



Lambeth Long Term Transport Strategy

Future Baseline Report (Part 2)

March 2017

London Borough of Lambeth

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London Borough of Lambeth

10 Wandsworth Road,
London,
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Contents

Chapter	Title	Page
	Executive Summary	i
	List of Abbreviations	vi
1	Introduction	1
2	Trip Generation Forecast	8
3	Active Modes	19
4	Public Transport	35
5	Road Use	64
6	Marine Transport	77
7	Airport Access	79
8	Journey Information	82
9	Air Quality, Carbon & Sustainable Drainage Systems	84
10	Future Transport Considerations	99
11	Gap Analysis	108
12	SWOT Analysis	109
13	Conclusion	112

Figures

Figure 1.1	Delivery Flow Chart	2
Figure 1.2:	Mode Share in the Lambeth	3
Figure 2.1:	Amalgamation of LTS Zones	10
Figure 2.2:	Lambeth's Resident Population Projections ('000s)	11
Figure 2.3:	Lambeth Employment Projections ('000s)	12
Figure 2.4:	Residential Population % Change (2011-2036)	13
Figure 2.5:	Employment Population % Change (2011-2036)	14
Figure 2.6:	Lambeth Total Population Projections ('000s)	15
Figure 2.7:	Mode Share Changes – North Lambeth	16
Figure 2.8:	Mode Share Changes – Central Lambeth	16
Figure 2.9:	Mode Share Changes – South Lambeth	16
Figure 3.1:	Active Travel: Future Trip Generation Change % (2011-2026)	21
Figure 3.2:	Active Travel: Future Trip Generation Change % (2011-2036)	22
Figure 3.3:	Future Baseline Summary: Walking	28
Figure 3.4:	Future Baseline Summary: Cycling	34
Figure 4.1:	Public Transport: Future Trip Generation Change % (2011-2026)	36
Figure 4.2:	Public Transport: Future Trip Generation Change % (2011-2036)	37
Figure 4.3:	National Rail: AM Peak Congestion 2021 (standing passengers per sqm)	41
Figure 4.4:	Total Capacity on Trains Departing Rail Stations in Lambeth 2021 (8am to 9am)	42
Figure 4.5:	National Rail: AM Peak Congestion 2031 (standing passengers per sqm)	43
Figure 4.6:	Total Capacity on Trains Departing Rail Stations in Lambeth 2031 (8am to 9am)	44
Figure 4.7:	Future Baseline Summary: Rail	48
Figure 4.8:	Bus Capacity Analysis: Waterloo (2021)	50
Figure 4.9:	Bus Capacity Analysis: Waterloo (2031)	50
Figure 4.10:	Bus Capacity Analysis: Vauxhall/Oval (2021)	51
Figure 4.11:	Bus Capacity Analysis: Vauxhall/Oval (2031)	51
Figure 4.12:	Bus Capacity Analysis: Brixton/Clapham (2021)	52
Figure 4.13:	Bus Capacity Analysis: Brixton/Clapham (2031)	52
Figure 4.14:	Bus Capacity Analysis: Streatham/West Norwood (2021)	53
Figure 4.15:	Bus Capacity Analysis: Streatham/West Norwood (2031)	53
Figure 4.16:	Future Baseline Summary: Bus	55
Figure 4.17:	Underground: AM Peak Congestion 2021 (standing passengers per sqm)	57
Figure 4.18:	Total Capacity on Trains Departing Rail Stations in Lambeth 2021 (8am to 9am)	58
Figure 4.19:	Underground: AM Peak Congestion 2031 (standing passengers per sqm)	59
Figure 4.20:	Total Capacity on Trains Departing Rail Stations in Lambeth 2031 (8am to 9am)	60
Figure 4.21:	Future Baseline Summary: Underground	63
Figure 5.1:	Road Traffic: Future Trip Generation Change % (2011-2026)	65
Figure 5.2:	Road Traffic: Future Trip Generation Change % (2011-2036)	66
Figure 5.3:	SoLHAM Traffic Volumes (2021)	69
Figure 5.4:	SoLHAM Traffic Volumes (2031)	70
Figure 5.5:	SoLHAM Junction Capacity Analysis (2021)	71
Figure 5.6:	SoLHAM Junction Capacity Analysis (2031)	72
Figure 5.7:	Future Baseline Summary: Car	76
Figure 8.1:	Top Destinations from Lambeth (by Borough, 12-hour weekday average)	83
Figure 9.1:	Lambeth's Road Transport reduction since 2013 (Emissions in Tonnes/Year)	85

Figure 9.2:	Total NO _x Emissions by Source Type in Lambeth (Tonnes/Year)	87
Figure 9.3:	Road Transport NO _x emissions by Mode (%)	87
Figure 9.4:	NO ₂ Annual Mean Concentrations in Lambeth (2025)	89
Figure 9.5:	NO ₂ Annual Mean Concentrations in Lambeth (2030)	90
Figure 9.6:	Road Transport PM ₁₀ emissions by Mode (%)	91
Figure 9.7:	Total PM ₁₀ Emissions by Source Type in Lambeth (Tonnes/Year)	91
Figure 9.8:	PM ₁₀ Annual Mean Concentrations in Lambeth (2025)	92
Figure 9.9:	PM ₁₀ Annual Mean Concentrations in Lambeth (2030)	93
Figure 9.10:	Road Transport CO ₂ emissions by Mode (%)	94
Figure 9.11:	Total CO ₂ Emissions by Source Type in Lambeth (Tonnes/Year)	94
Figure 13.1:	2021 National Rail Load Factors (Lambeth Stations)	120
Figure 13.2:	2031 National Rail Load Factors (Lambeth Stations)	121
Figure 13.3:	2021 Underground Load Factors (Lambeth Stations)	122
Figure 13.4:	2031 Underground Load Factors (Lambeth Stations)	122

Tables

Table 2.1:	Resident Population Growth Forecast (LTS vs Turley)	11
Table 2.2:	Employment Population Growth Forecast (LTS vs Turley)	12
Table 2.3:	Forecast AM Trips in Lambeth (including all purposes)	17
Table 2.4:	Waterloo Station AM Peak trips (2011)	18
Table 3.1:	Active Modes: Trip Generation in Lambeth	19
Table 3.2:	Walking: Future Challenges	24
Table 3.3:	Future Pedestrian Schemes in the Borough	25
Table 3.4:	Cycling: Future Challenges	30
Table 3.5:	Future Cycling Schemes in the Borough	31
Table 4.1:	Public Transport: Trip Generation in Lambeth	35
Table 4.2:	Improvement Schemes included in the Railplan Model	39
Table 4.3:	Future Rail Schemes	45
Table 4.4:	Future Bus Schemes	54
Table 4.5:	Future Underground Schemes	61
Table 5.1:	Trip Generation for road traffic in Lambeth	64
Table 5.2:	Future Road Schemes	75
Table 12.1:	Northern Lambeth – Strengths, Weaknesses, Opportunities and Threats (SWOT)	109
Table 12.2:	Central Lambeth – Strengths, Weaknesses, Opportunities and Threats (SWOT)	110
Table 12.3:	Southern Lambeth – Strengths, Weaknesses, Opportunities and Threats (SWOT)	111

Executive Summary

Mott MacDonald has been commissioned by the London Borough of Lambeth (LBL) to develop a Long Term Transport Strategy (LTTS) for the Borough to cover the next 10 to 20 years (2026 and 2035). The purpose of the LTTS is to identify which transport schemes are needed to support growth and regeneration in key growth areas as well as improving the overall network across the Borough.

This report has examined Lambeth's future transport expectations to identify which areas of the transport network may have a shortage of capacity in the future. The findings note that there is a significant difference in the forecast transport provision across the Borough, and demonstrates the potential for future improvements to support Borough-wide growth. This report follows on from the Existing Baseline Report (Part 1), which considers current transport situation.

The two Baseline reports have been developed based on information that was available at the time of writing. The results presented in this report focus on a strategic level and discuss future challenges that are likely in the Borough. The analysis in these reports supports the development and direction of the Long Term Transport Strategy and should be used as a starting point for scheme and policy identification and prioritisation.

Trip Generation

The LTS model predicts that Lambeth's total (residential and employment) population is expected to increase by 27 per cent from 450,000 in 2011 to 570,000 in 2036. LTS's mode share predictions also suggest that Lambeth's car mode share is expected to decline and travel by active modes and by public transport is generally expected to rise.

Despite the reduction in Lambeth's mode share by car, the number of car trips in the Borough is likely to remain at similar levels, or increase, due to forecast population growth. The number of car trips in the northern section of the Borough is expected to increase by 2036 and throughout the rest of the Borough, the number of car trips in 2036 is expected to remain at similar levels to 2011.

Active Travel

Active travel trips, which mainly include walking and cycling, are expected to increase in all areas of the Borough in the future. The north of Lambeth is expected to see the highest increase with North Lambeth (excluding Waterloo) expected to see active travel trips increase by 63 per cent and Waterloo expected to see an increase 101 per cent by 2026. In addition, the Waterloo area may experience additional trips on top of that predicted by TfL's LTS figures due to the number of people who may alight at Waterloo station and walk and cycle to their destination outside of the Lambeth boundary (note: TfL's LTS model does not account for trips that start and end outside of the Borough boundary).

Public Transport

The number of total public transport trips in the AM peak period (7am – 10am) is likely to increase for all areas of the Borough. TfL's LTS model predicts that there will be a quarter more public transport trips in Brixton, Clapham and Streatham in 2036 compared to 2011 (see Table 2.3), which is in line with the population growth forecasts.

The Railplan analysis predicts that rail services operating at stations in Lambeth will be operating close to, but within total capacity. In terms of bus capacity, the population growth forecasts are likely to increase congestion on the highway network, therefore bus journey times are expected to increase. On the Underground, Railplan analysis indicates that the Northern Line is still expected to experience capacity constraints even though there will be capacity and service pattern enhancements in the future (see Table 4.5) .

Road Use

The LTS model predicts that in 2036, the number car trips in the southern section of the Borough are likely to remain the same to levels in 2011. On the other hand, the northern section of the Borough is likely to see an increase in car trips (see Table 2.3). SoLHAM outputs (Figure 5.4) suggest that by 2031 there is expected to be significant congestion on the Borough's main orbital and arterial roads,

particularly the A23, A24 and the South Circular. Junction capacity modelling (Figure 5.6) also indicates that future traffic levels pose issues at some key junctions in Lambeth, especially at the IMAX roundabout, Vauxhall gyratory and at the A23 / A214 junction. Although improvements at the IMAX roundabout are proposed, junction capacity issues are still expected at the junction.

Marine Transport

Marine transport in London is expected to have an increase in demand. TfL's River Action plan published in 2013 plans to prepare for an increase in demand and has set a target for 12 million passengers on the river Thames by 2020, which is an additional 2 million passengers compared to levels recorded in 2015.

Air Quality, Carbon, and Sustainable Drainage Systems

Technological advancements and improved engine efficiency are expected to reduce pollution in the future, however the actual level of decline is unclear due to population growth forecasts and development in the Borough. Therefore, the challenge will involve managing air quality with economic and transport network growth aspirations.

Air quality modelling suggests that some areas in the Borough will not achieve the recommended Objective levels ($40\mu\text{g m}^{-3}$) and therefore, air quality measures focused in these areas will be required in the future.

It is expected that susceptibility to flooding in Lambeth may change as a result of climate change, or changes to water management. This could lead to an increased risk of flooding in the Borough. Green infrastructure and permeable surfaces should be incorporated in new developments to have a significant impact on infiltration and surface water run-off.

Airport Access

Future transport improvements are likely to improve journey times from Lambeth to key airports in London. Journey times to Heathrow Airport and Gatwick airport are likely to reduce significantly due to future improvements on the transport network.

Thameslink improvements, the operation of the Crossrail Elizabeth Line and possible Southern Rail access are likely to improve connections from Lambeth to Heathrow. Connections to Gatwick are also expected to improve as a proposed transformation programme could reduce congestion at the stations, increase the number of trains to central London to every 2.5 minutes and implement new Gatwick express trains.

Journey Information

The future number of trips from Lambeth to the top five boroughs in London is expected to increase by 12% between 2011 – 2021 and a further 9% between 2021 and 2031. In the future, the most popular destination for people in Lambeth is predicted to be Southwark, followed by Wandsworth and Westminster. Westminster and the City was the most popular destination for Lambeth residents in 2011.

Future Transport Considerations

The future transport infrastructure is likely to be affected by the introduction of key technologies; these may include, but are not limited to, the roll out of electric vehicles (EVs), autonomous vehicles (AVs) and introducing mobility as a service (MAAS).

Demographic and cultural factors such as an ageing population and flexible working can affect the future patterns and needs of transport. An aging population may demand more accessible transport, whereas flexible working could be a solution to reducing congestion and improving air quality.

The challenge for future transport policy is to facilitate the growth of new technology to tackle transport issues such as congestion, overcrowding and air quality, without the potential detrimental impacts such as modal shift towards private cars.

List of Abbreviations

AADF	Annual Average Daily Flow	LGVs	Light Goods Vehicles
AQAP	Air Quality Action Plan	LIP	Local Implementation Plan
AQMA	Air Quality Management Area	LSOA	Lower Super Output Area
AQS	Air Quality Strategy	LTS	London Transportation Studies
ATOC	Association of Train Operating Companies	LTTS	Long Term Transport Strategy
AV	Autonomous Vehicle	MAAS	Mobility As A Service
BID's	Business Improvement District	MALP	Minor Alterations to the London Plan
BRS	Bus Reliability Schemes	MAQS	Mayors Air Quality Strategy
CO₂	Carbon Dioxide gas	Mph	Miles per hour
CCTV	Closed Circuit Television	MTS	Mayors Transport Strategy
CCZ	Congestion Charge Zone	NO₂	Nitrogen Dioxide gas
CDA	Critical Drainage Area's	NO_x	Nitrogen Oxide gas
CIL	Community Infrastructure Levy	OA	Opportunity Area
CLIPs	Co-operative Local Investment Plans	OAPF	Opportunity Area Planning Framework
COTRP	Clapham Old Town Regeneration Project	ORR	Office of Rail and Road
CPZ	Controlled Parking Zone	PM₁₀	Particulate Matter less than 10 micron in diameter
CS [no.]	Cycle Superhighway route	PTAL	Public Transport Accessibility Level
DEFRA	Department for Environment, Food and Rural Affairs	PTW	Powered Two Wheeler
DfT	Department for Transport	Q [no.]	Quietway cycle route
DLR	Docklands Light Railway	RB	River Bus
ELR	Employment Land Review	REMA	Revised Early Minor Alterations (to the London Plan)
EV	Electric Vehicles	RTF	Road Task Force
EWT	Excess Waiting Time	SATURN	Flexible highway assignment package
FALP	Further Alterations to the London Plan	SHLAA	Strategic Housing Land Availability Assessment
FORS	Fleet Operator Recognition Scheme	SoLHAM	South London Highway Assignment Model
FTE	Full Time Equivalent	SPD	Supplementary Planning Documents
GIS	Geographic Information Systems	SuDS	Sustainable Drainage Systems
GLA	Greater London Authority	SWOT	Strengths, Weaknesses, Opportunities, and Threats
HAM	Highway Assignment Model	TERM	Transport Emission Roadmap
HGVs	Heavy Goods Vehicles	TfL	Transport for London
HS2	High Speed 2	TRLN	TfL Road Network
KIBAs	Key Industrial and Business Areas	ULEV	Ultra-Low Emission Vehicle
KSI	Killed or Seriously Injured	ULEZ	Ultra-Low Emission Zone
LAEI	London Atmospheric Emissions Inventory	VNEB	Vauxhall, Nine Elms, Battersea
LAQM	Local Air Quality Management	WHO	World Health Organisation
LBL	London Borough of Lambeth		
LEZ	Low Emission Zone		

1 Introduction

Mott MacDonald has been commissioned by the London Borough of Lambeth (LBL) to develop a Long Term Transport Strategy (LTTS) to cover the Borough for the next 10 to 20 years (2026 and 2035). The purpose of the LTTS is to understand where schemes are required to support growth and regeneration, as well as improving the overall network across the Borough.

As specified in the Existing Baseline Report (Part 1), some sections of Lambeth's transport infrastructure are currently at, or over capacity and the transport network is likely to come under additional pressure due to predicted increases in population. Projections suggest that the residential population of Greater London is expected to reach 10 million by early 2030s^{Error! Bookmark not defined.}, with Lambeth's residential population expected to increase by approximately 90,000 people from 305,000 in 2011 to 395,000 in 2036¹. This growth alone will increase demand for transport, and call for enhancements to existing infrastructure and the introduction of new infrastructure.

Lambeth is also expected to see a high increase in the employment population across all sectors from 2011 to 2036, with the number of jobs increasing by 30,000 from 146,000 to 176,000¹. Therefore, it will be vital for Lambeth to ensure that there is sufficient capacity on the network to serve the growing employment sectors and to support economic growth.

TfL predict that, by 2050, the number of public transport trips is likely to increase by 50 per cent in the central sub region. In particular, the number of underground and rail trips is forecast to increase by 60 and 80 per cent respectively, which is in part due to the limited additional capacity on London's roads.²

This study aims to assess the likely cumulative impact of population growth and travel demand to highlight key challenges that the Borough may face in the future.

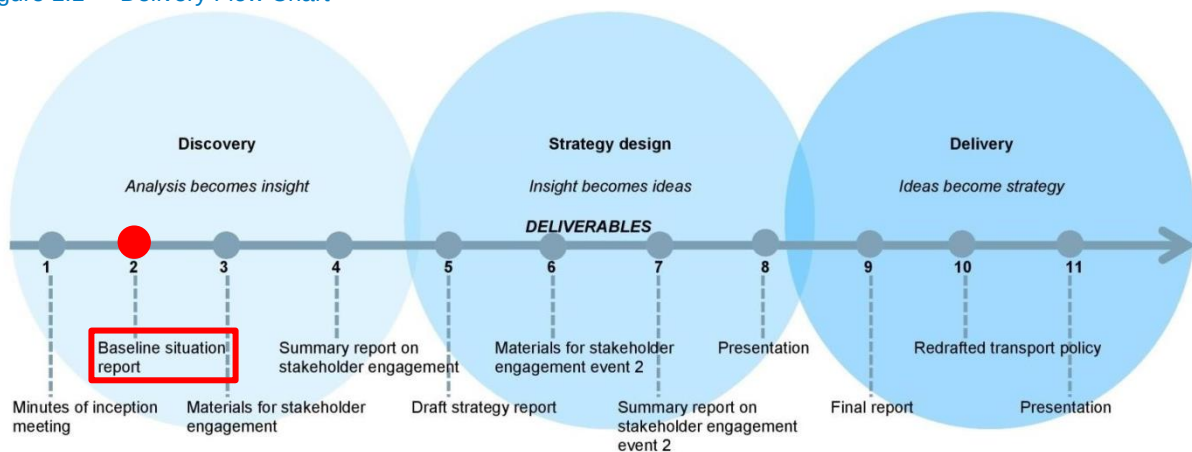
¹ TfL's London Transportation Studies (LTS) Model

² Mayor of London: London infrastructure plan 2050: transport supporting paper

The strategy will propose a package of mitigation measures and additional transport infrastructure recommendations to meet future demand for growth.

Figure 1.1 shows the delivery chart to develop the LTTS. As indicated, the Baseline Reports are the second step in this process. This step has been split into two sections; an Existing Baseline Report (Part 1) and a Future Baseline Report (Part 2). It is important to note that these reports highlight the areas that should be focused on in the Transport Strategy.

Figure 1.1 Delivery Flow Chart

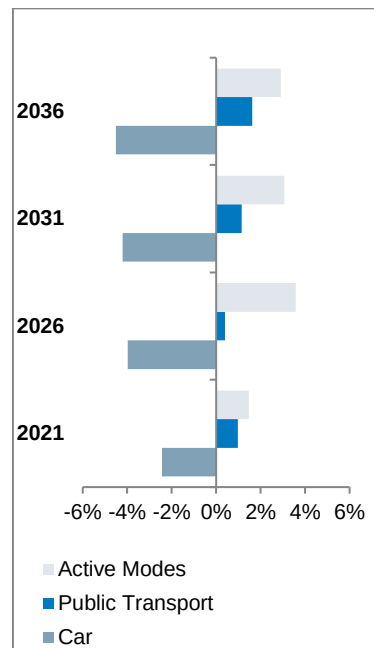


1.1 Context

As identified within the Existing Baseline Report (Part 1), Lambeth is a large and diverse Borough with different characteristics between the northern, central and southern sections. As a result, these sections of the Borough are expected to see different degrees of growth and future changes as identified through this document.

Following the methodology proposed in the Existing Baseline Report (Part 1), we have 'split' the Borough into three segments to help demonstrate the likely future challenges that Lambeth faces in the north, central and south sections.

Figure 1.2: Mode Share in the Lambeth



Source: London Transportation Studies Model (2011)

There are considerable differences in the future proposals with large investment in infrastructure in the north of the Borough, in areas such as Waterloo and Vauxhall, with very little major investment in the south of the Borough. Overall, the future proposals are likely to be occurring in the north of the Borough where there is expected to be large population increases.

Public transport mode share is expected to continue to increase, but only if capacity is increased to accommodate growth. Based on the continuation of recent trends, mode share of public transport and active travel modes will increase as mode share for car falls (see Figure 1.2). Much of this change is expected to come about from new residents, whose travel patterns are often different to existing residents. The Borough will therefore need to take action to encourage mode shift amongst existing residents too. In order to achieve this shift to more sustainable modes there will need to be considerable behavioural change in addition to investment in infrastructure. Measures to encourage a shift away from car could include smarter travel initiatives and measures to increase walking and cycling potential. Other measures that still allow access to services without having to travel as far, for example through better use of IT and freight consolidation, will also be important.

In order to maintain quality of life and support economic growth across Lambeth, it will be necessary to bring forward investment in the capacity of the transport network to cope with the demand and to enable people to get to work, businesses to access their customers and suppliers, and residents to access local services without experiencing significant overcrowding on public transport and congestion on the city's highways.

1.2 Evolving Content

In 2016, the introduction of a new Mayor of London and decision for the UK to leave the European Union (EU) were two of many changes that could have implications on future transport movements, policy and infrastructure. Two documents have recently been released which could shape future transport in Lambeth, these are 'A City for All Londoners' and the TfL business plan.

While the new Mayor of London's Transport Strategy (MTS) is scheduled for publication later in 2017, its expected principles were outlined in November 2016 through the Greater London Authority (GLA) publication 'A City for All Londoners'.³ This document detailed two

³ GLA, A City for All Londoners (2016)

main elements of the strategy: promoting travel behaviour change and increasing transport capacity.

The call to change the way Londoners travel is a response to the forecast six million additional trips on the capital's network by 2040. It centres on encouraging mode shift away from car and van and the use of more efficient, low-emission vehicles. To achieve these behaviour change aims, the GLA is expected to promote using road space for different purposes at different times of the day, shift freight consolidation centres closer to the River Thames or on the rail network, and encouraging more business deliveries by bike. These will be accompanied by campaigns to encourage a greater number of trips on foot or by bike - as part of the 'Healthy Streets' approach that aims to reduce traffic, pollution and noise, create more attractive, accessible and people-friendly streets where everybody can enjoy spending time and being physically active, and ultimately to improve people's health.

The second main element outlined in A City for All Londoners, to increase capacity, is driven by the Mayor's desire for investments to introduce new opportunities for communities beyond central London and as catalysts for regeneration. Several of these capacity-enhancing ambitions could directly affect Lambeth. These include the analysis of the growth potential of a better quality South London Overground service and the potential expansion of the Tramlink network from Wimbledon to Sutton, as well as the aims to secure a Bakerloo Line extension before 2030 and Crossrail 2 by 2033. Bus route improvements are also mooted with an ambition to establish 'mini-radial' transport systems through new strategic interchange hubs. This is to be complemented with the Hopper Fares that provide a second journey free within an hour of the first trip, and a requirement for all central London double-deckers to be 'Euro 6 Hybrid' by 2019 and retrofitting 3000 Outer London buses.

It is worth noting that two documents are expected to inform the Mayor's Transport Strategy. These are the 'Culture Infrastructure Plan' and the 'Night Time Economy Supplementary Planning Guidance' both to be published in 2017.

In the 2017 TfL Business Plan, boroughs are expected to collaborate on the delivery of the Healthy Streets programme, while existing levels of funding for Local Implementation Plans will be maintained. TfL will also detail an ambition to increase investment in town centres, and work with Business Improvement Districts (BIDs) to continue transforming areas including the Vauxhall gyratory.

Other localised improvements will be outlined in the Brixton Masterplan Development Brief, which sets out a guide to future development proposals. This prioritises several initiatives including, public realm

improvements, the creation of a cycle hub, the provision of a cycle hire scheme, the refurbishment of the rail station, a new entrance from the station to a new town square at Pope's Road, and a new off-street car park for the street market traders, to replace the existing facility.

1.3 Objectives and Data

The objectives of this Future Baseline Report (Part 2) are:

- To understand the future population growth projections for Lambeth and corresponding additional trips on the transport network
- To understand changes to Lambeth's transport network and schemes that are likely to be implemented, and
- To identify areas of the network which will be capacity constrained in future years, which may restrict growth

To assess the transport provision in the future, the following data sources have been used across all sections of the report:

1. ACEA (2014) Car sharing: Evolution, Challenges and Opportunities
2. Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007)
3. Business Register and Employment Survey (2014)
4. Car Club Coalition (2015) A Car Club Strategy for London
5. Carplus (2014) Annual Survey
6. Catapult (2016) Mobility as a Service
7. Crossrail Website (2016)
8. DEFRA - UK-air website (2016)
9. Draft Employment Land Review [2016]
10. Driving Electric Vehicles, TfL, Online (2016)
11. Employment Projections in the London Plan [2015]
12. Gatwick Obviously- Press Releases (2016)
13. GLA, A City for All Londoners (2016)
14. Government Ultra Low Emission Strategy
15. Greater London Authority (GLA) Economics Employment Projections (2013)
16. Greater London Authority (GLA) Economics Population Projections (2014)
17. Guidelines for Motorcycling (2005)
18. KPMG Connected Autonomous Vehicles Study
19. Lambeth Air Quality Action Plan (2017-2022) Draft for Consultation
20. Lambeth Local Plan [2015]
21. Lambeth Strategic Infrastructure Study (2015)
22. London Atmospheric Emissions Inventory (2013)
23. London Borough of Lambeth Local Implementation Plan (LIP) 2017/18 Spending Submission and programme of Investment Form
24. London Transportation Studies Model (2011)
25. Low Emission Neighbourhoods, Guidance Note, Online [2016]
26. Mayor of London. (2012) Vauxhall Nine Elms Battersea Opportunity Area Planning Framework
27. Mayors Transport Strategy (2011)

28. North Lambeth Delivery Plan (2016)
29. Northern Line Extension (2016)
30. Port of London Authority (2011) New Pier at St George Wharf.
31. Progress Report on the delivery of the Mayor's Air Quality Strategy (2015)
32. RAC Foundation (2012) Car Rental 2.0.
33. SoLHAM (2012)
34. Southern Rail Access to Heathrow (2015)
35. Sub Regional Transport Plan for Central London – 2015 Update
36. Taking Britain Further-Press Releases (2016)
37. TfL (2014) Record numbers travel on the River Thames as Action Plan delivers improvements in its first year.
38. TfL Bus Consultation, Online (2016)
39. TfL Business Plan (2016)
40. TfL Consultation on ULEZ (October 2016)
41. TfL Rail Terminal Study (2011)
42. TfL Railplan Data (2011)
43. TfL Road Modernisation Plan (2014)
44. TfL Website (2016)
45. TfL, Your accessible transport network Report (2015)
46. TfL. (2013) River Action Plan.
47. TfL's London Transportation Studies (LTS) Model
48. The Lambeth Cycling Strategy (2013)
49. The Lambeth Transport Plan (2011)
50. The Mayor's Vision for Cycling (2013)
51. The Mayors Transport Strategy: A Consultation on the key policies and proposals (2010)
52. Transport Emissions Roadmap (2014)
53. Ultra-Low Emission Vehicle (ULEV) Delivery Plan (2015)
54. Vauxhall Area Supplementary Planning Document [2012]
55. Waterloo Area Infrastructure Delivery Plan (2013)
56. Waterloo Area Supplementary Planning Document [2012]
57. WSP Electric Vehicle Charging Scheme Study

To understand the transport conditions over the next 10 to 20 years and in line with the LTTS assessment years of 2026 and 2035, the most available and relevant data sets have been analysed. In some instances it has not been possible to obtain data to correspond to the assessment years, though the most representative data has been used. For example, Railplan and SoLHAM outputs, which are models to assess public transport and road network capacity, have only been made available for TfL's standard years of 2011, 2021 and 2031.

Where data sources are lacking – and have been agreed as unavailable in the context of this study – they are highlighted in the gap analysis.

1.4 Report Structure

The structure of the report is as follows:

- Section 2 analyses TfL's trip generation forecasts in the Borough based on population growth and modal changes,
- Section 3 reports on the future active transport accessibility and conditions in the Borough,
- Section 4 examines the future public transport accessibility and likely capacity constraints across the Borough for rail, bus and underground services,
- Section 5 discusses the future road capacity challenges throughout Lambeth and future trends in powered two wheelers, cars and freight traffic,
- Section 6 covers future marine transport conditions in the Borough
- Section 7 reports on airports nearest the Borough and likely access changes in the future,
- Section 8 studies popular journey locations from Lambeth in future years,
- Section 9 analyses modelled pollutant data and identifies future hot spot areas in the Borough,
- Section 10 considers future technological, societal and policy changes that may affect the future transport infrastructure,
- Section 11 identifies the gaps in our analysis,
- Section 12 outlines the findings from a Strength Weakness Opportunity Threats (SWOT) analysis of Lambeth's future transport network, and
- Section 13 draws together the summary and conclusion

2 Trip Generation Forecast

This section of the report examines TfL's future growth predictions and likely mode share changes in the Borough. The trip generation analysis identifies the number of additional trips expected on Lambeth's transport network in the future years. The predictions are based on TfL's London Transportation Studies (LTS) 2011 base year model and inform the likely capacity constraints that may affect the Borough.

2.1 Background

Trip Generation: Data Sources

- Greater London Authority (GLA) Economics Employment Projections (2013)
- Greater London Authority (GLA) Economics Population Projections (2014)
- Employment Projections in the London Plan [2015]
- Draft Employment Land Review [2016]
- Lambeth Local Plan [2015]
- Waterloo Area Supplementary Planning Document [2012]
- Vauxhall Area Supplementary Planning Document [2012]
- TfL Rail Terminal Study (2011)
- Business Register and Employment Survey (2014)

A trip generation exercise has been undertaken to identify capacity constraints on the transport network. The analysis highlights transport challenges that may restrict planned growth in the Borough and identifies whether improved transport infrastructure is required to support growth.

Trip generation predictions have been calculated using TfL's LTS model. The LTS model has been analysed to understand the likely additional active mode, public transport, and car trips on Lambeth's transport network in the future.

Due to the complexity of forecasting trip generation in the Borough, which may be influenced by several factors (e.g. growth assumptions, macroeconomic factors, policy interventions and transport infrastructure), it should be noted that the number of additional trips presented in this report should be treated as indicative only.

TfL's LTS data has been used as it provides demand inputs to the Railplan and SoLHAM models, which are discussed in more detail throughout the report. In order to have confidence in LTS data, a separate assessment of population growth has been undertaken to compare the assumptions made by TfL. Mott MacDonald teamed up with planning consultants, Turley, to carry out a separate assessment of residential and employment population projections in Borough centres, and the comparison is presented later in this section.

It is also important to note that the trip generation analysis is only able to indicate the number, and type, of trips starting and finishing in LTS zones in Lambeth. It is not possible to understand the journey people take through the Borough (i.e. trip assignment) and thus the number of trips in the Borough might be underestimated by the model. However, trip assignment is analysed further for public transport (via Railplan outputs) and highway traffic (via SoLHAM outputs) later in this report.

The trip generation methodology has been agreed in advance by LBL.

2.1.1 What is the London Transportation Studies (LTS) model?

The latest LTS model at the time of writing (v 7.0) uses residential and employment population forecasts along with other inputs to predict the number of trips to be made, where people travel to and from, when they travel and which transport mode they use. The model predicts how personal travel in London might respond to socio-demographic changes to population and employment, new transport infrastructure, policy interventions, macroeconomic factors, and other influences such as levels of car ownership.

The following journey purposes are represented in the model:

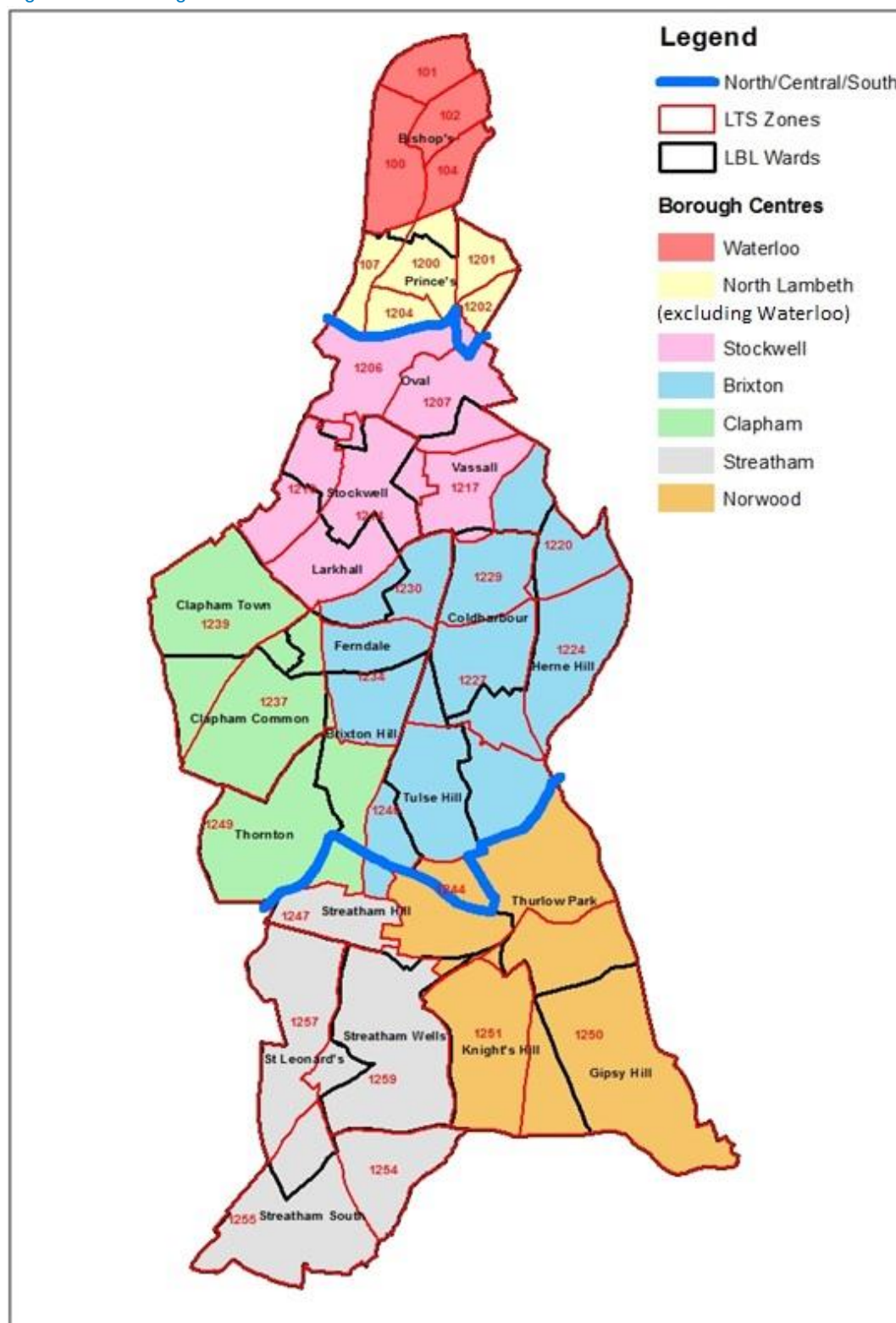
- Home-based work – white collar (journey between home and work by people based on socio-economic groupings)⁴
- Home-based work – blue collar (journey between home and work by people based on socio-economic groupings)⁴
- Home-based employers' business (journey between home and work at employers' expense)
- Home-based education (journey between home and school, university, or college)
- Home-based other (journey between home and other activity such as shopping or leisure)
- Non-home-based employers' business (trips at employers' expense that do not begin or end at home)
- Non-home-based other (all other trips)

Trip generation analysis has been extracted per LTS modelled zone, for all journeys originating and ending in Lambeth. Trip generation has been calculated per LTS zone, however for clarity throughout this report, each LTS zone has been assigned to a Borough centre (neighbourhood / town centre) location, and the amalgamation of zones is shown in Figure 2.1. It is noted that the LTS zones do not directly align to ward boundaries / Borough centres and professional judgement has determined the LTS zones that make up the Borough centres. This approach has been agreed in advance with the LBL.

Trip generation has been calculated for four future years, 2021, 2026, 2031 and 2036, and the analysis has been compared to the 2011 base situation throughout this report (which is discussed in the Existing Baseline Report – Part 1). Trip generation results represent trips undertaken in the AM peak period (07:00 - 10:00), as this is considered as the worst case scenario.

⁴ Blue and White collar splits are based on ONS-SOC2011 classifications.

Figure 2.1: Amalgamation of LTS Zones



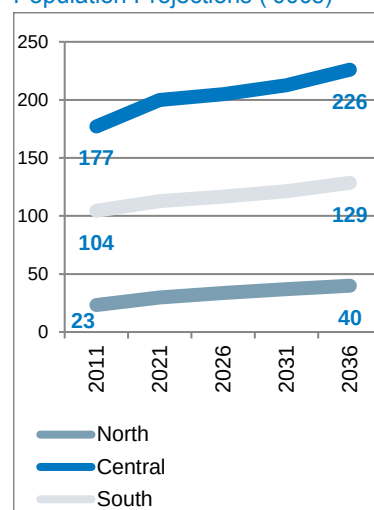
Source: Ordnance Survey
See Appendix B for list of LTS zones

2.2 Population Growth Forecast

Future trip generation projections in Lambeth are largely based on population growth forecasts, and in particular changes to residential and employment populations.

2.2.1 Residential Population

Figure 2.2: Lambeth's Resident Population Projections ('000s)



Source: London Transportation Studies Model (LTS)

Table 2.1: Resident Population Growth Forecast (LTS vs Turley)

	2026	2035/ 2036
LTS	355,000	394,000
Turley	355,000	376,000

Note: LTS assessment (2026 & 2036)
Turley assessment (2026 & 2035)

Lambeth's residential population growth estimates have been obtained from TfL's LTS model. The data indicates that between 2011 and 2036, Lambeth's residential population is expected to increase by 29 per cent from approximately 305,000 to 394,000 people.

As Figure 2.2 shows, the central section has the highest proportion of Lambeth's population, and the population here is expected to increase to 226,000 in 2036, which is an increase of 28 per cent from 2011. The greatest percentage increase in population is expected in the northern section of the Borough, where the residential population is expected to increase by 72 per cent from 23,000 to 40,000 residents between 2011 and 2036.

Mott MacDonald teamed up with planning consultants, Turley, to undertake a separate assessment of residential population growth for the LLTTS assessment years of 2026 and 2035; and these were compared to TfL's assumptions. Turley's population predictions have been drawn from the latest development based population trends available at ward level, published by Greater London Authority (GLA) Economics.⁵ These were then compared to additional homes for Waterloo and Vauxhall as set out in the Lambeth Local Plan, and housing growth aspirations set out in the Waterloo Area SPD and Vauxhall SPD.

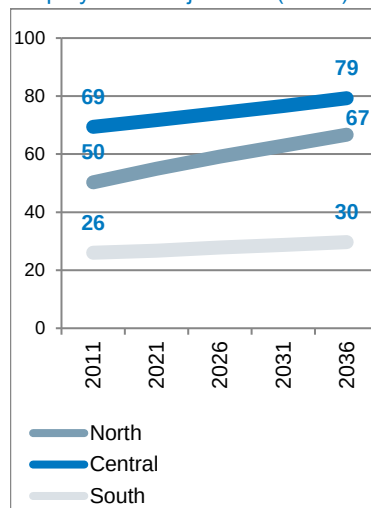
Turley's predictions in 2026 and 2035 are shown in Table 2.1, and indicate that they tend to agree with TfL's population assumptions in 2026, and under predict the population forecast by 5 per cent compared to TfL's assumptions in 2036. However part of this difference may be attributed to the different assessment years. On this basis, we can be confident that TfL's residential population growth forecasts are sensible and may present the worst-case scenario.

2.2.2 Employment Population

Lambeth's employment growth estimates have also been obtained from TfL's LTS model. The data shows that the number of jobs in Lambeth is

⁵ 2014 'Housing Based' SHLAA Capped Short Term projection

Figure 2.3: Lambeth
Employment Projections ('000s)



Source: London Transportation
Studies Model

expected to increase by 21 per cent between 2011 and 2036, from approximately 146,000 to 176,000 jobs.

Figure 2.3 shows that the greatest proportion of jobs is in the central section of the Borough, which is closely followed by the northern section. By 2036, the employment population in the central section is expected to increase by 14 per cent from 69,000 jobs in 2011 to 79,000 jobs in 2036. However, the greatest proportionate employment growth is expected in the northern section of the Borough, where the number of jobs is expected to increase by 33 per cent, from 50,000 to 67,000 jobs. The southern section of the Borough has the lowest employment population (26,000 jobs) and is expected to experience a similar growth to the central section, with increases of 14 per cent by 2036 compared to 2011 levels.

Mott MacDonald teamed up with planning consultants, Turley, to undertake an assessment of employment population growth for the LLTTS assessment years of 2026 and 2035, which were then compared to TfL's forecasts. Turley's employment predictions have been based on the draft Employment Land Review (ELR)⁶, which forms part of the evidence base for the new Lambeth Local Plan. These estimates are based on Experian forecasts and are above the latest GLA Economics projections.⁷ These projections have converted Full Time Equivalent (FTE) job estimates, as estimated by Experian in the draft ELR, to total jobs based on the average ratio of FTE to total jobs in the Borough, based on the latest data.⁸ To align the 2013-2031 projections as set out in the ELR to the 2026 and 2035 timeframes, the projections have been extrapolated on a per annum basis. As the growth aspirations for the Borough are to 2031, the bulk of the growth (75%) is to 2026 and the remainder to 2035.

Table 2.2: Employment Population
Growth Forecast (LTS vs Turley)

	2026	2035/ 2036
LTS	161,000	176,000
Turley	188,000	205,000

Note: LTS assessment (2026 & 2036)
Turley assessment (2026 & 2035)

Turley's predictions for 2026 and 2035 are shown in Table 2.2, and indicate that they tend to overestimate TfL's employment population forecast by 17 per cent in future assessment years. As stated previously, due to complexity of forecasting employment projections there are likely to be differences in the population numbers.

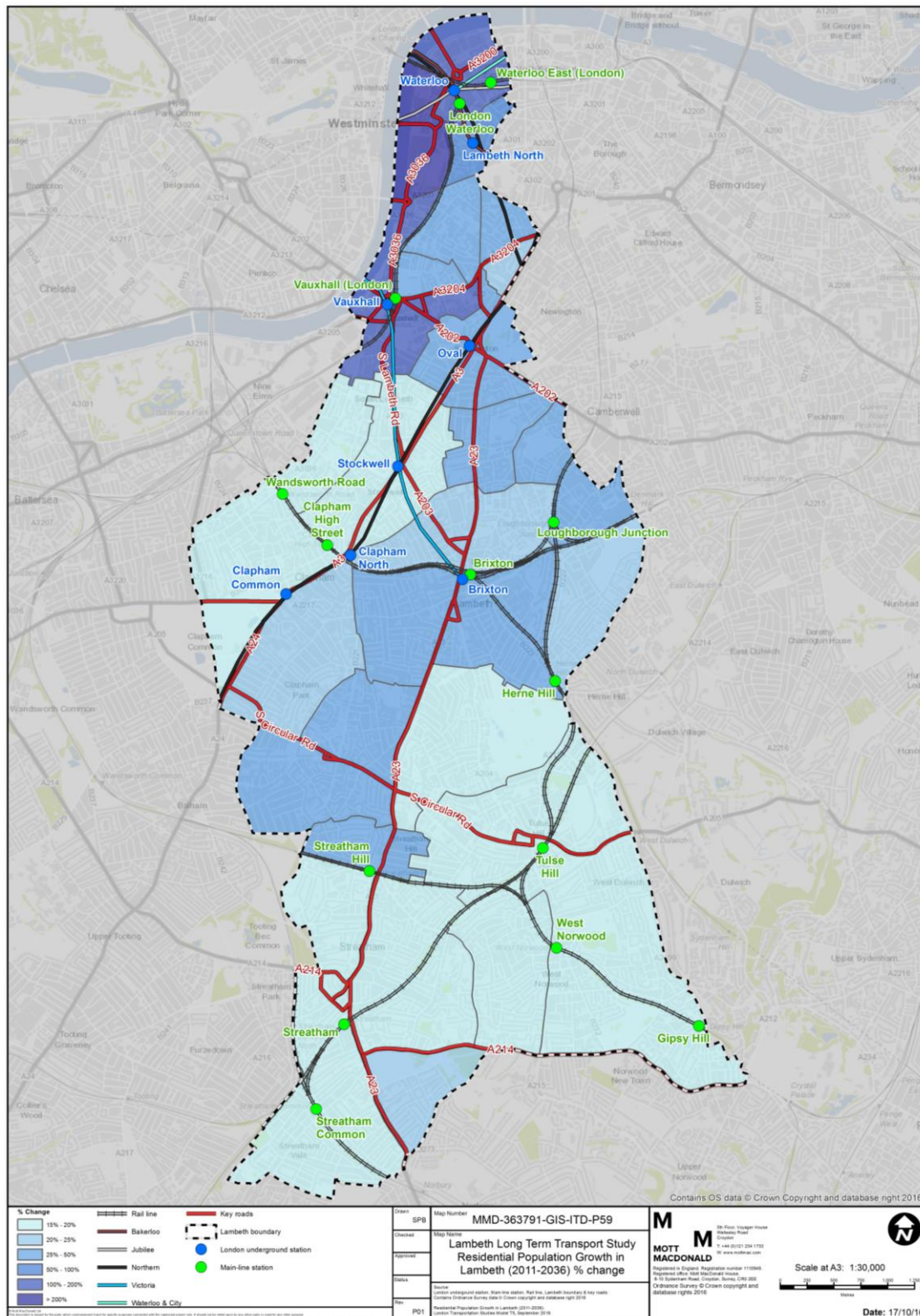
Figure 2.4 and Figure 2.5 present the population growth assumptions per LTS zone. These figures highlight the localised variations of residential and employment growth within sections of the Borough.

⁶ Employment Land Review (2016)

⁷ GLA Economics Projections data (2013)

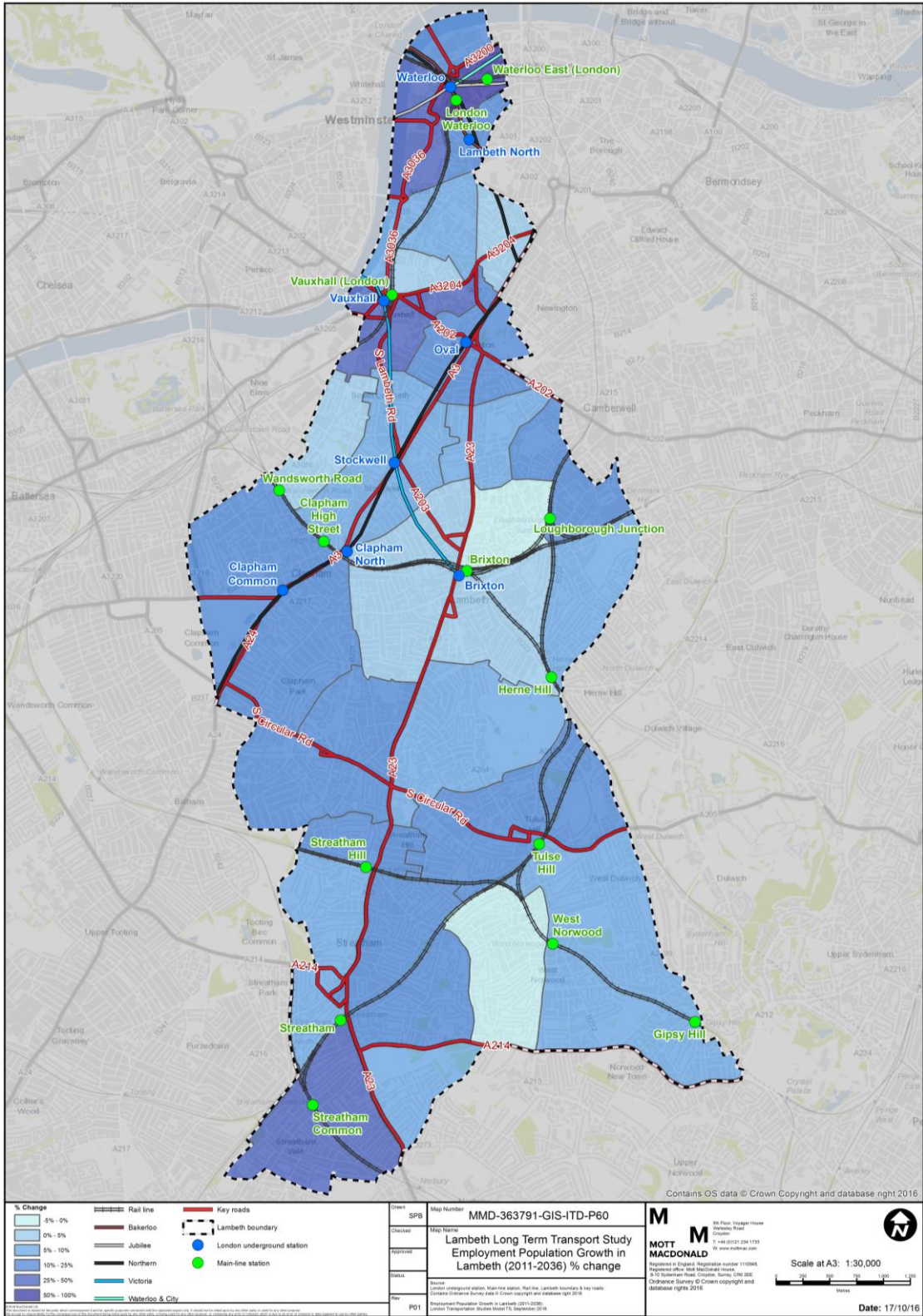
⁸ Business Register and Employment Survey (2014)

Figure 2.4: Residential Population % Change (2011-2036)



Source: London Transportation Studies Model (2011)

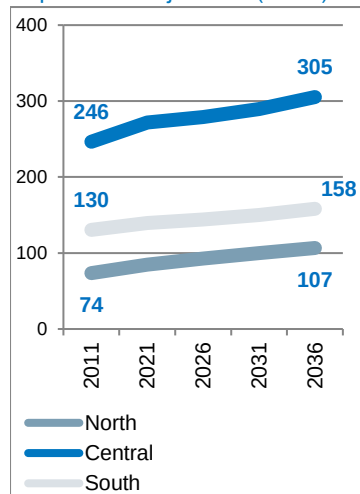
Figure 2.5: Employment Population % Change (2011-2036)



Source: London Transportation Studies Model (2011)

2.2.3 Total Population

Figure 2.6: Lambeth Total Population Projections ('000s)



Source: London Transportation Studies Model

Overall in 2036, Lambeth's total population (residential plus employment) is expected to be approximately 570,000, which is an increase of 27 per cent from 2011.

As shown in Figure 2.6, the central section of the Borough is anticipated to hold the largest share of Lambeth's total population (54%) in 2036. The population in this region is expected to increase by 24 per cent from 246,000 in 2011 to 305,000 in 2036. The southern section of the Borough is likely to have 28 per cent of Lambeth's total population, and is predicted to increase to 158,000 in 2036 from 130,000 in 2011, up by 21 per cent. The north of the Borough has the lowest share of the population in Lambeth, but this area is expected to experience the highest growth in population, and thus most pressure on existing transport infrastructure. In the north, the total population is expected to reach 107,000 in 2036 from 74,000 in 2011, which is an increase of 45 per cent.

2.3 Mode Share Forecast

Residential and employment growth reduces the capacity on Lambeth's road network, and is likely to cause increased demand for public transport and active modes in the future, which can put pressure on these networks.

Figure 2.7, Figure 2.8 and Figure 2.9 present the mode share changes in the future years compared with 2011 levels in the northern, central and southern sections of the Borough.

Generally, car mode share is expected to reduce and travel by active modes is forecast to increase in all areas throughout the Borough. The greatest reductions in car mode share are experienced in the central and southern sections of the Borough, in areas such as Streatham and Norwood. Norwood is expected to see a 2 per cent increase in people travelling by public transport; however, the mode share for public transport is expected to remain unchanged in other central and southern locations. In the north of the Borough, the mode share for public transport is expected to decrease quite significantly, and there is likely to be a considerable increase in active mode trips, with active mode trips in Waterloo increasing by 7 per cent in 2026, when compared to 2011 levels.

Figure 2.7: Mode Share Changes – North Lambeth

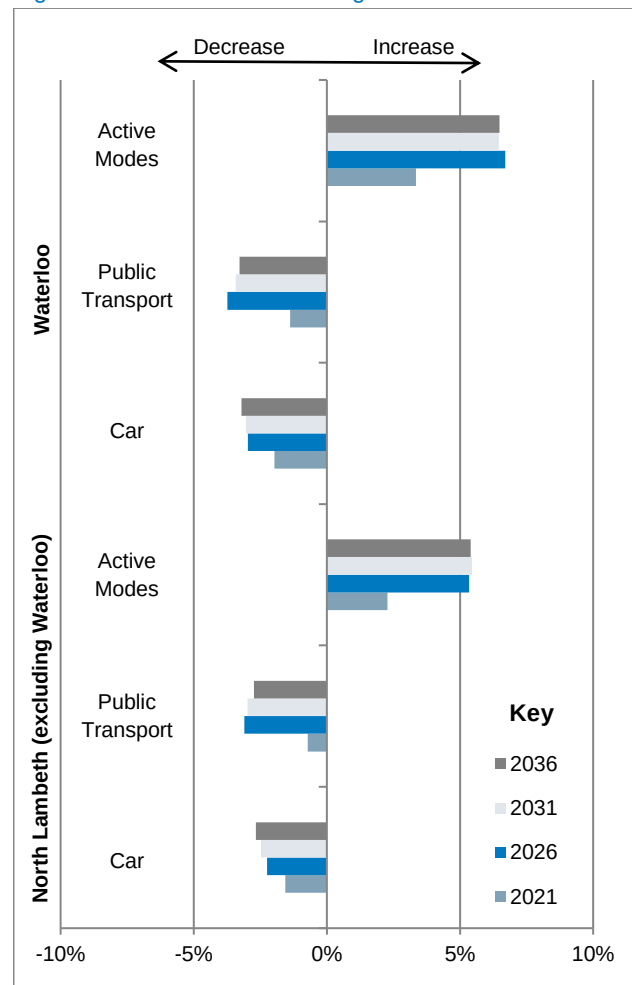


Figure 2.8: Mode Share Changes – Central Lambeth

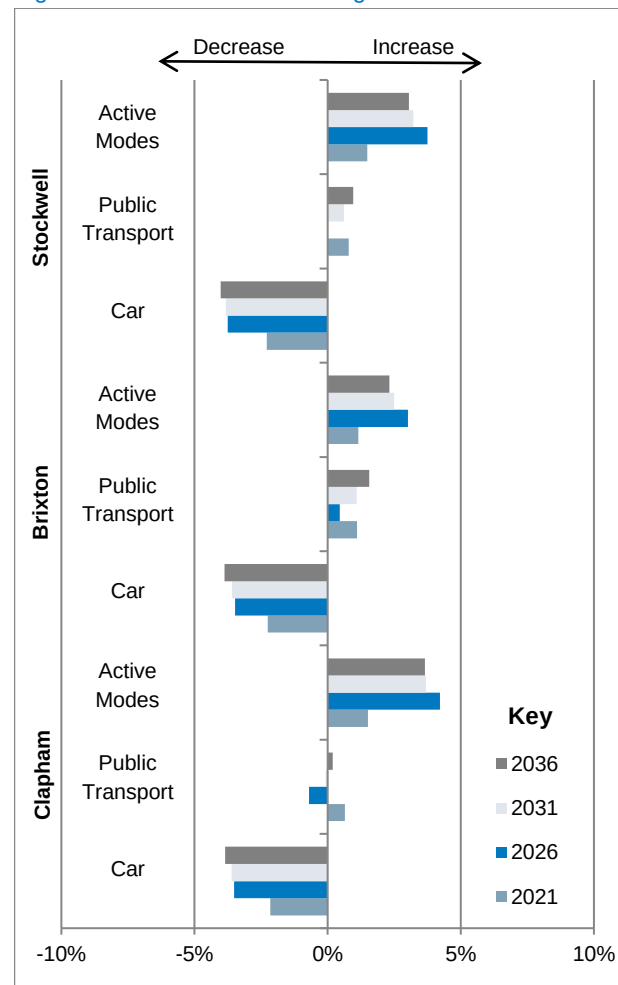
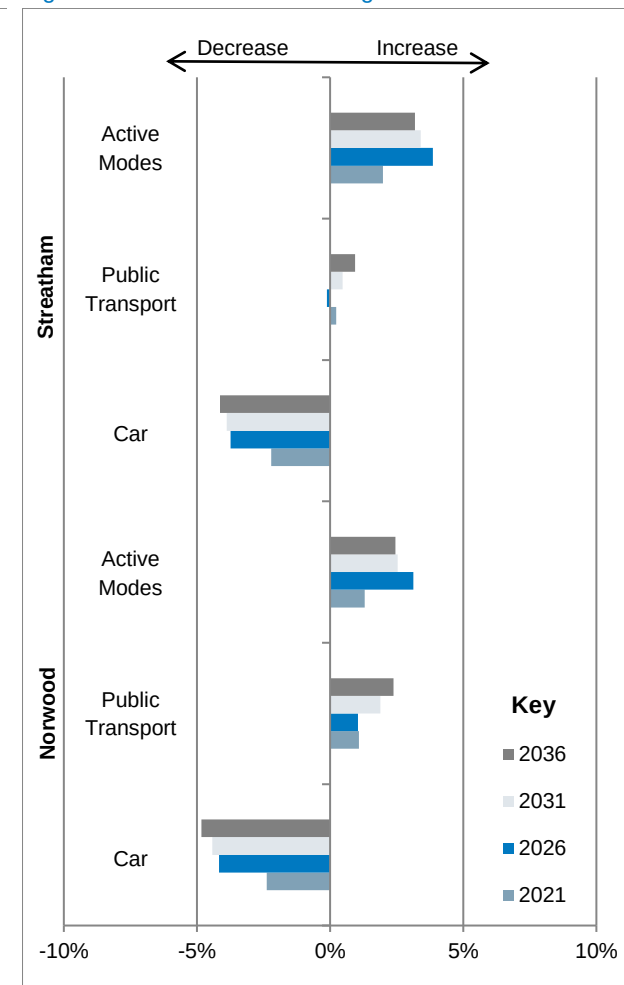


Figure 2.9: Mode Share Changes – South Lambeth



Source: London Transportation Studies Model (2011)

2.4 Total Trip Generation Forecast

Table 2.3 presents the AM peak period trips in 2011 and the projected change of trips in the future years. The trip generation is based on total population forecasts and mode share predictions. Trip generation for each mode is discussed further in each chapter.

Table 2.3: Forecast AM Trips in Lambeth (including all purposes)

Borough Centre			Mode	2011	% change compared to 2011 trips			
					2021	2026	2031	2036
North Lambeth	Waterloo	Car	2,473	-1%	1%	5%	9%	
		Public Transport	25,856	23%	39%	50%	63%	
		Active Modes	4,475	45%	101%	118%	135%	
		Total	32,804	24%	45%	56%	69%	
	North Lambeth (excluding Waterloo)	Car	2,119	1%	-5%	-2%	2%	
		Public Transport	11,642	19%	20%	26%	33%	
		Active Modes	4,423	38%	63%	68%	77%	
		Total	18,185	21%	28%	33%	40%	
Central Lambeth	Stockwell	Car	9,790	4%	0%	2%	6%	
		Public Transport	30,405	21%	24%	30%	38%	
		Active Modes	17,515	25%	44%	46%	54%	
		Total	57,710	19%	26%	30%	38%	
	Brixton	Car	15,643	-1%	-6%	-5%	-1%	
		Public Transport	34,855	13%	13%	17%	24%	
		Active Modes	22,172	14%	23%	24%	29%	
		Total	72,670	10%	12%	14%	20%	
	Clapham	Car	11,757	1%	-2%	-1%	2%	
		Public Transport	25,843	15%	18%	21%	27%	
		Active Modes	15,835	19%	33%	33%	37%	
		Total	53,434	13%	18%	20%	25%	
South Lambeth	Streatham	Car	13,811	0%	-5%	-4%	0%	
		Public Transport	21,581	12%	15%	20%	27%	
		Active Modes	14,547	14%	24%	25%	31%	
		Total	49,940	9%	12%	15%	21%	
	Norwood	Car	12,613	-1%	-6%	-5%	-2%	
		Public Transport	19,442	8%	9%	13%	18%	
		Active Modes	15,718	14%	22%	23%	27%	
		Total	47,773	8%	9%	12%	16%	
Lambeth Total	Car	68,206	0%	-4%	-3%	1%		
	Public Transport	169,623	16%	20%	25%	33%		
	Active Modes	94,686	20%	34%	36%	42%		
	Total	332,515	14%	19%	23%	29%		

Source: London Transportation Studies Model (2011) Note: See Appendix C for Origin and destination trip numbers

2.5 Waterloo Trip Generation

Waterloo station itself is a major trip generator caused by a high number of passengers (underground and rail) arriving and departing from Waterloo station for onward journeys to central London locations (in the AM peak period). Therefore, Waterloo trip generation has been analysed as a separate exercise.

The trip generation analysis presented in Table 2.3 above does not take account of additional future trips generated at Waterloo station where the origin and destination of the trip is outside of the Borough boundary. For example, people who start their journey in Woking will alight at Waterloo station to end their journey in Westminster will not be accounted for in the LTS model.

TfL's 2011 Rail Terminal Study, which includes results of an AM peak (07:00-10:00) survey of passengers entering and exiting Waterloo station, has been examined to understand additional trips likely in the future around Waterloo. The survey results show the number and mode share of passengers travelling between Waterloo station and central London; and these are summarised in Table 2.4 below.

The number of passengers at Waterloo station is expected to increase over the next 10 to 20 years due to growth in population in London and suburban areas along the South West Trains network. This is backed up by results from TfL's Railplan model, which shows that there is expected to be approximately 13 per cent growth in passengers at Waterloo station between 2011 and 2021, and an increase of 25 per cent of passengers between 2011 and 2031. Therefore, there is likely to be an increase of onward journeys from Waterloo station, see Table 2.4.

Table 2.4: Waterloo Station AM Peak trips (2011)

	Underground	Walk	Bus	Rail	Cycle	Taxi
Mode Share (2011)	55%	21%	11%	9%	2%	1%
AM Peak Trips (2011)	55,550	21,210	11,110	9,090	2,525	1,515
Estimated AM Peak Trips (2021)	62,660	23,924	12,532	10,253	2,848	1,709
Estimated AM Peak Trips (2031)	69,381	26,491	13,876	11,353	3,153	1,892

Source: TfL Rail Terminal Study (2011)

Since the Rail Terminal Study was carried out in 2011, there has been significant expansion of TfL's cycle hire scheme which was first introduced in 2010. The Existing Baseline Report (Part 1) demonstrated that the busiest cycle hire locations in London are around Waterloo station, Therefore cycle mode share for Waterloo passengers is likely to have increased since 2011, and may increase in future years compared to the 2 per cent shown in the Rail Terminal Study results.

3 Active Modes

This section of the report analyses the likely future levels of active transport in Lambeth. The analysis accounts for future walking and cycling trip generation and examines likely future schemes that are likely to be implemented in the Borough.

3.1 Trip Generation

Table 3.1 presents the number of active travel (walking and cycling) trips in 2011 during the AM peak period. The table presents the change in combined walking and cycling trips per Borough centre in the future years, compared with 2011 trips.

It should be noted that the data does not detail the specific origin and destination of trips, therefore the active travel trips presented are only representative of people residing or working in the Borough boundary. The trip generation analysis does not account for active mode trips through the Borough for any journey where the origin and destination is outside of Lambeth's boundary. As such, the additional active mode trips presented in Table 3.1 are likely to under predict the actual number of trips on Lambeth's transport network.

Table 3.1: Active Modes: Trip Generation in Lambeth

	Borough Centres	2011	2021	2026	2031	2036
North Lambeth	Waterloo	4,475	45%	101%	118%	135%
	North Lambeth (excluding Waterloo)	4,423	38%	63%	68%	78%
Central Lambeth	Stockwell	17,515	25%	44%	46%	54%
	Brixton	22,172	15%	23%	24%	29%
	Clapham	15,835	19%	33%	33%	37%
South Lambeth	Streatham	14,547	14%	24%	25%	31%
	Norwood	15,718	14%	22%	23%	27%

Source: London Transportation Studies Model (2011). The figures represent the number of trips in the AM peak period. All percentage changes are representative of changes from the 2011 baseline figure.

Nonetheless, the data does indicate that the number of active travel trips in Lambeth is anticipated to increase throughout the Borough. Table 3.1 shows that by 2026 the number of active travel trips is expected to increase by at least 20 per cent in all areas.

The north of the Borough is anticipated to experience largest increases in active mode trips, with North Lambeth (excluding Waterloo) experiencing a 63 per cent increase in active mode trips and in Waterloo, active mode trips are expected to increase by 101 per cent by 2026. In

addition, north Lambeth and Waterloo especially may be expected to experience additional trips than projections show in Table 3.1 due to the number of people that may alight Waterloo station and cycle or walk for their onward journey. These trips where the origin and destination are outside of the Borough boundary are not represented in TfL's LTS analysis.

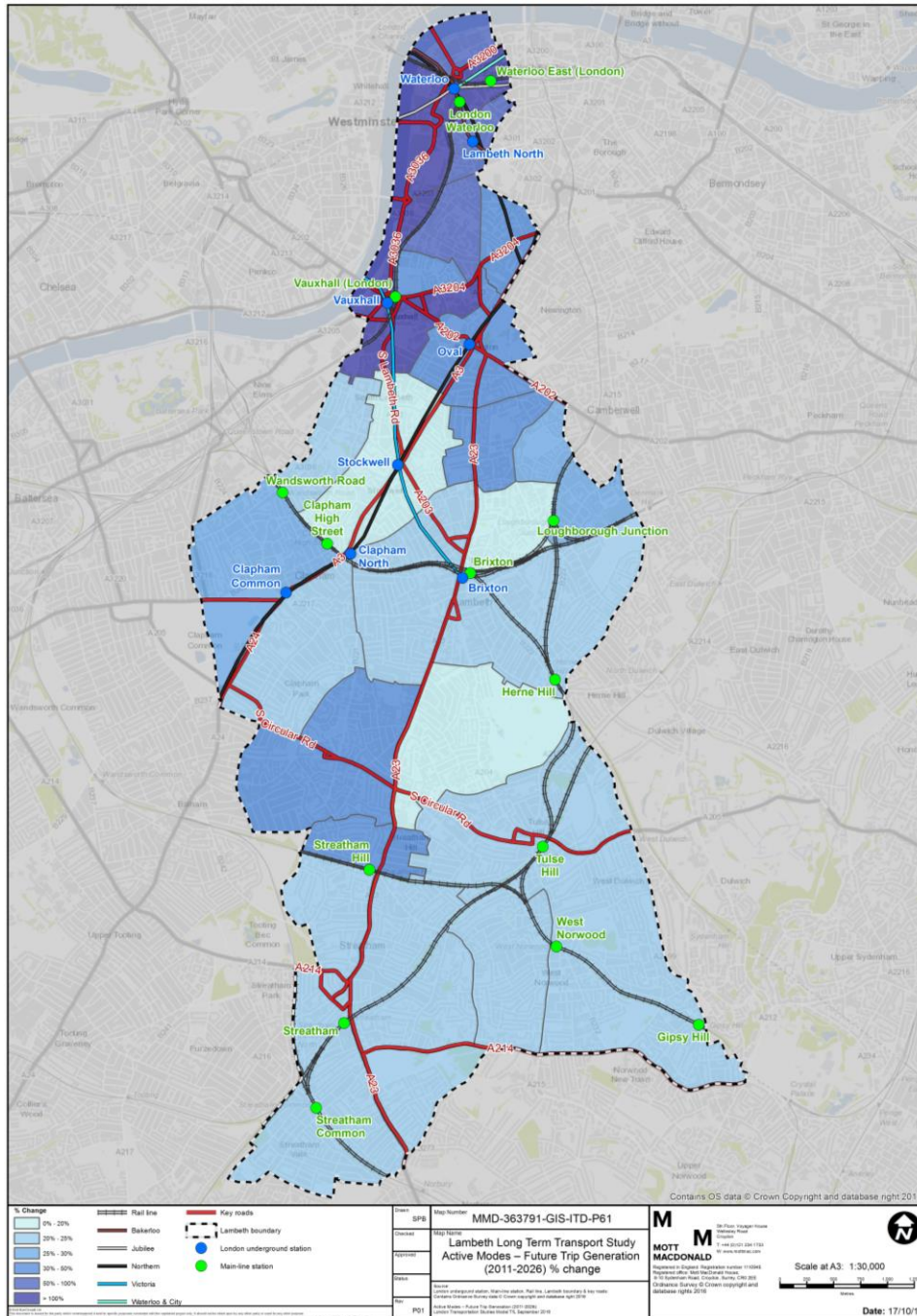
In the central and southern sections of the Borough, the number of active mode trips are also expected to increase quite significantly. For example, there is expected to be more than half the number of active mode trips in Stockwell by 2036 compared to 2011. Also, the number of active mode trips in Streatham are expected to increase by 31 per cent.

The predicted rise in active mode trips throughout the Borough is likely to be an extension of increased walking and cycling in recent years (see Existing Baseline Report – Part 1) and as a result of limited capacity expected on the road and public transport networks. However, it is vital that measures are introduced to encourage the shift to active travel and to support the increased level of walking and cycling in the Borough. For example, enhanced public realm improvements are likely to improve pedestrian accessibility and the development of cycle superhighways and quietways are likely to encourage cycling in the Borough.

While active travel mode trips generally increase in the future years, it must be noted that the percentage change will vary at each location and will depend on localised factors, which may determine the uptake of active modes. For example, the provision of cycle and walking infrastructure, public realm enhancements and the permeability across large road networks is likely to encourage the uptake of active mode trips.

Figure 3.1 and Figure 3.2 highlight the variations of future active travel trips in the Borough in 2026 and 2036.

Figure 3.1: Active Travel: Future Trip Generation Change % (2011-2026)

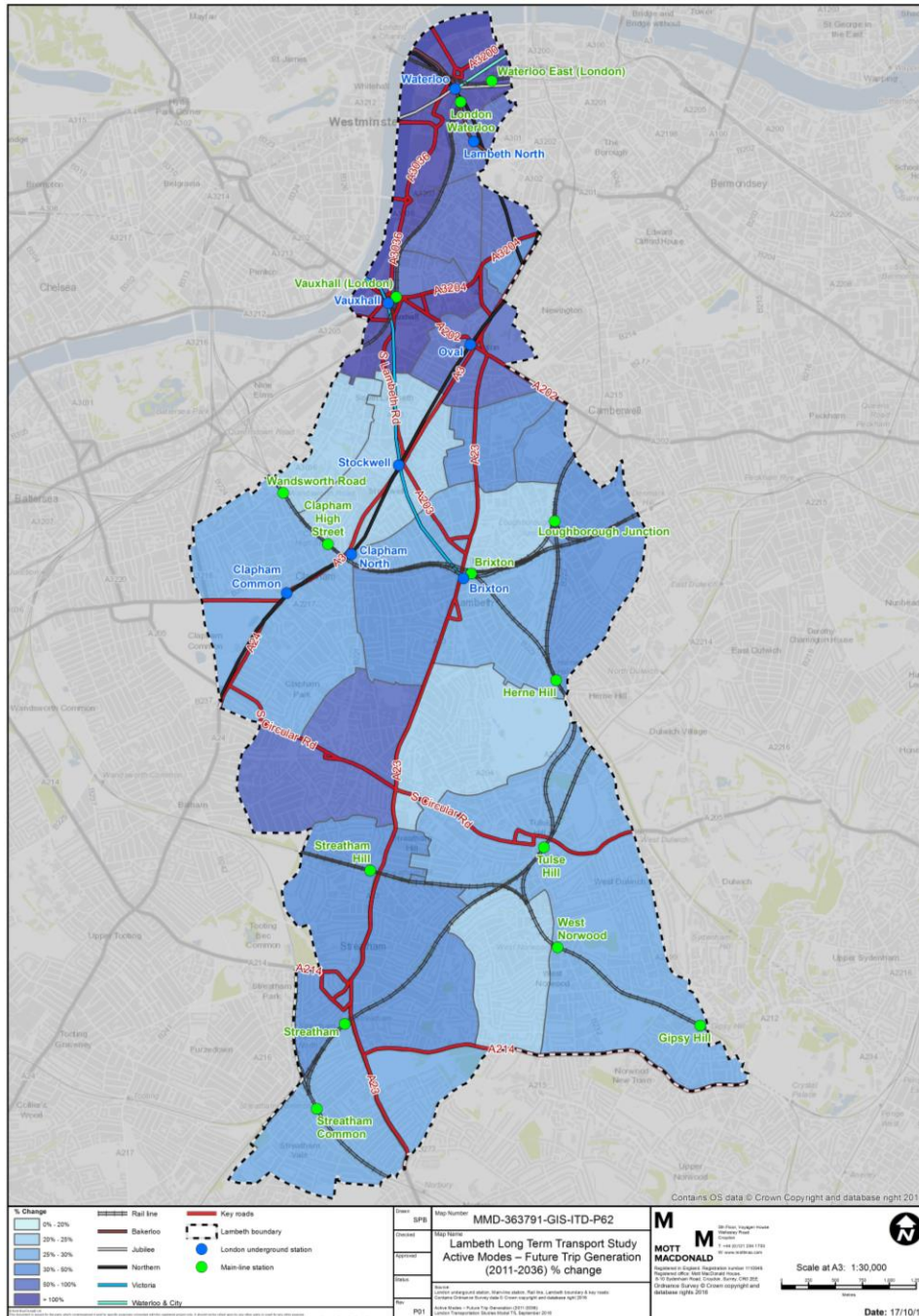


Key Observations:

- The number of active travel trips are forecast to increase significantly in all areas throughout the Borough.
- The highest increase in walking and cycling trips in the Borough is expected close to Waterloo East, where active mode trips are expected to increase by 140 per cent, from 1,385 to 3,321 trips.
- There is a high increase of active mode trips in north Lambeth particularly around Waterloo and Vauxhall stations. The number of trips in these locations are expected to double between 2011 and 2026.
- Areas north of Streatham Hill are also expected to experience a significant increase in active travel trips.
- The south of the Borough is likely to see a consistent increase across LTS zones, with active travel trips expected to increase by around 22 to 24 per cent.

Source: London Transportation Studies Model (2011)

Figure 3.2: Active Travel: Future Trip Generation Change % (2011-2036)



Key Observations:

- The highest increase in walking and cycling trips in the Borough is expected close to Waterloo East, where active mode trips are expected to increase by 169 per cent from 1,385 to 3,722.
- There is a high increase of active mode trips in north Lambeth particularly around Waterloo and Vauxhall stations. The number of trips in these locations is expected to double between 2011 and 2036.
- Areas north of Streatham Hill are also expected to experience a significant increase in active travel trips, where active travel trips increase by 45 to 50 per cent in 2036.
- The south of the Borough is likely to see a consistent increase across LTS zones, with active travel trips expected to increase by around 30 per cent.

Source: London Transportation Studies Model (2011)

3.2 Walking

Walking: Data Sources

- Lambeth Strategic Infrastructure Study (2015)
- London Borough of Lambeth Local Implementation Plan (LIP) 2017/18 Spending Submission and programme of Investment Form
- London Transportation Studies Model (2011)
- North Lambeth Delivery Plan (2016)
- TfL Website (2016)
- The Lambeth Cycling Strategy (2013)
- The Mayor's Vision for Cycling (2013)

The Existing Baseline Report (Part 1) indicated that 23 per cent of people who live in north Lambeth walk to work, 7 per cent of residents walk to work in central Lambeth and 5 per cent of residents in the south walk to work.

Improving infrastructure for walking was a key aim of the previous Mayor and stated in the Transport Strategy⁹, which details the following objectives:

- To design and redesign public spaces to encourage more Londoners to walk, particularly through the 'better streets' schemes,
- To make walking count as almost all journeys require some walking, the strategy will improve the provision of resources and information to meet this goal,
- To make sure people feel safe when walking by improving road safety,
- To reduce London's CO₂ emissions by 60 per cent by 2025. Cleaning up our transport system is a major part of this effort and reliant on the encouragement and uptake of walking in reducing emissions, and
- To provide better information such as local journey planning tools and smarter travel initiatives.

With regard to local policy, Lambeth's Transport Plan outlines the boroughs ambition until 2031,¹⁰ in which walking plays a major role. The overarching principles of the document are adopted from the Mayors Transport strategy to fit the aspirations of the Borough.

The documents' overarching vision for walking is 'to promote and increase walking's modal share'. The strategy will see a restructuring of the Road Hierarchy list, placing walking at the top of the list.

3.2.1 Future Challenges

Based on existing conditions and analysing future trip generation analysis, Table 3.2 highlights areas of the Borough that may experience future walking challenges.

⁹ The Mayors Transport Strategy: A Consultation on the key policies and proposals (2010)

¹⁰ The Lambeth Transport Plan (2011)

Table 3.2: Walking: Future Challenges

Future Challenges	
North Lambeth	Waterloo - The pedestrian environment around Waterloo station already faces considerable capacity constraints and congestion in and around the station. Increases in passenger numbers interchanging in the Waterloo area, particularly during commuting hours is likely to create substantial challenges in the future resultant of onwards trips from the station; changes to existing walkways will be required. - If the Waterloo Station development is implemented the pedestrian environment is anticipated to experience additional capacity demand. An improved pedestrian environment at the Waterloo IMAX roundabout may result in additional pedestrian trips in and around Waterloo.
Central Lambeth	Vauxhall - Vauxhall is a key location for passenger interchange, particularly between the bus terminus, National Rail station and Underground. Increases in passenger numbers on these networks is likely to lead to add substantial footfall to the pedestrian network in the area, creating challenges for the future. While the Vauxhall gyratory has undergone substantial public realm enhancements, the nature of the road network is anticipated to continue to restrict severance for pedestrians in the area, particularly at crossing points during peak hours. Stockwell / Oval - In future years there are still likely to be severance and safety issues for pedestrians at Stockwell and Oval due to the high volumes of traffic which are still predicted to pass through these areas. - The pedestrian infrastructure will come under pressure because of the large increases in active travel creating capacity constraints at both locations. Brixton / Clapham - User conflict is likely to remain a feature of both Clapham and Brixton because of the high volumes of traffic passing through the areas on the Borough's busy arterial roads. As a result, severance and safety issues are likely to create challenges for the area.
South Lambeth	Tulse Hill - High car volumes in the Tulse Hill area will create issues for pedestrians in traveling around the area on foot, improving access to the stations by foot is likely to be a challenge that will need to be addressed in the future. The possible extension of the ULEZ to the South Circular could increase car volumes and escalate the issues. Streatham - Walking in the Streatham area will continue to make up a low proportion of the modal split; this is due to the distance to the centre of London and to rail stations. Without improvements to the A23, walking will continue to be hindered due to congestion and safety concerns.

3.2.2 Future Schemes

Table 3.3 shows the pedestrian improvements that are likely to be implemented in the Borough by 2026 and 2035, and thus the likely pedestrian environment. The inclusion of these schemes in the following table is based on strong policy and/or funding backing, which have been agreed in advance with LBL.

Table 3.3: Future Pedestrian Schemes in the Borough

	Pedestrian Improvements	Scheme Benefit
North Lambeth		
Waterloo Station	By 2026 the walking environment around Waterloo station is likely to significantly improve through the Elizabeth House and Shell Centre developments. Both developments are expected to be constructed by 2019. The following pedestrian improvements are proposed between Waterloo Station and the South Bank¹¹: • Elizabeth House – Widen eastern footway of York Road – Remove high level pedestrian bridge on York Road • Shell Centre – Improve public realm on York Road – Improvements to pedestrian crossing capacity on York Road – Improved pedestrian footways on Chicheley Street – Making Belvedere Road / Upper Ground a prestige walking route – New pedestrian routes through the site to provide better linkages between Waterloo and South Bank • Waterloo/IMAX Roundabout – Proposals to remove existing roundabout and introduce a more pedestrian friendly environment – The enhancements to the current pedestrian subways are also being considered – Public consultation is anticipated in 2016/17 and could be in place by 2020	The pedestrian environment around Waterloo station is still likely to be congested if the Waterloo station development is implemented, which proposes a new western pedestrian access. Waterloo station currently acts as a superblock with poor pedestrian permeability through the station. This is unlikely to significantly improve without enhancements to public realm at Waterloo station. Potential enhancements to the station frontage and severance from both National Rail and underground platforms would potentially improve increased pedestrian footfall from Waterloo station to the South Bank, which are currently poor due to dominance of cars and lack of legibility.
Central Lambeth		
Vauxhall	As part of the TfL Road Modernisation programme it is likely by 2026 works would be completed to remodel the Vauxhall Gyratory system. The proposal involves converting the gyratory into two way streets and provide new 'straight-across' pedestrian crossings on desire lines. The existing roads between the Underground Station and the Network Rail Station will also be removed to create a new public square and improve interchange between rail and underground services.¹²	The new highway layout will significantly improve pedestrian accessibility to and from public transport services around Vauxhall Station. The provision of pedestrian crossings on desire lines is likely to improve pedestrian safety as pedestrians by addressing current severance constraints currently restricting travel by foot.
Stockwell / Oval	The Baseline Report highlighted current transport schemes to improve the pedestrian environment at both the Stockwell and Oval gyratory, which have improved the pedestrian environment in these areas. Despite the improvements, high vehicular traffic flows on principal routes (such as the A3 and A23) through Stockwell and Brixton still cause severance concerns for pedestrians due to difficulties crossing these roads. These roads also lead to a perception of danger due to the high volume of buses and HGV	In future years there are still likely to be severance and safety issues for pedestrians at Stockwell and Oval due to the high volumes of traffic which are still predicted to pass through these areas.

¹¹ Waterloo Area Infrastructure Delivery Plan (2013)

¹² TfL Road Modernisation Plan (2014)

	Pedestrian Improvements	Scheme Benefit
	vehicles. The accident analyses in the Baseline Report shows that the Oval junction has a high level of KSI collisions. ¹⁷	
Brixton	The Brixton Town Centre Masterplan identifies a number of pedestrian and public realm enhancements; these are: - To create an improved pedestrian route from Coldharbour Lane to Brixton Station (Objective No. 8), - To improve Pope's Road and Brixton Station road, including street markets (Objective No. 15), - To establish a new town square on Pope's Road, in between the railway tracks (Objective No. 16) - To create a new entrance from the station onto the new town square at Pope's Road (Objective No. 12) - To prioritise safe pedestrian and cycle movement & crime reduction. (Objective No. 31)¹⁷	The transport network for pedestrians in Brixton is unlikely to significantly change for future years 2026 and 2035, however the improvements identified in the Brixton Masterplan may enhance the user experience for pedestrians by making it a safer environment with better links between key town centre locations and transport hubs.
Clapham	Streetscape enhancements on side streets adjoining Clapham High Street, including improved access to Clapham High Street station. ¹³	Improved pedestrian environment in Clapham and access to station.
South Lambeth		
Tulse Hill	The Tulse Hill gyratory currently leads to a poor environment for pedestrians and cyclists due to the dominance of cars through the junction. Lambeth have recently carried out community consultation regarding potential improvements to the Tulse Hill gyratory to improve pedestrian, cycle, and vehicular traffic through the junction. Vehicular traffic currently heavily dominates the junction, therefore any future works to the junction is likely to relocate road space from vehicular traffic to vulnerable road users such as pedestrians and cyclists. ¹⁷	Enhancements to the pedestrian and cycle environment in the area will rebalance the current dominance of the car and may even create a shift in the current road hierarchy, if successful this would leader to a safer and more attractive pedestrian environment.
Streatham High Road	TfL are currently developing plans for Phase 2 of Streatham town centre public realm improvements. The proposal is to remove the central reservation from Streatham High Road, between Leigham Court Road and the South Circular Road junction. The proposal also includes reducing the carriageway width from three lanes down to two lanes in each direction subject to traffic modelling analysis. The reduced carriageway width and removal of the raised central reservation will improve the environment for pedestrians on the High Road as it removes the dominance of vehicular traffic. It will also create further opportunities to cross the road and improve pedestrian permeability through the road. The scheme is currently proposed to be completed in 2018.¹⁷	Even though the proposed public realm improvements will improve conditions for pedestrians, the overall pedestrian environment in Streatham will continue to be poor due to the level of vehicular traffic on the A23 which dissects the town centre. The public realm improvements will reduce some of the severance issues, however the traffic volume on the A23 still creates severance issues as the road will remain difficult to cross for pedestrians.
Borough-wide		
Our Streets Neighbourhood enhancement	Lambeth's Neighbourhood Enhancement Programme aims to identify local issues and co-design measures to reduce driving speeds, reduce the dominance of traffic and promote walking and cycling. Measures are likely to include public realm improvements, junction tightening, landscaping to reduce speeding, cycle parking, lighting improvements, road safety measures, tree planting, play areas. The Council will supplement	These enhancements are likely to improve the pedestrian and cycle environment in the Borough and may lead to a safer and more attractive pedestrian environment.

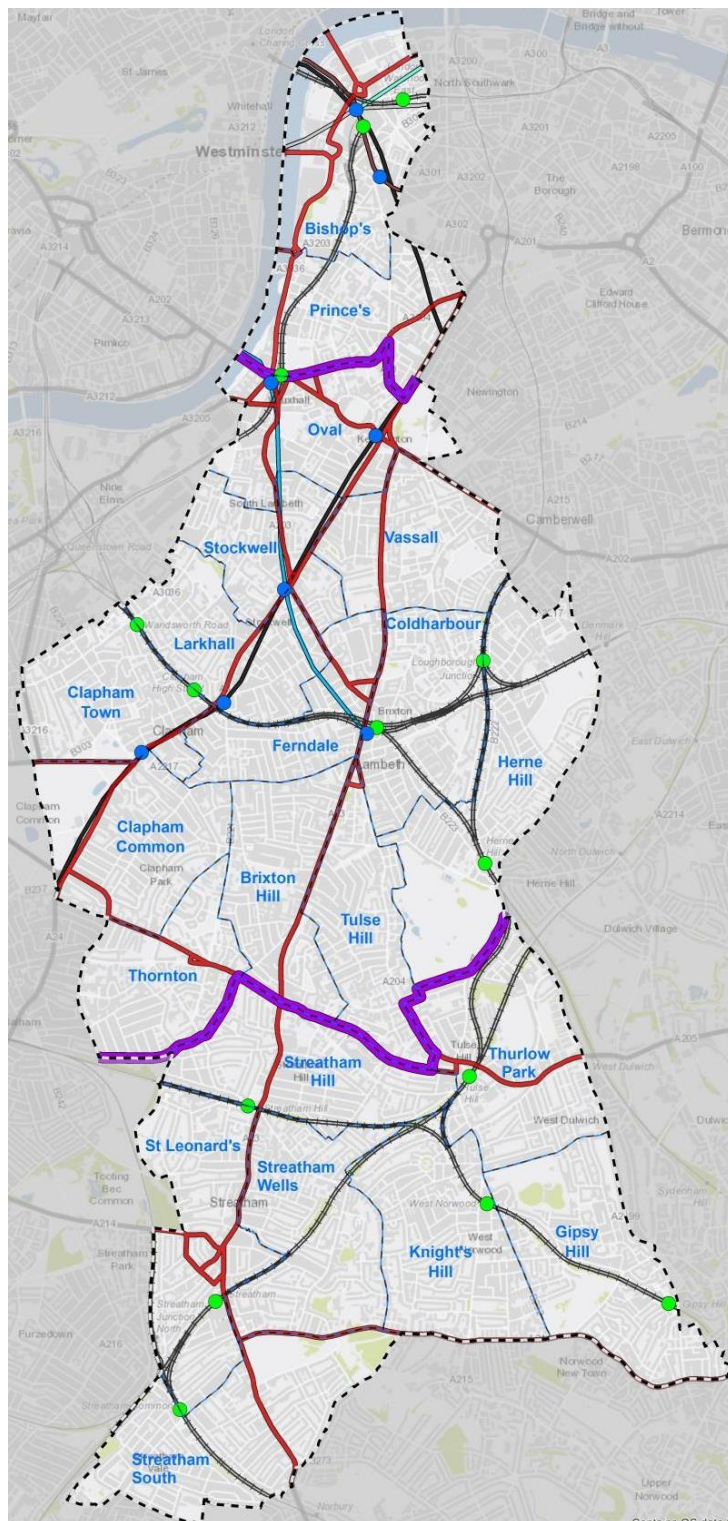
¹³ Local Implementation Plan (LIP) 2017/18 Annual Spending Submission and Programme of Investment

	Pedestrian Improvements	Scheme Benefit
	the construction of schemes with S106 funding. To cover 3 wards, including Streatham Hill & completion of existing wards. ¹³	
Walk Lambeth	Improvements to crossings & footway accessibility focussing on schools and areas of high walking potential. ¹³	
Greener Streets	Targeted tree planting to create more attractive environment for walking. To complement tree planting as part of existing schemes. ¹³	

In addition to the measures identified in the table above, it is fundamental that softer measures are implemented in the Borough to encourage the uptake of walking. For example, schemes to promote the use of sustainable transport may include:

- ☐ Workplace Travel Plans
- ☐ Car Free Days
- ☐ Lunch time led walks, and
- ☐ Walk to work days

Figure 3.3: Future Baseline Summary: Walking



- The data suggests that the number of active travel trips are expected to increase in all areas of the Borough.

North Lambeth

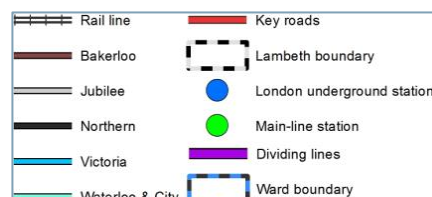
- The largest increases in active travel trips are expected in the north of the Borough, and in particular around Waterloo
- There is likely to be an increase in walking trips generated by an increase in rail passengers alighting at Waterloo station.
- By 2026 the walking environment around Waterloo station is likely to significantly improve through the Elizabeth House and Shell Centre developments.

Central Lambeth

- Stockwell in the central section of the Borough is expected to see the highest increase in active travel trips, with an additional 44 per cent of trips by 2026 and an additional 54 per cent of trips in 2036, compared with 2011.
- There are also significant increases in active travel trips expected in other Borough centres such as Vauxhall, Oval, Brixton, and Tulse Hill.
- Enhancements to gyratories throughout the Borough, particularly in the central region, is anticipated to improve the environment for pedestrians, however the improvements will not reduce the high flows of traffic experienced, which may lead to user conflict and safety issues.

South Lambeth

- The south of the Borough has lower levels of walking trips anticipated in future years, which can be expected due to the distance from central London and the dominance of car travel in the area.
- Improvements for Tulse Hill gyratory and Streatham High Road are likely to improve the pedestrian environment and support the increases in active mode trips, however it is likely that high traffic volumes will be expected in the future leading to safety challenges.



Source: London Underground station, Main-line station, Rail line, Lambeth boundary & key roads: Contains Ordnance Survey data © Crown copyright and database right 2016

3.3 Cycling

Cycling: Data Sources

- Lambeth Strategic Infrastructure Study (2015)
- London Borough of Lambeth Local Implementation Plan (LIP) 2017/18 Spending Submission and programme of Investment Form
- London Transportation Studies Model (2011)
- North Lambeth Delivery Plan (2016)
- TfL Website (2016)
- The Lambeth Cycling Strategy (2013)
- The Mayor's Vision for Cycling (2013)

As demonstrated in the Existing Baseline Report (Part 1), 8 per cent of residents in north Lambeth currently commute by bicycle. Central Lambeth has the highest percentage of residents cycling to work (9%), however the report identified a lack of infrastructure as a key issue in the area. South Lambeth has low levels of cycling (6%) due to both being further from central London and having limited segregated cycle routes.

Cycling in London has increased by 173 per cent since 2001, and the Mayor's Vision for Cycling (2013) states an ambition to double cycling in the next 10 years.¹⁴ In order to meet this goal the report details four key principles which if implemented correctly should facilitate the continued and unprecedented growth in cycling that London has experienced. A summary of the vision is detailed below:

- To create a Tube network for the bike - The scheme will provide Londoners with a network of direct, high capacity, interconnected cycle routes running both in an orbital and radial direction.
- To develop safer streets for the bike - Cycle infrastructure at junctions will benefit from substantial investment so that cyclists feel safe, in particular around large vehicles.
- Get more people travelling by bike - The vision sets out to 'normalise cycling', making cycling accessible and comfortable for everyone.
- Make better places for everyone - The vision will improve conditions for everyone not just cyclists by creating more green spaces, pedestrianised areas and less traffic.

In addition to the Mayor's Vision for Cycling, in 2013 Lambeth Council published the Lambeth Cycling Strategy. This document delivers a 10 step strategy set out to achieve their vision of becoming the 'most cycle friendly Borough in London'.¹⁵ The strategy aims are as follows:

- To create safe and attractive streets for cycling through a mix of measures including a 20mph speed limit.
- To encourage and enabling a range of people to cycle so that Lambeth's cycling population reflects the local population.
- To create a high quality network of route for all ages and abilities.
- To provide cycle parking at both ends of the trip.
- To promote a modal shift to cycling.
- To increase the number of children cycling and make cycling to school the norm.

¹⁴ The Mayor's Vision for Cycling (2013)

¹⁵ The Lambeth Cycling Strategy (2013)

- To establish a local demonstration area to focus a range of cycle measures to showcase what can be achieved, and
- To deliver the strategy through co-operative working.

This vision places cycling at the forefront of future transport for Lambeth and details an ambitious target to have 20 per cent of all trips in the Borough made by bike by 2020.

3.3.1 Future Challenges

Based on existing conditions and analysis of future trip generation, Table 3.4 highlights areas of the Borough that may experience future cycling challenges.

Table 3.4: Cycling: Future Challenges

Future Challenges	
North Lambeth	- As stated in the Existing Baseline Report (Part 1) the highway layout around Waterloo station is heavily dominated by vehicular traffic with minimum segregated cycle facilities. Despite being a popular route for cyclists, the IMAX roundabout acts as a potential barrier to cycling around Waterloo station due to the dominance of vehicular traffic at the junction - There is expected to be an additional 323 rail passengers cycling to and from Waterloo station in 2021 and an additional 628 in 2031. As discussed in Section 2, these numbers are based on existing mode share of rail passengers travelling to Waterloo station, and the mode share of cycling to Waterloo is likely to increase in-line with London wide trends. Therefore, the actual increase in passengers cycling to and from Waterloo is likely to be higher. - The Existing Baseline Report (Part 1) highlighted current cycle parking at Waterloo station is operating at capacity, therefore with an increase in the number of passengers cycling to Waterloo there is likely to be increase demand for cycle parking facilities at the station.
Central Lambeth	- Central Lambeth was identified in the Existing Baseline Report (Part 1) as having the largest mode share in the Borough, however it was also noted that the area had limited cycle provision. This presents a challenge in the future as cycling mode share is anticipated to grow, thus the area will need to improve cycle provision to accommodate the additional cyclists so that there is a safe and user friendly environment. There are no planned schemes to reduce the dominance of cars or volumes of traffic on this route. There are also no schemes to provide segregated cycle facilities on the A23. - It is anticipated that Borough Centres such as Brixton, Vauxhall and Stockwell need significant cycle infrastructure enhancements to accommodate additional trips and to minimise user conflict between motorised vehicles, pedestrians, and cyclists. Key transport interchanges are likely to experience additional cycle demand in line with increases in passenger travel and active travel trip generation rates which will need to be planned for and potential problems mitigated against.
South Lambeth	An under provision of cycle infrastructure combined with highly congested A roads in South Lambeth are anticipated to be the key challenges facing cycling in the future. While in the north and central sections of Lambeth the key challenge may be accommodating the additional cycling demand, in south Lambeth challenges in the future and more likely to stem around encouraging an uptake in cycling by making cycling in the area more attractive to users.

3.3.2 Future Schemes

Table 3.5 shows the cycling improvements that are likely to be implemented in the Borough by 2026 and 2035. The inclusion of these schemes in the following table is based on strong policy and/or funding backing, which have been agreed in advance with LBL.

Table 3.5: Future Cycling Schemes in the Borough

Cycle Improvements		Scheme Benefit
Borough-wide		
Oval to Pimlico	Cycle superhighway 5 is proposed to run from Oval to Belgravia via the proposed improved Vauxhall cross junction. The new cycle superhighway will connect to the existing CS7 route (which runs along the A3) to areas north of the river, such as Victoria, West End and Westminster. Consultation for the scheme was carried out by TfL in January 2016, with the scheme due to start in 2018 and completed by 2020.¹⁶	As stated in the Existing Baseline Report (Part 1) cycle connectivity from cycle superhighway CS7 to Victoria (and surrounding areas) is currently poor as the Vauxhall Gyratory acts as a barrier for cycling. The cycle superhighway and improvements to the Vauxhall Cross junction will significantly improve cycle access from areas such as Vauxhall, Stockwell, Clapham and Oval to areas north of the river such as Victoria, West End and Westminster.
Waterloo to Greenwich	Quietway 1 launched in June 2016 to run from Waterloo in an easterly direction towards Greenwich.¹⁶	As identified in the Existing Baseline Report (Part 1), user conflict and a high demand for cycle infrastructure were key constraints in north Lambeth, Quietway 1 is expected to reduce user conflict in the future by providing a safer cycle thoroughfare that avoids many of the Boroughs arterial roads, the route will also increase cycle capacity on the network thus enhancing the cycle network in north Lambeth.
Waterloo to Croydon	Quietway 5 is currently at consultation stage. It is proposed to run along the Western periphery of the Borough from Waterloo to Croydon. The 12-mile route will utilise current cycle infrastructure including parts of the London Cycle Networks routes 5 and 3.¹⁶	Quietway 5 has the potential to enhance future cycling environment throughout the Borough, particularly at key town centres such as Waterloo, Vauxhall, Streatham, and Clapham. The route will interconnect these hubs and provide north/south connectivity that was previously not there.
Herne Hill to Archbishops Park	The Cycle Greenway is currently being implemented in the Borough connecting Ruskin Park and Kennington Park. Future enhancements to the route will connect the Herne Hill area to Archbishops Park in North Lambeth through an interconnected route of green spaces.¹⁷	The Cycle Greenway will provide cycle routes linking green spaces in the Borough, traveling along less busy and traffic calmed roads. This includes measures to make the route more cycle friendly. The route should create a safe environment, focused on leisure cyclists traveling between parks and green spaces.
Elephant & Castle to	Quietway 7 runs to the east of Lambeth between Elephant and Castle and Crystal Palace, providing	Quietway 7 will offer cycle connectivity to residents in the east of the Borough and will

¹⁶ TfL Website (2016)

¹⁷ Lambeth Strategic Infrastructure Study (2015)

	Cycle Improvements	Scheme Benefit
Crystal Palace	cycle connectivity for Lambeth residents, particularly in the Tulse Hill area. ¹⁶	provide cycle infrastructure connecting the north and south. The route should address concerns for cyclists around the Tulse Hill Gyratory by providing a safe and alternative route.
Cycle Hire Brixton	Extending the Cycle Hire scheme to Brixton town centre ¹⁸	This scheme will allow more residents within the central section of the Borough to cycle to work and travel to central London.
Bike Hangers	The Borough are committed to the continued roll-out of secure, covered, on-carriageway cycle shelters at high demand locations across the Borough. ¹⁸	The availability of safe and secure bike shelters is likely to encourage cycling in the locality. However, the installation cycle shelters on the carriageway will reduce parking.
Cycling Network	Targeted investment to improve network permeability for cycling e.g. cycle streets, contraflows, junction improvements and filtered permeability schemes. ¹⁸ At the time of writing, LBL commissioned a study that requires an evidence based approach in order to plan and prioritise network interventions that will encourage more people to cycle in Lambeth and will make the borough more accessible for active travel and more liveable generally.	Cycle network improvements are likely to improve connections in the Borough and make cycling more user friendly.

North Lambeth

Waterloo/IMAX roundabout	There have been short term improvements at the junction such as an introduction of 20mph speed limit and advance stop lines. TfL is currently developing proposals to remove existing roundabout to introduce more pedestrian and cycle friendly environment at the roundabout. They are currently considering plans to improve the existing subways. Design is currently underway with proposals to go to public consultation in 2016/17, and work could be completed by 2020.¹⁷	20mph limits on at the IMAX roundabout enhance the 'bikeability' by improving the safety for cyclists in the coming years. The additional enhancements could have much more significant impacts on the cycle network, the removal of the roundabout will mitigate current safety concerns and any segregated cycle lanes will enhance the cycle environment, in doing so cycling though the north of the Borough will be significantly improved.
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Central

Vauxhall	Improvements to the Vauxhall highway network are planned, which will significantly improve conditions for cyclists are proposed works to the Vauxhall gyratory. The works involve converting the existing gyratory back into two-way working. The proposed changes at the gyratory include: • Removing the existing one-way road system around the transport interchange (Parry Street, Wandsworth Road, Kennington Lane, South Lambeth Road) by converting these roads around Vauxhall to two way • Providing more cycle and pedestrian crossings as well as segregated lanes and parking for cyclists	As stated in the Existing Baseline Report (Part 1) the Vauxhall gyratory currently acts as a barrier to cycling due to the dominance of cars and perception of danger created by the gyratory layout The proposed improvements to the Vauxhall gyratory will reduce the dominance of vehicular traffic, therefore likely to encourage a greater mode share towards cycling in the central section of the borough. The improved cycle infrastructure in Vauxhall will also accommodate projected increase in cycling traffic generated by the VNEB development. Table 3.1 shows that active mode trips in Vauxhall are anticipated to increase
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¹⁸ London Borough of Lambeth Local Implementation Plan (LIP) 2017/18 Spending Submission and programme of Investment Form

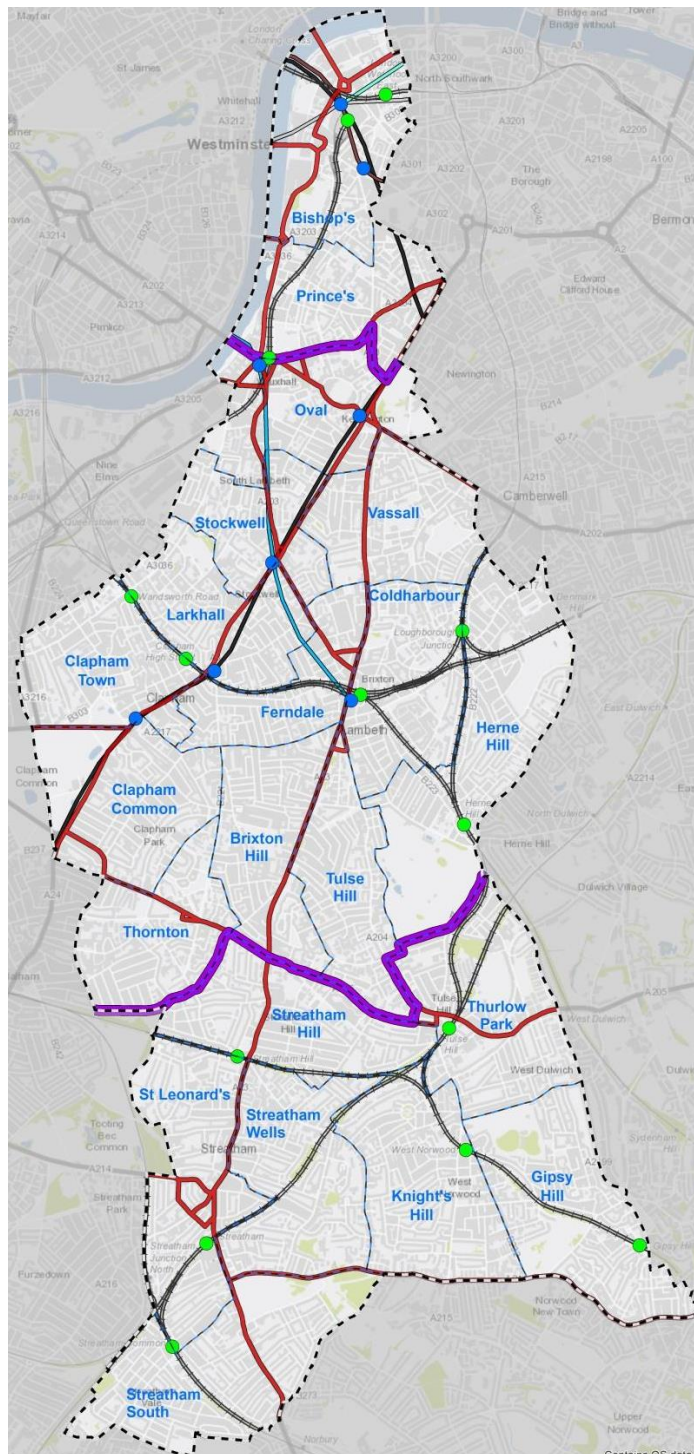
Cycle Improvements	Scheme Benefit
- Improving existing and providing new public spaces - Redesigning the transport interchange, including a new central bus station The scheme is not currently committed, however TfL carried out consultation for the scheme in 2015 with construction works due to begin in 2018.¹⁹	substantially in 2026 and further increase by 2036, the increase in demand for cycling is likely to result in a requirement to accommodate cyclists with suitable infrastructure, additional cycle parking will be required and connectivity between public transport and cycle networks may need further enhancement. A significant proportion of cycling traffic in Vauxhall are likely to be cycling trips whose origin and destination are outside of the borough, which is likely to increase as population and cycling levels increase in neighbouring boroughs.

In addition to the measures identified in the table above, it is vital that softer measures are implemented in the Borough to encourage the uptake of cycling. For example, schemes to promote the use of sustainable transport may include:

- Dr Bike Programmes,
- HGV Awareness days
- Cycle awareness days, and
- Security bike marking

¹⁹ North Lambeth Delivery Plan (2016)

Figure 3.4: Future Baseline Summary: Cycling



Source: Contains Ordnance Survey data © Crown copyright and database right 2016, Cycle Routes: <https://tfl.gov.uk/travel-information/improvements-and-projects/quietways>

- The data suggests that the number of active travel trips are expected to increase in all areas of the Borough.

North Lambeth

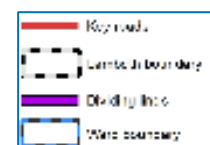
- There is likely to be an increase in cycling trips generated by an increase in rail passengers alighting at Waterloo station. Thus, the supply of cycle parking and cycle hire bikes will need to be increased to cope with extra demand.
- Improvements in the north e.g. the IMAX roundabout, Quietways, and Cycle superhighways are likely to encourage a significant number of cyclists, particularly en-route to destinations to the northern side of the river.

Central Lambeth

- Central Lambeth had the largest mode share for cycling in 2011, and will face challenges to accommodate the projected increases in cycling (Table 3.1)
- Vauxhall, Brixton, and Clapham are anticipated to experience high increases in cycle demand by 2026 and 2036.
- Improvements at the Vauxhall gyratory are likely to improve conditions for cyclists at this junction, however there are no planned schemes along routes between Borough Centres to cope with the anticipated demand of cycling and to reduce user conflict with vehicles.

South Lambeth

- The dominance of vehicles on the road network and a lack of cycle infrastructure remain key restrictions for cycle growth in the south.
- Additional trips are anticipated to be commuter trips, therefore providing cycle infrastructure to accommodate this should be a priority.
- Quietways 5 and 7 will improve cycle connectivity from the west and eastern sections of south Lambeth, to the central and northern sections, however there are still expected to be issues along the A23, where improvements may be required to cope with demand, and reduce user conflict between cyclists and road traffic.



4 Public Transport

This section of the report analyses the likely provision of public transport in Lambeth in the future. The analysis accounts for future public transport trip generation, and examines likely schemes in the north, central and southern sections of the Borough.

4.1 Trip Generation

Table 4.1 presents the number of public transport trips in 2011 during the AM peak period (7am to 10am), and shows the increase in trips forecast during this period in the future years (2021/2026/2031/2036).

Table 4.1: Public Transport: Trip Generation in Lambeth

	Borough Centre	2011	2021	2026	2031	2036
North Lambeth	Waterloo	25,856	23%	39%	50%	63%
	North Lambeth (excluding Waterloo)	11,642	19%	20%	26%	33%
Central Lambeth	Stockwell	30,405	21%	24%	30%	38%
	Brixton	34,855	13%	13%	17%	24%
	Clapham	25,843	15%	18%	21%	27%
South Lambeth	Streatham	21,581	12%	15%	20%	27%
	Norwood	19,442	8%	9%	13%	18%

Source: London Transportation Studies Model (v7.0)

Note: The table does not account for additional trips alighting at Waterloo (See Section 2.5 for more information).

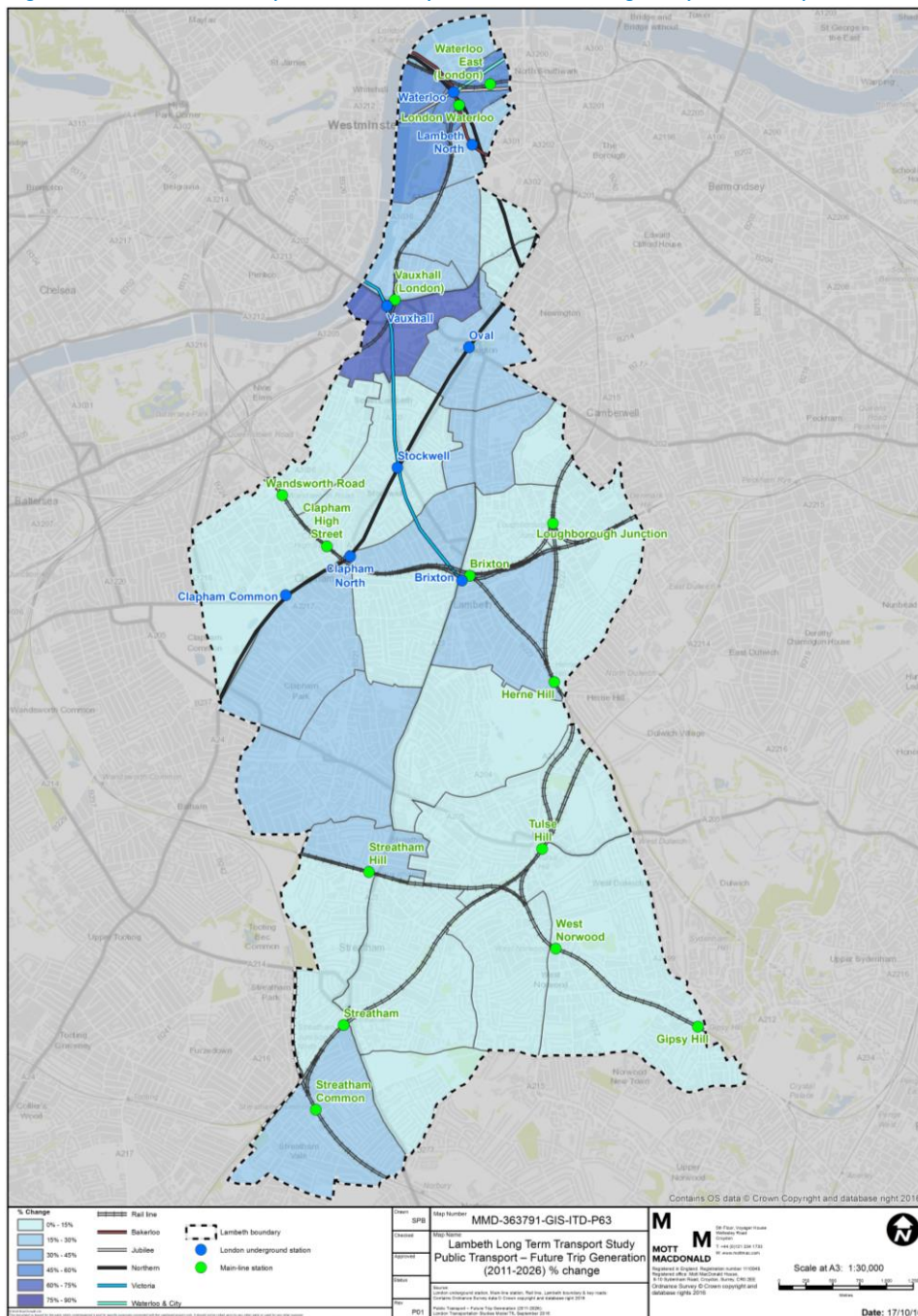
All percentage changes are representative of changes from the 2011 baseline figure.

As the results indicate, the number of public transport trips in all areas of the Borough is anticipated to increase in the future year scenarios.

The northern section of the Borough is projected to have the highest increases in public transport trips, with Waterloo expected to experience more than half as many trips (approximately 13,000 additional AM peak trips) between 2011 and 2031, which may be attributed to the high residential and employment growth forecast in north Lambeth. Waterloo may be expected to experience additional trips than projections show in Table 4.1 due to the number of people that may alight Waterloo station and take the bus for their onward journey. These trips where the origin and destination are outside of the Borough boundary are not represented in TfL's LTS analysis.

There is forecast to be around a quarter more public transport trips in Brixton, Clapham and Streatham in 2036 compared to 2011, and although Norwood, in south Lambeth, is expected to have lowest increase in public transport trips, there are still an extra 18 per cent public transport trips forecast in 2036 compared to 2011.

Figure 4.1: Public Transport: Future Trip Generation Change % (2011-2026)

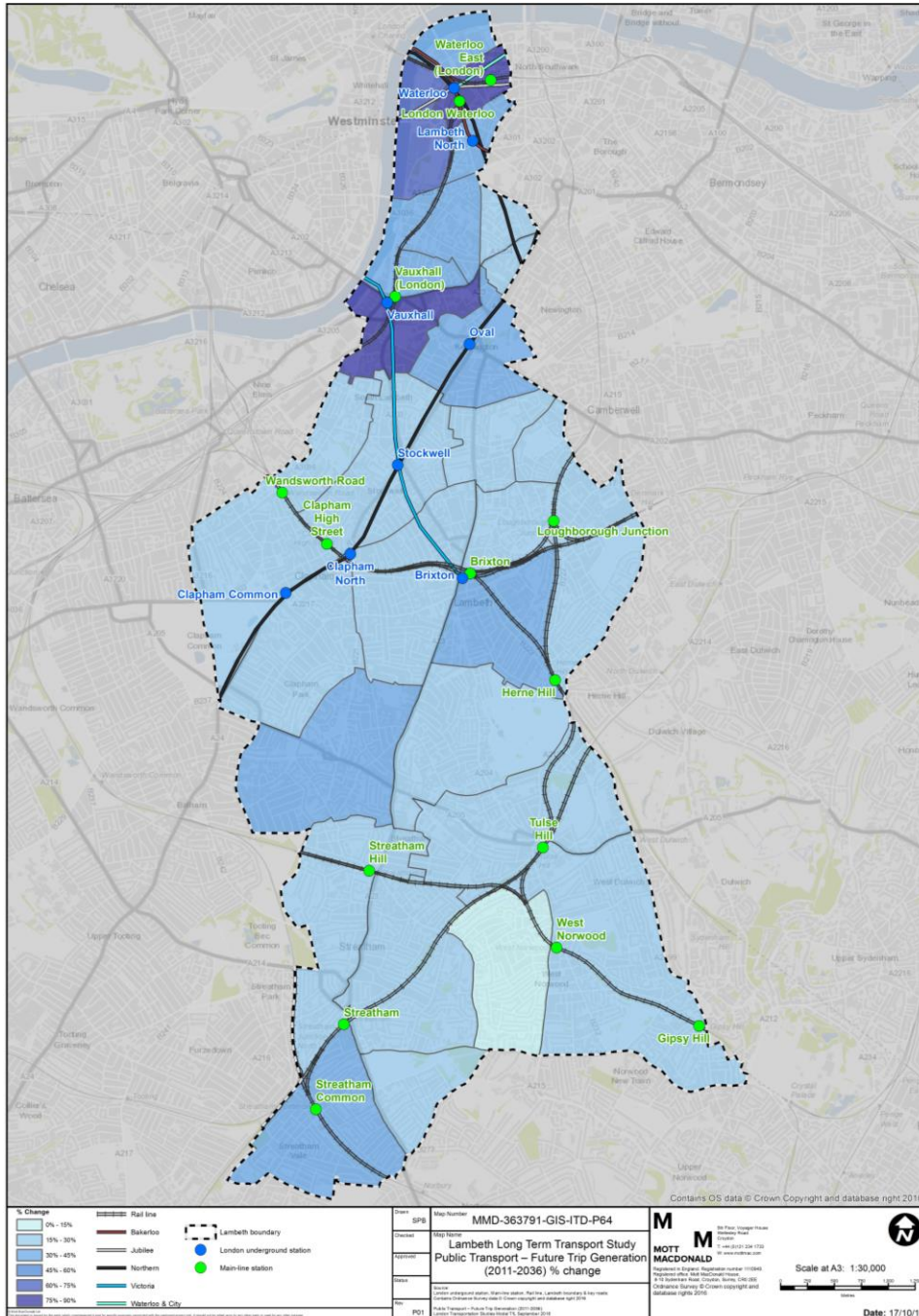


Key Observations:

- Not surprisingly, there is a high increase in public transport trips in areas surrounding rail and underground stations, most notably: Waterloo, Vauxhall, Oval, Brixton, Herne Hill, Clapham North, Clapham Common, Streatham Hill and Streatham stations
- An additional 60 per cent of public transport trips are expected in the area south of Vauxhall station.
- High increase in trips around Waterloo station (approximately 45 per cent more public transport trips assumed)
- In the central section of the Borough, an additional 15 per cent of public transport trips are expected around Brixton and Clapham.
- The general increase in public transport trips south of the Borough is much slower, particularly in the Tulsh Hill and West Norwood areas, which may be due to there being no provision of underground services. Despite this, the number of public transport trips is likely to increase by at least 15 per cent around Streatham and Streatham Hill rail stations.

Source: London Transportation Studies Model (2011)

Figure 4.2: Public Transport: Future Trip Generation Change % (2011-2036)



Key Observations:

- The pattern of additional trips in 2036 is similar to that highlighted in 2026 (Figure 4.1); however, the growth is much more significant.
- There is likely to be at least an additional 75 per cent of public transport trips in the area south of Vauxhall station.
- The increase in public transport trips around Waterloo station is expected to be around 60 per cent
- In the central section of the Borough, an additional 30 per cent of public transport trips are expected south of Brixton station and in areas in between Streatham Hill and Clapham stations.
- There is also an additional 30 per cent of public transport trips projected in the area surrounding Streatham rail station.
- The lowest increase in public transport trips is expected west of West Norwood station.

Source: London Transportation Studies Model (2011)

As the results suggest, the number of public transport trips in the AM peak period (7am to 10am) are likely to increase, which may lead to network constraints and call for network improvements to manage the additional demand on the network. To analyse this further, TfL's Railplan analysis has been interrogated to understand constraints on public transport corridors through the Borough.

4.2 TfL's Railplan Model

TfL's LTS data, which has been used for trip generation analysis purposes, provides the input to London's Public Transport Assignment Model (referred to as Railplan). The Railplan model allocates travel demand to various methods of public transport and analyses trip assignment to identify and understand overcrowding issues on the network.

TfL have provided Mott MacDonald with Railplan outputs for three standard years, 2011 (which are referred to in the Existing Baseline Report – Part 1), 2021 and 2031 (which are discussed later in this section). It is noted that the Railplan outputs for 2021 and 2031 do not align to Lambeth's LTTS assessment years of 2026 and 2035, and it has been acknowledged by LBL that amending these modelled years is outside the scope of this study. Nonetheless, the Railplan results offer a sound understanding of the likely capacity constraints in 2021 and 2031, and trip generation results (Table 4.1) provide an understanding of additional trips between the modelled years.

The results represent the public transport conditions in the AM peak hour (08:00-09:00), and this is considered as the worst case scenario based on the Railplan model.

The model accounts for how the public transport network responds to new services, improved infrastructure and changes to service frequencies or vehicles speeds.

Table 4.2 presents the improvements to Lambeth's rail and underground networks, which have been included in the Railplan modelling outputs. No bus improvement schemes are included in the future Railplan modelling analysis.

Table 4.2: Improvement Schemes included in the Railplan Model

Scheme	Model Year*	Scheme Description
Rail Schemes		
South Western and South Central Services	2021	Capacity increases on South West Train Services and on South Central services to London Bridge and Victoria
Thameslink Programme - Key Output 1	2021	Train lengthening of the existing Thameslink rolling stock
Overground	2021	Lengthening all class 378's to 5 cars on the London Overground
East London Line Phase 2b extension	2021	An extension of the line from south of Surrey Quays via the Network Rail South London Line to Clapham Junction via Queens Road Peckham, Peckham Rye, Denmark Hill, Clapham High Street and Wandsworth Road
Thameslink Full Programme - Key Output 2	2021	Introduction of 24 trains per hour through the core section (including Blackfriars, Cannon St, Charing Cross, London Bridge and Victoria services)
Main Line to Victoria	2021	Train lengthening to up to 12 cars on most peak services that run fast between Bromley South and Victoria that can be lengthened without infrastructure enhancements (services to/from Ramsgate and Gillingham)
Catford Loop	2021	Additional two trains per hour off peak all stations service between Bromley South and Victoria with stops in selected peak services at Peckham Rye and Denmark Hill
Main Line	2021	Train lengthening to 12 cars on all peak services to/from Woking that run fast between Surbiton and Waterloo via Clapham Junction and Vauxhall
Crossrail Elizabeth Line	2021	New railway line running from Reading to the west and Abbey Wood and Shenfield to the east.
Underground Schemes		
Northern Line (Phase 1)	2021	Signalling upgrades on the Northern Line to provide additional capacity and improve journey times
Victoria Line	2021	Increased frequency to 36 trains per hour
Northern Line (Phase 2)	2021	Revised service patterns to deliver a further 20 per cent increase in capacity
Bakerloo Line	2031	Increased frequency to 27 trains per hour
Jubilee Line	2021	Increased frequency to 36 trains per hour
Waterloo & City Line	2021	Increased Capacity and revised timetable

Source: TfL Railplan data (2011)

*The assessment year within the model, where schemes have been included.

Note: The Railplan model outputs do not include Northern Line extension to Battersea

4.3 Rail

Rail: Data Sources

- Crossrail Website (2016)
- London Transportation Studies Model (2011)
- Sub Regional Transport Plan for Central London – 2015 Update
- TfL Railplan Data (2011)
- TfL Website (2016)

The Existing Baseline Report (Part 1) indicated that the rail mode share in Lambeth was 7 per cent. As Figure 1.2 of this report demonstrates, the public transport share in Lambeth is anticipated to increase by over 2 per cent from 2011 to 2031.²⁰

Currently parts of Lambeth's rail network are heavily congested, specifically Southeastern services to Victoria, Southwest to Waterloo and the Thameslink service. As Lambeth's population continues to grow, and as more residents start to use rail based modes, the crowding on rail services in the Borough is expected to worsen.

By 2050, the number of rail trips is forecast to increase by 80 per cent in the central London sub-region, which is also due to the limited capacity on London's roads.²⁰

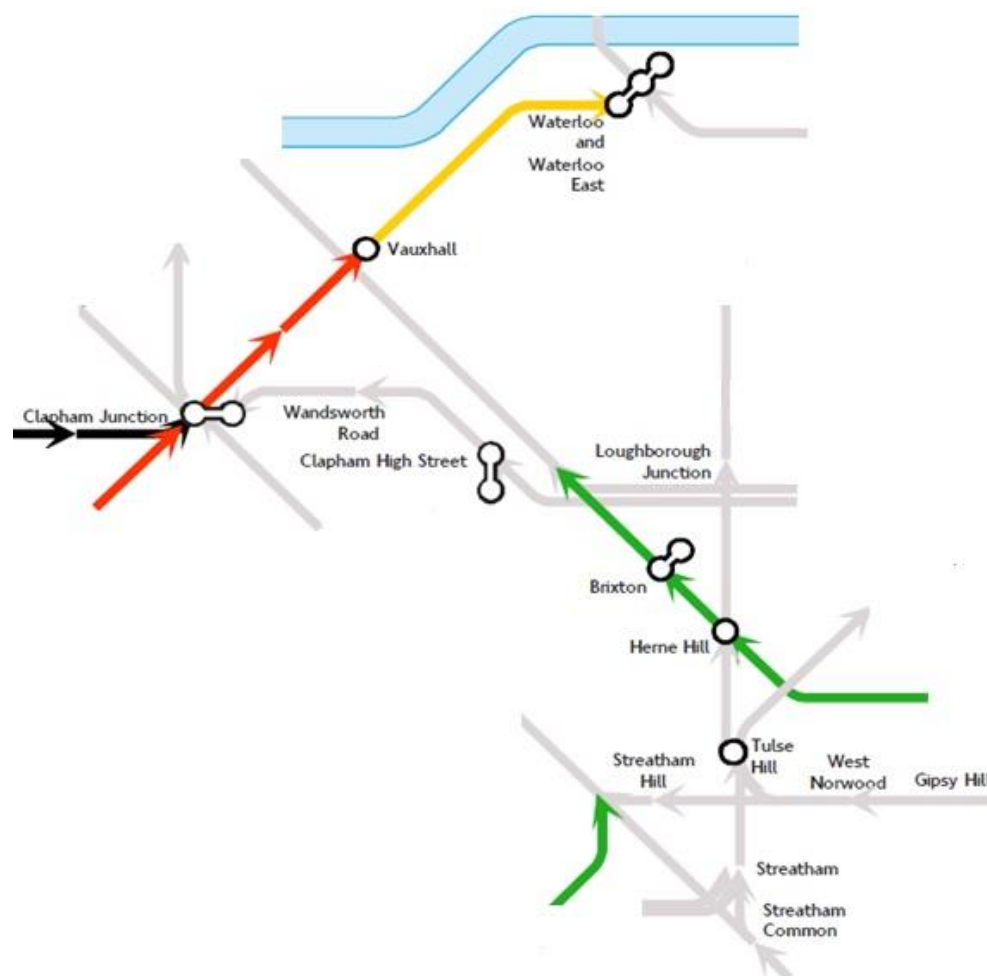
4.3.1 Future Challenges (Railplan Analysis)

The Railplan outputs are presented in Figure 4.3 to Figure 4.6. Figure 4.3 and Figure 4.5 show the average AM peak hour (8am to 9am) crowding expected on Lambeth's rail network in 2021 and 2031, respectively. It should be noted that these outputs show an aggregate of all train services on a particular train line, rather than specific train services. This analysis also includes non-stopping trains at stations where a fast train will travel through, therefore there is expected to be variations in capacity during the AM peak hour and at certain stations.

To understand the capacity of specific train services stopping at Lambeth's stations, Railplan data has been interrogated further. Figure 4.4 and Figure 4.6 presents the capacity on services departing Lambeth's stations in the AM peak hour (8am to 9am) in 2021 and 2031, respectively. The graph shows each station that services stop at, and the level of usage of that service upon departure from the station. It must be noted that this data shows an aggregate of all train services within the peak hour where capacity may fluctuate throughout the hour.

²⁰ Mayor of London: London infrastructure plan 2050: transport supporting paper

Figure 4.3: National Rail: AM Peak Congestion 2021 (standing passengers per sqm)



Key Observations:

- Trains approaching Clapham Junction station from the Putney branch are likely to operate over capacity (4 to 5 people standing per sqm).
- Trains travelling from Clapham Junction to Vauxhall are likely to operate at absolute capacity in 2021, and although the congestion is relieved slightly between Vauxhall and Waterloo, there is still no seating capacity in the AM peak hour.
- On average, between 8am and 9am, the train services in the south of the Borough are likely to operate within capacity in 2021.

< 1 standing / m ²	Within capacity (No seating capacity)
1 to 2 standing / m ²	
2 to 3 standing / m ²	Absolute capacity
3 to 4 standing / m ²	
4 to 5 standing / m ²	Over capacity
> 5 standing / m ²	

Source: TfL Railplan Data (2011)

Note: This analysis includes an aggregate of all train services on a particular train line rather than specific train services for a peak hour (8am to 9am). The analysis also includes both stopping trans and fast trains. It is not recommended to use this data for fine detail as the models strength is at a more strategic level.

Figure 4.4: Total Capacity on Trains Departing Rail Stations in Lambeth 2021 (8am to 9am)



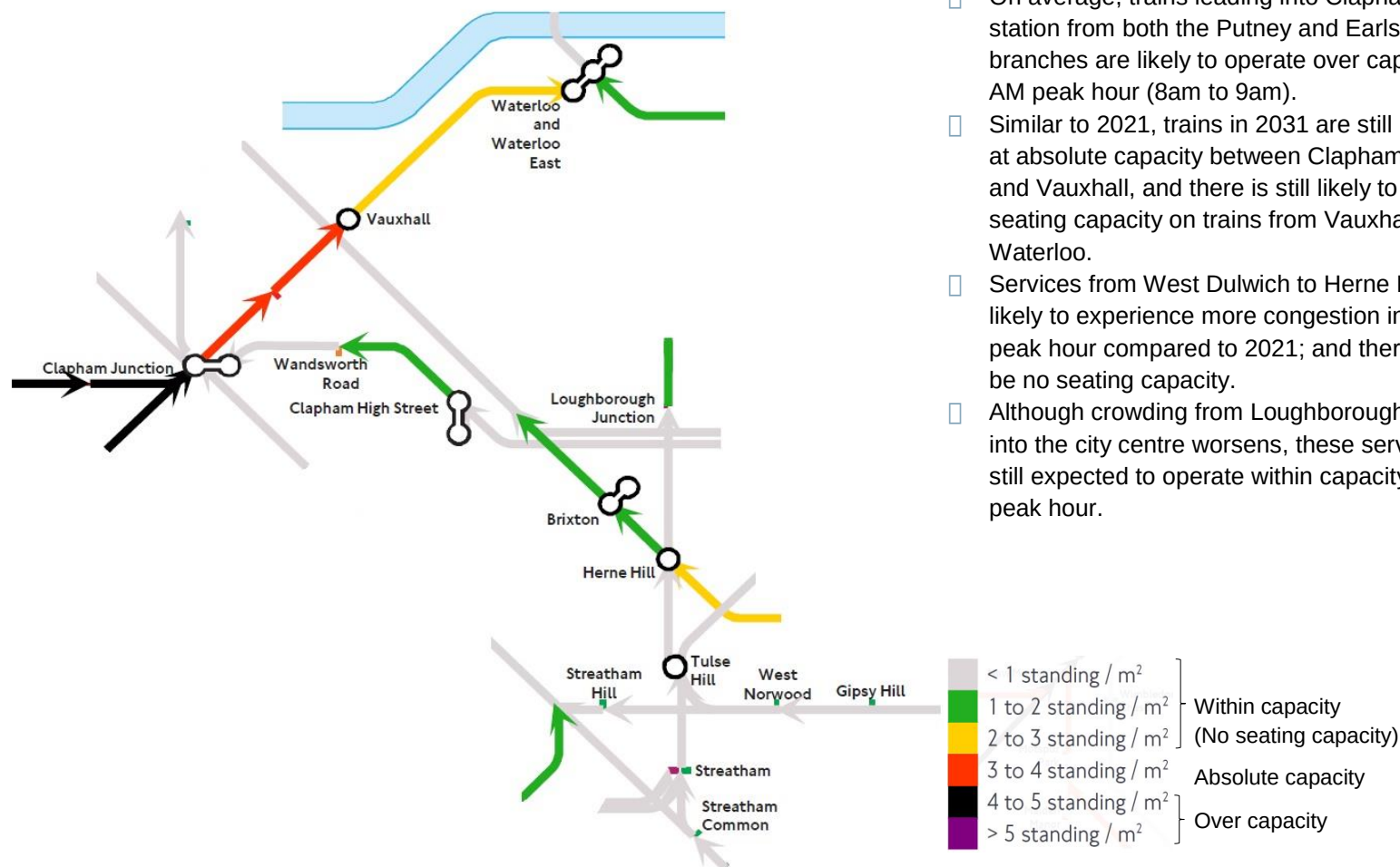
Key Observations:

- Despite the high population growth, the Railplan model suggests that all train services departing Lambeth's stations in 2021 are likely to operate within total capacity. The capacity improvements may be attributed to the schemes identified in Table 4.2.
- Southwest trains to Waterloo are expected to be over capacity by 13% when they arrive at Vauxhall, however this reduces to 83% usage when the train leaves Vauxhall.
- The Southeastern route to Victoria is projected to be 3% over capacity when it arrives at Herne Hill, but this is expected to reduce to 88% used when the train leaves.
- Southern services usage via Streatham Common towards Balham are expected to increase to 72% from 32% when the train leaves Streatham Common.

Source: Railplan Data (2011)

Note: Total capacity = 4 people per every sqm of standing space. Please see Appendix D for the Railplan data output

Figure 4.5: National Rail: AM Peak Congestion 2031 (standing passengers per sqm)



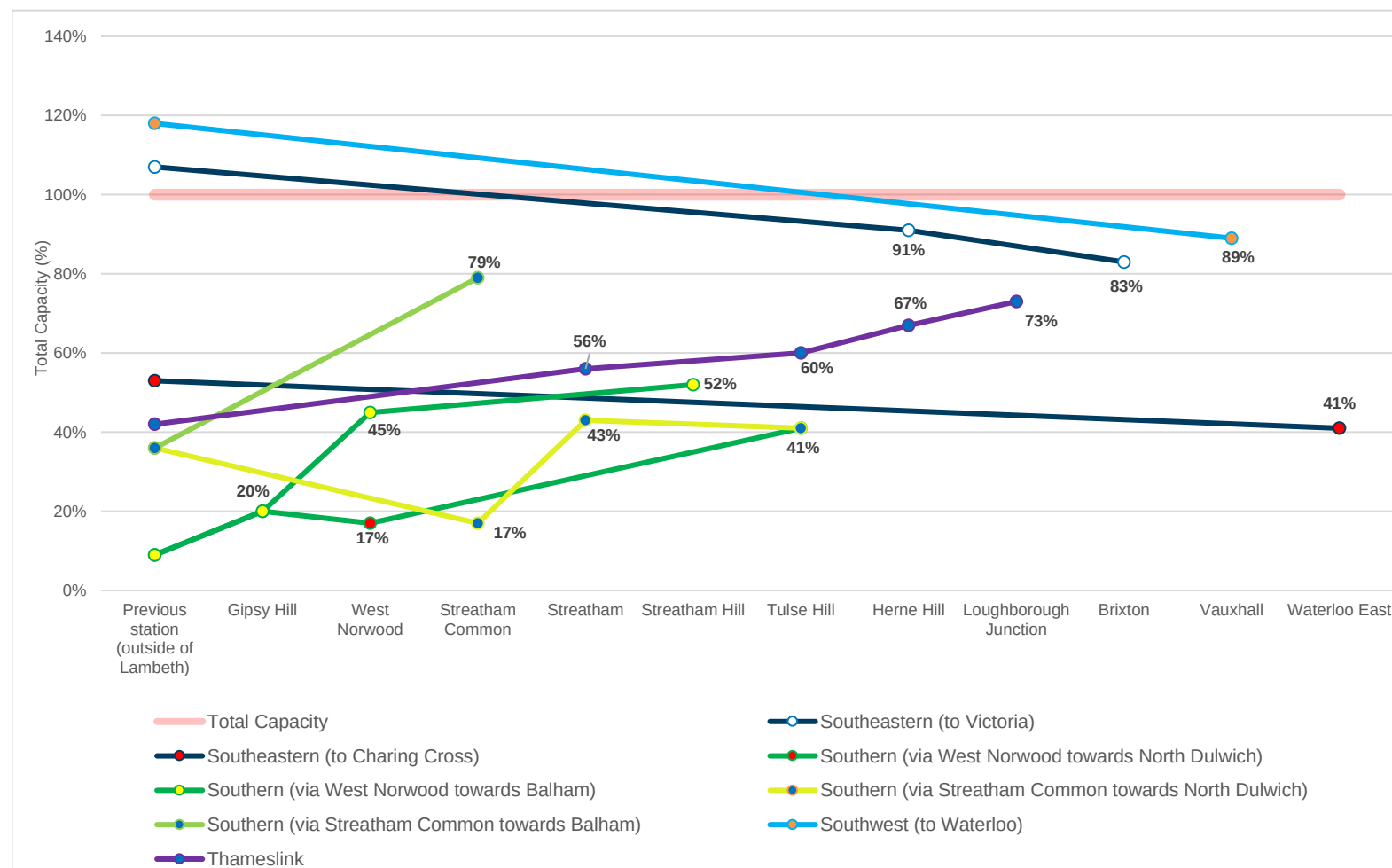
Key Observations:

- On average, trains leading into Clapham Junction station from both the Putney and Earlsfield branches are likely to operate over capacity in the AM peak hour (8am to 9am).
- Similar to 2021, trains in 2031 are still likely to be at absolute capacity between Clapham Junction and Vauxhall, and there is still likely to be no seating capacity on trains from Vauxhall to Waterloo.
- Services from West Dulwich to Herne Hill are likely to experience more congestion in the AM peak hour compared to 2021; and there is likely to be no seating capacity.
- Although crowding from Loughborough Junction into the city centre worsens, these services are still expected to operate within capacity, in the AM peak hour.

Source: Railplan Data (2011)

Note: This analysis includes an aggregate of all train services on a particular train line rather than specific train services for a peak hour (8am to 9am). The analysis also includes both stopping trains and fast trains. It is not recommended to use this data for fine detail as the models strength is at a more strategic level.

Figure 4.6: Total Capacity on Trains Departing Rail Stations in Lambeth 2031 (8am to 9am)



Key Observations:

- The Railplan model suggests that all train services departing Lambeth's stations in 2031 are likely to operate within total capacity
- Southwest trains to Waterloo are likely to be over capacity by 18% when they reach Vauxhall, which reduces to 89% usage when the train leaves Vauxhall.
- Southeastern services to Victoria are predicted to be 7% over capacity when they arrive at Herne Hill, however trains leaving this station are likely to operate within, but close to, capacity.
- Southern services are expected to operate comfortably within total capacity between 8am and 9am in 2031.

Source: Railplan Data (2011)

Note: Total capacity = 4 people per every sqm of standing space. Please see Appendix B for the Railplan data output

4.3.1 Future Schemes

Table 4.3 discusses the rail schemes that are likely to be implemented in the future years, based on strong policy and/or funding backing. The inclusion of these schemes in the following table have been agreed with LBL. Some of these improvements have been accounted for in the modelling; these are highlighted in Table 4.2.

Table 4.3: Future Rail Schemes

Station	Scheme Description	Scheme Benefit
Borough-wide		
Crossrail Elizabeth Line	Crossrail is a constructed railway line running from Reading to Abbey Wood and Shenfield. The Crossrail Elizabeth Line is due to be operational by the end of December 2018. There are proposals for a new station at Old Oak Common to provide an interchange between the Crossrail Elizabeth Line, HS2 and London Overground services. If the new station is built, then there could be an alternative route to the Crossrail Elizabeth Line and HS2 services via Clapham junction which will avoid the need for passengers to travel through central London. Even though Clapham junction lies just outside the borough boundary it is well connected to the Borough by numerous bus services. The Old Oak Common Station is dependent on the HS2 going ahead and funding secured. Indicative timelines show the station could be operational by 2026.²¹	Even though Crossrail Elizabeth Line is not routing through the Borough directly it will impact how rail passengers travel into central London to catch Crossrail services. For example, once Crossrail Elizabeth Line is operational there is likely to be greater demand for Thameslink services running through the Borough to access the Crossrail Elizabeth Line at Farringdon. From Lambeth the only London underground link to Crossrail Elizabeth Line services is via the Northern Line at Tottenham Court Road or via the Victoria and Jubilee line via Bond Street, which may add increased congestion on already busy Northern and Victoria lines.
Crossrail 2	Crossrail 2 is a proposed railway service running from Wimbledon in the south to Tottenham Hale and New Southgate in the north, but is not committed The route will travel through the west of Lambeth, passing through the Clapham Junction, which although outside the Borough boundary, is well connected via public transport. The proposals are currently considering stations at Balham and Tooting Broadway to the west of Lambeth. The line will provide a link to central London, with key interchange with HS2, the Crossrail Elizabeth Line and National Rail services in central London. A Crossrail 2 Streatham Feasibility Study has recently been undertaken to assess the feasibility of Crossrail 2 to Streatham. The findings suggest that there is unlikely to be sufficient demand in Streatham alone to justify a Crossrail 2 branch line.²¹	As with the Crossrail Elizabeth Line, the Crossrail 2 proposed route will not pass through the Borough, however the potential impact of the scheme is anticipated to directly impact passenger travel into Central London. Furthermore, if Crossrail 2 does route into Balham, then Streatham Common and Streatham Hill stations will benefit from being interconnected to the line by being only one stop away. The scheme is anticipated to remove some of the current capacity pressures on rail and tube networks (particularly the Northern Line) by presenting an alternative transport option for passengers. Furthermore, the interconnectedness of the service with HS2 and Central London termini could improve accessibility to for Lambeth residents to Airports and the wider UK.
Thameslink Improvements	The Thameslink Programme will transform north-south travel through London and support the projected	The key impact of the Thameslink Programme will be the additional capacity

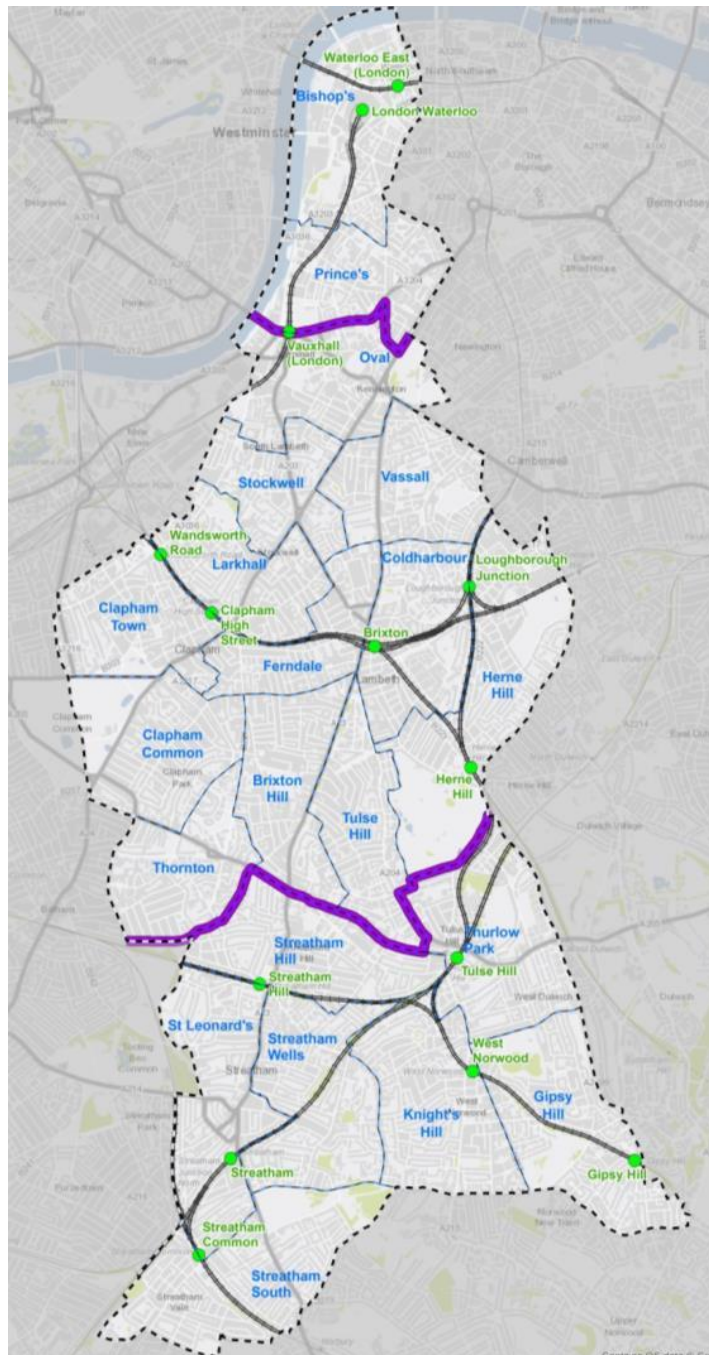
²¹ Crossrail Website (2016)

Station	Scheme Description	Scheme Benefit
	growth in demand for rail travel. The scheme is due for completion in 2018. The scheme will improve north-south travel from Thameslink stations within the Borough (i.e. Loughborough Junction, Herne Hill, Tulse Hill & Streatham). The following improvement are expected: - Improved connections – more stations outside of London will be connected to the Thameslink route. The rail hub at Farringdon will connect Thameslink and Crossrail and provide direct links to Gatwick, Heathrow and Luton. This is likely to relieve pressure on the Northern Line. - More reliable journeys – trains will run every two to three minutes in each direction through central London - Better stations - the works include changes at London Bridge station to provide nine 'through' platforms to increase capacity at the station and increase the number of trains continuing through the station. Un completion, services for the Borough will increase to 24 train per hour, with services either entering Lambeth from the South East at Streatham on the Wimbledon loop line, or at Herne Hill on trains from the South / South East. - New trains – new trains will be longer and more energy efficient. They will have improved access for people with reduced mobility.²²	generated because of the scheme, by increasing the number of trains per hour through London Bridge and introducing higher capacity trains on the Wimbledon loop future passenger demand pressures should be alleviated. The enhancements should improve the transport connectivity of the Borough, particularly in the South and Central regions by increasing the frequency of trains passing through stations such as Loughborough Junction, Herne Hill, Tulse Hill, and Streatham. The improved quality of service and reliability has the potential to create mode shift to Thameslink services, aiding aspirations of the Borough.
Main Line	Train lengthening to 12 cars on all peak services to/from Woking that run fast between Surbiton and Waterloo via Clapham Junction and Vauxhall. Error! Bookmark not defined.	Improved capacity on trains terminating at Waterloo and calling at Vauxhall.
South Western and South Central Services	Capacity increases on South West Train Services and on South Central services to London Bridge and Victoria. Error! Bookmark not defined.	Improved capacity on trains to London Bridge and Victoria calling at stations in Lambeth.
North Lambeth		
Waterloo Station	To increase capacity and accessibility of Waterloo station the following station upgrades are proposed Reopening of Waterloo International Platforms - Work is currently underway to reuse the redundant Waterloo International terminal for domestic commuter train services. Once completed the scheme will increase capacity at the station by 30%. The scheme is expected to be completed by 2019 with a total cost of approximately £100 million. The scheme is being funded by DfT.	The scheme will increase the capacity of both the station and services arriving and departing from it, and will therefore can accommodate anticipated future growth in passenger footfall. Increased capacity on the rail network will also result in additional demand for onwards journeys via underground, bus, taxi, cycle, and foot and as a result, all of these services will need to be reassessed to ensure they are suitable for the raised levels of demand.

²² The Thameslink Programme website: <http://www.thameslinkprogramme.co.uk/benefits-of-the-programme>

Station	Scheme Description	Scheme Benefit
	• Waterloo station platform, Lengthening - The program includes lengthening platforms 1 - 4 to enable the operation of 10 car trains on suburban routes to increase capacity on these routes. The project is also expected to be completed in 2019. • Step-Free access to all National Rail and Underground platforms – To improve accessibility of the station all national rail and underground services will have step-free disabled access from 2020. • Fleet of Brand New Trains – As part of the Network Rail's Wessex's Capacity Improvement Plan there will be a roll out of 150 new trains on South West Trains will begin in mid-2017 and complete by mid-2018. The roll out will increase the number of carriages on the network to 1,599 compared to 1,022 in 1996. ¹⁷	
Central Lambeth		
Vauxhall station	Networks Rail's Wessex Capacity Improvement Plan includes enhancements to Vauxhall National Rail Station which increases capacity and passenger facilities at the station. The improvements are due to be completed by December 2018. ¹⁷	The population growth analysis shows that there are projected to be significant increases in rail passengers at Vauxhall, therefore improvements to capacity at the station will be necessary to accommodate the growth in passengers at the station.
East London Line Phase 2b extension	An extension of the line from south of Surrey Quays via the Network Rail South London Line to Clapham Junction via Queens Road Peckham, Peckham Rye, Denmark Hill, Clapham High Street and Wandsworth Road	Improved connectivity from Wandsworth Road and Clapham High Street.
South Lambeth		
Streatham station	A provision of an accessible route is planned for 2017/2018 at the station	After this improvement the station will be step-free and fully accessible to disabled users.

Figure 4.7: Future Baseline Summary: Rail



Source: London Underground & Lambeth boundary: Contains Ordnance Survey data © Crown copyright and database right 2016

- The data suggests that the number of public transport trips are expected to increase in all areas of the Borough, with the largest increases expected in the north.

North Lambeth

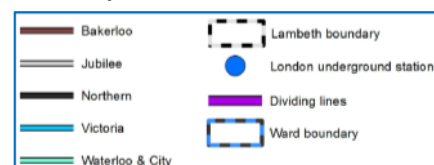
- On average, rail services to Waterloo Station via Vauxhall are expected to be the most crowded in the Borough, with trains operating over capacity when they arrive at Vauxhall and close total capacity when they depart in 2021 and 2031.
- Waterloo Station improvements should alleviate some of the capacity constraints experienced currently and anticipated in the future by increasing the capacity of trains on the network and reopening the old Eurostar terminus.

Central Lambeth

- The Railplan analysis indicates that all services stopping at stations in the central section of the Borough operate within total capacity limits. Though, Southeastern services to Victoria are expected to be very close to total capacity at Herne Hill and Brixton.
- Planned improvements to capacity at Vauxhall station will be vital to deal with the anticipated increase in rail passengers at the station.
- The benefits at stations in the central section of the Borough due to the Thameslink programme improvements are visible at Tulse Hill, Herne Hill and Loughborough Junction, with declines in the total capacity on trains compared to 2011.

South Lambeth

- In the south, Railplan analysis suggests that all services stopping at stations are operating within total capacity in 2021 and 2031.
- Thameslink improvements should be particularly beneficial to south Lambeth, particularly Streatham station by improving both service frequency and capacity into central London.
- Step free access at Streatham station should be available by 2017/18.



4.4 Bus

Bus: Data Sources

- London Transportation Studies Model (2011)
- Sub Regional Transport Plan for Central London – 2015 Update
- TfL Bus Consultation, Online (2016)
- TfL Railplan Data (2011)

The Existing Baseline Report (Part 1) stated that in Lambeth, one in five people currently use the bus for their journeys. With the expected increase in public transport mode share (Figure 1.2), and the population growth forecasts, it is anticipated that bus travel demand will increase in the future.

Due to population growth forecasts and the likely increase in highway congestion, bus journey times are likely to increase in the future. As a result, bus service improvements may need to be prioritised or introduced to serve key growth areas.

Since 2011, TfL's business plan has set aside £200m over the period 2020/21²³ for the development and implementation of schemes at pinch points and along new bus priority corridors serving key growth areas.

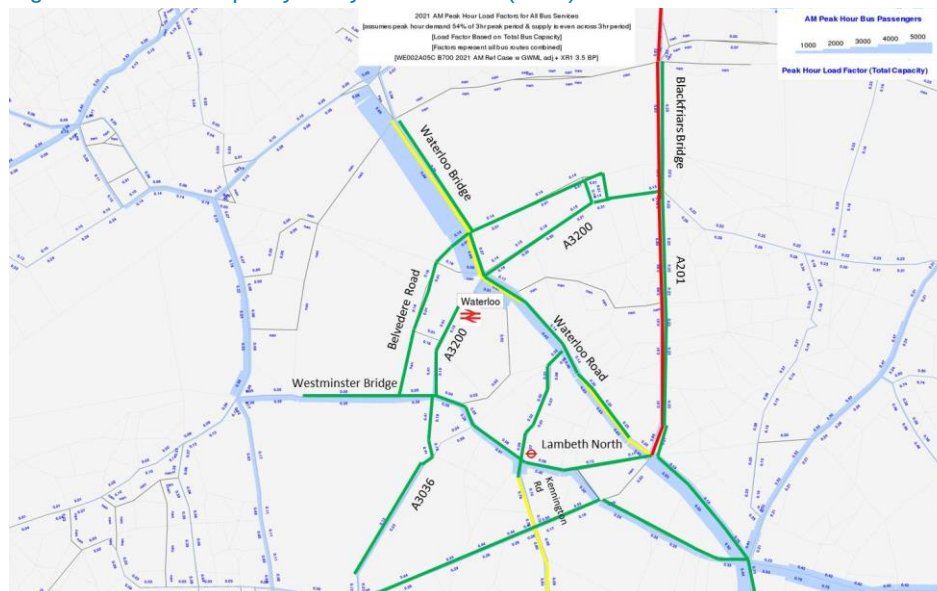
4.4.1 Future Challenges (Railplan Analysis)

TfL's Railplan model has been interrogated to identify the crowding expected on Lambeth's buses in 2021 and 2031. The modelled results represent the AM peak hour (8am to 9am).

It should be noted that the Railplan results show an average capacity along bus corridors and does not show capacity on particular services; therefore, some bus services may perform better or worse than the results presented in the figures below. As a result, it is not recommended to use this data for localised issues as the models strength is at a more strategic level.

²³ Background Paper 3, Bus Priority and Reliability. TfL [2011]

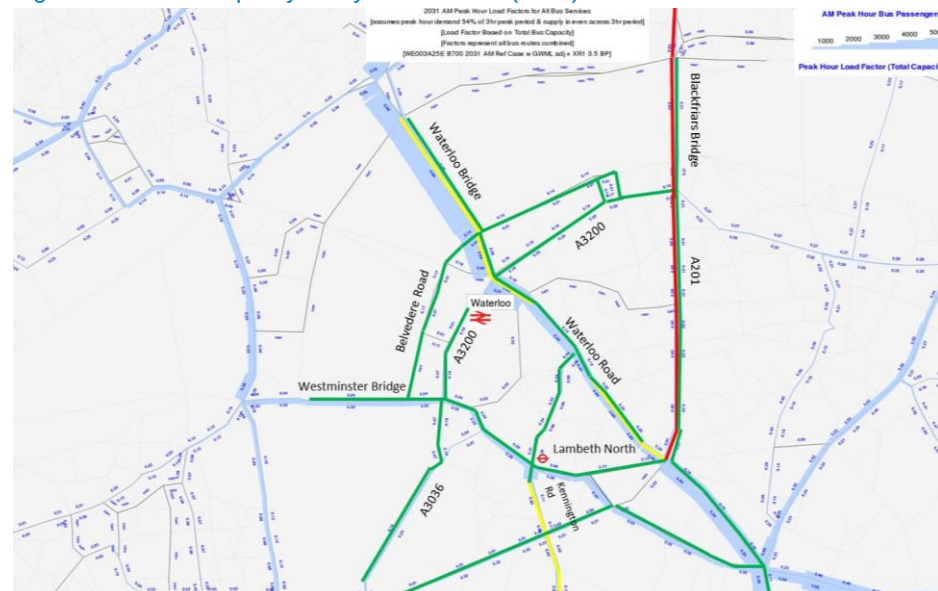
Figure 4.8: Bus Capacity Analysis: Waterloo (2021)



Key

Over 100% capacity 80%-100% capacity 60%-80% capacity Under 60% capacity

Figure 4.9: Bus Capacity Analysis: Waterloo (2031)



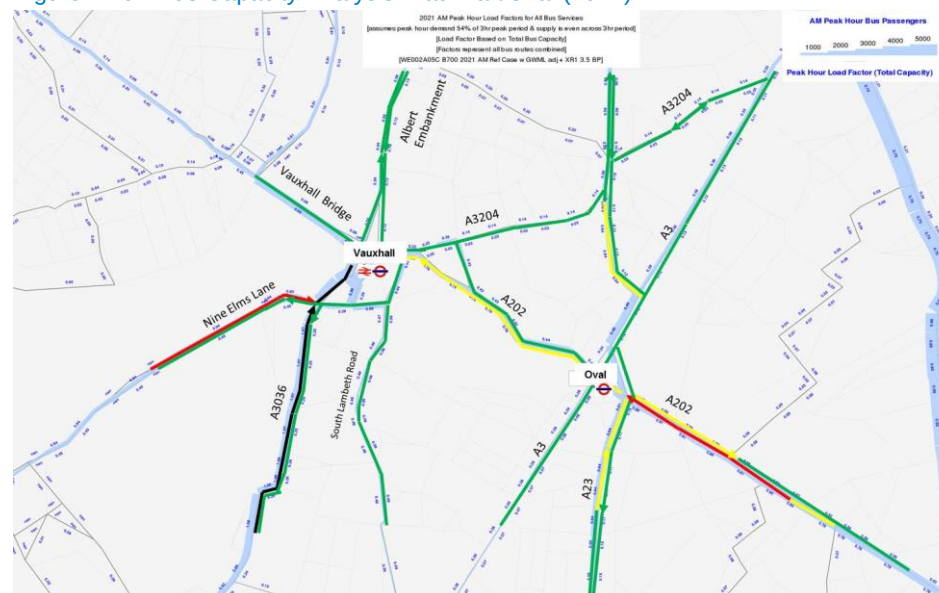
Waterloo

- Although the capacity on buses on the A201 towards Blackfriars Bridge is likely to improve from existing conditions (see Existing Baseline Report – Part 1) they are still predicted to operate close to capacity limits (80-100% capacity)
- The busiest bus routes are expected to be from Waterloo Station across Waterloo Bridge with buses operating 60% to 80% of total capacity
- Bus services south of Lambeth North, along Kennington Road, improve slightly from existing conditions but are still expected to operate close to capacity (60-80% capacity)
- Buses from the Westminster Bridge South gyratory are forecast to be busy however buses are likely to operate within capacity.

Source: TfL Railplan Data (2011)

Note: AM Peak Hour Load Factors for All Bus Services (assumes the peak hour demand 54% of 3hour peak period and supply is even across 3hour period).

Figure 4.10: Bus Capacity Analysis: Vauxhall/Oval (2021)



Key

Over 100% capacity 80%-100% capacity 60%-80% capacity Under 60% capacity

Figure 4.11: Bus Capacity Analysis: Vauxhall/Oval (2031)



Vauxhall

- Northbound bus services along the A3036 Wandsworth Road are forecast to operate over capacity limits in 2021 and 2031.
- By 2021, buses along A3205 Nine Elms Lane are expected to operate close to capacity limits, and by 2031 buses along the route towards Vauxhall are likely to be over capacity limits. This may happen due to increased demand for buses generated by VNEB development.
- Bus services between Oval and Vauxhall along the A202 are likely to operate at 60 to 80 per cent capacity in 2021, which worsens in 2031.

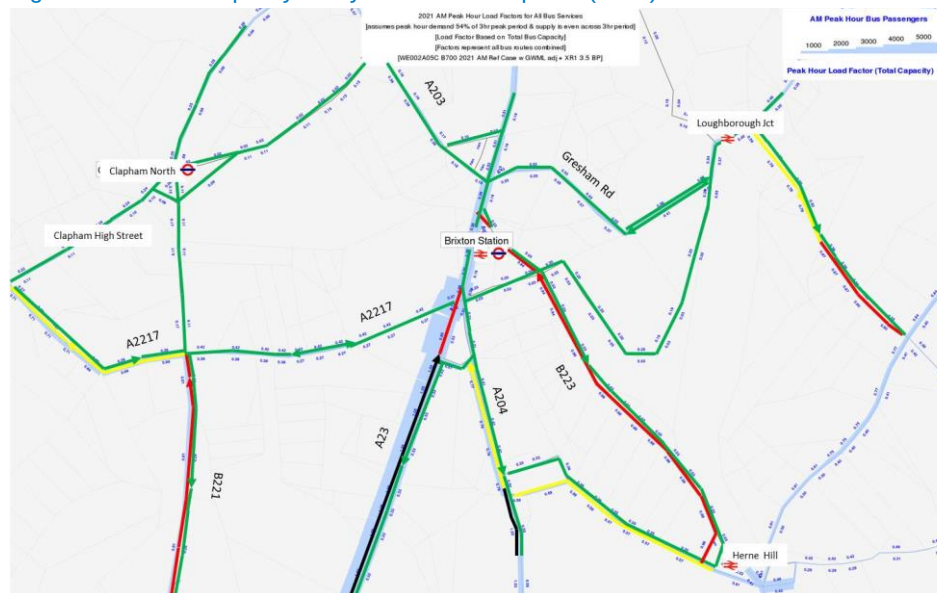
Oval

- The A202 towards Oval station is expected to operate close to capacity in 2021 and this is unlikely to change by 2031.
- Buses along the A23 Brixton Road are predicted to operate at 60 to 80 per cent capacity.
- Northbound and southbound buses on the A23 are predicted to have comparably low flows and operate within capacity limits.

Source: TfL Railplan Data (2011)

Note: AM Peak Hour Load Factors for All Bus Services (assumes the peak hour demand 54% of 3hour peak period and supply is even across 3hour period).

Figure 4.12: Bus Capacity Analysis: Brixton/Clapham (2021)



Key

Over 100% capacity 80%-100% capacity 60%-80% capacity Under 60% capacity

Brixton

- Bus routes along the A23, south of Brixton, are forecast to operate over capacity in 2021 and 2031.
- The buses along the A204, towards Brixton town centre, are likely to be more congested in 2031, compared to 2021. In 2031, the buses are expected to be at 80 to 100 per cent capacity.
- Buses along B223 are predicted to operate close to capacity limits in 2021, and in 2031 they are likely to operate over capacity limits near Herne Hill station.
- Buses along Herne Hill Road are likely to operate close to capacity limits in 2021, with the situation worsening slightly in 2031.

Clapham

- Northbound buses along the B221 are likely to operate close to absolute capacity (80-100%) in 2021 and 2031.
- Buses along the A2217 are likely to be fairly congested and operate at 60 to 80 per cent capacity in 2021 and 2031.
- Bus services around Clapham North station are predicted to operate within capacity

Source: TfL Railplan Data (2011)

Note: AM Peak Hour Load Factors for All Bus Services (assumes the peak hour demand 54% of 3hour peak period and supply is even across 3hour period).

Figure 4.13: Bus Capacity Analysis: Brixton/Clapham (2031)



Figure 4.14: Bus Capacity Analysis: Streatham/West Norwood (2021)



Key

Over 100% capacity 80%-100% capacity 60%-80% capacity Under 60% capacity

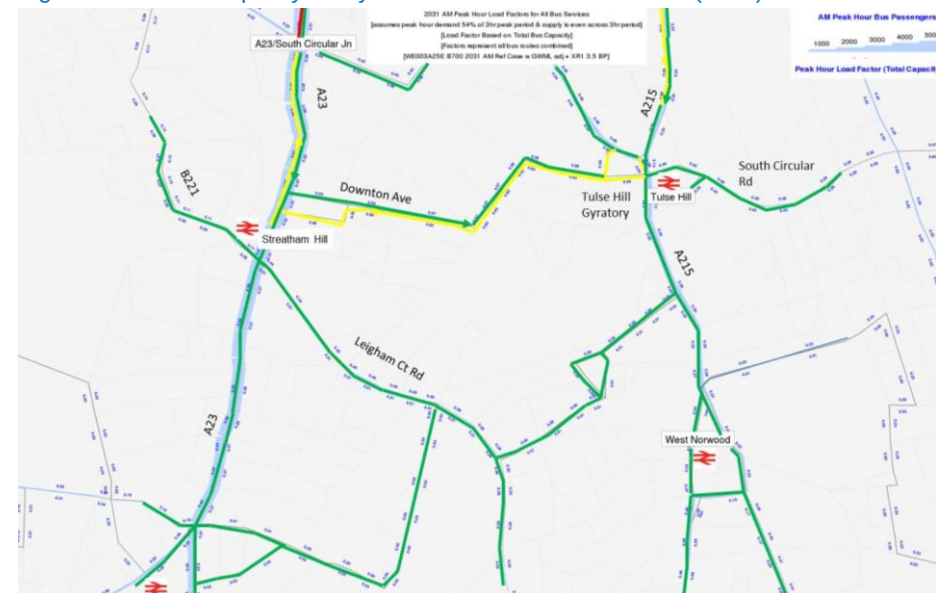
Streatham/Tulse Hill

- The busiest bus routes in the AM peak hour are expected northbound along the A23.
- Buses travelling westbound between Tulse Hill and Streatham Hill are likely to operate close to capacity in both 2021 and 2031 modelled years
- Buses travelling north of Tulse Hill station are likely to get more congested in 2031, compared to 2021.

West Norwood

- Buses routes around West Norwood and Tulse Hill are predicted to have relatively low passenger volumes, and buses are likely to operate within capacity limits.

Figure 4.15: Bus Capacity Analysis: Streatham/West Norwood (2031)



Source: TfL Railplan Data (2011)

Note: AM Peak Hour Load Factors for All Bus Services (assumes the peak hour demand 54% of 3hour peak period and supply is even across 3hour period).

4.4.2 Future Schemes

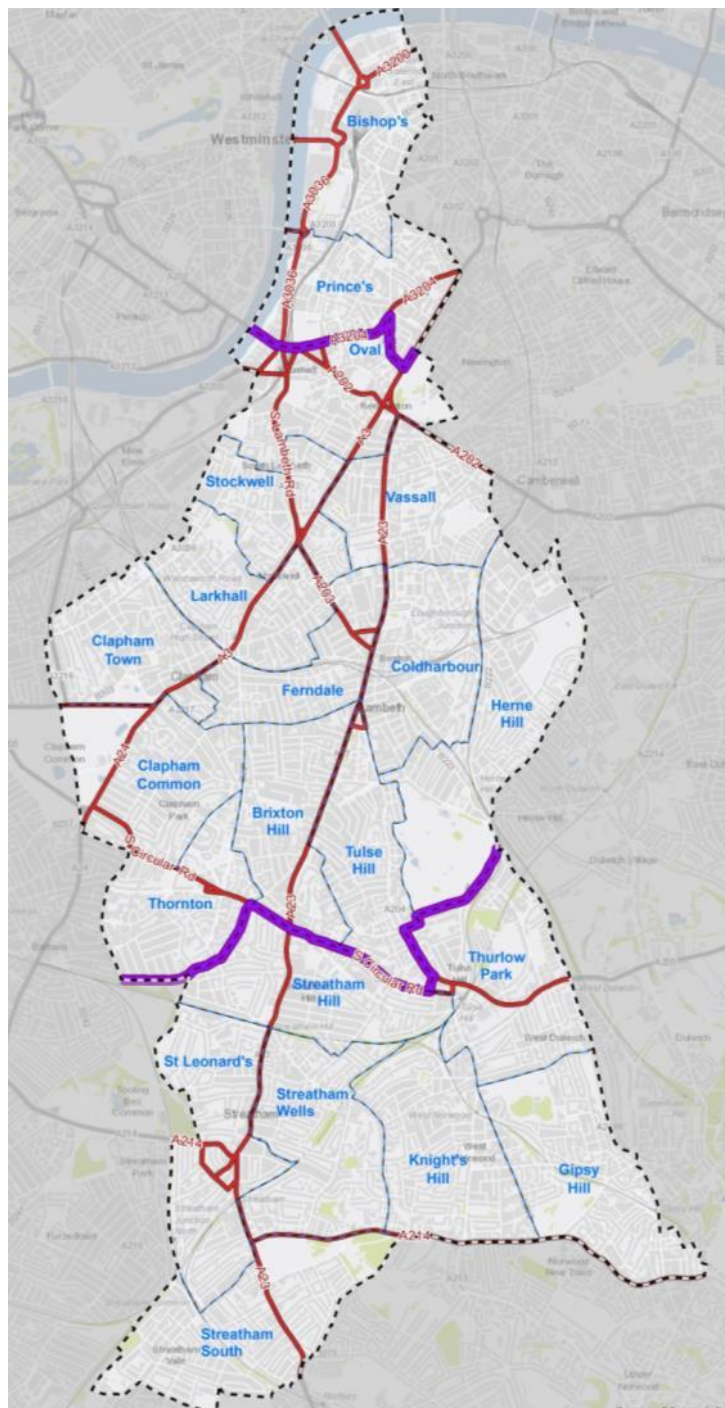
Table 4.4 identifies the bus schemes that are likely to be implemented in the Borough. The inclusion of these schemes in the following table is based on strong policy and/or funding backing, which have been agreed in advance with LBL.

Table 4.4: Future Bus Schemes

Station	Scheme Description	Scheme Impact
North Lambeth		
	VNEB- Re-route of bus service 436 and 452²⁴ Route 436 would be extended to operate from Vauxhall to Battersea Park station via Nine Elms Lane serving existing stops. It would no longer operate between Vauxhall and Paddington Route 452 would be extended from Wandsworth Road station to terminate at Vauxhall bus station.¹⁹	The frequency of this route will be reduced from 6 minutes to every 7 to 8 minutes during peak hours, however the route 36 will increase to every 4 minutes during peak house to accommodate this. This would increase the capacity along Wandsworth Road and create new links for the area. The frequency of the service will remain the same.
Central Lambeth		
	No bus schemes identified	
South Lambeth		
	No bus schemes identified	
Borough Wide		
	A Low Emission Bus Zone is proposed on the A23 between Streatham and Brixton and is due to be operational by 2018. The zone will restrict high polluting buses and will ensure buses have priority over other traffic; reducing congestion and emissions.	Restricting high polluting buses will reduce pollutant levels on the A23 between Streatham and Brixton. However, this may divert buses to use other routes and increase pollution on other roads.

²⁴ TfL Bus Consultation, Online (2016)

Figure 4.16: Future Baseline Summary: Bus



Source: Key Roads & Lambeth boundary: Contains Ordnance Survey data © Crown copyright and database right 2016

- The data suggests that the number of public transport trips are expected to increase in all areas of the Borough, with the largest increases expected in the north.

North Lambeth

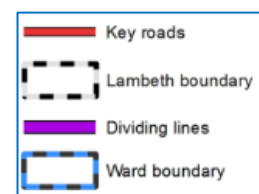
- Additional bus trips are likely to be generated by increases in rail passengers alighting at Waterloo station (not included in Table 4.1). This may lead to added pressures on the bus interchange point at Waterloo, prolonging waiting times and creating user conflict between various road users.
- The Railplan analysis suggests that buses travelling over Blackfriars Bridge are likely to be close to capacity in 2021 and 2031.

Central Lambeth

- Bus routes are expected to be busiest close to Brixton, Vauxhall and Oval rail/ underground stations; these routes are forecast to operate over capacity in 2021 and 2031. There are no future schemes identified to improve the capacity on buses at Oval and Brixton.
- The re-routing of bus route 436 will help with additional demand at VNEB. However, the Railplan analysis shows that there are capacity constraints around Vauxhall and that more improvements may be required.

South Lambeth

- Bus services in the south of the Borough are generally less busy than bus services in the central and northern section of the Borough.
- The Railplan analysis suggests there is unlikely to be significant additional demand for buses in the southern section of the Borough based on current future growth forecasts.
- The A23 remains a key route for bus services connecting the south with Brixton and the North, with approximately 12 services providing bi-directional travel along the arterial road.



4.5 Underground

Underground: Data Sources

- London Transportation Studies Model (2011)
- Northern Line Extension (2016)
- Sub Regional Transport Plan for Central London – 2015 Update
- TfL Railplan Data (2011)
- TfL, Your accessible transport network Report (2015)

The Existing Baseline Report (Part 1) indicated that the Underground mode share in Lambeth was 10%. The report also indicated that parts of the Underground network in Lambeth were heavily congested, particularly the Northern Line.

With future pressures from residential and employment population growth, the demand for Underground services will increase. In London's central sub-region, it is expected that the demand for underground services is forecast to increase by 60 per cent, which is in part due to the limited capacity on the road network.²⁵

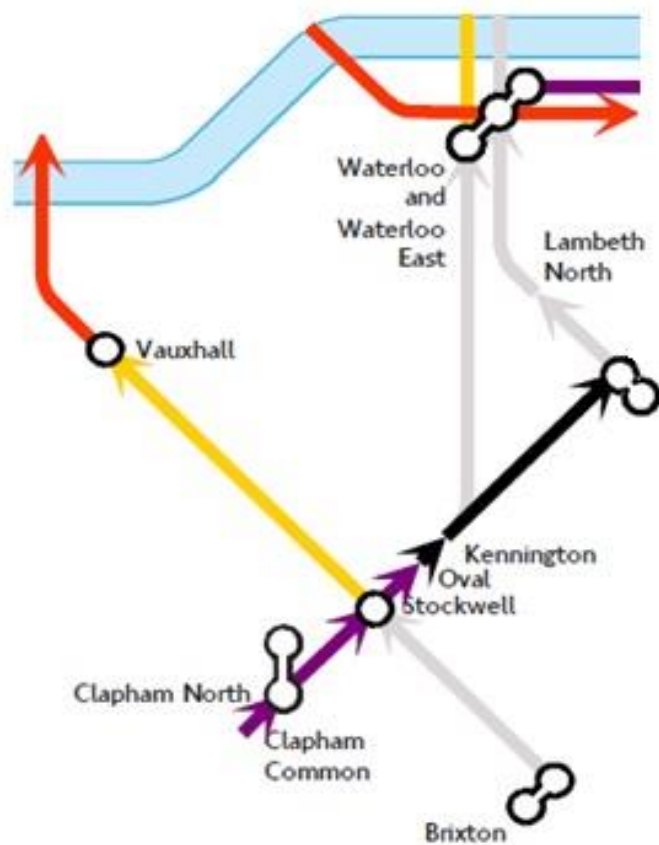
4.5.1 Future Challenges (Railplan Analysis)

Railplan outputs showing levels of crowding expected on the Underground network in 2021 and 2031 are highlighted below. Figure 4.17 and Figure 4.19 present the average AM peak hour (8am to 9am) crowding expected on Lambeth's Underground network in 2021 and 2031, respectively. The modelled results account for population and employment growth predictions, and the improvement schemes summarised in Table 4.2.

Railplan outputs have also been analysed to understand the crowding at specific Underground stations within the AM peak hour (8am to 9am); these are shown in Figure 4.18 and Figure 4.20.

²⁵ Sub Regional Transport Plan for Central London – 2015 Update

Figure 4.17: Underground: AM Peak Congestion 2021 (standing passengers per sqm)



Northern Line (Clapham Common, Clapham North, Stockwell, Oval, Kennington & Waterloo)

- There is likely to be significant overcrowding through the Borough, particularly between Clapham Common and Oval, where there is expected to be more than 5 people standing per square metre

Victoria Line (Brixton, Stockwell & Vauxhall)

- The underground is likely to operate within capacity from Brixton to Vauxhall. However, beyond Vauxhall the underground is predicted to operate close to absolute capacity limits, which is similar to existing conditions (see Existing Baseline Report – Part 1).

Jubilee Line (Waterloo)

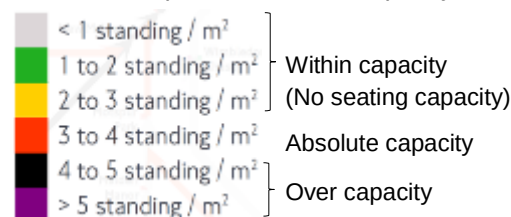
- The increased frequency of trains on the Jubilee Line improves congestion from existing conditions; however, it is still predicted to operate at absolute capacity during the AM peak hour as a result of Waterloo being a key interchange location

Waterloo & City Line (Waterloo)

- Similar to existing conditions (see Existing Baseline Report – Part 1), the Waterloo & City Line is still expected to be extremely over capacity during the AM peak hour as a result of Waterloo being a key interchange location.

Bakerloo Line (Waterloo & North Lambeth)

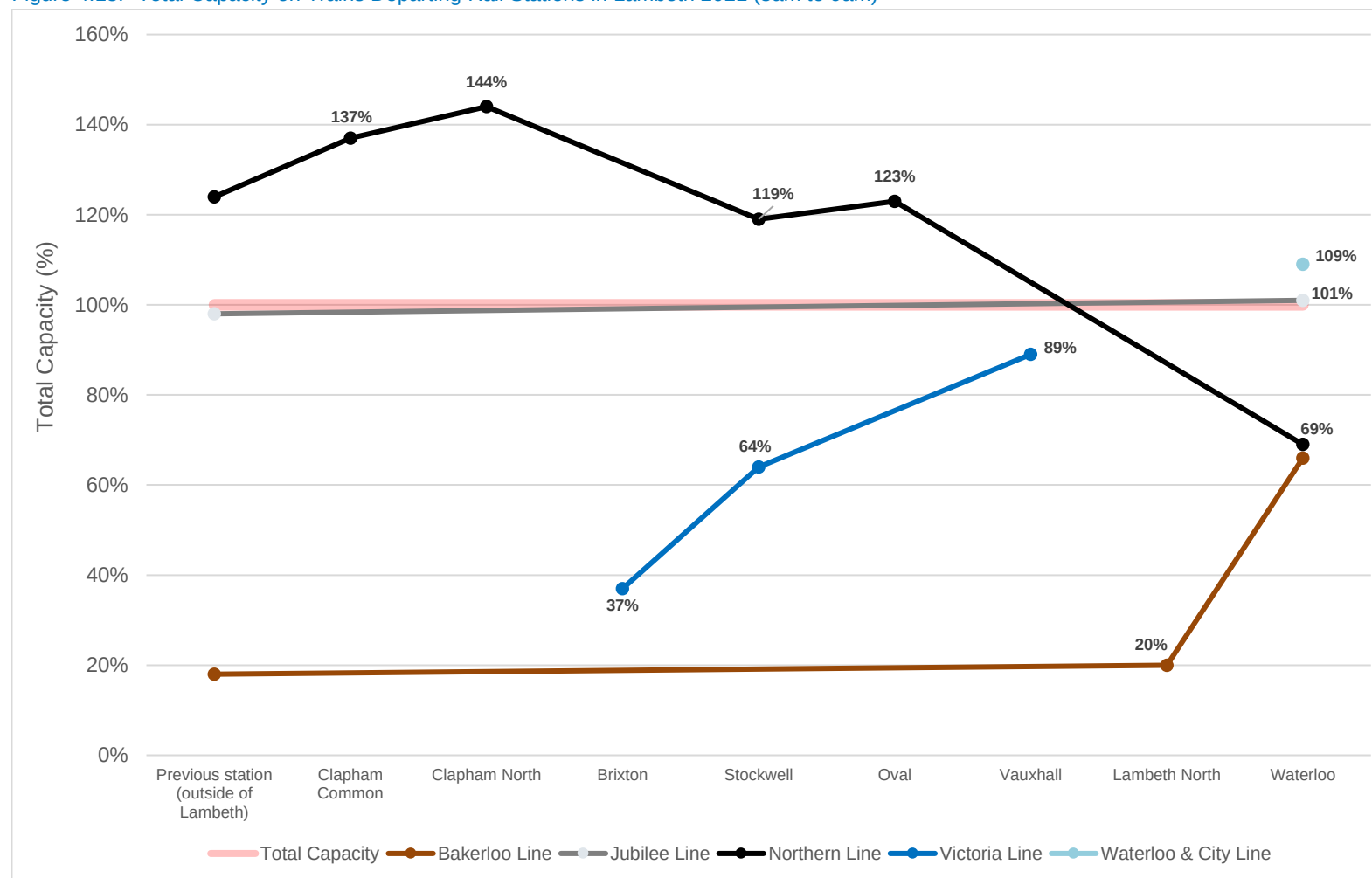
- There are expected to be no capacity issues on the Bakerloo Line in 2021.



Source: TfL Railplan Data (2011)

Note: This analysis includes an aggregate of all services in the peak hour (8am to 9am). It is not recommended to use this data for fine detail as the models strength is at a more strategic level.

Figure 4.18: Total Capacity on Trains Departing Rail Stations in Lambeth 2021 (8am to 9am)



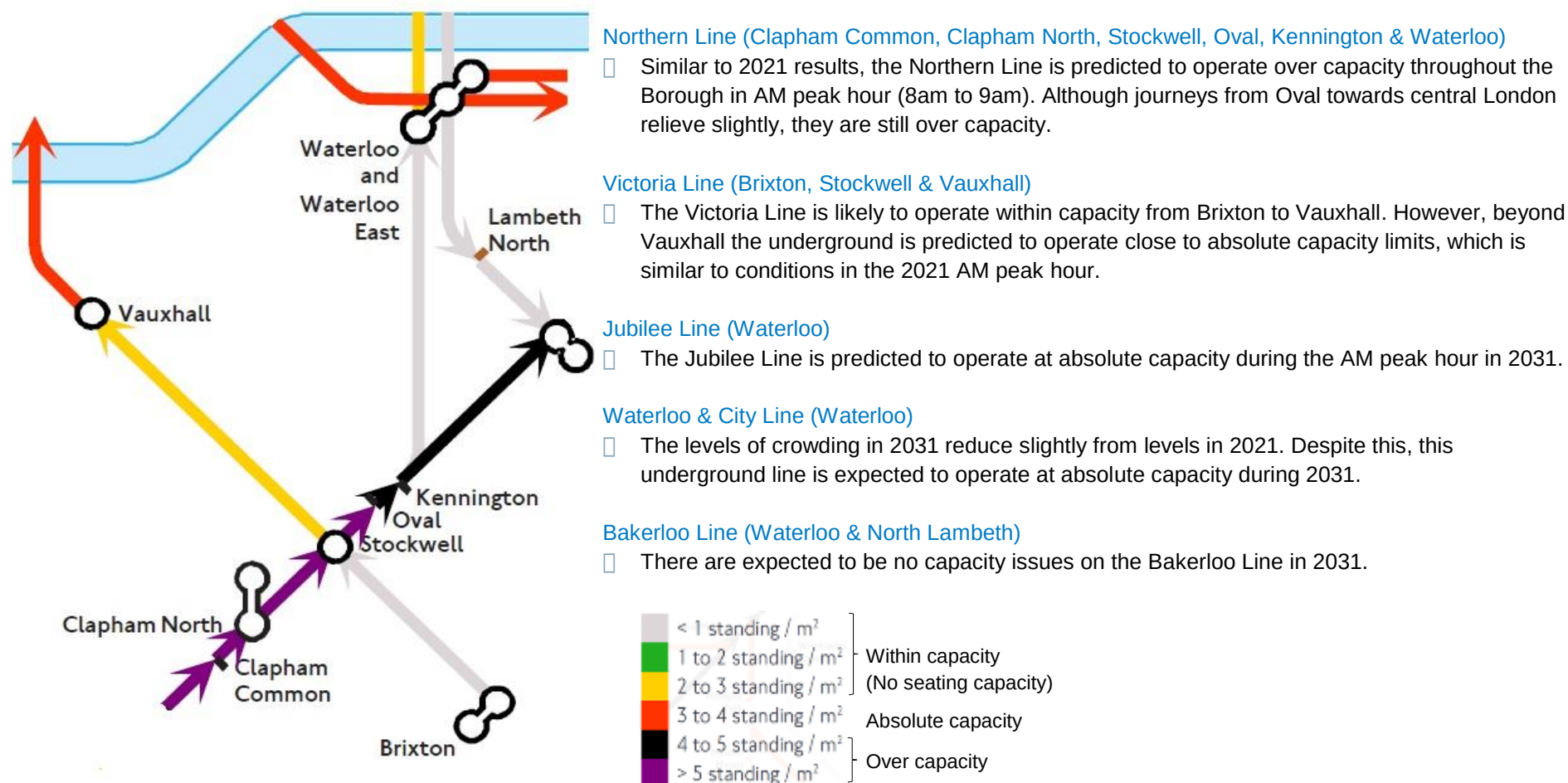
Key Observations:

- Similar to existing conditions, the Northern Line is expected to operate over capacity in 2021. The stations are likely to be severely congested at Clapham Common where the Line is expected to be over capacity by 37 per cent at Clapham Common and 44 per cent over capacity at Clapham North
- The Waterloo and City line is expected to be over capacity by 9% at Waterloo
- The Jubilee line is expected to be over capacity at Waterloo, where demand increases to 101% at Waterloo.
- The Bakerloo Line and Victoria Line are expected to operate within capacity.

Source: TfL Railplan Data (2011)

Note: Total capacity = 4 people per every sqm of standing space. Please see Appendix B for the Railplan data output

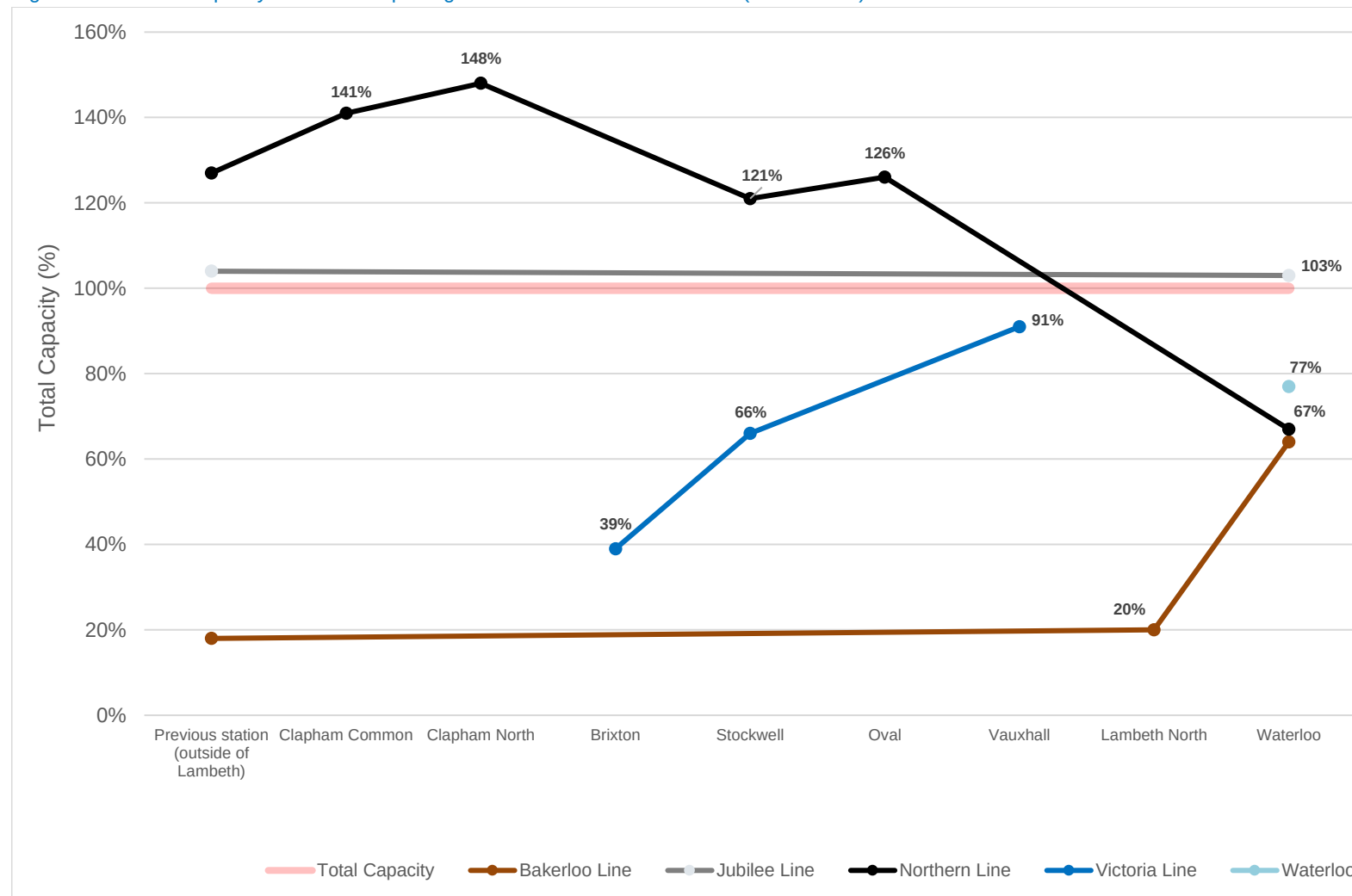
Figure 4.19: Underground: AM Peak Congestion 2031 (standing passengers per sqm)



Source: TfL Railplan Data (2011)

Note: This analysis includes an aggregate of all services in the peak hour (8am to 9am). It is not recommended to use this data for fine detail as the models strength is at a more strategic level.

Figure 4.20: Total Capacity on Trains Departing Rail Stations in Lambeth 2031 (8am to 9am)



Key Observations:

- The Northern Line capacity is likely to get worse in 2031, compared to 2021 results. Underground services leaving Clapham Common and Clapham North are expected to be 41 per cent and 48 per cent over capacity, respectively. Underground services leaving Stockwell and Oval are also expected to be operating over capacity.
- The congestion on the Jubilee Line slightly worsens from 2021, with services over capacity by 3 per cent at Waterloo.
- Although the number of people using the Victoria Line is likely to increase in 2031, the service is still likely to operate within total capacity limits in Lambeth.
- By 2031, there are expected to be no capacity constraints with the Bakerloo and Waterloo & City Lines.

Source: Railplan Data (2011)

Note: Total capacity = 4 people per every sqm of standing space. Please see Appendix B for the Railplan data output

4.5.2 Future Schemes

Table 4.5 discusses the Underground improvements that are likely to be implemented in the future years; these are likely to have a large impact on Lambeth. The inclusion of these schemes in the following table is based on strong policy and/or funding backing, which have been agreed in advance with LBL. Please note, Underground schemes that have been accounted for in the Railplan model are highlighted in Table 4.2, and many these schemes are capacity and frequency improvements.

Table 4.5: Future Underground Schemes

	Scheme Description	Scheme Impact
Borough Wide		
Northern Line Accessibility	Northern lines trains are being refurbished to include dedicated wheelchair space, improved colour contrast, low level passenger emergency alarms and visual door closing indicators.²⁶ Also, there are signalling upgrades proposed on the Northern Line to provide additional capacity and improve journey times Revised service patterns to deliver a further 20 per cent increase in capacity	This will improve the accessibility of all Northern Line trains stopping at Clapham Common, Clapham North, Stockwell, Oval and Waterloo. In addition, signalling upgrades will improve capacity and will help to manage the demand from increase in trips.
North Lambeth		
Bakerloo Line	Increased frequency to 27 trains per hour ^{Error! Bookmark not defined.}	Improved capacity during the AM peak hour.
Jubilee Line	Increased frequency to 36 trains per hour ^{Error! Bookmark not defined.}	Improved capacity during the AM peak hour.
Waterloo and City Line	Increased capacity and revised timetable ^{Error! Bookmark not defined.}	Improved capacity during the AM peak hour.
Central Lambeth		
Victoria Line	Increased frequency to 36 trains per hour ^{Error! Bookmark not defined.}	Improved capacity during the AM peak hour.
Northern Line Extension	Extension of the Northern Line from Kennington to Battersea to support the regeneration of the Vauxhall/Nine Elms/Battersea area.¹⁹	The Northern line extension will help to regenerate the Battersea area, and will lead to improved capacity along the line by separating branches serving Bank and Charring Cross at Kennington. The extension will play a key role in supporting 25,000 new jobs and more than 20,000 new

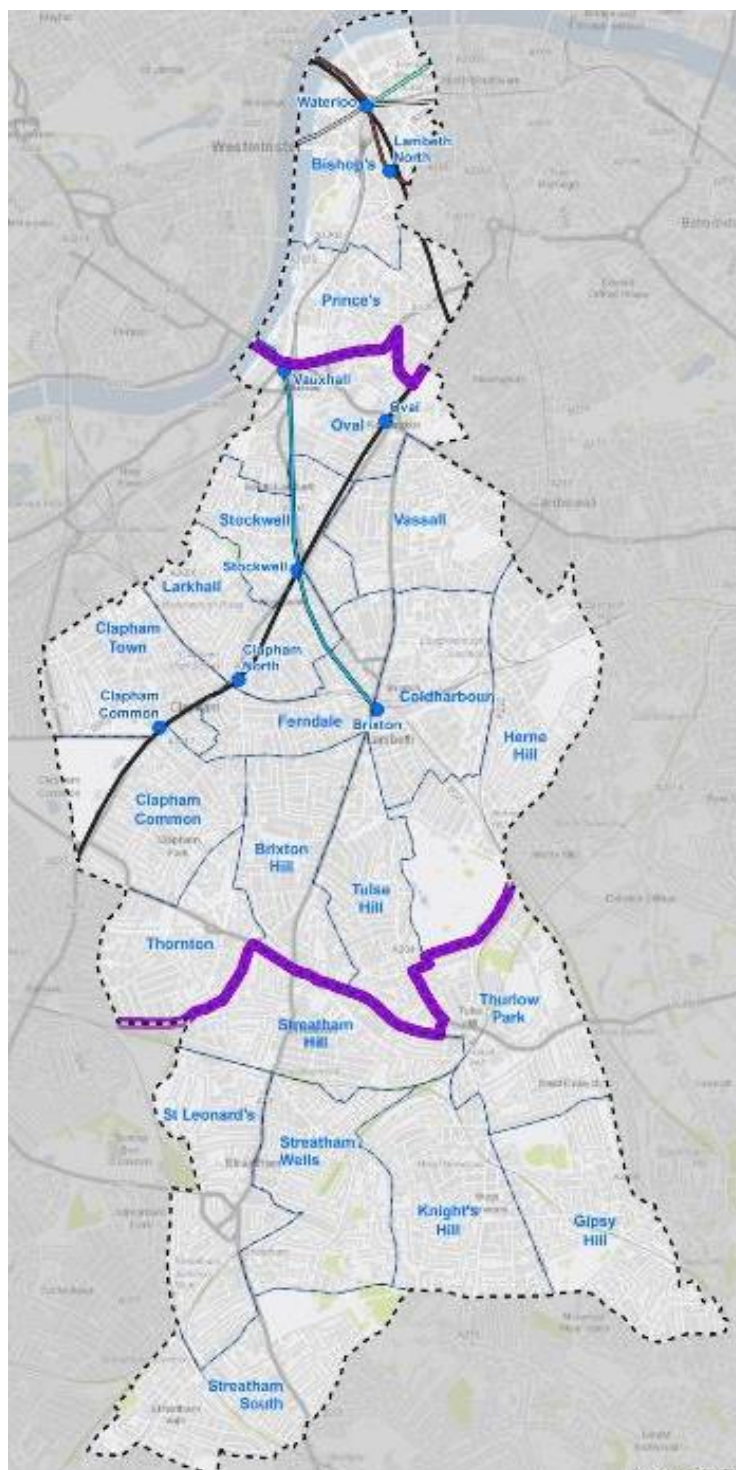
²⁶ TfL, Your accessible transport network Report (2015)

Scheme Description	Scheme Impact
	homes. The stations are due for completion in 2020. ²⁷
South Lambeth	<i>No underground services in the south</i>

Although Crossrail 2 is a rail scheme, it should also be referred to in this section of the report as this scheme is likely to reduce passenger demand on the Underground network in Lambeth. In particular the Crossrail 2 service is predicted to relieve pressure on the Northern Line and Victoria Line by providing passengers with an alternative travel option from Lambeth into Central London. In doing so, Railplan capacity constraints that currently show over capacity between Clapham Common and Elephant and Castle may be reduced.

²⁷ Northern Line Extension [2016]

Figure 4.21: Future Baseline Summary: Underground



- The data suggests that the number of public transport trips are expected to increase in all areas of the Borough, with the largest increases expected in the north.

North Lambeth

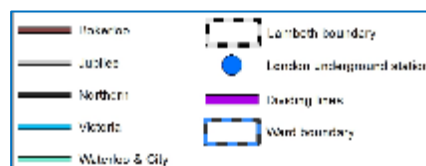
- Waterloo station is expected to be very busy in the future as it is a key interchange station.
- In 2021, the Jubilee Line and Waterloo and City Lines are expected to be over capacity at Waterloo station; the capacity on the Jubilee Line worsens in 2031 but improves on the Waterloo and City Line.
- The Railplan analysis suggests that the Northern Line and Bakerloo Line services stopping at Waterloo in the AM peak hour are expected to operate within capacity.

Central Lambeth

- The Northern Line services stopping at stations in central Lambeth are anticipated to be over capacity, particularly between Clapham North and Stockwell where the trains are likely to be 44 per cent over capacity in 2021 and 48 per cent over capacity in 2031.
- The Northern line extension is anticipated to provide a good transport link for the VNEB development.
- The Victoria line is predicted to operate within capacity until 2031

South Lambeth

- There is no underground infrastructure in South Lambeth.



Source: London Underground & Lambeth boundary: Contains Ordnance Survey data © Crown copyright and database right 2016

5 Road Use

The following section of this report analyses the likely capacity on Lambeth's road network in the future by considering future car trip generation, SoLHAM outputs and committed road schemes in the Borough.

5.1 Trip Generation

Figure 5.1 presents the number of private car trips in 2011 during the 07:00 to 10:00 AM peak period, and the increase in trips forecast during this period in the future years. It should be noted that the trip generation analysis does not account for light goods vehicles (LGVs), heavy goods vehicles (HGVs) or taxis.

Table 5.1: Trip Generation for road traffic in Lambeth

Borough Centres		2011	2021	2026	2031	2036
North Lambeth	Waterloo	2,473	-1.2%	1.5%	4.8%	9.0%
	North Lambeth (excluding Waterloo)	2,119	0.7%	-4.8%	-1.7%	1.7%
Central Lambeth	Stockwell	9,790	4.1%	0.0%	2.2%	6.4%
	Brixton	15,643	-1.2%	-6.2%	-4.8%	-1.4%
	Clapham	11,757	1.5%	-2.4%	-1.1%	1.8%
South Lambeth	Streatham	13,811	-0.1%	-4.7%	-3.7%	-0.4%
	Norwood	12,613	-1.2%	-6.1%	-4.9%	-2.5%

Source: London Transportation Studies Model (2011)

Note: All percentage changes are representative of changes from the 2011 baseline figure.

Road Use: Data Sources

- Guidelines for Motorcycling (2005)
- London Borough of Lambeth Local Implementation Plan (LIP) 2017/18 Spending Submission and programme of Investment Form
- London Transportation Studies Model (2011)
- SoLHAM (2012)
- Sub Regional Transport Plan for Central London – 2015 Update

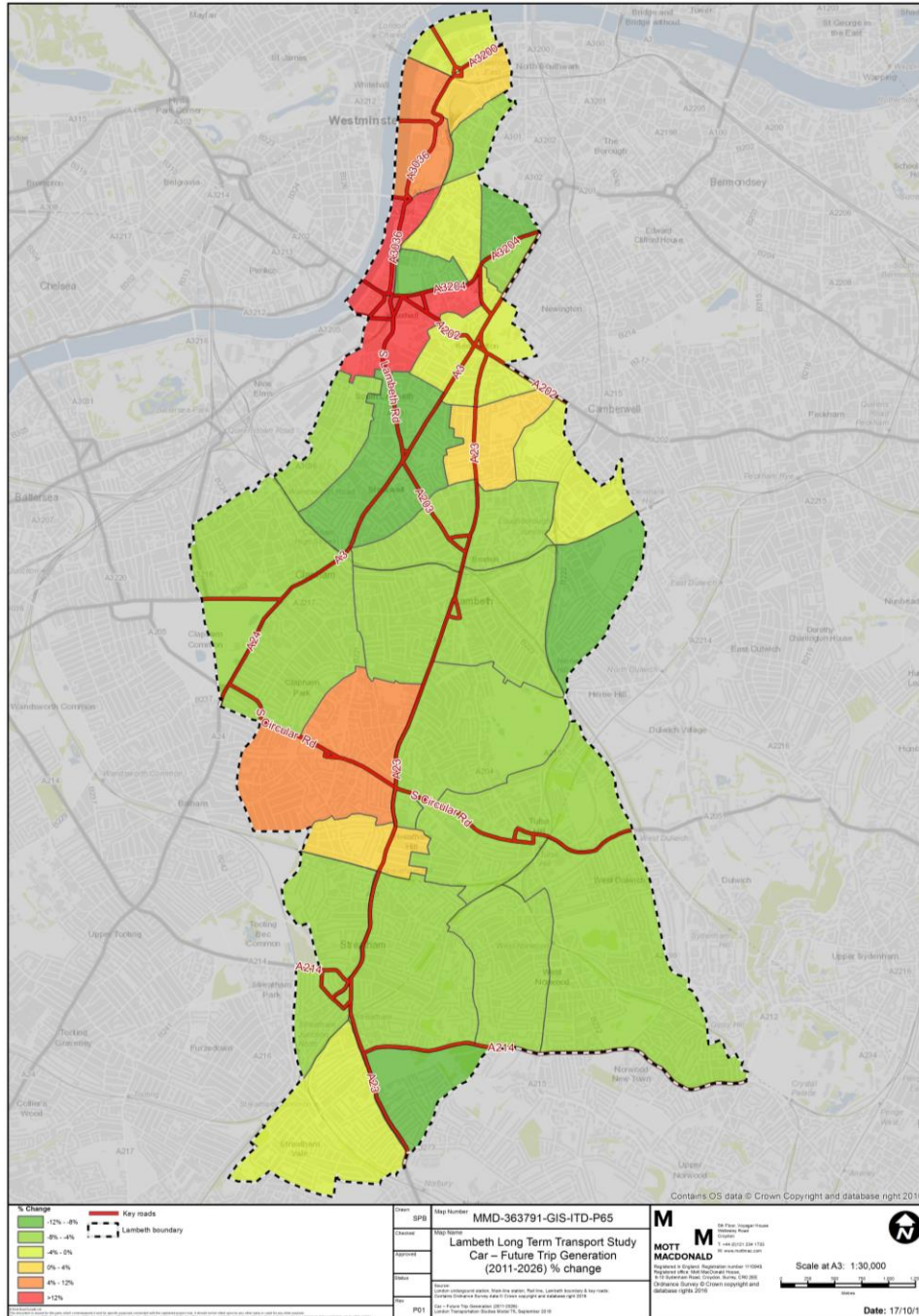
In comparison to the high increase in active mode and public transport trips, car trips in the Borough are anticipated to fluctuate between 2011 and 2036.

The data suggests that in the south of the Borough, there is likely to be a reduction of car trips. For example, the number of car trips by 2036 are predicted to be 0.4 per cent and 2.5 per cent lower than trips in 2011 in Streatham and Norwood respectively.

On the other hand, Waterloo and Stockwell are expected to experience a noteworthy growth in car trips, with an additional 9 per cent of car trips in Waterloo and 6.4 per cent more trips in Stockwell by 2036.

Figure 5.1 and Figure 5.2 present future car based trips per LTS zone in Lambeth.

Figure 5.1: Road Traffic: Future Trip Generation Change % (2011-2026)

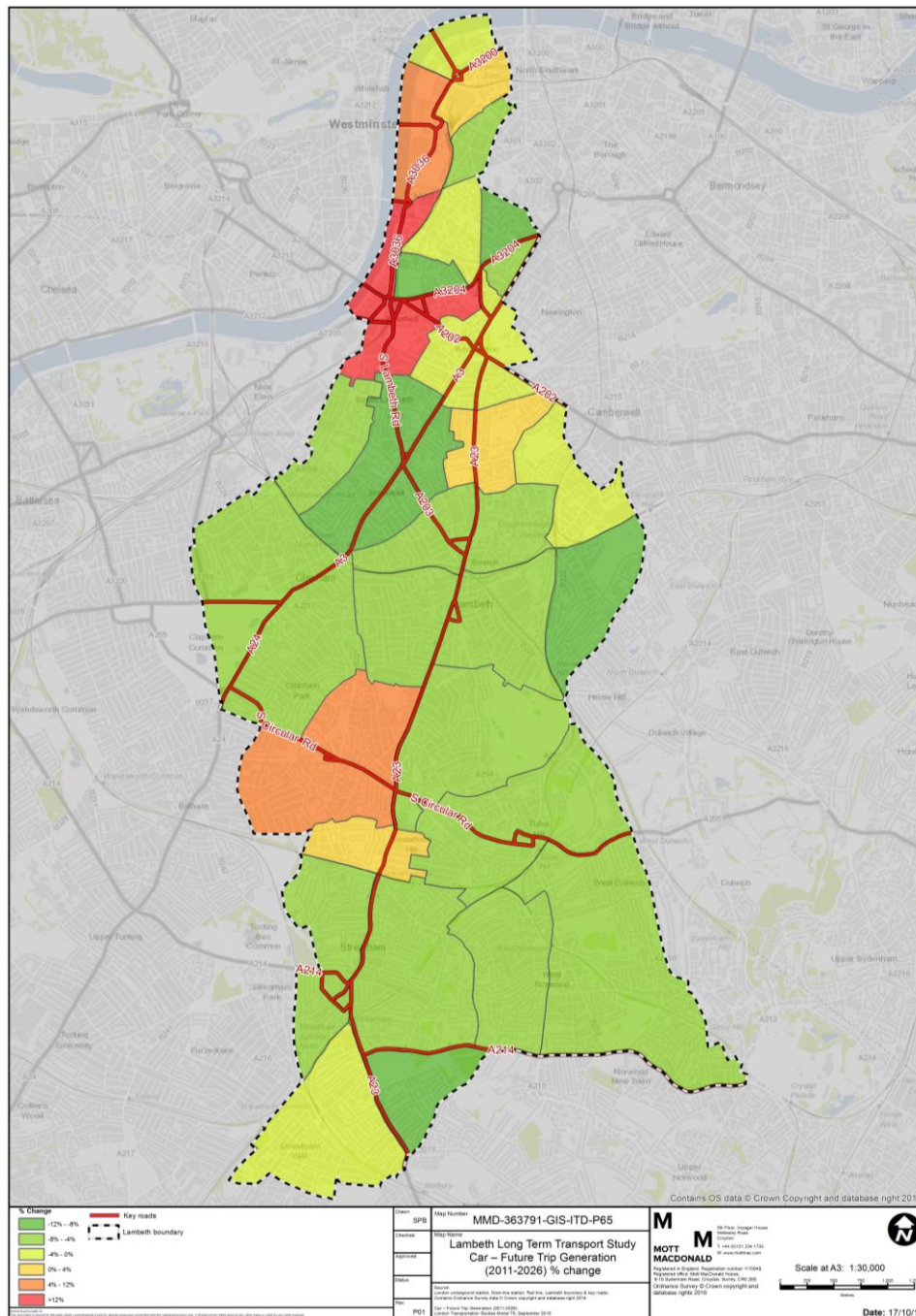


Key Observations:

- Only 7 of the 32 LTS zones are anticipated to experience an increase in car trips by 2026. (Waterloo, Waterloo East, Oval and Kennington, Kennington South, Vauxhall West, Streatham Hill and Streatham Hill South)
- The highest increase in future car trips is anticipated around the Vauxhall/Kennington and Oval area, with four of the Boroughs busiest roads intersecting at junctions and gyratories in the area.
- There is a noteworthy increase in trip generation to the west of the intersection of the S. Circular and A23; the key North/South and East/West roads in the Borough.
- LTS zones to the east of the A23 in the Borough predominately have reductions in car trips, potentially explained due to a lack of north/south arterial roads.

Source: London Transportation Studies Model (2011)

Figure 5.2: Road Traffic: Future Trip Generation Change % (2011-2036)



Key Observations

- Between 2026 and 2036 a number of LTS zones experience increases in trip generation rates.
- The majority of LTS zones in the north of the Borough have over 4% increases in trips by 2036
- Most wards in central and south Lambeth continue to have a reduction in car trips by 2036.
- In the South, Streatham (Vale, Hill South, and Hill) experience increases in road traffic by 2036, probably accounted for by the Streatham High road and South Circular roads and associated traffic thoroughfare traffic to wider London.
- The Camberwell South area has a notable increase in road traffic trips between 2026 and 2036.

Source: London Transportation Studies Model (2011)

As the results suggest, the number of private car trips in the AM peak period (7am to 10am) are likely to increase in the north and some sections of central and south Lambeth, which may lead to network constraints and call for network improvements to manage the additional demand. To analyse this increase further and to understand changes in LGV and HGV volumes, TfL's SoLHAM has been interrogated to understand constraints on the road network through the Borough.

5.2 TfL's SoLHAM

There are five sub-regional SATURN based highway assignment models available for London based highway modelling. Highway assignment models (HAM's) are used to quantify impacts of demand changes on highway networks in the future, for assessing large highways infrastructure schemes and for assessing policy changes that may have an impact on the network. In this instance the South London Highway Assignment Model (SoLHAM) has been examined

TfL's LTS data, which has been used for trip generation analysis purposes, provides the input to SoLHAM, which then allocates travel demand across the road network to understand road congestion and junction capacity issues.

TfL have provided Mott MacDonald with SoLHAM outputs for three standard years, 2011 (which are referred to in the Existing Baseline Report – Part 1), 2021 and 2031 (which are discussed later in this section). It is noted that the SoLHAM outputs for 2021 and 2031 do not align to Lambeth's LTTS assessment years of 2026 and 2035, and it has been acknowledged by LBL that amending these modelled years is outside the scope of this study. Nonetheless, the SoLHAM results offer a sound understanding of the likely capacity constraints in 2021 and 2031, and trip generation results (Table 5.1 Table 4.1) provide an understanding of additional trips between the modelled years.

The results represent the road conditions in the AM peak hour (08:00-09:00), as this is considered as the worst case scenario.

The following schemes have been accounted for in the model:

- Imax roundabout – This involves the removal of roundabout, which is made into peninsular junction by 2021.
- Stockwell – This involves the removal of the gyratory. This improvement is reflected in the 2021 model.
- Oval Triangle – This includes slight changes to road alignment from public realm improvements and is reflected in 2021 modelling results.
- Lambeth bridge – The removal of the roundabout on southern side of the bridge.

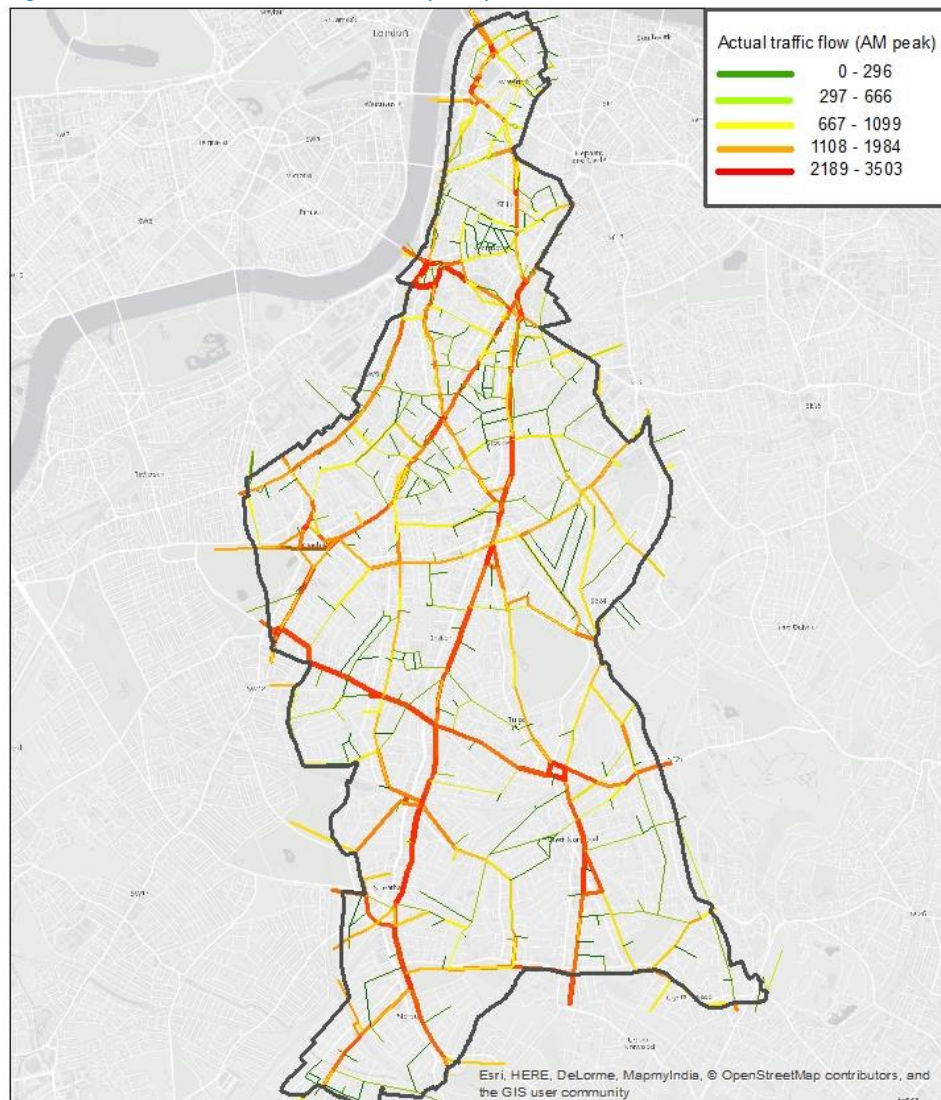
5.3 Future Challenges (SoLHAM Analysis)

Highway delays and congestion are a significant problem across Lambeth and can affect access to several key radial and orbital routes. This may constrain employment growth in these locations, as congestion and poor journey time reliability adds costs to business operations and restricts accessibility to potential customers and suppliers. Continued employment and population growth is likely to put considerable pressure on the road network in the future.

5.3.1 Future Traffic Volumes

The following figures present the traffic volumes expected on Lambeth's roads in 2021 and 2031. The modelled results represent the AM peak hour (08:00-09:00). The following figures show the popular routes through the Borough and indicates the changes in traffic volumes in the future years, which may worsen traffic congestion along the routes. In addition, routes with high car volumes are likely to correspond to traffic congestion, most notably congestion along bus routes.

Figure 5.3: SolHAM Traffic Volumes (2021)



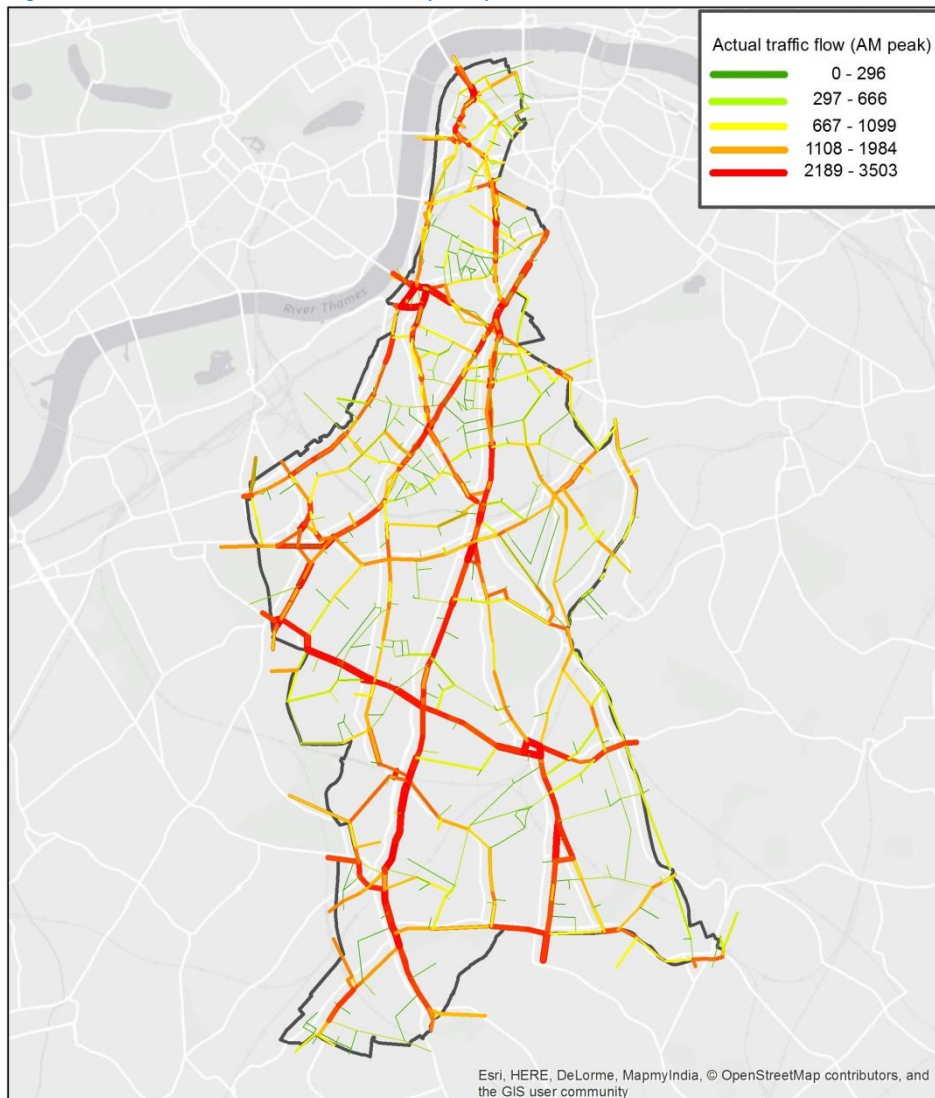
Key Observations:

- The Borough's main arterial and orbital routes (A23 and South Circular in particular) are predicted to experience the highest car volumes by 2021.
- Traffic volumes surrounding the Vauxhall gyratory is anticipated to be high by 2021.
- Almost all of the Borough's main roads will have traffic volumes over and above 667 person car units (PCUs) per hour
- Traffic volumes in 2021 does not vary substantially from the 2011 SolHAM baseline map (see Existing Baseline Report – Part 1)
- The South Circular and A23 south of Brixton experience a reduction in traffic volumes from 2011.
- Traffic volumes are higher in the south, reflecting the high car ownership in the area, which is likely to remain in the future years.

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Title 2021 Vehicle Flow (AM peak) SolHAM				 Environment Division Demeter House Station Road Cambridge, CB1 2RS United Kingdom T +44 (0) 1223 463 500 F +44 (0) 1223 461007 W www.mottmac.com			
Date	Drawn	Checked	Approved	Scale at A4	Drawing No.	Status	Rev
28/04/16	TN			1:24,124		INF	01

Source: SolHAM (2012)

Figure 5.4: SoLHAM Traffic Volumes (2031)



Key Observations:

- By 2031, there is likely to be an increase in traffic volumes, and thus possible congestion on many of the Borough's main orbital and arterial roads.
- The majority of key roads in the south of the Borough high car volumes by 2031.
- The Borough's gyratories at Vauxhall, Tulse Hill and Westminster Bridge are expected to experience considerable car volumes.
- The A3 and South Circular Roads both show increases from 2021
- Population growth in the Borough is likely to lead to additional traffic flow for future years, this alongside employment trends are anticipated to be causational factors leading to increases in congestion.

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Title 2031 Traffic flow (AM) SoLHAM							
Date	Drawn	Checked	Approved	Scale at A4	Drawing No.	Status	Rev
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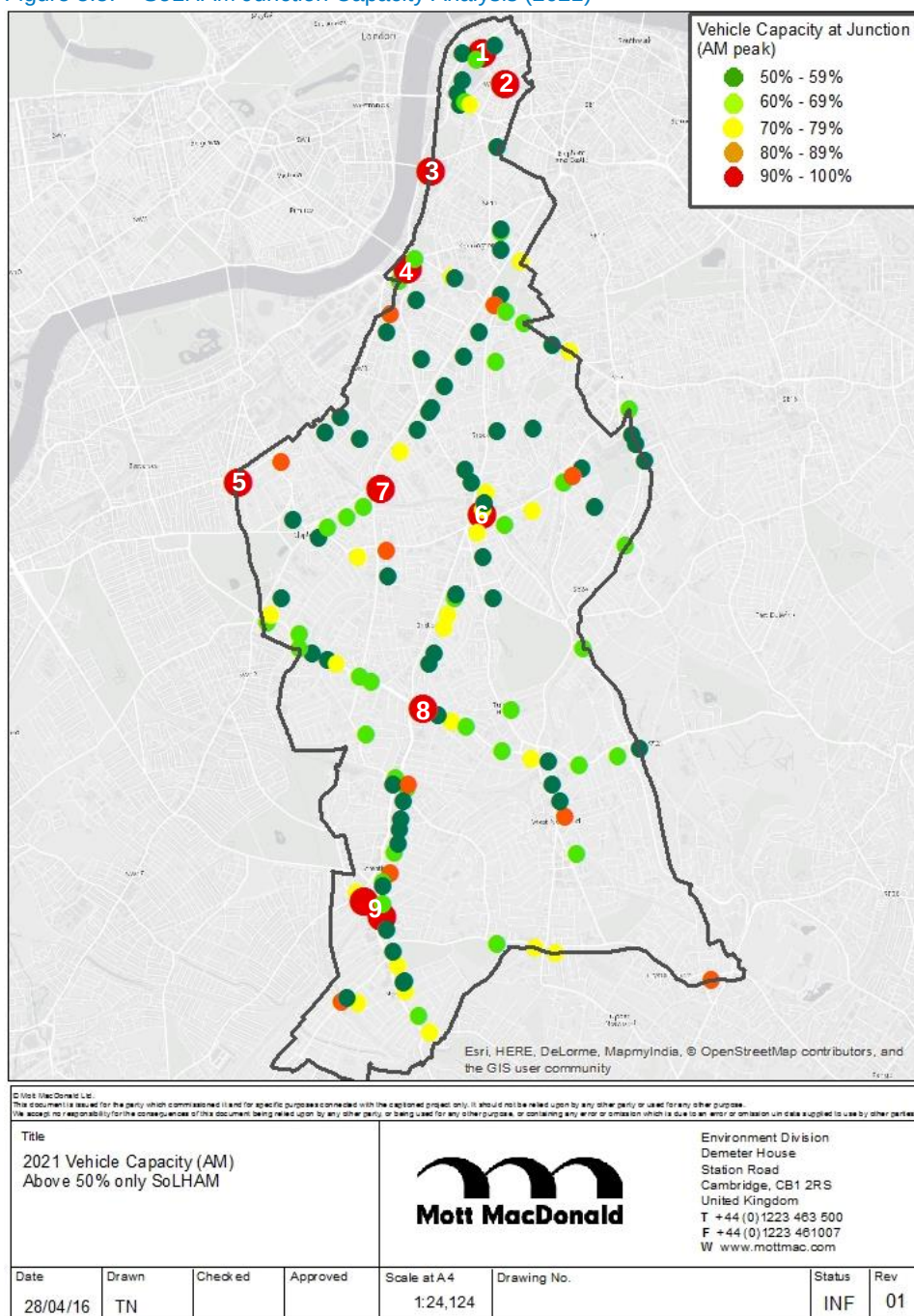
SoLHAM Aug 20, 2016 - 03:22PM

Source: SoLHAM (2012)

5.3.2 Future Junction Capacity Analysis (SolHAM)

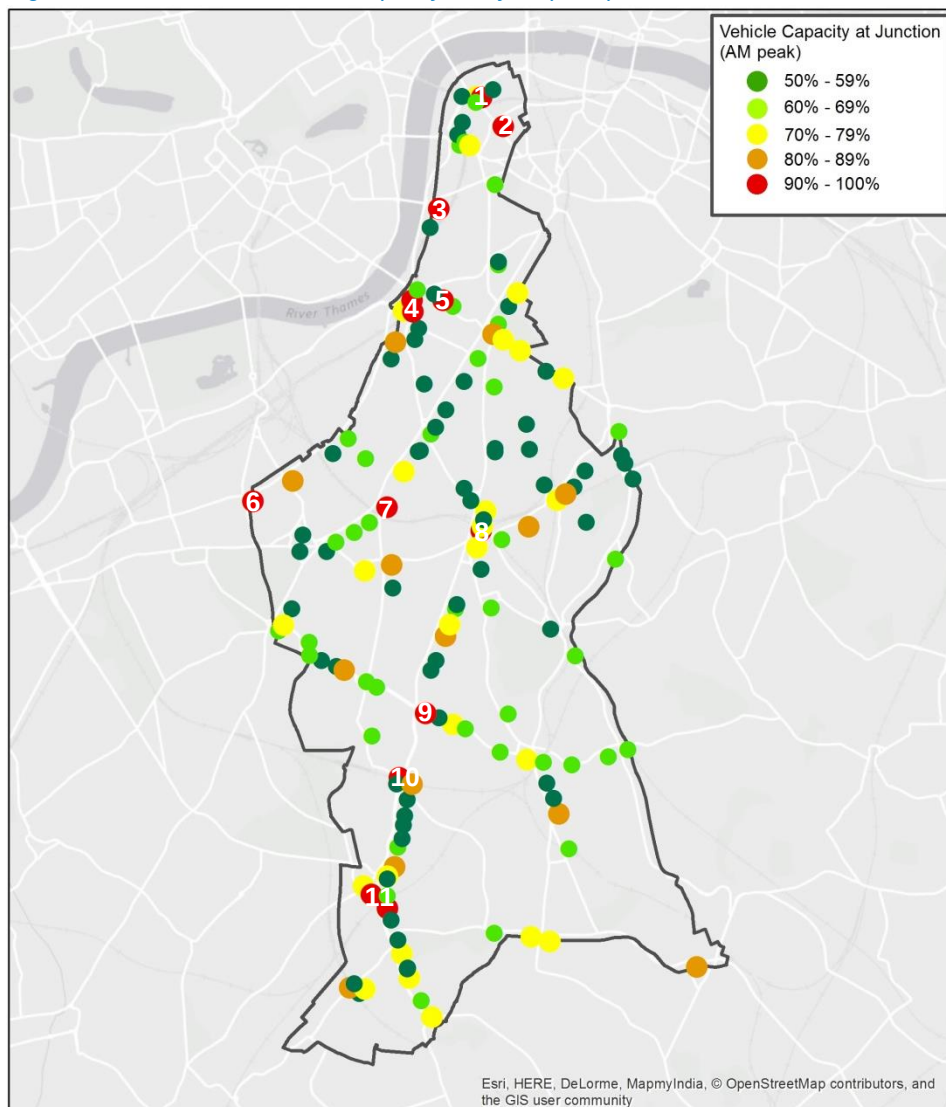
The following figures present challenges expected at Lambeth's junctions in 2021 and 2031. The modelled results represent the AM peak hour (08:00-09:00).

Figure 5.5: SolHAM Junction Capacity Analysis (2021)



Source: SolHAM (2012)

Figure 5.6: SolHAM Junction Capacity Analysis (2031)



Key Observations:

The following junctions, within the Borough, are likely to operate at over 90 per cent capacity in 2031:

1. Waterloo/IMAX roundabout (A3200, A30)
2. Waterloo Road (A301) and Bayliss Road (B300) intersection.
3. Lambeth Bridge Roundabout (Lambeth Road, A3036 and Albert Embankment)
4. The Vauxhall Gyratory (A3036, Parry Street, S. Lambeth Road, A3204)
5. Harleyford Road and Vauxhall Gyratory.
6. Cedars Rd (A3216) / Wandsworth Road (A3036)
7. A3 / Landor Road / Bedford Road
8. Brixton Town Centre (Brixton Road, A2217 and B223)
9. A23 / South Circular Road intersection
10. Streatham Hill junction (A23 and B221)
11. A23 / A 214 (one-way system)

- There are more junctions functioning at 90% capacity than there were in 2021
- The area surrounding the Vauxhall Gyratory is predicted to have severe capacity constraints.
- The A23 will present particular junction capacity issues with four of the junctions in central and south Lambeth affected by it.

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Title 2031 Vehicle Capacity (AM) Above 50% only SolHAM				 Environment Division Demeter House Station Road Cambridge, CB1 2RS United Kingdom T +44 (0)1223 463 500 F +44 (0)1223 461007 W www.mottmac.com			
Date	Drawn	Checked	Approved	Scale at A4	Drawing No.	Status	Rev
22/08/16	TN			1:24,124		INF	01

Source: SolHAM (2012)

5.4 Cars

Under current forecasts, whilst car mode share is likely to decline in some areas (notably in the southern section of the Borough), population and employment growth mean there will be an increase in the number of cars using the highway network in Lambeth, which is likely to result in increased congestion and constrain economic growth. Continued efforts to support mode shift away from motorised highway modes, as well as measures to optimise the operation of the highway network, will be required to tackle these issues.

In addition, increased or sustained levels of traffic will continue to create air quality issues in the Borough, particularly at key junctions and interchanges where congestion is highest. As a result, targeted measures may be required to reduce air quality in Lambeth. Further exploration of the impacts of this can be found in Section 9.

Congestion also has the potential to create issues such as 'rat running', whereby vehicle drivers travel through built up residential areas at speed to avoid congested principal roads, with technological advancements providing constant analysis of the quickest and most efficient route for its drivers there is a potential for 'rat running' to become a feature of Lambeth's streets if congestion remains an issue and mitigation measures are not implemented.

5.5 Powered Two Wheelers

The Existing Baseline Report (Part 1) findings demonstrated that there was a general decrease in motorcycle flows across the Borough; though large local variations were highlighted. For example, the south of the Borough had seen large increased of motorcycle traffic flow and has the highest mode share compared to the rest of the borough.

TfL's LTS data which has been used in the future year trip generation analysis shown in Section 2 does not include motorcycle trips and these trips are also not taken into account in TfL's Solham model which shows future impacts on the road network. In the absence of this data there are no known reasons to suggest that recent trends in motorcycle traffic will not continue in future years.

Motorcycle safety is currently a major problem in London, and the 2013 Safe Streets for London document published by the Mayor and TfL included an ambitious target to reduce further the number of people Killed or Seriously Injured (KSI) in London by 40 per cent by 2020. To achieve this target both TfL and LBL will need to introduce specific measures to reduce motorcycle collisions.

TfL's Motorcycle Safety Action Plan sets out 29 actions which cover areas such as programme of engineering, education, and enforcement,

together with increased investment in road safety. Many of these actions can also be adopted by LBL to improve motorcycle safety across the borough. Below are examples of measures which can be adopted by LBL:

- TfL's Motorcycle Safety Action Plan shows the most common conflicts which cause KSI collisions involving motorcycles, such as right turning vehicles into the path of oncoming motorcycles. Future changes to the borough's highway network should fully consider factors which are likely to cause motorcycle collisions and appropriate mitigation measures should be incorporated into the design.
- Where changes to the borough's highway network are proposed then they should comply with the latest Guidelines for Motorcycling from the Institute of Highway Engineers²⁸. This recommends new initiatives such the inclusion of motorcycle safety experts to inform design at an early stage and taking steps to ensure proposed traffic calming schemes do not have unintentional safety risks to motorcyclists.
- Work with TfL and other stakeholders to implement local awareness campaigns. For example, the promotion of appropriate safety clothing.

5.6 Freight

Whilst there has been a decline in the number of vans and HGVs since 2000, both have been growing again in recent years, driven by the servicing requirements of growing central London businesses, e-commerce and construction projects. In particular, LGVs are likely to increase due to the increase in home deliveries. The logistics sector plays a key role in supporting London's economy, providing vital support to commercial activities through the delivery of goods. Online commerce is expected to continue growing, in part contributing to an estimated 22 per cent increase in demand for vans on Lambeth's roads.²⁹

Promoting freight consolidation of businesses in town centre locations through FTE(BID). Businesses which form part of the BID can share deliveries or waste collection to save costs. For examples the BID can negotiate a single waste collection contract for multiple businesses. This would reduce the waste collection costs of businesses and reduce the number of waste collection trips.

²⁸ Guidelines for Motorcycling (2005)

²⁹ Sub Regional Transport Plan for Central London – 2015 Update

5.7 Future Schemes

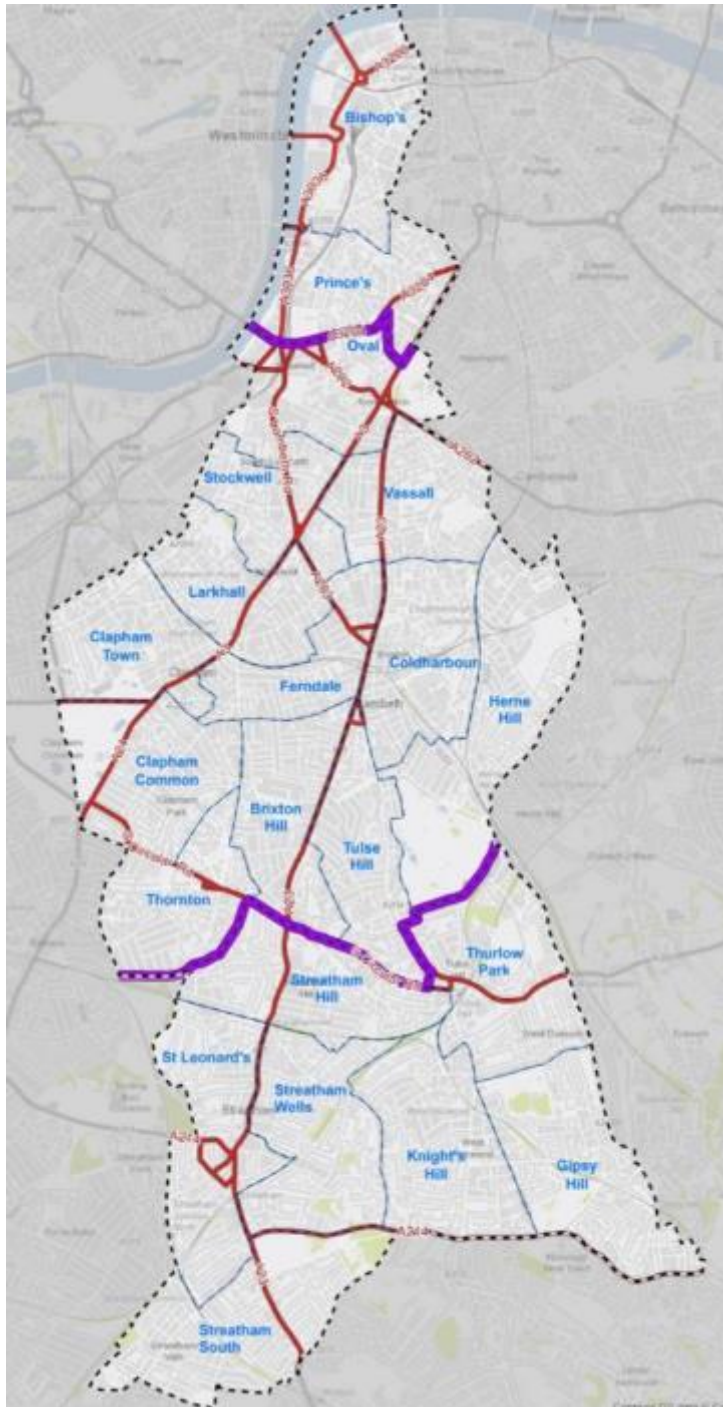
Table 5.2 shows the road schemes that are likely to be implemented in the Borough in the future.

Table 5.2: Future Road Schemes

Scheme Description		Scheme Benefit
North Lambeth		
Waterloo IMAX roundabout Better Junction	20mph limits will be introduced to ease congestion and reduce user conflict. ¹⁷	The improvements at the Waterloo junction will increase queuing time at the junction, the results are shown below for each modelled year: • 2012= 22 sec (existing junction layout) • 2021=48 sec (new junction layout) • 2031= 79 sec (new junction layout)³⁰
Central Lambeth		
Vauxhall Gyratory and Interchange	Significant changes are proposed at the Vauxhall Gyratory to convert the junction into two-way streets. The new junction will provide significant benefits to pedestrians, cyclists, and public transport users. The new road layout will also provide more direct vehicular routes through the junction as vehicles would not need to travel through non-direct routes round the gyratory system. ¹⁹	A restructuring of the road layout and current one/two-way system should help ease congestion around the gyratory system.
South Lambeth		
Tulse Hill gyratory conversion	As stated in Section 3, Lambeth have carried out community consultation regarding potential improvements to the Tulse Hill gyratory to improve pedestrian, cycle and vehicular traffic through the junction. The junction is currently heavily dominated by vehicular traffic, therefore any future works to the junction is likely to relocate road space from vehicular traffic to vulnerable road users such as pedestrians and cyclists, which could impact capacity at the junction for vehicular traffic. ¹⁷	This improvement will predominately focus on enhancing the experience of vulnerable road users, therefore the impact is likely to focus on traffic calming measures and road user segregation.
Streatham High Road Phase 5	Improvements to the public realm and road layout, which includes the removal of the central reservation to improve the pedestrian/cycling environment. ¹⁷	Will reduce traffic capacity on the road from 3 to 2 lanes, while enhancing the pedestrian and cycling environment.

³⁰ SoLHAM (2012)

Figure 5.7: Future Baseline Summary: Car



- LTS data suggests that there is likely to be a reduction of car trips in the south of the Borough, and an increase in car trips in the north of the Borough. Stockwell is also expected to see a high increase in car trips in the central section.

North Lambeth

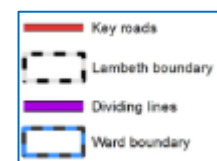
- There are improvements proposed at the IMAX roundabout, however modelling results suggest that this improvement will increase queuing times at the roundabout.
- Car traffic volumes are expected to increase in the northern part of the Borough, and as a result there are expected to be junction capacity issues at the IMAX roundabout in 2021.

Central Lambeth

- There are expected to be high volumes of road traffic along the A23, A24 and South Circular roads.
- The high volume of traffic in the central section of the Borough is expected to cause junction capacity issues in Clapham, Brixton and Vauxhall.
- Improvements at the Vauxhall gyratory are likely to improve congestion issues currently faced at the junction.

South Lambeth

- Despite the reduction of car trips in the southern section of the Borough (as predicted by the LTS model), there are still high volumes of traffic expected on the A23 and junction capacity issues are expected in Streatham.



Source: Key Roads & Lambeth boundary: Contains Ordnance Survey data © Crown copyright and database right 2016

6 Marine Transport

This section focuses on marine transport and considers the changes in future river transport provision.

London's river traffic is set to continue growing. Since the River Concordat Group was set up in 2009 a new integration of services has provided opportunities for marine transport's expansion across the city. In Lambeth, the construction of the St George Wharf pier in Vauxhall³¹, the expansion of services between Blackfriars and Putney³², and the promotion of the river freight in the VNEB transport strategy have highlighted the potential for enhancing passenger freight transport locally.³³

TfL's River Action Plan, published in February 2013, plans for significant increases in demand for river transport, and the previous Mayor set a target of 12 million passenger journeys on the Thames by 2020 to meet this.³⁴ Inner-London riverside developments, including VNEB, are expected to contribute to the Mayor's target with an additional 500,000 river journeys a year by 2020.

Marine Transport: Data Sources

- Mayor of London. (2012) Vauxhall Nine Elms Battersea Opportunity Area Planning Framework
- Port of London Authority (2011) New Pier at St George Wharf.
- TfL (2014) Record numbers travel on the River Thames as Action Plan delivers improvements in its first year.
- TfL. (2013) River Action Plan.

The River Action Plan sets out four key improvement areas for London to deliver an improved river transport system. These are listed below:

- Better Piers – includes improved pier infrastructure, and creating a consistent pier experience through clear branding and a harmonised ticketing system that can facilitate more efficient pier management.
- Better Information and Integration – improving real-time information on services, integrating river services with other transport modes through clear wayfinding to provide opportunities for seamless interchanges.
- Better Promotion - new marketing campaigns are expected to raise awareness of the river travel options, as well as direct engagement with Business Improvement Districts (BIDs)
- Better Partnership Working – this is seeing river transport becoming a topic to be prioritised at TfL sub-regional borough forums, while at the same time enhancing opportunities for staff training.

³¹ Port of London Authority (2011) New Pier at St George Wharf.

³² TfL (2014) Record numbers travel on the River Thames as Action Plan delivers improvements in its first year.

³³ Mayor of London. (2012) Vauxhall Nine Elms Battersea Opportunity Area Planning Framework, p.67

³⁴ TfL. (2013) River Action Plan. Online: <http://content.tfl.gov.uk/river-action-plan.pdf>

These strategies are liable to impact on use of river transport in Lambeth. The River Action Plan states that among the BIDs it is prioritising for engagement is South Bank³⁵, and that all improvements at Vauxhall Station should improve connectivity with St George's Wharf pier³⁵. These targeted measures should promote the use of services by making more people aware of marine options and creating more legible access to river boat services.

³⁵ Ibid

7 Airport Access

This section of the report discusses the likely changes to Lambeth's connections to air travel in the future.

7.1 Heathrow Airport

Airport Access: Data Sources

- Crossrail, Online (2016)
- Gatwick Obviously- Press Releases (2016)
- Southern Rail Access to Heathrow (2015)
- Taking Britain Further-Press Releases (2016)

On the 25th October 2016 the Government announced its support for a new runway at Heathrow airport. The expansion will be taken forward in the form of a National Policy Statement for consultation and the runway is anticipated to be opened in 2025.

The expansion of the Heathrow third runway is likely to improve connectivity to the wider world with 14 domestic routes and 40 additional long haul destinations. In addition, the expansion is projected to create an additional 77,000 jobs for the local area, which is likely to provide employment for Lambeth residents³⁶. Therefore, the expansion is likely to generate an increase in trips from Lambeth to Heathrow airport in the future years, which will demand improved transport connections.

The Existing Baseline Report (Part 1) highlighted travel times from the Borough to Heathrow, suggesting that travel times varied from 40 minutes in the north of the Borough, to 1 hour and 30 minutes in the south. The following list details some future changes that could impact on Lambeth's connections to Heathrow:

- Crossrail Elizabeth Line – This line is anticipated to open in May 2017, and a year later will provide a service between Paddington and Heathrow Airport, replacing the Heathrow Connect service. The Crossrail Elizabeth Line will stop at Farringdon station, allowing Lambeth residents to interchange directly from Thameslink services. The new service should both reduce travel time to the airport and increase capacity along the route.³⁷
- Thameslink Programme – The programme should improve accessibility in Lambeth, with the more efficient, more frequent services connecting much of the Borough to interchange stations for the Crossrail Elizabeth Line, Heathrow Express and Underground services to Heathrow.

³⁶ Taking Britain Further-Press Releases (2016)

³⁷ Crossrail, Online (2016)

- Southern Rail Access - A feasibility study has been undertaken to understand the potential benefits of Southern Rail Access route from Waterloo to Heathrow. If approved, this route could have substantial benefits for the Borough by improving connectivity and reducing travel time for residents, particularly in the north of the Borough. Further details of the proposed route can be viewed on the network rail website: www.networkrail.co.uk.

7.2 Gatwick Airport

The Government announcement to support plans for a new runway at Heathrow suggests that an additional runway at Gatwick is unlikely to be developed in the near future. However, if backing was received, 'Gatwick stands ready to proceed when the time comes'.³⁸ A second runway at Gatwick Airport could be operational by 2025 and would result in a significant number of additional trips between Lambeth and Gatwick.

As the Existing Baseline Report (Part 1) identified, connectivity to Gatwick is relatively good due to the distance from the airport with travel times ranging from 50 minutes to 1 hour and 15 minutes. Connections to Gatwick are likely to improve as a proposed transformation programme could have the following impacts:

- Reduced congestion at the station, which is likely to improve passenger experience,
- New Gatwick Express trains in 2016 and Thameslink Trains by 2018 (the Thameslink programme itself will benefit from and enhanced timetable and service), and
- Trains to central London every 2.5 minutes by 2025.

7.3 Other London Airports

In addition to the two key airports discussed above, Lambeth also benefits from high levels of accessibility to London's other key airports in Stanstead, London City, and Luton. While no major changes are anticipated at the airports themselves in future years, improvements to transport links may enhance accessibility for Lambeth residents.

³⁸ Gatwick Obviously- Press Releases (2016)

London Luton Airport

Thameslink services run directly through Lambeth to London Luton Airport. The proposed Thameslink programme should therefore improve accessibility for Lambeth residents by improving the capacity and frequency of services to the airport.

London Stanstead

The development of Crossrail 2 will provide a direct link to Tottenham Hale, from which direct services run into Stanstead airport. This would be particularly beneficial to residents in the South where links to Crossrail 2 (via national rail services) are significantly better than those to the Underground line.

London City Airport

London City Airport is accessible via the DLR at Bank Underground station, thus, improved access to the airport will be dependent on changes in accessibility to Bank. The Northern Line upgrade and Thameslink programme may therefore both enhance travel into the Airport by increasing capacity and efficiency on their networks, providing faster, more efficient travel options into Bank.

8 Journey Information

This section of the report analyses popular journeys made from Lambeth to other London Boroughs and outlines the mode share of these journeys in 2021 and 2031.

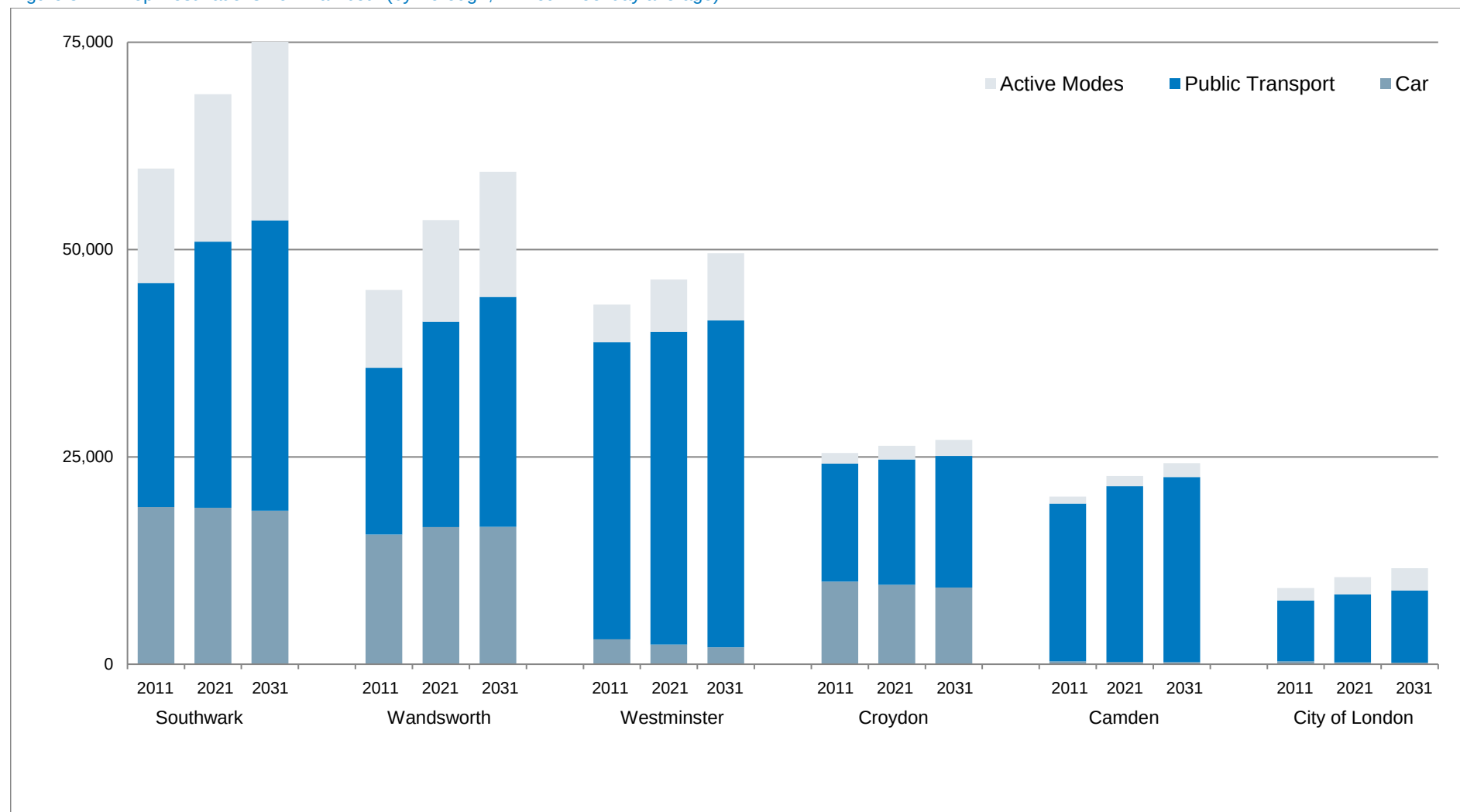
Figure 8.1 shows the most popular journeys from Lambeth to London Boroughs, based on 12-hour weekday average trips for all journey purposes (TfL's LTS model). The average number of trips from Lambeth to the top five destination Boroughs is set to rise by around 12 per cent between 2011 and 2021, from 195,000 to 220,000, and by a further 9 per cent between 2021 and 2031.

The most popular destination for people in Lambeth is expected to be Southwark. In 2021, there is expected to be approximately 69,000 trips to Southwark for a 12-hour period on an average weekday. This is likely to increase to approximately 75,000 trips in 2031.

The data shows that the mode split is expected to shift away from the car in favour of public transport and active modes. Cars represented 25 per cent of trips in 2011 and are expected to reduce to 20 per cent of total trips by 2031. Walking and cycling is expected to see the increases in mode share rising from 15 per cent in 2011 to 18 per cent in 2021 and 20 per cent in 2031.

LTS future data projections covers all purpose journeys over a 12-hour period, whereas journey information in the Existing Baseline Report (Part 1) considered journeys to work (Census data 2011). Journeys to Westminster and the City are likely to be popular in the peak hour for travel to work, however there are likely to be more journeys to Southwark when all journey purposes are considered.

Figure 8.1: Top Destinations from Lambeth (by Borough, 12-hour weekday average)



Source: London Transportation Studies Model (2011)

9 Air Quality, Carbon & Sustainable Drainage Systems

This section of the report reviews the modelled emission levels in the Borough and identifies areas of high pollution. The impact of the proposed Ultra-Low Emission Zone is discussed and it is highlighted that further measures will be required to reduce pollutant levels below the legal limits.

9.1 Background

Air Quality: Data sources

- Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007)
- DEFRA - UK-air website (2016)
- Lambeth Air Quality Action Plan (2017-2022) Draft for Consultation
- London Atmospheric Emissions Inventory (2013)
- Low Emission Neighbourhoods, Guidance Note, Online [2016]
- Progress Report on the delivery of the Mayor's Air Quality Strategy (2015)
- TfL Consultation on ULEZ (October 2016)
- TfL Business Plan (2016)
- Transport Emissions Roadmap (2014)
- Ultra-Low Emission Vehicle (ULEV) Delivery Plan (2015)

The Existing Baseline Report (Part 1) identified that pollutant levels in London remain high, with all London Boroughs exceeding the air quality objective levels³⁹ and declaring Air Quality Management Areas (AQMA)⁴⁰ within the Borough boundary. It is understood that some of the highest recordings of NO₂ emissions in London have been recorded at the Brixton Road monitoring station in Lambeth. Therefore, it is vital that measures to reduce transport emissions, which are a major contributor to poor air quality, are introduced in Lambeth to achieve improved pollutant levels in the future.

Due to technological advances and improved engine efficiency, air pollution is predicted to decline in the future, however the level of the decline is unclear. Conversely, the forecast growth and development in the Borough (as discussed in Section 2), may increase the number of vehicles on Lambeth's roads and poses challenges in terms of balancing air quality management with economic and transport aspirations.

There is expected to be a significant decline in transport related emissions in 2020 (see Figure 9.1), which can be attributed to the introduction of the ULEZ. The modelled emission data presented in this report assumes that the ULEZ will achieve a considerable reduction in emissions, particularly in the northern section of the Borough where it is in operation. Conversely, LBL dispute whether the ULEZ will deliver such a drastic change in road transport emissions.⁴¹

³⁹ Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007)

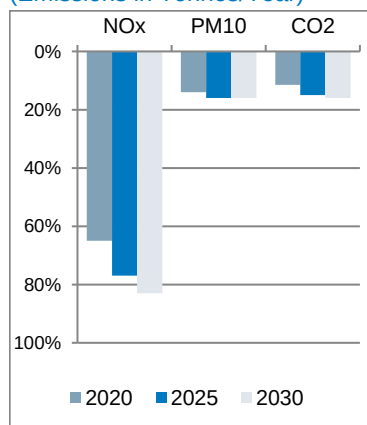
⁴⁰ DEFRA - UK-air website (2016)

⁴¹ Lambeth Air Quality Action Plan (2017-2022) Draft for Consultation

This section discusses the ULEZ in greater detail and examines the forecast pollutant levels along with several future schemes that are being implemented to improve future air quality.

9.2 Ultra-Low Emissions Zone (ULEZ)

Figure 9.1: Lambeth's Road Transport reduction since 2013 (Emissions in Tonnes/Year)



Source: LAEI (2013)

The Inner London Borough average is expected to see a decline of the following emissions by 2030:

NO_x – 82%
PM₁₀ – 16%
CO₂ – 16%

The ULEZ is proposed to launch in central London on 7th September 2020 and is expected to operate within the existing Congestion Charge Zone (CCZ). However, at the time of writing this report, TfL opened a new consultation seeking views on the following changes to existing proposals:

- To bring forward the introduction of the ULEZ to 2019,
- To extend the ULEZ from Central London to Londonwide for heavy vehicles (including HGVs, buses, and coaches) by 2019, and
- To extend the ULEZ from Central London up to the North and South Circular roads for all vehicles by 2019⁴²

The concept has already been considered as a 'game changer for London's air quality'⁴³, which will aim to reduce nitrogen oxide (NO_x) emissions by half and ensuring 80 per cent of central London meets the European legal limits by 2020.⁴³

Unlike the existing CCZ, the pricing structure of the ULEZ will be operational 24 hours a day, 7 days per week. Furthermore, the ULEZ will require vehicles travelling within the CCZ to meet more stringent emission standards or pay a daily charge. More specifically, the ULEZ will ensure that:

- Cars, vans and minibuses meet Euro 6 emission standards for diesel engines and Euro 4 for petrol engines, or pay a daily charge of £12.50,
- Heavy goods vehicles, buses and coaches meet Euro VI emission standards or pay a daily charge of £100, and
- Motorcycles and similar vehicles meet Euro 3 emission standards or pay a daily charge of £12.50.

⁴² TfL Consultation – New proposals to improve Air Quality
<https://consultations.tfl.gov.uk/environment/air-quality-consultation-phase-2?cid=airquality-consultation>

⁴³ Progress Report on the delivery of the Mayor's Air Quality Strategy – Cleaning the air (2015)

As well as emission-based vehicle charging, there will be a new procurement requirement for TfL buses to increase the total number of hybrid double-decker buses operating in central London and zero emission single-decker buses. In addition, taxis will have revised licensing requirements to reduce emissions and accelerate the uptake of zero emissions capable vehicles.

Assuming that the ULEZ will operate in the same area as the CCZ by 2020, the greatest air quality benefits can be expected in the north of the Borough. However, if the ULEZ is extended to the South Circular as proposed in the most recent consultation, it can be expected that there will be greater air quality improvements seen throughout the northern and central sections of the Borough.

The introduction of the ULEZ is also predicted to have wider-Borough benefits, outside of the ULEZ boundary, as the scheme is likely to encourage the up-take of cleaner vehicles in the inner and outer London areas. The scheme is estimated to reduce emissions by 16 per cent and 10 per cent, in these areas respectively.⁴⁴ Additionally as low emission vehicle technology and markets develop; it may become more feasible and practical to introduce more stringent requirements for the ULEZ, and to potentially expand the zone into other areas.

However, there are concerns that highly polluting vehicles (cars and buses) may be assigned to non-ULEZ areas.

9.3 Future Air Quality

Future modelled air pollution has been analysed using outputs from the London Atmospheric Emissions Inventory (LAEI) database. Data has been extracted for five year periods between 2020 and 2030. For the purposes of this report, data for the key transport related pollutants NO₂, PM₁₀ and CO₂ have been analysed for 2025 and 2030 to align as close to the assessment years.

Generally, transport related pollutants associated with nitrogen dioxide (NO₂), particulate matter (specifically PM₁₀) and carbon dioxide (CO₂),

⁴⁴ Transport Emissions Roadmap (2014)

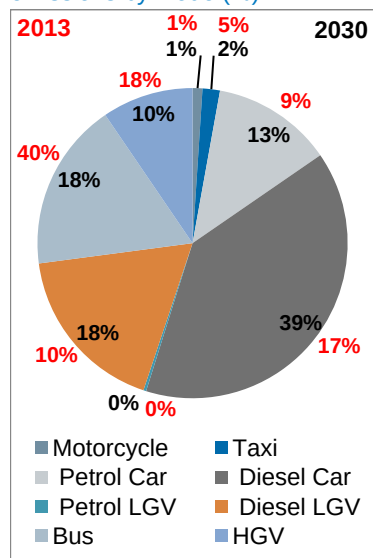
are expected to decline in the future years as shown in the sections below.

9.3.1 Nitrogen Dioxide (NO₂)

Figure 9.2 presents the NO_x contribution from emission sources in Lambeth and shows the projected NO_x emissions in the future. As shown, transport accounts for a large proportion of total NO_x emissions and the transport contribution is expected to decline dramatically in 2020. The forecast decline can be attributed to the introduction of the ULEZ. By 2030, modelled results suggest that overall NO_x emissions decline by 59 per cent, with road transport-related emissions declining by 83 per cent.

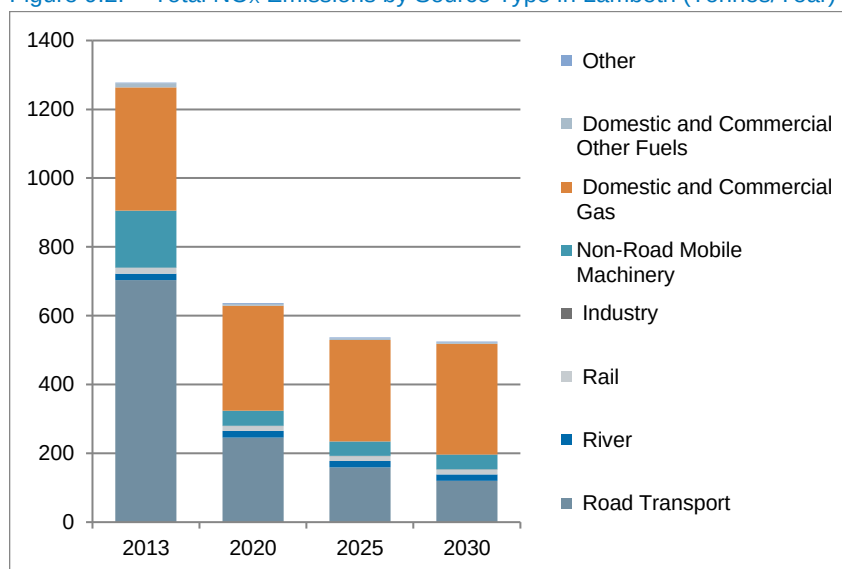
As Figure 9.3 shows, over half of road transport NO_x emissions are likely to be created by private cars in 2030, with diesel cars having a greater contribution. In addition, diesel LGV's and buses are likely to have a significant contribution to NO_x emissions in Lambeth. In comparison to existing conditions (see Existing Baseline Report Part 1), by 2030 the NO_x contribution of buses and HGV's are predicted to reduce substantially and the contribution of NO_x emissions from private car and diesel LGVs are predicted to increase.

Figure 9.3: Road Transport NO_x emissions by Mode (%)



Source: LAEI (2013)

Figure 9.2: Total NO_x Emissions by Source Type in Lambeth (Tonnes/Year)



Source: LAEI (2013)

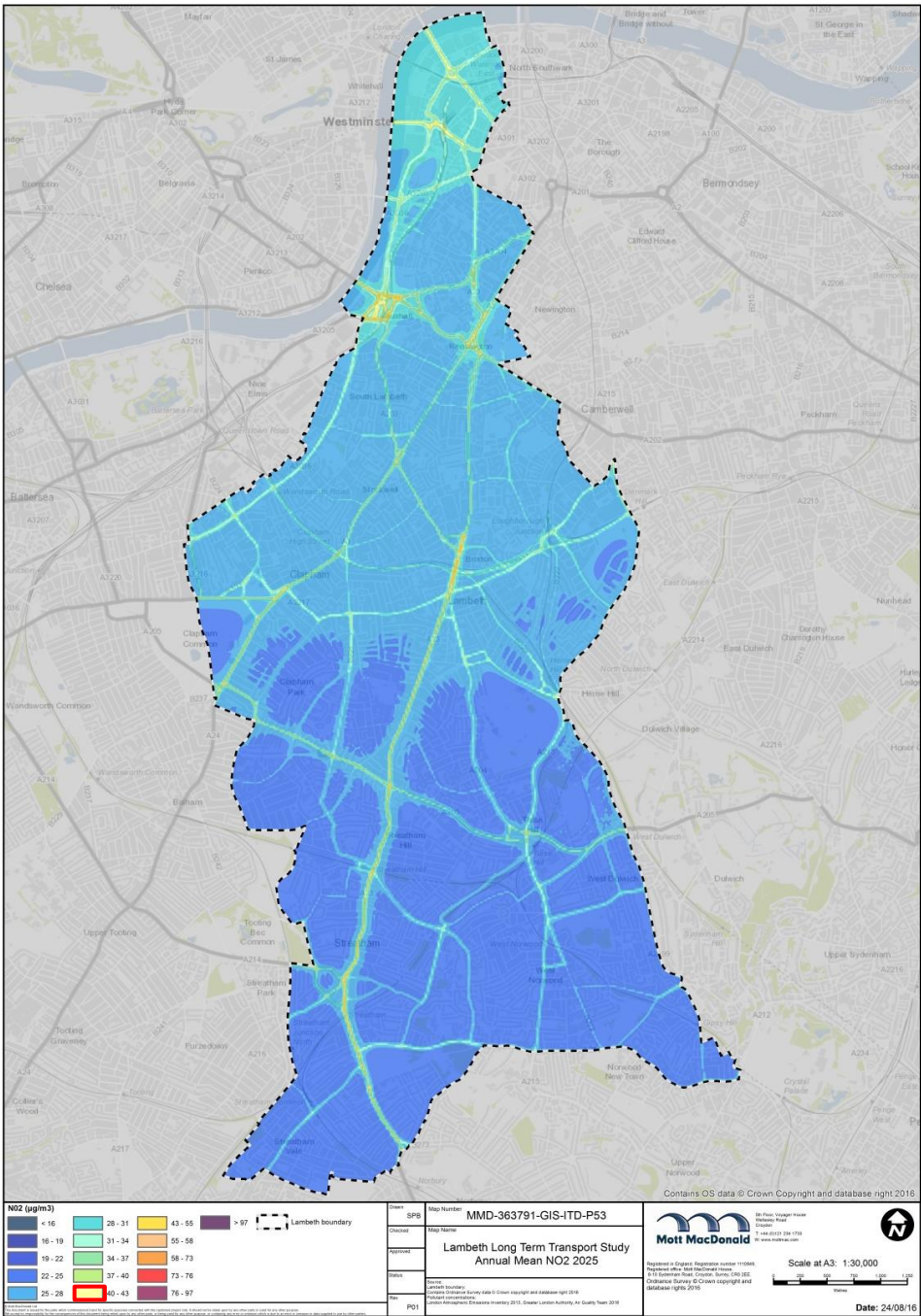
Figure 9.4 and Figure 9.5 present the modelled annual mean NO₂ concentrations in 2025 and 2030, respectively.

Compared to existing conditions (see Existing Baseline Report Part 1), emissions are forecast to reduce considerably with a large proportion of the central and southern sections of the Borough experiencing emission levels below the Objective Level (40µgm⁻³). Despite this, poor air quality is still identified along major routes and junctions in the Borough in 2030, particularly in the following areas:

- Roads/junctions surrounding Waterloo station (i.e. IMAX roundabout, Westminster Bridge Road, Waterloo Road),
- Vauxhall gyratory,
- Kennington Oval, Kennington Park Road and Camberwell New Road, and
- Majority of the A23 and especially the A23, north of Brixton station

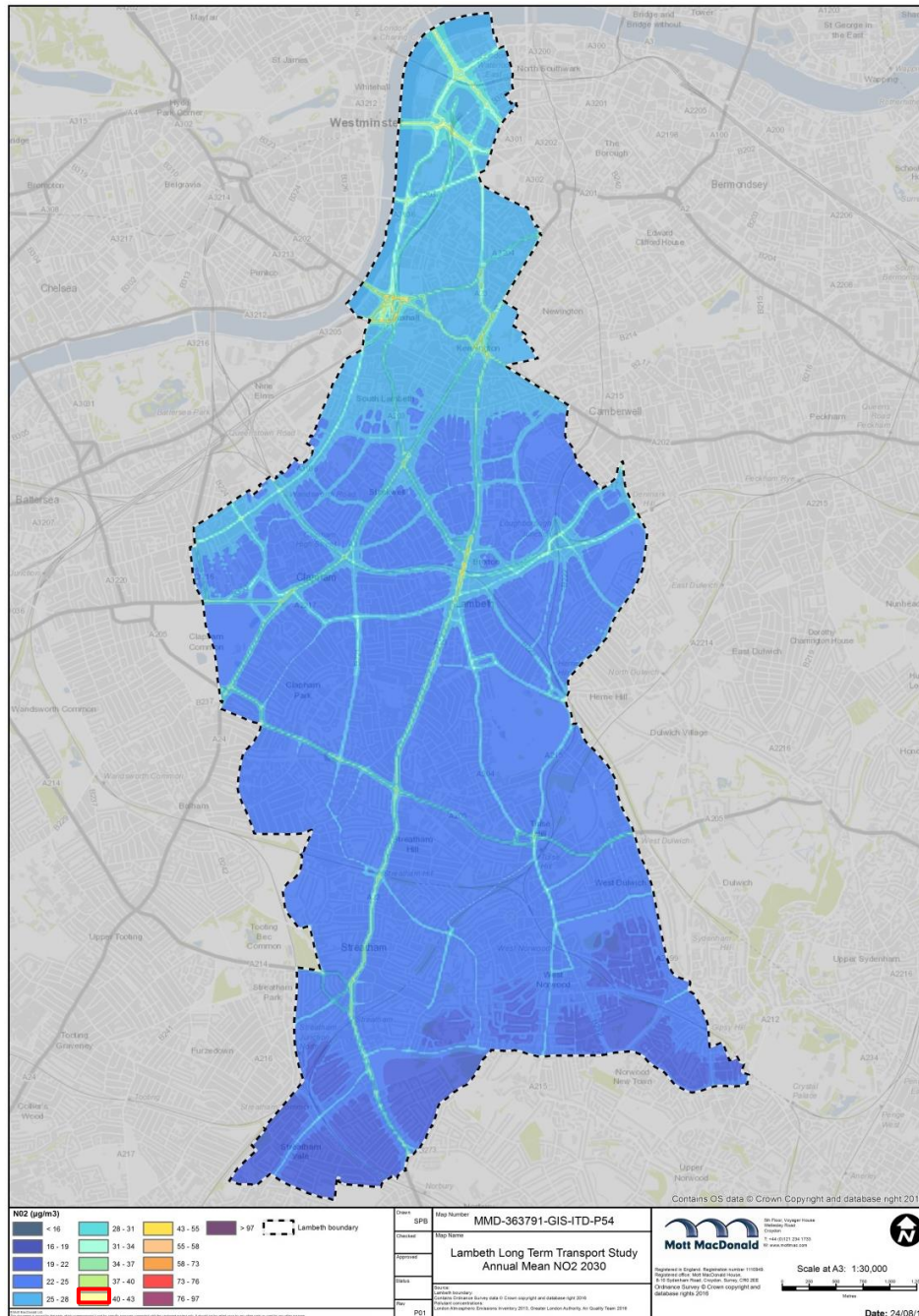
Although the introduction of the ULEZ in 2020 may have a positive impact on emissions in the northern section of the Borough, areas such as Waterloo and Vauxhall are still expected to experience the poorest air quality levels in the Borough by 2025 and 2030.

Figure 9.4: NO₂ Annual Mean Concentrations in Lambeth (2025)



Source: London Atmospheric Emissions Inventory (2013)

Figure 9.5: NO₂ Annual Mean Concentrations in Lambeth (2030)



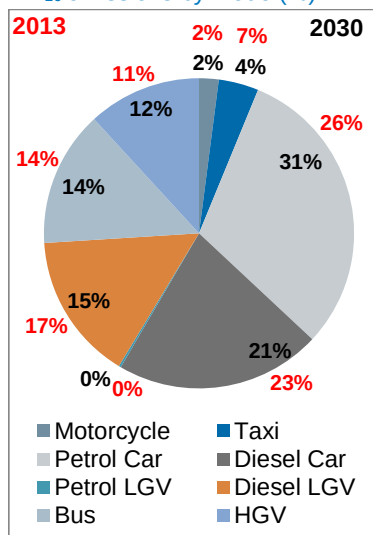
Source: London Atmospheric Emissions Inventory (2013)

9.3.2 Particulate Matter (PM₁₀)

The modelled data predicts that overall PM₁₀ emissions are likely to decline 20 per cent by 2020, with road transport alone declining by 14 per cent (Figure 9.7). After 2020 total PM₁₀ emissions in Lambeth are not expected to change significantly and remain around 90 tonnes per year. The significant reduction in road transport PM₁₀ emissions in 2020 can be attributed to the operation of the ULEZ in combination with the take up of technology and improved engine efficiency, however the influence of the ULEZ is unknown and LBL dispute whether the expected reductions can be achieved.

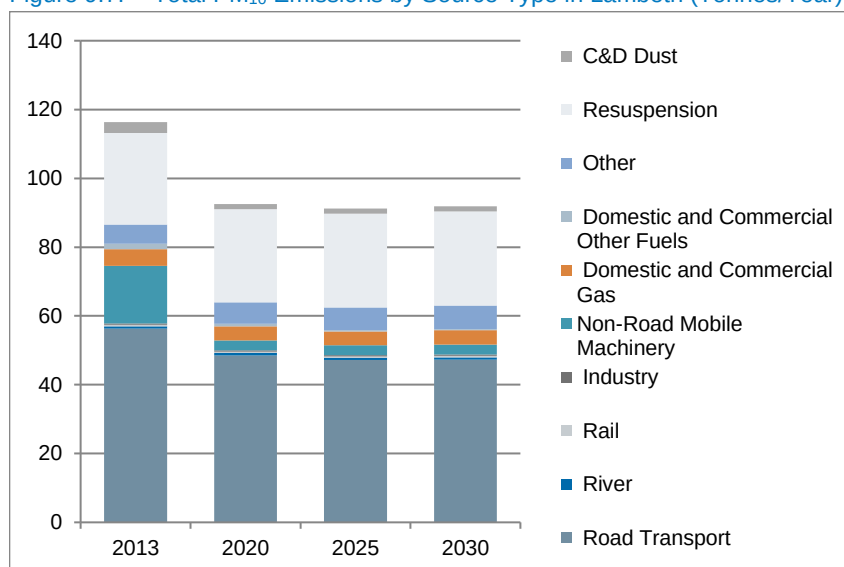
Figure 9.6 suggests that car travel may account for 52 per cent of PM₁₀ emissions by 2030. Diesel LGV's, buses and HGV's are also expected to make up a large proportion of PM₁₀ emissions in the Borough. In comparison to existing conditions (see Existing Baseline Report Part 1), by 2030 the PM₁₀ contribution of taxis, diesel cars and diesel LGV's are predicted to reduce slightly and the contribution of PM₁₀ emissions from petrol car and buses are forecast to increase slightly.

Figure 9.6: Road Transport PM₁₀ emissions by Mode (%)



Source: LAEI (2013)

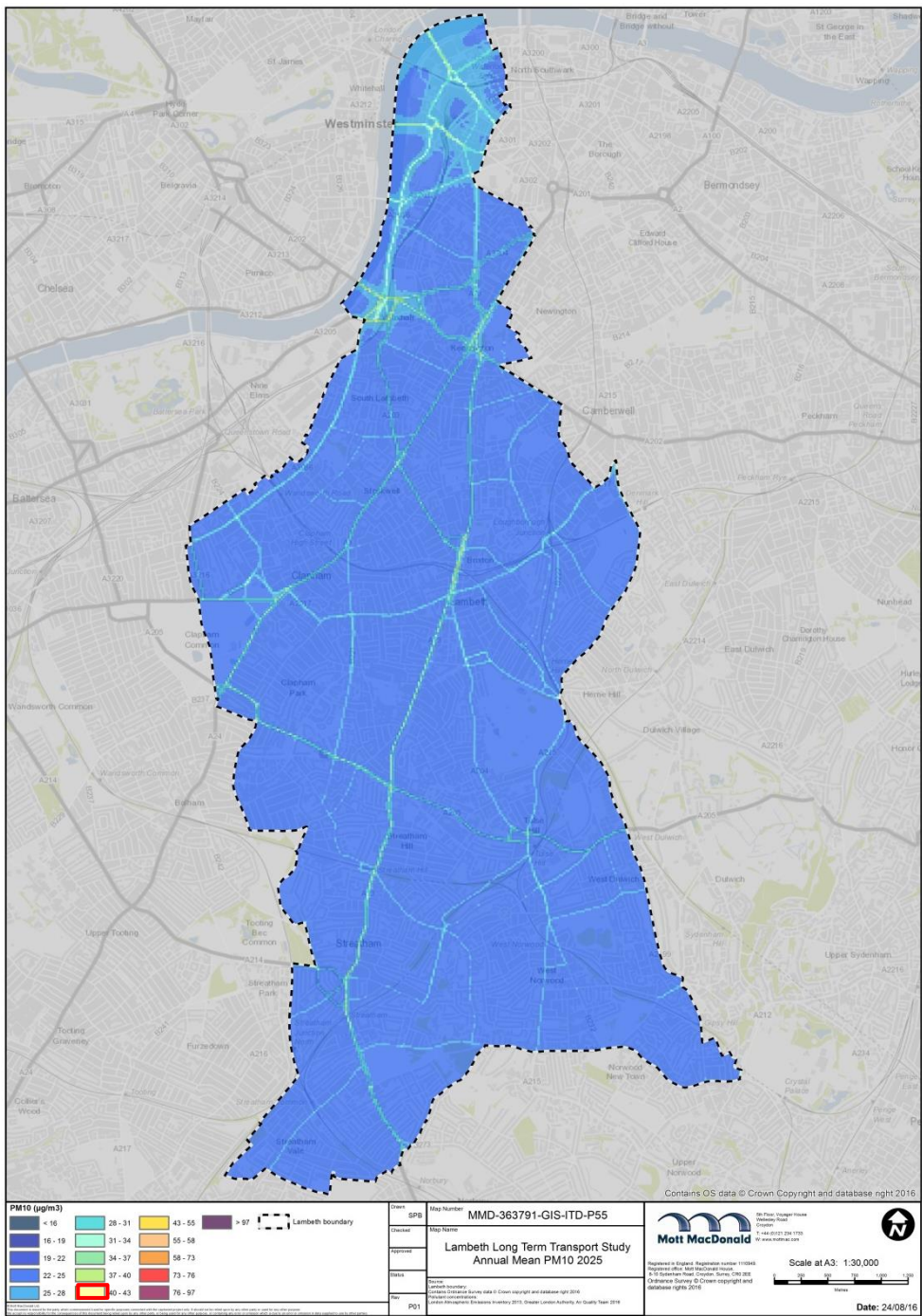
Figure 9.7: Total PM₁₀ Emissions by Source Type in Lambeth (Tonnes/Year)



Source: LAEI (2013)

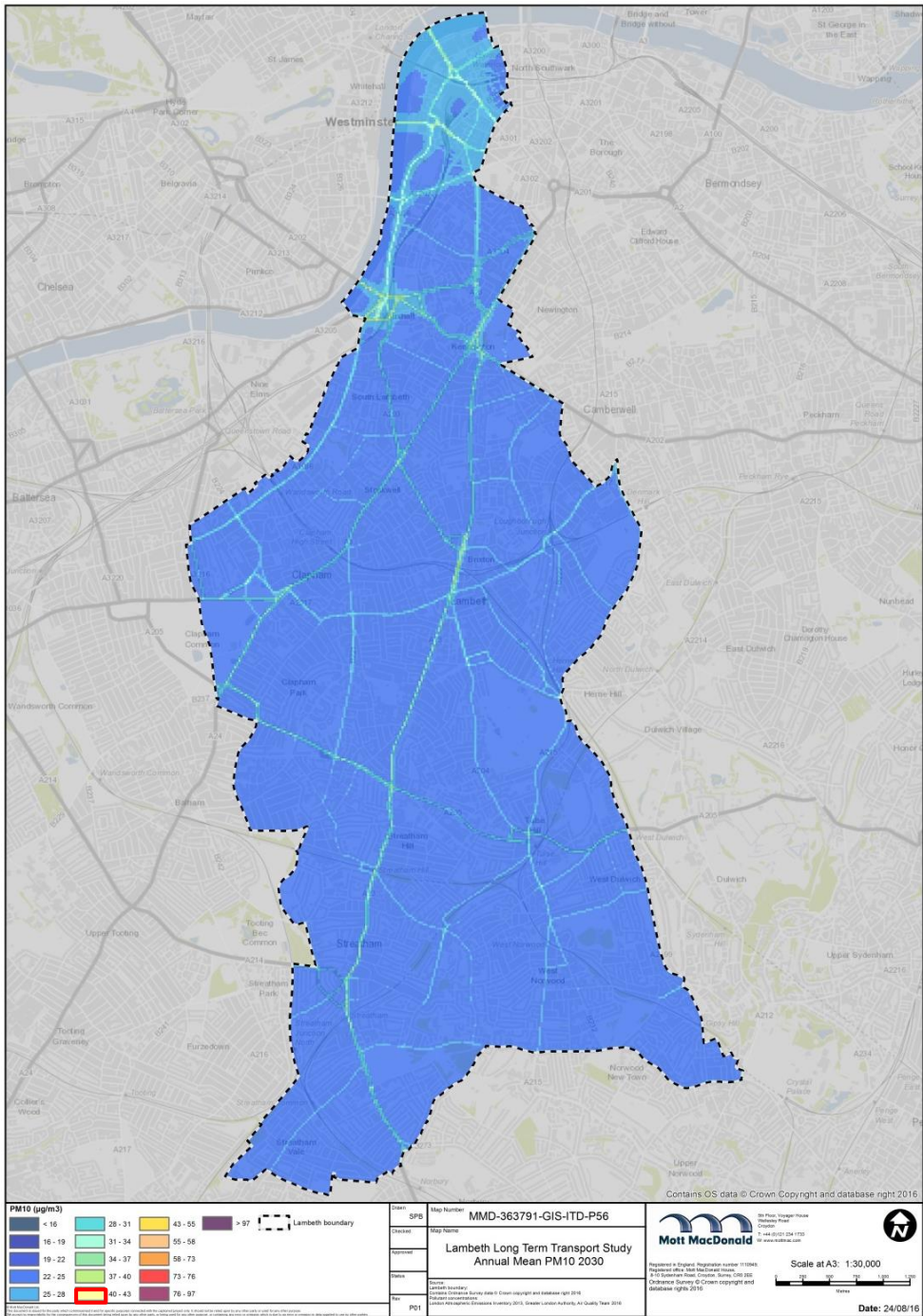
Figure 9.8 and Figure 9.9 present the modelled annual mean PM₁₀ concentrations in 2025 and 2030, respectively.

Figure 9.8: PM₁₀ Annual Mean Concentrations in Lambeth (2025)



Source: London Atmospheric Emissions Inventory (2013)

Figure 9.9: PM₁₀ Annual Mean Concentrations in Lambeth (2030)



Source: London Atmospheric Emissions Inventory (2013)

The modelled PM₁₀ emissions are expected to reduce considerably by 2025, compared to existing conditions (see Existing Baseline Report Part 1). Thus, much of the Borough is likely to experience improved pollutant levels, aside from areas surrounding Waterloo station (i.e. IMAX roundabout), the Vauxhall gyratory and areas along the A23, especially north of Brixton station.

After 2025, PM₁₀ emissions do not reduce much further and poor air quality is still experienced in the Waterloo, Vauxhall, and Brixton areas in 2030. Based on these findings, more measures will need to be introduced to reduce PM₁₀ emissions to acceptable at major junctions and along major routes.

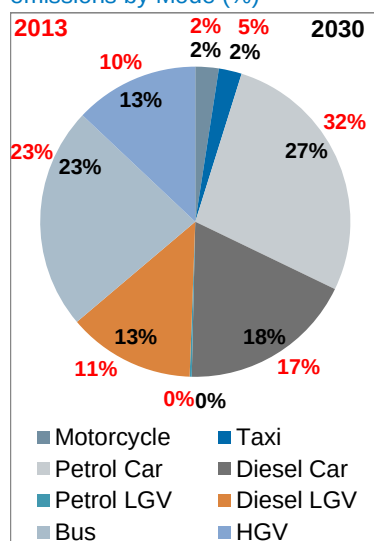
9.3.3 Carbon Dioxide (CO₂)

CO₂ emissions are expected to decline significantly by 2020, but are forecast to increase slightly again 2030 (See Figure 9.11). Transport-related CO₂ emissions are forecast to continually reduce into the future and it is predicted that by 2030, transport emissions are likely to reduce by 16 per cent from existing levels.

By 2030, car travel is expected to account for 45 per cent of total CO₂ emissions. Buses also make up 23 per cent of total emissions with diesel LGVs and HGVs each accounting for 13 per cent. In comparison

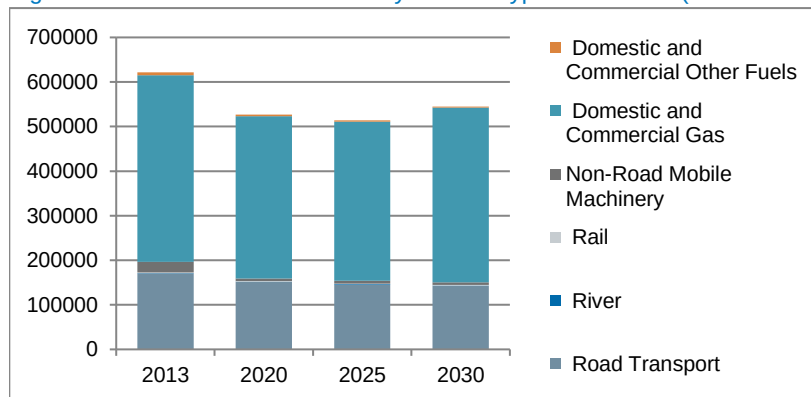
CO₂ contribution of taxis and petrol cars are predicted to reduce slightly and the contribution of CO₂ emissions from diesel car, diesel LGVs and HGVs are forecast to increase slightly.

Figure 9.10: Road Transport CO₂ emissions by Mode (%)



Source: LAEI (2013)

Figure 9.11: Total CO₂ Emissions by Source Type in Lambeth (Tonnes/Year)



Source: LAEI (2013)

9.4 Future Air Quality Measures

It is recognised that although emissions are projected to decrease in part due to technological advances and the introduction of the ULEZ, NO₂ is still expected to exceed the legal limits in areas around major routes and in north Lambeth, even with the ULEZ in operation. Therefore, further action is required to further reduce pollutant levels throughout the Borough; several transport measures to reduce future transport emissions are discussed in the following documents.

9.4.1 Lambeth's AQAP (2017-2022)

At the time of writing this report, Lambeth's draft Air Quality Action Plan (AQAP), which contains a list of proposed measures and actions that aim to improve air quality between 2017 and 2022, was in the consultation process.

The AQAP is based on three overarching priorities, which are:

1. To continue to encourage modal shift in Lambeth to more sustainable transport and to promote sustainability
2. To reduce exposure to air pollution and to raise awareness; and
3. To work in partnership with residents, community groups, Business Improvement Districts (BIDs), Transport for London and other organisations to concentrate on local pollution problems in Lambeth.

The implementation of Lambeth's AQAP will aim to improve high pollutant levels in localised areas and protect the most vulnerable residents from exposure to main pollutants between 2017 and 2022. Particularly by:

- Reprioritisation of road space (AP46); reducing parking at some destinations and/or restricting parking on congested high streets and A roads to improve bus journey times, cycling experience, and reduce emissions caused by congested traffic,
- Investigating measures such as building a Low Emission Neighbourhood (LEN), to improve air quality and/or reduce exposure to pollution in focus areas, and
- Installation of more residential electric charging points (AP44).

9.4.2 Ultra-Low Emission Vehicle (ULEV) Delivery Plan (2015)

TfL launched the Ultra-Low Emission Vehicle Delivery Plan in July 2015. This plan set out 15 actions to ensure the right charging infrastructure is supplied in the right places to serve the needs of Londoners. These actions included a commitment by the car club industry to achieve 50 per cent ULEVs in London's car club fleet by 2025, and car clubs are currently actively working towards this target.

It is envisaged that car club's fleet of the future will include more electric vehicles and means of supporting this is discussed in this document. The introduction of car clubs and electric vehicles will improve emissions in the Borough.

9.4.3 Ultra-Low Emissions Bus Zones

The Mayor of London confirmed plans for a series of Low Emission Bus Zones, which prioritises the greenest buses on the most polluted routes in London.

A Low Emission Bus Zones' is proposed on the A23 between Streatham and Brixton and is due to be operational by 2018. The zone will restrict high polluting buses and will ensure buses have priority over other traffic; reducing congestion and emissions.

Based on pollutant outputs, LBL are pushing to introduce another Low Emission Bus Zone on A202 and A3.

9.4.4 London Environment Strategy

Sadiq Khan was elected Mayor of London in May 2016 and is in the process of creating a new London Environmental Strategy which will supersede the Mayor's Air Quality Strategy (MAQS), which was published in 2010. Until the London Environment Strategy is published, the current MAQS applies.

Sadiq Khan has shown some urgency to reduce air quality emissions in London, by allocating £875 million to improve London's air quality⁴⁵ and

⁴⁵ TfL Business Plan (2016)

by the latest consultation to bring forward the ULEZ operation year. As such, it can be expected that measures identified in the London Environment Strategy will help to reduce air pollution with a focus on tackling air quality sooner rather than later.

The new mayor has also proposed a low emission bus zone between Streatham and Brixton. This low emission zone will see exclusive use of hybrid or diesel buses with top-of-the-range anti-pollutant systems that meet or exceed Euro VI emission standards. This zone is expected to be operational by 2020 and is likely to reduce NO_x emissions from buses along these routes by around 84 per cent⁴⁶, which is expected to significantly improve air quality readings at the Brixton Road monitoring site.

One other key incentive being used to encourage areas in London to introduce measures focused on reducing emissions is the Low Emission Neighbourhood scheme (LEN).⁴⁷ The area-based scheme provides funding to areas of high exposure to high pollution which can be reduced through local measures, and locations with high trip generation and the potential to reduce emissions on the wider road network.

The concept sets out to create neighbourhood involvement in a manner by which a partnership is created between the local community, businesses, and the local authority to identify ways to address emission concerns in the area, especially if the end result creates a transformation for the urban environment.

9.5 Sustainable Drainage Systems (SuDS)

The Existing Baseline Report (Part 1) identified areas in Lambeth that may be at risk of surface water flooding, and indicated that areas of the Borough were unsuitable for infiltration techniques; however, there is a lot of local variation, and other non-infiltration SuDS techniques are still applicable.

⁴⁶ Mayor of London Press Release (2016): <https://www.london.gov.uk/press-releases/mayoral/mayor-announces-first-clean-green-bus-routes>

⁴⁷ TfL Guidance Note: Low Emission Neighbourhoods: <http://content.tfl.gov.uk/low-emission-neighbourhoods.pdf>

It is expected that susceptibility to flooding in the Lambeth may change as a result of climate change, or changes to water management. For example, one of the climate change effects includes an increase of high rainfall events. This could lead to an increased risk of flooding in Critical Drainage Areas (CDA), which were identified in existing conditions (see Existing Baseline Report Part 1).

It is noted that in areas of future developments, green infrastructure and permeable surfaces should be incorporated into the plans to have a significant impact on infiltration and surface water run-off. Interventions such as Stockholm tree pits and rain gardens can be added to highways or public realm schemes in most contexts to reduce the risk of surface water flooding.

10 Future Transport Considerations

This section of the report examines the future transport network and its usage in light of technological advances and policy changes, which are likely to revolutionise transport in the Borough and aim for a sustainable future. Also, future societal changes such as flexible working arrangements and ageing population are considered in the transport context.

Future Transport: Data Sources

- ACEA (2014) Car sharing: Evolution, Challenges and Opportunities
- Car Club Coalition (2015) A Car Club Strategy for London
- Carplus (2014) Annual Survey
- Catapult (2016) Mobility as a Service
- Driving Electric Vehicles, TfL, Online (2016)
- Government Ultra Low Emission Strategy
- KPMG Connected Autonomous Vehicles Study **10.1**
- Mayors Transport Strategy (2011)
- RAC Foundation (2012) Car Rental 2.0.
- WSP Electric Vehicle Charging Scheme Study

As the analysis has shown, Lambeth's transport network is expected to face pressures from population growth, in addition to other unknown factors such as hyper urbanisation, climate change, and demographic and societal changes. By virtue of technological breakthroughs many of the obstacles may be overcome and seamless mobility may be achieved.

The majority of today's transport networks are by-products of earlier systems that were designed to serve societies with rather different characteristics. Future innovative transport infrastructure can play a fundamental role in meeting the objectives of economic competitiveness, social cohesion and sustainable growth. This can involve the introduction of future technologies, future transport policy changes or through societal changes, as highlighted in this section.

Future Technologies

The future transport infrastructure is likely to be affected by the introduction of key technologies; these may include, but are not limited to, the roll out of electric vehicles (EVs), autonomous vehicles (AVs) and introducing mobility as a service (MAAS), which are discussed in more detail below.

Even though these technologies provide significant benefits they can also create future problems. For example, if people change transport mode from public transport and cycling to use electric or autonomous vehicles then it could be detrimental to congestion issues within the Borough.

The challenge for future transport policy is to facilitate the growth of new technology to tackle transport issues such as congestion, overcrowding and air quality, without the potential detrimental impacts such as modal shift towards private cars.

10.1.1 Electric Vehicles (EVs)

Potential impacts of EV's in Lambeth

- Air Quality improvements particularly at major bus transport hubs such as Vauxhall and Brixton High Street.
- Increased demand for EV charging points (installing of wiring for infrastructure)
- Electric fleet for public transport and servicing
- Introduction of more car clubs / car sharing that use EV's in Lambeth

There has been significant growth in sales of electric charging vehicles in recent years. According to data from Next Green Car, UK registrations of plug-in cars has increased from 3,500 in 2013 to more than 75,000 by October 2016. If the trend in electric vehicle growth continues at a similar rate then a large proportion of new cars could be electric vehicles.

With rising concerns over pollutant levels (discussed in Section 9), leading world cities are being called upon to drastically improve air quality. In the UK, the Government has set a vision that “by 2050 almost every car and van in the UK will be an ultra-low emission vehicle (ULEV)”⁴⁸ As part of this commitment the UK government has made a funding commitment of over £500 million of new capital investment between 2015 and 2020 to continue to establish the UK as a premier market for ULEVs. The UK government also offers funding grants of 20% to 25% to owners who purchase a plug-in vehicle and 75% for the associated charging point.⁴⁹

Electric vehicles are already being rolled out to much of London's bus fleet, improving the public transport provision in the Borough. As stated in the Existing Baseline Report (Part 1), a large proportion of Lambeth's bus fleet are hybrids or low emission vehicles. The introduction of more low emission vehicles and the ULEZ may have a positive impact on key pollutant areas such as the Vauxhall gyratory or around Waterloo station. However, this may worsen pollution levels outside of the ULEZ boundary.

The growth in electric vehicles could cause problems associated with electric charging as there is limited off-street parking in Lambeth, and there is estimated to be two-thirds of households in London which do not have access to off-street parking⁵⁰. Therefore, the demand for on-street kerb space is likely to increase and the availability of on-street kerb space is likely to reduce due to the following:

⁴⁸ Government Ultra Low Emission Strategy
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/239317/ultra-low-emission-vehicle-strategy.pdf

⁴⁹ TfL Website Electric Vehicles: <https://tfl.gov.uk/modes/driving/electric-vehicles>

⁵⁰ WSP Electric Vehicle Charging Scheme Study

- On-street car parking spaces being converted into cycle parking spaces
- Increase in disabled and car club parking

In the future years LBL may need to consider measures to increase the number of on-street electric charging points. Below are examples of measures which could be considered:

- Consider the use of street lighting to also be used as electric charging points. A similar scheme is currently being trialled in Berlin. If implemented in Lambeth there could be issues with cables across footways and how users will pay for the service.
- Some European cities offer permits where homeowners are permitted to run a cable between their house and car over the public highway, with secured matting to avoid safety issues on footway. This could still create trip hazards and issues for mobility impaired road users.
- Encourage the use of alternative parking arrangements such as the night time use of business car parks or the overnight use of loading bays.
- Instead of cables the use of charging pads placed on the carriageway. This would be a long term measure as the technology is not widespread at the moment. There are also likely to be issues with road maintenance and disruption caused by installation.

If any of the above measures are implemented in Lambeth then there are likely to be changes required to current highway standards and legislation.

10.1.2 Autonomous Vehicles (AVs)

Autonomous vehicles have the potential to alter perceptions of travel, removing the requirement for a licenced driver in a vehicle; as a result AV technology has the potential to make private vehicular travel accessible to all.

The development of AV is likely to result in the merging of vehicle types, with car hire, taxi, and private vehicles all serving the same purpose. It is anticipated that the merging of vehicle types will see a redefined model that provides an on-demand service to users. The new accessibility of AV's may increase the number of users on London's roads, which on the one hand may reduce the pressure on public transport modes, but may add additional traffic on the road network.

Potential impacts of AV's in Lambeth

- Improved flow along key arterial roads as AV travel more efficiently / reduced breaking time etc.
- More cars on the road as licences become redundant and the potential congestion accrued as a result.
- Less parking demand as vehicles shared between users, they also know where parking spaces are so move away from busy streets
- Less traffic incidents at traffic blackspots such as the IMAX roundabout
- Phased introduction will be difficult with the potential for conflict between AV's and owner driven vehicles
- New policy requirements and new monitoring

Currently, levels of autonomy are at the early stages of exploration (levels 0, 1 and 2), with most new vehicle models sold to customers with some form of autonomous capability, such as parking assist, automatic breaking, and lane-centring. It is anticipated that by 2025 urban and motorway automated driving vehicles (known as level 4) will be available

and by 2030 fully automated vehicle (known as level 5) will be available. Between 2025 and 2030 there is expected to be significant growth in level 4 and level 5 autonomous vehicles⁵¹.

When AV's become readily available they will impact the city's infrastructure and roads in a number of ways:

- Improve efficiency (quicker breaking time and can travel closer together),
- Reduce the number of incidents, and therefore delays,
- Understand the traffic conditions and reroute accordingly,
- Locate a parking spot and park without the need to loiter or circle around the block,
- Pick up and drop off passengers on demand,
- Provide an improved inter-modal service, and
- Reduce the requirement for parking at new or existing developments, however they will increase the requirement for off-site parking and drop off areas.

10.1.3 Real-time information

Potential impacts of RTI in Lambeth

- Congestion significantly reduced as vehicles reroute to avoid traffic
- Less passenger complaints and concerns as RTI updates users on exact location of transport, and provides alternative options
- Lambeth can monitor travel patterns more accurately and use that to improve infrastructure across all modes- i.e. public realm enhancements at key interchange points, improve junctions at bottlenecks etc

Real time information will play a major role in cities of the future for a number of reasons;

- Vehicles will be able to obtain parking information, understand and avoid congestion using both vehicle to vehicle and vehicle interaction as well as real time traffic updates through synced satellite navigation systems, and drop off passengers to the most convenient drop off location;
- Passengers will benefit from high quality reliable travel information that has already been rolled out to some degree at bus stops in the city, and is anticipated to be rolled out to train stations and integrated more efficiently with transport apps. The transport apps

⁵¹ KPMG Connected Autonomous Vehicles Study

will provide users with real-time information, allowing them to co-ordinate their journey efficiently.

- Lambeth council will be able to monitor congestion, parking demand and passenger flows and plan accordingly
- Transport services will be able to provide services in accordance with demand, for example a bus service may wait for a delayed train to arrive before departing.

10.1.4 Mobility as a Service (MAAS)

Potential impacts of MAAS in Lambeth

- Improved transport efficiency by integrating modes more efficiently, for example at Vauxhall or Waterloo
- Re-routing users to avoid areas of disruption or congestion, for example advising users to travel via the tube if train services are delayed
- Provide more options for users, gives Lambeth the opportunity to promote transport modes
- Reduce customer confusion, waiting times by allocating a pre-designed route

Mobility as a Service is best understood as “using a digital interface to source and manage the provision of a transport related service(s) which meets the mobility requirements of a customer”⁵²

The concept of MAAS is one of integration that will see transport services offered as one whole package. MAAS will present users with the opportunity to purchase mobility as a whole rather than a multiple single products. Cities by their very nature are a hotbed of integrated travel, however it can often be confusing and time consuming for an individual when deciding upon the ideal inter-modal journey.

MAAS would remove confusion by providing the user with a service that would allow them to travel from door to door by purchasing journey as a whole via a digital interface. The service would offer various transport modes that would allow the user to cater his or her travel to their specific requirements, with ranging levels of cost, luxury and time offered.

For Lambeth, MAAS in the future is anticipated to improve consumer experience by providing a smoother and more efficient end to end journey, presenting users with the most suitable transport services for their requirements. MAAS can use real time journey planning information in Lambeth to assess the current transport demand of various transport options, and in the case of delays and / or congestion, reroute the user. In doing so MASS should facilitate a more even distribution of transport users across multiple modes. MAAS should optimise all available modes. It could also have preferences in built to reflect local issues or even

⁵² Catapult (2016) Mobility as a Service https://ts.catapult.org.uk/wp-content/uploads/2016/07/Mobility-as-a-Service_Exploring-the-Opportunity-for-MaaS-in-the-UK-Web.pdf

policy. However, this would require authorities having a legislative stake in MAAS as a product.

10.1.5 Car Clubs

Potential impacts of car clubs in Lambeth

- Increasing the number of car club numbers can reduce the number of total vehicles on the road
- Car clubs require parking space; should members trade their vehicles in to use car clubs this shouldn't pose a problem. However, if current drivers do not trade in their vehicles, there is likely to be limited road space for parking.
- Policy has a large impact on car club impacts for the future.

In 2015 Lambeth had the highest number of dedicated car club bays compared to all London Boroughs (with 37 off street bays and 164 on street bay) and third highest car club membership, 10,740.^[3] This can lead to positive impacts on traffic as becoming a car club member correlates with falling vehicular mileage per person while each car club trip carries more people on average.^[4] But the spread of beneficiaries of car clubs, is unclear, RAC research found that car club membership is usually drawn from people with middle to upper incomes who are well educated.^[5]

Although car clubs have the ability to reduce car usage, they can also encourage the infrequent car usage from those that would otherwise not bother. The increase of infrequent car usage will undoubtedly lead to increased demand for kerb space in the Borough.

Although car clubs have the potential to provide an alternative to car ownership,^[6] free up parking spaces, lower the environmental impacts of car travel, and reduce costs of living and doing business in Lambeth, there are a number of policy challenges associated with their growth. These can be summarised by the ten-point action plan detailed in Car Club Coalition's 'A Car Club Strategy for London':

1. Developing the monitoring framework to build the evidence on the impacts of car clubs
2. Working with key stakeholders to support car clubs
3. Transforming London's public sector fleets

^[3] Car Club Coalition (2015) A Car Club Strategy for London: Growing car clubs to support London's transport future

^[4] Carplus (2014) Annual Survey: London. <http://www.carplus.org.uk/resources/annual-survey-of-car-clubs/annual-survey-201314/>

^[5] RAC Foundation (2012) Car Rental 2.0. <http://www.racfoundation.org/research/mobility/car-rental-2>

^[6] ACEA (2014) Car sharing: Evolution, Challenges and Opportunities <http://www.acea.be/publications/article/sag-report-22-carsharing-evolution-challenges-and-opportunities>

4. Building capacity and creating a framework for supportive policy development
5. Helping more Londoners make the switch from private cars
6. Making parking management smarter and easier
7. Driving the uptake of Low Emission Vehicles
8. Transforming the profile of car clubs in London
9. Driving the uptake of car clubs in London's commercial fleets
10. Car club integration

Car clubs will become an increasingly significant aspect of Lambeth's future transport that could have a positive traffic reducing impact, but which trips it will affect, and which people will benefit most from this, will hinge on the policy responses to the ten points listed above.

10.2 Future Societal Changes

10.2.1 Ageing population

Potential impacts of an ageing population in Lambeth

- Largest impact in the south of the Borough where there is a high proportion of people aged 65+
- Council likely to have to introduce more transit options specifically for the elderly (i.e. more daytime buses, and rerouted services)
- Elderly likely to use AV's over bus/tube/train
- Infrastructure may require redesign in areas with high ratios of elderly, i.e. more crossing points, more legibility, and less steps.
- While public transport may be accessible to the elderly, congestion and overcrowding on the network may make it difficult for them to travel on the network.

The proportion of elderly people is expected to increase, generating more demand for an accessible transport network. An ageing population is likely to have a number of impacts in the future for the Borough, including:

- Policy review so that the correct facilities and infrastructure are in place for the elderly,
- Higher demand for bus services and the requirement to have bus infrastructure that is accessible for all,
- Improved access at all rail and tube stations (stair and step free access),
- Better wayfinding and signage,
- A larger discrepancy in age demographics between wards in the Borough with the more southern Wards having more elderly people,
- Autonomous vehicles / Taxi / Government funded lift services all likely to have a high demand from the elderly
- AV may result in higher vehicle use by the elderly as there would no longer be a requirement to drive / own a licence

10.2.2 Flexible working

Flexible working has become a widely discussed and potentially beneficial solution to a number of issues, including those related to transport. Flexible working can lead to a reduction in highway congestion, which can help to reduce pollutants, save energy and petroleum consumption, and reduce the risk of highway accidents.

Flexible working is already widely seen as a potentially valuable travel demand management measure to reduce congestion and meet existing air quality aims.

Potential impacts of flexible working in Lambeth

- Ease pressure on stations such as Waterloo, Vauxhall and tube stations in Brixton etc.
- Potential to reduce congestion on key arterial roads (South Circular, A23 and A3)
- Improve air quality in the Borough due to a reduction of vehicle trips
- Improve work life balance for residents, may result in increases in active travel and travel for leisure activities

Lambeth has a substantial commuter population in addition to having some of the busiest interchange and destination stations in the UK that are currently at or over capacity during peak hours. Flexible working has the potential to reduce the number of days each commuter travels into the capital, and in doing so reduce overall transport demand and interchange pressure.

The key arterial roads in the Borough also experience high transport demand, particularly during peak hours in central and northern sections of the Borough. Flexible working may mitigate some of this by encouraging commuters to work from home or from a more convenient location.

10.3 Future Changes to Transport Policy

Changes to national, regional, local planning policy is likely to be dependent on the political landscape in terms of political party in central government, mayor of London and local councillors etc.

In May 2016, a new Mayor of London, Sadiq Khan, was elected into the position. The new mayor will need to prepare a new London Plan and a new Mayor's Transport Strategy, with a new set of objectives and priorities for London. To inform this process, the Mayor will need to update the medium to longer-term challenges for London. However, unlike previous years, we are in a unique environment where TfL will have a new funding settlement, as well as the recent arrival of a new Mayor who will have his own priorities about how to allocate the available funding. It is therefore not appropriate to assume that all transport schemes recently considered will fit with the new Mayor's priorities, and the transport schemes that will receive funding is uncertain. The new Mayor is likely to review and revise the current

Transport Strategy, and may potentially provide a new MTS in future years. Therefore, any changes to the current strategy would need to be reconsidered.

Between 2016 and 2035 there could be four general election and mayoral election cycles. Even though each political party and Mayor will have their own priorities for transport, future transport policy is unlikely to significantly change at a national, regional, or local level due to the transport difficulties London experiences. Traffic congestion, overcrowding and air pollution are still likely to be major issues which future transport policy would need to tackle.

Any future replacement to policy documents such as the National Planning Policy Framework, London Plan and Mayor Transport Strategy are likely to continue to focus towards sustainable growth and transport schemes to unlock development to provide jobs and housing for a growing population.

Due to current air quality and congestion issues future transport policy is still likely to prioritise active travel such as walking and cycling, over public transport, and private vehicular travel.

Lambeth must also be mindful of technological changes that have the potential to substantially alter the transport landscape that the Boroughs current policy caters for. The introduction of AV technology is anticipated to result in the merging of taxi and car hire services as both would no longer require a driver. Furthermore, autonomy is likely to result in a considerable reduction in car ownership as ordering and using a hired vehicle would become more efficient, convenient and cost effective. For Lambeth, transport policy in the Borough may need to consider how autonomous vehicles are used, where they can park and if their numbers require restriction. Policy may also need to consider legislation for incident regarding autonomous vehicles.

Car Clubs and Car Sharing policy may also need to be re-assessed as the demand for parking increases in the Borough.

11 Gap Analysis

The following list highlights the data sets that would have complemented the study but were not available at the time of writing:

- Future walking and cycling mode splits (separated),
- Public transport trip generation split into rail, underground and bus,
- Future bus accessibility data
- Future bus excess waiting time data
- Future year trip assignment within the Borough (i.e. journeys from origin to destination)

12 SWOT Analysis

A Strengths, Weakness, Opportunity and Threats (SWOT) analysis for the northern, central and southern sections of the Borough has been completed based on findings from this Future Baseline Report (Part 2).

The SWOT analysis highlights the distinct characteristics across the Borough and the varying transport priorities.

Table 12.1: Northern Lambeth – Strengths, Weaknesses, Opportunities and Threats (SWOT)

Northern Lambeth SWOT	
Strengths • Excellent public transport accessibility; good coverage of National Rail, London Underground and buses. • Major transport terminal / intersections. • Access to the Elizabeth Line (Crossrail) via Jubilee and Northern Line. • Cycle superhighways CS5/CS7 running through north of the Borough. • High mode share for buses and pedestrians. • The highest increase in active travel mode share. • ULEZ to help to reduce road based emissions, within the current CCZ boundary.	Weaknesses • Heavily congested during peak hours making it difficult to board trains from Lambeth stations to central London. • Limited rail connectivity to the south of the Borough (i.e. Streatham/ Tulse Hill/ West Norwood). • Challenging walking environment around Waterloo station due to high volume of pedestrians, localised high levels of road traffic. • Peak hour congestion at key junctions around Waterloo. • National rail trains operating close to absolute capacity in the AM peak. • Bus corridor along Blackfriars and Waterloo bridge operating close to capacity in the AM peak. • Waterloo station is expected to be a busy interchange station, with Jubilee and Waterloo & City lines operating at capacity in the AM peak. • Waterloo expected to experience poor air quality levels in the future years.
Opportunities • Improved pedestrian environment around Waterloo due to Waterloo Station development and IMAX roundabout. • Increase in cycling trips due to increase in rail passengers at Waterloo; therefore, cycle parking and bike hire facilities need to expand to accommodate future demand. • Waterloo Station development to increase rail capacity. • Improved public transport capacity across London could relieve pressure at key points (e.g. Crossrail 2 takes pressure of Charing Cross branch of the Northern Line). • Improve accessibility / public realm around railway stations. • Improved walking mode share. • Increase use of river services/use of river for construction of freight. • River Bus routes to the City and Canary Wharf. • Increase cycle hire scheme. • Create cycle hub at Waterloo.	Threats • Increase in rail passengers boarding trains from the south of Lambeth making it more difficult for residents to board trains during peak hours. • Poor air quality surrounding Waterloo station (i.e. IMAX roundabout, Westminster Bridge Road, Waterloo Road). • Delay to redevelopment of Waterloo Station. • Funding and budgetary constraints. • Transport system cannot accommodate additional demand beyond projected growth. • Large increase in car trips. • Largest predicted increase in residential and employment population from 2011 to 2036. • 25% increase in rail passengers at Waterloo from 2011 to 2031. • High increase in public transport trips. • Elizabeth Line (Crossrail 1) could lead to further congestion on Northern and Victoria lines.

Table 12.2: Central Lambeth – Strengths, Weaknesses, Opportunities and Threats (SWOT)

Central Lambeth SWOT	
Strengths - Served by National Rail, London Underground, London Overground, Thameslink services. - Served by both the Northern and Victoria Lines. - Key rail interchanges (Stockwell / Vauxhall – to the North). - Good rail links into Central London. - Excellent public transport accessibility in district town / neighbourhood centres. - High frequency bus network. - Significant reduction in traffic flows. - Improvements at Vauxhall Station and Thameslink improvements to increase rail capacity. - Improved cycle accessibility through Cycle Quietways. - Improved pedestrian and cycle environment around Vauxhall. - Significant increase in active travel trips projected in Stockwell, Vauxhall, Oval and Brixton.	Weaknesses - Rail and underground network remain heavily congested during the peak hours. - Lack of north to south cycle routes through the Borough. - Buses around Oval, Stockwell and Brixton operate at capacity. - Lack of north to south rail links through Borough and lack of east to west rail connections to connect to town / neighbourhood centres. - Lack of segregated cycle facilities through Brixton. - High increase in public transport trips predicted. Trains between Loughborough Junction and Herne Hill are projected to operate close to total capacity in 2031. - Congestion challenges expected in Stockwell, Oval and Brixton caused by traffic volumes on major routes such as the A3 / A24 / South circular likely to remain. - Northern and Victoria lines generally operating close to or over capacity in AM peak. - High increase in car trips projected in Vauxhall. - High traffic volumes and junction capacity constraints projected (Clapham, Brixton, Vauxhall). - Poor air quality around Vauxhall gyratory, Kennington Oval, Kennington Park Road and Camberwell New Road.
Opportunities - Improve cycle routes through the centre of the Borough. - ULEZ being extended to the south circular to further improve air quality. - Expand cycle hire beyond Stockwell. - Improved rail access to Heathrow from Clapham Junction through Southern Rail Access. - Opportunity for development at Vauxhall to assist with funding for future transport improvements. - New London Overground interchange at Brixton. - Removal of Vauxhall gyratory leading to significantly improved pedestrian and cycling environment. - Potential for Crossrail 2 to relieve congestion on the Northern line. - Increase in infrastructure such as electric charging provision to encourage low emission vehicles. - Reduced emissions from freight with consolidation centres and electric / cycle delivery vehicles.	Threats - Air quality challenges; both PM₁₀ and NO_x objectives are being exceeded, especially on the A23 between Streatham and Brixton. - Road congestion around town/ neighbourhood centre locations. - Potential for additional travel demand beyond to Brixton Station. - Public transport trips are expected to increase by 50%. - Rail and underground trips projected to increase by 60% and 80%, respectively. - Highest share of Lambeth's total population. - Elizabeth Line (Crossrail 1) could lead to further congestion on Thameslink services. - Increase in rail passengers at Waterloo station likely to lead to additional pressure on local bus services which are congested. - Traffic congestion could impact bus journey times and reliability. - Lack of charging points for electric vehicles.

Table 12.3: Southern Lambeth – Strengths, Weaknesses, Opportunities and Threats (SWOT)

Southern Lambeth SWOT	
Strengths • Direct train links south of the Borough (i.e. Croydon) • National Rail and Thameslink services operating within absolute capacity. • Improved public realm at Streatham and West Norwood. • Buses operating within capacity. • Projected future reduction in car trips. • Large increase in projected future active travel mode share. • Bus corridors generally operating within capacity in the AM peak. • Projected reduction in road traffic flows from 2011 – 2021. • Improved rail services through Thameslink Improvements.	Weaknesses • No London Underground or Overground connections. • Lack of north to south rail connections limits accessibility in the South. • Low public transport accessibility away from major transport corridor likely to remain. • Limited segregated cycle facilities. • Traffic congestion on major routes. • Proposed public realm improvements in Tulse Hill and Streatham, however severance issues likely to remain due to traffic high volumes. • Cycle quietways likely to improve cycle access from the east and west sections, to the central and northern Lambeth. • Despite reduction in car trips the south of the borough is projected to experience high traffic volumes and capacity constraints around Streatham. • Poor air quality along the A23 corridor.
Opportunities • Improved cycle connections through proposed Cycle Quietways. • Improved connections to Croydon (Tramlink extension). • Improved National Rail frequencies and improvements of train services through 'Turning South London Orange' proposals. • Modal shift away from cars. • Improvements to cycle parking facilities at train stations. • Additional capacity created by Thameslink improvements. • Improvements to pedestrian and cycle environment through Streatham High Road and Tulse Hill gyratory improvements. • Low emission bus zone between Streatham and Brixton has the potential to improve air quality on A23.	Threats • Continued air quality challenges. PM₁₀ objectives still expected to be exceeded. • Poor pedestrian and cycle environment due to traffic and congestion in key south district centres. • Lack of east to west bus routes. • Despite reduction in vehicle trips traffic congestion remains on A23 and congestion issues around Streatham. • The change of mode to electric or autonomous vehicles may exacerbate congestion issues. • Lack of charging points for electric vehicles. • High percentage in employment population in south of the borough.

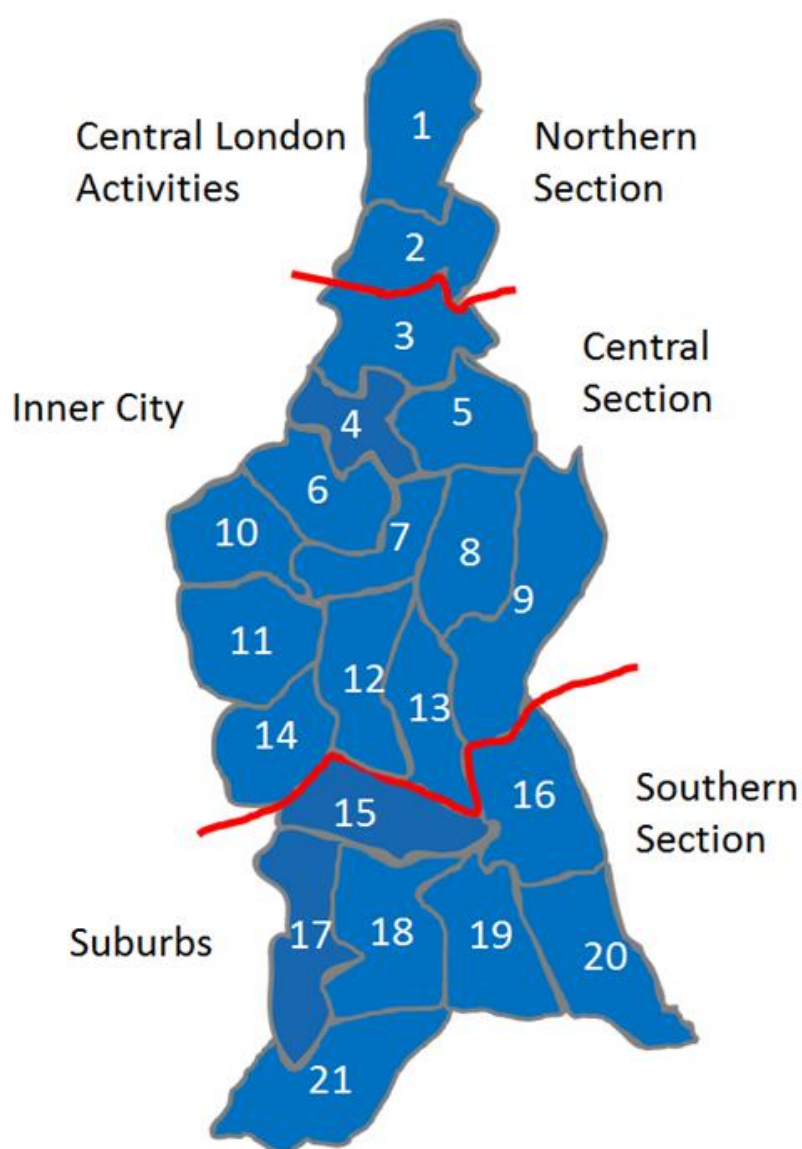
13 Conclusion

This Future Baseline Report (Part 2) helps to identify the likely condition of Lambeth's transport network in the next 10 to 20 years. The analysis in this report takes account of population growth assumptions and mode share expectations and identifies likely transport schemes that make improve transport conditions. The findings note that there is a significant difference in the forecast transport provision across the Borough, and demonstrates the potential for future improvements to support Borough-wide growth.

The prioritised schemes to be delivered in the short, medium and long term to support Borough-wide growth will be set out in the final phase of the study, in the Long Term Transport Strategy (LTTS). The final strategy will aim to 'Link Lambeth' together via its communities and link Lambeth to major transport infrastructure and developments outside of the Borough. The proposed measures will be tested against future scenarios to take into account impact of future travel habits based on economic and societal changes.

The LTTS will conclude with a description of the preferred strategic transport system for Lambeth in year 2035, which will form the basis of stakeholder consultation. The purpose of the LTTS is to identify which transport schemes are needed to support growth and regeneration in key growth areas as well as improving the overall network across the Borough.

Appendix A. Ward Locations and Borough Sections



Northern Wards
Bishops (1)
Prince's (2)
Central Wards
Oval (3)
Stockwell (4)
Vassall (5)
Larkhall (6)
Ferndale (7)
Coldharbour (8)
Herne Hill (9)
Clapham Town (10)
Clapham Common (11)
Brixton Hill (12)
Tulse Hill (13)
Thornton (14)
Southern Wards
Streatham Hill (15)
Thurlow Park (16)
St Leonards (17)
Streatham Wells (18)
Knight's Hill (19)
Gipsy Hill (20)
Streatham South (21)

Appendix B. Amalgamation of LTS Zones

Section	Borough Centres	Ward	LTS Zone	
North Lambeth	Waterloo	Bishops	100	Waterloo East
			101	Waterloo Bridge South
			102	Waterloo
			104	Lambeth North
	North Lambeth (excluding Waterloo)	Princes	107	Vauxhall West
			1200	Lambeth West
			1201	Lambeth East
			1202	Kennington West
			1204	Vauxhall
			1206	Oval and Kennington
Central Lambeth	Stockwell	Oval	1207	Oval West
		Stockwell/ Larkhall	1210	South Lambeth West
			1214	South Lambeth East
		Vassall	1217	Kennington South
	Brixton	Herne Hill	1220	Camberwell South
			1224	Herne Hill North
		Coldharbour	1227	Brixton East
			1229	Brixton North
		Ferndale / Brixton Hill	1230	Stockwell South
			1234	Brixton
		Tulse Hill	1240	Brockwell Park
	Clapham	Clapham Common	1237	Clapham Park
		Clapham Town	1239	Clapham
		Thornton	1249	Streatham Hill
South Lambeth	Streatham	Streatham Hill	1247	Streatham Hill South
		Streatham South	1254	Streatham Park
			1255	Streatham Vale
		Leonards	1257	Streatham West
		Streatham Wells	1259	Streatham
	Norwood	Thurlow Park	1244	Tulse Hill
		Gipsy Hill	1250	West Norwood
	Knights Hill	Knights Hill	1251	West Norwood West

Appendix C. Trip Generation Forecasts (LTS Data)

Residential Growth Forecasts (population)

	LTS Zone	2011	2021	2026	2031	2036
100	Waterloo East	1,426	1,840	3,914	4,143	4,553
101	Waterloo Bridge South	1,035	1,336	1,542	2,140	2,397
102	Waterloo	2,085	3,018	3,516	4,067	4,476
104	Lambeth North	3,275	4,226	4,490	5,196	5,578
107	Vauxhall West	954	1,860	2,319	2,559	2,793
1200	Lambeth West	6,411	8,149	8,348	8,831	9,319
1201	Lambeth East	3,145	3,679	3,750	4,001	4,438
1202	Kennington West	2,285	2,598	2,649	2,753	2,864
1204	Vauxhall	2,642	3,004	3,070	3,325	3,475
1206	Oval and Kennington	6,544	11,798	14,456	15,722	16,642
1207	Oval West	11,147	13,260	13,806	14,260	16,140
1210	South Lambeth West	9,239	9,855	9,921	10,179	10,721
1214	South Lambeth East	22,108	23,857	23,979	24,770	26,399
1217	Kennington South	7,544	9,278	9,359	9,645	9,986
1220	Camberwell South	7,722	8,498	8,656	8,984	9,918
1224	Herne Hill North	6,635	7,030	7,096	7,405	8,125
1227	Brixton East	14,123	15,882	16,074	16,690	17,846
1229	Brixton North	7,858	8,740	8,856	9,209	9,512
1230	Stockwell South	9,023	10,329	10,361	10,631	11,077
1234	Brixton	13,157	14,759	14,937	15,938	17,060
1237	Clapham Park	17,255	18,897	19,282	19,739	20,851
1239	Clapham	12,750	14,103	14,146	14,445	14,946
1240	Brockwell Park	15,660	16,574	16,644	17,085	18,084
1244	Tulse Hill	16,318	17,197	17,359	18,034	18,706
1247	Streatham Hill South	5,161	5,672	6,277	6,452	6,751
1249	Streatham Hill	20,680	24,114	26,085	27,203	28,651
1250	West Norwood	23,184	24,204	24,565	25,690	27,356
1251	West Norwood West	11,151	11,766	12,092	12,465	12,848
1254	Streatham Park	2,955	3,111	3,170	3,298	3,565
1255	Streatham Vale	14,553	15,384	15,618	16,283	17,415
1257	Streatham West	9,376	10,053	10,109	10,501	11,153
1259	Streatham	17,405	18,452	18,592	19,375	20,772

Source: London Transportation Studies Model

Employment Growth Forecasts (population)

	LTS Zone	2011	2021	2026	2031	2036
100	Waterloo East	20,903	23,791	25,372	27,086	28,983
101	Waterloo Bridge South	6,123	6,335	6,570	6,803	7,053
102	Waterloo	5,905	7,313	9,174	10,448	11,541
104	Lambeth North	5,216	5,349	5,669	5,942	6,207
107	Vauxhall West	7,895	7,938	8,040	8,212	8,433
1200	Lambeth West	1,414	1,428	1,449	1,482	1,524
1201	Lambeth East	1,188	1,182	1,191	1,211	1,239
1202	Kennington West	605	601	606	616	631
1204	Vauxhall	1,046	1,040	1,049	1,066	1,091
1206	Oval and Kennington	10,678	12,312	13,833	14,831	15,717
1207	Oval West	4,228	4,354	4,539	4,726	4,930
1210	South Lambeth West	2,378	2,359	2,370	2,405	2,456
1214	South Lambeth East	5,511	5,618	5,684	5,798	5,950
1217	Kennington South	833	839	848	864	886
1220	Camberwell South	2,905	2,998	3,075	3,157	3,251
1224	Herne Hill North	7,727	7,730	7,810	7,973	8,187
1227	Brixton East	4,278	4,223	4,240	4,300	4,388
1229	Brixton North	2,843	2,775	2,771	2,795	2,837
1230	Stockwell South	3,753	3,702	3,715	3,765	3,841
1234	Brixton	4,603	4,542	4,561	4,621	4,711
1237	Clapham Park	7,300	7,578	7,794	8,079	8,413
1239	Clapham	6,884	7,051	7,204	7,419	7,678
1240	Brockwell Park	2,865	2,873	2,906	2,968	3,048
1244	Tulse Hill	2,627	2,731	2,823	2,902	2,987
1247	Streatham Hill South	1,213	1,216	1,364	1,432	1,479
1249	Streatham Hill	3,248	3,445	3,504	3,582	3,680
1250	West Norwood	6,025	5,937	6,092	6,278	6,504
1251	West Norwood West	2,199	2,096	2,078	2,089	2,117
1254	Streatham Park	782	791	802	820	843
1255	Streatham Vale	2,886	3,364	3,754	3,867	3,973
1257	Streatham West	2,698	2,720	2,756	2,817	2,893
1259	Streatham	6,979	7,135	7,437	7,794	8,202

Source: London Transportation Studies Model

Total Trip Generation Forecasts (total trips per mode)

LTS Zones		2011			2021			2026			2031			2036		
		Car	PT	Active	Car	PT	Active	Car	PT	Active	Car	PT	Active	Car	PT	Active
100	Waterloo East	804	10,130	1,385	781	12,683	2,084	846	14,826	3,321	859	15,741	3,430	892	17,168	3,722
101	Waterloo Bridge South	326	4,547	610	320	5,229	839	321	5,552	1,088	339	5,988	1,280	354	6,381	1,391
102	Waterloo	958	6,414	1,195	961	8,569	1,781	984	9,890	2,398	1,010	10,924	2,630	1,048	11,926	2,854
104	Lambeth North	385	4,765	1,285	380	5,395	1,791	360	5,634	2,192	385	6,148	2,422	401	6,582	2,562
107	Vauxhall West	257	4,173	562	289	4,790	973	293	5,100	1,354	306	5,251	1,417	322	5,538	1,511
1200	Lambeth West	447	2,730	1,790	477	3,418	2,520	437	3,343	2,884	456	3,542	2,969	474	3,751	3,102
1201	Lambeth East	399	1,719	940	386	1,995	1,202	363	1,954	1,370	373	2,058	1,412	393	2,232	1,541
1202	Kennington West	475	1,251	594	468	1,435	728	448	1,426	818	454	1,484	821	460	1,546	845
1204	Vauxhall	541	1,770	538	515	2,169	677	478	2,180	782	493	2,313	822	505	2,414	851
1206	Oval and Kennington	1,578	6,385	2,908	1,953	9,280	5,061	2,020	10,572	6,746	2,119	11,329	7,138	2,198	12,053	7,520
1207	Oval West	2,064	5,850	3,672	2,122	6,836	4,589	2,043	6,906	5,202	2,077	7,144	5,247	2,216	7,900	5,834
1210	South Lambeth West	1,646	4,228	2,306	1,606	4,596	2,556	1,520	4,536	2,778	1,541	4,648	2,757	1,585	4,880	2,866
1214	South Lambeth East	3,268	10,393	7,100	3,190	11,644	7,758	2,960	11,522	8,310	3,010	11,877	8,247	3,132	12,563	8,617
1217	Kennington South	1,235	3,548	1,530	1,318	4,355	1,965	1,242	4,293	2,120	1,257	4,415	2,109	1,282	4,571	2,152
1220	Camberwell South	1,807	4,893	2,695	1,870	5,465	3,164	1,789	5,523	3,446	1,819	5,675	3,473	1,917	6,106	3,734
1224	Herne Hill North	1,829	3,845	2,276	1,719	4,187	2,562	1,616	4,250	2,797	1,634	4,340	2,801	1,725	4,683	2,982
1227	Brixton East	3,041	5,840	4,356	3,046	6,818	5,023	2,904	6,812	5,366	2,940	7,085	5,378	3,035	7,605	5,640
1229	Brixton North	1,449	3,687	2,584	1,427	4,111	2,895	1,358	4,130	3,075	1,381	4,279	3,105	1,403	4,437	3,169
1230	Stockwell South	1,840	4,545	2,596	1,813	5,261	3,013	1,718	5,235	3,216	1,727	5,368	3,188	1,757	5,602	3,268

LTS Zones		2011			2021			2026			2031			2036		
		Car	PT	Active	Car	PT	Active	Car	PT	Active	Car	PT	Active	Car	PT	Active
1234	Brixton	2,764	5,873	4,408	2,705	6,712	5,101	2,568	6,679	5,480	2,627	7,089	5,628	2,728	7,561	5,918
1237	Clapham Park	4,223	9,276	6,359	4,178	10,579	7,276	3,954	10,722	7,931	3,978	11,002	7,868	4,099	11,579	8,164
1239	Clapham	3,492	7,872	3,090	3,454	8,860	3,592	3,292	8,890	3,943	3,321	9,082	3,907	3,384	9,426	4,000
1240	Brockwell Park	2,913	6,172	3,257	2,875	6,779	3,628	2,722	6,731	3,866	2,757	6,882	3,821	2,859	7,291	3,981
1244	Tulse Hill	3,700	6,823	3,958	3,697	7,529	4,576	3,521	7,563	4,902	3,562	7,811	4,920	3,639	8,114	4,994
1247	Streatham Hill South	1,331	2,883	1,008	1,329	3,198	1,171	1,337	3,484	1,408	1,353	3,571	1,409	1,388	3,726	1,457
1249	Streatham Hill	4,042	8,695	6,387	4,297	10,289	7,961	4,234	10,821	9,127	4,332	11,254	9,247	4,487	11,819	9,584
1250	West Norwood	6,270	8,448	8,738	6,174	9,061	9,980	5,878	9,121	10,621	5,965	9,487	10,742	6,152	10,100	11,217
1251	West Norwood West	2,643	4,171	3,022	2,585	4,483	3,411	2,450	4,525	3,690	2,472	4,633	3,680	2,510	4,786	3,724
1254	Streatham Park	920	1,297	569	888	1,430	634	838	1,454	703	843	1,525	689	889	1,631	735
1255	Streatham Vale	3,673	5,708	3,358	3,746	6,628	3,779	3,561	6,810	4,115	3,606	7,192	4,054	3,759	7,703	4,278
1257	Streatham West	2,478	4,041	2,627	2,459	4,486	3,040	2,292	4,500	3,264	2,320	4,652	3,277	2,392	4,935	3,422
1259	Streatham	5,409	7,652	6,985	5,374	8,432	7,985	5,130	8,550	8,579	5,172	8,868	8,693	5,325	9,475	9,138

Appendix D. Railplan Load Factors

Figure 13.1: 2021 National Rail Load Factors (Lambeth Stations)

Southeastern (to Victoria)											
Seated Capacity Load Factor	West Dulwich	1.77	Herne Hill	1.51	Brixton	1.39	Victoria				
Total Capacity Load Factor		1.03		0.88		0.81					
Southeastern (to Charing Cross)											
Seated Capacity Load Factor	London Bridge	0.85	Waterloo East	0.68	Charing Cross						
Total Capacity Load Factor		0.47		0.37							
Southern (via West Norwood)											
Seated Capacity Load Factor	Crystal Palace	0.17	Gipsy Hill	0.39	West Norwood	0.35	Tulse Hill	0.79	North Dulwich		
Total Capacity Load Factor		0.08		0.18		0.16		0.38			
					West Norwood	0.88	Streatham Hill	1	Balham		
						0.41		0.47			
Southern (via Streatham Common)											
Seated Capacity Load Factor	Thornton Heath	0.68	Norbury	0.97	Streatham Common	0.31	Streatham	0.82	Tulse Hill	0.79	North Dulwich
Total Capacity Load Factor		0.32		0.45		0.15		0.4		0.38	
					Streatham Common	1.54	Balham				
						0.72					
Southwest (all main lines combined)											
Seated Capacity Load Factor	Queenstown Road	2.12	Vauxhall	1.52	Waterloo						
Total Capacity Load Factor		1.13		0.83							
Thameslink											
Seated Capacity Load Factor	Tooting/Mitcham Eastfields	1.04	Streatham	1.52	Tulse Hill	1.65	Herne Hill	1.49	Loughborough Junction	1.64	Elephant & Castle
Total Capacity Load Factor		0.39		0.52		0.56		0.63		0.69	

Source: Railplan (2011)

Figure 13.2: 2031 National Rail Load Factors (Lambeth Stations)

Southeastern (to Victoria)											
Seated Capacity Load Factor	West Dulwich	1.84	Herne Hill	1.56	Brixton	1.43	Victoria				
Total Capacity Load Factor		1.07		0.91		0.83					
Southeastern (to Charing Cross)											
Seated Capacity Load Factor	London Bridge	0.96	Waterloo East	0.75	Charing Cross						
Total Capacity Load Factor		0.53		0.41							
Southern (via West Norwood)											
Seated Capacity Load Factor	Crystal Palace	0.2	Gipsy Hill	0.43	West Norwood	0.36	Tulse Hill	0.87	North Dulwich		
Total Capacity Load Factor		0.09		0.2		0.17		0.41			
					West Norwood	0.97	Streatham Hill	1.12	Balham		
						0.45		0.52			
Southern (via Streatham Common)											
Seated Capacity Load Factor	Thornton Heath	0.77	Norbury	1.08	Streatham Common	0.36	Streatham	0.9	Tulse Hill	0.87	North Dulwich
Total Capacity Load Factor		0.36		0.5		0.17		0.43		0.41	
					Streatham Common	1.7	Balham				
						0.79					
Southwest (all main lines combined)											
Seated Capacity Load Factor	Queenstown Road	2.22	Vauxhall	1.63	Waterloo						
Total Capacity Load Factor		1.18		0.89							
Thameslink											
Seated Capacity Load Factor	Tooting/Mitcham Eastfields	1.12	Streatham	1.62	Tulse Hill	1.74	Herne Hill	1.59	Loughborough Junction	1.74	Elephant & Castle
Total Capacity Load Factor		0.42		0.56		0.6		0.67		0.73	

Source: Railplan (2011)

Figure 13.3: 2021 Underground Load Factors (Lambeth Stations)

Bakerloo Line									
Seated Capacity Load Factor	Elephant & Castle	0.49	Lambeth North	0.55	Waterloo	1.82	Embankment		
Total Capacity Load Factor		0.18		0.2		0.66			

Jubilee Line					
Seated Capacity Load Factor	Southwark	3.45	Waterloo	3.55	Westminster
Total Capacity Load Factor		0.98		1.01	

Northern Line															
Seated Capacity Load Factor	Clapham South	3.4	Clapham Common	3.76	Clapham North	3.95	Stockwell	3.25	Oval	3.38	Kenningington	0.98	Waterloo	1.89	Embankment
Total Capacity Load Factor		1.24		1.37		1.44		1.19		1.23		0.36		0.69	

Victoria Line							
Seated Capacity Load Factor	Brixton	1.1	Stockwell	1.9	Vauxhall	2.64	Pimlico
Total Capacity Load Factor		0.37		0.64		0.89	

Waterloo & City Line			
Seated Capacity Load Factor	Waterloo	3.45	Bank
Total Capacity Load Factor		1.09	

Source: Railplan (2011)

Figure 13.4: 2031 Underground Load Factors (Lambeth Stations)

Bakerloo Line									
Seated Capacity Load Factor	Elephant & Castle	0.55	Lambeth North	0.62	Waterloo	2	Embankment		
Total Capacity Load Factor		0.18		0.2		0.64			

Jubilee Line					
Seated Capacity Load Factor	Southwark	3.65	Waterloo	3.63	Westminster
Total Capacity Load Factor		1.04		1.03	

Northern Line															
Seated Capacity Load Factor	Clapham South	3.49	Clapham Common	3.87	Clapham North	4.08	Stockwell	3.33	Oval	3.46	Kennington	0.99	Waterloo	1.84	Embankment
Total Capacity Load Factor		1.27		1.41		1.48		1.21		1.26		0.36		0.67	

Victoria Line							
Seated Capacity Load Factor	Brixton	1.15	Stockwell	1.98	Vauxhall	2.72	Pimlico
Total Capacity Load Factor		0.39		0.66		0.91	

Waterloo & City Line			
Seated Capacity Load Factor	Waterloo	2.41	Bank
Total Capacity Load Factor		0.77	

Source: Railplan (2011)

