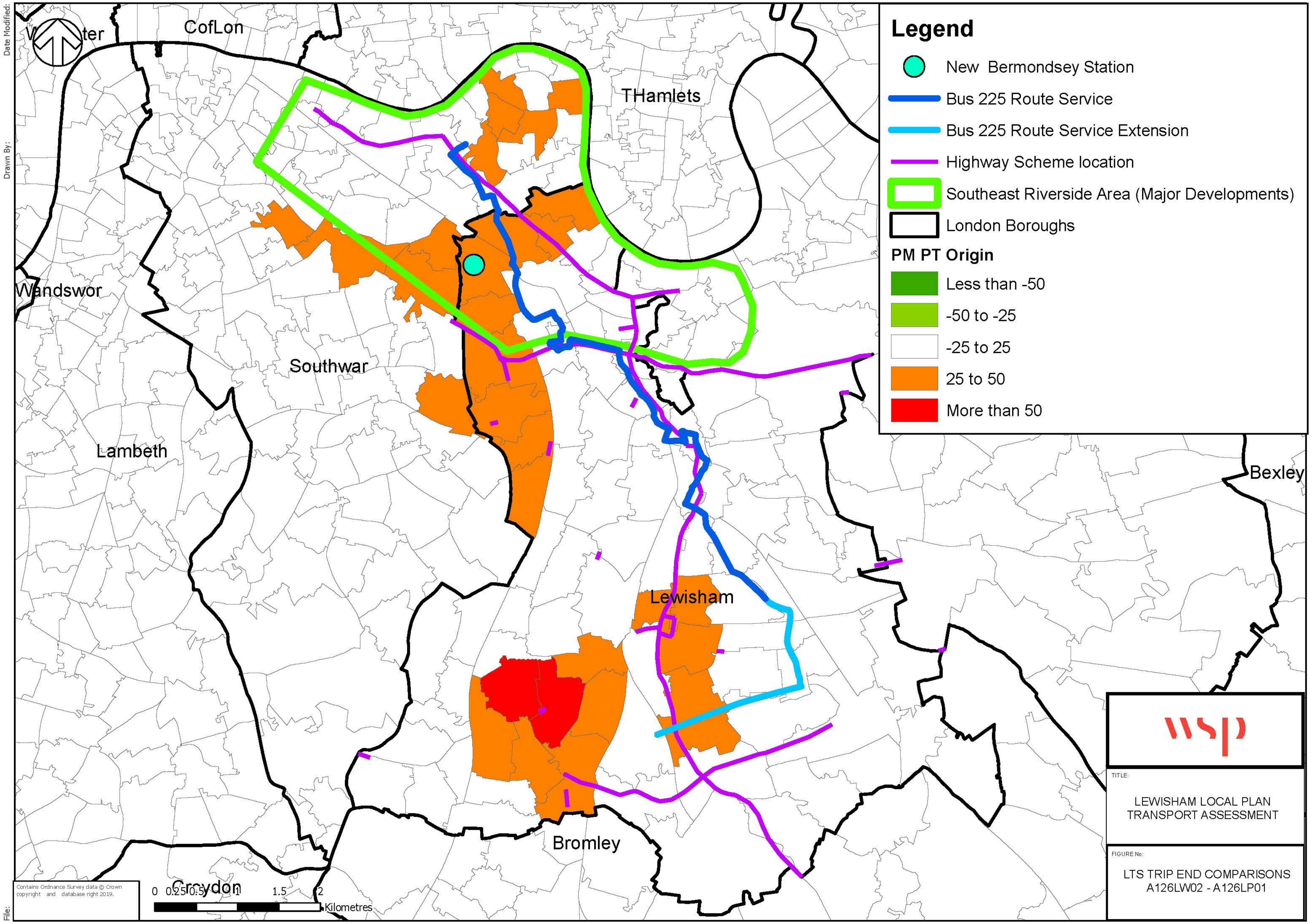
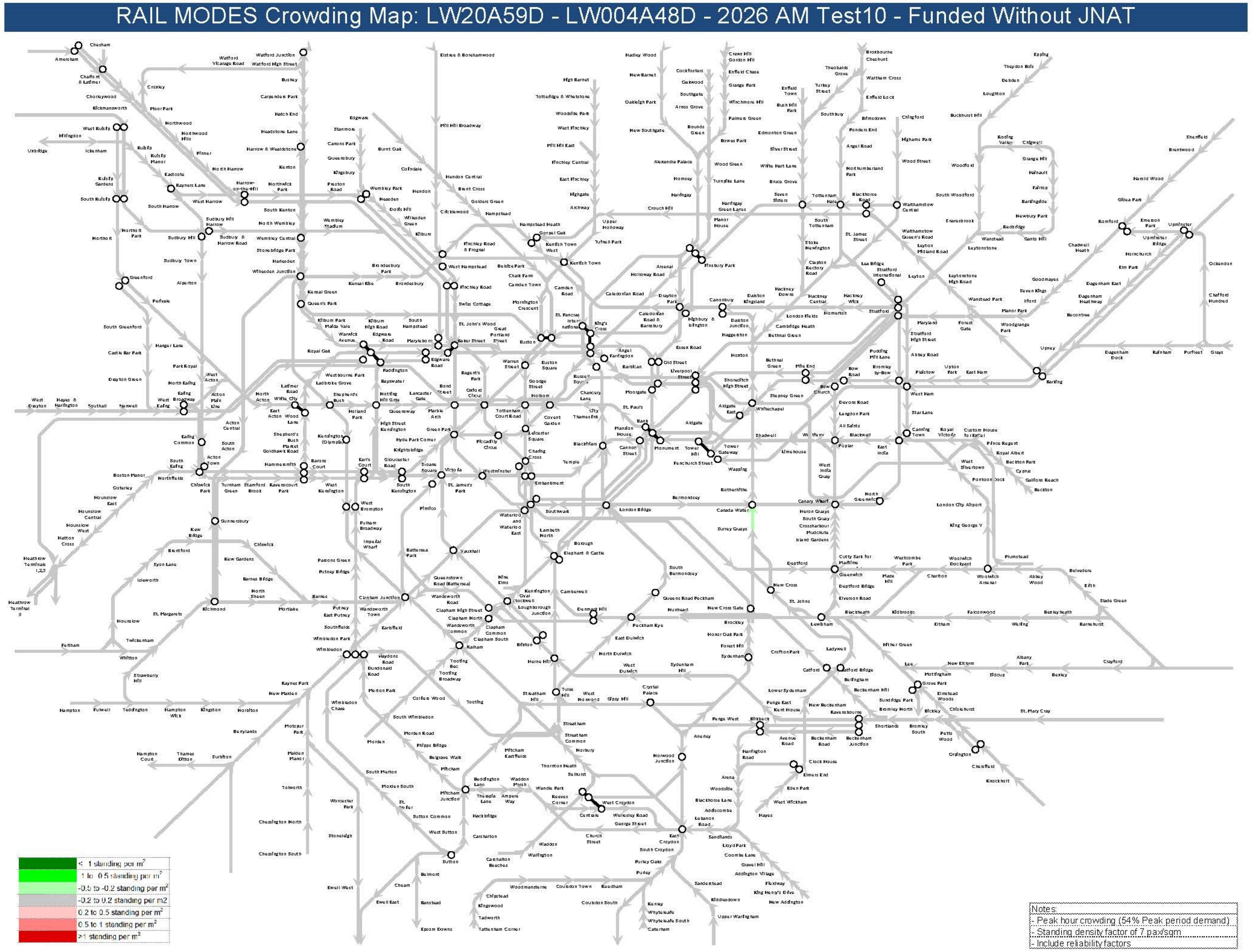
A126LW02 - A126LP01

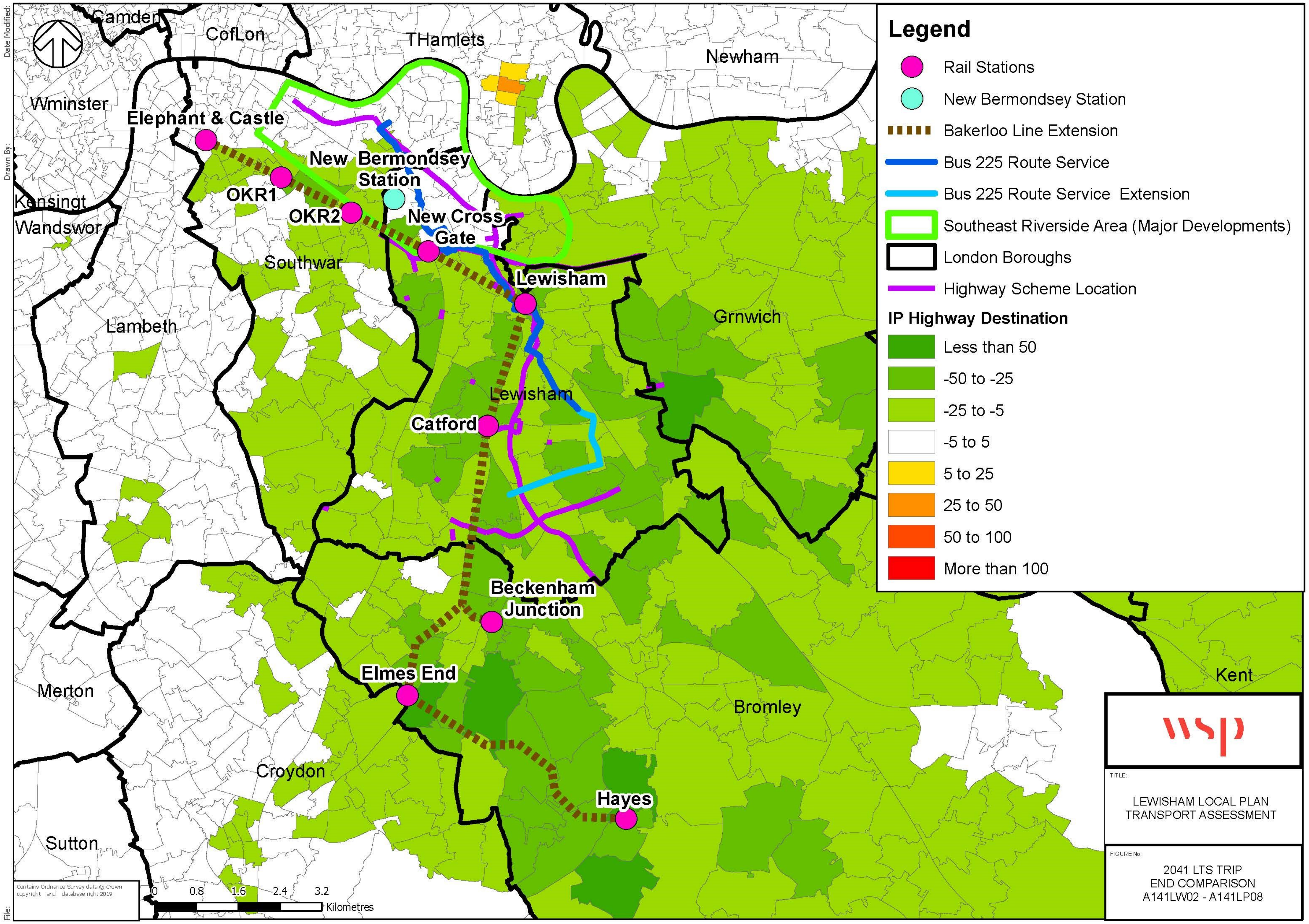


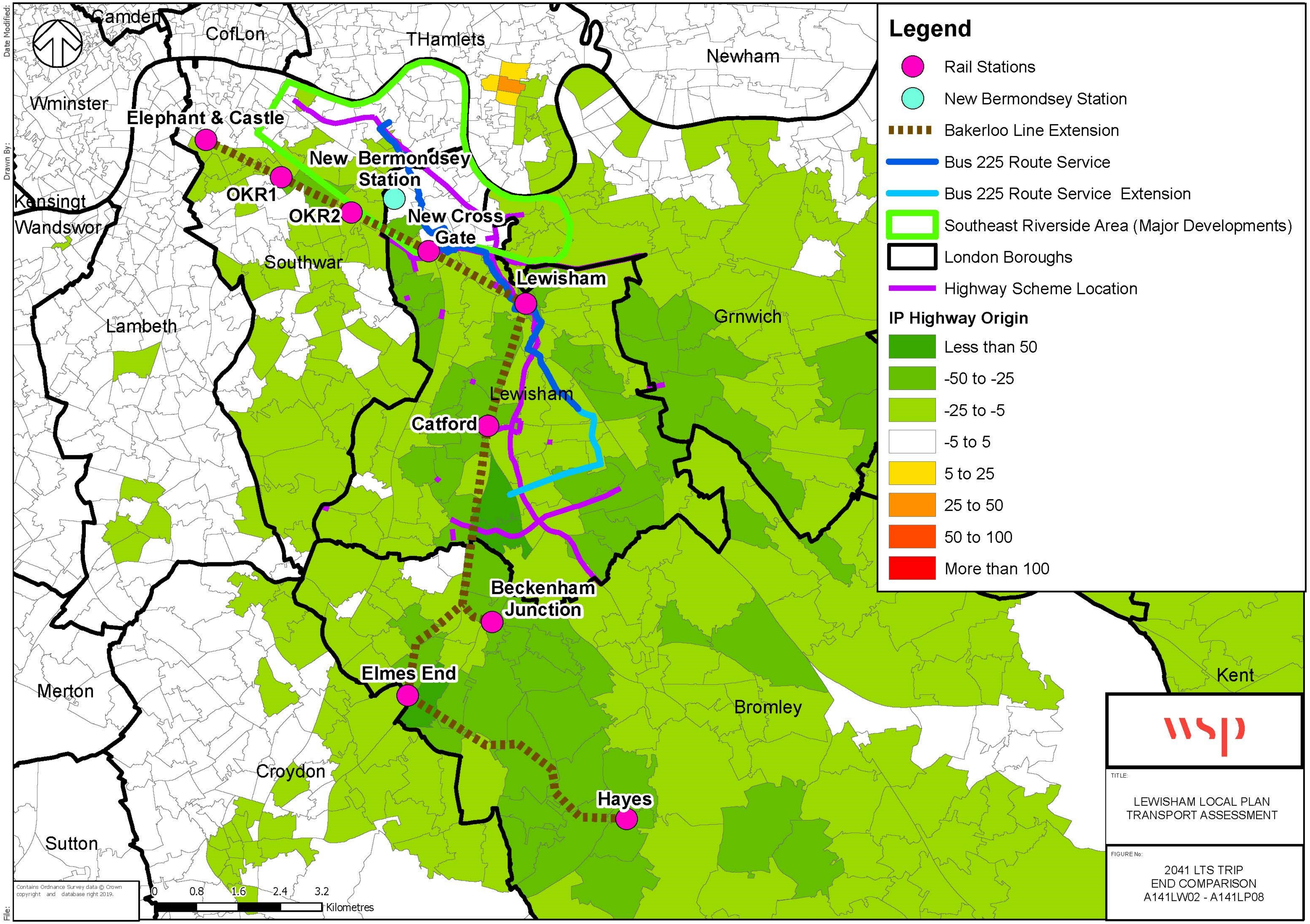
Legend
New Bermondsey Station
Bus 225 Route Service
Bus 225 Route Service Extension
Highway Scheme location
Southeast Riverside Area (Major Developments)
London Boroughs
PM PT Origin
Less than -50
-50 to -25
-25 to 25
25 to 50
More than 50
CofLon
THamlets
Wandswor
Southwar
Lambeth
Lewisham
Bexley
Bromley
Croydon
0 0.25 0.5 1 1.5 2
Kilometres
Contains Ordnance Survey data © Crown copyright and database right 2019.
TITLE:
LEWISHAM LOCAL PLAN TRANSPORT ASSESSMENT
FIGURE No:
LTS TRIP END COMPARISONS A126LW02 - A126LP01

Annex B – 2026 Crowding Map Difference Plot for Rail Modes



Annex C – 2041 PT and Highway Trip End Differences in London Borough of Lewisham for Inter Peak and Evening Peak Periods

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CofLon
THamlets
Newham
Wminster
Elephant & Castle
New Bermondsey Station
OKR1
OKR2
New Cross Gate
Kensingt
Wandswor
Southwar
Lewisham
Lambeth
Grnwich
Lewisham
Catford
Beckenham Junction
Elmes End
Merton
Bromley
Kent
Croydon
Hayes
Sutton
Legend
Rail Stations
New Bermondsey Station
Bakerloo Line Extension
Bus 225 Route Service
Bus 225 Route Service Extension
Southeast Riverside Area (Major Developments)
London Boroughs
Highway Scheme Location
IP Highway Origin
Less than 50
-50 to -25
-25 to -5
-5 to 5
5 to 25
25 to 50
50 to 100
More than 100
0 0.8 1.6 2.4 3.2 Kilometres
TITLE:
LEWISHAM LOCAL PLAN TRANSPORT ASSESSMENT
FIGURE No:
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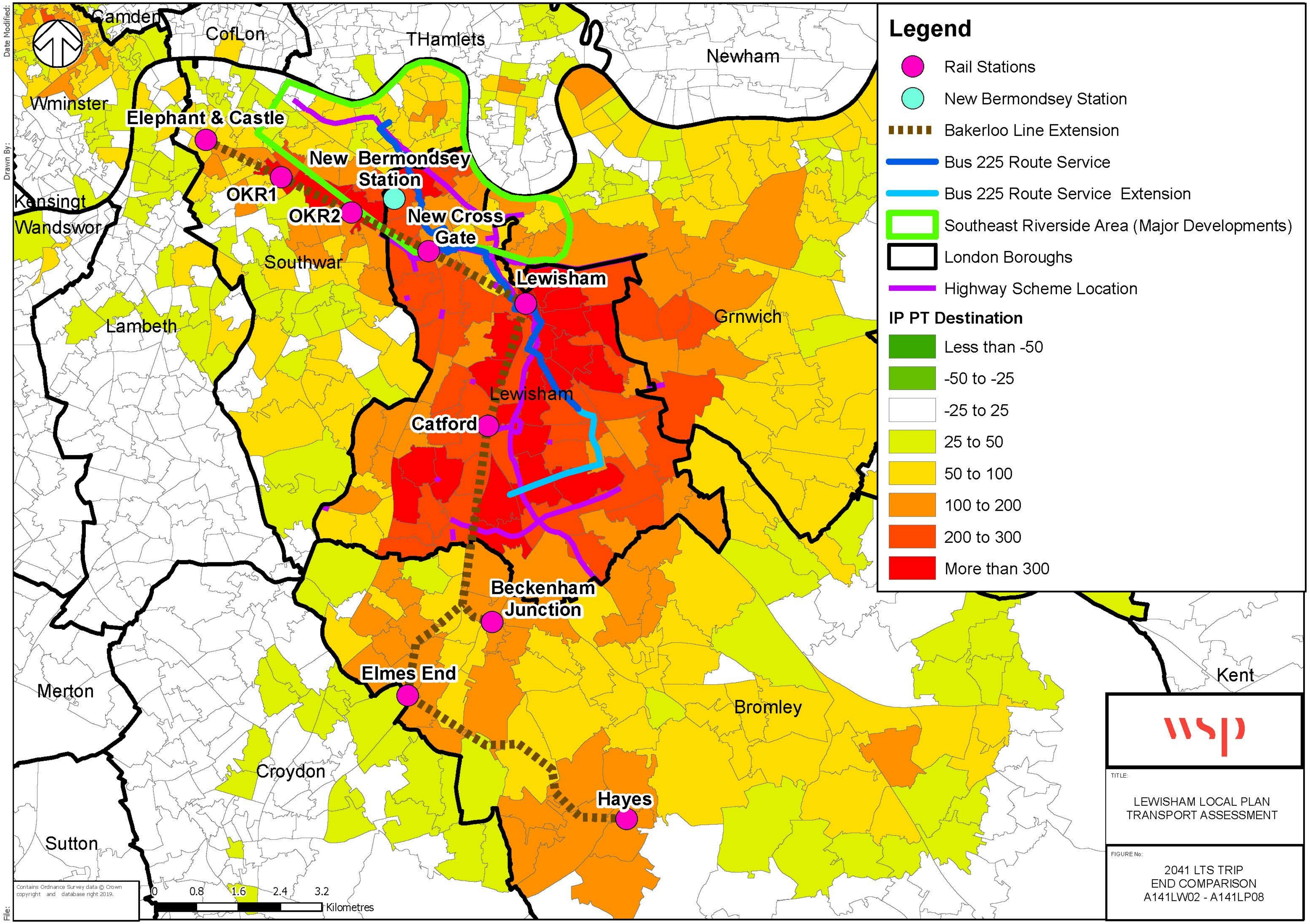
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Hayes
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Legend
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Bakerloo Line Extension
Bus 225 Route Service
Bus 225 Route Service Extension
Southeast Riverside Area (Major Developments)
London Boroughs
Highway Scheme Location
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25 to 50
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200 to 300
More than 300
0 0.8 1.6 2.4 3.2 Kilometres
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TITLE:
LEWISHAM LOCAL PLAN TRANSPORT ASSESSMENT
FIGURE No:
2041 LTS TRIP END COMPARISON A141LW02 - A141LP08

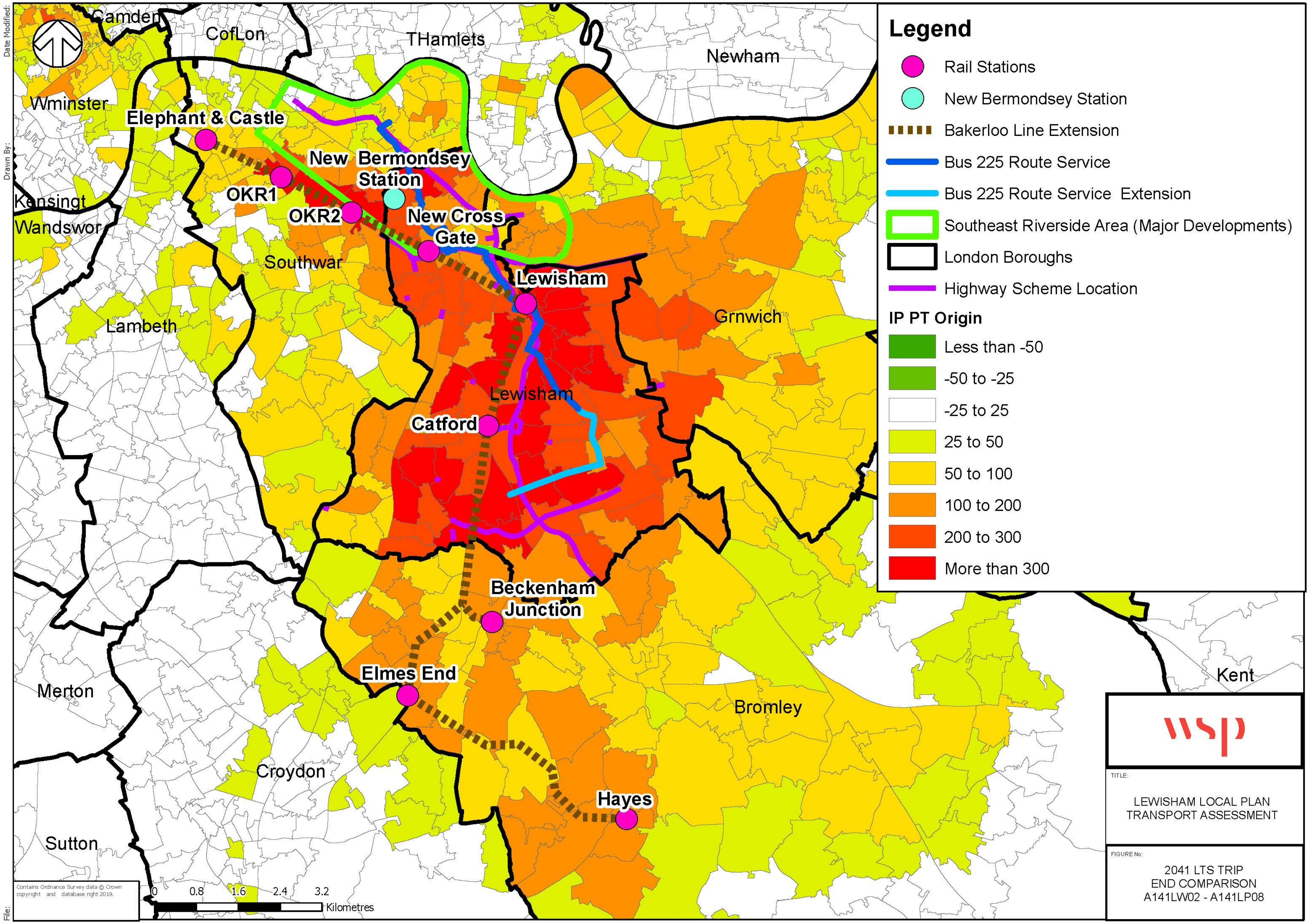
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FIGURE No:
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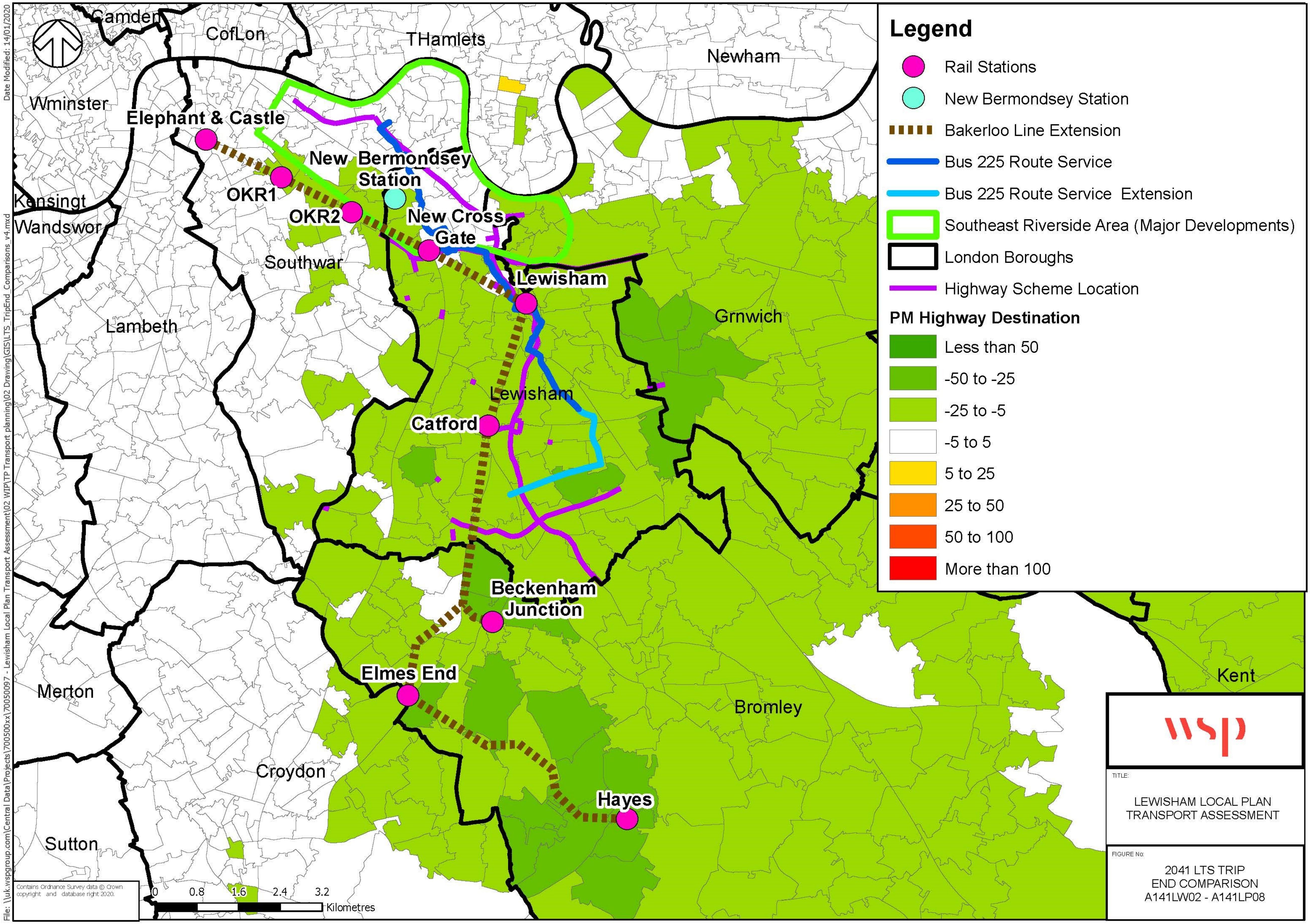
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END COMPARISON
A141LW02 - A141LP08
Date Modified: 14/01/2020

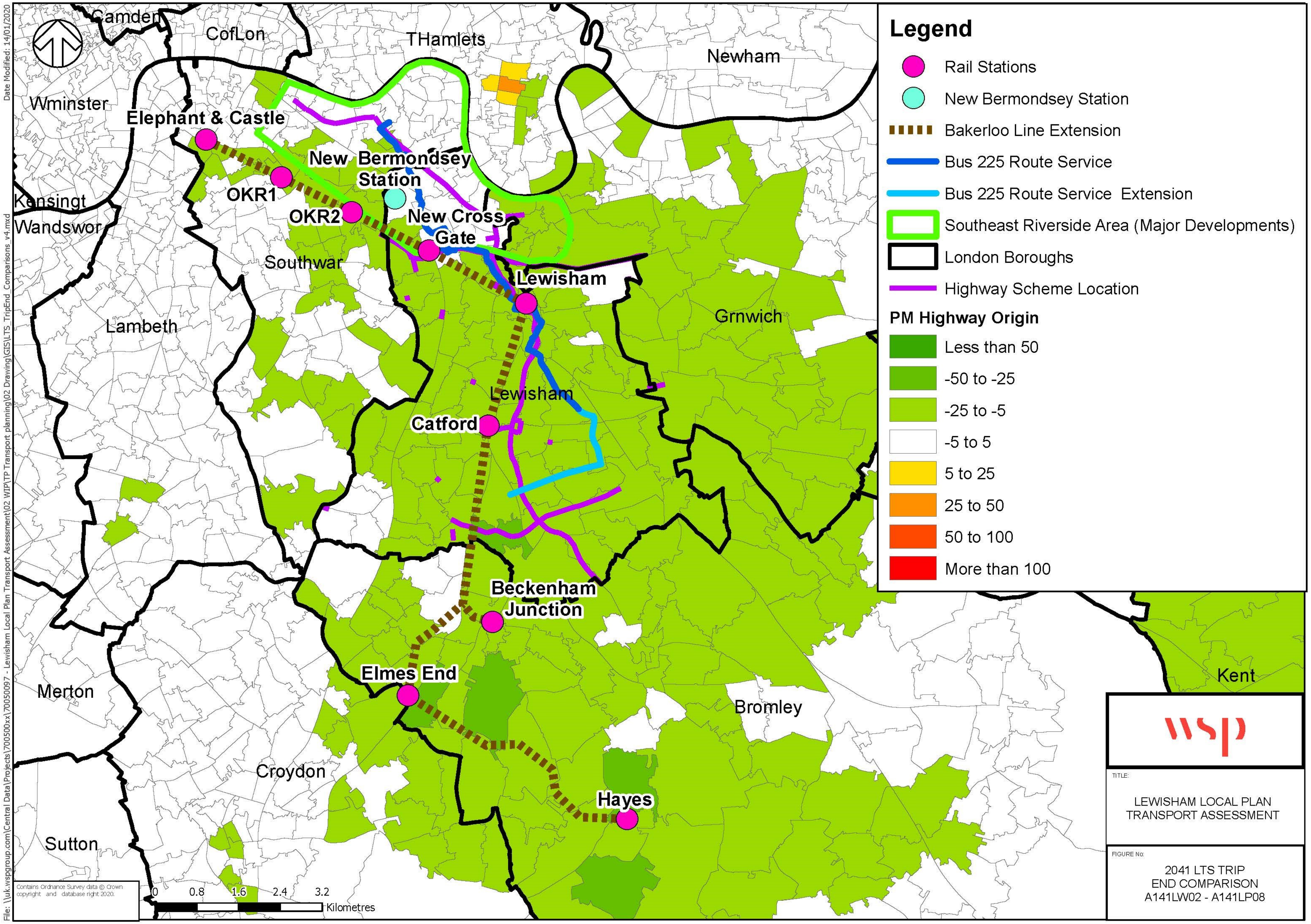
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FIGURE No:
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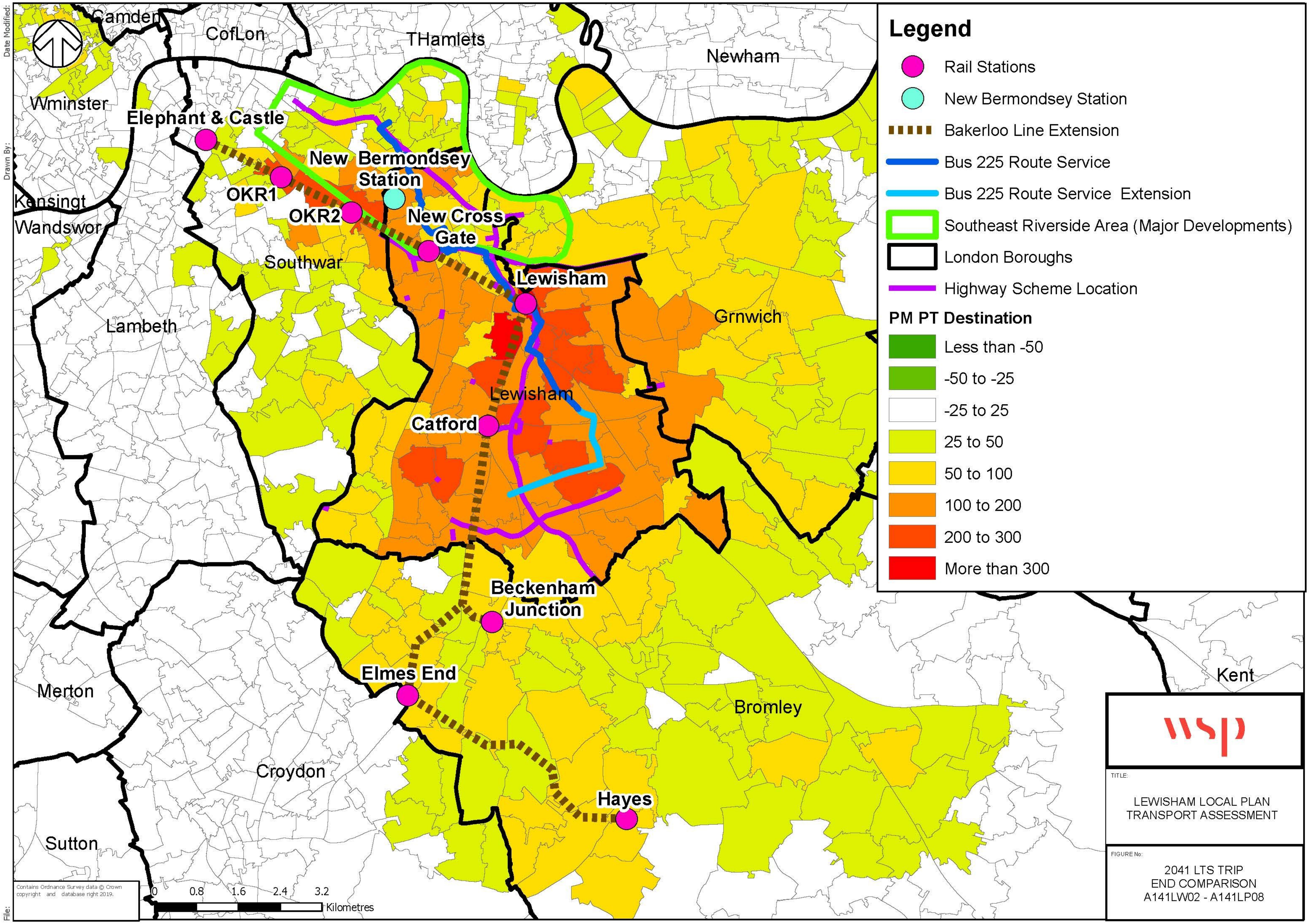

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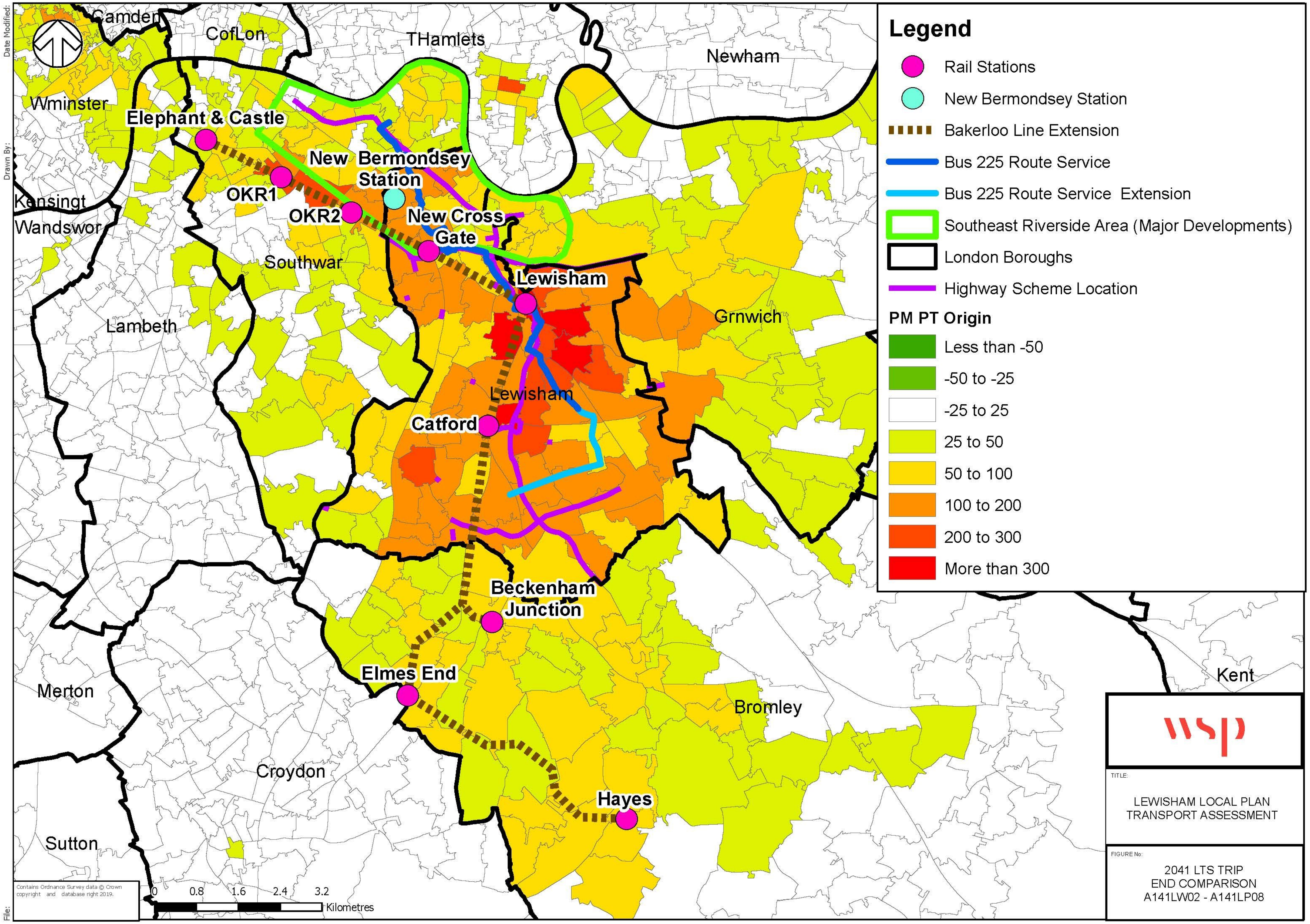

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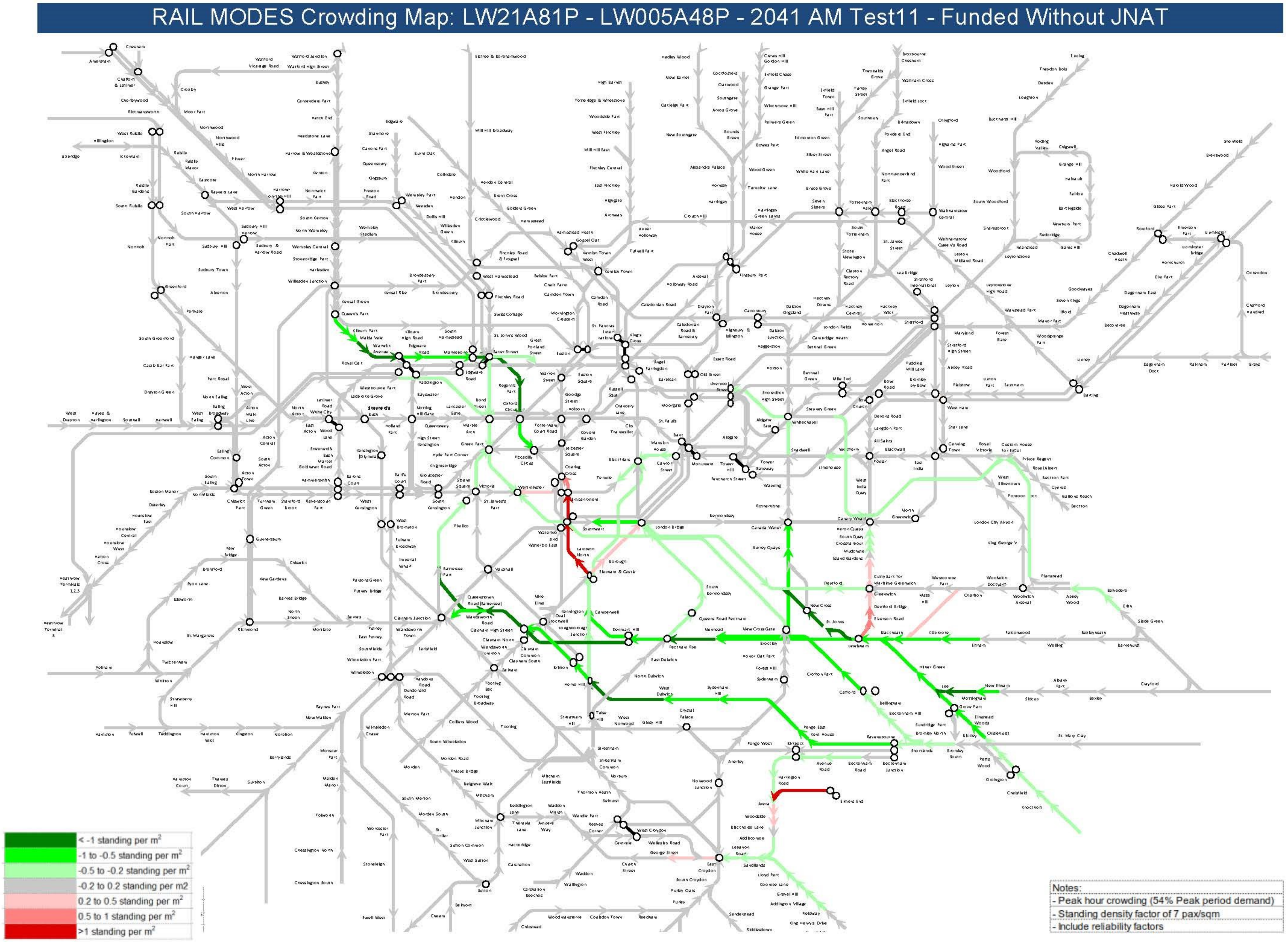
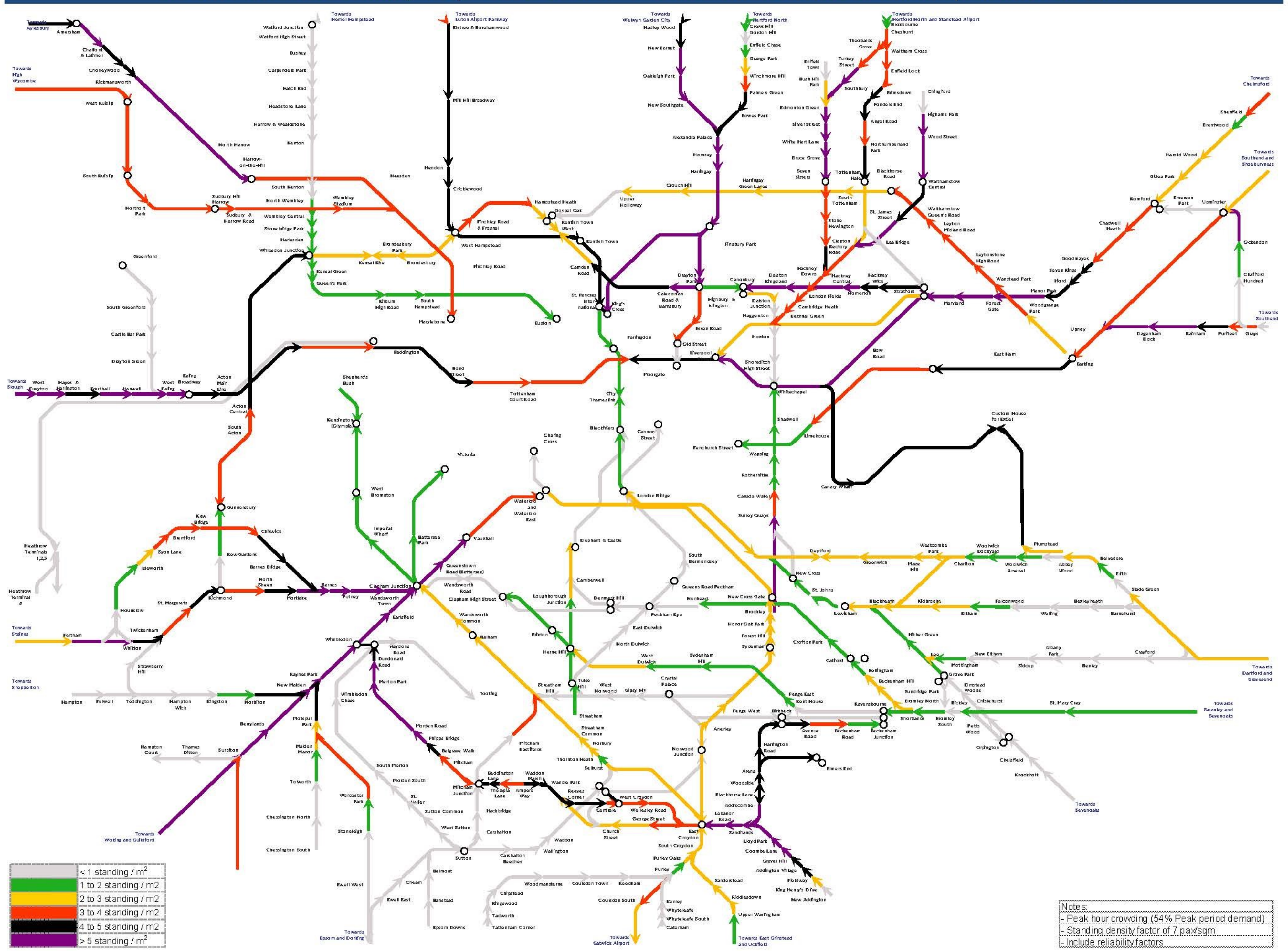
LEWISHAM LOCAL PLAN TRANSPORT ASSESSMENT
FIGURE No:
2041 LTS TRIP END COMPARISON A141LW02 - A141LP08

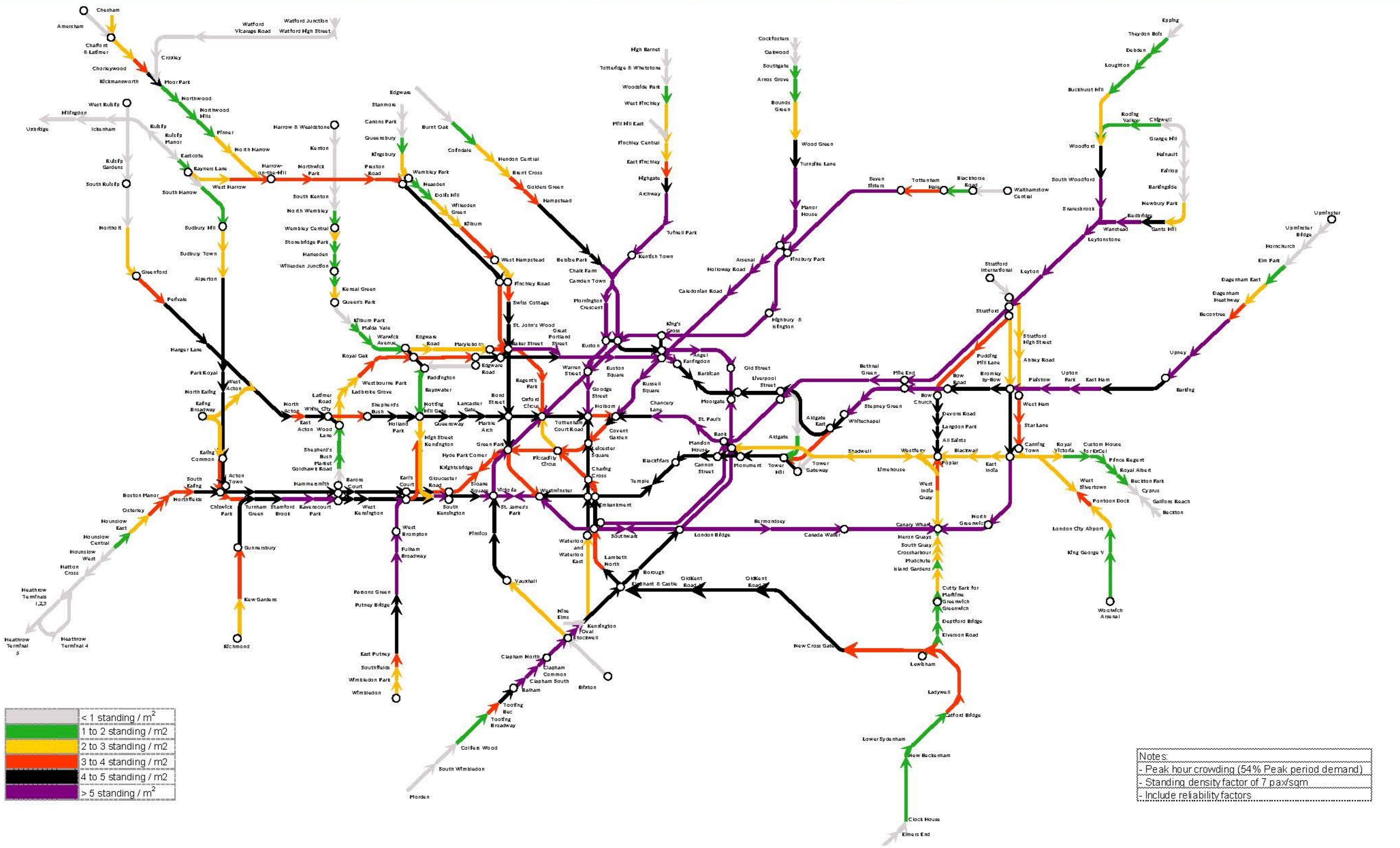
Annex D – 2041 Crowding Map Difference Plot for Rail Modes



NR and TRAM Crowding Map: LW023A82P - 2041 Lewisham Interventions plus Metroisation



LUL and DLR Crowding Map: LW023A82P - 2041 Lewisham Interventions plus Metroisation



RAIL MODES Crowding Map: LW023A82P - LW005A48P - 2041 AM Lewisham Interventions plus Metroisation