Gatwick Airport Northern Runway Project

Environmental Statement
Chapter 12: Traffic and Transport - Tracked

Book 5

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12 Traffic and Transport

12.1. Introduction

12.1.1 This chapter of the Environmental Statement (ES) presents the findings of the Environmental Impact Assessment (EIA) concerning the potential effects of the proposal to make best use of Gatwick's existing runways and infrastructure (referred to within this report as 'the Project') on traffic and transport.

12.1.2 This chapter sets out the assessment methodology and considers the potential traffic and transport effects of the Project during construction and operation. In particular, this ES chapter:

- sets out the existing and future baseline conditions on the highway network, public transport services and walking and cycling infrastructure. The Project is assessed against the future baselines in this chapter. For the highway network, the future baselines are established from extensive strategic modelling work which takes into account background growth and cumulative developments;
- presents the potential environmental effects on traffic and transport arising from the Project;
- identifies any assumptions and limitations encountered in compiling the environmental information; and
- highlights any necessary monitoring and/or mitigation measures that could prevent, minimise, reduce or offset the possible environmental effects identified in the EIA process.

12.1.3 This chapter covers the traffic and transport effects on people arising from the Project and provides an assessment on severance, driver delay, pedestrian and cyclist delay and amenity, accidents and safety, hazardous loads, and effects on public transport amenity based on the approach and methodology set out in the Institute of Environmental Management and Assessment (IEMA) guidance (IEMA, 1993).

12.1.4 A Transport Assessment (TA) is submitted separately with the **Draft Development Consent Order** (Doc Ref. 2.1), in keeping with the requirement set out in paragraph 113 of the National Planning Policy Framework (NPPF). The TA provides more information on the assessment of the impacts of the Project on the transport networks, including demand forecast/trip generation information and modelling methodologies. The annexes to the **Transport Assessment** (Doc Ref. 7.4) provide extensive technical reports on strategic modelling, microsimulation modelling and station modelling. Whilst the TA and ES are separate assessments with different objectives, they share some technical information, such as the outcome of transport modelling work. Information from the TA that has been used to inform the environmental assessment presented within this chapter is provided either within this chapter or its appendices. Traffic flows and rail data, upon which this chapter relies, are included in **ES Appendix 12.9.1: Highway Flows and Driver Delay Review** (Doc Ref. 5.3) and **ES Appendix 12.9.2: Rail Passenger Flows** (Doc Ref. 5.3).

12.1.5 The Preliminary Environmental Information Report (PEIR) chapter on Traffic and Transport identified next steps and these have been addressed in this chapter as follows:

- Strategic modelling work has been updated in consultation with stakeholders. The outputs informed this chapter and traffic flows are included in **ES Appendix 12.9.1:**

Highway Flows and Driver Delay Review (Doc Ref. 5.3). A detailed review of the junctions has been undertaken for driver delay which are set out in this chapter and further detail is included in **ES Appendix 12.9.1: Highway Flows and Driver Delay Review** (Doc Ref. 5.3).

- Further work has been undertaken on cumulative effects which is set out in Section 12.11.
- The existing Airport Surface Access Strategy 2022-2030 (the ASAS) aims to achieve the targets set out in Gatwick Airport's Decade of Change documents in a situation without the Project. In parallel, GAL has developed Surface Access Commitments (SACs) for the Project which represent the surface access outcomes that GAL commits to achieving at the Airport with the Project in place. In due course, in accordance with the expected cycle of ASAS, GAL will produce a new ASAS to refresh its strategy which will be informed by the **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3) and provide the wider context within which those commitments are delivered. The SACs form part of the Project and all measures identified and relied upon for the assessments in this chapter are summarised in Section 12.6 (future baseline) and Section 12.7~~12.7.3~~ (with Project).
- Further work has been undertaken on freight and by the GAL construction team on the detailed programme and improvement measures, which has informed the assessments in this chapter.

12.2. Legislation and policy

Legislation

12.2.1 This section identifies the legislation and policy context for traffic and transport that has been taken into account for the assessment. Legislation relevant to traffic and transport includes the Transport Act 2000, the Highways Act 1980, the Infrastructure Act 2015 and the Railways Acts 1993 and 2005.

12.2.2 The Transport Act 2000 contains *'measures to create a more integrated transport system'*. Specific measures include requirements to improve local passenger transport services, and reduce road congestion and pollution – eg local transport authorities should produce a Local Transport Plan (LTP) every five years and to keep that plan under review. These plans have been considered in the assessment of traffic and transport.

12.2.3 The Highways Act 1980 sets out the duties of the highway authorities and how the highway network will be managed and operated. Part V of the Highways Act 1980 sets out the legislation on Improvement of Highways and Part VA covers the Environmental Impact Assessment, which is relevant to this chapter. In addition, the Infrastructure Act 2015 defines the role of National Highways as a government-owned company responsible for ensuring improvements to the UK's strategic road network. National Highways is a statutory consultee as part of the application for development consent for the Project.

12.2.4 The Aerodrome Traffic (Heathrow), (Gatwick), (Stansted) Order 2006 designates Gatwick Airport Limited as highway authority. It is stated that the order "…*shall have effect subject to the exceptions, adaptations and modifications specified in Schedule 2 for the purpose or in consequence of conferring on the Airport Operator the functions exercisable under those enactments and regulations by a highway authority or a council of a London borough or a local authority or a traffic authority*".

12.2.5 Privatisation of UK railways led to the Railways Act 1993 which governs licensing, access agreements to the railway for operators, access charges and their review and enforcement. The Railways Act 2005 largely amends the Railways Act 1993. The Act makes a number of changes to the regulatory framework, including a change to periodic reviews of access charges and transferring various responsibilities to the Office of Rail and Road (ORR). These Acts designate Network Rail as the owner of rail infrastructure in the UK. Network Rail is a statutory consultee as part of this application for development consent.

12.2.6 On 20 May 2021, the Williams-Shapps plan for rail was announced by Government. This White Paper sets out the Government's plan for "a revolution on the railways" in Great Britain in terms of replacing the franchising model, accelerating innovation and technological change, levelling-up the country and cleaner, greener rail travel. The plan envisages a new agency, Great British Railways, which will absorb Network Rail as well as parts of the Department for Transport's and ORR's rail functions.

Planning policy context

National Policy Statements

12.2.7 The Airports National Policy Statement (NPS) (Department for Transport, 2018), although primarily provided in relation to a new runway at Heathrow Airport, remains an important and relevant consideration for other applications for airport infrastructure in London and the south east of England.

12.2.8 The NPS for National Networks (Department for Transport, 2014[1]) sets out the need for development of road, rail and strategic rail freight interchange projects on the national networks and the policy against which decisions on major road and rail projects will be made. This has been taken into account in relation to the highway improvements proposed as part of the Project.

12.2.9 Table 12.2.1 provides a summary of the relevant requirements of these NPSs and how these are addressed within the ES.

Table 12.2.1: Summary of NPS information relevant to this chapter

Summary of NPS requirement	How and where considered in the ES
Airports NPS	
Para 5.9 – "The applicant must prepare an airport surface access strategy in conjunction with its Airport Transport Forum, in accordance with the guidance contained in the Aviation Policy Framework. The airport surface access strategy must reflect the needs of the scheme	SACs for the Project (summarised in Section 12.7.312.8 of this chapter) represent the outcomes which GAL commits to achieving in relation to surface access at the Airport with the Project. In due course and in accordance with the expected cycle of ASAS, GAL will

[1] The Department for Transport published a revised draft National Policy Statement for National Networks ("NPSNN") for consultation on 14 March 2023. The draft NPSNN confirms in paragraph 1.16 that the existing NPSNN remains the relevant government policy and has full force and effect in relation to any applicable applications for development consent accepted for examination before designation of the updated NPSNN. The draft NPSNN further notes in paragraph 1.17 that the emerging draft NPSNN is capable of being an important and relevant consideration in the Secretary of State's decision making process. As such, the Applicant will continue to monitor the progress of the NPSNN review process and incorporate any updates to the Project's application documentation where considered appropriate in due course.

Summary of NPS requirement	How and where considered in the ES
contained in the application for development consent, including any phasing over its development, implementation and operational stages, reflecting the changing number of passengers, freight operators and airport workers attributable to the number of air traffic movements. The strategy should reference the role of surface transport in relation to air quality and carbon. The airport surface access strategy must contain specific targets for maximising the proportion of journeys made to the airport by public transport, cycling or walking. The strategy should also contain actions, policies, and defined performance indicators for delivering against targets, and should include a mechanism whereby the Airport Transport Forum can oversee implementation of the strategy and monitor progress against targets alongside the implementation and operation of the preferred scheme."	produce a new ASAS to refresh its strategy and to reflect the commitments it is making about surface access outcomes and measures as part of the Project. The future ASAS will be informed by **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3) and become the means through which those commitments are delivered.
Para 5.10 – "The applicant should assess the implications of airport expansion on surface access network capacity using the WebTAG methodology [now TAG] stipulated in the Department for Transport guidance, or any successor to such methodology. The applicant should consult National Highways, Network Rail and highway and transport authorities, as appropriate, on the assessment and proposed mitigation measures. The assessment should distinguish between the construction and operational project stages for the development comprised in the application."	Assessment methodology is in accordance with Transport Analysis Guidance (TAG) guidance and has been developed in consultation with authorities (see Section 12.3). Both construction and operational effects have been assessed in this chapter (see Section 12.9).
Para 5.11 – "The applicant should also consult with National Highways, Network Rail and relevant highway and transport authorities, and transport operators, to understand the target completion dates of any third party or external schemes included in existing rail, road or other transport investment plans. It will need to assess the effects of the preferred scheme as influenced by such schemes and plans. Such consultation and assessment, both of third-party schemes on which the preferred scheme	Consultation took place with the local highway authorities, National Highways and Network Rail (see Section 12.3), and relevant cumulative schemes are included in the assessments contained in this chapter.

Summary of NPS requirement	How and where considered in the ES
depends, and others which interact with it, all of which may be subject to their own planning, funding and approval processes, must be understood in terms of implications of the timings for the applicant's own surface access proposals."	
Para 5.13 – "For schemes and related surface access proposals or other works impacting on the strategic road network, the applicant should have regard to Department for Transport Circular 02/2013, *The Strategic Road Network and the delivery of sustainable development* (or prevailing policy), and the National Networks NPS. This sets out the way in which the highway authority for the strategic road network will engage with communities and the development industry to deliver sustainable development and economic growth, whilst safeguarding the primary function and purpose of the network."	The design of the Project and this assessment gives regard to the Department for Transport Circular, the delivery of sustainable development and the National Networks NPS.
Para 5.14 – "The surface access systems and proposed airport infrastructure may have the potential to result in severance in some locations. Where appropriate, the applicant should seek to deliver improvements or mitigation measures that reduce community severance and improve accessibility."	Surface access improvement works to reduce community severance and improve accessibility are set out in Section 12.8 of this chapter.
Para 5.17 – "Any application for development consent and accompanying airport surface access strategy must include details of how the applicant will increase the proportion of journeys made to the airport by public transport, cycling and walking..."	A summary of the **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3) is provided in Section 12.8~~12.7.3~~. The targets in the NPS described for 2030 and 2040 relate specifically to the Heathrow Runway 3 project (*"5.1 This chapter focuses on the potential impacts of the Heathrow Northwest Runway scheme"*). The SACs set out GAL's commitment to achieving a mode share of 55% by sustainable modes for passenger and staff journeys by the summer period after the third anniversary of the opening of the new runway. These are described in Section 12.8~~12.7.3~~.
Para 5.18 – "The applicant should commit to annual public reporting on performance against these specific targets. The airport surface access strategy should consider measures and incentives which could help to manage demand	GAL is committed to mode shares as set out in the **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3) and as part of this is also committed to annual monitoring and reporting. This will involve undertaking

Summary of NPS requirement	How and where considered in the ES
by car users travelling to and from the airport, as well as physical infrastructure interventions, having at all times due regard to the effect of its strategy on the surrounding area and transport networks. The strategy should also include an assessment of the feasibility of the measures proposed as well as the benefits and disbenefits related to those measures, including any implications for National Highways, Network Rail and affected relevant highway authorities and transport providers. These measures could be used to help achieve mode share targets and should be considered in conjunction with measures to mitigate air quality impacts as described in the Airports NPS."	comprehensive monitoring based on a range of data sources, as set out in the SACs, and preparing an Annual Monitoring Report (AMR). The first AMR will be produced six months before commencement of dual runway operations. A summary of the monitoring commitments in the SACs is provided in Section 12.7.3. The measures which inform the SACs and the highway improvements which form part of the Project have been discussed with highway authorities as set out in Section 12.3.
NPS for National Networks[2]	
Para 3.17 – "There is a direct role for the national road network to play in helping pedestrians and cyclists. The Government expects applicants to use reasonable endeavours to address the needs of cyclists and pedestrians in the design of new schemes. The Government also expects applicants to identify opportunities to invest in infrastructure in locations where the national road network severs communities and acts as a barrier to cycling and walking, by correcting historic problems, retrofitting the latest solutions, and ensuring that it is easy and safe for cyclists to use junctions."	Improvements to walking and cycling are incorporated in the highway improvement proposals. The **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3) also identify that GAL will enhance on-site facilities to ensure that these support the aim of encouraging staff to walk and cycle. GAL commits to achieving 15% of staff journeys to work originating within 8 km of the Airport to be made by active modes by the summer period after the third anniversary of the opening of the new northern runway. See Section 12.8.
Para 3.20 – "The Government's strategy for improving accessibility for disabled people is set out in Transport for Everyone: an action plan to improve accessibility for all. In particular: ▪ The Government will continue to work to ensure that the bus and train fleets comply with modern access standards by 2020, and to improve rail station access for passengers with reduced	GAL's aim is for the Airport to be the UK's most accessible airport, giving everybody an equal opportunity to fly. The station has step-free level access to all platforms via lifts and escalators. The Station Project will add five new lifts and eight escalators.

[2] The Department for Transport published a revised draft National Policy Statement for National Networks ("NPSNN") for consultation on 14 March 2023. The draft NPSNN confirms in paragraph 1.16 that the existing NPSNN remains the relevant government policy and has full force and effect in relation to any applicable applications for development consent accepted for examination before designation of the updated NPSNN. The draft NPSNN further notes in paragraph 1.17 that the emerging draft NPSNN is capable of being an important and relevant consideration in the Secretary of State's decision making process. As such, the Applicant will continue to monitor the progress of the NPSNN review process and incorporate any updates to the Project's application documentation where considered appropriate in due course.

Summary of NPS requirement	How and where considered in the ES
mobility. The private car will continue to play an important role, providing disabled people with independence where other forms of transport are not accessible or available. ▪ The Government expects applicants to improve access, wherever possible, on and around the national networks by designing and delivering schemes that take account of the accessibility requirements of all those who use, or are affected by, national networks infrastructure, including disabled users."	There are dedicated drop-off points on forecourts for Blue Badge holders or passengers who have booked assistance at the Airport. GAL also provides Blue Badge bays in short-stay, long-stay and for valet parking.
Para 3.22 – "Severance can be a problem in some locations. Where appropriate applicants should seek to deliver improvements that reduce community severance and improve accessibility."	Surface access improvement works to reduce community severance and improve accessibility are set out in Section 12.8 of this chapter.
Para 4.61 and 4.62 – "The applicant should undertake an objective assessment of the impact of the proposed development on safety including the impact of any mitigation measures. This should use the methodology outlined in the guidance from Department for Transport (WebTAG) and from the Highways Agency." "They should also put in place arrangements for undertaking the road safety audit process. Road safety audits are a mandatory requirement for all trunk road highway improvement schemes in the UK (including motorways)."	The assessment has been undertaken in line with TAG guidance and based on DMRB (see Section 12.4). Road Safety Audits have been undertaken for the highway improvements proposed as part of the Project (see Section 12.7.3).
Para 5.201 to 5.212 – This section is on Impacts on Transport Networks and references the applicant to have regard to policies in local plans, consulting with relevant authorities, support for other transport modes, assessing impacts and mitigation in EIA.	Assessment in this chapter is undertaken in accordance with guidance and policies in local plans (see later in this section), consultation with authorities (Section 12.3) and describes the assessment of the effects of the Project (Section 12.9) and whether mitigation is required.

National Planning Policy Framework

12.2.10 The National Planning Policy Framework (NPPF) (Department for Levelling Up, Housing and Communities, formerly Ministry of Housing, Community and Local Government, 2021) sets out the planning policies for England. At the heart of the Framework is a presumption in favour of sustainable development.

12.2.11 The NPPF states the following.

'Transport issues should be considered from the earliest stages of plan-making and development proposals, so that:

a) the potential impacts of development on transport networks can be addressed;

b) opportunities from existing or proposed transport infrastructure, and changing transport technology and usage, are realised – for example in relation to the scale, location or density of development that can be accommodated;

c) opportunities to promote walking, cycling and public transport use are identified and pursued;

d) the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains; and

e) patterns of movement, streets, parking and other transport considerations are integral to the design of schemes, and contribute to making high quality places.' (para 104).

'In assessing sites that may be allocated for development in plans, or specific applications for development, it should be ensured that:

a) appropriate opportunities to promote sustainable transport modes can be – or have been – taken up, given the type of development and its location;

b) safe and suitable access to the site can be achieved for all users;

c) the design of streets, parking areas, other transport elements and the content of associated standards reflects current national guidance, including the National Design Guide and the National Model Design Code 46; and

d) any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree.' (para 110).

'Development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe' (para 111).

12.2.12 The National Planning Practice Guidance (NPPG) (Department for Levelling Up, Housing and Communities, formerly Ministry of Housing, Communities and Local Government, 2019) supports the NPPF and provides guidance across a range of topic areas. This includes general guidance on 'Travel Plans, Transport Assessments and Statements' (2014). The guidance sets out the overarching principles of the documents, how they relate to each other and why they are important. The key principles of preparing the reports are provided in the guidance together with when they are required and what information they should include.

Decarbonising transport

12.2.13 Decarbonising Transport: A Better, Greener Britain (Department for Transport, 2021) was published in July 2021 and sets out the government's commitments and the actions to decarbonise the transport system in the UK.

12.2.14 The plan includes details regarding:

- a pathway to achieving net zero transport in the UK;
- the wider benefits net zero transport can deliver; and
- the principles that underpin the government's approach to delivering net zero transport.

12.2.15 The plan follows on from Decarbonising Transport: setting the challenge, published in March 2020, which identifies the scale of additional reductions needed to deliver transport's contribution to legally binding carbon budgets and delivering net zero by 2050.

Other relevant national planning policy

12.2.16 Other relevant national documents include the following.

- Aviation Policy Framework (Department for Transport, 2013) - This provides the recommendation to produce Airport Surface Access Strategies (ASASs) to set out: targets for increasing the proportion of journeys made to the airport by public transport for both airport workers and passengers; the strategy to achieve those targets; and a system whereby the forum can oversee implementation of the strategy.
- Road Investment Strategy 2: 2020-2025 (Department for Transport, 2020) – sets out the five-year strategy for investment in and management of the strategic road network.
- The Strategic Road Network and the Delivery of Sustainable Development (Department for Transport, 2013a).
- South East Route Control Period 6 Delivery Plan, Network Rail, March 2019 – This includes reference to support for a 45% rail mode share target for Gatwick Airport.
- Strategic Business Plan 2019 – 2024 (Network Rail, 2018) – Sets out the business plan for Control Period 6 (CP6).
- Periodic Review 2018 (PR18) (Network Rail, 2018) – PR18 establishes outputs and funding for CP6 from 1 April 2019 to 31 March 2024.
- Flightpath to the Future (Department for Transport, 2022a) – A strategic framework for the aviation section that supports the DfT's vision for a modern, innovative, and efficient sector over the next 10 years.
- The Jet Zero Strategy (Department for Transport, 2022b) – Sets out a commitment that the DfT will encourage passengers and employees to travel by sustainable modes of transport to and from the Airport where possible.

Local planning policy

12.2.17 Gatwick Airport lies in the administrative area of Crawley Borough Council and adjacent to the boundaries of Mole Valley District Council to the north west, Reigate and Banstead Borough Council to the north east and Horsham District Council to the south west. From the Airport, the administrative area of Tandridge District Council is located approximately 1.9 km to the east, Mid Sussex District Council approximately 2 km to the south east. Other local authorities are East Sussex (12 km southeast) and Kent (15 km east). The

Airport is located within West Sussex County Council and is adjacent to Surrey County Council to the north.

12.2.18 The relevant local planning policies applicable to traffic and transport based on the extent of the study area for this assessment and taken into account for this assessment are listed in Table 12.2.2.

Table 12.2.2: Local planning policy

Administrative Area	Plan	Policy
Adopted Policy		
West Sussex	West Sussex County Council Highway Infrastructure Policy and Strategy 2018	West Sussex's approach to transport includes four strategies which are: promoting economic growth; tackling climate change; providing access to services, employment and housing; and improving safety, security and health. Also, West Sussex's Gatwick Airport Strategy includes supporting initiatives that will increase sustainable transport mode share for passengers and employees and ensure community needs are taken into account.
	West Sussex Walking and Cycling Strategy 2016-2026	
	West Sussex Transport Plan 2022-36	
Surrey	Surrey Local Transport Plan 2022-2032 (LTP4)	The Local Transport Plan aims to significantly reduce transport carbon emissions to meet the net zero challenge and to support delivery of Surrey's other priority objectives of enhancing Surrey's economy and communities, as well as the health and quality of life of our residents.
East Sussex	East Sussex Local Transport Plan 2011-2026	The high-level objectives are to improve economic competitiveness and growth; improve safety, health and security; tackle climate change; improve accessibility and enhance social inclusion; and improve quality of life.
Kent	Kent Local Transport Plan 2016-2031	The ambition for Kent is to deliver safe and effective transport, ensuring that all Kent's communities and businesses benefit, the environment is enhanced and economic growth is supported.
Mid Sussex	Mid Sussex Infrastructure Delivery Plan 2016	This document supports the objectives outlined in the emerging District Plan 2014-2031 and provides detail on infrastructure needs to support new development.
	Mid Sussex District Plan 2014-2031	Policy DP21 Transport
Crawley	Crawley Borough Local Plan 2015-2030	IN3 Development & Requirements for Sustainable Transport
		IN4 Car & Cycle Parking Standards
		IN5 The Location & Provision of New Infrastructure

Administrative Area	Plan	Policy
		GAT1 Development of the Airport with a Single Runway
		GAT3 Gatwick Airport Related Parking
Reigate & Banstead	Reigate and Banstead Local Plan: Core Strategy 2014 (Reviewed in 2019)	CS17 Travel Options & Accessibility
	Reigate and Banstead Local Plan: Development Management Plan (2019)	TAP1 Access, Parking and Servicing
		TAP2 Airport Car Parking
		HOR09 Horley Strategic Business Park
Mole Valley	Mole Valley Core Strategy 2009	CS18 Transport Options & Accessibility
	Mole Valley Local Plan 2000	RUD28 Off Airport Carparking
		MOV2 The Movement Implications of New Development
		MOV5 Parking Standards
Horsham	Horsham District Planning Framework (excluding South Downs National Park) 2015	Policy 40 Sustainable Transport
		Policy 41 Parking
Tandridge	Core Strategy 2008	CSP12 Managing Travel Demand
	Tandridge Local Plan Part 2: Detailed Policies 2014-2029	DP5 Highway Safety & Design
Emerging Policy		
Crawley	Draft Crawley Borough Local Plan 2021-2037: Regulation 19 Consultation	SD1 Presumption in Favour of Sustainable Development
		SD2 Enabling Healthy Lifestyles and Wellbeing
		ST1 Development and Requirements for Sustainable Transport
		ST2 Car and Cycle Parking Standards
		ST3 Improving Rail Stations
		ST4 Safeguarding of a Search Corridor for a Crawley Western Relief Road
		GAT1 Development of the Airport with a Single Runway
		GAT3 Gatwick Airport Related Parking
Tandridge	Our Local Plan: 2033 (Regulation 22	TLP50 Sustainable Transport & Travel
		TLP51 Airport Related Parking

Administrative Area	Plan	Policy
	Submission)	
Mole Valley	Draft Future Mole Valley 2020-2037: Proposed Submission Version	INF1 Promoting Sustainable Transport and Parking
Horsham	Draft Horsham District Local Plan 2019-2036: Regulation 18 Consultation	Strategic Policy 41 – Infrastructure Provision
		Strategic Policy 42 – Sustainable Transport
		Policy 43 – Parking
		Policy 44 – Gatwick Airport Safeguarded Land

12.3. Consultation and engagement

12.3.1 In September 2019, GAL submitted a Scoping Report to the Planning Inspectorate, which described the scope and methodology for the technical studies being undertaken to provide an assessment of any likely significant effects and, where necessary, to determine suitable mitigation measures for the construction and operational periods of the Project. It also described those topics or sub-topics which are proposed to be scoped out of the EIA process and provided justification as to why the Project would not have the potential to give rise to significant environmental effects in these areas. The Scoping Report is provided in **ES Appendix 6.2.1: Scoping Report** (Doc Ref. 5.3).

12.3.2 Following consultation with the statutory bodies, the Planning Inspectorate (on behalf of the Secretary of State) provided a Scoping Opinion on the 14 October 2019. The Scoping Opinion is provided in **ES Appendix 6.2.2: Scoping Opinion** (Doc Ref. 5.3).

12.3.3 Key issues raised during the scoping process specific to traffic and transport are listed in Table 12.3.1, together with details of how these issues have been addressed within the ES. See **ES Appendix 12.3.1: Summary of Stakeholder Scoping Responses – Traffic and Transport** (Doc Ref. 5.3) for a more detailed summary of stakeholder consultation and responses.

Table 12.3.1: Summary of scoping responses

PINS Ref	Summary of comment	How/where addressed in ES
2.3.6	There is limited information in the Scoping Report relevant to the North and South terminal junction access improvements.	A description of the highway works is included in Chapter 5: Project Description.
3.3.18	Any mitigation relied upon for the purposes of the assessment should be explained in detail within the ES. The likely efficacy of the mitigation proposed should be explained with reference to residual effects. The ES should also address how any mitigation proposed is secured.	See Section 12.7.3 on the mitigation and enhancement measures which are relied upon for the purposes of this assessment and how they will be secured.

PINS Ref	Summary of comment	How/where addressed in ES
4.6.3	The ES should clearly present the periods over which data has been collected and where previous sources are being relied upon, justification should be provided to demonstrate the suitability of such data.	See Section 12.4 on data collection and Section 12.6 on the justification of the data sources.
4.6.4	Any such assumptions which influence the definition of future baseline conditions (passenger and employee modal shares) should be clearly presented in the ES and be subject to sensitivity testing where applicable such that consideration is given to different mode share scenarios in assessing a worst-case scenario. The Scoping Report makes no reference to the provision of travel plans associated with the Project (for example in relation to staff travel). The ES should explain the need for/absence of such plans in delivering mitigation measures in order to achieve the predicted and assessed modal shares.	See Section 12.5 on assumptions and limitations of the assessment. Section 12.6 covers future baseline conditions. Section 12.7.3 covers mitigation which includes developing an appropriate Travel Plan.
4.6.5	The ES should assess the impacts to the rail network taking into account the anticipated capacity and projected growth from increased passenger and employee movements (as well as nonairport user increases as a result of the Proposed Development). Cumulative impacts with planned and necessary developments to achieve this anticipated growth should also be assessed in demonstrating the validity of capacity assumptions set out in the ES.	The rail capacity as well as the station modelling undertaken in Legion, both reported in this chapter (see 'effects on public transport amenity' section for each assessment year), assume a proportion of visitors (meeter-greeters, well-wishers) as well as commuter use of Gatwick Airport railway station and rail services. The strategic modelling of rail capacity has been developed using a number of sources and includes all journeys made by airport passengers, airport employees and all other users of Gatwick Airport railway station and is reported under each assessment year. Cumulative effects are addressed in Section 12.11.
4.6.6	The Applicant should ensure that the relationship between the TA and the scope of the traffic and transport assessment is fully explained and justified within the ES.	See paragraphs 12.1.3 and 12.1.4

PINS Ref	Summary of comment	How/where addressed in ES
4.6.7	Diagram 7.6.1 splits airport-related highway demand into passenger and employee trips, but does not set out how trips by airport supplier goods delivery trips and visitors to the airport (people using the airport hotels without being air passengers or visitors to on-airport businesses) will be accounted for in the modelling.	Diagram 7.6.1 of the ES Scoping Report has been updated. Airport supplier, cargo and logistics, ie delivery trips, as well as non-airport users including visitors and commuters are included in the modelling as shown in Diagram 12.4.1. See also Section 12.5 on assumptions and limitations of the assessment.
4.6.8	It is clear that significant engagement is planned and ongoing with the relevant consultation bodies (particularly as part of the surface access topic working group). Agreements reached with consultation bodies on the Applicant's methodological approach to the assessment (as part of the topic working group) should be documented in the ES where relevant.	See Section 12.3 on consultation and engagement.
4.6.9	The assessment should demonstrate how the worst-case construction and operational assessment scenarios and assumptions are considered with regard to trip generation and modal splits. The construction and operational assessment should clearly set out how impacts associated with closures or delays on the M23, M25 or the A217 have been considered. In particular, the potential for increased traffic on the villages of Hookwood and Charlwood should be specifically considered given anticipated duration of the proposed construction works to the north and south terminal junctions and the impacts on these villages in the event of a closure(s) during operation.	See Section 12.5 on assumptions and limitations of the assessment, including on construction and operational traffic. The assessment of effects during the construction and operational phases is presented in Section 12.9. The airfield and highway construction assessments take into account Hookwood and Charlwood as they are within the highway study area. Information about the approach to construction and managing construction operations can be found in **ES Appendix 5.3.2: CoCP Annex 3 - Outline Construction Traffic Management Plan** (Doc Ref. 5.3).
4.6.10	Assumptions around the increased movements of freight during operation should be explained and ideally quantified.	The highway modelling used to inform this chapter includes freight and logistics movements related to the Airport. These have been uplifted in line with the projected increase in freight tonnage through the Airport in the future baseline and with Project scenario.

PINS Ref	Summary of comment	How/where addressed in ES
4.6.11	The Inspectorate is unclear what is meant by the creation of an "integrated travel application for passengers and staff…facilitating Mobility-as-a-Service".	GAL envisages an integrated travel planning tool, either hosted on or directed via the Airport's website and accessible on a mobile device through an app. Using this app, passengers, customers, and employees will be able to choose across a range of surface transport modes, enabling Mobility-as-a-Service, whereby a person can choose across a range of modes to access the Airport weighing up next available service, frequency of service and cost in one integrated platform. This could provide more accessible information about travel choices and improve the quality of the journey, but is not included as a specific mitigation in the assessment reported in this chapter nor relied upon for any of the assessment.
4.6.12	The ES should explain the relevant provisions for the Applicant to monitor surface access impacts. No further information is provided as to the metrics of such monitoring, how "success" will be determined and what remedial actions (if any) could be involved.	See Section 12.7.3 on the mitigation and enhancement measures. The mode share and monitoring commitments are set out in the **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3). GAL is committed to producing Annual Monitoring Reports (AMR). If the AMR shows that the mode share commitments are not met, the SACs document set out the remedial actions that would be taken.
4.6.13	The Scoping Report proposes that a Construction Traffic Management Strategy (CTMS), will be implemented to deliver mitigation measures. Any assumptions made in this regard should be set out in the ES, which should reflect a worst-case scenario in the absence of such commitments being guaranteed. In particular, the description of the Proposed Development in the ES should explain the	See Section 12.5 on assumptions and limitations. Chapter 5: Project Description includes information on the proposed construction approach and **ES Appendix 5.3.2: Outline Code of Construction Practice** (Doc Ref. 5.3) describes the approach to construction. An Outline Construction Traffic Management Plan is provided in **ES Appendix 5.3.2: Outline Code of Construction Practice** (Doc Ref. 5.3).

PINS Ref	Summary of comment	How/where addressed in ES
	extent to which existing infrastructure would allow for such deliveries by rail.	For the purposes of the ES no assumption has been made regarding the ability to secure deliveries by rail, ensuring a robust case for the impacts of construction traffic. However, this option will be pursued in due course through engagement with Network Rail and third parties should Project consent be granted.
4.6.14	Paragraphs 5.3.14 to 5.3.16 of the Scoping Report explains that there is some uncertainty around the need for and location of a Construction Logistics Consolidation Centre. Where such a facility is required, volumes of trips between this compound and main construction locations should be presented. Where uncertainty exists, a worst case should be assumed with respect to additional traffic generation on the local and strategic highway networks. The Applicant should have regard to Transport for London's Construction and Logistics Plan (CLP) guidance in this respect.	See Section 12.5 on assumptions and limitations. The Project does not include a Construction Logistics Consolidation Centre. GAL has had regard to Transport for London's Construction and Logistics Plan (CLP) guidance.

12.3.4 The PEIR was issued to inform the statutory consultation carried out on the Project in Autumn 2021. It presented the preliminary findings of the EIA process for the Project at that time. The consultation responses specific to the Traffic and Transport assessment and the way in which they have been taken into account in this ES chapter are set out in Table 12.3.2. Further detail about the consultation process for the Project and way the consultation responses have been addressed is provided in the separate Consultation Report.

Table 12.3.2: Summary of consultation in response to the PEIR

Consultee	Key themes	How/where taken into account in ES
Surface Access Commitments (SACs) and mode share commitments		
West Sussex CC, Crawley BC, East Sussex CC, Mayor of London	Targets should be ambitious but realistic and supported by evidence; Targets should reflect an ambition for zero growth in highway trips;	The **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3) set out the mode share commitments, which are summarised in Section 12.8. The SACs are informed and supported by extensive transport modelling.

Consultee	Key themes	How/where taken into account in ES
	Targets for low emissions vehicles should be separate from sustainable modes; Targets should exclude zero emission vehicles/have specifics for zero emission vehicles	
Surrey CC, West Sussex CC, Sevenoaks DC, Chichester DC, Tonbridge BC, Tunbridge Wells BC, East Sussex CC	Insufficient information provided to demonstrate how mode shares will be achieved; The package of measures is inadequate	Further information is now provided on the The **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3), and the package of measures, see Section 12.8.
Surrey CC, West Sussex CC, Mole Valley DC, Horsham DC, Mid Sussex DC, Tunbridge Wells BC, Mayor of London	Limited detail provided on activities and measures to promote modal shift; Insufficient focus on sustainable transport modes/mitigation is too focused on vehicles; Measures should go beyond site and highway upgrades; Detailed proposals required for better early morning and late evening public transport; Measures should include increased charging and reduced parking supply; Measures should include journey planning and ticketing initiatives	The measures for The **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3) have been refined since the statutory consultation and include additional public transport, active travel and charging measures.
Multiple Surrey CC, Reigate & Banstead BC, Horsham DC, East Sussex CC	Unclear what measures will be taken if targets are not met; Need to identify how, where and when surface access activity will be monitored; Need to identify proposals for independent scrutiny	The **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3) contain commitments for monitoring travel patterns and identifying whether the mode share commitments are met. The SACs identify actions should the mode share commitments not be met, and this is summarised in Section 12.8.
Active Travel proposals		

Consultee	Key themes	How/where taken into account in ES
Surrey CC, West Sussex CC, Crawley BC, Mole Valley DC, Chichester DC	Better active travel proposals needed; Would expect an overall increase in provision for walking and cycling facilities as part of the Project; Highway proposals do not facilitate access by active travel	The highway proposals have been revised since the statutory consultation and now include additional active travel infrastructure. They are described in Section 12.7.312.8.
Bus and coach proposals		
Crawley BC	More ambitious proposals are needed	The measures which support achieving the committed mode shares in the **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3) have been refined since the statutory consultation and include additional public transport proposals. They are described in Section 12.8.
Surrey CC, Mid Sussex DC	Assumes operators will react to demand rather than proactively investing in shared travel; No detail provided on what is assumed in the model re operators increasing services to meet demand	GAL is committed to providing enhanced coach and bus services as part of the **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3), together with financial support to enable these services, including the potential to provide funding from GAL's Sustainable Transport Fund. It is reasonable to assume that operators would respond to demand in future. Details of the assumptions are now included and set out in the **Transport Assessment** (Doc Ref. 7.4) and its annexes.
Wealden DC, Waverley BC East Sussex CC Mayor of London	Like to see support for further sustainable transport provision to rural districts. Should take account of shift working and provide evening and weekend services Improve bus services between LGW and northern East Sussex Provide new bus services to parts of London with poor rail access	The public transport proposals are described in the **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3) and in Section 12.8 and have been tested to ensure they make an effective contribution to achieving the mode share commitments whilst providing reasonable value for money.

Consultee	Key themes	How/where taken into account in ES
Rail		
Network Rail	Greater understanding for crowding assessment methodology is required, with information provided not just for peak hours	The methodology is described in Section 12.4 and has been discussed with Network Rail as part of engagement. Assessment outcomes are reported in Section 12.9. Further technical information is provided in the TA.
Network Rail Surrey CC, West Sussex CC, Reigate & Banstead BC, Mid Sussex DC Network Rail, Mayor of London	Croydon Area Remodelling Scheme (CARS) is still at Outline Business Case stage and therefore delivery is not guaranteed Need to test implications if other rail schemes (eg CARS, North Downs Line electrification) do not come forward; Reliance should not be placed on schemes with significant funding uncertainty (eg CARS); Review list of schemes included in base given industry review of effects of Covid	Noted; the CARS proposals are no longer included in the future baseline modelling. The Strategic Modelling Report contains the Uncertainty Log for future infrastructure and development schemes and this has been updated. This **Transport Assessment Annex B – Strategic Transport Modelling Report** (Doc Ref. 7.4) is an annex to the TA.
Crawley BC	More ambitious proposals for station	Modelling has been undertaken for the station and the assessment is included in Section 12.9. Further technical information is contained in the **Transport Assessment Annex D – Station and Shuttle: Legion Modelling Report** (Doc Ref. 7.4) to the TA.
Tonbridge BC	No ambition shown to increase rail mode share beyond current percentage	Gatwick already has the highest rail mode share of any major UK airport, and the highest number of annual rail passengers. The **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3) commit to 55% of air passenger journeys being made by public transport by the summer period after the third anniversary of the opening of the new northern runway. This is in excess of the 45% public transport mode share recorded in 2017/2018. The public transport

Consultee	Key themes	How/where taken into account in ES
		mode share includes journeys by rail, bus and coach and this provides flexibility for GAL to promote the use of a range of different sustainable transport options in order to achieve its mode share commitments.
Multiple	Improved links between Gatwick and Kent sought to reduce reliance on and congestion on the road network	The public transport proposals are described in the **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3) and in Section 12.8 and include new coach routes between Gatwick and Kent.
Car parking		
Multiple Crawley BC, Horsham DC	Need to produce a car parking strategy	The car parking provision as part of the Project is described in Chapter 5 of this ES and summarised in Section 12.6. The **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3) set out the commitments on car parking provision and GAL expects to refine the airport car parking strategy as part of the future ASAS.
Multiple Surrey CC, Crawley BC, Horsham DC, Mole Valley DC, East Sussex CC, Mayor of London	Parking ratio for passenger and overall is increasing; Provision of 18,500 extra parking spaces is excessive/counterproductive; Require justification for number of spaces proposed	The parking proposals for the Project have been reduced since the statutory consultation. The Project would result in a net increase of up to 1,100 car parking spaces, as set out in Chapter 5 of this ES.
Mayor of London	Charging should be increased for parking and forecourt to counter kiss and fly/taxi use	GAL regularly reviews and amends its parking charges in response to anticipated demand at different times of year and needs to be able to retain the flexibility to reflect the market for airport parking alongside GAL's mode share commitments. As part of the **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3), GAL commits to using parking charges to influence passenger travel choices, to the extent necessary to achieve the mode share commitments. See also Section 12.8.
Surrey CC	Delivery of substantial proportion of the 18,500 spaces before the highway	The parking proposals have been reduced since the statutory consultation. The Project would result in a net increase of up to 1,100

Consultee	Key themes	How/where taken into account in ES
	scheme is implemented is a disincentive to mode shift	car parking spaces, as set out in Chapter 5 of this ES.
Surrey CC	What mechanism will be in DCO to secure providing "only those spaces that are required to meet demand"?	The parking proposals have been reduced since the statutory consultation. The Project would result in a net increase of up to 1,100 spaces. The usage of the car parks will be monitored as part of the **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3), alongside the ability for GAL to adjust its parking charges to influence demand at different times of day and year. Outcomes will be reported in the AMR each year.
West Sussex CC	Provide rationale for number of staff spaces to be provided and pricing strategy for these	The **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3) set out the commitments on staff parking and the approach to managing staff single-occupancy car trips will be set out in the future ASAS in due course. A parking charge has been applied for modelling purposes and assumes no reduction in parking spaces, although the SACs allow GAL to manage such trips in other ways in order to achieve the mode share commitments.
National Highways	The location of 18,500 extra spaces does not appear to have been considered in terms of potential impact on the SRN	The modelling is described in the **Transport Assessment** (Doc Ref. 7.4) and the **Transport Assessment Annex B – Strategic Transport Modelling Report** (Doc Ref. 7.4) which is annexed to the TA including the approach taken to the location of additional parking spaces in the model.
Highway proposals		
Surrey CC, Reigate & Banstead BC	Highway works should be complete before runway is operational	The operation of the highway network and effects of the Project are identified in Section 12.9.
Surrey CC	Design at North Terminal is very complex	The design of the highway proposals has been revised since the Autumn 2021 statutory consultation in discussion with National Highways and the local highway authorities. See also Table 12.3.3

Consultee	Key themes	How/where taken into account in ES
National Highways	Unclear why there are no other junctions where improvements are required. Need to be satisfied there are no other locations on the strategic road network	The operation of the highway network and effects of the Project are identified in Section 12.9.
National Highways	Highway schemes at North and South Terminals are not acceptable and have not been demonstrated to deliver a safe and reliable strategic road network	The design of the highway proposals has been revised since the Autumn 2021 statutory consultation in discussion with National Highways and the local highway authorities. See also Table 12.3.3.
National Highways	Need to understand the optioneering process and agree any departures from standard, futureproofing provisions and construction and phasing proposals	The design of the highway proposals has been revised since the Autumn 2021 statutory consultation including consideration of the matters raised by National Highways. See also Table 12.3.3.
National Highways, Surrey CC, Reigate & Banstead BC	Further information requested on how Horley Business Park access proposals tie into South Terminal Roundabout proposals	There are no firm proposals for Horley Business Park and it is not included in the core scenario given its level of uncertainty. This approach is in keeping with TAG Unit M4. The Horley Business Park is considered as part of the cumulative effects assessment; see Section 12.11 for more information. The South Terminal Roundabout proposals do not preclude the opportunity for access to be provided for the Business Park should it be necessary for that development.
Surrey CC	Not clear whether highway improvements would be needed anyway given the substantial growth forecast without the Project	The assessment presented in Section 12.9 includes modelling for the future baseline. The VISSIM modelling work shows that conditions on the network in the 2032 future baseline scenario are approaching capacity and that the addition of demand from the Project would require the implementation of the highway works which form part of it. Further information is contained in the TA. GAL has no plans to implement the proposed highway scheme if the Project does not proceed.
Assessment		

Consultee	Key themes	How/where taken into account in ES
Reigate & Banstead BC	Clarification/further details on assessment and its outcomes	The assessment methodology is covered in Sections 12.4 and 12.5, inputs in Sections 12.7 and 12.8 and outcomes in Sections 12.9 to 12.12.
Surrey CC, West Sussex CC, Mayor of London	Congestion thresholds used in assessment to identify adverse impacts are too generous and will mask severity of negative impacts	Congestion thresholds in the assessment of driver delay have been revised as set out in Section 12.4.
Surrey CC, Horsham DC, East Sussex CC	Study area for TA is same as for EIA but TA study area should include all locations which are at or nearing capacity; Define study area for road traffic in ES	The study area covers the extent of the Area of Detailed Modelling within the strategic transport model and is identified in Section 12.4.
Horsham DC, East Sussex CC	Provide information on car and taxi occupancy assumptions in ES/TA	A range of occupancy factors has been applied based on journey purpose and trip distance as part of the modelling work. This information is provided in the **Transport Assessment Annex B – Strategic Transport Modelling Report** (Doc Ref. 7.4).
West Sussex CC	Assessment of severance fails to take account of impacts of changes in composition of traffic/increasing numbers of HGV	As Section 12.4 describes, changes in the percentage of HGV in traffic flows is taken into account when considering effects on pedestrian amenity.
West Sussex CC, Crawley BC, Reigate & Banstead BC, Horsham DC, Mid Sussex DC	Site-specific impacts of emerging development sites in the area need to be considered – at West of Ifield, Horley Business Park, Gatwick Green – as part of cumulative impact assessment	The three developments (West of Ifield, Horley Business Park and Gatwick Green) are not included in the core scenario given their present level of uncertainty. This approach is in keeping with TAG Unit M4. These developments are considered in the cumulative effects assessment described in Section 12.11.
Modelling		
National Highways	Modelling needs to be completed to demonstrate that impacts of the scheme are adequately mitigated	Modelling has been progressed since the statutory consultation, including extensive engagement with National Highways and the local highway authorities. Full details are provided in the **Transport Assessment** (Doc Ref. 7.4) and its appendices.

Consultee	Key themes	How/where taken into account in ES
Surrey CC, Mole Valley DC, Tandridge DC, Mayor of London	Requests to extend strategic model and microsimulation model	The extents of the strategic and microsimulation models have not changed since the Autumn 2021 statutory consultation. The strategic modelling at PEIR stage did not indicate that significant impacts and effects are likely to occur beyond the extents of the model at that time. The microsimulation model is intended to address the operation of the network immediately around the airport in more detail. Where potential impacts have been identified beyond the extent of the microsimulation model, further investigation has been undertaken to identify whether these would lead to significant environmental effects, as described in Section 12.9.
Tandridge DC	Traffic surveys should be updated	Additional data collection has not been undertaken because the effect of the pandemic, at the time the surveys would need to have been taken, would lead to unrepresentative results
Tandridge DC	Disagree there will be no local impact – eg A22	The operation of the highway network and effects of the Project are identified in Section 12.9.
Horsham DC, East Sussex CC	Concern about hours selected and whether model calibration and validation will be updated	Model calibration and validation has been undertaken and documented in Local Model Validation Reports and is summarised in **Transport Assessment Annex B – Strategic Transport Modelling Report** (Doc Ref. 7.4) and **Transport Assessment Annex C – VISSIM Forecasting Report** (Doc Ref. 7.4) annexed to the **Transport Assessment** (Doc Ref. 7.4).
National Highways, Surrey CC, Mayor of London	Concern that transport model calibration and validation is not TAG compliant	Model calibration and validation has been undertaken and documented in Local Model Validation Reports which have been shared with these consultees, and is summarised in **Transport Assessment Annex B – Strategic Transport Modelling Report** (Doc Ref. 7.4) and **Transport Assessment Annex C – VISSIM Forecasting Report** (Doc Ref. 7.4) annexed to the **Transport Assessment** (Doc Ref. 7.4).

Consultee	Key themes	How/where taken into account in ES
Horsham DC, East Sussex CC	Further justification for use of June for assessment and information on seasonality	The assessment is based on a June busy day for air passenger movements, overlaid on a typical June day for the background operation of the highway network. This represents conditions anticipated during non-school holiday periods of the year, when background traffic levels are at their greatest and air passenger demand is also at some of its highest levels of the year. The June weekday air passenger demand used in the assessment is only expected to be exceeded on 7% of weekdays in the year, which are likely to occur in July and August when background traffic is lower than in June, because of the summer holiday period. Further information is provided in Section 12.5.
West Sussex CC, Mid Sussex DC	Models include some Network Rail and National Highways schemes that are not fully funded or consented – including CARS and Lower Thames Crossing – these should be removed from the modelling	The Uncertainty Log for future infrastructure and development schemes has been updated. This is contained in the **Strategic Transport Modelling Report** (Doc Ref. 7.4), an annex to the **Transport Assessment** (Doc Ref. 7.4). Among others, the CARS proposals are no longer included in the future baseline modelling. The Lower Thames Crossing is considered sufficiently certain to be included in the core scenario. The approach to the Uncertainty Log is in accordance with TAG Unit M4.
Mid Sussex DC	Unclear how Gatwick Mode Choice Model has been developed	The Local Model Validation Report for the strategic model suite provides further detail. The TA and its annex **Strategic Transport Modelling Report** (Doc Ref. 7.4) explain the model suite in further detail.
Horsham DC, East Sussex CC	Explain how unauthorised off-airport parking has been taken into account in modelling and model outcomes	The number of off-airport parking spaces is assumed to remain constant in the modelling, as GAL is not able to enforce against unauthorised off-airport car parking sites and therefore cannot assume this reduction for the purposes of modelling. However, GAL is keen to ensure that the Project does not lead to traffic nuisance in the surrounding neighbourhoods. As part of the **ES Appendix 5.4.1: Surface Access**

Consultee	Key themes	How/where taken into account in ES
		Commitments (Doc Ref. 5.3), GAL will therefore commit to provide funding to support additional parking controls on surrounding streets if considered necessary by the relevant local authority; and/or support local authorities in their enforcement actions against unauthorised off-airport passenger car parking.
Mayor of London	Only a small proportion of South London is included in the modelled area – concern that full impacts have not been assessed	Analysis shows that only a small number of vehicle trips travel to/from destinations north of the Area of Detailed Modelling in south London. The public transport model covers all rail/underground services within London. The model extent is therefore considered appropriate to assess the impact of the Project.
Surrey CC, West Sussex CC, Horsham DC, East Sussex CC, Mayor of London	Request for detailed technical modelling reports to be made available	Detailed technical information is provided in the TA and its appendices, including the **Transport Assessment Annex B – Strategic Transport Modelling Report** (Doc Ref. 7.4), **Transport Assessment Annex C – VISSIM Forecasting Report** (Doc Ref. 7.4) and **Transport Assessment Annex D – Station and Shuttle: Legion Modelling Report** (Doc Ref. 7.4).
Surrey CC, West Sussex CC, Horsham DC, Mole Valley DC, Mid Sussex DC	Sensitivity tests suggested: - changes since base 2016 - changes due to Covid 19 (passengers and staff) - other major planned development - busy airport days, busy highway days and busy PT days - different mode share scenarios - a 'high demand' forecast scenario	Sensitivity tests to examine the implications of higher and lower than the committed mode shares have been undertaken. These have been discussed with the relevant highway authorities. Planned developments are included in the future baselines in accordance with Tag Unit M4 and other specific major planned developments (Horley Business Park, West of Ifield and Gatwick Green) have been considered as part of in the cumulative effects assessment reported in Section 12.11.
Construction		
West Sussex CC, Reigate & Banstead BC,	Construction traffic routing – further details on routes and safeguards;	A draft Code of Construction Practice (CoCP) is contained in **ES Appendix 5.3.2: Code of Construction Practice** (Doc Ref.

Consultee	Key themes	How/where taken into account in ES
Horsham DC, Mole Valley DC, East Sussex CC, Tandridge DC, Waverley BC	Need to agree temp diversion routes during construction (traffic)	5.3) which draws together the proposed mitigation measures during the construction period. An Outline Construction Traffic Management Plan (OCTMP) is contained in **ES Appendix 5.3.2: CoCP Annex 3 - Outline Construction Traffic Management Plan** (Doc Ref. 5.3). The assessment described in Section 12.9 covers both the airfield and highway works construction periods.
National Highways, West Sussex CC, Mid Sussex DC	Provide modelling and construction phasing and traffic management information	The assessment considers the effects of the Project during airfield and highway construction periods. Indicative construction sequencing, programming and traffic management principles are contained in the Outline Construction Traffic Management Plan (OCTMP) and related documents in **ES Appendix 5.3.2: CoCP Annex 3 - Outline Construction Traffic Management Plan** (Doc Ref. 5.3).

12.3.5 In June 2022 an additional consultation was undertaken to update stakeholders and the local community on the ongoing work and refinement to the Project proposals, which included a targeted, statutory consultation on the design changes to the proposed highway improvement changes. As these changes to the Project could lead to new or materially different significant environmental effects compared to those reported in the PEIR, an updated PEI was issued as part of this additional consultation. The consultation responses specific to the Traffic and Transport assessment and the way in which they have been taken into account in this ES chapter are set out in Table 12.3.3. Further detail about the consultation process for the Project and way the consultation responses have been taken into account is provided in the separate Consultation Report.

Table 12.3.3: Summary of consultation in response to the updated PEI

Consultee	Key themes	How/where taken into account in ES
Surface Access Commitments (SACs) and mode shares		
Surrey CC, Crawley BC, Tandridge DC, Mole Valley DC	Not clear whether ASAS focuses sufficiently on non-car modes sufficiently and does enough to improve on the future baseline.	Section 12.6 describes the current ASAS and the interventions which are tested in the future baseline. The SACs for the Project (**ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3))

Consultee	Key themes	How/where taken into account in ES
	No evidence provided to confirm how 60% targets will be achieved; more evidence required.	commit to a 55% public transport mode share for air passengers by the summer period after the third anniversary of the opening of the new runway, and a 55% share for staff journeys by public transport, shared travel and active modes. The **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3) are summarised in Section 12.8, and the section also sets out the interventions that have been tested in the strategic model. The modelling work shows that these interventions can achieve the mode share commitments by the summer period after the third anniversary of the new runway opening, which in this assessment is assumed to be by 2032.
Crawley BC, Kent CC	The ASAS should avoid targets which are easily achievable; the desirable outcome should be set and measures determined to achieve it; Targets should be more ambitious; Targets should be for separate modes; The ASAS should include stretch targets.	The mode share commitments for the Project are set out in the **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3) and summarised in Section 12.8. These have been tested in the modelling work. Mode share commitments are expressed for public transport and sustainable travel modes, including active travel. GAL has also identified further mode share aspirations which go beyond the committed mode shares.
Mid Sussex DC	The forecourt charging strategy needs to be explained and secured.	Forecourt charging is now operational and the **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3) set out how GAL commits to using forecourt charges to influence passenger travel choices, to the extent necessary to achieve the mode share commitments.

Consultee	Key themes	How/where taken into account in ES
Surrey CC, West Sussex CC, Crawley BC, Horsham DC, Reigate & Banstead BC & others	Monitoring needs to be secured and potential for additional mitigation measures. What mitigation is proposed if targets are not met?	The **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3) contain monitoring commitments and these are summarised in Section 12.7.3.
Active travel		
Surrey CC, West Sussex CC, Crawley BC, Reigate & Banstead BC, Mole Valley DC, Mid Sussex DC	Insufficient focus on active travel. Need clarity on active travel proposals and rationale for them. More improvements are required for active travel.	The highway proposals have been revised since the statutory consultation and now include additional active travel infrastructure. They are described in Section 12.7.3.
Surrey CC	Crossing facilities required at Longbridge Roundabout and across A23 at North Terminal junction.	Crossing facilities at both locations are now included as part of the highway proposals, as described in Chapter 5: Project Description.
Bus and coach		
West Sussex CC	Insufficient focus on bus and coach services.	The commitments to public transport interventions are described in the **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3) and Section 12.8 and have been tested to ensure they make an effective contribution to achieving the mode share commitments whilst providing reasonable value for money..
Crawley BC	Provide more detail of what is being proposed for bus and coach including more local bus service enhancements.	The public transport proposals are described in the **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3) and are summarised in Section 12.8.
Surrey CC	Concern about lack of public transport routes into Surrey and reliance on North Downs Line without improvement.	The public transport proposals are described in the **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3) and Section 12.8 and have been tested to ensure they make an effective contribution to achieving the mode share

Consultee	Key themes	How/where taken into account in ES
		commitments whilst providing reasonable value for money.
East Sussex CC	Provide bus services to East Sussex to improve connections to and from Gatwick.	The public transport proposals are described in the **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3) and are summarised in Section 12.8. They include two routes via East Grinstead, one to Uckfield and one to Tunbridge Wells.
Mid Sussex DC	Local bus route improvements are too narrowly focused on Crawley and Horley.	The public transport proposals are described in the **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3) and Section 12.8 and have been tested to ensure they make an effective contribution to achieving the mode share commitments whilst providing reasonable value for money.
Kent CC	Provide further details of regional coach services to Kent.	The public transport proposals are described in the **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3) and are summarised in Section 12.8. They include a coach route to Sevenoaks, Maidstone and Chatham and a route to Romford via Dartford.
Surrey CC	Impact on bus journey times remains unclear.	Journey times are included in the **Transport Assessment Annex B – Strategic Transport Modelling Report** (Doc Ref. 7.4) annexed to the **Transport Assessment** (Doc Ref. 7.4).
Rail		
Crawley BC	Need to understand what service enhancements are proposed and what impacts are expected.	Section 12.9 presents the information about the expected levels of patronage on the rail network with and without the Project.
Mole Valley DC	More investment in Gatwick Express service. Invest in electrification of North Downs Line.	The assessment indicates that the effects of the Project are such that GAL does not need to provide additional investment in Gatwick

Consultee	Key themes	How/where taken into account in ES
		Express services or North Downs Line electrification.
Car parking		
Surrey CC, Crawley BC, East Sussex CC, Mid Sussex DC	Welcome the reduction in parking proposed but there remains a need for a detailed parking strategy.	The **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3) set out the commitments on car parking. The usage of the car parks will be monitored and as set out in the SACs, GAL is able to adjust its parking charges to influence demand at different times of day and year.
National Highways	Parking requirements should be justified in the context of mode share targets to demonstrate that the proposed provision is reasonable.	The current parking proposals and the basis for them are described in the **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3) and in Section 12.8.
East Sussex DC	Pricing of on-airport car parking should be set to encourage greater shift to sustainable modes.	The **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3) include the proposed charging strategy, which retains flexibility to allow GAL to respond to progress towards its mode share commitments by varying charges as appropriate to influence car-borne demand.
Highway proposals		
National Highways	Welcome the proposed changes to design subject to review through all National Highways processes.	Extensive engagement has taken place with National Highways in relation to all technical aspects of the highway proposals. Comments from National Highways have been addressed.
National Highways	Demonstrate that proposals are capable of future enhancement for further growth.	The highway modelling which informs the assessment contained in this chapter shows the performance of the network in 2047, 15 years after the highway works are completed.
National Highways, Surrey CC, Crawley BC, Mole Valley DC	Concern that proposals are designed in advance of modelling being completed or shared; Need to see and agree modelling	The highway modelling has been advanced and completed since the Summer 2022 consultation and has been the subject of engagement with

Consultee	Key themes	How/where taken into account in ES
		National Highways and the local highway authorities.
Surrey CC	Proposals should include better provision for bus priority.	The highway proposals result in better overall operation of the network with fewer delays and further bus priority is therefore not considered necessary.
Crawley BC, Horsham DC, Tandridge DC, Mid Sussex DC	Proposals limited to area of airport, no indication of improvements on the surrounding local road network; Require assurance that proposals do not have detrimental effect on traffic flows elsewhere.	The operation of the highway network and effects of the Project are assessed in Section 12.9.
Surrey CC	Highway improvements should be in place before northern runway comes into use.	The operation of the highway network and effects of the Project are identified in Section 12.9. Modelling work has shown that there would not be sufficient capacity on the existing highway network to accommodate the additional demand arising from the Project after the 2032 assessment year and therefore the highway improvement works are expected to be completed three years after the opening of the northern runway.
Modelling		
National Highways	Additional work still required to understand impact of proposals on the SRN.	The highway modelling has been the subject of extensive engagement with National Highways prior to and following the Summer 2022 consultation. The effects of the Project on the highway network, including the wider SRN, is included Section 12.9 and further information on the technical work on the SRN is contained in the **Transport Assessment** (Doc Ref. 7.4) and its annexes.
National Highways	Need to see microsimulation modelling.	Microsimulation modelling has been the subject of engagement with National Highways and the local

Consultee	Key themes	How/where taken into account in ES
		highway authorities since the Summer 2022 consultation. Technical information on the microsimulation modelling is contained in the **Transport Assessment** (Doc Ref. 7.4) and its annexes.
Surrey CC	Confirm that modelling reflects reduction in parking now proposed and demonstrates ability to meet 60% mode share target.	The modelling reflects the proposed number of car parking spaces. It demonstrates that the commitments identified in the **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3) can be achieved.
West Sussex CC	Provide evidence that proposals perform adequately through strategic and local modelling. There is insufficient information to confirm performance of proposals.	The assessment of effects is covered in Section 12.9. Detailed technical information on strategic and local modelling is contained in the **Transport Assessment** (Doc Ref. 7.4) and its annexes.
Reigate & Banstead BC, Tandridge DC, Sevenoaks DC, Tunbridge Wells BC	Capacity impacts on wider road network are not identified.	The operation of the highway network and effects of the Project are identified in Section 12.9.
East Sussex CC	Extend scope of modelling to include Ashdown Forest.	The Area of Detailed Modelling includes the Ashdown Forest area.
Crawley BC	Need to understand the baseline assumptions.	Baseline and future baseline assumptions are described in Section 12.6.
Construction		
National Highways	Need to be satisfied that potential impact on the strategic road network during construction can be managed.	The assessment considers the effects of the Project during airfield and highway construction periods.
Surrey CC	Construction methodology remains unclear.	Indicative construction sequencing, programming and traffic management principles are contained in **ES Appendix 5.3.2: Outline Code of Construction Practice** (Doc Ref. 5.3).

Consultee	Key themes	How/where taken into account in ES
West Sussex CC	Carriageway widening over River Mole likely to create significant traffic disruption.	Indicative construction sequencing, programming and traffic management principles are contained in **ES Appendix 5.3.2: Outline Code of Construction Practice** (Doc Ref. 5.3).
Tandridge DC, Waverley DC	Impacts on wider area during construction need to be identified.	The assessment considers the effects of the Project during airfield and highway construction periods for the whole of the study area, as described in Section 12.9.
Crawley BC	Provide details of construction phasing and works including closures and diversions for pedestrians and cyclists.	These matters are dealt with in the Code of Construction Practice and Outline Construction Traffic Management Plan.

12.3.6 Outside of the above-described public consultations, GAL also continued to engage with key stakeholders and during such engagement, key issues raised specific to the assessment of traffic and transport are listed in Table 12.3.4, together with details of how these issues have been taken into account within the ES.

Table 12.3.4: Summary of consultation and engagement

Consultee	Date	Details	How/where taken into account in ES
National Highways	Various, early 2019	Initial briefing sessions held in early 2019 to discuss master plan scenarios and National Highways expectations around both modelling and testing of effects and potential mitigation on the highway network.	Agreement on use of South East Regional Transport Model (SERTM) for future strategic modelling. Transport modelling is addressed in Sections 12.4 and 12.9 and in the TA.
	1 October 2019	Meeting with National Highways to discuss modelling approach for PEIR, potential surface access improvement options, strategic highway modelling. Also covered process, engagement and interface between NH and GAL.	The methodology for the assessment is addressed in Section 12.4 and in the TA.
	26 November 2019	Meeting on governance and forward engagement, design progress, surface access	Not applicable – general update meeting.

		modelling programme, PINS engagement and DCO programme.	
	7 January 2020	Meeting to discuss potential concepts for surface access improvements on the strategic road network.	Surface access improvement options have been considered and tested for the DCO application and are described in Chapter 5: Project Description and in Section 12.8 of this chapter.
	13 February 2020	To discuss VISSIM modelling outputs in the context of different highway options for 2047 future baseline and 2047 with Northern Runway Project (NRP).	VISSIM modelling outputs are included in the TA.
	26 October 2020	A meeting to confirm the recommencement of the Project after a pause because of the Covid-19 pandemic. This included a recap on where the work had got to in Spring 2020 and next steps.	Not applicable – meeting confirming project restart.
	2 February 2021	Given a change in personnel on the National Highways team considering GAL's DCO application, a briefing on all aspects of the Project including proposed surface access improvements, VISSIM modelling demonstrating the appropriateness of the surface access improvements, strategic transport modelling including highway modelling and a proposed engagement schedule with National Highways.	Updated briefing for National Highways officers. Strategic modeling is described in Section 12.4 and used for the assessment of effects in Section 12.9 and together with VISSIM modelling is included in the TA.
	13 April 2021	The purpose of this meeting was to provide new team members at National Highways with an overview of the highway network serving GAL and the design development of surface access improvements to support growth at the Airport with NRP.	
	May 2021 to current/ongoing	Meetings to discuss project governance, National Highways	Not applicable – non-technical meetings to discuss

		engagement and milestones to DCO submission.	collaborative engagement through to DCO submission.
	Engagement related to transport modelling		
	6 July 2021	Meeting held with National Highways to discuss the status of strategic modelling and to set out the strategy for engagement through to DCO submission.	The strategic modelling methodology is described in Section 12.4 and in the TA.
	12 August 2021, 15 October 2021, 21 January 2022, 17 March 2022	Workshops held to discuss the base strategic model for DCO, including calibration, validation and the Local Model Validation Report for the strategic model suite.	Information on the strategic modelling methodology is contained in Section 12.4 and in the TA.
	28 March 2022, 30 May 2022	Meetings held to discuss the forecasting assumptions and model scenarios for the DCO application	Information on the strategic modelling methodology is contained in Section 12.4 and in the TA.
	7 July 2022, 22 September 2022, 6 October 2022, 21 October 2022, 2 November 2022, 24 November 2022, 16 December 2022, 19 January 2023	Workshops held to discuss the emerging outputs from the strategic modelling for the DCO application, covering an overview, specific scenarios and responses to queries raised by National Highways through this series of workshops.	Information on the strategic modelling methodology is contained in Section 12.4 and in the TA.
	Engagement related to highway design		
	8 July 2021, 3 August 2021, 26 August 2021, 6 October 2021, 14 October 2021, 18 October 2021, 28 October 2021, 4 November 2021, 12 November 2021, 23 November 2021, 29 November 2021, 2 December 2021, 8 December 2021, 14 December 2021, 13 January 2022, 20 January 2022, 24 January 2022 10 February 2022, 15 March 2022,	Series of meetings to discuss the highway proposals presented in the PEIR, examine alternative options, and develop updated highway proposals for the DCO application. Topics included: • Introduction to scheme concept technical design proposals • Proposed highway geometry • NH feedback on concept design • Gatwick design deliverables • Historical options development for the PEIR proposals	The highway proposals for the DCO application are described in Chapter 5: Project Description and in Section 12.8 of this chapter.

	5 April 2022, 19 May 2022, 13 June 2022, 28 June 2022, 13 July 2022, 25 July 2022, 18 August 2022, 28 September 2022, 19 October 2022, 9 November 2022, 29 November 2022	• Revised concept design options for the highway proposals • High-level traffic modelling information for options • Options Assessment Matrix and key performance criteria • Technical specialisms including structures, drainage, geotechnics, technology, lighting, departures, and pavement design.	
West Sussex County Council *(note joint engagement has also taken place and is covered later in this table)*	15 April 2019	Meeting held with West Sussex CC surface access and modelling leads on to discuss master plan scenarios, West Sussex's expectations, a potential modelling approach and study area, including access to the Crawley model network.	The strategic modelling methodology is described in Section 12.4 and in the TA.
	14 July 2021	Meeting held with West Sussex CC to discuss the status of strategic modelling and to set out the strategy for engagement through to DCO submission.	The strategic modelling methodology is described in Section 12.4 and in the TA.
	26 August 2022	Structures design meeting with West Sussex CC covering scheme update, structures options proposals and technical notes.	The highway proposals for the DCO application are described in Chapter 5: Project Description and in Section 12.8 of this chapter.
Surrey County Council *(note joint engagement has also taken place and is covered later in this table)*	7 July 2021	Meeting held with Surrey CC to discuss the status of strategic modelling and to set out the strategy for engagement through to DCO submission.	The strategic modelling methodology is described in Section 12.4 and in the TA.
	23 February 2022	Structures design meeting with Surrey CC covering scheme update, review of affected Surrey CC structures, availability of existing information.	The highway proposals for the DCO application are described in Chapter 5: Project Description and in Section 12.8 of this chapter.
	2 March 2022	Drainage meeting with Surrey CC covering updates on design, overview of existing drainage, proposed drainage strategy and	The highway proposals for the DCO application are described in Chapter 5: Project Description and in Section 12.8 of this chapter.

		design and affected Surrey CC assets.	
	22 July 2022	Structures design meeting with Surrey CC covering scheme updates since previous meeting.	The highway proposals for the DCO application are described in Chapter 5: Project Description and in Section 12.8 of this chapter.
	27 July 2022	Meeting with Surrey CC to discuss noise barrier proposals including findings of analysis by GAL and impacts of including or excluding the noise barrier in the highway proposals.	The highway proposals for the DCO application are described in Chapter 5: Project Description and in Section 12.8 of this chapter.
Highway Authorities (jointly)	11 November 2019	Meeting held with National Highways, West Sussex CC, and Surrey CC to discuss strategic modelling and the Model Specification Report (MSR), covering demand types, time periods, strategic model to VISSIM integration, committed highway schemes to be included in the modelling etc.	The methodology used for the assessment is presented in Sections 12.4 and 12.5. Further technical information is contained in the TA.
	12 December 2019	Meeting held with National Highways, West Sussex CC, and Surrey CC to discuss strategic modelling, including model validation, demand forecasting, future transport schemes and forecast scenarios.	The methodology used for the assessment is presented in Sections 12.4 and 12.5. Further technical information is contained in the TA.
	25 February 2020	Meeting held with National Highways, West Sussex CC, and Surrey CC to discuss strategic modelling technical notes issued by Arup on behalf of GAL.	The methodology used for the assessment is presented in Sections 12.4 and 12.5. Technical information is contained in the TA.
	6 September 2021	Meeting held with National Highways, West Sussex CC, and Surrey CC to discuss the potential scope of forecast scenarios for the strategic transport modelling.	Transport modelling is reported in the TA. The assessment of effects draws on the modelling and is reported in Section 12.9.
	11 January 2022	Highway design meeting with West Sussex CC and Surrey CC covering overview of scheme,	The highway proposals for the DCO application are described in Chapter 5: Project

		traffic considerations, highway ownership, existing constraints, walking, cycling and horse-riding proposals and next steps.	Description and in Section 12.8 of this chapter.
	19 January 2022	Highway design meeting with West Sussex CC and Surrey CC covering review of highway geometry proposals for Longridge roundabout, North Terminal junction proposals and South Terminal area, including proposed speed limit changes.	The highway proposals for the DCO application are described in Chapter 5: Project Description and in Section 12.8 of this chapter.
	7 February 2022	Highway design meeting with West Sussex CC and Surrey CC covering walking, cycling and horse-riding proposals, journey time impacts and feedback on design layouts and documents.	The highway proposals for the DCO application are described in Chapter 5: Project Description and in Section 12.8 of this chapter.
	30 March 2022	Structures and drainage design meeting with West Sussex CC and Surrey CC covering overview of proposals and discussion of further background information.	The highway proposals for the DCO application are described in Chapter 5: Project Description and in Section 12.8 of this chapter.
	8 September 2022	Highway drainage meeting with West Sussex CC and Surrey CC covering updates on highway design, overview of existing drainage, proposed highway drainage strategy and design.	The highway proposals for the DCO application are described in Chapter 5: Project Description and in Section 12.8 of this chapter.
	23 September 2022	Meeting to provide an update on the status of the strategic and microsimulation modelling for the DCO application, including forecasting assumptions and methodology for assessing effects.	Transport modelling is reported in the **Transport Assessment** (Doc Ref. 7.4) and its appendices. The assessment of effects in this chapter draws on the modelling and is reported in Section 12.9.
	12 October 2022	Technology and traffic signal meeting with West Sussex CC and Surrey CC, covering scheme background, summary of proposals, requirements for technology and signals and approach to provision.	The highway proposals for the DCO application are described in Chapter 5: Project Description and in Section 12.8 of this chapter.

	14 October 2022	Meeting to present considerations around seasonality, the outputs from the strategic modelling core scenarios and emerging outputs from cumulative scenarios, and to discuss sensitivity tests.	Transport modelling is reported in the TA. The assessment of effects in this chapter draws on the modelling and is reported in Section 12.9.
	17 November 2022	Drainage meeting with West Sussex CC and Surrey CC covering review of drainage strategy report, update on design and discussion on discharge rates, culverting proposals.	The highway proposals for the DCO application are described in Chapter 5: Project Description and in Section 12.8 of this chapter.
	17 November 2022	Meeting to discuss further actions and queries arising from meeting on 14 October 2022 in relation to strategic modelling.	Transport modelling is reported in the TA. The assessment of effects in this chapter draws on the modelling and is reported in Section 12.9
	30 November 2022	Meeting with West Sussex CC and Surrey CC covering Flood Risk Assessment and including highway culverting proposals.	The highway proposals for the DCO application are described in Chapter 5: Project Description and in Section 12.8 of this chapter.
Local Authorities	21 August 2019	Meeting with Mid Sussex DC, West Sussex CC, Mole Valley DC, Crawley BC, Surrey CC, East Sussex CC, Tandridge DC, Reigate & Banstead BC, Horsham DC to describe approach for the Project, including PEIR.	Not applicable – initial briefing session.
	04 February 2020	Meeting with Mid Sussex DC, West Sussex CC, Mole Valley DC, Crawley BC, Surrey CC, East Sussex CC, Kent CC, Tandridge DC, Reigate & Banstead BC, Horsham DC to describe approach for the Project, including an update on the assessment for PEIR and the Airport Surface Access Strategy.	Meeting related to the assessment for PEIR which is a predecessor to the assessment presented in Section 12.9 and the methodology presented in Section 12.4.
	27 July 2021	Meeting with Mid Sussex DC, West Sussex CC, Mole Valley	Meeting related to the assessment for PEIR which is

		DC, Crawley BC, Surrey CC, East Sussex CC, Kent CC, Tandridge DC, Reigate & Banstead BC, Horsham DC to describe approach for the Project, including an update on the assessment for PEIR and draft actions and targets in the Airport Surface Access Strategy.	a predecessor to the assessment presented in Section 12.9 and the methodology presented in Section 12.4.
	17 May 2022	Topic Working Group (invited Mid Sussex DC, West Sussex CC, Mole Valley DC, Crawley BC, Surrey CC, East Sussex CC, Kent C, Tandridge DC, Reigate & Banstead BC, Horsham DC, National Highways) providing update on statutory consultation, intended reporting, transport model development for DCO application; changes to proposed highway works, sustainable travel and car parking proposals.	The methodology for the assessment is presented in Section 12.4 and the outcomes of the assessment are presented in Section 12.8. Detail of the surface access strategy is presented in the **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3).
	15 June 2022	Topic Working Group (invited Mid Sussex DC, West Sussex CC, Mole Valley DC, Crawley BC, Surrey CC, East Sussex CC, Kent CC, Tandridge DC, Reigate & Banstead BC, Horsham DC, National Highways) providing update on active travel infrastructure proposals.	The active travel infrastructure contained within the proposed highway works is described in Chapter 5: Project Description and in Section 12.8. The **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3) also recognise that GAL will enhance on-site facilities to ensure that these support the aim of encouraging staff to walk and cycle.
	26 July 2022	Topic Working Group (invited Mid Sussex DC, West Sussex CC, Mole Valley DC, Crawley BC, Surrey CC, East Sussex CC, Kent CC, Tandridge DC, Reigate & Banstead BC, Horsham DC, National Highways) providing update on public transport proposals forming part of the SACs and	The **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3) set out the proposals and commitments for public transport provision in more detail, which are also summarised in Section 12.8.

		matters related to bus infrastructure and emerging update of rail assessment.	
	28 July 2022	Meeting with Reigate & Banstead Borough Council, Crawley Borough Council. Discussion of noise barrier on A23 including design and assessment considerations, potential impacts on Riverside Garden Park and next steps.	The highway proposals are described in Chapter 5: Project Description and in Section 12.8.
	27 September 2022	Topic Working Group (invited Mid Sussex DC, West Sussex CC, Mole Valley DC, Crawley BC, Surrey CC, East Sussex CC, Kent CC, Tandridge DC, Reigate & Banstead BC, Horsham DC, National Highways) providing update on transport modelling outputs for core scenarios; overview of approach to construction; and key considerations for further active travel infrastructure.	The outcomes of the transport modelling are used in the assessment reported in Section 12.9 and further detail is provided in the TA.
	1 November 2022	Topic Working Group (invited Mid Sussex DC, West Sussex CC, Mole Valley DC, Crawley BC, Surrey CC, East Sussex CC, Kent CC, Tandridge DC, Reigate & Banstead BC, Horsham DC, National Highways) providing update on active travel infrastructure options study; information on construction sequencing and impacts; initial discussion on mode shares and draft SACs targets.	The highway proposals are described in Chapter 5: Project Description and in Section 12.8. Section 12.8 also summarises the mode share commitments which form part of the **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3). Construction impacts are assessed in Section 12.9.
	5 December 2022	Topic Working Group (invited Mid Sussex DC, West Sussex CC, Mole Valley DC, Crawley BC, Surrey CC, East Sussex CC, Kent CC, Tandridge DC, Reigate & Banstead BC, Horsham DC, National Highways) providing update on	The assessment of cumulative effects is presented in Section 12.11. Section 12.8 summarises the proposed SACs which are set out in **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3).

		cumulative development scenarios and details of the SACs including measures, targets and monitoring approach.	
	31 January 2023	Topic Working Group (invited Mid Sussex DC, West Sussex CC, Mole Valley DC, Crawley BC, Surrey CC, East Sussex CC, Kent CC, Tandridge DC, Reigate & Banstead BC, Horsham DC, National Highways) providing update on proposed construction methodology for the proposed highway works.	Information on the construction proposals can be found in **ES Appendix 5.3.2: Outline Code of Construction Practice** (Doc Ref. 5.3).
Network Rail	13 February 2019	Meeting held with Network Rail to discuss master plan scenarios and potential impacts on the station, South Terminal, and inter-terminal shuttle. Network Rail agreed to release the Legion model used for business case modelling of the station project for use by GAL in relation to the DCO application.	Information on the modelling methodology for the station is provided in Section 12.4 and the outcomes are presented in Section 12.9. Further information is provided in the **Transport Assessment** (Doc Ref. 7.4) and **Transport Assessment Annex D – Station and Shuttle: Legion Modelling Report** (Doc Ref. 7.4).
	11 July 2019	Meeting to discuss and agree preliminary Legion modelling of the station.	Information on the modelling methodology for the station is provided in Section 12.4 and the outcomes are presented in Section 12.9.
	4 December 2019	Meeting to discuss use of rail to transport project-related construction materials and spoil.	Information on the construction proposals can be found in **ES Appendix 5.3.2: Outline Code of Construction Practice** (Doc Ref. 5.3).
	10 December 2019	Meeting to discuss further Legion modelling of the station and to discuss route capacity enhancements.	Information on the modelling methodology for the station is provided in Section 12.4 and the outcomes are presented in Section 12.9.
	8 November 2021	To provide an overview of the current status of strategic	Not applicable – briefing meeting.

		modelling and the assessment presented in the PEIR	
	29 July 2022	Highway design meeting with Network Rail covering scheme background and overview, review of existing Airport Way bridge over London to Brighton Railway, proposed design, and construction considerations.	Highway design is described in Chapter 5: Project Description and is also referenced in this chapter in Section 12.8.
	9 November 2022	To provide an update on the strategic modelling for the DCO application, covering general context and the outcomes related to rail crowding.	Information on the modelling methodology for the station is provided in Section 12.4. Rail crowding is assessed in Section 12.9.
	1 December 2022	Meeting to discuss Legion modelling undertaken for Gatwick station, including outputs from core scenarios.	Information on the modelling methodology for the station is provided in Section 12.4. Station performance is assessed in Section 12.9.
Transport for London	16 April 2019	Meeting held with Transport for London to discuss master plan scenarios and the approach to modelling and testing effects, including access to the London Highway Assignment Model (LoHAM) model network.	Not applicable – initial briefing session.
	4 November 2019	Meeting to discuss expectations for assessment, potential modelling approach and study area, assumptions regarding rail access and onward travel across London.	Information on the modelling methodology for the station is provided in Section 12.4.
	14 April 2021	Update on progress towards DCO application, in particular the outline programme to consultation, progress and forthcoming outputs on surface transport modelling and transport assessment. Other subjects covered included the recently introduced Forecourt Charging at Gatwick and the Mayor's Financial Sustainability Plan with potential user charging concepts for London.	Not applicable – briefing discussion.

	22 October 2021	To provide an overview of the current status of strategic modelling and the assessment presented in the PEIR.	Meeting related to the assessment for PEIR which is a predecessor to the assessment presented in Section 12.9 and the methodology presented in Section 12.4.
	20 October 2022	To provide an overview of the transport modelling for the DCO application including the approach to forecasting, selected model scenarios and modelling for the rail network.	Information on the modelling methodology for the station is provided in Section 12.4.
	30 November 2022	To provide an update on the transport modelling for the DCO application including model outputs and addressing queries from previous meeting.	Transport modelling is reported in the **Transport Assessment** (Doc Ref. 7.4) and its annexes. The assessment of effects in this chapter draws on the modelling and is reported in Section 12.9.
Environment Agency	22 March 2022	Meeting to discuss Water Quality and Water Environment Regulations in relation to highway proposals.	Environmental effects related to water are reported in Chapter 11: Water Environment.
	5 July 2022	Meeting to discuss highway proposals and interface with watercourses, including culverting of main rivers, other culverting and ditch proposals, highway drainage proposals.	Environmental effects related to water are reported in Chapter 11: Water Environment. Highway design is described in Chapter 5: Project Description and is also referenced in this chapter in Section 12.8.
Sussex Police	16 November 2022	Design and operations meeting covering scheme background and overview, summary of proposals, impacts on Gatwick Police station, proposed operational regime and comments from Sussex Police.	Not applicable – briefing meeting.
Planning Inspectorate (PINS)	15 November 2019	Meeting held with PINS to respond to comments provided on the Environmental Impact Assessment Scoping Report, including in relation to cumulative development which	The methodology used for the assessment is presented in Section 12.4.

		impacts upon the strategic transport modelling.	
	3 February 2021	Meeting held with PINS to restart engagement on the Project after a short pause related to Covid. Discussion on NSIPs, Heathrow Runway 3 and in relation to cumulative development which will impact upon the next stage of strategic transport modelling.	Meeting confirming project restart and further modelling and strategy to inform the DCO application. No further actions for DCO application.

12.4. Assessment methodology

Relevant guidance

12.4.1 The assessment of the traffic and transport effects has been undertaken in accordance with the following guidance:

- IEMA (2004), Guidelines for Environmental Impact Assessment.
- IEMA (1993), Guidelines for the Environmental Assessment of Road Traffic.
- Design Manual for Roads and Bridges (DMRB), in particular LA 101 Introduction to Environmental Assessment, LA 103 Scoping Projects for Environmental Assessment and LA 104 Environmental Assessment and Monitoring. This chapter does not include the assessments for LA 112 Population and Human Heath, which are contained in Chapter 19: Agricultural Land Use and Recreation of this ES.
- Department for Transport (2013b, last updated 2022) transport appraisal guidance (TAG).

Scope of the assessment

12.4.2 The scope of this ES has been developed in consultation with relevant statutory and non-statutory consultees as detailed in Section 12.3. It has also been informed by the statutory consultation in 2021 and the consultation on updated PEI relating to the highway improvement changes in 2022 (see **ES Appendix 12.3.1: Summary of Stakeholder Scoping Responses – Traffic and Transport** (Doc Ref. 5.3)). As set out in paragraphs 12.1.3 and 12.1.4, this ES chapter covers the traffic effects on people arising from the Project, based on the approach and methodology set out in the IEMA guidance. The TA provides more information on the impacts of the Project on the transport networks, including demand forecasts and modelling methodologies.

12.4.3 Taking into account the scoping and consultation process, Table 12.4.1 summarises the issues considered as part of this assessment. No effects identified in the scoping and consultation process to date have been scoped out. However, DMRB guidance on driver stress and view from the road assessments has since been withdrawn. These were originally included in the scoping in order to comply with the published DMRB at the time of writing. On the basis that these elements of the DMRB have been withdrawn, driver stress and view from the road effects have now been excluded from this assessment.

Table 12.4.1: Issues considered within the assessment

Activity	Potential Effects	Receptor
Construction Period (including Demolition): Traffic and Transport		
Construction and demolition activities	Traffic generation and % change for local highway network (including construction materials, cut/fill, staff)	Highway users (all modes)
	Severance – local highway network	Highway users (all modes)
	Driver delay – local highway network, including during construction of highway junctions	Highway users (all modes)
	Pedestrian and cyclist delay – local highway network, including during construction of highway junctions	Pedestrian and cycle modes
	Pedestrian and cyclist amenity – local highway network, including during construction of highway junctions	Pedestrian and cycle modes
	Accidents and safety	Highway users (all modes)
	Hazardous loads	Highway users (all modes)
	Effects on rail network and rail users, such as crowding	Rail users
	Effects on other public transport services and users (eg bus and coach, such as amenity)	Public transport users
Operational period: traffic and transport		
Use of airport, including upgraded highway junctions	Traffic generation and % change for local highway network (staff and passengers)	Highway users (all modes)
	Severance – local highway network	Highway users (all modes)
	Driver delay – local highway network	Highway users (all modes)
	Pedestrian and cyclist delay – local highway network	Pedestrian and cycle modes
	Pedestrian and cyclist amenity – local highway network	Pedestrian and cycle modes
	Accidents and safety	Highway users (all modes)
	Hazardous loads	Highway users (all modes)
	Effects on rail network and rail users, such as crowding	Rail users
	Effects on other public transport services and users (eg bus and coach, such as amenity)	Public transport users

12.4.4 The assessment years contained in this chapter are:

- Initial construction period (2024-2029)
- First full year of opening (2029)
- Highway construction period (2029)

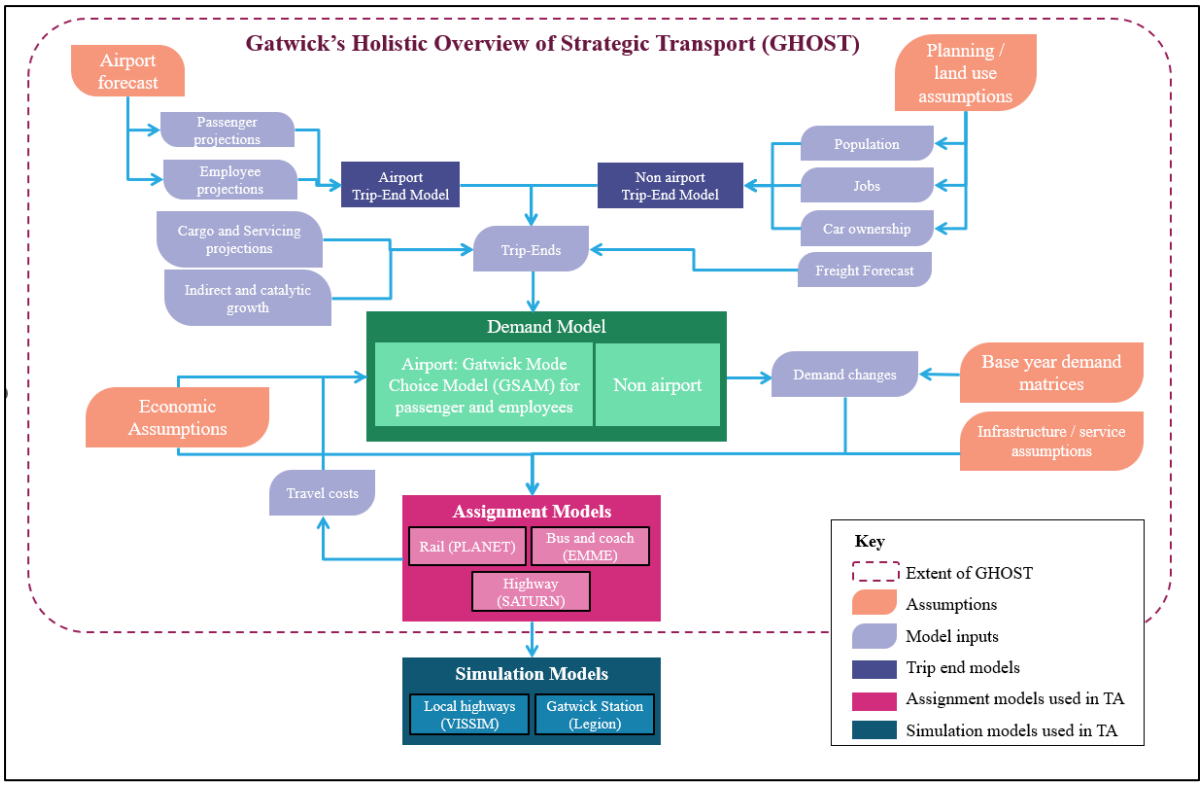
- Interim assessment year (2032) – assumed opening of the highway improvement scheme which forms part of the Project.
- Design year (2047) – 15 years from the assumed opening of the highway improvement scheme, as required by National Highways

12.4.5 It is recognised that some other ES chapters also address 2038 as an assessment year. This is not a requirement for assessing traffic and transport effects. DMRB guidance requires assessment for opening year and plus 15-year assessment, which is covered as 2047.

Study area and methodology

12.4.6 The assessment in this chapter is based on extensive transport modelling work which provides information on mode choice and the expected performance of the highway and public transport networks. An overview of the modelling approach is shown in Diagram 12.4.1.

Diagram 12.4.1 Overview of transport modelling

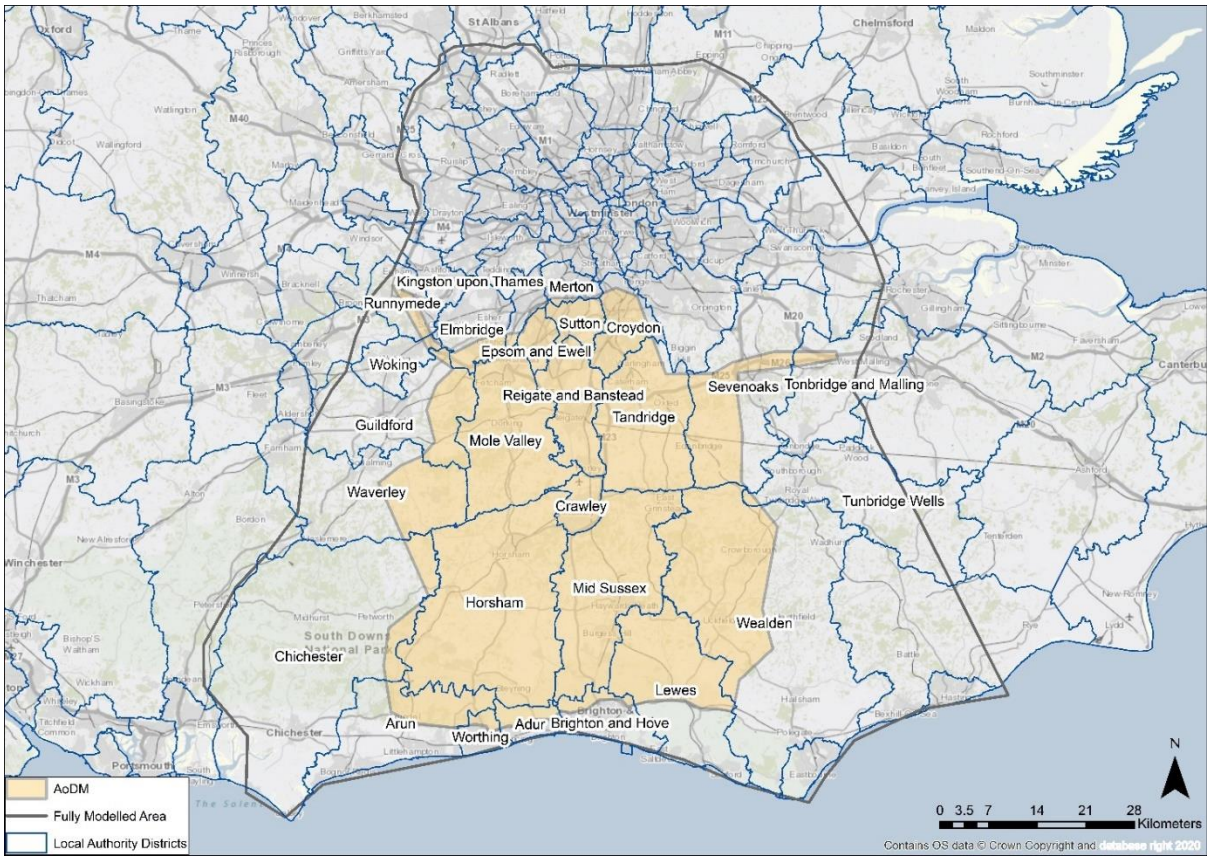


Highway network

12.4.7 The assessment of the highway network in this chapter is informed by the Area of Detailed Modelling (AoDM) in the SATURN strategic model, as shown in Diagram 12.4.2. The extent of the AoDM was determined through analysis of the scale of the potential Affected Road Network (ARN) using the South East Regional Transport Model (SERTM) by uplifting airport demand and reassigning it to the base network to identify the ARN following the quantification method outlined in DMRB. The modelling work has been undertaken in consultation with National Highways and the relevant highway authorities and the AoDM has been adjusted following comments from those stakeholders. The appended Figure 12.4.1 illustrates the distribution of airport traffic on the local highway

network and Figure 12.4.2 shows this traffic over the wider highway network. Further detailed technical information on the methodology for the strategic and other modelling work is contained in the TA.

Diagram 12.4.2 Highway assignment model coverage and Area of Detailed Modelling (AoDM)



12.4.8 The highway peak hours examined in this chapter are:

- AM Peak 1 (AM1) – 07:00 to 08:00;
- AM Peak 2 (AM2) – 08:00 to 09:00;
- Interpeak (IP) – average hour between 09:00 and 16:00; and
- PM Peak (PM) – average hour between 16:00 and 18:00, as 16:00-17:00 and 17:00-18:00 are very similar in terms of traffic flows.

12.4.9 For the assessment of driver delay, the approach is to consider all junctions within the strategic highway assignment model coverage, with a Volume to Capacity (V/C) ratio of over 80% in the with Project case (see paragraph 12.4.48 on the assessment methodology).

12.4.10 The approach to define the study area for the other environmental effects on the highway (severance, pedestrian and cyclist delay, pedestrian and cyclist amenity, accidents and safety, and hazardous loads) is to firstly use Rules 1 and 2 defined in the IEMA (1993) guidance:

- Rule 1 – include highway links where traffic flows will increase by more than 30% (or the number of Heavy Goods Vehicles (HGVs) will increase by more than 30%); and
- Rule 2 – include any other specifically sensitive areas where traffic flows have increased by 10% or more.

12.4.11 Government guidance on the requirements of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 explains that although every Environmental Statement should provide a full factual description of the development, the emphasis should be on identifying and explaining the significant environmental effects which are likely to be associated with that development. Each ES should be proportionate and not be longer than is necessary to properly assess those effects. Impacts which have little or no significance for that development can be treated only briefly. The same principles are also applicable to environmental assessment under the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.

12.4.12 In keeping with the above guidance, to focus on the likely significant effects and exclude any minor flow variations in the region-wide strategic modelling outputs, the additional screening thresholds described below have been applied to each of the IEMA rules. These have been developed with reference to the assessment criteria and magnitude of impacts and were consulted on as part of the PEIR (see paragraphs 12.4.43 onwards).

- Rule 1 – Where the change in total traffic is more than 30%, include links where the absolute difference is greater than two vehicles per minute and on links where the model is showing at least one vehicle in the future baseline (ie excluding routes with zero traffic). Where the change in HGVs is more than 30%, include links where the absolute difference is greater than one HGV every five minutes.
- Rule 2 – Where the change in total traffic is more than 10%, include links where the absolute difference is greater than two vehicles per minute, on links where the model shows at least one vehicle in the future baseline (ie excluding routes with zero traffic) and where there are sensitive receptors along the link's frontage.

12.4.13 This chapter covers the traffic and transport effects on people arising from the Project. The thresholds adopted of two vehicles per minute and one HGV every five minutes are on two-way flows, and this level of change is not considered to have an impact on any of the assessment areas within this regard.

12.4.14 Based on the above, the extent of the study area for the environmental effects on the highway (except driver delay which is assessed over the full extent of the strategic model) is shown in Diagram 12.4.3 for the Gatwick Airport area, and Diagram 12.4.4 and Diagram 12.4.5 for other areas for assessment. Larger plans are appended as Figures 12.4.3 to 12.4.5.

Diagram 12.4.3: Study area links for assessment – Gatwick Airport area

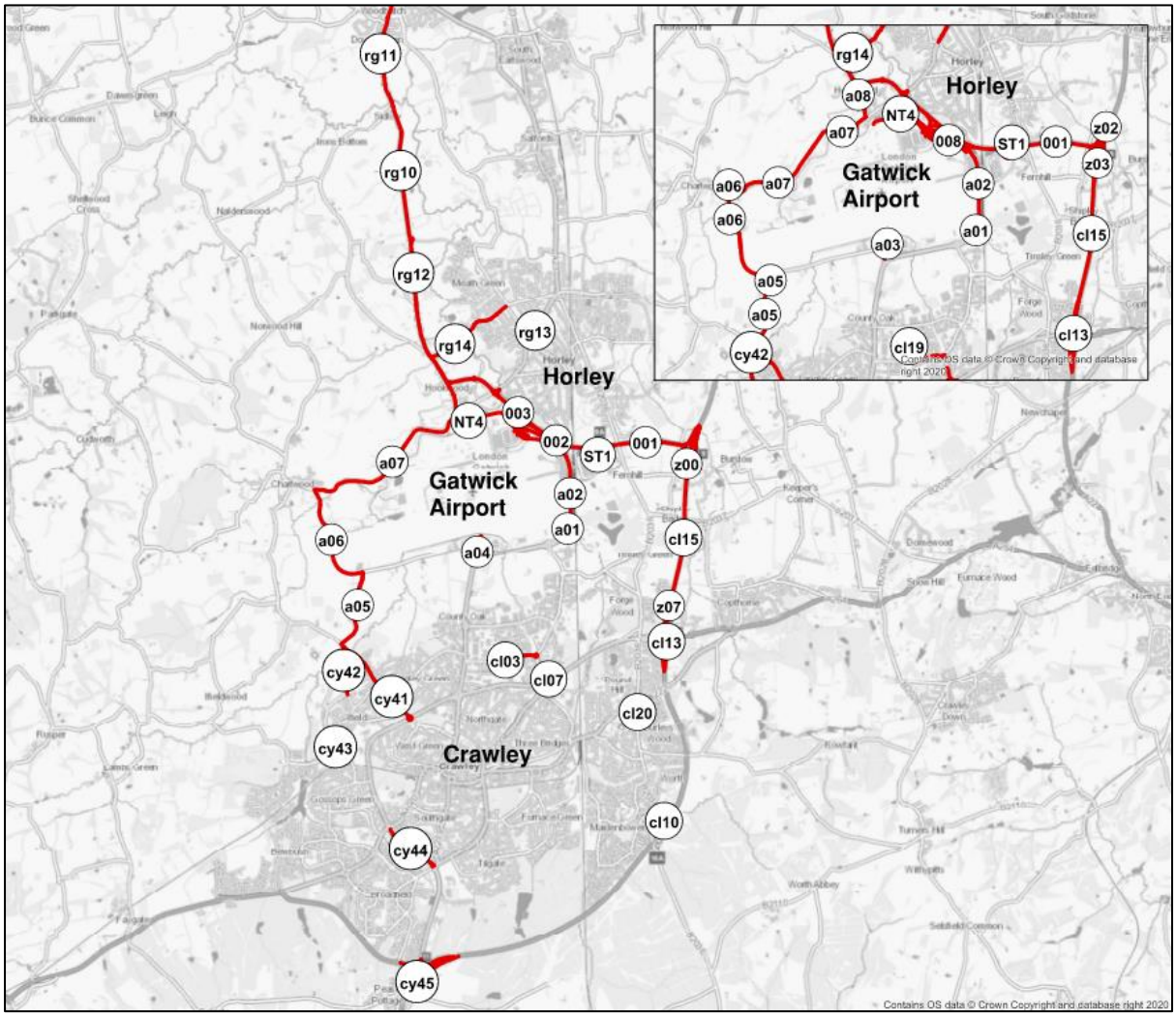


Diagram 12.4.4 Study area links for assessment – other areas for assessment (1)

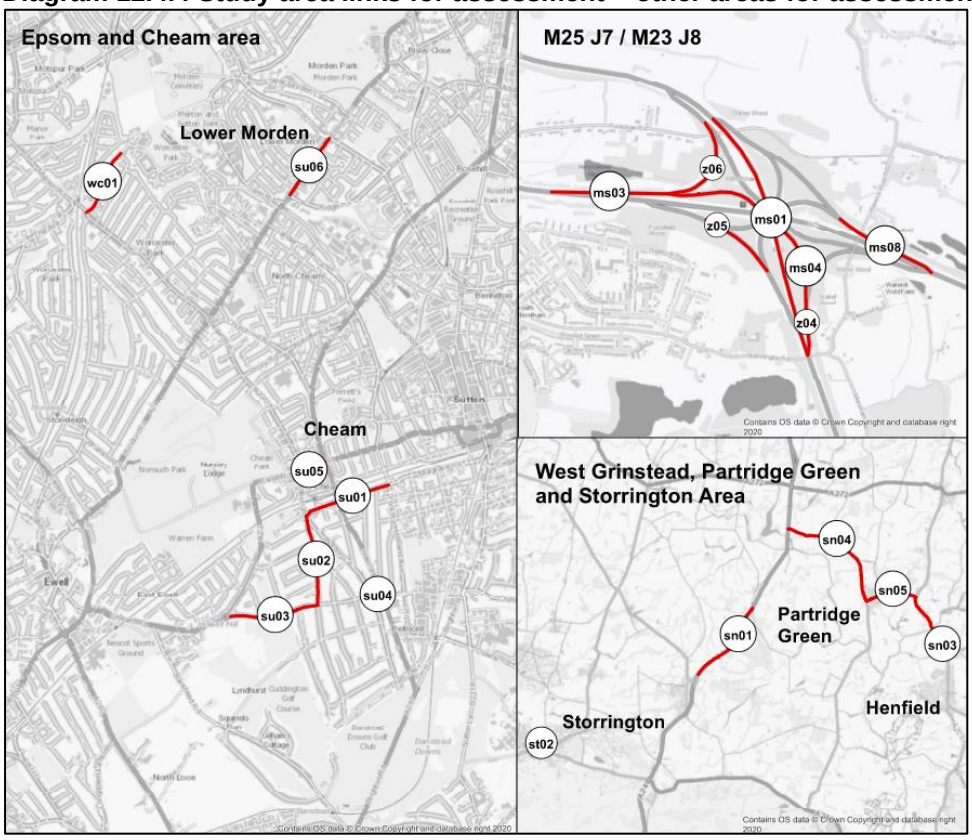
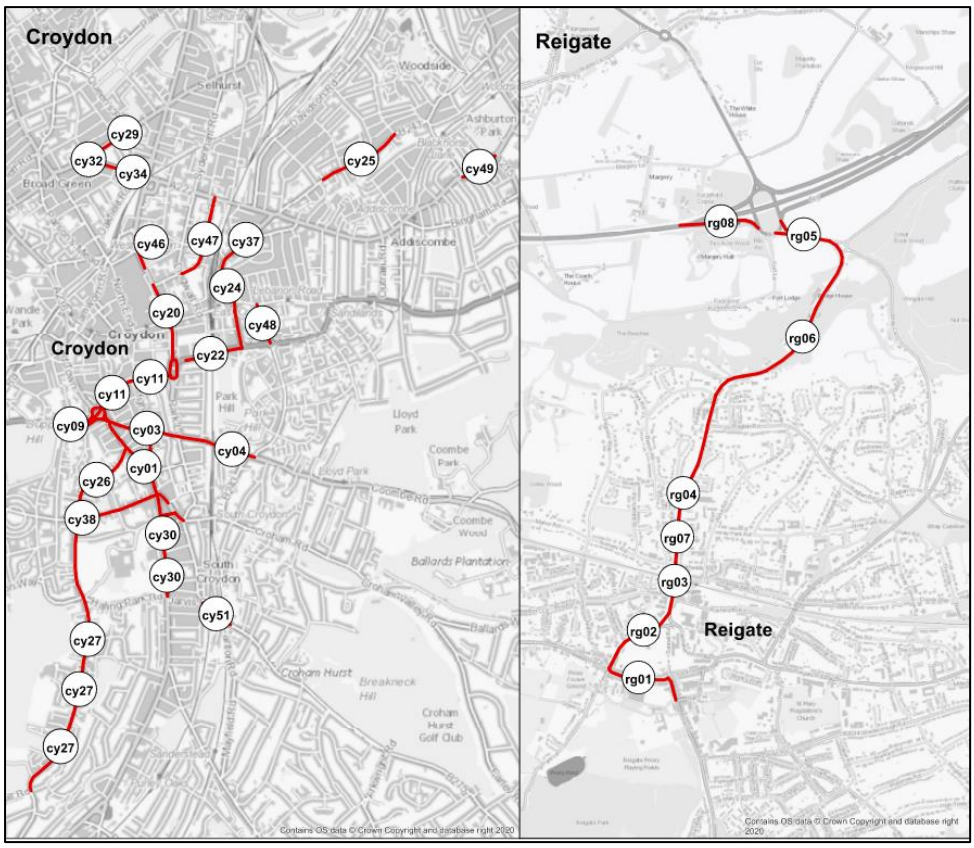


Diagram 12.4.5 Study area links for assessment – other areas for assessment (2)



12.4.15 The traffic flows for all the study area links are provided in **ES Appendix 12.9.1: Highway Flows and Driver Delay Review** (Doc Ref. 5.3). For the purposes of reporting, only those which have a magnitude of impact of low, medium, and high adverse or beneficial are assessed in the text of this chapter, to focus on potential significant effects. It should be noted that some of the links are the result of 'model noise' and are not considered likely to occur in practice as a result of the Project. This is explained further in Section 12.5.

Public transport

Rail network

12.4.16 The public transport study area is based on strategic modelling and the PLANET model for the rail network.

12.4.17 Rail modelling has been undertaken for 24 hours for the following services:

- All services between Gatwick Airport and Victoria/London Bridge
  - Fast London Bridge services operated by Thameslink
  - Fast London Victoria services operated by Gatwick Express and Southern
  - London Bridge and London Victoria stopping services
- North Downs Line (NDL)
- Arun Valley line.

12.4.18 The rail network within the public transport model covers much of south and east England. However, Gatwick's primary area of effect on the rail network is on services which pass through Gatwick Airport railway station and for the assessment itself the study area for the rail network encompasses services on all the lines identified in the previous paragraph. These are considered in the **Transport Assessment** (Doc Ref. 7.4) and a comprehensive set of 24-hour rail modelling results for all services is included in **ES Appendix 12.9.2: Rail Passenger Flows** (Doc Ref. 5.3).

12.4.19 The analysis in this chapter focuses on the services between Gatwick Airport and Victoria/London Bridge because this is the section with the largest potential change in demand. However, the TA provides more detail on line loading, seated capacity and occupied standing capacity on all lines serving Gatwick Airport. This chapter focuses on the occupied standing capacity as a measure of crowding (see Table 12.4.8).

12.4.20 Analysis is undertaken in this chapter for the peak periods by direction where the crowding effects are the highest (analysis for off-peak and inter-peak periods is contained in **ES Appendix 12.9.2: Rail Passenger Flows** (Doc Ref. 5.3) and in the **Transport Assessment** (Doc Ref. 7.4)). The Project generates the most trips in the contra-peak direction and generally outside of the rail network's peak hours. The peak hours for assessment are therefore identified as follows, for each assessment year for both northbound and southbound directions:

- Network peak hour – The hour with highest line loading at the busiest station, where rail passengers are most sensitive to increase passengers and the effects of crowding.
- Project peak hour – The hour with the highest increase in rail passengers as the result of the Project.

Gatwick Airport station

12.4.21 The study area for public transport also includes the effects of growth on crowding in Gatwick Airport station.

12.4.22 Network Rail's Governance for Railway Investment Projects (GRIP) defines different design stages for rail projects in the UK, with GRIP3 being the option selection phase, GRIP4 being further development of that single design option and GRIP5 representing Detailed Design stage of a preferred option to be taken forward for construction.

12.4.23 For the Project, Network Rail provided the 2036 GRIP5 Legion model developed as part of the Gatwick Station Project. The Gatwick Station Project is a Network Rail upgrade scheme which includes doubling the size of the station overbridge, adding five new lifts and eight escalators to improve passenger flow, and widening two platforms to reduce crowding. The GRIP5 model was developed by a third party, including calibration and validation to observed data, on behalf of Network Rail. The model was used to demonstrate the performance of the station under 2036 AM and PM peak demand conditions assuming incremental growth and without the Project.

12.4.24 The latest version of the model was provided to GAL by Network Rail on 18 August 2022 and has been modified to reflect the requirements of the Project. The model of the station as provided by Network Rail includes the existing concourse, the new concourse and all seven platforms. For this assessment, the Inter-Terminal Shuttle has been added to the model. Discussions have taken place with Network Rail, which confirmed they are content with the changes made to the model and that the outputs obtained from the assessment appear logical.

Methodology for baseline studies

Desk study

12.4.25 Desk studies have been undertaken to inform the baseline conditions and update GAL's assessment and modelling tools to test the likely effects of the Project. The desk studies and data sources include the following.

- WebTRIS data – National Highways has an extensive count database for the SRN available online, which measures the volume of traffic on the network and provides continuous outputs.
- Department for Transport manual classified counts (MCCs).
- Traffic Count Data – an extensive primary data collection exercise was undertaken in both 2016 and 2019 which has been supplemented by secondary data sources from the local authorities. Paragraphs 12.4.29 to 12.4.31 contain a commentary on the use of this data in the base models, in the context of current (2022) conditions.
- Civil Aviation Authority (CAA) data – data from CAA air passenger surveys at Gatwick (2014-2018) was used to provide the database of air passenger details.
- Employee Survey – behavioural survey data was obtained from the Gatwick Employee and Employment survey which GAL undertakes periodically; the data available for this work was collected in 2016.
- Trip Distribution Data – Citi Logik (CL) were commissioned in 2016 to provide travel demand data for an area within the south east of England. In the context of GAL, a broad specification to the data was included to ensure that temporal and geographic characteristics of travel through the area could be identified.

- OS Open Roads data set to inform network attributes such as link length and road type.
- Rail timetable information obtained from the Network Rail schedule database in CIF (Common Interface File) format. This provides the arrival and departure time at each station for each train service.
- London Underground, Tramlink and Docklands Light Railway (DLR) timetables obtained from the Transport for London website.
- The national General Transit Feed Specification dataset, which includes published timetable/schedule data for all public transport services across the UK.
- ORR station entries and exits – ORR publishes annual estimates of the total numbers of passengers entering, exiting, and interchanging at each UK rail station.
- West Sussex Cycle Journey Planner to establish existing national, regional, and local cycle routes.

12.4.26 To develop the demand forecasts for each future baseline year, the following data sources were used:

- The DfT's Trip End Presentation Program (TEMPro) (V7.2) was used to source the National Trip End Model (NTEM) assumptions. This sets out national travel demand growth for each local authority area based on a set of planning assumptions covering employment and housing projections.
- Planning documents and council planning portals (Local Plan Development, Strategic Housing Land Availability Assessment, Annual Monitoring Report, and Housing/Employment Land Trajectory) – to develop a demand Uncertainty Log. In accordance with TAG Unit M4, an Uncertainty Log was developed for both demand (eg new developments) and supply (eg new transport infrastructure) that could affect the future performance of the transport system. The demand Uncertainty Log was used as the basis for reviewing the NTEM assumptions at a fine level of spatial detail in the AoDM. The NTEM assumptions were then updated accordingly, and the most current local plan assumptions were used as the basis for the growth trajectory in each local authority district.
- MoTiON 3.0.18 data from Transport for London (TfL) – adopted to modify the assumptions in London for growth in travel demand. This involved the updating of population and employment forecasts for the London Boroughs.
- Road Traffic Forecast 2018 (RTF18) Scenario 1 – goods vehicle traffic growth factors (in vehicle miles) at regional level were applied to the 2016 base goods vehicle demand. Goods vehicle forecasting at Gatwick airport was undertaken using passenger and cargo forecasts.
- Distribution of Heathrow Airport demand was taken from SERTM – this was based on data from the DfT, with demand projections based on 2014 DfT forecasts for the existing two-runway configuration at Heathrow. This demand was updated using the latest available public demand forecasts for Heathrow which assumed by 2047, a total of 92 million passengers per annum (mppa) from the existing runway configuration. Specific time period assumptions were derived by comparing base Heathrow assumptions with observed counts on the M4 Spur, and Terminal 5 slip roads on the M25.

Site-specific surveys

12.4.27 Surveys of the site were also undertaken to validate and calibrate the existing baseline which was used to develop the future baselines. A summary of the surveys undertaken is provided in Table 12.4.2. A number of these surveys were undertaken in 2016 in order to

capture a representative data set, including mobile phone data capture, collected over a two-month period and comprising upwards of 2.5 million devices and 170 million events per day for the busiest days giving a wealth of information to inform transport modelling. Given industrial action by Southern as well as rail disruption associated with works at London Bridge from late 2016 to 2018, the construction of the M23 Smart Motorway Project from 2018 to 2020, the Covid-19 pandemic and the subsequent recovery of airport and transport operations, 2016 is considered to be a more representative baseline upon which to develop future baseline scenarios than more recent datasets.

Table 12.4.2: Summary of site-specific surveys

Survey	Methodology
Traffic counts (2016 and 2019)	Following on from the Airports Commission process and in anticipation of future projects, GAL undertook an extensive data collection exercise in 2016 and 2019* which included: ▪ automatic traffic counts; ▪ manual classified link and turning counts; and ▪ automatic number plate recognition (ANPR) counts.
INRIX (2016)	Journey time data collected which represents an estimated road speed at different times of the day based on real time GPS feeds. This was used to validate and calibrate the 2016 model against which the 2018 baseline and the future baseline scenarios are developed.
Mobile phone-based survey (2016)	A comprehensive mobile phone-based survey of origin and destination movements in the area surrounding Gatwick across an area equivalent to the Gatwick Diamond. This was used to validate and calibrate the 2016 model against which the 2018 baseline and the future baseline scenarios are developed.
Employee survey (2016)	Gatwick Employer and Travel to Work Survey 2016 comprising data on number of employees, temporary or permanent, postcodes, shift patterns, mode of travel to work, travel preferences and influences. This data was used to understand travel patterns and use to develop the mode choice model.
Airport-related cargo and goods movement data (2019)	Data provided by GAL. This data was being considered in the context of the 2019* INRIX data.

2019 data was used to assist the development of the strategic model where it supplemented coverage of the 2016 data, for example to provide an indication of traffic distribution and turning proportions at junctions. Further information is provided in the **Transport Assessment Annex B – Strategic Transport Modelling Report (Doc Ref. 7.4) annexed to the **Transport Assessment** (Doc Ref. 7.4).*

12.4.28 In terms of passenger data, three sources have been used to inform the assessment.

- CAA data provides a national survey of departing passengers at each UK airport to understand passenger characteristics and trends. Access to this dataset has been secured through GAL.
- Profiler data – Survey of departing passengers to support further analysis on passenger trends and characteristics. This dataset which is collected by GAL is similar to the CAA data; however, Profiler has a substantially higher response rate to

the postcode question. This is important for developing air passenger matrices and more detail on parking location.

- A profile of arriving and departing passengers, by year, month, day, and hour for 2016 to 2018 from passenger counts for each flight as collected by GAL.

12.4.29 All the data and surveys used are considered sufficiently up to date to inform the ES in accordance with best practice and Department for Transport TAG guidance (2013b), noting that construction of M23 Smart Motorways and rail disruption means that data collection since late 2016 would have been affected.

12.4.30 The transport modelling is based on data originally collected in 2016 during a period where the transport network was operating in a relatively stable condition. During the period of 2018 to 2019, the introduction of the Smart Motorways Scheme between Junctions 8-10 on the M23, and changes in railway timetabling through 2018 and 2019 led to a period of variability in access to the airport. 2016 was considered the best period pre-COVID to base the modelling.

12.4.31 Analysis of the changes in traffic flows at key locations adjacent to Gatwick Airport and on the Strategic Road Network has suggested weekday daily traffic volumes in June 2022 were below the equivalent for 2016 suggesting traffic levels had not recovered to pre-pandemic levels. This ranged from -2% to -27% with less recovery noted on the local road network. More detailed analysis of the daily and hourly profile of traffic suggested this was consistent across the day for a typical weekday, with peak hour traffic volumes tending to be lower than 2016 equivalents. The modelling assumptions in producing the future baseline imply general traffic growth between the 2016 base year and 2022 of around +6%. From this analysis, the 2016 base for modelling is considered to be robust and appropriate for assessing the effects of the Project.

Assessment criteria and assignment of significance

12.4.32 The significance of an effect is determined by the sensitivity of a receptor and the magnitude of an impact which the receptor experiences. This section describes the criteria applied in this chapter to characterise the sensitivity of receptors and magnitude of potential impacts. The terms used to define magnitude and sensitivity are based on and have been adapted from those used in IEMA (1993) and DMRB (National Highways *et al*., 2022), which is described in further detail in Chapter 6: Approach to Environmental Assessment.

Receptor sensitivity/value

12.4.33 The receptors considered in the assessment are:

- pedestrians and cyclists using roadside footways;
- bus and coach passengers;
- rail passengers; and
- car drivers and passengers, including taxis and private hire vehicles, servicing vehicles.

12.4.34 Effects on public rights of way (including their use by walkers, cyclists, and equestrians) are considered within Chapter 19: Agricultural Land Use and Recreation.

12.4.35 The criteria to assess receptor sensitivity are shown in Table 12.4.3.

Table 12.4.3: Sensitivity criteria

Sensitivity	Definition
Very High	Those receptors with greatest sensitivity due to site-specific characteristics which make them particularly sensitive to changes in traffic flows (eg community with high incidence of mobility impairment requiring to crossroads to access essential facilities).
High	Receptors of high sensitivity to traffic flows (eg schools, colleges, playgrounds, accident black spots, urban/residential roads without footways that are used by pedestrians).
Medium	Receptors of medium sensitivity to traffic flows (eg congested junctions, doctors' surgeries, hospitals, shopping areas with roadside frontage, roads with narrow footways un-segregated cycle ways, community centres, parks, recreation facilities, retirement homes).
Low	Receptors with some sensitivity to traffic flows (eg places of worship, public open space, nature conservation areas, listed buildings, tourist attractions and residential areas with adequate footway provision).
Negligible	Receptors with low sensitivity to traffic flows and those sufficiently distance from affected roads and junctions.

12.4.36 The links being assessed within the study area are shown in Diagram 12.4.3 and Diagram 12.4.4. Each link has been assessed for sensitivity (in terms of pedestrians and cyclists) and the sensitivities are set out in **ES Appendix 12.9.1: Highway Flows and Driver Delay Review** (Doc Ref. 5.3). The sensitivities of other road users are considered separately as outlined below.

12.4.37 For pedestrian and cyclist sensitivity, there are roads within the study area which are not on desire lines (direct routes which pedestrians and cyclists prefer to take to reach their destination) and have no footway or dedicated cycle provision. The sensitivity of these roads is considered to be negligible. The sensitivity is considered to be low if there are footways and/or cycle provision, and medium if there are residential frontages or particularly sensitive receptors, eg a hospital. A table is provided in **ES Appendix 12.9.1: Highway Flows and Driver Delay Review** (Doc Ref. 5.3) which sets out the sensitivity considered for each link within the study area.

12.4.38 For car drivers and passengers, the sensitivity on roads is considered to be low if there is generally no congestion and the road is not considered to be particularly sensitive to changes in traffic. The sensitivity is considered to be medium if there is sometimes congestion or if the road is of strategic importance, and therefore more sensitive to changes in traffic. For the purposes of assessing driver delay, junctions are only considered where the volume of traffic is over 80% of the capacity of the junction in the with Project scenario, and which are therefore becoming congested (ie with a V/C ratio of over 80%), in order to provide a focus on potential significant effects. Car drivers and passengers are considered to have medium sensitivity where V/C ratios are 80% or higher. This 80% V/C ratio threshold has been reduced from the 85% used in the PEIR, to reflect stakeholder comments.

12.4.39 In terms of crowding on rail services, rail passengers on busy train services will be more sensitive to increases in demand. Rail services where seats are available to passengers are considered to have low sensitivity. Rail services where passenger demand exceeds the number of seats but is within standing capacity are considered to have medium

sensitivity. Rail services where passenger demand exceeds standing capacity are considered to have high sensitivity.

12.4.40 For station crowding, higher crowding means a lower standard of passenger comfort and a reduction in crowding means improved passenger comfort. Paragraphs 12.4.59 to 12.4.62 set out the Level of Service (LoS) methodology, which ranges from LoS A to F (see Diagram 12.4.6). LoS A represents free flow and LoS F a complete breakdown in circulation. LoS C is typically used for designing transport interchanges. For the purposes of this assessment, passengers experiencing LoS C or better are considered to have a low sensitivity to increases in crowding, those experiencing LoS D are considered to have medium sensitivity and those experiencing LoS E or F are considered to have high sensitivity.

Magnitude of impact

12.4.41 The magnitude of impact has taken into account the impact duration which is defined as follows for the purposes of this assessment:

- short term: a period of months, up to one year;
- medium term: a period of more than one year, up to five years; and
- long term: a period of greater than five years.

12.4.42 The criteria used to assess the magnitude of impact, are described below in Table 12.4.4. For some assessment topics, the magnitude of impact is specially defined in the IEMA guidance (1993), and these are set out in the following sections for each impact.

Table 12.4.4: Impact magnitude criteria

Magnitude of Impact	Definition
High	Changes which are likely to be perceptible and which would significantly change conditions which would otherwise prevail to the extent that it would significantly affect travel behaviour.
Medium	Changes which are likely to be perceptible and which would materially change conditions which would otherwise prevail to the extent that it may affect travel behaviour to a measurable degree.
Low	Changes which are likely to be perceptible but not the extent that they would materially change conditions which would otherwise prevail.
Negligible	Changes which are just perceptible.
No Change	No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Severance

12.4.43 IEMA (1993) defines severance as the perceived divisions that can occur within a community when it becomes separated by a traffic route. Severance may result from the difficulty of crossing a heavily trafficked road or a physical barrier created by the road itself.

12.4.44 The assessment thresholds are based on changes in traffic flows as set out in the IEMA guidelines (1993) as set out in Table 12.4.5. IEMA (1993) states that full regard should be

given to specific local conditions, such as whether crossing facilities are provided. Peak hour two-way traffic flows have been used to assess severance.

Table 12.4.5: Magnitude of impact for severance

Magnitude of Impact – Severance	Changes in Traffic Flow
High	More than 90%
Medium	60% to 90%
Low	30% to 60%
Negligible	0% to 30%
No Change	No change in traffic flows

12.4.45 The DMRB (National Highways *et al*., 2022) defines community severance as the extent to which members of communities are able (or not able) to move around their community and access services/facilities. This DMRB assessment has been undertaken separately and is contained in Chapter 19: Agricultural Land Use and Recreation.

12.4.46 For the purposes of reporting, highway flows for links within the study area are contained in **ES Appendix 12.9.1: Highway Flows and Driver Delay Review** (Doc Ref. 5.3), with those which have a magnitude of impact of low, medium, and high assessed within this chapter to focus on potential significant effects on people.

Driver delay

12.4.47 The IEMA guidance (1993) on assessing driver delay requires the use of modelling packages. Driver delay can occur where the Project results in additional vehicular movements at junctions and along highway links. Increased pedestrian movements at crossing points could also have an impact on driver delay.

12.4.48 The IEMA guidance (1993) does not define the magnitude of impact for driver delay. For the purposes of this report, ratios expressing the total traffic volume with respect to its total available capacity (the V/C ratio) have been taken from strategic modelling for nodes in the model and have been used to assess the level of congestion. The approach to the magnitude of impact for driver delay is set out in Table 12.4.6. Junctions with a V/C ratio of over 80% in the with Project scenarios are considered in this chapter to focus on potential significant effects.

Table 12.4.6: Magnitude of impact for driver delay

Magnitude of Impact – Driver Delay	Volume to Capacity (V/C) ratio			
	80-85%	85-90%	90-95%	95% or more
<2 percentage point change in V/C ratio	Negligible	Negligible	Negligible	Negligible
2-5 percentage point change in V/C ratio	Low	Low	Low	Medium

Between 5-10 percentage point change in V/C ratio	Low	Low	Medium	High
>10 percentage point change in V/C ratio	Low	Medium	High	High

Pedestrian and cyclist delay

12.4.49 IEMA (1993) states that changes in volume, composition or speed of traffic may affect the ability of pedestrians to cross roads. The IEMA guidelines do not prescribe any quantitative criteria for the assessment of pedestrian delay. Instead, professional judgement has been used to determine the magnitude of pedestrian and cyclist delays, taking into account pedestrian and cycle routes and pedestrian crossing facilities.

Pedestrian and cyclist amenity

12.4.50 IEMA (1993) defines pedestrian amenity as the relative pleasantness of a journey. It is affected by traffic flow, traffic composition, and footway width/separation from traffic. The IEMA guidelines suggest that the threshold for judging the significance of changes in pedestrian amenity would be where the traffic flow is doubled.

12.4.51 The perception of traffic can also affect fear and intimidation for pedestrians and cyclists. IEMA (1993) identifies the impact of fear and intimidation is dependent on the volume of traffic, the HGV composition, the proximity of traffic to people, or the level of protection caused by factors such as narrow pavement widths. There are no commonly agreed thresholds for fear and intimidation. Professional judgement has been used to determine the magnitude of impact on pedestrian and cyclist amenity, taking into account the degree of hazard, the changes in traffic flows and also the provision of pedestrian and cyclist facilities.

Accidents and safety

12.4.52 IEMA (1993) references the use of professional judgement to assess the accident and safety impacts. Implications of local circumstances, or factors which may elevate or lessen risks of accidents, such as junction conflicts, would be considered.

12.4.53 Changes in traffic flows and highway design could influence the risk of accidents. Surface access improvements are proposed as part of the Project, and the proposed design changes to the highway network have been subject to a Road Safety Audit. Therefore, professional judgement has been used to consider the risks in terms of accidents and safety, taking into account changes in traffic flows, existing accident clusters, and the design of the proposed surface access improvements.

Hazardous loads

12.4.54 IEMA (1993) recognises that some developments may involve the transportation of dangerous or hazardous loads (such as gases, inflammable liquids, toxic substances, or radioactive material) by road. The Project is not expected to generate hazardous loads but changes to highway design and temporary diversion routes during the construction period could affect the existing transportation of hazardous loads on the public highway.

Rail network and rail users

12.4.55 No IEMA or DMRB guidance exists for the measurement of public transport amenity. For the purposes of this assessment, crowding assessments on rail services to and from

Gatwick Airport and crowding at Gatwick Airport station have been used to indicate public transport amenity.

Rail crowding

12.4.56 The EMME platform has been used for the public transport modelling for Gatwick Airport railway station. EMME is a well-established and reliable software model for public transport assignment, including modelling impacts of in-vehicle crowding on passenger route choice. The PLANET South model has been used for the assessment of rail effects.

12.4.57 Line loading data, as well as information on seating and standing capacity by line, have been used to determine crowding. If all passengers have a seat, this is assumed to be a more comfortable journey with low levels of crowding. More passengers standing indicates a reduction in space and less comfortable journeys and higher crowding.

12.4.58 The approach to assess rail crowding is as follows:

- Assess the percentage increase in line loadings as the result of the Project (note line loadings shown are on departure from each station).
- Review the seating capacity on the services being considered.
- If the number of passengers exceeds the number of seats, a further assessment is undertaken on the standing capacity in terms of percentage occupied. The criteria considered in determining the magnitude of impact for rail crowding are shown in Table 12.4.7.

Table 12.4.7: Magnitude of impact for rail crowding

Magnitude of impact – rail crowding	Rail crowding – change in occupied standing capacity
High	Over 30 percentage points
Medium	10 to 30 percentage points
Low	0 to 10 percentage points
Negligible	No change, or the number of seats exceeds the number of passengers, ie all passengers can be seated.
No Change	

Railway station crowding

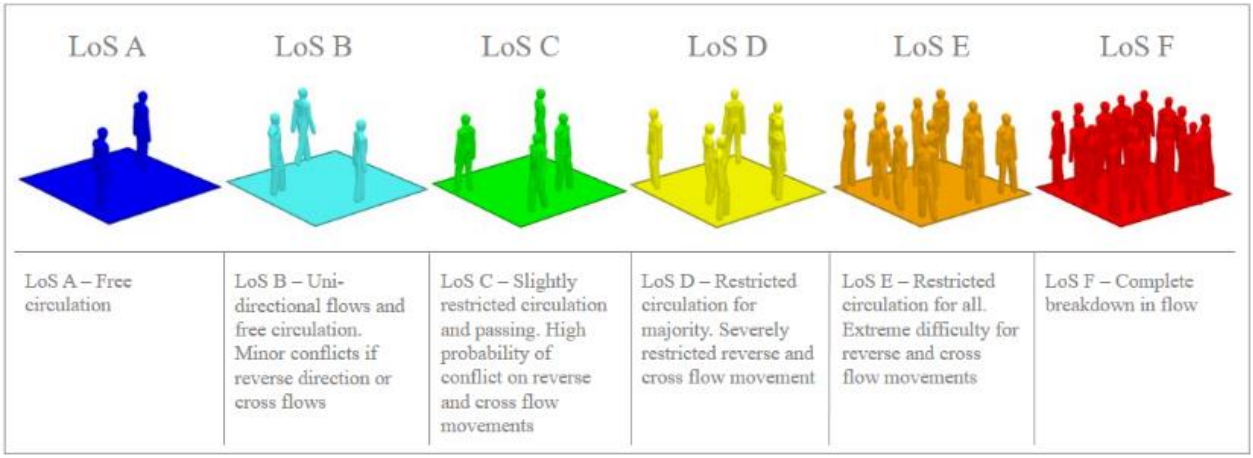
12.4.59 The assessment of crowding in Gatwick Airport railway station has been modelled in Legion using the calibrated and validated model developed by Network Rail for AM and PM peak periods (07:00-09:00 and 16:00-18:00).

12.4.60 In the station, higher crowding means a lower standard of passenger comfort and a reduction in crowding means improved passenger comfort. Crowding has been assessed in line with Station Capacity Planning Guidance (Network Rail, 2016). The assessment of crowding is based on the Fruin Level of Service criteria. Level of Service (LoS) is used to describe pedestrian movement, relating density of pedestrians and flow rates for walkways and circulation areas, stairs and in queues, with LoS A representing free flow and LoS F a complete breakdown in circulation.

12.4.61 LoS C is typically used for designing transport interchanges as it provides a balance between congestion, design, and operations. Network Rail therefore typically recommends

LoS C or better for the design of new stations and station enhancements. LoS D can be considered acceptable in peak conditions at existing stations for short durations or where flows are predominantly one-way.

Diagram 12.4.6 Levels of Service ranges



12.4.62 Changes in station crowding level have been used to estimate the magnitude of impact of the Project. Where there is no change in Level of Service experienced between the baseline conditions and the 'with Project' scenarios, the impact is considered to be negligible. Changes in Level of Service by one category (ie a change from LoS C to LoS D) are defined as a low to medium impact. Changes in LoS by two categories (such as between LoS C and LoS E) are defined as a medium to high impact.

Table 12.4.8: Magnitude of impact for public transport amenity

Magnitude of impact – public transport amenity	Level of Service in the railway station
High	A change of two Levels of Service.
Medium	
Low	A change of one Level of Service.
Negligible	No change in Level of Service experienced in the station.
No Change	

Other public transport services and users

12.4.63 A bus and coach network model has been developed in EMME software and complements the rail modelling undertaken in PLANET South to create the overarching public transport model.

12.4.64 The public transport model includes all bus and coach services used to access the Airport by air passengers and employees. The information for bus/coach route coding has been obtained through discussions with operators, data from GAL and other publicly available data sources.

12.4.65 Given the adaptability of bus and coach provision, it is expected that operators will increase services to meet demand. For many local authority areas, the change in bus or coach trips is very small and would not require a change in bus or coach frequency. However, gradual increases in capacity could be expected to be required over time with a

sustained increase in demand. Therefore, it is not considered necessary to model crowding on bus and coach services explicitly within the modelling framework. The assessment does however consider service frequency as a measure of public transport amenity. More information is contained in the TA. Table 12.4.9 illustrates the coaches per day assumed for each assessment year with and without the Project. The services which GAL will look to bring forward in the future baseline and with Project scenarios are described in Sections 12.6 and 12.7.3.

Table 12.4.9: Assumed number of coaches per day

Terminus	2029		2032		2047	
	Future baseline	With Project	Future baseline	With Project	Future baseline	With Project
Bognor Regis	2	2	2	3	2	3
Brighton	21	23	22	27	25	30
Bristol*	7	8	8	9	9	10
Cardiff*	9	10	10	12	11	13
Chingford	16	17	16	20	19	22
Derby/Nottingham*	12	13	12	15	14	17
Heathrow*	5	5	5	6	5	7
Northampton*	9	10	10	12	11	13
Norwich*	11	12	12	14	13	16
Oxford	27	28	27	33	31	37
Park Royal	12	13	12	15	14	16
Poole	11	11	11	13	12	15
Rayleigh	16	17	16	20	19	22
Southend	16	17	16	20	19	22
Swansea*	13	14	14	17	16	19
Victoria	61	65	62	76	71	85
Worthing	4	4	4	5	5	6
Wolverhampton*	8	9	8	10	9	11

* indicates via Heathrow

Significance of effect

12.4.66 The significance of the effect upon traffic and transport has been determined by taking into account the sensitivity of the receptor and the magnitude of the impact. The method employed for this assessment is presented in Table 12.4.10. Where a range of significance levels are presented, the final assessment for each effect has been based upon expert judgement.

12.4.67 In all cases, the evaluation of receptor sensitivity, impact magnitude, and significance of effect has been informed by professional judgement and is underpinned by narrative to explain the conclusions reached.

12.4.68 For the purpose of this assessment, any effects with a significance level of minor or less are not considered to be significant in terms of the EIA Regulations.

Table 12.4.10: Assessment matrix

Sensitivity	Magnitude of impact				
	No change	**Negligible**	**Low**	**Medium**	**High**
Negligible	No change	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	No change	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	No change	Negligible or Minor	Minor	Moderate	Moderate or Major
High	No change	Minor	Minor or Moderate	Moderate or Major	Major or Substantial
Very High	No change	Minor	Moderate or Major	Major or Substantial	Substantial

12.4.69 A description of the significance levels is provided in the bullets below:

- Substantial: Only adverse effects are normally assigned this level of significance. These effects are generally, but not exclusively, associated with changes of international, national, or regional importance (such as on the strategic highway network) that are likely to suffer a most damaging impact. However, a major change of local importance may also enter this category.
- Major: These beneficial or adverse effects are considered to be very important considerations on the receptors (pedestrians, cyclists, public transport users and highway users).
- Moderate: These beneficial or adverse effects may be important. The cumulative effects of such factors may lead to an increase in the overall effect on a particular receptor.
- Minor: These beneficial or adverse effects may be raised as local factors. They may be important in enhancing the subsequent design of the project.
- Negligible: No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

12.5. Assumptions and limitations of the assessment

12.5.1 The assessments contained in this chapter are based on information and assumptions about the following parameters:

- passenger forecasts, based on a scenario with no Heathrow third runway;
- mode shares and travel patterns of future users of the Project based on strategic modelling work;
- the distribution of trips on the network;
- committed developments (in accordance with TAG Unit M4); and
- TEMPro growth to indicate background growth associated with cumulative schemes.

12.5.2 Technical details of the above assumptions are set in the **Transport Assessment Annex B – Strategic Transport Modelling Report** (Doc Ref. 7.4) which is an annex of the **Transport Assessment** (Doc Ref. 7.4).

12.5.3 Strategic multi-modal modelling has been undertaken which informs mode shares and the resulting traffic flows and rail loadings used in this assessment. Further information on passenger forecasts, trip generation and mode shares are contained in the TA.

12.5.4 This assessment uses historical passenger terminal counts provided by GAL and assumes that future baseline travel behaviour will be similar to that in 2018. Employee data from 2016 has been extrapolated to 2018. These datasets have been combined, for the purposes of informing inputs to the assessment of likely effects of the Project on air quality and carbon where required.

12.5.5 In developing the strategic model, every effort has been made to ensure the model networks reflect the expected future network state, with the coding of junctions being appropriate and traffic loading from zones being reasonable. However, where high levels of congestion are predicted within such models, a localised effect known as 'model noise' can occur. This results in traffic demand switching between routes in successive iterations (of a model run), and when compared against a corresponding scenario, may indicate effects that do not appear logical in the context of the test. This can indicate lower levels of model convergence in specific localised areas, which can make the model results subject to higher levels of uncertainty.

12.5.6 Within the Gatwick model, some localised model noise has been identified in two particular areas – Croydon and Steyning. These locations have been reviewed in detail and it is clear that airport traffic represents a very small proportion of traffic in these areas (less than 1%). The large changes in traffic flows between future baseline and with Project scenarios in these areas, and the associated impacts, are due to background traffic switching between routes with very similar journey times within the model. In practice this is unlikely to happen, for instance because the alternative route is unsuitable or is not the signed route on the ground, and in such cases the assessment includes professional judgement on the likelihood of such impacts occurring.

12.5.7 The interaction of airport and non-airport travel demand is complex and in part driven by the seasonal variations in travel demand. The airport peak period occurs in August, when there are lower levels of background (ie non-airport) trip demand, particularly in highway peak hours, because of reduced commuting activity in this summer school holiday period. For the PEIR, the modelling work used August peak airport-related demand combined with June non-airport demand, recognising that because June is outside the school holiday period, non-airport demand is typically between 2% and 6% higher in June than in August.

12.5.8 This approach used in the PEIR therefore combined peak demand from both airport and non-airport sources. In preparing the modelling for the application, it was concluded that although very robust, this approach presented an unrealistic scenario that would not actually occur in practice and that it would be more realistic for the modelling to be based on a common month for both airport and non-airport demand.

12.5.9 For the assessments contained in this chapter, the modelling is based on combining non-airport demand for a typical June weekday with airport-related demand for a peak June weekday. Airport-related demand in June would only be exceeded on around 7% of weekdays (18 days) in the rest of the year, based on current patterns, and those busier weekdays would be in the summer school holiday period. Airport-related demand on a peak June weekday would be some 3.5% lower than on the busiest August day, based on current patterns. Furthermore, since the air traffic forecasts on which the assessment is based assume more 'busy' days in the future, the difference between the June peak day

and August peak day would reduce to between 1% and 2% in future years. Conversely, as non-airport demand in June is between 2% and 6% higher than in August, this counterbalances the slightly lower airport-related demand in June.

12.5.10 The approach taken for this assessment therefore provides a consistent approach, by using the same month for airport and non-airport demand, and thus represents a realistic worst case. It represents the busier conditions generally anticipated during non-school holiday periods of the year combined with airport demand which is close to that expected on the very busiest days of the year. On this basis, the revised approach is considered appropriate and provides a robust case for the purposes of the assessments for the Project.

12.5.11 The assessment of traffic impacts includes consideration of the Project construction periods.

- Airfield Construction – The peak airport construction assessment is based on the construction assumptions (see Chapter 5 of this ES) for the core airfield works required to enable operation of the Project (with runway opening assumed in 2029). Airfield construction would take place between 2024 and 2029 and has been modelled using a 2029 future baseline highway network as a robust case for baseline traffic flows (ie, the model uses the highest background traffic flows likely to occur in the airfield construction period). Forecast year traffic has been derived using the information and process set out in paragraph 12.4.26. Some residual activity related to build-out will continue beyond 2029 but remaining activity is expected to be similar to future baseline (business-as-usual) levels, which include the everyday construction and maintenance works associated with normal airport operations. This is already accounted for in the traffic data used for the modelling and the assessment.
- Highway Construction – A separate assessment has been undertaken for the construction of the surface access improvements. The surface access improvements are anticipated to be complete by the summer period after the third anniversary of the opening of the northern runway, and thus assumed to be complete by 2032 in this assessment. Construction is anticipated to commence in 2028, with the most complex traffic management arrangements being in place through the second half of 2029. This construction scenario has therefore been modelled using the 2029 with Project demand, reflecting operational demand growth associated with the northern runway, on the existing network with modifications in order to facilitate construction of the proposed surface access improvements works.

12.5.12 Given industrial action by Southern as well as rail disruption associated with works at London Bridge from late 2016 to 2018, the construction of the M23 Smart Motorway Project from 2018 to 2020 and the Covid-19 pandemic, it has not been possible to update this base position with a more recent dataset (see paragraphs 12.4.27 and 12.6.1 to 12.6.5). It should be noted that the Project is assessed against future baseline years, rather than against 2016.

12.5.13 GAL notes the DfT published guidance in May 2023 which supplies advice regarding the treatment of the Covid-19 pandemic in transport modelling[3], including in relation to the proportionate accounting for the pandemic in prior-calibrated models. The advice acknowledges that in the near future the large majority of transport models will continue to

[3] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1161977/tag-unit-m4-forecasting-and-uncertainty.pdf

use baselines established prior to the pandemic (as with the Project's transport model for the reasons discussed above) and accepts that the practical course of action in relation to any rebasing or adjustments to such models in respect of this guidance will be subject to professional judgment from the relevant expert analyst. Whilst the timing of the publication of this guidance was such that it was not possible or practicable to review the Project's transport model in its respect ahead of the submission of the Application, GAL confirms it will carefully review the guidance and consider the need for any necessary updates or adjustments to its transport model (and the implications for the assessments which depend on its outputs) in the post-application period, and in consultation with National Highways and the local Highway Authorities.

12.5.14 The impact of growth on rail passenger flows through Gatwick Airport railway station uses Network Rail's simulation model built for the station upgrade project using Legion software. The station modelling undertaken in Legion includes all airport-related rail users and assumes a proportion of visitors (meeter-greeters, well-wishers) as well as commuter use of Gatwick Airport railway station.

12.5.15 The rail crowding modelling and analysis did not specifically include consideration of space taken up by luggage. However, it provides forecasts of the proportion of seats taken in each scenario. It is assumed that all seats are available for passenger use, and that air passengers place their luggage in overhead luggage racks, under the seats, in the luggage compartments provided throughout the train, or on the floor, but not on the seats. If luggage is placed on the floor it takes up space that would otherwise be available for standing but does not affect the seated capacity. Where occupied standing capacity is approaching capacity, further consideration has been given to any implications that might arise from luggage occupying standing space.

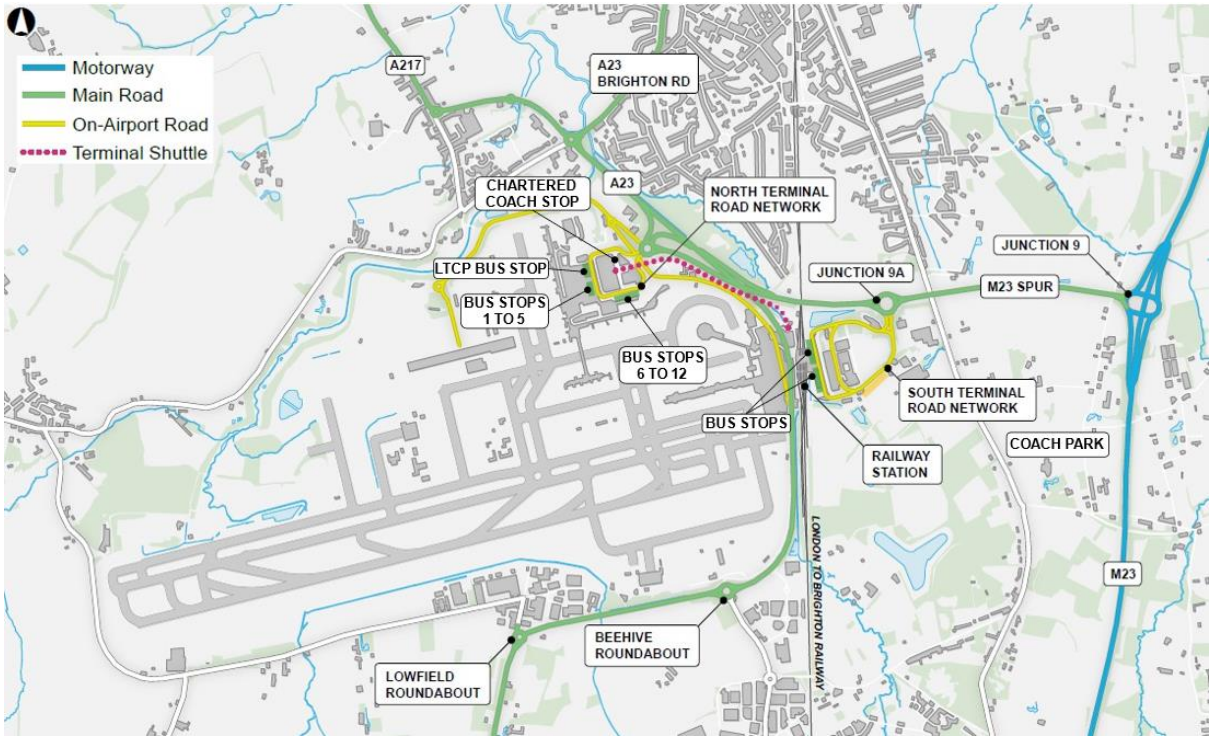
12.5.16 The ES assessment uses the best information available at the time of writing. Where possible, a robust approach has been taken to minimise the risk of under reporting effects. Where assumptions have been made, these are stated where appropriate in the assessment.

12.6. Baseline environment

Existing baseline

12.6.1 Gatwick is well located to the strategic highway network and is a transport hub, where a range of modes connect, acting as both a destination and an interchange for passengers. Gatwick Airport has 24-hour rail, bus and express coach access, and access by a range of modes are shown on Diagram 12.6.1.

Diagram 12.6.1 – Gatwick Airport transport overview



12.6.2 A summary of the 2022 baseline is provided in this section, using the latest information where available. The modelling baseline assessment year is 2016, based on a 2016 calibrated and validated transport model. The 2016 model provided base flows which have been extrapolated to describe relevant 2018 conditions as input to the noise, air quality and carbon assessments. This is the same approach as outlined in the ES Scoping Report and PEIR. Additional commentary is provided in this section on any baseline differences between 2016 and 2022.

12.6.3 The Covid-19 pandemic had a very severe impact on the global aviation industry in 2020. Gatwick, along with all other UK airports, experienced a significant reduction in passenger traffic levels as a result of both Government-imposed restrictions on air travel and reduced passenger demand driven by low consumer confidence.

12.6.4 Passenger numbers at Gatwick decreased from over 46.6 mppa in 2019 to 10.2 mppa in 2020. Government travel restrictions continued to have an impact on passenger demand and traffic levels throughout 2021, but by the end of 2021 and through 2022, traffic levels started to recover.

12.6.5 It is anticipated that demand at Gatwick will return to pre-Covid levels by the mid-2020s.

12.6.6 It should be noted that for each assessment year, the Project is assessed against future baseline conditions in that year, which include any committed changes or improvements to the transport network. This reflects the likely effects for each of the assessment years and is in keeping with IEMA (1993) guidance. The existing baseline is therefore used to provide an indication of the existing transport situation, from which the future baselines are developed.

Mode share and travel patterns

12.6.7 Table 12.6.1 shows the passenger mode shares from the Gatwick 2018 Airport Surface Access Strategy and 2017 CAA data, and staff mode shares from the 2016 Gatwick Employer and Travel to Work Survey. The mode shares shown provide an indication of travel patterns to the Airport.

Table 12.6.1: Staff (2016) and passenger (2017/2018) mode shares

Mode	Passenger	Staff
Rail	39%	12%
Bus/Coach	6%	16%
Walk/Cycle	0%	3%
Car Driver	39%	52%
Car Share		8%
Taxi	15%	0%
Car rental	1%	0%
Company	N/A	6%
Other	0%	3%
Total	**100%**	**100%**

12.6.8 Table 12.6.1 shows that the Airport achieved an annual average public transport mode share for passengers of over 45%, with 39% of passengers coming to the Airport by rail and 6% by bus and coach in 2018. Around 55% of passengers access the Airport by car-based modes, with almost 40% of passengers coming by private car, either as pick-up and drop-off trips to terminal forecourts or to park their car at the Airport.

12.6.9 It should be noted that there is significant quarter-by-quarter variation in passenger mode share, which is an important consideration for the assessment. The assessment has been undertaken to test a busy summer day at the Airport which is when public transport mode share is lower owing to the higher proportion of UK outbound leisure passengers. Public transport mode share for the busiest summer months in 2019 was 43.4% as compared to the yearly average of 47.4%.

12.6.10 Table 12.6.1 shows the sustainable mode share for employees was 31% excluding car share and company travel (shared transport provided by individual airlines and other on-airport employers) and 45% including those methods of travel.

12.6.11 CAA surveys to first quarter 2020 (prior to the impact of Covid-19) show a continuing improvement in public transport mode share year-on-year, up to 47.4% in 2019 and 47.8% in the 12 months to March 2020. Post-pandemic mode share data are emerging. The CAA released 2022 mode share data in April 2023 which is included in the TA to provide the most recent available information and to allow comparison where appropriate with the 2016 data on which the transport modelling is based. For 2022, public transport mode share was 43.7%.

12.6.12 It should also be noted that 2022 data is not expected to be fully representative due to a variety of other domestic factors (such as public transport services not having fully recovered to pre-pandemic levels), and global factors (such as flights to some destinations not being available due to ongoing restrictions).

Highway network

12.6.13 Gatwick can be directly accessed from the national strategic road network via the M23 motorway, which runs north-south adjacent to the Airport. Junction 9 of the M23 is the main access point with an onward link of motorway (M23 Spur) to Junction 9a at the Airport's South Terminal Roundabout. National Highways' M23 Smart Motorway Project was completed in Summer 2020. This has added additional running lane capacity to the strategic network serving Gatwick at peak times.

12.6.14 The typical journey time from Gatwick to the M25 via the M23 is less than ten minutes. From the M25, there is access to the wider UK strategic road network.

12.6.15 The A23, which runs parallel to the M23, continues north beyond the M25 into London via Croydon and Brixton to the West End and the City. It connects south London and Croydon, through Redhill then Horley and Gatwick, through Crawley and providing a connection to the south through Pease Pottage to Brighton.

12.6.16 South of Gatwick, the M23/A23 continues as a strategic highway corridor from London to Brighton on the South Coast. Brighton is approximately 30 to 45 minutes from the Airport by road in the off-peak and peak periods respectively. The A23 connects with the A272 and A27 east – west routes, placing the whole of the South Coast between Southampton and Folkestone within approximately one hour and 20 minutes of the Airport.

12.6.17 The M25 is busy and can be slow-moving and congested at peak times. National Highways is committed to improving conditions on the M25, through a variety of committed enhancements as well as the M25 South West Quadrant study, which is looking at ways to enhance capacity from Junctions 7 (for the M23) to 16 (for the M40) of M25. In addition, the proposed Lower Thames Crossing linking Essex and Kent will provide additional cross-river capacity east of London, relieving congestion on the M25 at the existing Dartford Crossing and improving accessibility to South Coast ports.

12.6.18 Surface transport facilities within the Airport boundary are made up of on-airport roads, forecourts and car parks, including facilities for coaches, taxis and car rental companies. GAL has recently completed works to improve the North Terminal Forecourt and has introduced forecourt charging at both terminals. There are currently around 46,700 car parking spaces 'on-airport', including staff parking, and a further 21,200 authorised spaces 'off-airport'.

Accident data

12.6.19 Department for Transport STATS19 road safety data has been examined for the study area for the latest available five years (2017 to 2021). Accidents which occurred within 30 m of the study area links and adjacent junctions are shown in Diagram 12.6.2, and a more detailed plan around the Airport is shown in Diagram 12.6.3. The study area links are defined as per the approach set out in paragraph 12.4.12.

Diagram 12.6.2: Five-year accident data within 30 m of a study area link

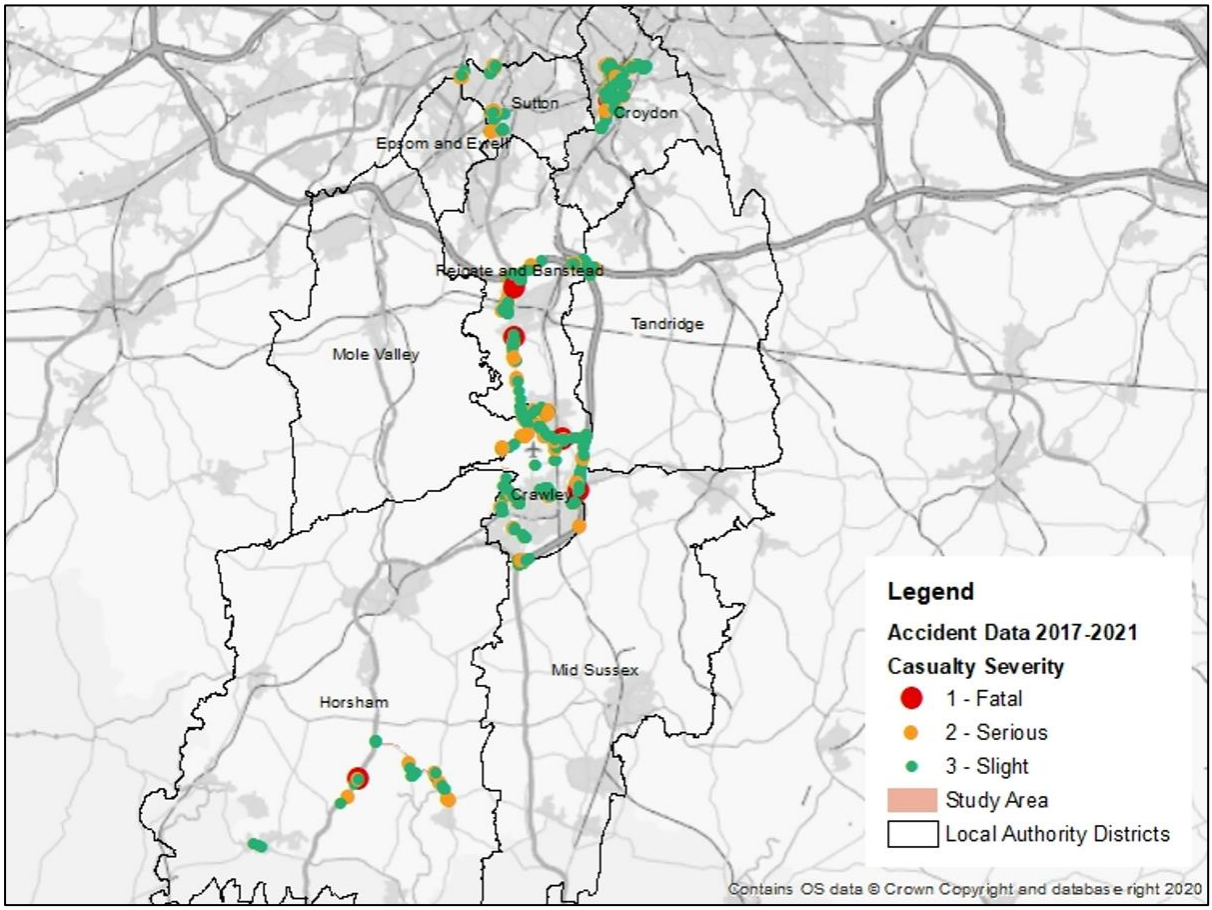
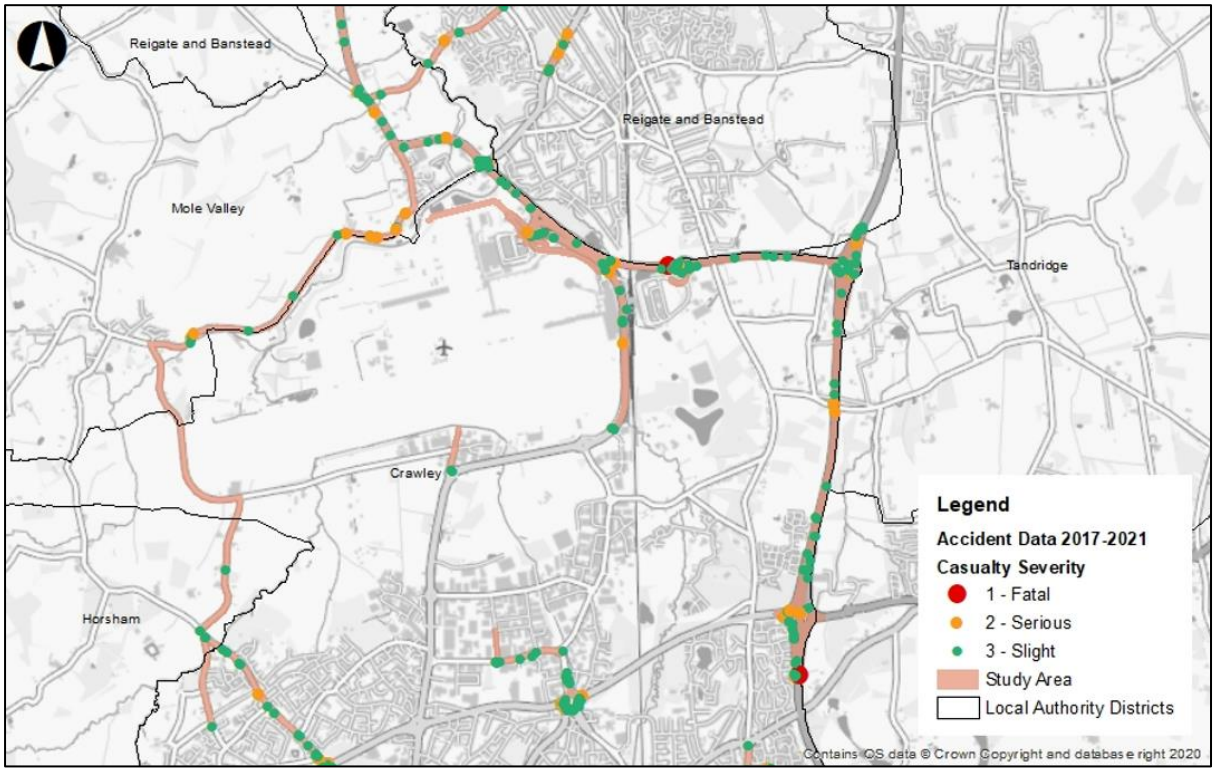


Diagram 12.6.3: Five-year accident data in the vicinity of the airport



12.6.20 The total number of accidents per year within 30 m of a study area link is summarised in Table 12.6.2. The average annual number of accidents by local authority is shown in Table 12.6.2.

Table 12.6.2: Summary of accidents from 2017 to 2021

Year	2017	2018	2019	2020	2021
Fatal	1	1	4	0	0
Serious	27	26	39	34	27
Slight	241	222	208	155	171
Total	**269**	**249**	**251**	**189**	**198**

Table 12.6.3 Accident Data (average per year)

Location	Average annual number of accidents, 2017 to 2021 (highest recorded injury severity)			
	Fatal	Serious	Slight	Total
Total accidents within 30 m of a study area link	0.8	30.6	199.4	230.8
Crawley	0	6.6	49.2	55.8
Croydon	0.2	10.2	83.8	94.2
Horsham	0.2	1.6	6.2	8
Mid Sussex	0	0	0.8	0.8
Mole Valley	0	2.2	6.4	8.6
Reigate and Banstead	0.4	6.2	32	38.6
Sutton	0	3.4	17.2	20.6
Tandridge	0	0.4	3.8	4.2

12.6.21 The above shows that on average, 231 accidents per year occurred within the study area over the five-year period. Of these, 199 accidents resulted in slight injuries (86%), 31 resulted in serious injuries (13%) and less than one on average over five years resulted in a fatality.

12.6.22 The location of the accidents suggest that junctions tend to have a higher risk of accidents because of potential conflicts and sensitivity to human error.

Rail

12.6.23 Gatwick Airport station has regular, direct daily services from over 120 stations. Over 1,000 stations are accessible with one interchange. There are four train operators serving Gatwick Airport station.

- **Gatwick Express** provides a direct service to London Victoria, departing every 15 minutes in peak periods and taking around 30 minutes. Four trains per hour extend to Brighton at peak times, with two trains per hour to Brighton in off-peak periods.

- **Southern** provides services across London and the southeast, including London Victoria, Clapham Junction, Brighton, Southampton, Ore, Eastbourne, Littlehampton, Bognor Regis and Portsmouth, as well as many local stations.
- **Thameslink** connects Gatwick Airport to Brighton, Horsham and Three Bridges, as well as central London through London Bridge, St. Pancras International and Farringdon, and north to Bedford, Cambridge and Peterborough. Thameslink also provides a direct train to Luton Airport Parkway.
- **Great Western** runs an hourly service between Gatwick Airport and Reading, via Redhill, Reigate and Guildford.

12.6.24 Rail frequencies are provided below for the current situation (2022) and the modelling baseline (2016). This illustrates that peak rail frequencies are very similar to pre-pandemic levels but that frequencies have not yet regained that position in the interpeak period.

Table 12.6.4: Rail frequencies to Gatwick Airport

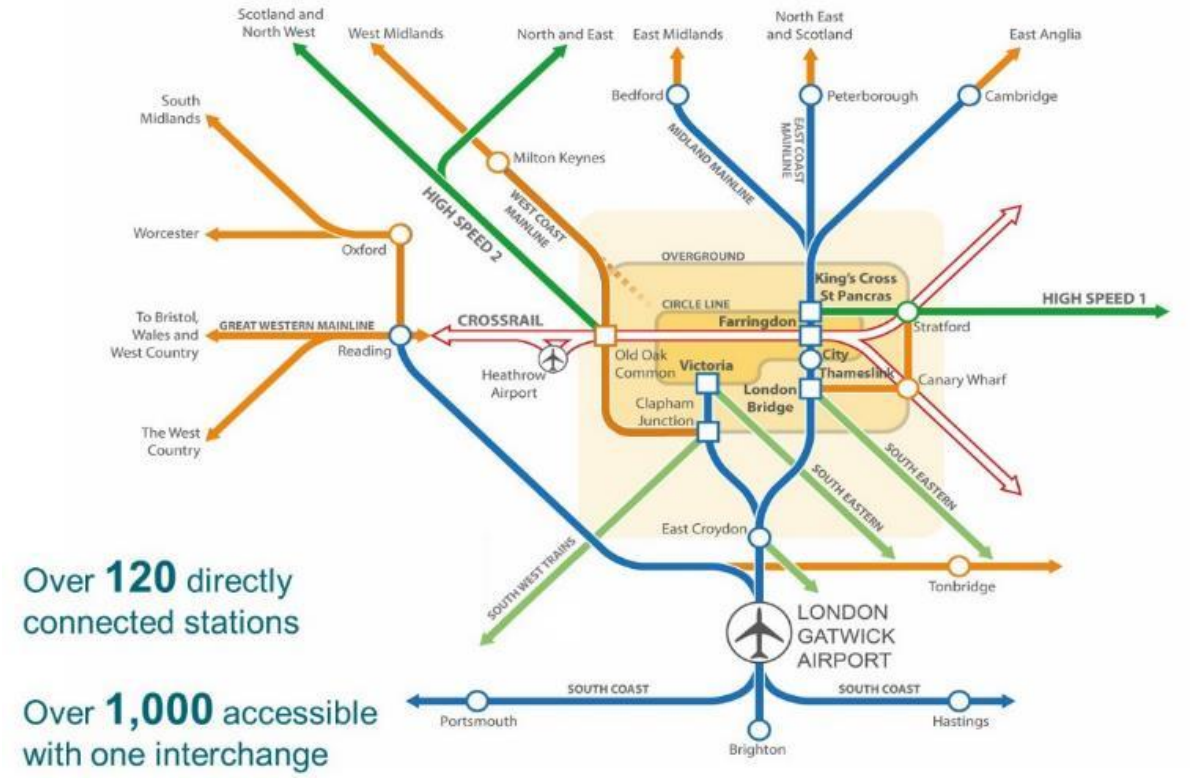
Operator/Service	Route	Peak frequency per hour (average hourly over 7am to 9am)		Interpeak peak frequency per hour	
		Modelling baseline 2016	**Baseline 2022**	**Modelling baseline 2016**	**Baseline 2022**
Gatwick Express	Brighton and Gatwick Airport non-stop to London Victoria	4 trains per hour	2 trains per hour	4 trains per hour	2 trains per hour
Southern (Brighton Main Line) London Victoria	South coast (Main Line) to Victoria via Gatwick, East Croydon and Clapham Junction	4-5 trains per hour	7 trains per hour	3 trains per hour	3 trains per hour
Southern (Arun Valley) London Victoria	South coast (Arun Valley) to London Victoria via Gatwick, East Croydon and Clapham Junction	Up to 1 train per hour	No trains	2 trains per hour	No trains
Southern London Bridge	South coast (Main Line) to London Bridge via Gatwick and East Croydon	1-2 trains per hour	No trains	No trains	No trains
Thameslink (Brighton Main Line) London Bridge	Littlehampton and Brighton to London Bridge via Gatwick and East Croydon	3 trains per hour**	4-5 trains per hour	6 trains per hour	4 trains per hour
Thameslink (Arun Valley) London Bridge	Horsham to London Bridge via Gatwick and East Croydon	No trains	4 trains per hour	2 trains per hour	2 trains per hour
Great Western (North Downs Line)	Reading to Gatwick Airport via Redhill	1 train per hour	1 train per hour	1 train per hour	1 train per hour
Total		**14-15 trains per hour**	**18-19 trains per hour**	**18 trains per hour**	**12 trains per hour**

***some trains terminated at Elephant and Castle whilst the Thameslink through platforms at London Bridge were closed for reconstruction*

12.6.25 Gatwick Airport station is part of London's Oyster and contactless fare payment network. From Gatwick Airport station, it is possible to travel directly to the City of London via the Thameslink route (with interchange to Docklands from London Bridge station or at

Farringdon on the Elizabeth Line) and to the West End via London's Victoria station. These services also directly connect the Airport to key interchanges at Croydon, Clapham Junction and Brighton. In the 2016 modelling baseline, the Elizabeth Line was not open, and it was added into the modelling work as part of the future baseline.

Diagram 12.6.4: Rail Connectivity Map



12.6.26 Gatwick Airport therefore enjoys a very high level of rail connectivity, with 22 trains to and from central London in the morning peak hour (12 via London Bridge and 10 to London Victoria, of which four are Gatwick Express services).

12.6.27 Train services can be busy in peak periods, with the busiest direction being into London in the morning and towards Brighton and the south coast in the evening. Trains towards London become increasingly busy further north of Gatwick Airport in the morning peak, whereas trains out of London towards Brighton and the south are already busy north of Gatwick Airport in the evening.

Bus and coach

12.6.28 Gatwick is served by frequent bus and coach services at both North and South Terminals. The operators include Metrobus, National Express, Megabus and Oxford Bus Company. On average there are approximately 450 daily arrivals and 500 daily departures, offering services to destinations throughout the UK. An extract of the Metrobus network map is appended in Figure 12.6.1.

Coach services

12.6.29 The Airport is served by a range of coach services, which complement and provide choice alongside the rail network. Many operators have invested in high quality vehicles,

customer service improvements and effective marketing which have contributed to more attractive coach services.

12.6.30 National Express provides a number of direct services to and from Gatwick and the most popular routes are summarised in Table 12.6.5 for the current situation (2022) and modelling baseline (2016). The table shows that coach services have not yet returned to pre-Covid levels. Scheduled journey times for some services vary, especially across peak periods. Several of the long-distance services also stop either at Heathrow's Central Bus Station or at Victoria Coach Station allowing for onward connections to a wider range of destinations. All services are expected to resume as passenger demand at the Airport returns.

Table 12.6.5: Popular National Express coach services to Gatwick

Routes	Modelling baseline 2016		Baseline 2022		Fastest journey time
	Service	Daily services	Service	Daily services	
London (Victoria) to Gatwick	A3	37	025	22	1 hr 50 mins
Brighton to Gatwick	025, 026, 028, 029, 201, 206, 747	23	025	19	40 mins
Heathrow to Gatwick	200, 201, 210, 230, 707, 727, 747	81	025, 201, 210	43	50 mins
Bristol to Gatwick	200, 201	19	201	8	3 hrs 35 mins
Birmingham to Gatwick	210	23	210	10	3 hrs 50 mins
Cardiff to Gatwick	201	22	201	8	4 hrs 30 mins
Swansea to Gatwick	201	15	201	8	5 hrs 40 mins

12.6.31 Other coach services which are either currently running or operated at Gatwick Airport pre-pandemic include the following:

- Megabus routes serving Gatwick from London (EB1) and Bristol (M25).
- Oxford Bus Company providing the Airline service between Gatwick and Oxford.

Local bus services

12.6.32 The majority of local bus services are provided by Metrobus and are used by airport staff and air passengers, as well as rail passengers accessing Gatwick Airport station.

12.6.33 Metrobus provides three 'Fastway' bus routes, calling at stops with shelters and real-time information displays and using a combination of bus lanes and guided busways to achieve bus priority over general traffic:

- 10: Bewbush – Broadfield – Crawley – Gatwick Airport;

- 20: Broadfield – Three Bridges – Gatwick Airport – Crawley – Horley; and
- 100: Maidenbower – Three Bridges – Crawley – Gatwick Airport – Horley – Redhill.

12.6.34 Metrobus also provides conventional routes:

- 4 and 5: Gatwick Airport – County Oak – Crawley – Pound Hill;
- 22: Holmbury St Mary – Docking – Crawley;
- 200: Horsham – Gatwick Airport;
- 400: East Grinstead – Gatwick Airport – Redhill – Caterham; and
- 460: Epsom – Redhill – Crawley.

12.6.35 Emphasis has been placed on improving early morning services to the Airport every day of the week in order to enable shift work staff to travel by bus. GAL has worked with Metrobus over many years to support and subsidise an extensive 24-hour, local bus network.

12.6.36 The appended Figure 12.6.1 shows an extract of the Metrobus map to illustrate the coverage of the bus network. The map shows that there is good local bus coverage in the local areas of Crawley and Horley, extending west to Horsham and north to Redhill, which is reflected in the staff mode shares in these areas.

12.6.37 All buses are low-floor, wheelchair accessible vehicles. Metrobus has introduced a range of ticketing options through the use of smart ticketing in the form of a smart Key Card. Airport staff are entitled to the Gatwick Travelcard key card which enables them to buy discounted bus travel. Staff can top up their smartcard online or at local travel shops.

12.6.38 All local buses are fitted with GPS technology, so users can find out how far away their bus is from any bus stop on the network using the internet or their smart phone. Many bus stops are also fitted with screens providing this information, as well as the exit from Gatwick Airport railway station. QR codes and NFC tags at bus stops, compatible with smart phone readers, make it even easier for users to get this information. Buses are also fitted with the 'Next Stop' screens which are very useful for infrequent travellers.

12.6.39 GAL has improved the customer experience for bus and coach services at the Airport through provision of a new waiting area at South Terminal for passengers and installation of new fully accessible lifts connecting South Terminal, the railway station and the A23 southbound bus stops.

Other bus and coach services

12.6.40 In common with other large airports, Gatwick also has a wide range of staff buses/coaches, licensed car park and car hire shuttle buses, hotel and guest house shuttle buses.

12.6.41 There are multiple hotel bus routes which operate on circular routes calling at both terminals in one direction. All routes operate seven days per week and include journeys in the early morning and late evening, in order to match demand from departing and arriving passengers.

12.6.42 There were also large numbers of bus movements associated with off-airport car parks and charter coach services operated by a large number of companies from across the UK.

Walking and cycling

12.6.43 Based on mode share information, very few air passengers walk or cycle to the Airport and a low percentage of staff walk or cycle to the Airport. Given the extent of the catchment area for walking and cycling trips, the focus to improve active travel is on staff from nearby residential areas, including Horley and Crawley.

12.6.44 Footways are provided along some of the internal forecourt roads where pedestrian movements are considered to be appropriate. Zebra crossings are provided along primary desire lines and signage is also provided to direct passengers to the terminals. In addition, GAL has introduced campus-wide advisory walking routes and maps for use by both passengers and employees. This includes a designated route between North Terminal and South Terminal.

12.6.45 There is also access to the Airport via Povey Cross Bridge which is convenient for staff living around Charlwood and Hookwood, and from the Balcombe Road for residential areas to the east of the Airport.

12.6.46 There are designated off-road walking routes towards Crawley and Horley which minimise conflicts with vehicles. The appended Figure 12.6.2 shows the key designated pedestrian routes along with a 2 km catchment to indicate the areas likely to attract walking trips.

12.6.47 The cycling catchment is expected to be larger and the appended Figure 12.6.3 shows the key designated cycling routes together with a 5 km catchment to indicate the areas likely to attract cycling trips.

12.6.48 National Cycle Route 21 (NCR21) provides a continuous route between Crawley, Gatwick, Horley, Reigate and London. Route 20 continues south towards Brighton and Route 21 continues east towards Royal Tunbridge Wells before heading south towards Eastbourne.

12.6.49 Within the vicinity of the Airport, NCR21 provides an A23 crossing in the form of a subway, located to the north of the South Terminal. It crosses the railway lines along a ramped subway to the north of Horley station and along St Mary's Drive to the north of Three Bridges station.

12.6.50 Cyclists and pedestrians using NCR21 currently have to navigate a number of underpasses and overbridges and, while some sections of the route provide adequate lighting and priority off-road space, other sections are not well signed and require users to switch to on-road facilities.

12.6.51 Signal controlled pedestrian crossings are located on all four arms of the Longbridge Roundabout. There is also a marked cycle lane on the A23 merge from North Terminal Roundabout, which becomes narrow and indistinct before terminating close to where the River Mole passes under the highway. From here it joins an overgrown unpaved track, which diverts away from the A23. There are no other pedestrian or cycle facilities along the A23 or M23 to the east.

Future baseline

12.6.52 The following paragraphs describe predicted future baseline scenarios, based on anticipated passenger growth in the absence of the Project. Chapter 4: Existing Site and Operation sets out the future airport context and the projects which are proposed or have already been consented and would proceed in the short term, in the absence of the

Project. These include airport passenger throughput, freight demand, additional car parking and Gatwick Airport station improvements which are all included in the future baseline. Minor improvements (signalisation and local widening) to South and North Terminal Roundabouts form part of the demand input and network structure of the strategic modelling.

12.6.53 As set out in paragraph 12.4.26, background traffic growth has been taken into account based on TEMPro growth factors and vehicle trips from developments which are sufficiently certain, using TAG criteria, to merit their inclusion in the future baseline for each of the assessment years. In London, data from TfL was adopted to modify the assumptions in London for growth in travel demand.

12.6.54 The future baseline also includes the measures in the current ASAS. The modelled measures are described in more detail at paragraphs 12.6.68 to 12.6.76.

2024-2029

12.6.55 Peak airport construction impacts are expected between 2024 and 2029. For the purposes of this assessment, 2029 traffic flows have been used to test the performance of the highway network to cope with the additional construction traffic associated with the Project.

12.6.56 The committed rail upgrade works at Gatwick Airport station will be in place in this future baseline scenario. Works commenced in 2019 and completion is expected in 2023. The works involve a larger concourse, five new lifts, eight new escalators, four new stairways and widening for two existing platforms to reduce overcrowding and improve accessibility. The works are expected to reduce train delays caused by platform overcrowding and congestion, while also improving passenger experience by providing easier connections to other destinations.

12.6.57 GAL is committed to working with National Highways to secure upgrades at South and North Terminal Roundabouts through local highway widening and signalisation in order to provide additional capacity for future baseline conditions. These improvements are identified in GAL's Capital Investment Programme (CIP) and are expected to be completed before 2029. No other committed improvements by highway authorities on the local highway network have been identified.

12.6.58 Some changes are expected to car parking, including the South Terminal Hilton Hotel multi storey car park (expected to be completed in 2024/2025 with 820 spaces), multi-storey car park 7 at North Terminal (expected to be completed in 2024 with 3,250 additional spaces), and use of robotics technology within existing South Terminal long stay parking areas to increase capacity, resulting in an additional 2,500 spaces by 2026. These improvements will result in approximately an additional 6,570 spaces.

12.6.59 No other committed infrastructure changes within the study area are expected for public transport or highway network.

2029

12.6.60 The 2029 future baseline passenger demand at Gatwick is forecast to be 57.3 million passengers per annum.

12.6.61 A number of rail, bus and coach improvements are anticipated to 2029, as set out at paragraph 12.6.72 below.

12.6.62 Relevant measures from the current ASAS, described below, are also included in the future baseline for 2029 and beyond.

Interim assessment year: 2032

12.6.63 The 2032 future baseline passenger demand at Gatwick is forecast to be 59.4 million passengers per annum. No additional changes are assumed by 2032.

12.6.64 Relevant measures from the current ASAS, described below, are also included in the future baseline.

Design year: 2047

12.6.65 The 2047 passenger demand at Gatwick is forecast to be 67.2 million passengers per annum.

12.6.66 By 2047 the North Downs Line is expected to be operating one additional train per hour between Gatwick Airport and Reading. No other committed changes within the study area are assumed for walking, cycling, public transport, or highway network.

12.6.67 Relevant measures from the current ASAS, described below, are also included in the future baseline.

Airport Surface Access Strategy (ASAS)

12.6.68 GAL is committed to sustainable growth and its Decade of Change strategy (GAL, 2021) sets ambitious carbon reduction targets. These inform headline mode share targets established for the future baseline, together with surface access measures, all of which are outlined in the latest Airport Surface Access Strategy 2022-2030 (GAL, October 2022). Measures contained within this ASAS are included in the future baseline modelling for this assessment.

12.6.69 GAL has also developed Surface Access Commitments (SACs) for the Project. The relationship between the SACs, the existing ASAS and the future ASAS is set out in the **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3).

Interventions

12.6.70 Based on the current Airport Surface Access Strategy 2022-2030 and the known status of other transport infrastructure and service improvements, relevant interventions have been included in the strategic modelling for the future baseline as set out below. In line with TAG, only those third-party schemes which are near certain or more than likely to occur have been included in the modelling.

12.6.71 Committed highway schemes included are:

- the M23 Smart Motorway Project;
- A27 east of Lewes;
- the M25 (J10 to J16) Smart Motorway Project[4];
- Lower Thames Crossing;
- M23 J9 northbound slip road widening;
- M23 J10 signalisation; and

[4] A review of this scheme will be undertaken based on the Government's announcement in April 2023 that all new Smart Highways plans are to be cancelled.

- M25 J8 improvement scheme.

12.6.72 Rail schemes to 2029 and beyond in the future baseline include:

- the Elizabeth Line;
- Thameslink frequency 24 trains per hr (tph);
- North Downs Line increase from 2 tph to 3 tph (increase from 1 tph to 2 tph at Gatwick Airport);
- London Underground Limited (LUL) Northern Line Extension;
- LUL, London Overground and DLR frequency and capacity improvements; and
- Gatwick Airport Station Project, doubling the size of the station concourse, adding five new lifts and eight escalators to improve passenger flow, and widening two platforms to reduce crowding.

12.6.73 The modelling also includes measures from the current ASAS. As part of the current ASAS, GAL will provide financial support through the Sustainable Transport Fund to enable enhanced bus and coach services. Based on GAL's experience of working with bus operators, the bus and coach assumptions included in the modelling work to 2029 and beyond in the future baseline are:

- As part of the 2022-2030 ASAS:
  - Frequency enhancements on local bus routes 4/5, 10, 20, 22 and 100.
  - New coach route (hourly in peaks, otherwise two-hourly) Uckfield – East Grinstead – Gatwick.
  - New coach route (two-hourly) Chatham – Maidstone – Sevenoaks – Gatwick.
  - New coach route (hourly) Romford – Upminster – Dartford – Gatwick.
- Increased coach frequencies in proportion to growth in air passengers over time, representing market reaction to increasing demand.

12.6.74 Car parking assumptions in the future baseline are:

- The addition of 6,570 air passenger car parking spaces, in the absence of the Project, bringing the total to 47,200 spaces throughout the period from 2029 to 2047;
- Staff car parking capacity at 6,100 spaces throughout the period 2029 to 2047; and
- Off-airport parking capacity held constant and occupancy capped at 87.5% of capacity, after which any off-airport parking demand is assumed to divert to on-airport car parks.

12.6.75 Charges for air passenger parking and forecourt use in the future baseline are assumed in the model to be as below:

- Car parking for air passengers charged at between £67 and £84 per typical length of stay by 2032 (in 2021 prices), with charges increasing at the retail price index (RPI) + 1% annually thereafter to 2047;
- Forecourt access charge at £11.50 by 2032 (in 2021 prices); and
- No charge for staff car parking.

12.6.76 There will be some active travel improvements in the future baseline situation, as part of the current ASAS, which are expected to encourage local staff to walk or cycle to the Airport. These improvements have not been included in the future baseline highway and public transport models, as the models do not provide sufficiently granular information on

active travel activity. This does not affect the assessment of the operation of the highway network and public transport services. In practice, there could be slightly higher active travel mode shares than are forecast through the transport modelling, but this would not materially alter the assessment conclusions in this chapter.

12.7. Key aspects of the Project

12.7.1 The assessment has been based on the description within Chapter 5: Project Description.

12.7.2 Table 12.7.1 below identifies the maximum design scenarios relevant to this assessment. The maximum design scenario selected is the one having the potential to result in the greatest effect on an identified receptor or receptor group. Effects of greater adverse significance are not predicted to arise should any other option identified in Chapter 5 be taken forward in the final design of the Project.

Table 12.7.1: Maximum design scenarios

Potential impact	Maximum design scenario	Justification
Initial construction period: 2024-2029		
Increase in construction traffic. Temporary traffic and pedestrian diversions. Rail improvements.	Peak construction traffic assessed together with 2029 future baseline background traffic growth (highest background traffic between the period 2024-2029). Construction traffic assessed.	2029 is the last modelled year prior to opening of the northern runway. Peak construction traffic added to 2029 (with the highest background traffic during this period) presents a robust assessment.
First full year of opening: 2029		
Increase in passenger numbers.	Passenger throughput based on forecast data. Peak highway construction traffic has been assessed as a separate scenario, added to the 2029 with Project demand.	The increase in the number of passengers once the new runway is open will increase trips on the transport networks. The separate highway construction scenario includes construction traffic in addition to increased airport demand.
Interim assessment year: 2032		
Increase in passenger numbers and anticipated completion of the proposed highway improvement works.	Passenger throughput based on forecast data.	The increase in the number of passengers will increase trips on the transport networks. The highway works will increase the capacity of the highway network to cater for car-borne demands.
Design year: 2047		

Potential impact	Maximum design scenario	Justification
Increase in passenger numbers. Highway improvement works.	A conservative assessment year reflecting a requirement under DMRB to assess the effects of a project 15 years after it has been completed.	Airport passenger and staff numbers would be higher in 2047 than in previous years and background traffic would have increased on the network. This assessment year therefore provides a robust assessment anticipated some 15 years after the highway works are completed and anticipated some 18 years after the opening of the new runway.

12.7.3 The traffic modelling outputs have been used to inform the assessments contained in Chapter 13: Air Quality, Chapter 14: Noise and Vibration and Chapter 16: Greenhouse Gases.

12.8. Mitigation and enhancement measures adopted as part of the Project

12.8.1 A number of embedded mitigation measures have been designed into the Project to reduce the potential for impacts on traffic and transport. The embedded measures for traffic and transport are listed in Table 12.8.1.

Table 12.8.1: Mitigation and enhancement measures

Measures adopted as part of the Project	Justification	How secured
Mitigation		
Surface access improvements – highways (primary mitigation)	Traffic modelling shows that the surface access improvements will be required for the Project in assessment year 2032 (further technical detail is provided in the TA). The highway works have been developed and are considered to form part of the Project design. Details of the highway improvements proposed are contained in Chapter 5: Project Description. The surface access improvement works include changes to the North and South Terminal Roundabouts and involve grade-separated solutions. The Longbridge Roundabout also requires modification. These works are in addition to the CIP works identified in the future baseline (paragraph 12.6.57). Modelling indicates that mitigation is not required at M23 Junction 9.	DCO Requirement

Measures adopted as part of the Project	Justification	How secured
Surface access improvements – active travel (primary mitigation)	Improvements to walking and cycling infrastructure are incorporated into the highway proposals to improve accessibility and overcome severance (illustrated in the appended Figure 12.6.2). The improvements include: ▪ Segregated paths and signalised crossings at Longbridge Roundabout. ▪ A pedestrian and cycle path between Longbridge Roundabout and the Airport on the western side of A23 London Road. ▪ Shared use path between North Terminal Roundabout and South Terminal via Gatwick Way and Perimeter Road North. ▪ Shared use ramp to Riverside Garden Park on the eastern side of A23 London Road and widening of the existing footway on the eastern side of A23. ▪ A signal-controlled pedestrian crossing across A23 London Road northeast of North Terminal Roundabout. ▪ A pedestrian link between Riverside Car Park and the proposed open recreational space to be created within the extents of the current Car Park B. ▪ Pedestrian link between Balcombe Road and the existing South Terminal Ring Road footway network.	DCO Requirement
Surface Access Commitments (SACs) (primary mitigation)	In the **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3), GAL has set mode share commitments and commitments to interventions that would be implemented to support the achievement of these mode shares. These measures are included in the modelling work as embedded measures and relied upon in the assessments in this chapter (the measures are set out in paragraphs 12.8.5 to 12.8.9). The SACs will inform a future version of the ASAS in due course, which will set out the overall strategy for	DCO Requirement

Measures adopted as part of the Project	Justification	How secured
	implementation. GAL has some flexibility on the range of measures that could be implemented to best achieve the mode share commitments. The SACs also contain commitments to monitoring and reporting progress towards achieving the mode share commitments.	
Travel Plan (construction) (tertiary mitigation)	A Travel Plan will be implemented for construction workers, as part of the wider approach to managing the transport aspects of construction activity. This is set out in **ES Appendix 5.3.2: CoCP Annex 2 - Outline Construction Workforce Travel Plan** (Doc Ref. 5.3).	DCO Requirement
Temporary diversion routes during construction (tertiary mitigation)	Temporary diversion routes for traffic and pedestrians would be required during highway construction to maintain safety and therefore considered as part of the Project.	DCO Article and DCO Requirement
Construction Traffic Management Plan (tertiary mitigation)	As part of the construction works, a traffic management strategy (contained in **ES Appendix 5.3.2: CoCP Annex 3 - Outline Construction Traffic Management Plan** (Doc Ref. 5.3)) would be put in place to minimise any negative environmental and community impacts. This would include the following: ▪ Measures to ensure the transport of construction materials and waste is managed as sustainably as possible. ▪ Scheduling of construction material and logistics traffic movements that need to come by road to arrive and depart outside of peak periods and to use designated routes into construction sites on the Airport which are suitable for this type of traffic. ▪ Delivery Management System (DMS) to manage material deliveries to site and collections by scheduling and re-timing them in a manner that consciously avoids the most congested times of the day. ▪ Encouraging/incentivising public transport use for the construction workforce.	DCO Requirement

Measures adopted as part of the Project	Justification	How secured
	▪ Timing shift patterns such that those workers who do need to come by road to use roads and highways outside of peak periods. The strategy would be prepared in accordance with Transport for London guidance as set out in the PINS scoping comments. **ES Appendix 5.3.2: CoCP Annex 2 - Outline Construction Workforce Travel Plan** (Doc Ref. 5.3) and **ES Appendix 5.3.2: CoCP Annex 3 - Outline Construction Traffic Management Plan** (Doc Ref. 5.3) have been prepared which accompany the DCO application.	
Monitoring		
Surface Access Commitments (SACs) (primary mitigation)	As part of the **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3), there are monitoring commitments to provide periodic review of whether, and assurance that, the committed mode shares are being achieved. Annual reporting will be undertaken and presented and discussed with the Transport Forum Steering Group.	DCO Requirement
Travel Plan monitoring (construction) (tertiary mitigation)	As set out in the Outline Workforce Travel Plan, monitoring of the Travel Plan will indicate how well it is performing at meeting the target mode shares and any other targets that are set for the construction period. Monitoring will also assist in refining Travel Plan measures and establishing targets.	DCO Requirement

12.8.2 The above mitigation measures are considered to be part of the Project and are therefore relied upon for the purposes of this assessment.

Surface Access Commitments (SACs)

12.8.3 The SACs are set out in **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3). They include commitments to certain measures, which are reflected in the modelling work for the purposes of this assessment. In due course, in accordance with the expected cycle of ASAS, GAL will produce a new ASAS to refresh its strategy and to reflect the commitments it is making about surface access outcomes and measures as part of the Project through the SACs. The ASAS will be produced in accordance with the advice in the DfT Aviation Policy Framework.

12.8.4 Surface access measures have been tested through the strategic modelling process to understand the impact of 'pull' and 'push' measures and the mode shares that could be achieved as a result, informing the mode share commitments in the SACs. 'Pull' measures include committed and planned transport improvements such as additional bus and coach services, planned upgrades on the Brighton-London main line or the M23 Smart Motorway Project. 'Push' measures include increasing forecourt or parking charges.

Measures and interventions

12.8.5 The SACs identify the mode share commitments which GAL is making, together with commitments to the interventions and measures that GAL will use to achieve those mode shares. These interventions include measures that will increase public transport choice and encourage the use of public transport and active travel modes, alongside measures which aim to reduce levels of private car use amongst air passengers and staff. The measures in the SACs include some elements of flexibility, to allow GAL to adjust these specific measures to respond to demand and the degree of progress towards achieving the mode share commitments.

12.8.6 The strategic transport modelling requires a series of input assumptions to reflect the introduction of the SACs. For the purposes of the modelling and assessment, the following surface access interventions are contained in the strategic models for the with Project scenarios:

- The highway works proposed as part of the Project, between Longbridge Roundabout and M23 Junction 9.
- Increased frequency (half-hourly daytime, hourly early/late) on new coach route Chatham – Maidstone – Sevenoaks – Gatwick.
- New coach route (hourly) Bexley – Footscray – Gatwick.
- New coach route (half-hourly) Tunbridge Wells – East Grinstead – Gatwick.
- New coach route (hourly) Worthing – Horsham – Gatwick.
- On-airport air passenger car parking capacity of 47,200 spaces in 2029, increasing to 48,300 spaces in 2047.
- Increased car parking charges for air passengers. For the purposes of modelling parking is assumed to be charged at between £84 and £102 per typical length of stay by 2032 (in 2021 prices), with charges increasing at the retail price index (RPI) + 1% annually thereafter to 2047. The SACs do not commit to specific prices, as GAL regularly reviews and amends its parking charges and needs to be able to retain flexibility to adjust charges, including in order to respond to progress in achieving the committed mode shares.
- Increased forecourt access charges. For the purposes of modelling these are assumed to be at £15.75 by 2032 (in 2021 prices), with charges increasing at RPI + 1% annually thereafter to 2047. The SACs do not commit to specific prices, as GAL regularly reviews and amends the forecourt access charge and needs to be able to retain the flexibility, including in order to help achieve the committed mode shares.
- Measures to reduce single occupancy vehicle use by staff. For the purposes of modelling, a charge of £5 has been assumed for access to staff parking by single occupancy vehicle in 2029 (in 2021 prices), with no charge for multiple occupancy. In practice GAL may use this and/or other measures to achieve similar outcomes.

12.8.7 The on-airport air passenger car parking included in the modelling for the with Project scenarios by 2047 comprises a net gain of 1,100 spaces required to accommodate growth resulting from the Project. The proposals also include some 8,900 new parking spaces

which would replace the same number that would be lost as part of the construction of the Project.

12.8.8 The charges for car parking and forecourts have been set for the purposes of the transport modelling. For air passengers parking and forecourts, they reflect an expectation of the degree to which charges might have to increase to achieve the desired mode share outcomes. The exact level of charge used in operation would depend on progress towards achieving the mode share commitments and circumstances at the time. Free drop-off and pick-up space will be provided in long-stay car parks to ensure equitable access from locations not well-served by public transport.

12.8.9 For staff parking, the charge for single occupancy vehicles used in the modelling is used as a proxy for restraint measures that GAL would employ to reduce single occupancy vehicle use by staff. GAL may choose other ways to implement such a restraint, in which case parking charges may not be necessary provided that the staff mode share commitments are being met.

Mode share commitments

12.8.10 GAL commits to achieving the following annualised mode shares three years after the opening of the new northern runway[5] and on an ongoing basis thereafter:

- A minimum of 55% of air passenger journeys to and from the Airport to be made by public transport;
- A minimum of 55% of staff journeys to and from the Airport to be made by public transport, shared travel and active modes;
- A reduction of all passenger drop-off and pick-up car journeys at the Airport to a mode share of no more than 12% of surface access journeys; and
- At least 15% of airport staff journeys originating within 8 km of the Airport to be made by active modes.

12.8.11 The assessment shows that the interventions tested can adequately mitigate the effects of the Project and achieve at least the committed mode shares three years after the opening of the new northern runway. GAL aspires to a high-sustainable, low-emission mode share so will continue to work towards outcomes achieving in excess of the committed mode shares, in conjunction with stakeholders.

12.8.12 The identified measures and interventions are included in the strategic modelling used to inform this chapter as well as to provide traffic information for noise and air quality modelling and carbon assessment. The measures lead to an increase in annual average air passenger public transport mode share from around 45% prior to the Covid-19 pandemic up to 52% for all future baseline years, and 54% to 56% between 2029 and 2047 in the with Project scenario. This increase in public transport mode share for air passengers is significant and notable given the growth in passenger numbers with the Project and indicates that the commitment of 55% can be achieved by the summer period after the third anniversary of the opening of the new northern runway.

[5] Opening of the northern runway is the date at which commencement of dual runway operations occurs, meaning the first day on which commercial air transport movements (excepting diverted or emergency flights) are scheduled to depart from both the northern runway and the current main runway.

12.8.13 In terms of employees, the strategic model shows that a sustainable transport mode share of 48% to 50% is expected in the future baseline, increasing to between 55% and 56% in the with Project scenario. This indicates that the commitment of 55% is achievable.

12.8.14 In addition to the interventions listed above, GAL will work with stakeholders, including Network Rail and coach and bus operators, to support improvements to accommodate future growth.

Monitoring and reporting

12.8.15 The **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3) set out GAL's commitment to monitoring and reporting. Comprehensive monitoring will be undertaken based on a range of data sources (including surveys, barrier counts at car parks, automatic number plate recognition data, traffic flows, gateline data), and GAL will prepare Annual Monitoring Reports (AMRs). The first AMR will be produced no later than six months before the commencement of dual runway operations.

12.8.16 The AMR will be provided to the Transport Forum Steering Group (TFSG) prior to publication so that it can provide a response. Once received, GAL will publish on the GAL website both the AMR and the TFSG's response at the same time.

12.8.17 If the AMR shows that the mode share commitments have not been met or, in GAL's reasonable opinion, suggests they may not be met (having regard to any circumstances beyond GAL's control which may be responsible), GAL will prepare an action plan to identify such additional interventions which are considered reasonably necessary to correct such actual or potential non-achievement of the mode share commitments. These actions will apply to measures in GAL's control, or those actions that can be agreed with third parties such as service providers.

12.8.18 If two successive AMRs continue to show that the mode share commitments have not been met or, in GAL's reasonable opinion, suggests they may not be met (having regard to any circumstances beyond GAL's control which may be responsible), GAL will prepare a further action plan and will provide this to the TFSG, together with additional data if necessary and possible, in order that the TFSG can consider, provide commentary and approve the action plan. The TFSG may propose additional or alternative interventions it believes to be necessary to achieve the mode share commitments. GAL will either incorporate these interventions into the action plan; or provide reasons why it does not consider they are necessary to achieve the mode share commitments; or offer suggestions for alternative actions where there is evidence they will achieve or exceed the same goal. GAL will implement the measures in the approved action plan. This approach builds on the existing process for monitoring ASAS targets and the development of Actions Plans in consultation with the TFSG, which has seen GAL continue to invest in achieving sustainable transport mode shares.

12.9. Assessment of effects

12.9.1 For each year of assessment, the traffic and transport effects have been assessed as a comparison between the future baseline and with Project scenarios, in line with guidance.

Initial construction period: 2024-2029

12.9.2 During this period, only airfield construction traffic would be generated by the Project. The proposal is for the main route to the Airport for construction materials vehicles to be via the

strategic road network and M23 Junction 9, except where this would not be appropriate (for instance for local suppliers). No route restrictions for construction workers. Construction materials traffic would be monitored to ensure compliance with the proposed route via M23 Junction 9, unless disruption causes it to be unavailable and signed diversionary routes can be provided in agreement with the relevant highway authorities.

12.9.3 The indicative construction schedule and works programme developed by GAL for the purposes of assessment indicates that the busiest month for construction vehicle activity is anticipated to be December 2026. However, December typically sees less traffic on the highway network around the Airport and therefore the assessment has also considered other months in 2026 and 2027 when traffic on the network might be greater (and effects related to construction might therefore be worse). Typically, the summer months, with high Airport activity and background traffic, are the busiest on the network. Accordingly, the modelling and assessment considers the busiest summer month for the initial stages of construction activity, which occurs in August 2027.

12.9.4 In August 2027 the estimated hourly construction materials vehicle trip generation is 33 vehicles (HGVs and LGVs) in and out per hour along the M23 Spur, and 150 construction worker vehicles arriving in the morning peak hour between 07:00 and 08:00 and departing after the evening peak hour (after 18:00). The modelling has tested this summer peak level of construction activity overlaid on the 2029 future baseline airport and background traffic levels to provide a robust assessment of potential construction impacts. The difference in traffic flows between 2027 and 2029 will be small (the latter will be a few percent higher) and accordingly within the daily variation in any given year.

Severance

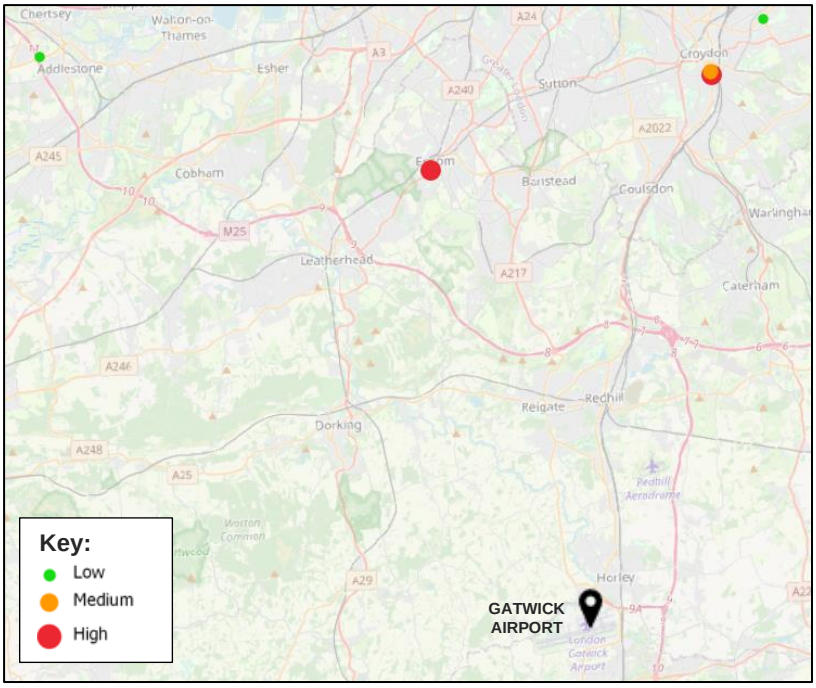
12.9.5 The peak hour highway flows for each link within the study area are contained in **ES Appendix 12.9.1: Highway Flows and Driver Delay Review** (Doc Ref. 5.3). For the purposes of reporting, only those which have a magnitude of impact of low, medium, and high adverse or beneficial are assessed to focus on potential significant effects.

12.9.6 The data shows that no link within the study area is expected to experience changes in traffic of over 30% as the result of the Project during the airfield construction period. Therefore, the magnitude of impact is considered to be negligible. The sensitivity of the links within the study area range from low to high, and the overall effect on severance is considered to be **negligible adverse**.

Driver delay

12.9.7 The embedded mitigation measures as set out in Table 12.8.1 in the form of the Construction Traffic Management Plan will aim to reduce impact on journey times, particularly during the peak hours. Diagram 12.9.1 shows the magnitude of impact for driver delay for junctions where the V/C ratio is over 80%.

Diagram 12.9.1: 2029 construction driver delay magnitude of impact (all assessment time periods)



12.9.8 Diagram 12.9.1 shows that most junctions (over 1,000) have a negligible or low magnitude of impact in terms of delay. Car driver and passenger sensitivity is considered to be medium for junctions where the V/C ratio is over 80%. For the junctions with negligible magnitude of impact, the driver delay effect is **negligible adverse**. For those with a low magnitude of impact, the driver delay is **minor adverse**.

12.9.9 There are three junctions shown to have a medium or high magnitude of impact. Two are located in the Croydon area, and one in Epsom. A review has been undertaken of these junctions which is included in **ES Appendix 12.9.1: Highway Flows and Driver Delay Review** (Doc Ref. 5.3) and a summary is provided in Table 12.9.1.

Table 12.9.1: 2029 construction driver delay assessment

Node	Magnitude of impact	Name	Assessment	Further mitigation
55025	High	South Croydon / Bartlett Street, Croydon	This junction is shown to be operating well within capacity in the future baseline in all time periods. The impact from the Project is identified in the AM2 peak where there is a reduction in traffic (-118 vehicles) but an increase in V/C ratio (from 17% to 109%). From reviewing the model, this appears to be due to model noise (see paragraph 12.9.10) and localised reassignment of background traffic from the adjacent junction to the west (where the V/C ratio increases	No mitigation is required.

Node	Magnitude of impact	Name	Assessment	Further mitigation
			from 61% to 76%), which results in queuing that affects the operation of this junction. The proportion of airport traffic at this junction is very small (1%) and the number of additional airport trips as a result of the Project is negligible (no change to -2 across the peak periods). For the other peak periods the junction operates with ample capacity (V/C ratio around 17% with construction).	
53192	High	South Street / Woodcote Road / Dorking Road, Epsom	This junction is identified as operating close to capacity in the morning and evening peak periods in the future baseline, with V/C ratios of between 91% and 99%. The impact from the Project is identified in the AM1 peak where there is an increase in traffic, although given that similar increases are not seen in other time periods, this is considered to be due to model noise and reassignment of background traffic (see paragraph 12.9.10). The proportion of airport traffic at this junction is very small (less than 1%) and the number of additional airport trips as a result of the Project is negligible (no change to +1 across the peak periods). The junction would continue to operate close to capacity with the Project, with V/C ratio in the AM1 peak 97% being lower than V/C ratios experienced in other time periods. No mitigation is required.	No mitigation is required.
55022	Medium	Brighton Road / Warham Road / South End, Croydon	This junction is shown to be operating well within capacity in the future baseline in all time periods. The impact from the Project is identified in the AM1 peak where there is an increase in traffic which is considered to be due to model noise and reassignment of background traffic (see paragraph 12.9.10). The proportion of airport traffic at this junction is very small (around 1%) and the number of additional airport trips as a result of the Project is negligible (-6 to +1 vehicles across the peak periods). The junction would	No mitigation is required.

Node	Magnitude of impact	Name	Assessment	Further mitigation
			continue to operate within capacity with the Project (V/C ratio up to 85%). No mitigation is required.	

12.9.10 The above shows that whilst three junctions are identified with a high or medium magnitude of impact in terms of driver delay, the impact is due to model noise. Information on model noise is provided in paragraphs 12.5.5 and 12.5.6. Model noise is identified by reviewing changes in traffic volumes and the amount of airport related traffic at each node location. Where the additional trips are identified as the result of an unexpected reassignment of background traffic on the network (rather than additional airport trips), particularly if this does not occur consistently or is at some distance from the Airport, the impacts are considered to be due to model noise.

12.9.11 No other junctions are identified to have medium or high impacts and therefore the overall magnitude of impact for driver delay is considered to be low, and the driver delay effect is considered to be **minor adverse**, which is not significant.

Pedestrian and cyclist delay

12.9.12 The peak construction traffic is not expected to interact with the main pedestrian and cyclist routes, which tend to be off-road. The change in traffic along pedestrian routes is also negligible, as set out in paragraph 12.9.6 and the flow data in **ES Appendix 12.9.1: Highway Flows and Driver Delay Review** (Doc Ref. 5.3). The magnitude of impact is considered to be negligible, the sensitivity of receptors along the highway routes ranges from negligible to medium. The overall effect on pedestrian and cycle delays are therefore expected to be **negligible adverse**.

Pedestrian and cyclist amenity

12.9.13 The suggested threshold for a significant effect on pedestrian and cyclist amenity is when the traffic flows have doubled. No roads within the study area are expected to meet this threshold during the construction period.

12.9.14 The traffic composition can also affect pedestrian and cyclist amenity. The traffic flows in **ES Appendix 12.9.1: Highway Flows and Driver Delay Review** (Doc Ref. 5.3) show that whilst there are links with increases in HGVs, with the highest increase in the number of HGVs along the M23 Spur and the A23, there are very small changes to the overall traffic composition. The highest increase in the percentage of HGVs (number of HGVs divided by total vehicle number) is 5.7 percentage points on Fell Road (Link ID: cy33) in the AM1 peak period, from 3.5% to 9.2%. This is due to the number of HGVs increasing from 9 to 23 and the volume of other traffic remaining broadly the same. The magnitude of this impact can be considered to be low. The sensitivity of Fell Road is considered to be low. The effect on pedestrian and cyclist amenity on this link is therefore considered to be **minor adverse**, which is not significant**.**

12.9.15 For all the other roads, the predicted change in the percentage of HGVs varies between -4 and +5 percentage points. The magnitude of impact is considered to be negligible. The sensitivity of the receptors along these links are considered to be negligible to high. The

effect on pedestrian and cyclist amenity on all other roads is considered to be **negligible adverse.**

Accidents and safety

12.9.16 Changes in traffic flows and highway design could influence the risk of accidents. No links are expected to experience a traffic increase of over 30%. Roads in the study area identified as construction routes in particular will experience a change in traffic composition with a slightly higher proportion of HGVs compared to total traffic. Suitable measures to minimise the impact of construction vehicles would form part of the Construction Traffic Management Plan.

12.9.17 The magnitude of impact for accidents and safety is considered to be low. The sensitivity of receptors in terms of pedestrians and cyclists along construction routes are considered to be negligible to low. The effect on accidents and safety on pedestrians and cyclist is considered **negligible** along the construction routes.

12.9.18 The sensitivity of receptors in terms of car drivers and passengers is considered to be low to medium for both construction scenarios. The effect on accidents and safety on car drivers and passengers is considered **negligible adverse** along the construction routes, and no change on all other roads.

Hazardous loads

12.9.19 It is expected that there would be some temporary diversions in place during construction as part of the Project but no significant changes are expected to the strategic highway network. This means that no significant changes are expected in terms of the transportation of hazardous loads on the highway network.

12.9.20 The magnitude of impact and sensitivity of receptors for hazardous loads are both considered to be negligible. The effect on transporting or routeing of hazardous loads is considered to be **negligible adverse.**

Effects on public transport amenity

12.9.21 Changes in passenger crowding during this period compared to the future baseline would be associated with the members of the Project construction workforce who travel to site by rail.

12.9.22 The number of construction workers travelling by rail is expected to be low. They will be travelling to Gatwick in the morning peak, and this has been examined in terms of capacity by direction. From the north, this is the counter-peak direction and capacity modelling shows there is plenty of seating capacity available in 2029, including with incremental background growth in passengers. Capacity modelling shows the rail service from the south also has seating capacity available (see paragraphs 12.9.43 onwards). In addition, measures within the Travel Plan for construction workers could include staggered shift start and end times to reduce peak period pressure as well as provision of bus services to park and ride sites and to specific locations where construction workers come from.

12.9.23 The magnitude of impact is considered to be negligible and the sensitivity of receptors in terms of rail capacity is also considered to be low. The effect on rail crowding is therefore considered **negligible adverse.**

Further mitigation and future monitoring

12.9.24 The assessment shows that although there will be increases in traffic flows as the result of construction, the effects are no greater than minor and are therefore not significant.

12.9.25 Construction activities will be monitored as part of the Construction Traffic Management Plan and further monitoring of GAL's performance against its surface access commitments is set out in the **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3). No further monitoring measures are proposed.

Significance of effects

12.9.26 No further mitigation is proposed and the significance of effects would therefore remain as presented above.

First full year of opening: 2029

12.9.27 The annual passenger demand for 2029 is expected to increase from 57.3 mppa in the 2029 future baseline to 61.3 mppa with the Project.

12.9.28 A number of rail, bus and coach improvements are anticipated to have occurred by the 2029 in the future baseline, as explained in Section 12.6. Further enhancements associated with the Project are explained in Section 12.7.3.

Severance

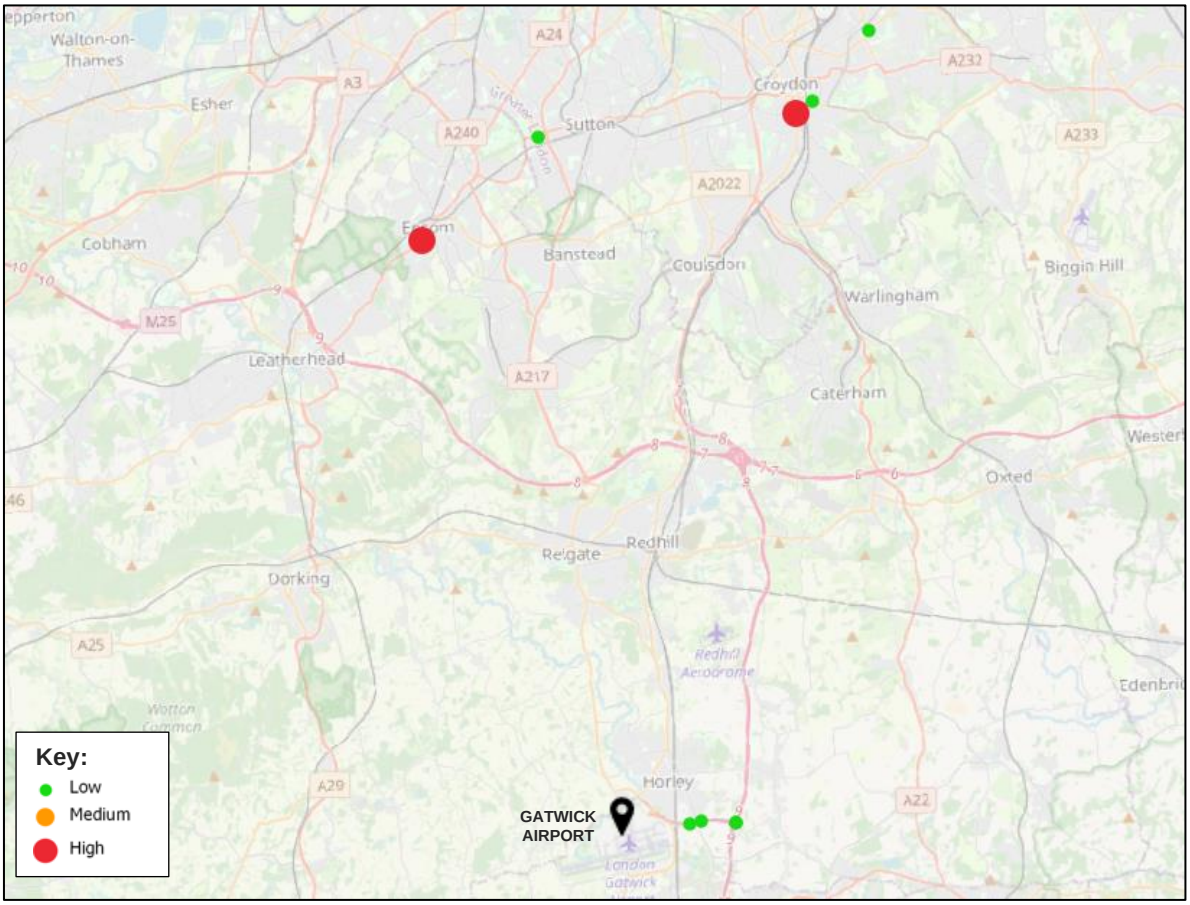
12.9.29 The peak hour highway flows for each link within the study area are contained in **ES Appendix 12.9.1: Highway Flows and Driver Delay Review** (Doc Ref. 5.3). For the purposes of reporting, only those which have a magnitude of impact of low, medium, and high adverse or beneficial are assessed to focus on potential significant effects.

12.9.30 The data shows that no link within the study area is expected to experience changes in traffic of over 30% as the result of the Project. Therefore, the magnitude of impact is considered to be negligible. The sensitivity of the links within the study area ranges from low to high, and the overall effect on severance is considered to be **negligible adverse**.

Driver delay

12.9.31 Diagram 12.9.2 shows the magnitude of impact for driver delay for junctions where the V/C ratio is over 80%. The diagram shows driver delay for all time periods assessed and any overlaps in colours indicate different magnitudes of impact by time period. The highest magnitude of impact for each junction is considered.

Diagram 12.9.2: 2029 driver delay magnitude of impact (all assessment time periods)



12.9.32 The above shows that most junctions (over 1,000) have a negligible or low magnitude of impact in terms of delay. Car driver and passenger sensitivity is considered to be medium for junctions where the V/C ratio is over 80%. For the junctions with negligible magnitude of impact, the driver delay effect is negligible. For those with a low magnitude of impact, the driver delay is minor adverse.

12.9.33 There are two junctions shown to have a high magnitude of impact (one in Croydon and one in Epsom). A review has been undertaken of these junctions which is included in **ES Appendix 12.9.1: Highway Flows and Driver Delay Review** (Doc Ref. 5.3) and a summary is provided in Table **12.9.2**.

Table 12.9.2: 2029 driver delay assessment

Node	Magnitude of impact	Name	Assessment	Further mitigation
55025	High	South Croydon / Bartlett Street, Croydon	This junction is shown to be operating well within capacity in the future baseline. The impact from the Project is identified in the AM2 peak where there is a reduction in traffic (-92 vehicles) but an increase in V/C ratio (from 17% to 109%). From	No junction mitigation is required.

Node	Magnitude of impact	Name	Assessment	Further mitigation
			reviewing the model, this appears to be due to model noise and localised reassignment of background traffic (see paragraph 12.9.34) from the adjacent junction to the west (V/C ratio increases from 61% in future baseline to 76% with the Project at that junction), which results in queuing that affects the operation of this junction. The proportion of airport traffic at this junction is very small (around 1%) and the number of additional airport trips at this junction as a result of the Project is negligible (-3 to +2 vehicles across the peak periods). For the other peak periods the junction operates with ample capacity (V/C ratio around 15% with Project).	
53192	High	South Street / Woodcote Road / Dorking Road, Epsom	This junction is shown to be operating close to capacity in the future baseline, in the morning and evening peak periods (V/C ratio ranging from 91% to 99%). The impact from the Project is identified in the AM1 peak where there is an increase in traffic of 159 vehicles. This is due to model noise and reassignment of background traffic, and there is no similar increase in the other time periods. The junction is operating near to capacity with the Project, with V/C ratio at AM1 peak with Project (97%). This is lower than PM peak for the future baseline without Project (99%). The proportion of airport traffic at this junction is very small (less than 1%) and the number of additional airport trips as a result of the Project is negligible (-3 to +2 vehicles across the peak periods).	No junction mitigation is required.

12.9.34 The above shows that whilst two junctions are identified with a high magnitude of impact in terms of driver delay, the impact is due to model noise. Information on model noise is provided in paragraphs 12.5.5 and 12.5.6. Model noise is identified by reviewing changes in traffic volumes and the amount of airport related traffic at each node location. Where the additional trips are identified as the result of an unexpected reassignment of background

traffic on the network, particularly if this does not occur consistently or is at some distance from the Airport, the impacts are considered to be due to model noise.

12.9.35 No other junctions are identified to have medium or high impacts and therefore the overall magnitude of impact for driver delay is considered to be low, and the effect on driver delay is considered to be **minor adverse**, which is not significant.

Pedestrian and cyclist delay

12.9.36 The change in traffic along pedestrian routes is negligible, as set out in paragraph 12.9.30 and shown in the flow data in **ES Appendix 12.9.1: Highway Flows and Driver Delay Review** (Doc Ref. 5.3). The sensitivity of receptors along the highway routes ranges from negligible to high. The effect on pedestrian and cycle delays are expected to be **negligible adverse**.

Pedestrian and cyclist amenity

12.9.37 The threshold for a significant effect on pedestrian and cyclist amenity is when the traffic flows have doubled as a result of the Project. No roads within the study area are expected to meet this threshold in 2029.

12.9.38 The traffic composition can also affect pedestrian and cyclist amenity. The highest increase in the percentage of HGVs (number of HGVs divided by total vehicle number) is 2.8 percentage points on Northgate Road (link: NT3) in the AM2 peak. The predicted increase is from 18.6% to 21.3% and the magnitude of this impact can be considered to be low. The sensitivity of Northgate Road is considered to be low and it is not considered to be a key pedestrian/cycle route. The effect of the Project on amenity along Northgate Road can be considered to be **negligible adverse**.

12.9.39 No other roads within study area will experience a doubling of traffic flows and on these roads the predicted change in the percentage of HGVs varies between -4 and +1 percentage points. The magnitude of impact is considered to be negligible and the sensitivity of receptors along the highway routes ranges from negligible to high. The overall effect on pedestrian and cyclist amenity is considered to be **negligible adverse**.

Accidents and safety

12.9.40 The increases in the traffic flows are not expected to be significant and no changes to the highway layouts are proposed. The magnitude of impact is considered to be negligible. The sensitivity of receptors is negligible for high for pedestrians and cyclists, and low to medium for car drivers and passengers. The risk of accidents and safety for all road users is considered to be **negligible adverse**.

Hazardous loads

12.9.41 No changes to traffic routes are proposed and therefore the effect on hazardous loads is considered to be **no change**.

Effects on public transport

12.9.42 To assess the effect of the Project on public transport, this section considers the impact on passenger crowding on rail services and in Gatwick Airport railway station. Public transport provision is as set out in Sections 12.6 and 12.7.3 for the future baseline and with Project scenarios respectively.

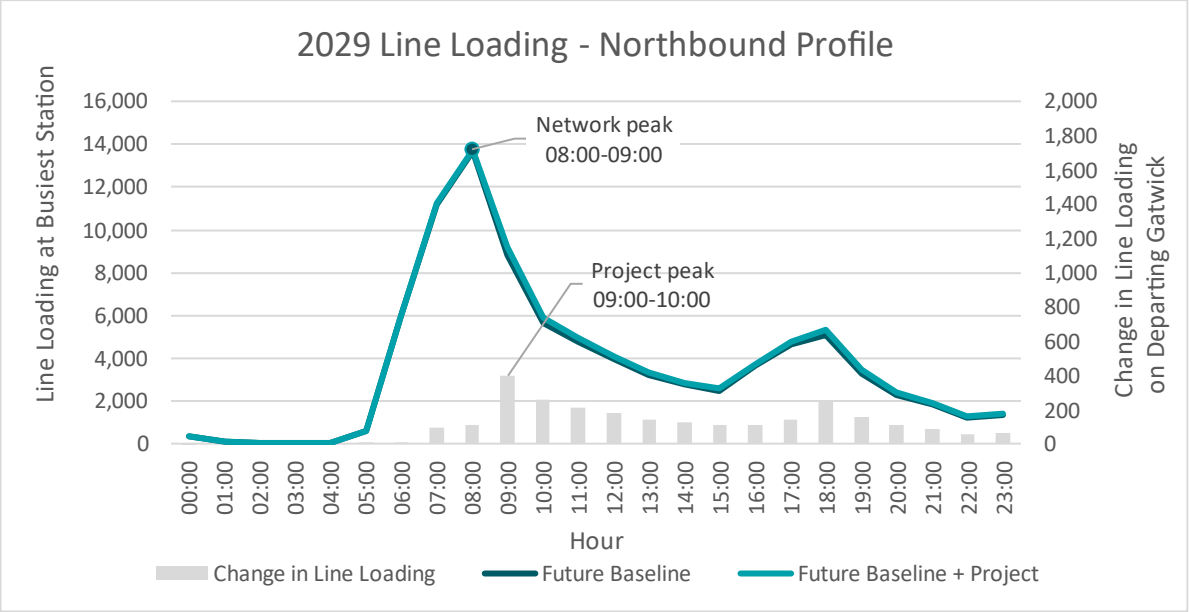
Crowding on rail services

Northbound services

12.9.43 Diagram 12.9.3 shows the 2029 line loading profile for the future baseline and with Project scenarios. The peak hours for assessment are identified as follows:

- Network peak 08:00-09:00, based on the highest line loading for all services at the busiest station (northbound trains passing or departing from Purley).
- Project peak 09:00-10:00, based on the highest line loading as the result of the Project, which for northbound is on departing Gatwick Airport station.

Diagram 12.9.3: 2029 northbound line loading profile



Northbound network peak (08:00-09:00)

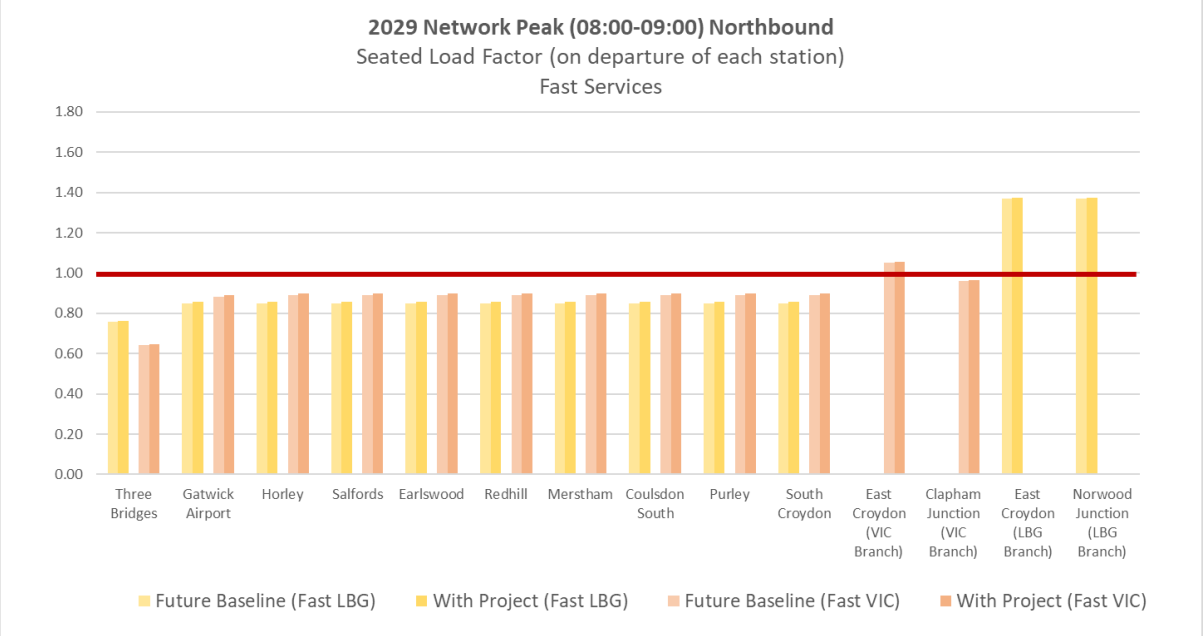
12.9.44 Table **12.9.3** provides a summary of the increase in line loading by station in the northbound direction for the network peak as the result of the Project.

12.9.45 Table **12.9.3** shows that during the network peak hour, the Project contributes an additional 110 passengers in the northbound direction. Most of these passengers are expected to use the fast train services to London Victoria and London Bridge. This represents around 1% increase in passengers on the fast services, and around 2% on the stopping services. To assess the impact on crowding, Diagram 12.9.4 shows the Seated Load Factor assessment and shows the standing capacity assessment.

Table 12.9.3: 2029 percentage change in line loading – northbound network peak

Station	2029 network peak northbound (08:00-09:00)							
	Change in line loading on departure				Percentage change			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
Three Bridges	29	25	10	64	0.7%	0.7%	1.5%	0.8%
Gatwick Airport	51	49	7	107	1.1%	1.0%	2.1%	1.1%
Horley	51	49	7	107	1.1%	1.0%	1.9%	1.0%
Salfords	51	49	7	107	1.1%	1.0%	1.8%	1.0%
Earlswood	51	49	7	107	1.1%	1.0%	0.9%	1.0%
Redhill	51	49	8	108	1.1%	1.0%	0.5%	1.0%
Merstham	51	49	8	108	1.1%	1.0%	0.4%	0.9%
Coulsdon South	51	49	9	109	1.1%	1.0%	0.3%	0.9%
Purley	51	49	10	110	1.1%	1.0%	0.2%	0.8%
South Croydon	51	49	10	110	1.1%	1.0%	0.2%	0.8%
East Croydon (VIC Branch)	0	40	3	43	-	0.7%	0.2%	0.6%
Clapham Junction (VIC Branch)	0	21	1	22	-	0.4%	0.1%	0.3%
East Croydon (LBG Branch)	32	0	8	39	0.4%	-	0.2%	0.4%
Norwood Junction (LBG Branch)	32	0	7	39	0.4%	-	0.2%	0.3%

Diagram 12.9.4: 2029 northbound network peak Seated Load Factor



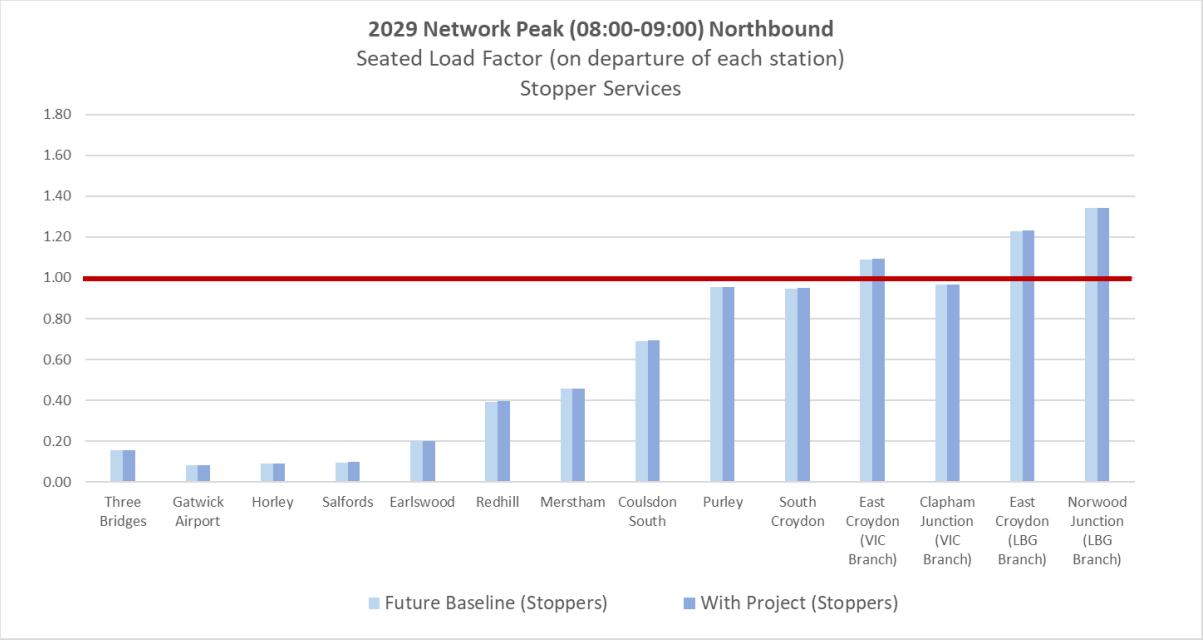


Table 12.9.4: 2029 northbound network peak standing capacity assessment (08:00-09:00)

Station	2029 network peak northbound – percentage of standing capacity occupied							
	Future baseline 2029				With Project (percentage point change from future baseline) 2029			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
East Croydon (VIC Branch)	-	8.1%	15.2%	9.5%	0.0% (-)	9.3% (1.1%)	15.6% (0.4%)	10.5% (1.0%)
East Croydon (LBG Branch)	27.6%	-	14.0%	22.4%	28.0% (0.4%)	0.0% (-)	14.2% (0.2%)	22.8% (0.3%)
Norwood Junction (LBG Branch)	27.6%	-	20.9%	25.0%	28.0% (0.4%)	0.0% (-)	21.1% (0.2%)	25.4% (0.3%)

12.9.46 Diagram 12.9.4 shows that seating capacity is exceeded north of East Croydon on the fast and stopping services for the network peak. This occurs in the future baseline owing to background commuter flows into London. Table 12.9.4 shows the highest percentage of standing capacity occupied in the future baseline is 8.1% and 27.6% on the fast services to London Victoria and London Bridge respectively, which occurs north of East Croydon. The Project will not significantly increase the percentage of standing capacity occupied when compared to the future baseline situation, with the highest increase in occupied standing space being 1.1 percentage points on the fast services into London Victoria. Ample standing capacity will therefore remain available.

Northbound project peak (09:00-10:00)

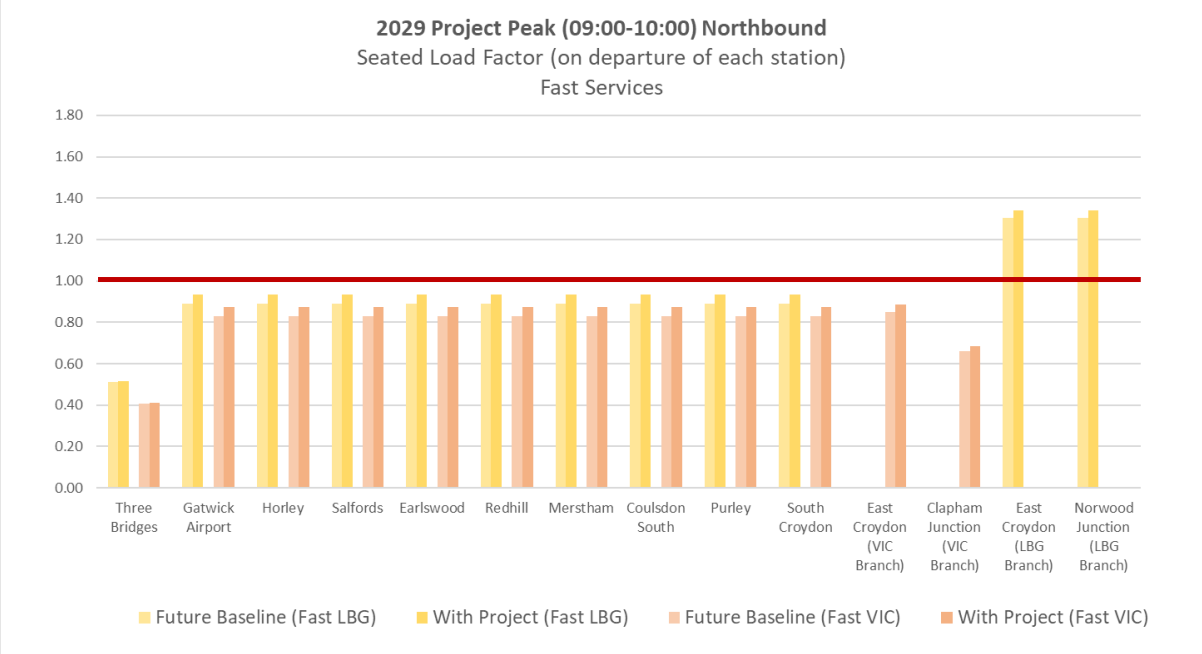
12.9.47 Table **12.9.5** provides a summary of the increase in line loading by station in the northbound direction for the project peak.

Table 12.9.5: 2029 percentage change in line loading – northbound project peak

Station	2029 project peak northbound (09:00-10:00)							
	Change in line loading on departure				Percentage change			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
Three Bridges	17	30	11	58	1.2%	1.3%	1.4%	1.3%
Gatwick Airport	117	252	18	387	4.8%	5.3%	3.2%	4.9%
Horley	117	252	17	387	4.8%	5.3%	3.1%	4.9%
Salfords	117	252	17	387	4.8%	5.3%	3.0%	4.9%
Earlswood	117	252	17	386	4.8%	5.3%	2.2%	4.8%
Redhill	117	252	10	379	4.8%	5.3%	1.0%	4.6%
Merstham	117	252	9	379	4.8%	5.3%	0.9%	4.6%
Coulsdon South	117	252	9	378	4.8%	5.3%	0.7%	4.5%
Purely	117	252	9	379	4.8%	5.3%	0.5%	4.3%
South Croydon	117	252	9	379	4.8%	5.3%	0.5%	4.3%
East Croydon (VIC Branch)	0	202	1	203	-	4.2%	0.5%	4.0%
Clapham Junction (VIC Branch)	0	130	0	130	-	3.4%	0.0%	3.3%
East Croydon (LBG Branch)	96	0	32	128	2.7%	-	0.9%	1.8%
Norwood Junction (LBG Branch)	96	0	26	123	2.7%	-	0.7%	1.7%

12.9.48 Table **12.9.5** shows that during the project peak hour, the Project contributes an additional 387 passengers in the northbound direction. Most of these passengers are expected to use the fast train services to London Victoria and London Bridge. This represents around a 5% increase in passengers on the fast services, and 3% on the stopping services. To assess the impact on crowding, Diagram 12.9.5 shows the Seated Load Factor assessment and Table 12.9.6 shows the standing capacity assessment.

Diagram 12.9.5: 2029 northbound project peak Seated Load Factor



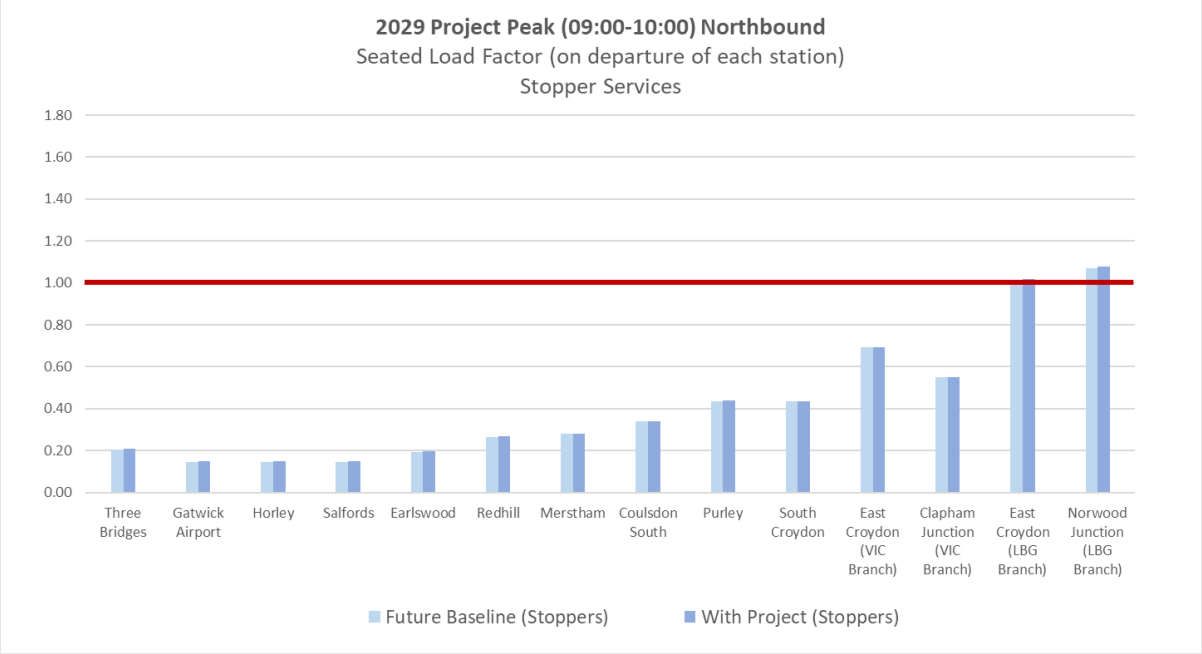


Table 12.9.6: 2029 northbound project peak standing capacity assessment (09:00-10:00)

Station	2029 project peak northbound – percentage of standing capacity occupied							
	Future baseline 2029				With Project (percentage point change from future baseline) 2029			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
East Croydon (LBG Branch)	21.2%	-	0.6%	8.8%	23.7% (2.5%)	0.0% (-)	1.1% (0.5%)	10.1% (1.3%)
Norwood Junction (LBG Branch)	21.2%	-	4.4%	11.1%	23.7% (2.5%)	0.0% (-)	4.8% (0.4%)	12.3% (1.2%)

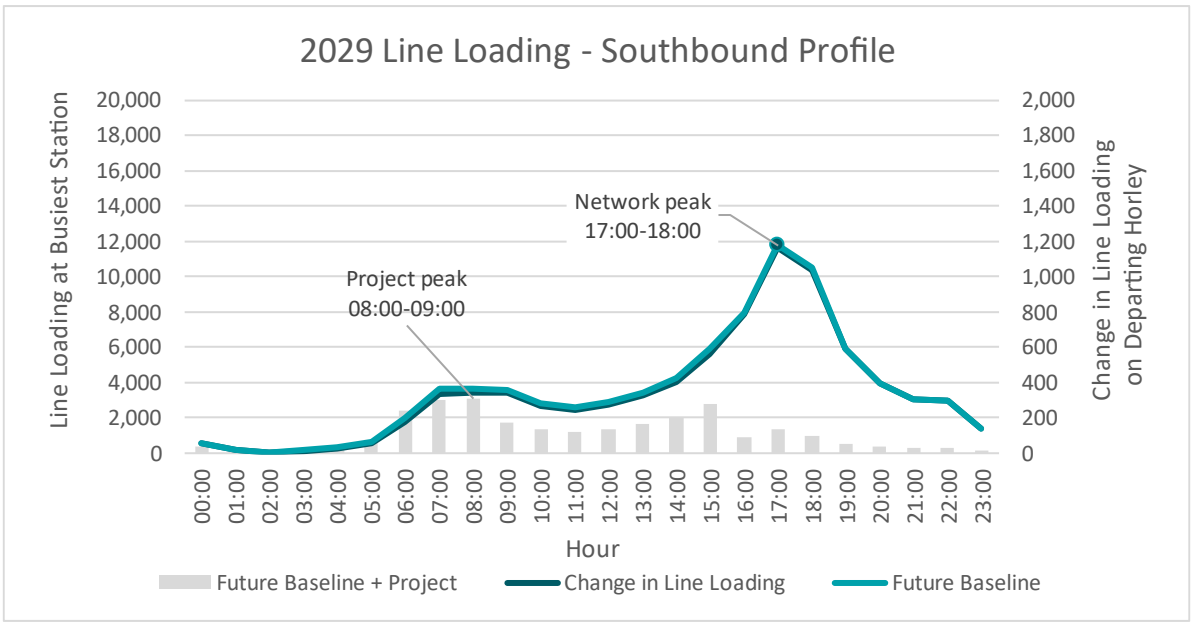
12.9.49 Diagram 12.9.5 shows that seating capacity is exceeded north of East Croydon and Norwood Junction stations. Table 12.9.6 shows the percentage of standing capacity occupied at these two stations is 23.7% on the fast services to London Bridge with the Project. The Project creates an insignificant increase in the percentage of standing capacity occupied when compared the future baseline 2029 situation, with the highest increase being 2.5 percentage points on the fast services into London Bridge. Ample standing capacity would therefore remain available on these services.

Southbound services

12.9.50 Diagram 12.9.6 shows the 2029 line loading profile for the future baseline and with Project scenarios. The peak hours for the southbound assessment are identified as follows:

- Network peak 17:00-18:00, based on the highest line loading for all services at the busiest station (trains departing southbound from East Croydon).
- Project peak 08:00-09:00, based on the highest line loading as the result of the Project, which for southbound is on departing or passing Horley station.

Diagram 12.9.6: 2029 southbound line loading profile



Southbound network peak (17:00-18:00)

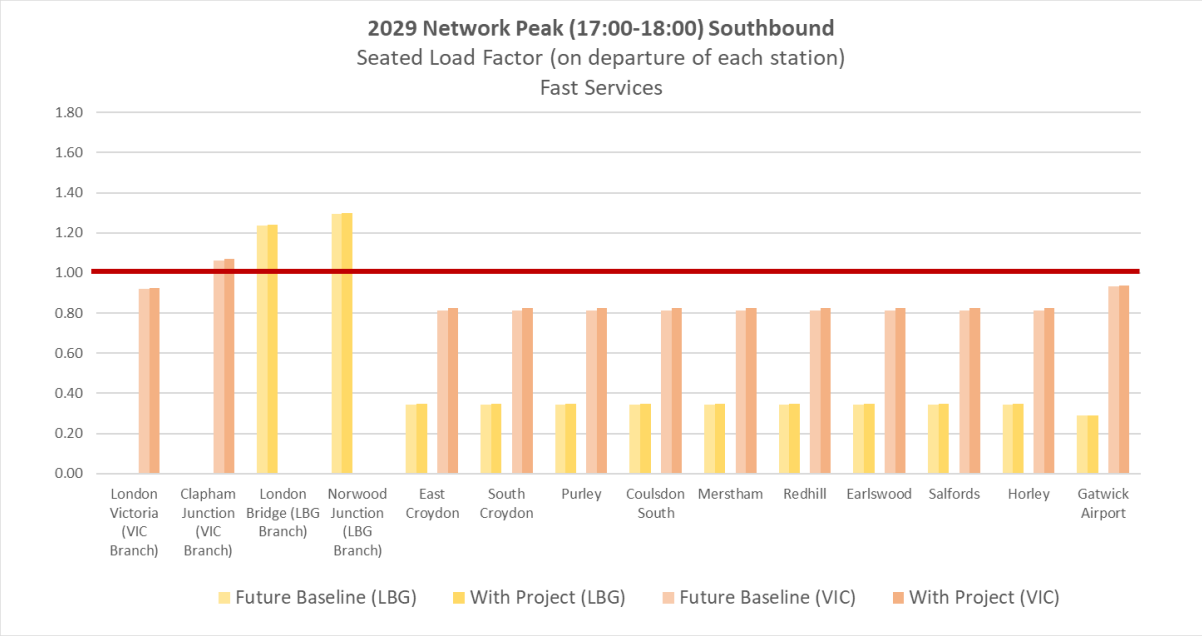
12.9.51 Table 12.9.7 provides a summary of the increase in line loading by station in the southbound direction for the network peak.

Table 12.9.7: 2029 percentage change in line loading – southbound network peak (17:00-18:00)

Station	2029 network peak southbound							
	Change in line loading on departure				Percentage change			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
London Victoria (VIC Branch)	0	41	0	41	-	0.7%	-	0.7%
Clapham Junction (VIC Branch)	0	53	0	53	-	0.8%	-	0.8%
London Bridge (LBG Branch)	22	0	9	31	0.3%	-	0.3%	0.3%
Norwood Junction (LBG Branch)	24	0	9	33	0.4%	-	0.3%	0.3%
East Croydon	43	80	4	126	1.1%	1.6%	0.1%	1.1%
South Croydon	43	80	4	126	1.1%	1.6%	0.1%	1.1%
Purley	43	80	4	126	1.1%	1.6%	0.2%	1.2%
Coulsdon South	43	80	3	125	1.1%	1.6%	0.2%	1.2%
Merstham	43	80	3	125	1.1%	1.6%	0.3%	1.2%
Redhill	43	80	7	129	1.1%	1.6%	1.0%	1.3%
Earlswood	43	80	7	129	1.1%	1.6%	1.2%	1.3%
Salfords	43	80	7	129	1.1%	1.6%	1.3%	1.3%
Horley	43	80	7	129	1.1%	1.6%	1.3%	1.3%
Gatwick Airport	17	35	6	59	0.5%	0.6%	1.5%	0.9%

12.9.52 Table 12.9.7 shows that during the network peak hour, the Project contributes an additional 129 passengers in the southbound direction. Most of these passengers are expected to use the fast train services from London Victoria and London Bridge. The increase in passengers represents around a 1% increase in passengers on both the fast and the stopping services. To assess the impact on crowding, Diagram 12.9.7 shows the Seated Load Factor assessment and Table 12.9.8 shows the standing capacity assessment.

Diagram 12.9.7: 2029 southbound network peak Seated Load Factor



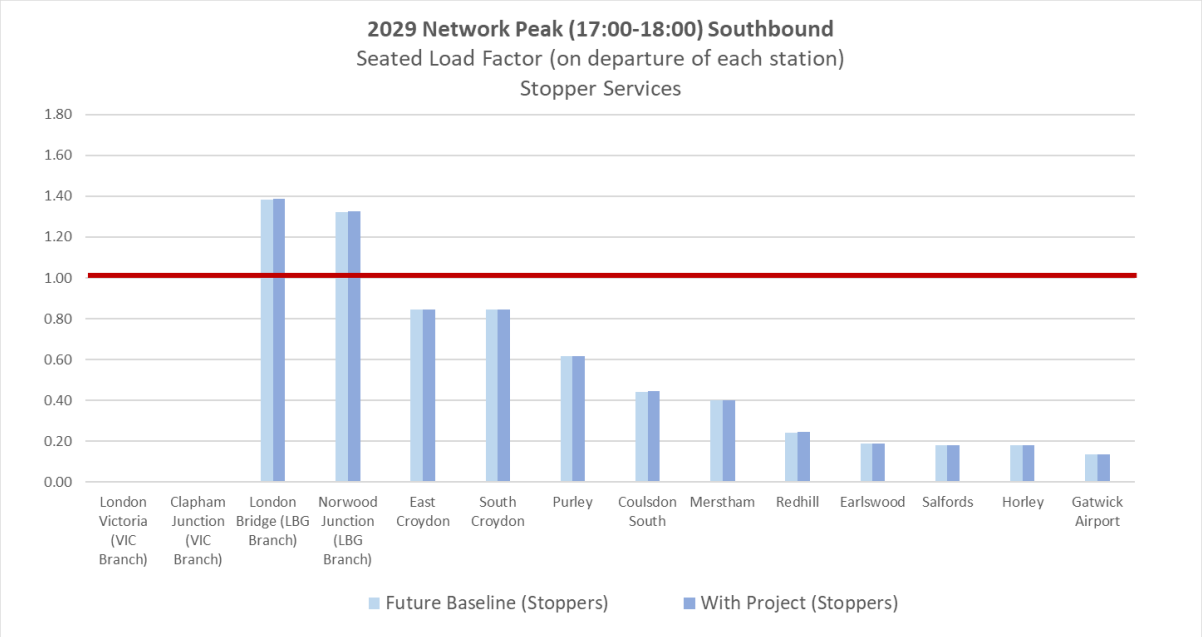


Table 12.9.8: 2029 southbound network peak standing capacity assessment (17:00-18:00)

Station	2029 network peak southbound – percentage of standing capacity occupied							
	Future baseline 2029				With Project (percentage point change from future baseline) 2029			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
Clapham Junction (VIC Branch)	-	10.1%	-	-	0.0% (-)	11.5% (1.4%)	0.0% (-)	- (-)
London Bridge (LBG Branch)	16.2%	-	23.4%	18.7%	16.5% (0.3%)	0.0% (-)	23.7% (0.2%)	19.0% (0.3%)
Norwood Junction (LBG Branch)	20.1%	-	19.8%	20.0%	20.4% (0.3%)	0.0% (-)	20.0% (0.2%)	20.3% (0.3%)

12.9.53 Diagram 12.9.7 shows that seating capacity is exceeded on fast and stopping services until reaching East Croydon. This occurs in the future baseline owing to background commuter flows from London. Table 12.9.8 shows the highest percentage of standing capacity occupied in the future baseline is 10.1% and 20.1% on the fast services out of London Victoria and London Bridge respectively, which occurs north of East Croydon. Whilst services north of East Croydon are therefore busy, the Project will not significantly increase the percentage of standing capacity occupied when compared to the future baseline 2029 situation, with the highest increase being 1.4 percentage points on the fast services out of London Victoria. Ample standing capacity will remain available on these services.

Southbound project peak (08:00-09:00)

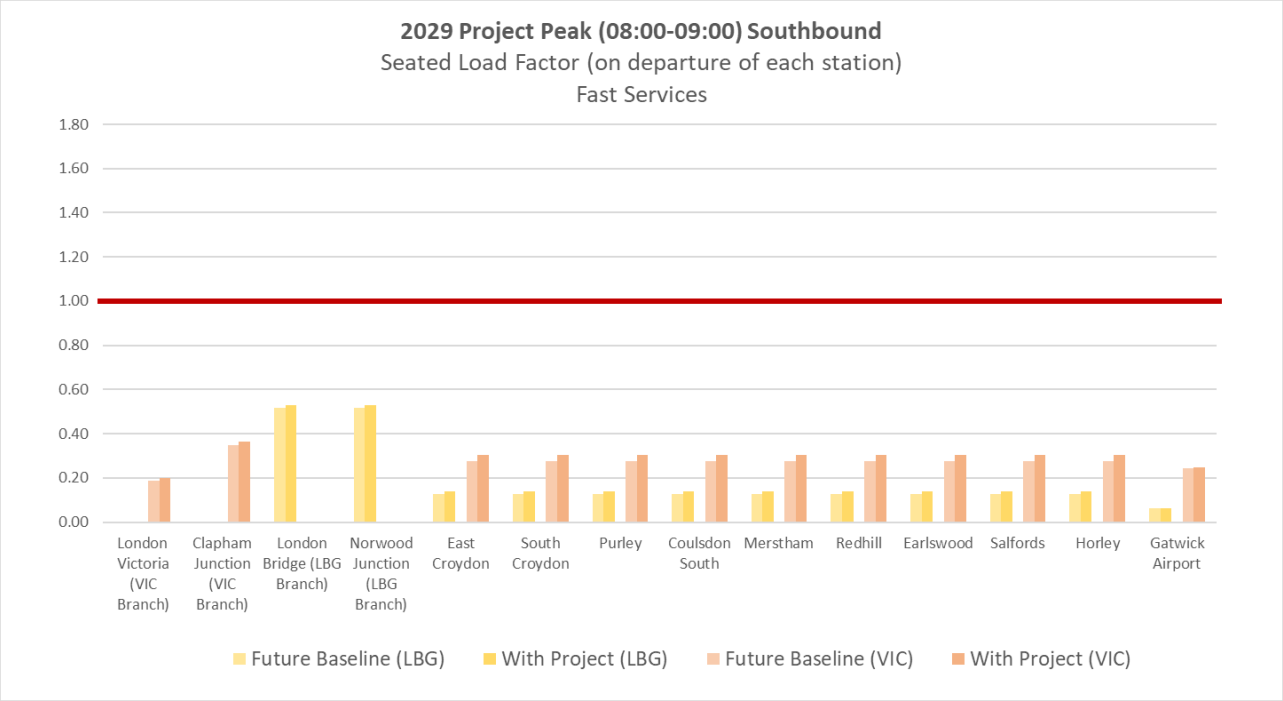
12.9.54 Table 12.9.9 provides a summary of the increase in line loading by station in the southbound direction for the Project peak.

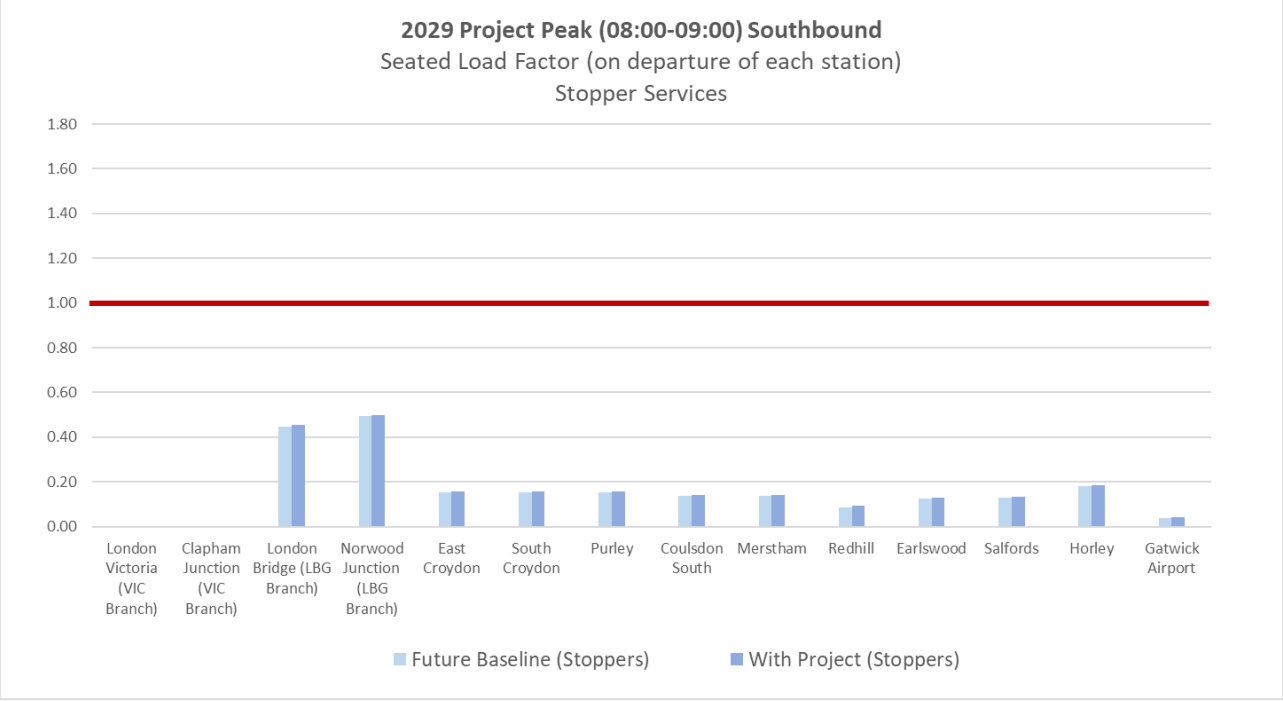
Table 12.9.9: 2029 percentage change in line loading – southbound project peak

Station	2029 project peak southbound							
	Change in line loading on departure				Percentage change			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
London Victoria (VIC Branch)	0	68	0	68	-	6.5%	-	6.5%
Clapham Junction (VIC Branch)	0	92	0	92	-	4.7%	-	4.7%
London Bridge (LBG Branch)	73	0	16	88	2.7%	-	1.6%	2.4%
Norwood Junction (LBG Branch)	73	0	14	87	2.7%	-	1.3%	2.3%
East Croydon	112	155	12	280	8.2%	10.0%	2.8%	8.3%
South Croydon	112	155	12	280	8.2%	10.0%	2.8%	8.3%
Purely	112	155	12	280	8.2%	10.0%	2.8%	8.3%
Coulsdon South	112	155	12	280	8.2%	10.0%	3.1%	8.4%
Merstham	112	155	12	280	8.2%	10.0%	3.2%	8.4%
Redhill	112	155	17	284	8.2%	10.0%	6.8%	8.1%
Earlswood	112	155	17	284	8.2%	10.0%	4.7%	7.9%
Salfords	112	155	17	284	8.2%	10.0%	4.6%	7.9%
Horley	112	155	17	284	8.2%	10.0%	3.3%	7.6%
Gatwick Airport	6	16	2	24	0.9%	1.2%	1.6%	1.6%

12.9.55 Table 12.9.9 shows that during the project peak hour, the Project contributes an additional 284 passengers in the southbound direction. Most of these passengers are expected to use the fast train services from London Victoria and London Bridge. The increase in passengers represents around a 10% increase in passengers on the fast services, and approximately 7% on the stopping services. To assess the impact on crowding, Diagram 12.9.8 shows the Seated Load Factor assessment.

Diagram 12.9.8: 2029 southbound project peak Seated Load Factor





12.9.56 Diagram 12.9.8 shows that seating capacity is not exceeded at any of the services and therefore no crowding issues are expected. Consequently, a southbound project peak standing capacity assessment is not required.

Summary on rail crowding

12.9.57 A summary of rail crowding by peak hour and direction is as follows:

- **Northbound** – The highest increase in line loading as a result of the Project is 5.3% (during the project peak). The percentage of standing capacity occupied on train services is around 23.7% in the Project peak and up to 28.0% in the network peak, indicating busy trains into London but with ample spare standing capacity available. The Project accounts for up to a 2.5 percentage points change in standing capacity which represents a low magnitude of impact.
- **Southbound** – The highest increase in line loading as a result of the Project is up to 10.0% (during the project peak). The percentage of standing capacity occupied on train services is around 23.7% in the network peak. The Project accounts for up to a 1.4 percentage points change in standing capacity which represents a low magnitude of impact and ample standing capacity would remain available.

12.9.58 The overall magnitude of impact is considered to be low and the sensitivity of receptors in terms of public transport capacity is considered to be low to medium. Any effects to changes in crowding levels for 2029 are therefore anticipated to be **minor adverse**, which is not significant. This assessment has been undertaken for the Network and Project peak periods. The full set of 24-hour line loading and crowding analysis is contained in **ES Appendix 12.9.2: Rail Passenger Flows** (Doc Ref. 5.3) and in the TA.

Crowding in station

12.9.59 The station crowding assessment has been completed for 2029 and the results are reported below. The AM peak used is 07:00-09:00 and the PM peak used is 16:00-18:00 for both the concourse and platform for all assessment years.

12.9.60 Diagram 12.9.9 and Diagram 12.9.10 show the Level of Service performance for circulation at the concourse level of the station for the peak hour in the AM and PM peak modelled periods.

Diagram 12.9.9: 2029 concourse LoS (AM peak period, 07:00-09:00)

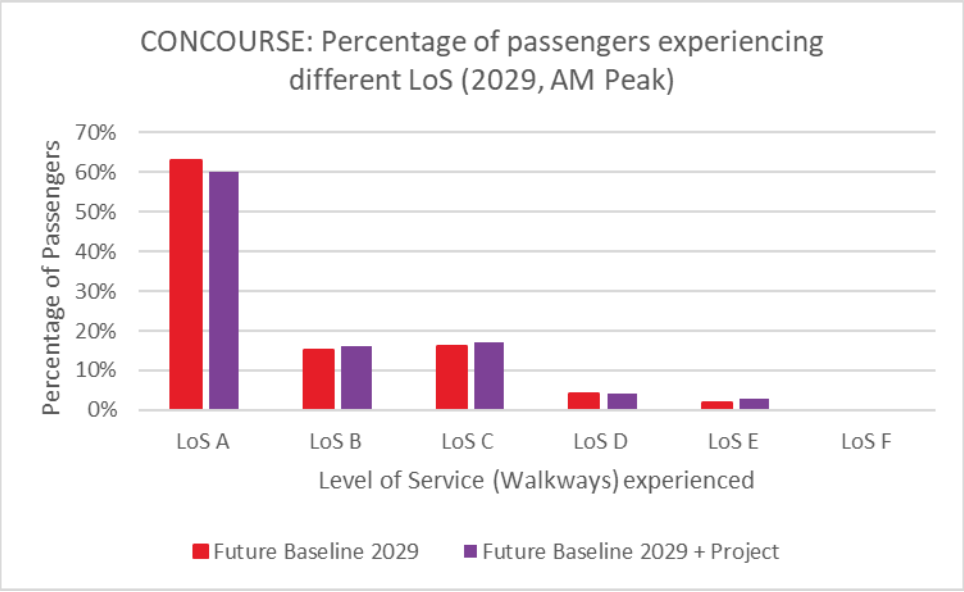
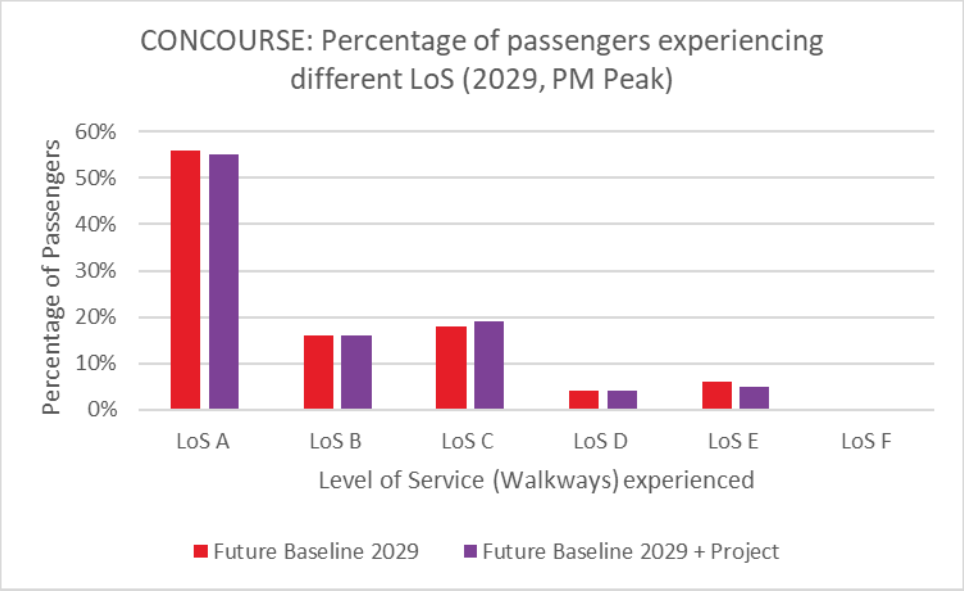


Diagram 12.9.10: 2029 concourse LoS (PM peak period, 16:00-18:00)



12.9.61 The percentage of passengers experiencing a different Level of Service varies but the assessment shows that station performance at concourse level would be predominantly LoS C or better. This represents a low passenger sensitivity to increases in crowding.

12.9.62 The Level of Service performance for queuing and waiting for the station platforms is shown in Diagram 12.9.11 and Diagram 12.9.12, excluding escalator elements. Level of Service is not typically applied to escalator elements as passengers either walk up these or stand at a spacing of their choosing.

Diagram 12.9.11: 2029 platforms LoS (AM peak period, 07:00-09:00)

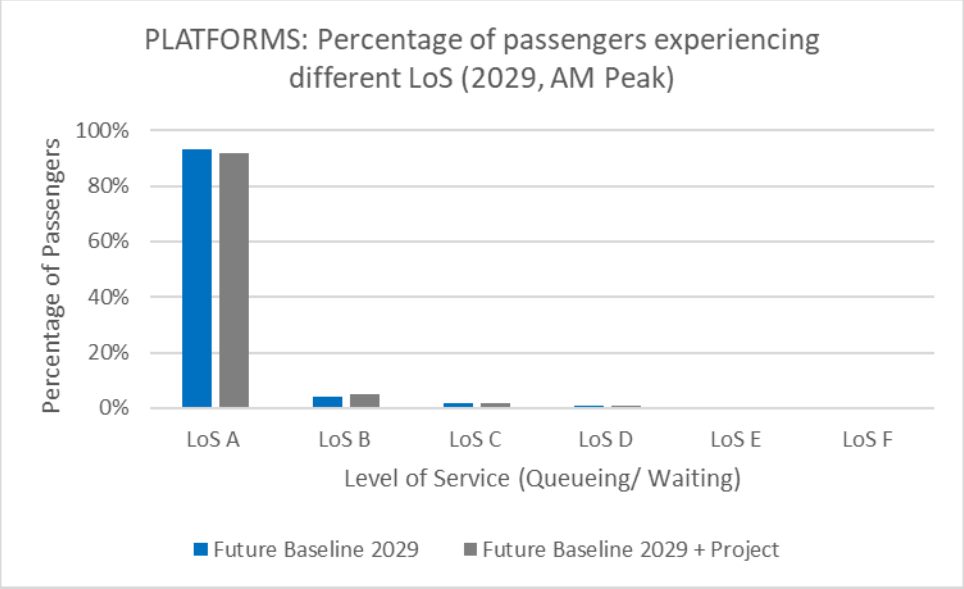
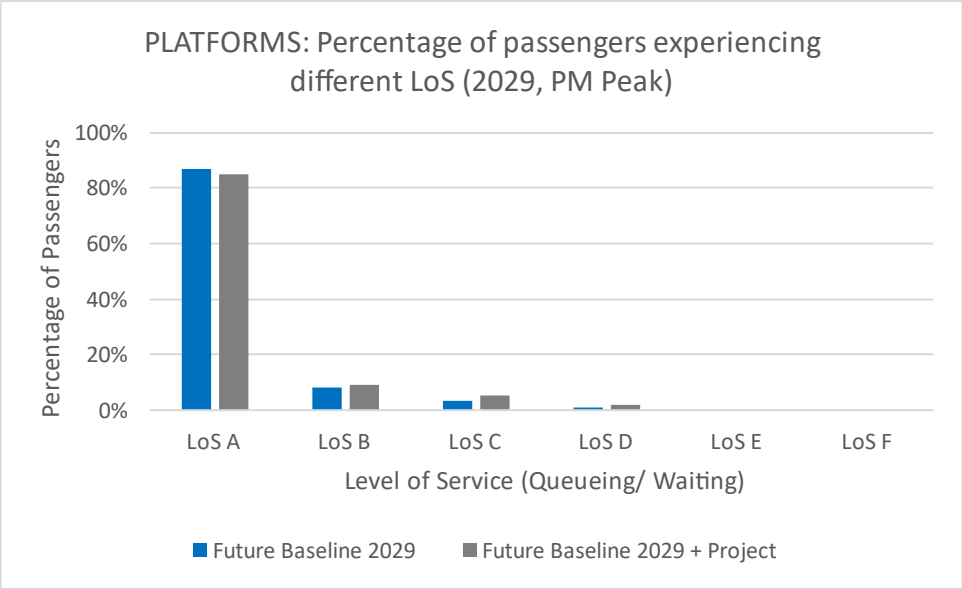


Diagram 12.9.12: 2029 platforms LoS (PM peak period, 16:00-18:00)



12.9.63 The percentage of passengers experiencing a different Level of Service ranges varies but the assessment shows that the station performance at platform level would generally be at LoS C or better, with a very small percentage of passengers experiencing LoS D in the peak hour. In fact, most passengers will experience LoS A for 80% (PM peak) to 90% (AM peak) of the time.

12.9.64 When considering the full assessment across the station, for the concourse and platforms and both peak hours, the magnitude of impact of the Project on crowding is considered to be negligible to low. The sensitivity of receptors is considered to be low given that most passengers experience LoS C or better. The overall effect on changes in crowding levels for the railway station with the Project are considered **negligible adverse**.

Further mitigation and future monitoring

12.9.65 Further monitoring of GAL's performance against its mode share commitments is set out in the **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3). This monitoring will be ongoing at Gatwick to understand travel patterns and measures will be implemented to further encourage the use of sustainable modes of transport and achieve the committed mode shares. No further mitigation is proposed other than that adopted as part of the Project (as set out in Section 12.7.3).

Significance of effects

12.9.66 No mitigation is proposed, and the significance of effects would therefore remain as presented above.

Highway construction period: 2029

12.9.67 The Project includes highway improvement works providing grade-separation of traffic movements at the North and South Terminal Roundabouts and upgrading the Longbridge Roundabout. Based on the modelling work undertaken, it is anticipated that the highway works will be required to be completed by the summer period after the third anniversary of the opening of the northern runway.

12.9.68 The highway construction scenario is based on the indicative programme for the highway works and on the point in that programme at which the combined traffic management arrangements would be at their most complex. This is assumed to occur in the latter part of 2029. The highway works construction period has therefore been assessed by overlaying construction activity onto the modelling for the first year of operation (2029), which also includes the additional air passenger demand that would arise from the opening of the new runway. This highway construction scenario is assessed and compared against the future baseline 2029.

12.9.69 Construction of the surface access improvements is expected to take place after the main airport construction activities are complete, but as soon as possible thereafter to allow for the highway works to be completed by the summer period after the third anniversary of the new runway opening. Construction would be undertaken with the aim of minimising disruption both to airport traffic and background traffic. Measures to manage construction traffic and the operation of the road network during this period are set out in the **ES Appendix 5.3.2: CoCP Annex 3 - Outline Construction Traffic Management Plan** (Doc Ref. 5.3).

Severance

12.9.70 The highway flows are contained in **ES Appendix 12.9.1: Highway Flows and Driver Delay Review** (Doc Ref. 5.3). For the purposes of reporting, only the links which have a magnitude of impact of low, medium, and high adverse or beneficial are assessed in this section to focus on potential significant effects. Table 12.9.10 shows the traffic flows for these links for the future baseline 2029 scenario. Table 12.9.11 shows the traffic flows for the 2029 with Project plus highway construction scenario. The net changes in traffic flows are shown in Table 12.9.12.

Table 12.9.10: First full year of opening 2029 traffic flows – future baseline

ID	Road	AM1			AM2			IP			PM		
		All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV
NT3	Northgate Road	644	93	14%	469	87	19%	677	147	22%	649	56	9%
ST1	South Terminal Entry/Exit	1429	24	2%	1508	29	2%	1401	36	3%	1431	22	2%
a08	Reigate Road - Povey Cross (North of the Airport)	575	7	1%	653	13	2%	401	10	2%	634	14	2%
rg15	Lee Street, Parkhurst Road-Vicarage Lane	420	4	1%	546	11	2%	500	16	3%	617	12	2%
sn04	Steyning Road/Church Road, Worthing Road-High Street, B2135, Steyning	655	17	3%	736	13	2%	626	23	4%	789	9	1%

Table 12.9.11: First full year of opening 2029 traffic flows – with Project and highway construction

ID	Road	AM1			AM2			IP			PM		
		All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV
NT3	Northgate Road	746	101	14%	653	98	15%	735	160	22%	576	61	11%
ST1	South Terminal Entry/Exit	2698	27	1%	2679	26	1%	2326	46	2%	2168	32	1%
a08	Reigate Road - Povey Cross (North of the Airport)	777	20	3%	885	11	1%	627	28	4%	831	14	2%
rg15	Lee Street, Parkhurst Road-Vicarage Lane	550	6	1%	608	11	2%	703	16	2%	720	13	2%
sn04	Steyning Road/Church Road, Worthing Road-High Street, B2135, Steyning	653	17	3%	735	12	2%	626	23	4%	1335	11	1%

Table 12.9.12: First full year of opening 2029 traffic flows with Project and highway construction – net change (percentage point change from future baseline)

ID	Road	AM1			AM2			IP			PM		
		All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV
NT3	Northgate Road	102 (16%)	8 (9%)	-1% (-6%)	184 (39%)	11 (13%)	-4% (-19%)	58 (9%)	13 (9%)	0% (0%)	-73 (-11%)	5 (9%)	2% (23%)
ST1	South Terminal Entry/Exit	1269 (89%)	3 (13%)	-1% (-40%)	1171 (78%)	-3 (-10%)	-1% (-50%)	925 (66%)	10 (28%)	-1% (-23%)	737 (52%)	10 (45%)	0% (-4%)
a08	Reigate Road - Povey Cross (North of the Airport)	202 (35%)	13 (186%)	1% (111%)	232 (36%)	-2 (-15%)	-1% (-38%)	226 (56%)	18 (180%)	2% (79%)	197 (31%)	0 (0%)	-1% (-24%)
rg15	Lee Street, Parkhurst Road-Vicarage Lane	130 (31%)	2 (50%)	0% (15%)	62 (11%)	0 (0%)	0% (-10%)	203 (41%)	0 (0%)	-1% (-29%)	103 (17%)	1 (8%)	0% (-7%)
sn04	Steyning Road/Church Road, Worthing Road-High Street, B2135, Steyning	-2 (0%)	0 (0%)	0% (0%)	-1 (0%)	-1 (-8%)	0% (-8%)	0 (0%)	0 (0%)	0% (0%)	546 (69%)	2 (22%)	0% (-28%)

12.9.71 The above shows that within the whole study area, only five links will experience a change of more than 30% in traffic flow during the highway construction period when compared to the future baseline scenario. Three links are near the Airport, which are Northgate Road (ID: NT3), South Terminal Access (ID: ST1) and Reigate Road (ID: a08). Additional links are located in Horley (ID: rg15) and West Grinstead (ID: sn04).

12.9.72 The following links are expected to have an increase of 30% to 60% (low impact) in traffic flow:

- Link NT3: Northgate Road (negligible sensitivity) in the AM2 period.
- Link a08: Reigate Road (medium sensitivity) in all the assessed periods.
- Link rg15: Lee Street, Parkhurst Road-Vicarage Lane (high sensitivity) in the AM1 and IP periods.

12.9.73 On these links the effect on severance would be **minor adverse**.

12.9.74 The following links are expected to have an increase of 60% to 90% (medium impact) in traffic flow:

- Link ST1: South Terminal Access (low sensitivity) in all the assessed periods.
- Link sn04: B2135 Steyning Road/Church Road (medium sensitivity) in the PM period.

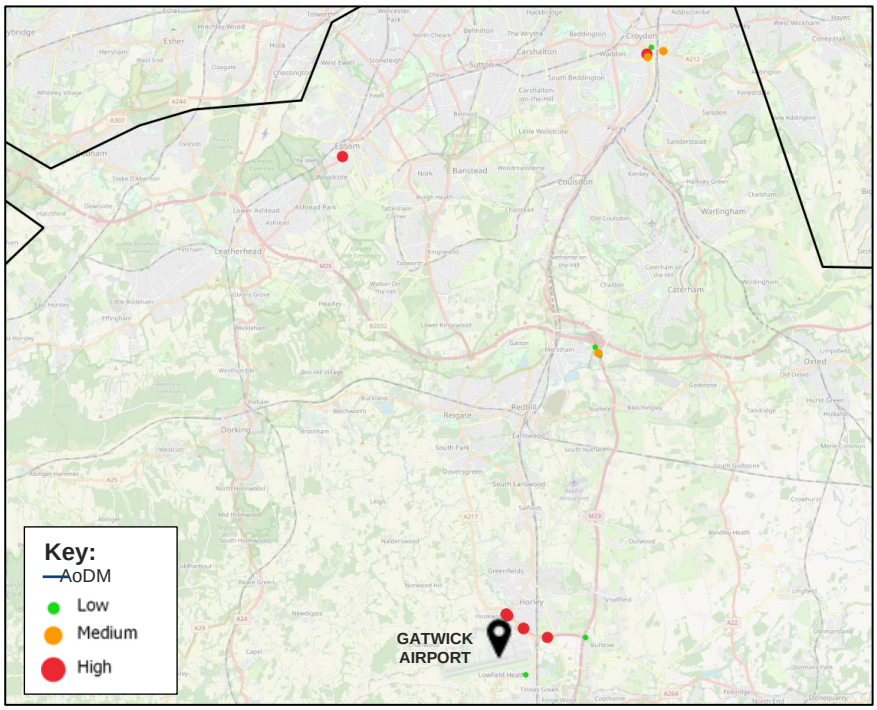
12.9.75 The above would mean a **minor adverse** severance effect on the South Terminal Access, and a **moderate adverse** severance effect on B2135 Steyning Road/Church Road. It should be noted that the majority of the B2135 has negligible sensitivity without any footway or pedestrian/cyclist desire lines.

12.9.76 All other links will have a change of traffic of less than 30% and therefore the magnitude of impact on severance is considered to be negligible. The sensitivity of the highway links for pedestrians and cyclists range from negligible to high and the overall effect of severance is considered to be **minor adverse**, which is not significant.

Driver delay

12.9.77 Diagram 12.9.13 shows the magnitude of impact for driver delay for junctions where the V/C ratio is over 80%. The diagram shows driver delay for all time periods assessed and any overlaps in colours indicate different magnitudes of impact by time period. The highest magnitude of impact for each junction is considered.

Diagram 12.9.13: 2029 with Project and highway construction driver delay magnitude of impact (all assessment time periods)



12.9.78 Diagram 12.9.13 shows that most junctions (over 1,000) have negligible or low magnitude of impact in terms of delay. Car driver and passenger sensitivity is considered to be medium for junctions where the V/C ratio is over 80%. For the junctions with negligible magnitude of impact, the driver delay effect is **negligible**. For those with a low magnitude of impact, the driver delay is **minor adverse**.

12.9.79 There are nine junctions with medium and high magnitudes of impact. A review has been undertaken of these junctions which is included in **ES Appendix 12.9.1: Highway Flows and Driver Delay Review** (Doc Ref. 5.3) and a summary is provided in Table **12.9.13**. (see paragraph 12.9.80).

Table 12.9.13: 2029 with Project and highway construction driver delay assessment

Node	Magnitude of Impact	Name	Assessment	Further Mitigation
54710	Medium	Coombe Rd / South Park Hill Rd, Croydon	This junction is shown to be operating close to capacity in the morning peak periods and within capacity at other time periods in the future baseline (maximum V/C ratios of 99% in the AM1 period). With the Project and highway construction activity, the model shows increases in traffic in the AM2 period, which are not reflected in other time periods.	No mitigation is required.

Node	Magnitude of Impact	Name	Assessment	Further Mitigation
			This is considered to be due to model noise (see paragraph 12.9.80) and reassignment of background traffic. The proportion of airport traffic at this junction is very small (less than 1%) and the number of additional airport trips as a result of the highway construction works is negligible (-1 to +1 vehicle across the peak periods). With the Project and highway construction activity the junction would continue to operate within or close to capacity, with a maximum V/C ratio of 98% in the AM1 time period.	
55021	High	Southbridge Road / South End, Croydon	This impact is identified in the AM1 peak where there is an increase in traffic of around 250 vehicles, but without a similar increase in the following AM2 period despite a similar total volume of traffic passing through the junction. This is considered to be due to model noise and reassignment of background traffic (see paragraph 12.9.80). The proportion of airport traffic at this junction is very small (around 1%) and the change in airport-related trips as a result of the Project is negligible (reducing by up to 6 vehicles across the peak periods). The junction continues to operate within capacity (V/C of 91% in the AM1 period with the Project and highway construction)	No junction mitigation is required.
55022	Medium	Brighton Road / Warham Road / South End, Croydon	This impact is identified in the AM1 peak where there is an increase in traffic of around 240 vehicles but without similar increases in other peak periods, despite a similar total volume of traffic passing through the junction. This is considered to be due to model noise and reassignment of background traffic (see paragraph 12.9.80). The proportion of airport traffic at this junction is very small (around 1%) and the change in airport-related trips as a result of	No junction mitigation is required.

Node	Magnitude of Impact	Name	Assessment	Further Mitigation
			the Project is negligible (a reduction of up to 7 vehicles across the peak periods). The junction continues to operate within capacity (V/C ratio up to 85.4% with the Project and highway construction).	
53192	High	South Street / Woodcote Road / Dorking Road, Epsom	This impact is identified in the AM1 peak where there is an increase in traffic of around 160 vehicles, but without similar increases in other periods despite similar total volumes of traffic passing through the junction. This is considered to be due to model noise and reassignment of background traffic (see paragraph 12.9.80). There is no change in airport-related traffic associated with the Project and highway construction. The junction is operating at capacity (V/C ratio of 97% in the AM1 peak with Project and highway construction).	No junction mitigation is required.
19607	Medium	M23 / M25 southern diverge	The impact is identified in the AM1 peak, where the V/C increases by 2% from 93.7% to 95.8%. The node continues to operate within capacity.	No junction mitigation is required.
15084	High	South Terminal - Airport Way Roundabout East / A23, Gatwick	This junction is indicated to be operating within capacity in the future baseline. It is part of the South Terminal Roundabout, which would be affected by the traffic management required for the highway construction works and would also experience some increase in traffic while the works are being undertaken. The impacts from the Project are identified in the AM1 and AM2 peak periods. AM1 is shown with a reduction of overall traffic (-47 vehicles) in the and an increase in Project airport traffic (+59 vehicles). AM2 is shown with an overall increase in vehicles (+87 vehicles) and a reduction in Project airport traffic (-15 vehicles). The model nevertheless indicates that the junction would continue to operate	No mitigation is required.

Node	Magnitude of Impact	Name	Assessment	Further Mitigation
			with V/C ratios of less than 100% in all time periods, and the impact of the Project shown by the modelling would be temporary (lasting around six months, based on the indicative programme) while the highway works are being undertaken.	
15083	High	London Rd / Airport Way, Gatwick	The model generally indicates that these locations would operate within capacity in the future baseline, but during highway construction they would be affected by the traffic management required for the highway construction, leading to a reduction in the number of lanes (and associated saturation flows) This would result in higher V/C ratios, approaching 100%, for a temporary period (lasting around six months, based on the indicative programme) while the highway works are being undertaken.	No mitigation is required.
14801	High	Longbridge Roundabout		
16768	High	London Rd / A23		

12.9.80 The above shows that some junctions are temporarily affected by the construction works, and other junctions are identified due to model noise. Information on model noise is provided in paragraphs 12.5.5 and 12.5.6. Model noise is identified by reviewing changes in traffic volumes and the amount of airport related traffic at each node location. Where the additional trips are identified as the result of an unexpected reassignment of background traffic on the network, particularly if this does not occur consistently or is at some distance from the Airport, this is considered to be due to model noise.

12.9.81 No other junctions are identified to have medium or high impacts and therefore the overall magnitude of impact for driver delay is considered to be low, and the effect on driver delay is considered to be **minor adverse**, which is not significant.

Pedestrian and cyclist delay

12.9.82 Works to the Longbridge Roundabout would require temporary changes to pedestrian and cycle routes. These are expected to be in the form of temporary diversions and signal-controlled crossing points which could increase pedestrian and cyclist delays. However, it is expected that the traffic management measures would minimise delays as far as possible and appropriate signage would be provided.

12.9.83 The magnitude of impact is considered to be low and the sensitivity of receptors at Longbridge Roundabout is low to medium. The effect on pedestrian and cycle delays at Longbridge Roundabout are therefore expected to be **minor adverse**, which is not significant.

12.9.84 There are limited pedestrian and cycle provision and movements at the other locations in the area of highway works (North Terminal and South Terminal Roundabouts, Airport Way, and London Road) and therefore pedestrian and cycle delay is not expected to be affected. For these links and the other roads within the study area which are not identified as construction routes, there will be **no change** to pedestrian and cyclist delay.

Pedestrian and cyclist amenity

12.9.85 The suggested threshold for a significant effect on pedestrian and cyclist amenity is when the traffic flows have doubled. No roads within the study area are expected to meet this threshold during the highway construction period.

12.9.86 The traffic composition can also affect pedestrian and cyclist amenity. As shown in the highway flows contained in **ES Appendix 12.9.1: Highway Flows and Driver Delay Review** (Doc Ref. 5.3), there are some links where the percentage of HGVs (number of HGVs divided by total vehicle number) will increase by over 100% which suggest a change in traffic composition. The following links are expected to experience a doubling of HGVs:

- Link a05: Bonnetts Lane, south of the Airport (negligible sensitivity), increase from 3 to 16 HGVs in AM1, 5 to 23 in the IP period. This represents a change in the percentage of HGVs of 395% in AM1 (from approximately 0% to 2% of total traffic) and 350% (from approximately 1% to 5% of total traffic) in the IP period.
- Link a08: Reigate Road (medium sensitivity), 7 to 20 HGVs in AM1. This represents a change in the percentage of HGVs of 111% in AM1 (from approximately 1% to 3% of total traffic).
- Link cy33: Fell Road (low sensitivity), 9 to 23 HGVs in AM1 period. This represents a change in the percentage of HGVs of 155% (from approximately 4% to 9% of total traffic).
- Link cy42: Ifield Green (medium sensitivity), 5 to 18 HGVs in the AM1 period. This represents a change in the percentage of HGVs of 246% (from approximately 1% to 3% of total traffic).

12.9.87 The above links have large percentage change in the number of HGVs. However, as shown above, the absolute increases in the number of HGVs are small, the overall proportion of traffic which is HGVs remain low and the high percentage increases are due to the links having generally low flows. Therefore, the magnitude of impact is considered to be low, and the effect on pedestrian and cyclist amenity is considered to be **minor adverse**.

12.9.88 HGV flows along Ifield Green have been examined in more detail and the increase in HGVs is identified as localised HGV re-routing between M23 J11 and A217 / Reigate Road within the model. This is considered unlikely to occur in practice. Measures will be taken through the Code of Construction Practice and Construction Traffic Management Plan to ensure that heavy traffic related to construction of the Project, and where possible other heavy traffic associated with GAL's normal operations, does not use these routes.

12.9.89 Amenity can also be affected by footway width/separation from traffic. During the construction of Longbridge Roundabout, the traffic composition could change with more HGVs and temporary footways and crossing points which may increase fear and intimidation for pedestrians and cyclists. The magnitude of impact is considered to be low for routes which would experience construction traffic and temporary traffic management measures. The sensitivity of receptors

along the highway links ranges from negligible to medium. The overall effect on pedestrian and cyclist amenity is considered to be **minor adverse**, which is not significant.

Accidents and safety

12.9.90 Changes in traffic flows and highway design could influence the risk of accidents. There would be temporary changes to the highway design during the highways construction period, but suitable signage and measures to minimise the impact on accidents and safety would be implemented as part of the Construction Traffic Management Plan. The magnitude of impact for accidents and safety is considered to be low.

12.9.91 The sensitivity of receptors in terms of pedestrians and cyclists for the highway works area is considered to be low. The effect on accidents and safety on pedestrians and cyclists is considered **minor adverse** along the construction routes, and no change on all other roads.

12.9.92 The sensitivity of receptors in terms of car drivers for the highway works is considered to be medium. The effect on accidents and safety on car drivers is considered **minor adverse** along the construction routes, which is not significant, and no change on all other roads.

Hazardous loads

12.9.93 The highway construction works are not expected to generate hazardous loads but changes to highway design and temporary diversion routes during the construction period could affect the existing transportation of hazardous loads on the public highway. The effect of highway construction on hazardous loads is therefore considered **negligible adverse**.

Effects on public transport amenity

12.9.94 Changes in passenger crowding during this period would be primarily associated with the growth in passenger numbers and those of the highway construction workforce who travel to site by rail.

12.9.95 Capacity modelling shows there is plenty of seating capacity available in 2029, including with incremental growth in passengers (see paragraphs 12.9.43 onwards). The likely level of construction trips made by rail is not expected to have a measurable impact on rail crowding. Measures within the Travel Plan for construction workers could include staggered shift start and end times to reduce peak period pressure as well as provision of bus services to park and ride sites and to specific towns and cities where construction workers come from.

12.9.96 The magnitude of impact is considered to be negligible and the sensitivity of receptors in terms of public transport capacity is also considered to be low. Any effects to changes in crowding levels are therefore anticipated to be **negligible adverse** and are not considered significant.

Further mitigation and future monitoring

12.9.97 Construction activities would be monitored as part of the Construction Traffic Management Plan. Further monitoring of GAL's performance against its surface access commitments is set out in the **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3). No further monitoring measures are proposed.

Significance of effects

12.9.98 No other significant effects have been identified for this assessment year. No further mitigation or monitoring has been identified; therefore, the significance of effects would remain as presented above.

Interim assessment year: 2032

12.9.99 The annual passenger demand for 2032 is expected to increase from 59.4 mppa in the future baseline scenario to 72.3 mppa with the Project. To deliver the growth in the with Project scenario, the highway improvements are anticipated to be open to traffic in 2032. This section therefore assesses the with Project scenario in 2032, including the completed highway improvements, and compares this with the future baseline (without the highway improvements).

Severance

12.9.100 The peak hour highway flows for the interim assessment year are contained in **ES Appendix 12.9.1: Highway Flows and Driver Delay Review** (Doc Ref. 5.3). For the purposes of reporting, only the links which have a magnitude of impact of low, medium, and high adverse or beneficial are assessed in this section to focus on potential significant effects. These links and associated flows are shown in Table 12.9.14 for the future baseline and Table 12.9.15 for the with Project scenario. The net changes in traffic flows are shown in Table 12.9.16.

Table 12.9.14: Interim assessment year 2032 traffic flows – future baseline

ID	Road	AM1			AM2			IP			PM		
		All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV
002	A23 Airport Way	4665	194	4%	4504	222	5%	3880	235	6%	4282	131	3%
004	A217 London Road, Longbridge Roundabout-Parking Entry	1343	71	5%	1527	67	4%	1287	84	7%	1185	31	3%
005	A217 London Road, Parking Entry-A217 Reigate Road	1354	71	5%	1537	67	4%	1293	84	6%	1196	31	3%
006	North Terminal Roundabout to A23 London Road	1145	37	3%	913	36	4%	1017	80	8%	1276	35	3%
NT1	North Terminal Entry/Exit	1278	65	5%	1176	66	6%	1083	64	6%	957	48	5%
NT2	Longbridge Way	974	163	17%	939	149	16%	1032	173	17%	1062	100	9%
NT5	Gatwick Way	543	58	11%	559	61	11%	279	55	20%	491	30	6%
ST1	South Terminal Entry/Exit	2684	28	1%	2731	36	1%	2225	45	2%	2050	31	2%
z00	M23 J9, Nb Slip (South Of J9)	1254	21	2%	1146	30	3%	846	42	5%	676	23	3%

Table 12.9.15: Interim assessment year 2032 – with Project

ID	Road	AM1			PM			IP			PM		
		All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV
002	A23 Airport Way	5900	236	4%	6085	266	4%	4244	271	6%	4637	153	3%
004	A217 London Road, Longbridge Roundabout-Parking Entry	1372	77	6%	1539	92	6%	1261	87	7%	1552	39	3%
005	A217 London Road, Parking Entry-A217 Reigate Road	1380	77	6%	1546	92	6%	1266	87	7%	1559	39	3%
006	North Terminal Roundabout to A23 London Road	2356	57	2%	2386	56	2%	1858	189	10%	1980	52	3%
NT1	North Terminal Entry/Exit	1800	74	4%	1663	68	4%	1235	69	6%	1039	51	5%
NT2	Longbridge Way	1097	197	18%	906	204	23%	1203	279	23%	722	115	16%
NT5	Gatwick Way	514	67	13%	401	61	15%	430	66	15%	452	36	8%
ST1	South Terminal Entry/Exit	3174	28	1%	3095	27	1%	2735	54	2%	2707	36	1%
z00	M23 J9, Nb Slip (South of J9)	1758	31	2%	1816	54	3%	1102	47	4%	876	27	3%

Table 12.9.16: Interim assessment year 2032 – net change (percentage change from future baseline in brackets)

ID	Road	AM1			AM2			IP			PM		
		All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV
002	A23 Airport Way	1235 (26%)	42 (22%)	0% (0%)	1581 (35%)	44 (20%)	-1% (-1%)	364 (9%)	36 (15%)	0% (0%)	355 (8%)	22 (17%)	0% (0%)
004	A217 London Road, Longbridge Roundabout-Parking Entry	29 (2%)	6 (8%)	0% (0%)	12 (1%)	25 (37%)	2% (2%)	-26 (-2%)	3 (4%)	0% (0%)	367 (31%)	8 (26%)	0% (0%)
005	A217 London Road, Parking Entry-A217 Reigate Road	26 (2%)	6 (8%)	0% (0%)	9 (1%)	25 (37%)	2% (2%)	-27 (-2%)	3 (4%)	0% (0%)	363 (30%)	8 (26%)	0% (0%)
006	North Terminal Roundabout to A23 London Road	1211 (106%)	20 (54%)	-1% (-1%)	1473 (161%)	20 (56%)	-2% (-2%)	841 (83%)	109 (136%)	2% (2%)	704 (55%)	17 (49%)	0% (0%)
NT1	North Terminal Entry/Exit	522 (41%)	9 (14%)	-1% (-1%)	487 (41%)	2 (3%)	-2% (-2%)	152 (14%)	5 (8%)	0% (0%)	82 (9%)	3 (6%)	0% (0%)
NT2	Longbridge Way	123 (13%)	34 (21%)	1% (1%)	-33 (-4%)	55 (37%)	7% (7%)	171 (17%)	106 (61%)	6% (6%)	-340 (-32%)	15 (15%)	7% (7%)
NT5	Gatwick Way	-29 (-5%)	9 (16%)	2% (2%)	-158 (-28%)	0 (0%)	4% (4%)	151 (54%)	11 (20%)	-4% (-4%)	-39 (-8%)	6 (20%)	2% (2%)
ST1	South Terminal Entry/Exit	490 (18%)	0 (0%)	0% (0%)	364 (13%)	-9 (-25%)	0% (0%)	510 (23%)	9 (20%)	0% (0%)	657 (32%)	5 (16%)	0% (0%)
z00	M23 J9, Nb Slip (South of J9)	504 (40%)	10 (48%)	0% (0%)	670 (58%)	24 (80%)	0% (0%)	256 (30%)	5 (12%)	-1% (-1%)	200 (30%)	4 (17%)	0% (0%)

12.9.101 Table 12.9.16 shows a selection of links which will experience more than a 30% change in traffic flows for one or more peak periods. These links have been considered against the magnitude of impact for severance based on IEMA guidance, as set out in Table 12.4.5.

12.9.102 The following links are expected to have an increase of 30% to 60% in traffic flow (low impact):

- Link 002: A23 Airport Way (negligible sensitivity) in the AM2 period.
- Links 004 and 005: A217 London Road (low sensitivity) in the PM period.
- Link 006: North Terminal Roundabout (low sensitivity) in the PM period.
- Link NT1: North Terminal Access (low sensitivity) in the AM1 and AM2 periods.
- Link NT2: Longbridge Way (low sensitivity) in the PM period.
- Link NT5: Gatwick Way (low sensitivity) in the IP period.
- Link ST1: South Terminal Access (low sensitivity) in the PM period.
- Link z00: M23 J9 northbound slip (negligible sensitivity) in the AM1 and AM2 periods.

12.9.103 The above links would experience a **negligible adverse** severance effect.

12.9.104 The following link is expected to have an increase of 60% to 90% in traffic flow (medium impact):

- Link 006: North Terminal Roundabout (low sensitivity) in the IP period.

12.9.105 The above link would experience a **minor adverse** severance effect.

12.9.106 The following links are expected to have an increase of more than 90% in traffic flow (high impact):

- Link 006: North Terminal Roundabout (low sensitivity) in the AM1 and AM2 periods.

12.9.107 The above links would experience a **minor adverse** severance effect.

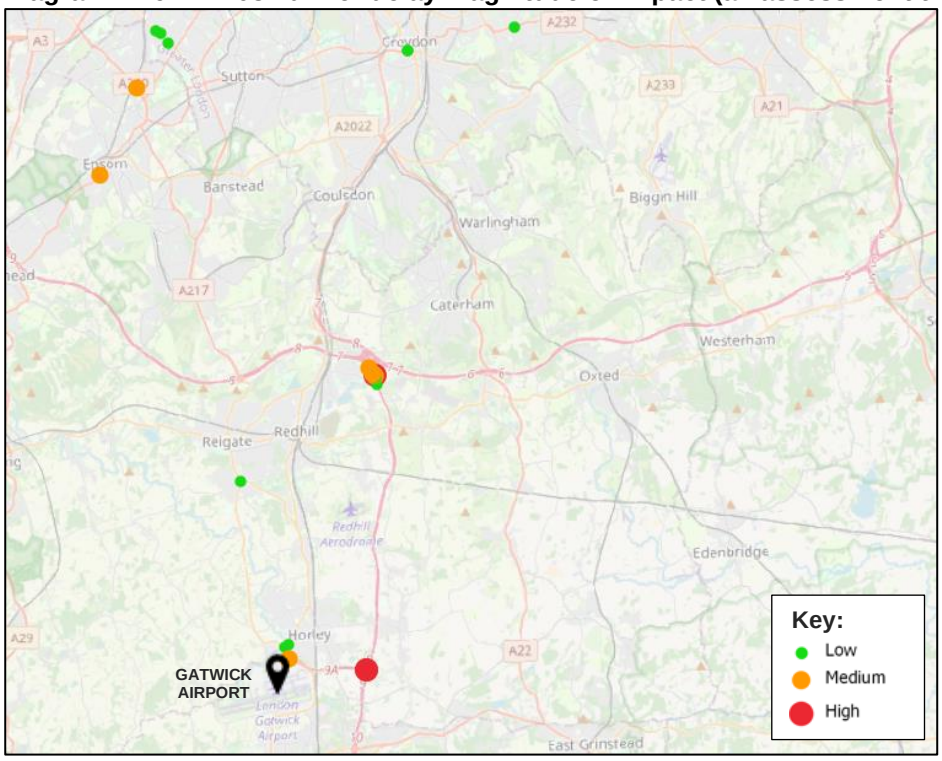
12.9.108 All other changes in traffic flows are below 30% and the magnitude of impact is considered to be negligible. The sensitivity of the pedestrians and cyclists along the highway links range from negligible to high. Overall, the effect of the Project on severance can be considered to be **minor adverse**, which is not significant.

Driver delay

12.9.109 The proposed surface access improvement measures in the 2032 with Project scenario aim to alleviate potential significant effects on driver delay as much as possible. Analysis indicates that most Airport-related traffic uses the M23 Spur and accordingly this, together with the road network serving the terminals, is where highway improvements have been proposed.

12.9.110 Diagram 12.9.14 shows the magnitude of impact for driver delay for junctions where the V/C ratio is over 80%. The diagram shows driver delay for all time periods assessed and any overlaps in colours indicate different magnitudes of impact by time period. The highest magnitude of impact for each junction is considered.

Diagram 12.9.14: 2032 driver delay magnitude of impact (all assessment time periods)



12.9.111 Diagram 12.9.14 shows that most junctions (over 1,000) have a negligible or low magnitude of impact in terms of delay. Car driver and passenger sensitivity is considered to be medium for junctions where the V/C ratio is over 80%. For the junctions with negligible magnitude of impact, the driver delay effect is **negligible**. For those with a low magnitude of impact, the driver delay is **minor adverse**.

12.9.112 There are seven nodes which are shown to have a medium or high magnitude of impact, with a number of these associated with the merge and diverge layout for the M23 / M25 junction and the M23 Junction 9 roundabout. A review has been undertaken of these junctions which is included in **ES Appendix 12.9.1: Highway Flows and Driver Delay Review** (Doc Ref. 5.3) and a summary is provided in Table **12.9.17**.

Table 12.9.17: 2032 driver delay assessment

Node	Magnitude of impact	Name	Assessment	Further mitigation
15214	Medium	M23 / M25 junction (merges / diverges)	This complex of merges and diverges is shown to be operating within capacity in the future baseline, with V/C ratios varying from 74% in the inter-peak period to 94% in the AM1 time period. A separate more detailed review of the whole junction has been undertaken against DMRB criteria, to	No junction mitigation is required.
19607	Medium			
1377	High			
1378	Medium			

Node	Magnitude of impact	Name	Assessment	Further mitigation
			consider the performance of the merges and diverges at this junction. No capacity issues are expected in the with Project scenario, which shows V/C ratios increasing by just two to three percentage points. Further consideration for this junction is undertaken under the 2047 assessment year.	
73465	Medium	Gatwick / Perimeter Road North	This is an internal junction within the GAL road network, which is shown to be operating within capacity in the future baseline. The junction is expected to experience an increase in traffic with the Project. The medium impact from the Project is identified for the AM1 peak where the junction would still be operating within capacity with the Project (85% V/C ratio).	No junction mitigation is required.
16393	High	M23 Junction 9 roundabout	This junction is within the VISSIM microsimulation model and its operation has been considered in more detail through the use of that model. This shows some reductions in speeds with the Project, compared to the future baseline, but no significant capacity issues have been identified (see **ES Appendix 12.9.1: Highway Flows and Driver Delay Review** (Doc Ref. 5.3) for more information).	No junction mitigation is required.
16388	Medium			

12.9.113 A more detailed review and assessment of the above junctions (see **ES Appendix 12.9.1: Highway Flows and Driver Delay Review** (Doc Ref. 5.3)) show no capacity issues. No other junctions are identified to have medium or high impacts and therefore the overall magnitude of impact for driver delay is considered to be low, and the effect on driver delay is considered to be **minor adverse**, which is not significant.

Pedestrian and cyclist delay

12.9.114 The highway improvements proposed as part of the Project would change some pedestrian and cycle routes at the North Terminal, South Terminal, and Longbridge Roundabout junctions. The works are expected to improve pedestrian and cycle accessibility and these movements would be separated from general traffic where practicable. The proposed changes to the Longbridge Roundabout would retain pedestrian crossings on all arms. Other works include a new path connection for pedestrians and cyclists between Longridge roundabout and the airport on the western side of A23 London Road, a new shared-use ramp for pedestrians and cyclists to Riverside Garden Park, a new signal-controlled pedestrian crossing across A23 London Road. These are shown in the appended Figures 12.6.2 and 12.6.3. Within the terminal forecourts, the zebra crossings would be retained. Existing off-road routes and National Cycle Route 21 underneath Airport Way near South Terminal would also be retained.

12.9.115 The magnitude of impact for the highway improvement works is considered to be negligible to low, the sensitivity of receptors along these routes ranges from negligible to medium. The changes to pedestrian and cycle delay would be **negligible beneficial**, and the junctions with proposed highway improvements with the Project would have **minor beneficial** effects on pedestrian and cyclist delay.

Pedestrian and cyclist amenity

12.9.116 The threshold for an effect on pedestrian and cyclist amenity is when the traffic flows have doubled. As shown in Table 12.9.16, North Terminal Roundabout (Link ID: 006) and M23 Gatwick Interchange (Link ID: cl17) will experience a doubling or more of traffic flows. The sensitivity of receptors on these links ranges from negligible to low. The magnitude of impact on these links is considered to be medium. The effect of the Project on pedestrian and cyclist amenity is considered to be **minor adverse** for the links with low sensitivity, which is not significant**.**

12.9.117 The traffic composition can also affect pedestrian and cyclist amenity. The traffic flows contained in **ES Appendix 12.9.1: Highway Flows and Driver Delay Review** (Doc Ref. 5.3) show that the highest increase in the percentage of HGVs (number of HGVs divided by total vehicle number) is on Longbridge Way (Link ID: NT2), with a change of around 7 percentage points in the AM2 and PM periods. The magnitude of this impact is considered to be low. The sensitivity of receptors on Longbridge Way is considered to be low. The effect of the Project on pedestrian and cyclist amenity along Longbridge Way can be considered to be **minor adverse**, which is not significant.

12.9.118 For all the other roads, the predicted change in the percentage of HGVs varies between -4 and +6 percentage points. The magnitude of impact is considered to be negligible to low. The sensitivity of the receptors along these links is considered to be negligible to high. The effect on pedestrian and cyclist amenity on all other roads is considered to be **negligible adverse.**

Accidents and safety

12.9.119 The design of the proposed highway improvements would separate through traffic from the North Terminal and South Terminal Roundabouts. This would reduce traffic flows through the junctions and reduce the risks of conflict and this is considered to be beneficial. In addition, the proposed highway improvements also allow for road surface improvements to help improve skid resistance, whilst speed limits would be reviewed in order to assess the potential for further safety benefits. The magnitude of impact is considered to be negligible to low.

12.9.120 The sensitivity of receptors in terms of pedestrians and cyclists along the highway links range from negligible to medium. The effect of accidents and safety on pedestrians and cyclist is considered to be **minor beneficial** where highway improvements as part of the Project are proposed, and **negligible adverse** on all other roads.

12.9.121 The sensitivity of receptors in terms of car drivers and passengers ranges from low to medium. The effect of accidents and safety on car drivers and passengers is considered **minor beneficial** at the junctions where highway improvements are proposed, and **negligible adverse** for all other roads.

Hazardous loads

12.9.122 The proposed changes to the highway network are expected to improve the safety of general traffic. The magnitude of impact is expected to be negligible, and the sensitivity of receptors is considered to be negligible. The effect on hazardous loads is considered to be **negligible beneficial.**

Effects on public transport amenity

Crowding on rail services

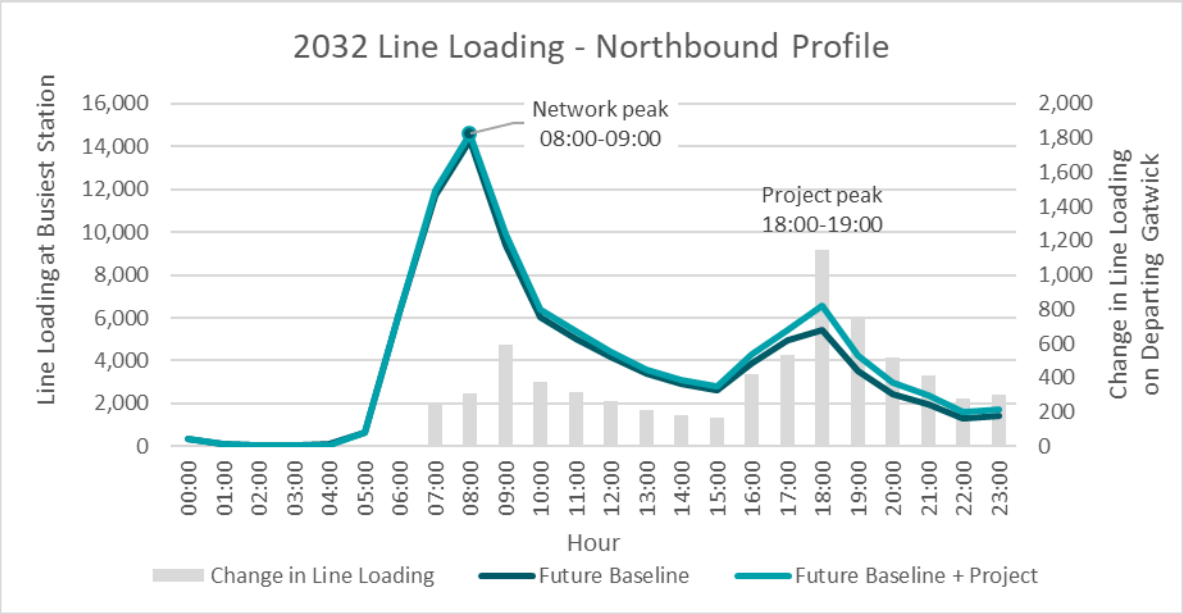
12.9.123 To assess the effect of the Project on public transport amenity, this section considers the impact on passenger crowding on rail services and in Gatwick Airport railway station.

Northbound services

12.9.124 Diagram 12.9.15 shows the 2032 line loading profile for the future baseline and with Project scenarios. The peak hours for assessment are identified as follows:

- Network peak 08:00-09:00, based on the highest line loading for all services at the busiest station (northbound trains passing or departing from Purley).
- Project peak 18:00-19:00, based on the highest line loading as the result of the Project, which for northbound is on departing Gatwick Airport station.

Diagram 12.9.15: 2032 northbound line loading profile



Northbound network peak (08:00-09:00)

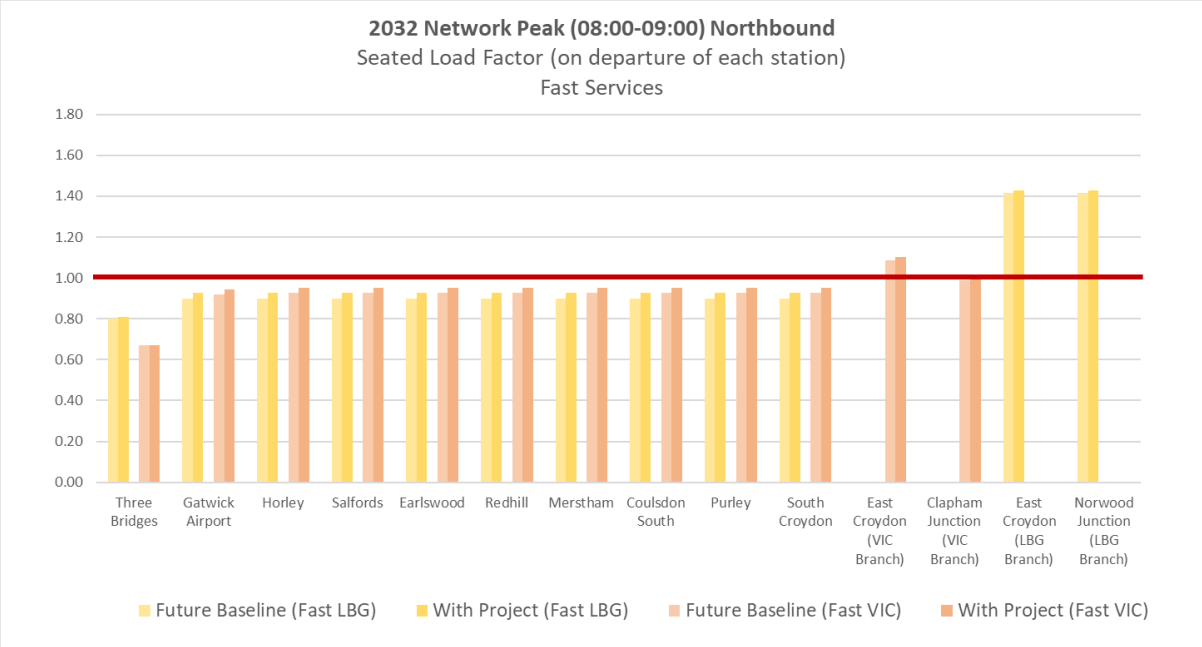
12.9.125 Table 12.9.18 provides a summary of the increase in line loading by station in the northbound direction for the network peak.

Table 12.9.18: 2032 percentage change in line loading – northbound network peak (08:00-09:00)

Station	2032 network peak northbound (08:00-09:00)							
	Change in line loading on departure				Percentage change			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
Three Bridges	48	6	-4	51	1.1%	0.2%	-0.6%	0.6%
Gatwick Airport	144	131	17	293	2.9%	2.5%	4.7%	2.7%
Horley	144	131	19	293	2.9%	2.5%	4.6%	2.7%
Salfords	144	131	19	293	2.9%	2.5%	4.3%	2.7%
Earlswood	144	131	19	293	2.9%	2.5%	2.2%	2.6%
Redhill	144	131	21	295	2.9%	2.5%	1.2%	2.5%
Merstham	144	131	20	295	2.9%	2.5%	1.0%	2.4%
Coulsdon South	144	131	19	293	2.9%	2.5%	0.6%	2.2%
Purley	144	131	17	291	2.9%	2.5%	0.4%	2.0%
South Croydon	144	131	17	291	2.9%	2.5%	0.4%	2.0%
East Croydon (VIC Branch)	0	94	7	101	-	1.5%	0.5%	1.3%
Clapham Junction (VIC Branch)	0	58	4	62	-	1.0%	0.3%	0.9%
East Croydon (LBG Branch)	70	0	12	82	0.9%	-	0.4%	0.7%
Norwood Junction (LBG Branch)	70	0	12	82	0.9%	-	0.3%	0.7%

12.9.126 Table 12.9.18 shows that during the network peak hour, the Project contributes an additional 295 passengers in the northbound direction. Most of these passengers are expected to use the fast train services to London Victoria and London Bridge. This represents around a 3% increase in passengers on the fast services, and approximately 5% on the stopping services. To assess the impact on crowding, Diagram 12.9.16 shows the Seated Load F assessment and Table 12.9.19 shows the standing capacity assessment.

Diagram 12.9.16: 2032 northbound network peak Seated Load Factor



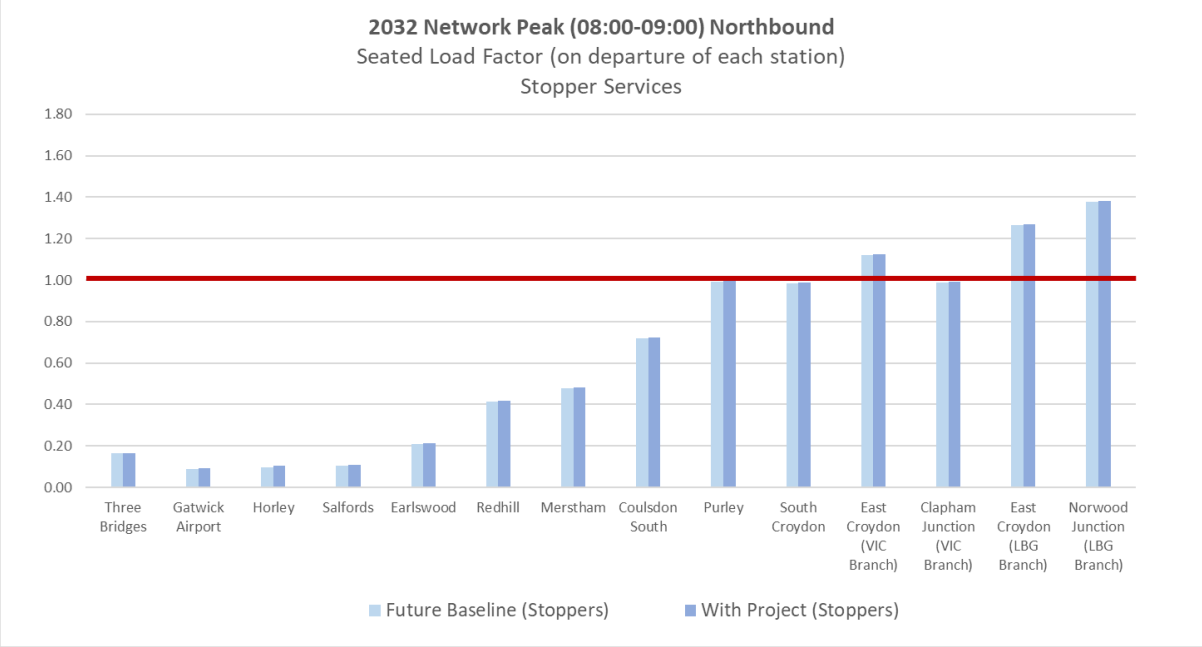


Table 12.9.19: 2032 northbound network peak standing capacity assessment (08:00-09:00)

Station	2032 network peak northbound – percentage of standing capacity occupied							
	Future baseline 2032				With Project 2032 (percentage point change from future baseline) 2032			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
East Croydon (VIC Branch)	-	14.1%	20.1%	15.2%	0.0% (-)	16.8% (2.7%)	21.0% (0.9%)	17.6% (2.3%)
East Croydon (LBG Branch)	31.1%	-	16.3%	25.5%	32.1% (1.0%)	0.0% (-)	16.6% (0.3%)	26.2% (0.7%)
Norwood Junction (LBG Branch)	31.1%	-	23.3%	28.1%	32.1% (1.0%)	0.0% (-)	23.5% (0.3%)	28.8% (0.7%)

12.9.127 Diagram 12.9.16 shows that seating capacity is exceeded north of East Croydon on the fast services for the network peak and exceeded on stopping services north of Purley. This occurs in the future baseline owing to background commuter flows into London.Table 12.9.19 shows the highest percentage of standing capacity occupied in the future baseline is 14.1% and 31.1% on the fast services to London Victoria and London Bridge respectively, which occurs north of East Croydon. The Project will not significantly increase the percentage of standing capacity occupied when compared to the future baseline situation, with the highest increase in occupied standing space being 2.7 percentage points on the fast services into London Victoria. Ample standing capacity will therefore remain available.

Northbound project peak (18:00-19:00)

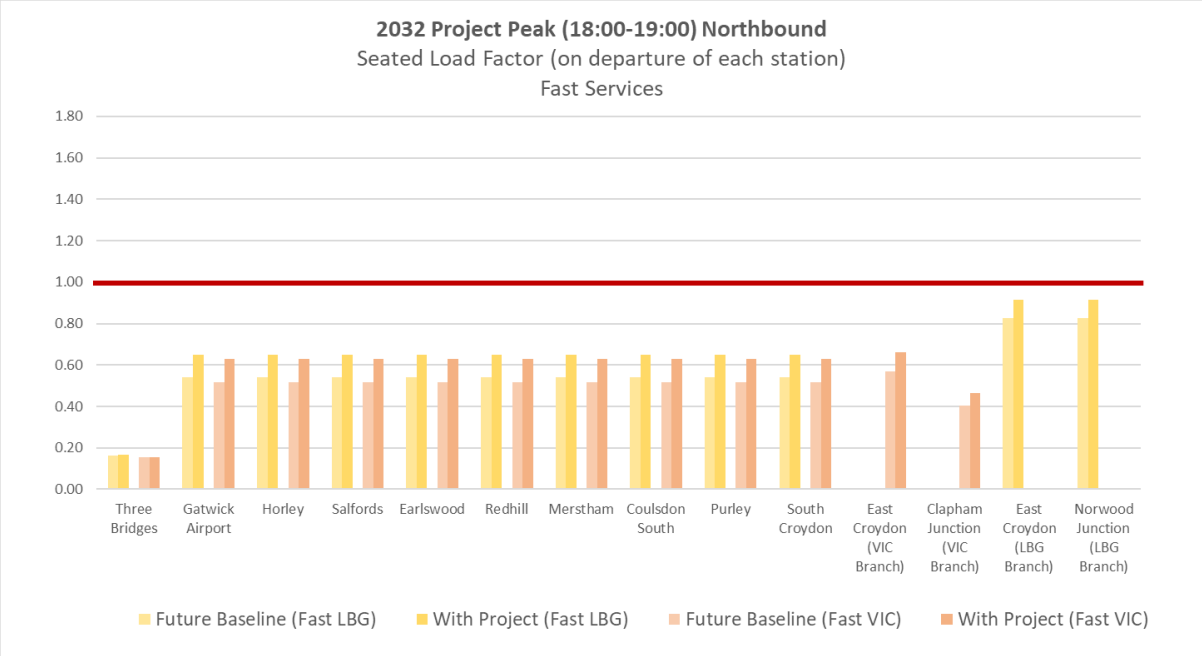
12.9.128 Table 12.9.20 provides a summary of the increase in line loading by station in the northbound direction for the project peak.

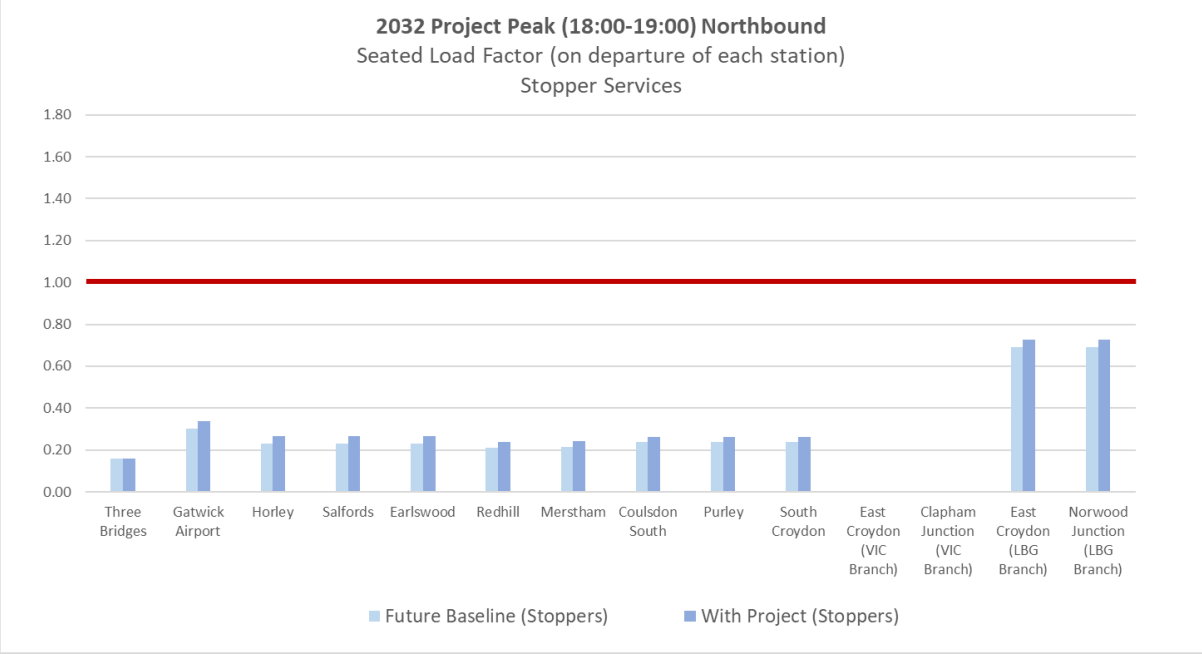
Table 12.9.20: 2032 percentage change in line loading – northbound project peak (18:00-19:00)

Station	2032 project peak northbound							
	Change in line loading on departure				Percentage change			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
Three Bridges	15	24	4	44	2.9%	2.4%	2.0%	2.5%
Gatwick Airport	341	723	49	1113	19.9%	21.3%	11.3%	19.6%
Horley	341	723	47	1112	19.9%	21.3%	14.5%	20.0%
Salfords	341	723	47	1112	19.9%	21.3%	14.5%	20.0%
Earlswood	341	723	47	1112	19.9%	21.3%	14.5%	20.0%
Redhill	341	723	35	1099	19.9%	21.3%	11.6%	20.3%
Merstham	341	723	34	1099	19.9%	21.3%	11.2%	20.3%
Coulsdon South	341	723	34	1099	19.9%	21.3%	10.0%	20.1%
Purley	341	723	34	1099	19.9%	21.3%	10.0%	20.1%
South Croydon	341	723	34	1099	19.9%	21.3%	10.0%	20.1%
East Croydon (VIC Branch)	0	594	0	594	-	15.9%	-	15.9%
Clapham Junction (VIC Branch)	0	408	0	408	-	15.5%	-	15.5%
East Croydon (LBG Branch)	276	0	53	329	10.5%	-	5.4%	9.1%
Norwood Junction (LBG Branch)	276	0	53	329	10.5%	-	5.4%	9.1%

12.9.129 Table 12.9.20 shows that during the project peak hour, the Project contributes an additional 1,113 passengers in the northbound direction. Most of these passengers are expected to use the fast train services to London Victoria and London Bridge. This represents around a 21% increase in passengers on the fast services, and 15% on the stopping services. To assess the impact on crowding, Diagram 12.9.17 shows the Seated Load Factor assessment.

Diagram 12.9.17: 2032 northbound project peak Seated Load Factor





12.9.130 Diagram 12.9.17 shows that seating capacity is not exceeded on any of the services and therefore no crowding issues are expected.

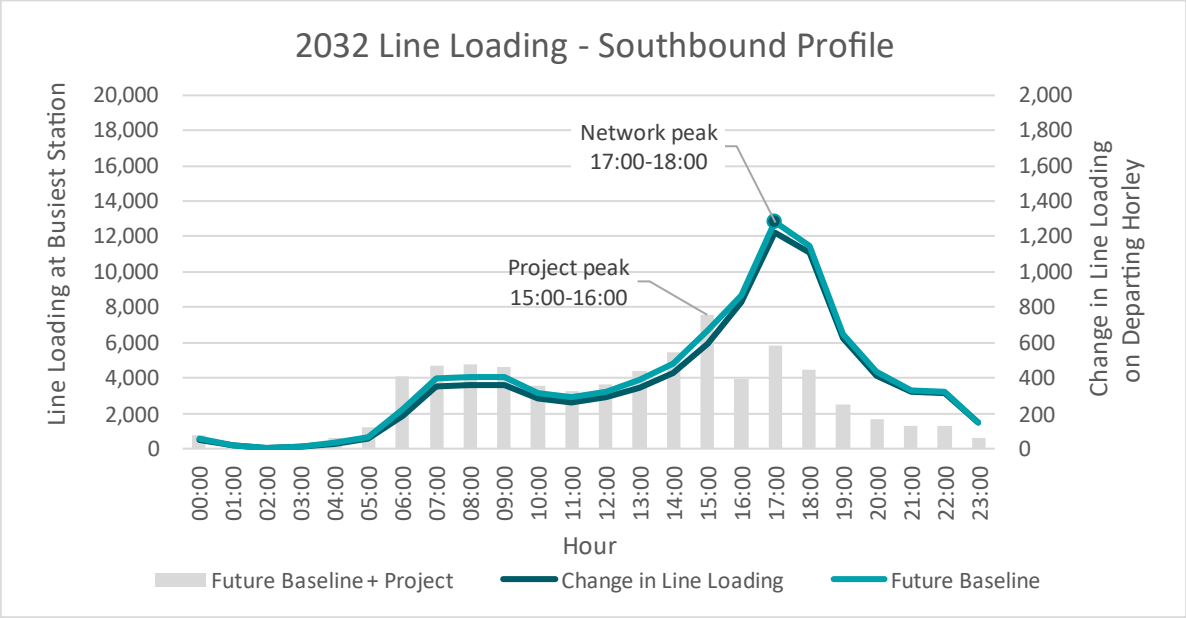
Southbound services

12.9.131 Diagram 12.9.18 shows the 2032 line loading profile for the future baseline and with Project scenarios. The peak hours for the southbound assessment are identified as follows:

- Network peak 17:00-18:00, based on the highest line loading for all services at the busiest station (trains departing southbound from East Croydon).

- Project peak 15:00-16:00, based on the highest line loading as the result of the Project, which for southbound is on departing or passing Horley station.

Diagram 12.9.18: 2032 southbound line loading profile



Southbound network peak (17:00-18:00)

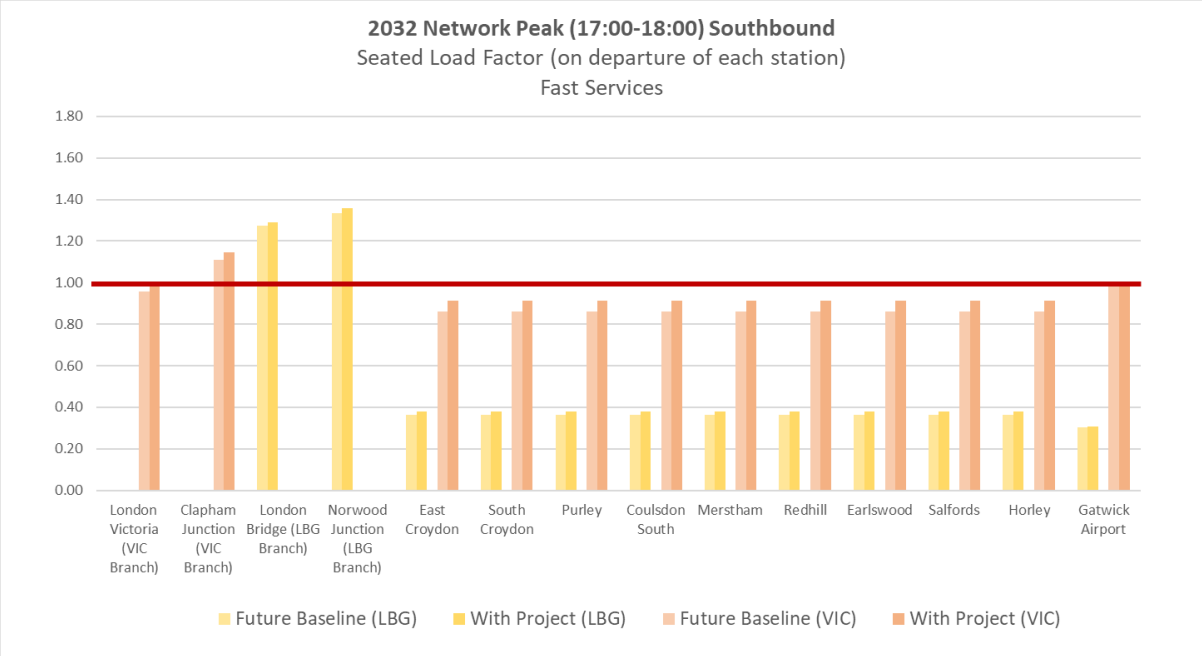
12.9.132 Table 12.9.21 provides a summary of the increase in line loading by station in the southbound direction for the network peak.

Table 12.9.21: 2032 percentage change in line loading – southbound network peak (17:00-18:00)

Station	2032 network peak southbound							
	Change in line loading on departure				Percentage change			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
London Victoria (VIC Branch)	0	199	0	199	-	3.3%	-	3.3%
Clapham Junction (VIC Branch)	0	245	0	245	-	3.5%	-	3.5%
London Bridge (LBG Branch)	98	0	34	133	1.5%	-	1.0%	1.3%
Norwood Junction (LBG Branch)	108	0	34	141	1.6%	-	1.0%	1.4%
East Croydon	199	339	5	543	4.8%	6.3%	0.2%	4.4%
South Croydon	199	339	5	543	4.8%	6.3%	0.2%	4.4%
Purley	199	339	7	545	4.8%	6.3%	0.3%	4.7%
Coulsdon South	199	339	7	545	4.8%	6.3%	0.5%	5.0%
Merstham	199	339	8	546	4.8%	6.3%	0.6%	5.0%
Redhill	199	339	20	558	4.8%	6.3%	2.5%	5.3%
Earlswood	199	339	19	557	4.8%	6.3%	3.0%	5.3%
Salfords	199	339	19	558	4.8%	6.3%	3.2%	5.3%
Horley	199	339	19	557	4.8%	6.3%	3.2%	5.3%
Gatwick Airport	42	61	7	110	1.2%	1.0%	1.5%	1.6%

12.9.133 Table 12.9.21 shows that during the network peak hour, the Project contributes an additional 558 passengers in the southbound direction. Most of these passengers are expected to use the fast train services from London Victoria and London Bridge. This represents around a 6% increase in passengers on the fast services, and approximately 3% on the stopping services. To assess the impact on crowding, Diagram 12.9.19 shows the Seated Load Factor assessment and Table 12.9.22 shows the standing capacity assessment.

Diagram 12.9.19: 2032 southbound network peak Seated Load Factor



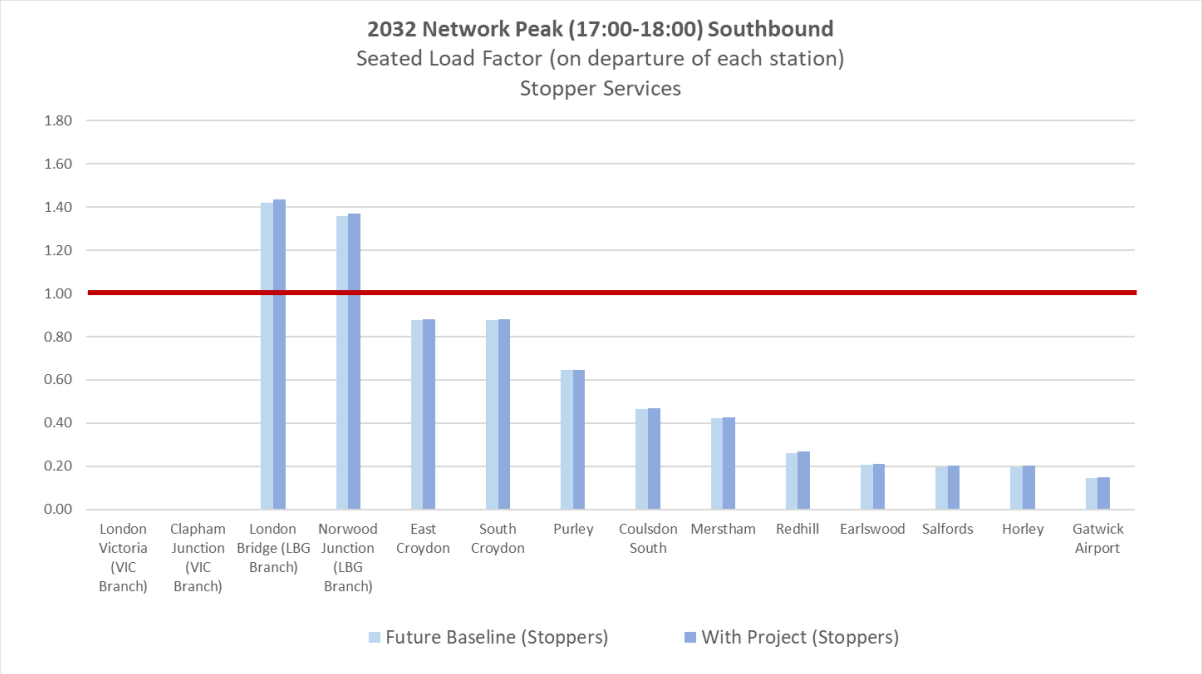


Table 12.9.22: 2032 southbound network peak standing capacity assessment (17:00-18:00)

Station	2032 network peak southbound – percentage of standing capacity occupied							
	Future baseline 2032				With Project (percentage point change from future baseline) 2032			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
Clapham Junction (VIC Branch)	-	17.6%	-	2.1%	0.0% (-)	24.0% (6.4%)	0.0% (-)	8.0% (5.9%)
London Bridge (LBG Branch)	18.6%	-	25.8%	21.1%	19.9% (1.3%)	0.0% (-)	26.6% (0.8%)	22.2% (1.1%)
Norwood Junction (LBG Branch)	22.9%	-	21.9%	22.5%	24.3% (1.4%)	0.0% (-)	22.7% (0.8%)	23.7% (1.2%)

12.9.134 Diagram 12.9.19 shows that seating capacity is exceeded on the fast and stopping services until reaching East Croydon for the network peak. This occurs in the future baseline owing to background commuter flows from London. Table 12.9.22 shows the highest percentage of standing capacity occupied in the future baseline is 22.9% on the fast services and 25.8% on stopping services in the future baseline. The Project will not significantly increase the percentage of standing capacity occupied when compared with the future baseline 2032 situation, with the highest increase being 6.4 percentage points on London Victoria fast services. The highest standing capacity occupied with the Project is 26.6%, with ample spare standing capacity available.

Southbound project peak (15:00-16:00)

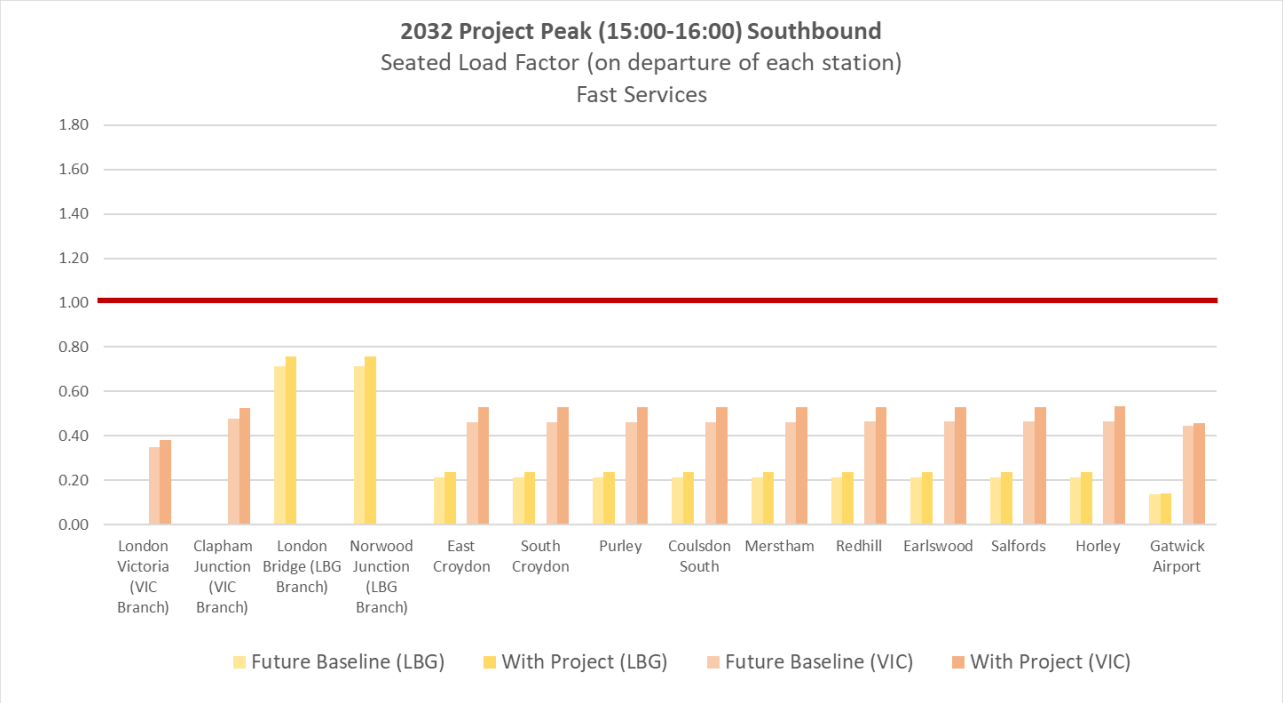
12.9.135 Table 12.9.23 provides a summary of the increase in line loading by station in the southbound direction for the Project peak.

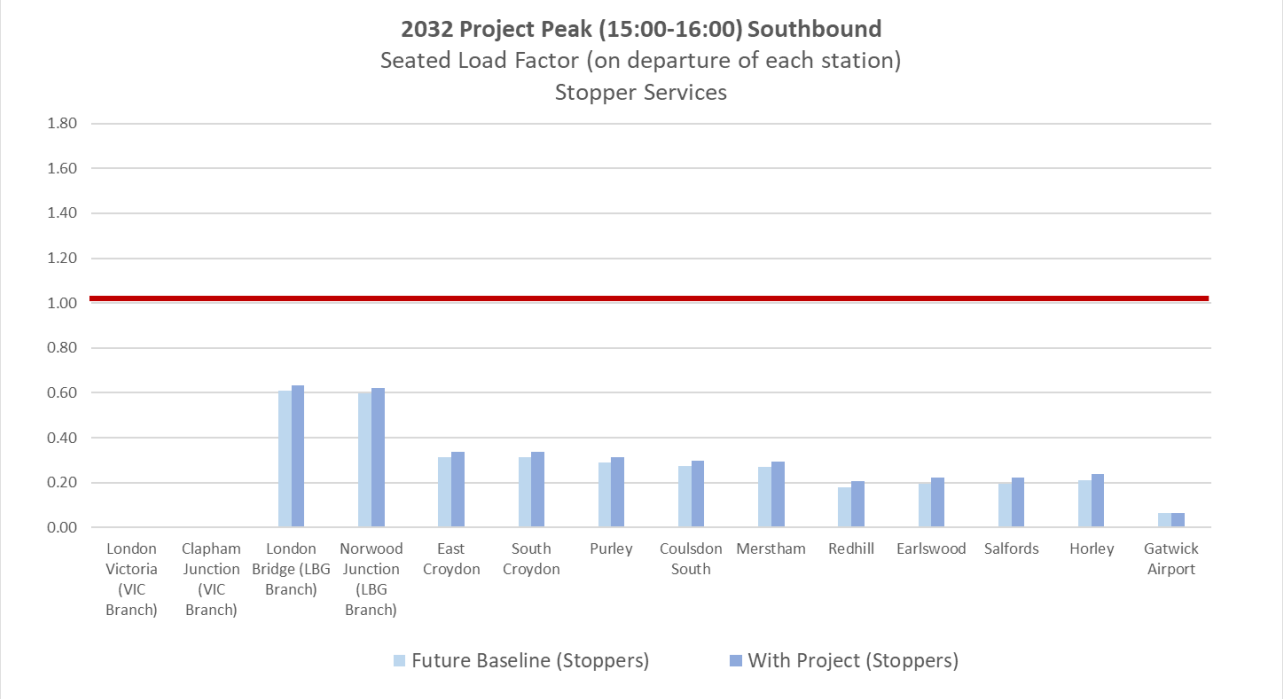
Table 12.9.23: 2032 percentage change in line loading – southbound project peak (15:00-16:00)

Station	2032 Project Peak Southbound							
	Change in Line Loading on Departure				Percentage Change			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
London Victoria (VIC Branch)	0	176	0	176	-	8.5%	-	8.5%
Clapham Junction (VIC Branch)	0	270	0	270	-	9.5%	-	9.5%
London Bridge (LBG Branch)	219	0	65	284	6.3%	-	3.6%	5.4%
Norwood Junction (LBG Branch)	219	0	65	284	6.3%	-	3.7%	5.4%
East Croydon	261	400	71	732	11.3%	14.6%	7.6%	12.3%
South Croydon	261	400	71	732	11.3%	14.6%	7.6%	12.3%
Purley	261	400	71	732	11.3%	14.6%	8.2%	12.4%
Coulsdon South	261	400	71	733	11.3%	14.6%	8.7%	12.5%
Merstham	261	400	71	733	11.3%	14.6%	8.9%	12.5%
Redhill	261	400	79	741	11.3%	14.6%	14.8%	12.9%
Earlswood	261	400	79	741	11.3%	14.6%	13.7%	12.8%
Salfords	261	400	79	741	11.3%	14.6%	13.6%	12.8%
Horley	261	401	80	742	11.3%	14.6%	12.9%	12.8%
Gatwick Airport	27	83	7	117	1.8%	3.2%	3.6%	4.1%

12.9.136 Table 12.9.23 shows that during the project peak hour, the Project contributes an additional 742 passengers in the southbound direction. Most of these passengers are expected to use the fast train services from London Victoria and London Bridge. This represents approximately 15% increase in passengers on the fast and stopping services. To assess the impact on crowding, Diagram 12.9.20 shows the Seated Load Factor assessment.

Diagram 12.9.20: 2032 southbound project peak Seated Load Factor





12.9.137 Diagram 12.9.20 shows that seating capacity is not exceeded on any of the services with the Project in the project peak and therefore no crowding issues are expected. Consequently, a southbound project peak standing capacity assessment is not required.

Summary on rail crowding

12.9.138 A summary of rail crowding by peak hour and direction is as follows:

- **Northbound** – The highest increase in line loading as a result of the Project is 21.3% (during the project peak). There is seating capacity available in the project peak, and the percentage of standing capacity occupied in the network peak on train services is around 32.1% (with Project), indicating busy trains into London but with ample standing capacity available. The Project accounts for up to a 2.7 percentage point increase in standing capacity during the network peak which represents a low magnitude of impact.
- **Southbound –** The highest increase in line loading as a result of the Project is 14.6% (during the project peak). There is seating capacity available in the project peak, and the percentage of standing capacity occupied on train services is around 24.3% in the network peak, indicating busy trains out of London but with plenty of spare standing capacity. The Project accounts for up to a 6.4 percentage point increase in standing capacity which represents a low magnitude of impact.

12.9.139 The overall magnitude of impact is considered to be low and the sensitivity of receptors in terms of public transport capacity is considered to be low to medium. Any effects to changes in crowding levels for 2032 are therefore anticipated to be **minor adverse**, which is not significant. This assessment has been undertaken for the Network and Project peak periods and the full set of 24-hour rail analysis is contained in **ES Appendix 12.9.2: Rail Passenger Flows** (Doc Ref. 5.3) and in the TA.

Crowding in station

12.9.140 The station crowding assessment has been completed for 2032 and the results are reported below. The AM peak used is 07:00-09:00 and the PM peak used is 16:00-18:00 for both the concourse and platform for all assessment years. Diagram 12.9.21 and Diagram 12.9.22 show the Level of Service performance for circulation at the concourse level of the station for the peak hour in the AM and PM peak modelled periods.

Diagram 12.9.21: 2032 concourse LoS (AM peak period, 07:00-09:00)

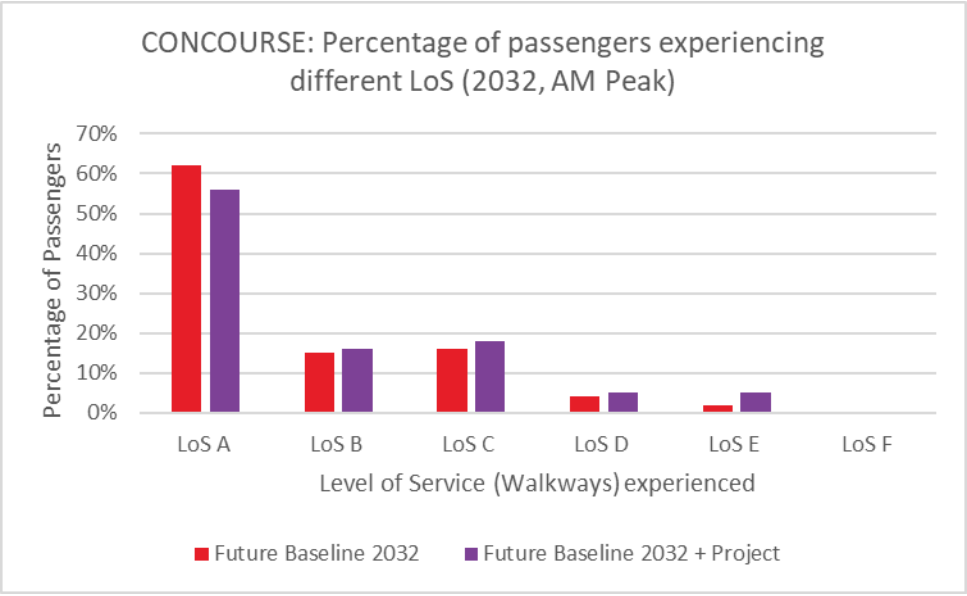
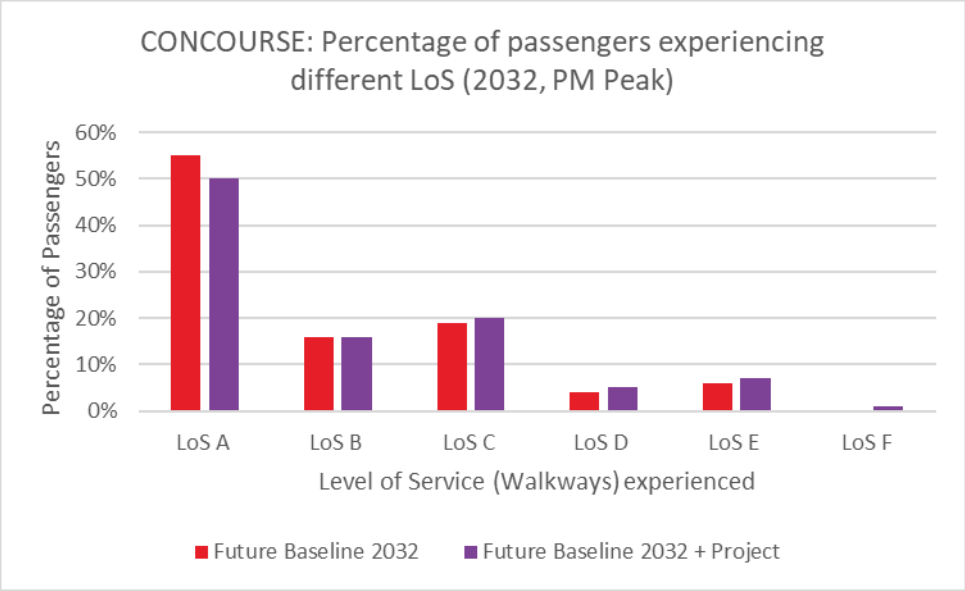


Diagram 12.9.22: 2032 concourse LoS (PM peak period, 16:00-18:00)



12.9.141 The percentage of passengers experiencing a different Level of Service varies but the assessment shows that station performance at concourse level would be predominantly LoS C or better. This represents a low passenger sensitivity to increases in crowding.

12.9.142 The Level of Service performance for queuing and waiting for the station platforms is shown in Diagram 12.9.23 and Diagram 12.9.24, excluding escalator elements. Level of Service is not typically applied to escalator elements as passengers either walk up these or stand at a spacing of their choosing.

Diagram 12.9.23: 2032 platforms LoS (AM peak period, 07:00-09:00)

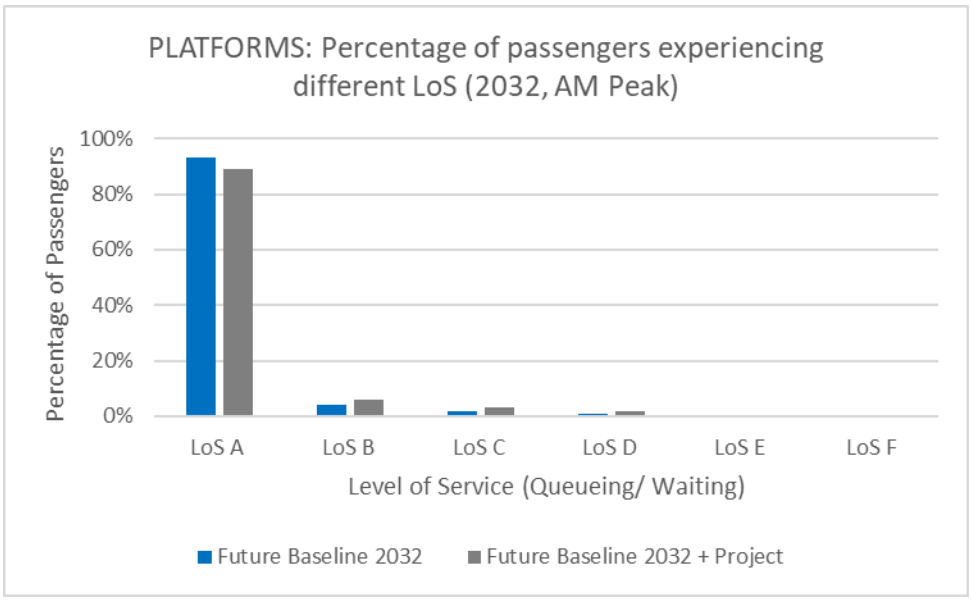
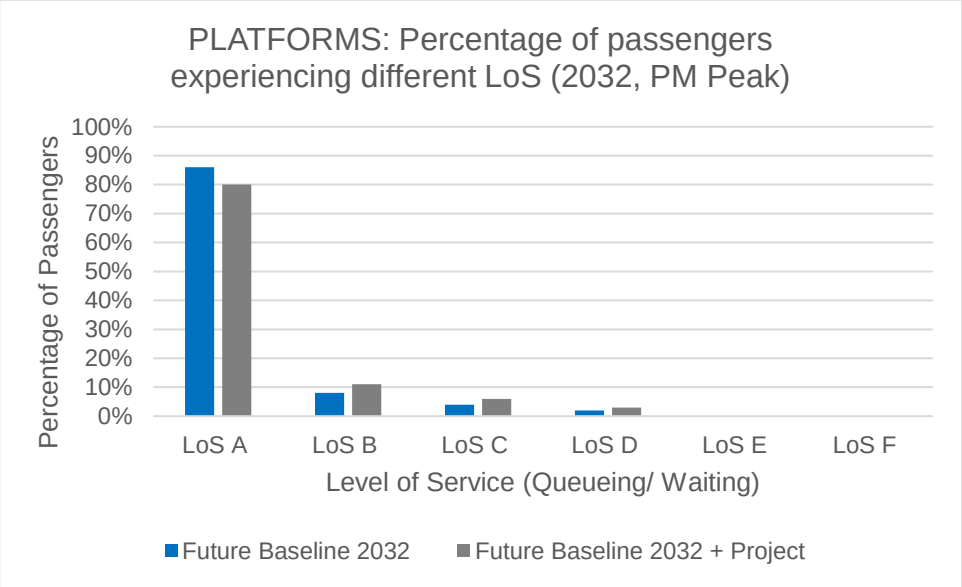


Diagram 12.9.24: 2032 platforms LoS (PM peak period, 16:00-18:00)



12.9.143 The percentage of passengers experiencing a different Level of Service ranges varies but the assessment shows that the station performance at platform level would generally be at LoS C or better, with a very small percentage of passengers experiencing LoS D in the peak hour. In fact, most passengers will experience LoS A for 80% (PM peak) to 90% (AM peak) of the time.

12.9.144 When considering the full assessment across the station, both the concourse and platforms and both peak hours, the magnitude of impact of the Project on crowding is considered to be negligible to low. The sensitivity of receptors is considered to be low given that most passengers experience LoS C or better. The overall effect on changes in crowding levels for the railway station with the Project are considered **negligible adverse**.

Further mitigation and future monitoring

12.9.145 Further monitoring of GAL's performance against its surface access commitments is set out in the **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3). This monitoring will be ongoing at Gatwick to understand travel patterns and measures will be implemented to further encourage the use of sustainable modes of transport and achieve the committed mode shares. No additional mitigation is proposed other than that adopted as part of the Project (as set out in Section 12.7.3).

Significance of effects

12.9.146 No significant effects have been identified for this assessment year. No further mitigation is required, and the significance of effects would therefore remain as presented above.

Design year: 2047

12.9.147 The annual passenger demand for 2047 is expected to increase from 67.2 mppa in the future baseline scenario to 80.2 mppa with the Project.

Severance

12.9.148 The peak hour highway flows for the design year are contained in **ES Appendix 12.9.1: Highway Flows and Driver Delay Review** (Doc Ref. 5.3). For the purposes of reporting, only the links which have a magnitude of impact of low, medium, and high adverse or beneficial are assessed in this section to focus on potential significant effects. These links and associated flows are shown in Table 12.9.24 for the future baseline and Table 12.9.25 for the with Project scenario. The net change in traffic flows is shown in Table 12.9.26.

Table 12.9.24: Design year 2047 traffic flows – future baseline

ID	Road	AM1			AM2			IP			PM		
		All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV
002	A23 Airport Way	4708	213	5%	4562	251	6%	4164	253	6%	4619	145	3%
004	A217 London Road, Longbridge Roundabout-Parking Entry	1387	74	5%	1424	70	5%	1240	91	7%	1117	33	3%
005	A217 London Road, Parking Entry-A217 Reigate Road	1400	74	5%	1438	70	5%	1247	91	7%	1130	33	3%
006	North Terminal Roundabout to A23 London Road	1294	42	3%	968	38	4%	1178	77	7%	1410	35	2%
NT1	North Terminal Entry/Exit	1368	62	5%	1267	64	5%	1104	64	6%	1000	48	5%
NT2	Longbridge Way	1029	187	18%	1047	167	16%	1026	200	19%	1237	104	8%
NT3	Northgate Road	805	109	14%	587	100	17%	796	176	22%	824	61	7%
NT5	Gatwick Way	601	58	10%	480	59	12%	400	59	15%	651	31	5%
cl19	Faraday Road, Kelvin Way-Manor Royal	463	54	12%	447	43	10%	248	48	19%	510	34	7%
cl21	Wentworth Drive, Balcombe Road-The Ridings	486	13	3%	341	12	4%	587	15	3%	771	23	3%

ID	Road	AM1			AM2			IP			PM		
		All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV
cy01	South Bridge Road, Bramley Hill-South End, A236	448	16	4%	299	10	3%	836	36	4%	979	11	1%
cy02	South Bridge Road, Lower Coombe Street-Bramley Hill, A236	1495	41	3%	1374	31	2%	1644	53	3%	1846	16	1%
cy04	Coombe Road, Park Lane-South Park Hill Road, A212	1123	19	2%	1071	16	1%	1454	37	3%	1485	11	1%
cy07	South End, Brighton Road-Selsdon Road, B275, Croydon	445	19	4%	374	18	5%	406	23	6%	619	16	3%
cy16	Lower Coombe Street, Roundabout-Southbridge Road, A212	1999	58	3%	1727	46	3%	2677	91	3%	2652	27	1%
cy28	St James's Road, Windhill Road-Kidderminster Road, Croydon	837	11	1%	715	8	1%	517	9	2%	724	3	0%
cy47	Lansdowne Road, Bedford Place-St James's Road A222	584	18	3%	675	14	2%	697	30	4%	805	15	2%

ID	Road	AM1			AM2			IP			PM		
		All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV
cy50	Bartlett Street, Selsdon Road-Brighton Road, B275	524	26	5%	693	29	4%	575	35	6%	547	19	3%
sr02	Spierbridge Road, North Street-Pulborough Road	186	6	3%	315	21	7%	150	13	9%	128	6	5%
z00	M23 J9, Nb Slip (South Of J9)	1243	23	2%	1134	30	3%	873	31	4%	784	25	3%

Table 12.9.25: Design year 2047 traffic flows – with Project

ID	Road	AM1			AM2			IP			PM		
		All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV
002	A23 Airport Way	6354	247	4%	6358	281	4%	4739	298	6%	4994	169	3%
004	A217 London Road, Longbridge Roundabout-Parking Entry	1434	79	6%	1588	93	6%	1328	97	7%	1702	40	2%
005	A217 London Road, Parking Entry-A217 Reigate Road	1442	79	5%	1598	93	6%	1334	97	7%	1707	40	2%
006	North Terminal Roundabout to A23 London Road	2553	46	2%	2576	45	2%	2033	196	10%	2055	59	3%
NT1	North Terminal Entry/Exit	1940	72	4%	1802	66	4%	1315	70	5%	1060	51	5%
NT2	Longbridge Way	1037	196	19%	900	203	23%	1270	293	23%	835	122	15%
NT3	Northgate Road	762	134	18%	582	136	23%	467	128	27%	351	67	19%
NT5	Gatwick Way	350	65	19%	375	61	16%	491	71	14%	496	38	8%
cl19	Faraday Road, Kelvin Way-Manor Royal	461	46	10%	440	41	9%	370	47	13%	483	38	8%
cl21	Wentworth Drive, Balcombe Road-The Ridings	557	14	3%	495	16	3%	626	15	2%	794	23	3%

ID	Road	AM1			AM2			IP			PM		
		All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV
cy01	South Bridge Road, Bramley Hill-South End, A236	841	26	3%	805	24	3%	843	36	4%	981	12	1%
cy02	South Bridge Road, Lower Coombe Street-Bramley Hill, A236	2004	53	3%	1951	46	2%	1654	54	3%	1842	16	1%
cy04	Coombe Road, Park Lane-South Park Hill Road, A212	1302	20	2%	1562	20	1%	1483	37	2%	1523	11	1%
cy07	South End, Brighton Road-Selsdon Road, B275, Croydon	558	21	4%	567	21	4%	410	24	6%	610	16	3%
cy16	Lower Coombe Street, Roundabout-Southbridge Road, A212	2463	67	3%	2634	62	2%	2694	92	3%	2629	26	1%
cy28	St James's Road, Windhill Road-Kidderminster Road, Croydon	898	14	2%	937	12	1%	606	12	2%	734	3	0%
cy47	Lansdowne Road, Bedford Place-St James's Road A222	801	17	2%	765	18	2%	692	30	4%	805	15	2%

ID	Road	AM1			AM2			IP			PM		
		All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV
cy50	Bartlett Street, Selsdon Road-Brighton Road, B275	698	30	4%	732	33	5%	569	35	6%	541	19	4%
sr02	Spierbridge Road, North Street-Pulborough Road	327	6	2%	311	22	7%	162	10	6%	128	6	5%
z00	M23 J9, Nb Slip (South of J9)	1861	34	2%	1907	58	3%	1230	53	4%	1010	30	3%

Table 12.9.26: Design year 2047 traffic flows – net change (percentage change from future baseline in brackets)

ID	Road	AM1			AM2			IP			PM		
		All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV
002	A23 Airport Way	1646 (35%)	34 (16%)	-1% (-1%)	1796 (39%)	30 (12%)	-1% (-1%)	575 (14%)	45 (18%)	0% (0%)	375 (8%)	24 (17%)	0% (0%)
004	A217 London Road, Longbridge Roundabout-Parking Entry	47 (3%)	5 (7%)	0% (0%)	164 (12%)	23 (33%)	1% (1%)	88 (7%)	6 (7%)	0% (0%)	585 (52%)	7 (21%)	-1% (-1%)
005	A217 London Road, Parking Entry-A217 Reigate Road	42 (3%)	5 (7%)	0% (0%)	160 (11%)	23 (33%)	1% (1%)	87 (7%)	6 (7%)	0% (0%)	577 (51%)	7 (21%)	-1% (-1%)
006	North Terminal Roundabout to A23 London Road	1259 (97%)	4 (10%)	-1% (-1%)	1608 (166%)	7 (18%)	-2% (-2%)	855 (73%)	119 (155%)	3% (3%)	645 (46%)	24 (69%)	0% (0%)
NT1	North Terminal Entry/Exit	572 (42%)	10 (16%)	-1% (-1%)	535 (42%)	2 (3%)	-1% (-1%)	211 (19%)	6 (9%)	0% (0%)	60 (6%)	3 (6%)	0% (0%)
NT2	Longbridge Way	8 (1%)	9 (5%)	1% (1%)	-147 (-14%)	36 (22%)	7% (7%)	244 (24%)	93 (47%)	4% (4%)	-402 (-32%)	18 (17%)	6% (6%)
NT3	Northgate Road	-43 (-5%)	25 (23%)	4% (4%)	-5 (-1%)	36 (36%)	6% (6%)	-329 (-41%)	-48 (-27%)	5% (5%)	-473 (-57%)	6 (10%)	12% (12%)
NT5	Gatwick Way	-251 (-42%)	7 (12%)	9% (9%)	-105 (-22%)	2 (3%)	4% (4%)	91 (23%)	12 (20%)	0% (0%)	-155 (-24%)	7 (23%)	3% (3%)
cl19	Faraday Road, Kelvin Way-Manor Royal	-2 (0%)	-8 (-15%)	-2% (-2%)	-7 (-2%)	-2 (-5%)	0% (0%)	122 (49%)	-1 (-2%)	-7% (-7%)	-27 (-5%)	4 (12%)	1% (1%)

ID	Road	AM1			AM2			IP			PM		
		All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV
cl21	Wentworth Drive, Balcombe Road-The Ridings	71 (15%)	1 (8%)	0% (0%)	154 (45%)	4 (33%)	0% (0%)	39 (7%)	0 (0%)	0% (0%)	23 (3%)	0 (0%)	0% (0%)
cy01	South Bridge Road, Bramley Hill-South End, A236	393 (88%)	10 (63%)	0% (0%)	506 (169%)	14 (140%)	0% (0%)	7 (1%)	0 (0%)	0% (0%)	2 (0%)	1 (9%)	0% (0%)
cy02	South Bridge Road, Lower Coombe Street-Bramley Hill, A236	509 (34%)	12 (29%)	0% (0%)	577 (42%)	15 (48%)	0% (0%)	10 (1%)	1 (2%)	0% (0%)	-4 (0%)	0 (0%)	0% (0%)
cy04	Coombe Road, Park Lane-South Park Hill Road, A212	179 (16%)	1 (5%)	0% (0%)	491 (46%)	4 (25%)	0% (0%)	29 (2%)	0 (0%)	0% (0%)	38 (3%)	0 (0%)	0% (0%)
cy07	South End, Brighton Road-Selsdon Road, B275, Croydon	113 (25%)	2 (11%)	-1% (-1%)	193 (52%)	3 (17%)	-1% (-1%)	4 (1%)	1 (4%)	0% (0%)	-9 (-1%)	0 (0%)	0% (0%)
cy16	Lower Coombe Street, Roundabout-Southbridge Road, A212	464 (23%)	9 (16%)	0% (0%)	907 (53%)	16 (35%)	0% (0%)	17 (1%)	1 (1%)	0% (0%)	-23 (-1%)	-1 (-4%)	0% (0%)
cy28	St James's Road, Windhill Road-Kidderminster Road, Croydon	61 (7%)	3 (27%)	0% (0%)	222 (31%)	4 (50%)	0% (0%)	89 (17%)	3 (33%)	0% (0%)	10 (1%)	0 (0%)	0% (0%)

ID	Road	AM1			AM2			IP			PM		
		All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV
cy47	Lansdowne Road, Bedford Place-St James's Road A222	217 (37%)	-1 (-6%)	-1% (-1%)	90 (13%)	4 (29%)	0% (0%)	-5 (-1%)	0 (0%)	0% (0%)	0 (0%)	0 (0%)	0% (0%)
cy50	Bartlett Street, Selsdon Road-Brighton Road, B275	174 (33%)	4 (15%)	-1% (-1%)	39 (6%)	4 (14%)	0% (0%)	-6 (-1%)	0 (0%)	0% (0%)	-6 (-1%)	0 (0%)	0% (0%)
sr02	Spierbridge Road, North Street-Pulborough Road	141 (76%)	0 (0%)	-1% (-1%)	-4 (-1%)	1 (5%)	0% (0%)	12 (8%)	-3 (-23%)	-2% (-2%)	0 (0%)	0 (0%)	0% (0%)
z00	M23 J9, Nb Slip (South Of J9)	618 (50%)	11 (48%)	0% (0%)	773 (68%)	28 (93%)	0% (0%)	357 (41%)	22 (71%)	1% (1%)	226 (29%)	5 (20%)	0% (0%)

12.9.149 Table 12.9.26 shows a selection of links which will experience more than a 30% increase in traffic flows for one or more peak periods. The following links are expected to have an increase of 30% to 60% (low impact):

- Link 002: A23 Airport Way (negligible sensitivity) in the AM1 and AM2 periods.
- Links 004 and 005: A217 London Road (low sensitivity) in the PM period.
- Link 006: North Terminal Roundabout (low sensitivity) in the PM period.
- Link NT1: North Terminal Entry/Exit (low sensitivity) in the AM1 and AM2 periods.
- Link cl19: Faraday Road, Croydon (medium sensitivity) in the IP period.
- Link cl21: Wentworth Drive, Crawley (medium sensitivity) in the AM2 period.
- Link cy02: Southbridge Road, Croydon (high sensitivity) in the AM1 and AM2 periods.
- Link cy04: Coombe Road, Croydon (high sensitivity) in the AM2 period.
- Link cy07: South End, Croydon (medium sensitivity) in the AM2 period.
- Link cy16: Lower Coombe Street, Croydon (high sensitivity) in the AM2 period.
- Link cy28: St James's Road, Croydon (high sensitivity) in the AM2 period.
- Link cy47: Lansdowne Road, Croydon (medium sensitivity) in the AM1 period.
- Link cy50: Bartlett Street, Croydon (medium sensitivity) in the AM1 period.
- Link z00: M23 J9 northbound slip (negligible sensitivity) in the AM1, AM2 and IP periods.

12.9.150 For the above links, the severance effect is **minor adverse.**

12.9.151 The following links are expected to have an increase of 60% to 90% in traffic flows (medium impact):

- Link 006: North Terminal Roundabout (low sensitivity) in the IP period.
- Link cy01: Southbridge Road, Croydon (medium sensitivity) in the AM1 period.
- Link sr02: Spierbridge Road, Storrington (high sensitivity) in the AM1 period.

12.9.152 The above links with low sensitivity would experience a **minor adverse** severance effect. Southbridge Road and Spierbridge Road would experience a **moderate adverse** severance effect due to the sensitivity of each of the links, which is considered to be medium and high respectively. However, a review of these links has identified the traffic flow changes are associated with model noise (as described in paragraphs 12.5.5 and 12.5.6) rather than arising from the Project. Model noise is identified by reviewing changes in traffic volumes and the amount of airport related traffic at each node location. Where the additional trips are identified as the result of an unexpected reassignment of background traffic on the network, particularly if this does not occur consistently or is at some distance from the Airport, the impacts are considered to be due to model noise.

12.9.153 The following links are expected to have an increase of more than 90% in traffic flows (high impact):

- Link 006: North Terminal Roundabout (low sensitivity) in the AM1 and AM2 periods.
- Link cy01: Southbridge Road, Croydon (medium sensitivity) in the AM2 period.

12.9.154 The above link with low sensitivity would experience a **minor adverse** severance effect. Southbridge Road with medium sensitivity would experience a **moderate adverse** severance effect. It should be noted that the North Terminal Roundabout link is associated with the Airport access which is considered to have negligible to low pedestrian and cyclist sensitivity.

12.9.155 In addition to the above, three links are expected to experience a reduction of 30% to 60% in traffic flows (low beneficial impact):

- Link NT2: Longbridge Way (low sensitivity) in the PM periods.
- Link NT3: Northgate Road (low sensitivity) in the IP and PM periods.
- Link NT5: Gatwick Way (low sensitivity) in the AM1 period.

12.9.156 The above links would have a **negligible beneficial** severance effect.

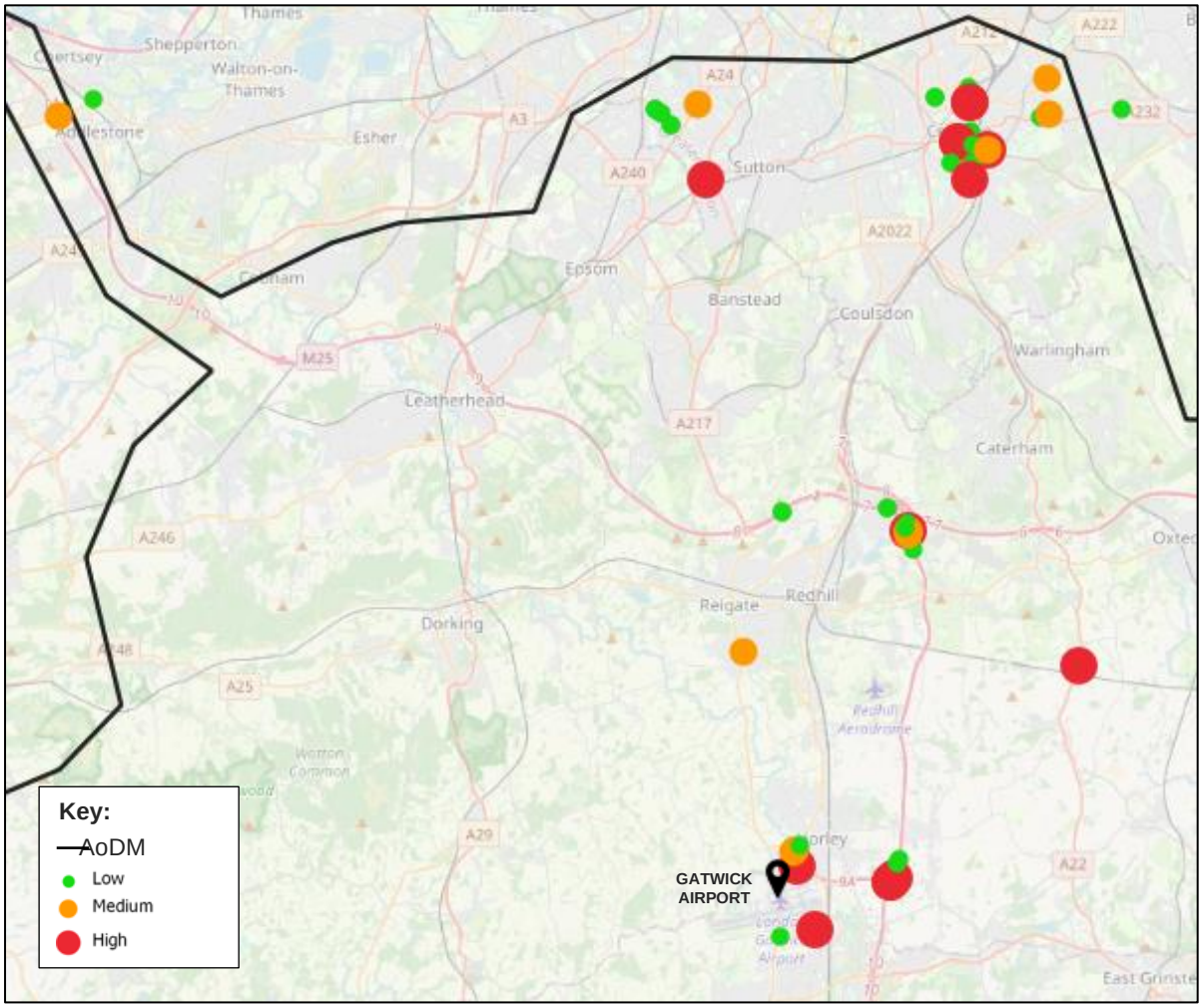
12.9.157 All other changes in traffic flows are below 30% and the magnitude of impact is considered to be negligible. The sensitivity of the pedestrians and cyclists along the highway links range from negligible to medium.

12.9.158 Overall, the effect of the Project on severance can be considered to be **minor adverse,** which is not significant.

Driver delay

12.9.159 Diagram 12.9.25 shows the magnitude of impact for driver delay for junctions where the V/C ratio is over 80%. The diagram shows driver delay for all time periods assessed and any overlaps in colours indicate different magnitudes of impact by time period. The highest magnitude of impact for each junction is considered.

Diagram 12.9.25:2047 driver delay magnitude of impact (all assessment time periods)



12.9.160 Diagram 12.9.25 shows that most junctions (over 1,000) have negligible or low magnitude of impact in terms of delay. Car driver and passenger sensitivity is considered to be medium for junctions where the V/C ratio is over 80%. For the junctions with negligible magnitude of impact, the driver delay effect is **negligible**. For those with a low magnitude of impact, the driver delay is **minor adverse**.

12.9.161 There are 22 junctions with medium and high magnitudes of impact. A review has been undertaken of these junctions which is included in **ES Appendix 12.9.1: Highway Flows and Driver Delay Review** (Doc Ref. 5.3) and a summary is provided in Table **12.9.27**.

Table 12.9.27: 2047 driver delay assessment

Node	Magnitude of Impact	Name	Assessment	Further Mitigation
10137	High	A22 / Harcourt Way	This node in the model does not represent an actual junction, but is a zone connector, which is a location at which all the traffic from the existing residential area is assumed to be loaded onto the network in one location.	No junction mitigation is required.
55049	High	Brighton Road / Jarvis Road, Croydon	This junction is shown to be operating close to capacity in the morning and evening peak periods in the future baseline, with V/C ratios of between 88% and 96%. The impact from the Project is identified in the AM2 peak where there is an increase in traffic of around 200 trips, which appears to be due to model noise and reassignment of background traffic as a similar increase does not appear in other time periods. The proportion of airport traffic at this junction is very small (less than 1%) and the number of additional airport trips as a result of the Project is negligible (up to six vehicles an hour). The junction would continue to operate at capacity with the Project, with the V/C ration in the AM2 peak with the Project (96.7%) being very similar to performance in the AM1 peak in future baseline (96.2%).	No junction mitigation is required.
54438	High	Bedford Park / Tavistock Road, Croydon	This junction is shown to be operating within capacity in all time periods in the future baseline, with V/C ratios of between 63% and 88%. The models show an increase in traffic with the Project in the AM1 and AM2 periods, which appears to be due to model noise and	No junction mitigation is required.

Node	Magnitude of Impact	Name	Assessment	Further Mitigation
			reassignment of background traffic. Furthermore, whilst the consequence of the increase in traffic with the Project is that the model indicates it would operate over capacity in the AM1 and AM2 peak periods with the Project (V/C increases from around 86% to 105%), The proportion of airport traffic at this junction is very small (around 0.5% which can be considered to be within daily variation in traffic) and the number of additional airport trips as a result of the Project is negligible (up to three vehicles an hour).	
54708	High	Lower Coombe Street / Southbridge Road, Croydon	This junction is shown to be operating within capacity in all time periods in the future baseline. An increase in traffic is shown in the AM1 and AM2 time periods with the Project, amounting to between 540 and 810 trips. However, this is considered to be the result of model noise and reassignment of background traffic (see paragraph 12.9.162), given that the proportion of airport traffic at this junction is very small (less than 1%) and the number of additional airport trips as a result of the Project is negligible (up to ten vehicles an hour). With the Project, the model indicates that the junction would still operate within capacity (V/C ratio of 94%).	No junction mitigation is required.
54710	High	Coombe Road / South Park Hill Road, Croydon	This junction is shown to be operating within capacity in the morning peak period and close to capacity in the interpeak and evening peak period in the future baseline. The model shows increases in traffic in the morning time periods with the Project which appear to be due to model noise and reassignment of background traffic (see paragraph 12.9.162, given that the proportion of airport traffic at this junction is very small (less than 1%) and the number of additional airport trips as a result of the Project is	No junction mitigation is required.

Node	Magnitude of Impact	Name	Assessment	Further Mitigation
			negligible (up to eight vehicles an hour). The junction would continue to operate within but close to capacity with the Project (maximum V/C ratio of 98% in any time period).	
54778	Medium	Selsdon Road / St Peter's Road / Croham Road, Croydon	This junction is shown to be operating within capacity in the morning and interpeak time periods, and at capacity in the evening time period (V/C of 99%) in the future baseline. The impact from the Project is identified in the AM1 peak where there is a small increase in traffic (+59 trips). The proportion of airport traffic at this junction is very small (less than 1%) and the number of additional airport trips as a result of the Project is negligible (up to four vehicles an hour). With the Project, the junction would operate closer to capacity in the AM1 peak (V/C of 91%) than it would in the future baseline, but the performance in the evening peak period would not be affected (V/C of 98% with Project compared to 99% in the future baseline).	No junction mitigation is required.
54135	Medium	Addiscombe Road pedestrian crossing	This node is a pedestrian crossing and is shown to be operating within capacity in the future baseline in the morning and inter-peak periods, and close to capacity (V/C ratio of 97%) in the evening peak period. The impact from the Project is identified in the AM1 peak where an increase of around 110 trips is considered to be due to model noise and reassignment of background traffic (see paragraph 12.9.162). The proportion of airport traffic at this junction is very small (less than 1%) and the number of additional airport trips as a result of the Project is negligible (-1 to +2 vehicles across the peak periods). With the Project the junction would operate close to capacity in the AM1 peak (V/C of 94%), although that would be slightly	No junction mitigation is required.

Node	Magnitude of Impact	Name	Assessment	Further Mitigation
			better than equivalent performance in the PM peak in the future baseline (V/C of 97%).	
54840	Medium	Lower Addiscombe Road / Spring Lane, Croydon	This junction is identified as operating within capacity in the future baseline, with V/C ratio of 86% or less. The impact is identified in the AM2 peak. With the Project there is a reduction in traffic but an increase in V/C, which is due to differences in the flows approaching the junction from different directions. The proportion of airport traffic at this junction is very small (less than 1%) and the number of additional airport trips as a result of the Project is negligible (up to +2 vehicles an hour) The junction would continue to operate within capacity with the Project (maximum V/C of 91%).	No junction mitigation is required.
53948	High	Ewell Road / High Street / The Broadway / Station Way	This junction is shown to be operating above capacity in the AM1 and PM time periods in the future baseline (V/C ratios of 104% to 105%) and close to capacity in the AM2 period (V/C of 96%). The impact from the Project is identified in the AM2 peak where there is an increase in traffic that appears to be due to model noise and reassignment of background traffic (see paragraph 12.9.162). With the Project, the junction is showing as operating over capacity in the AM2 peak (V/C increases from 96% to 102%) but also to experience slightly improved conditions in the AM1 peak (V/C reduces from 104% to 99%) as a result of an unexpected decrease in traffic, which tends to support the conclusion that changes shown in this location are the result of model noise. The proportion of airport traffic at this junction is very small (less than 0.5%) and the number of additional airport trips as a result of the Project is negligible (up to +2 vehicles an hour).	No junction mitigation is required.

Node	Magnitude of Impact	Name	Assessment	Further Mitigation
53906	Medium	London Road / Gander Green Lane / Spire St Anthony's Hospital Access	This junction is shown as operating close to capacity in the morning time periods in the future baseline (V/C ratios of 97%) in the future baseline. The impact from the Project is identified in the AM1 peak, where there is a very small increase in trips (+41 vehicles) but the V/C ratio changes by more than two percentage points. The proportion of airport traffic at this junction is very small (less than 0.5%) and the number of additional airport trips as a result of the Project is negligible (up to +2 vehicles an hour). The junction would continue to operate close to capacity with the Project (V/C of 99%).	No junction mitigation is required.
12722	Medium	M25 J9 roundabout (Addlestone)	In the future baseline this junction, which is one entry to a signalised roundabout, is shown to operate close to capacity in the morning time periods (V/C ratios of between 96% and 98%) and at capacity in the PM peak period (V/C of 101%). The impact from the Project is identified for the AM1 peak where there is a small increase in traffic (+32 vehicles, of which +21 is the result of the Project) leading to more than a two-percentage point increase in V/C ratio. The proportion of airport traffic at this junction is very small (less than 1% which can be considered to be within daily variation in traffic). With the Project the junction would continue to operate close to capacity in the morning peak periods (V/C ratios of 86% to 98%) and at capacity in the evening peak period (V/C of 101%, unchanged from the future baseline). The junction is operating close to capacity and there is very low airport traffic at this junction.	No junction mitigation is required.
1377	High	M23 / M25 junction (merges / diverges)	This complex of merges and diverges is shown to be operating within capacity in the future baseline, with V/C ratios varying from 70% in the inter-peak period to 98% in the	No junction mitigation is proposed.
1378	Medium			
19886	Medium			

Node	Magnitude of Impact	Name	Assessment	Further Mitigation
			AM1 time period. The with Project scenario shows V/C ratios increasing by up to six percentage points, reaching maximum values of 104% in certain locations. However, a separate more detailed review of the whole junction has been undertaken against DMRB criteria, to consider the performance of the merges and diverges at this junction, which suggests that although the merge/diverge complex will perform close to capacity, no additional issues are expected compared to the future baseline. The merges and diverges are expected to be operating increasingly close to capacity over time in the future baseline, and conditions would worsen slightly with the Project. Each location would operate at capacity in only one of the modelled time periods. In practice, the Project will not result in a material change in performance. This is illustrated by the journey time assessments for the M23 (northbound and eastbound) and M25 (eastbound and westbound) routes, as set out in Diagram 12.5.2. These show that for 2047, the Project results in either no change or one minute increase on each of the four routes, when considering the four time periods assessed. Merge and diverge capacity can only be increased in steps, rather than in small increments, and the degree of impact at the location resulting from the Project does not merit a large step-change in capacity and the associated scale of highway works. The impact of this junction has been presented to National Highways and they recognise that "*it would appear disproportionate to expect the developer of Gatwick NRP to redesign the entire interchange to cope with a relatively*	

Node	Magnitude of Impact	Name	Assessment	Further Mitigation
			small increase in traffic figures over those which would naturally occur". Further consultation with National Highways is ongoing.	
14812	Medium	Woodhatch Road / Dovers Green Road / Cockshot Hill	This junction is shown as operating close to capacity in the AM1 and PM periods (V/C ratios of 96% to 99%) and at capacity in the AM2 time period (V/C ratio of 106%). The impact from the Project is identified in the PM peak, where the increase in vehicles is 96. The proportion of airport traffic at this junction is very small (less than 1% which can be considered to be within daily variation in traffic) and the number of additional airport trips as a result of the Project is negligible (up to +11 vehicles an hour). The change in V/C ratio in the PM peak would be around four percentage points, reaching a ratio of 100%, but with reduced V/C ratios occurring in other time periods with the Project.	No junction mitigation is considered necessary given the low volume of airport traffic.
76209	Medium	Woodroyd Avenue / Brighton Road, Horley	This junction is indicated as operating within or approaching capacity in the future baseline (maximum V/C ratio of 91% in the PM peak). The traffic flows and operation of this junction are affected by the highway improvement scheme which forms part of the Project. With the Project, the junction would continue to operate within capacity (maximum V/C of 93% with Project).	No junction mitigation is required.
16769	Medium	Brighton Road / London Road, Horley	This junction is identified as operating within capacity in the future baseline (maximum V/C ratio of 90% in the PM peak). The traffic flows and operation of this junction are affected by the highway improvement scheme which forms part of the Project. With the Project, the junction would continue to operate within capacity (maximum V/C of 92% with Project).	No junction mitigation is required.

Node	Magnitude of Impact	Name	Assessment	Further Mitigation
73465	High	Perimeter Road North / Longbridge Way / Northgate Road	This node in the model does not represent an actual junction, but is a zone connector, which is a location at which all the traffic from the surrounding area is assumed to be loaded onto the network in one location.	No junction mitigation is required.
16388	Medium	M23 Junction 9 roundabout	This junction is within the VISSIM micro-simulation model, and its operation has been considered in more detail through the use of that model. This shows some reductions in speeds with the Project, compared to the future baseline, but no significant capacity issues have been identified.	No junction mitigation is required.
16393	High	M23 / M23 Spur		
1380	High	M23 / M23 Spur		
15080	High	A23 / Gatwick Road / Perimeter Road East	This junction is shown as operating close to capacity in the future baseline, with V/C ratios of around 98% in all time periods. The impact from the Project is identified for the PM peak, where the increase in traffic results in the junction operating over capacity (V/C changing from 97% in the future baseline to 103% with the Project). This junction is part of the VISSIM model and performance has been assessed using that model. VISSIM provides more detail on network performance and average speed plots are used to indicate congestion. This shows some reduction in average speeds with the Project, compared to the future baseline, but no significant capacity issues. Further details on this junction are included in **ES Appendix 12.9.1: Highway Flows and Driver Delay Review** (Doc Ref. 5.3).	No junction mitigation is required.

12.9.162 The above shows that whilst there are junctions identified with a high or medium magnitude of impact, the impact is often due to model noise and the associated reassignment of background traffic, and/or the junctions will continue to operate within or at capacity, similar to the future baseline conditions.

12.9.163 Information on model noise is provided in paragraphs 12.5.5 and 12.5.6. Model noise is identified by reviewing changes in traffic volumes and the amount of airport related traffic at each node location. Where the additional trips are identified as the result of an unexpected reassignment of background traffic on the network, particularly if this does not

occur consistently or is at some distance from the Airport, the impacts are considered to be due to model noise.

12.9.164 At the M23/M25 interchange, some merge and diverge locations are shown to be operating increasingly close to, or just above, capacity in the future baseline scenarios to 2047, which is not attributable to the Project. The assessment indicates that the Project would worsen conditions slightly, although this would not materially affect network performance. It is not possible to increase merge and diverge capacity in small increments, and the degree of effect that the Project has is not sufficient to merit undertaking the scale of highway works that would be necessary to deliver a step-change in capacity.

12.9.165 At the M23 Junction 9 and A23/Gatwick Road/Perimeter Road East, further VISSIM modelling has shown that there are some reductions in average vehicle speeds as a result of the Project, but conditions remain similar to those in the future baseline and no significant capacity issues have been identified.

12.9.166 No other junctions are identified to have medium or high impacts and therefore the overall magnitude of impact for driver delay is considered to be low, and the driver delay effect is considered to be **minor adverse**, which is not significant.

Pedestrian and cyclist delay

12.9.167 The highway improvements included as part of the Project would change some pedestrian and cycle routes at the North Terminal, South Terminal, and Longbridge Roundabout junctions. The proposed changes to the Longbridge Roundabout include sections of segregated paths and new pedestrian and cycle signalised crossings on all arms. Other works include a new path connection for pedestrians and cyclists between Longridge roundabout and the airport on the western side of A23 London Road, a new shared-use ramp for pedestrians and cyclists to Riverside Garden Park, a new signal-controlled pedestrian crossing across A23 London Road. These are shown in the appended Figures 12.6.2 and 12.6.3. Within the terminal forecourts, the pedestrian crossings would be retained.

12.9.168 The magnitude of impact is considered to be negligible to low; the sensitivity of receptors along the highway routes ranges from negligible to medium. Overall, it is expected that the changes to pedestrian and cycle delay would be **negligible**, and the junctions with proposed highway improvements with the Project would have **minor beneficial** effects on pedestrian and cyclist delay.

Pedestrian and cyclist amenity

12.9.169 The threshold for an effect on pedestrian and cyclist amenity is when the traffic flows have doubled. As shown in Table 12.9.26, North Terminal Roundabout (Link ID: 006), M23 Gatwick Interchange (Link ID: cl17) and Southbridge Road, Croydon (Link ID: cy01) are expected to experience a doubling or more in flows. The magnitude of impact on these links is considered to be medium. The sensitivity of these links ranges from negligible to medium in terms of pedestrians and cyclists. The effect of the Project on pedestrian and cyclist amenity can be considered to be **minor adverse** for North Terminal Roundabout and M23 Gatwick Interchange, and **moderate adverse** for Southbridge Road. However, a review of Southbridge Road has identified the traffic flow changes are associated with model noise (as described in 12.5.5 and 12.5.6) rather than arising from the Project.

12.9.170 The traffic composition can also affect pedestrian and cyclist amenity. The traffic flows contained in **ES Appendix 12.9.1: Highway Flows and Driver Delay Review** (Doc Ref. 5.3) shows that the highest increase in the percentage of HGVs (number of HGVs divided by total vehicle number) are expected on the Airport estate roads, namely 12 percentage points on Northgate Road (Link ID: NT3) and 6 percentage points on Longbridge Way (Link ID: NT2) in the PM peak. The magnitude of this impact can be considered to be low to medium. The sensitivity along these roads is considered to be negligible to low. The effect of the Project on amenity is considered to be **minor adverse**, which is not significant.

12.9.171 For all the other roads, the predicted increase in the percentage of HGVs varies between -7 and +7 percentage points. The magnitude of impact is considered to be negligible to low. The sensitivity of the receptors along these links are considered to be negligible to high. The effect on pedestrian and cyclist amenity on all other roads is considered to be **negligible adverse.**

Accidents and safety

12.9.172 The design of the highway improvements would separate through traffic from the North Terminal and South Terminal Roundabouts. This would reduce traffic flows through the junction and reduce the risks of conflict and this is considered to be beneficial. The magnitude of impact is considered to be negligible to low.

12.9.173 The sensitivity of receptors in terms of pedestrians and cyclists along the highway links range from negligible to medium. The effect of accidents and safety on pedestrians and cyclist is considered to be **minor beneficial** where highway improvements as part of the Project are proposed, and **negligible to minor adverse** on all other roads, which is not significant.

12.9.174 The sensitivity of receptors in terms of car drivers and passengers ranges from low to medium. The effect of accidents and safety on car drivers and passengers is considered to be **minor beneficial** at the junctions where highway improvements are proposed, and **negligible** for all other roads.

Hazardous loads

12.9.175 The proposed changes to the highway network are expected to improve the safety of general traffic. The magnitude of impact is expected to be negligible, and the sensitivity of receptors is considered to be negligible. The effect on hazardous loads is considered to be **negligible beneficial.**

Effects on public transport amenity

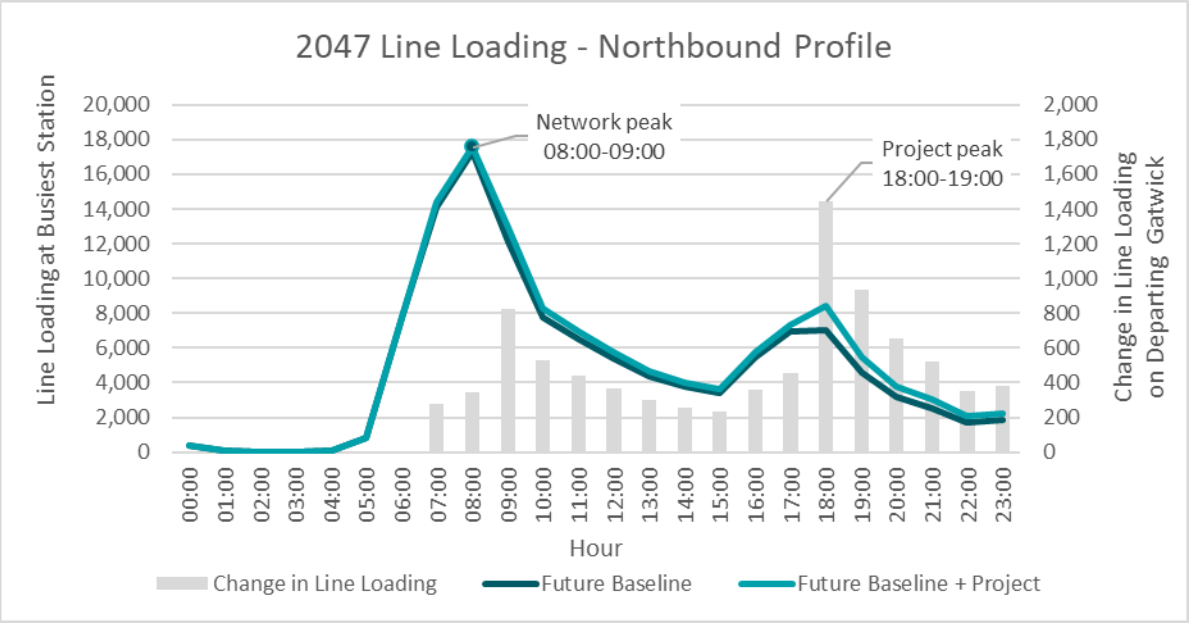
Crowding on rail services

Northbound services

12.9.176 Diagram 12.9.26 shows the 2047 line loading profile for the future baseline and with Project scenarios. The peak hours for assessment are identified as follows:

- Network peak 08:00-09:00, based on the highest line loading for all services at the busiest station (northbound trains passing or departing from Purley).
- Project peak 18:00-19:00, based on the highest line loading as the result of the Project, which for northbound is on departing Gatwick Airport station.

Diagram 12.9.26: 2047 northbound line loading profile



Northbound network peak (08:00-09:00)

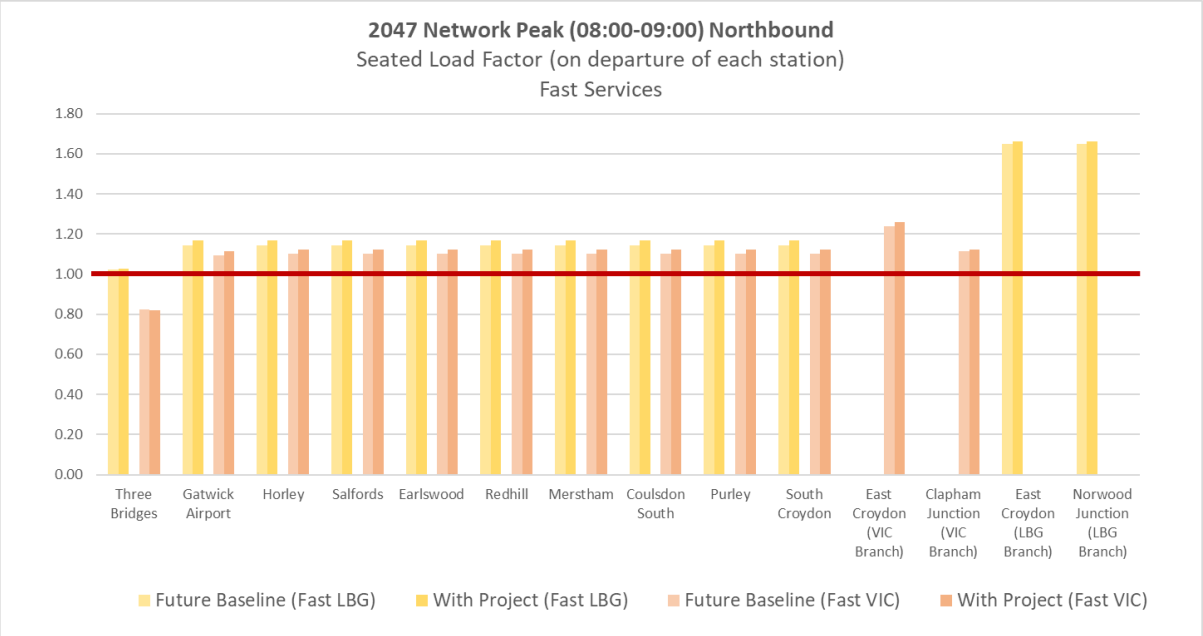
12.9.177 Table 12.9.28 provides a summary of the increase in line loading by station in the northbound direction for the network peak.

Table 12.9.28: 2047 percentage change in line loading – northbound network peak 08:00-09:00

Station	2047 network peak northbound (08:00-09:00)							
	Change in line loading on departure				Percentage change			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
Three Bridges	26	-24	13	15	0.5%	-0.5%	1.2%	0.1%
Gatwick Airport	140	129	54	323	2.2%	2.1%	8.7%	2.4%
Horley	140	128	55	323	2.2%	2.0%	8.1%	2.4%
Salfords	140	128	55	323	2.2%	2.0%	7.7%	2.4%
Earlswood	140	128	63	331	2.2%	2.0%	5.3%	2.4%
Redhill	140	128	59	327	2.2%	2.0%	2.8%	2.2%
Merstham	140	128	57	325	2.2%	2.0%	2.4%	2.2%
Coulsdon South	140	128	54	322	2.2%	2.0%	1.6%	2.0%
Purley	140	128	49	317	2.2%	2.0%	1.0%	1.8%
South Croydon	140	128	47	315	2.2%	2.0%	1.0%	1.8%
East Croydon (VIC Branch)	0	105	8	113	-	1.5%	0.5%	1.3%
Clapham Junction (VIC Branch)	0	57	0	57	-	0.9%	0.0%	0.7%
East Croydon (LBG Branch)	63	0	25	88	0.7%	-	0.6%	0.7%
Norwood Junction (LBG Branch)	63	0	22	85	0.7%	-	0.5%	0.6%

12.9.178 Table 12.9.28 shows that during the network peak hour, the Project contributes an additional 331 passengers in the northbound direction. Most of these passengers are expected to use the fast train services to London Victoria and London Bridge. This represents around a 2% increase in passengers on the fast services, and approximately 9% on the stopping services. To assess the impact on crowding, Diagram 12.9.27 shows the Seated Load Factor assessment and Table 12.9.29 shows the standing capacity assessment.

Diagram 12.9.27: 2047 northbound network peak Seated Load Factor



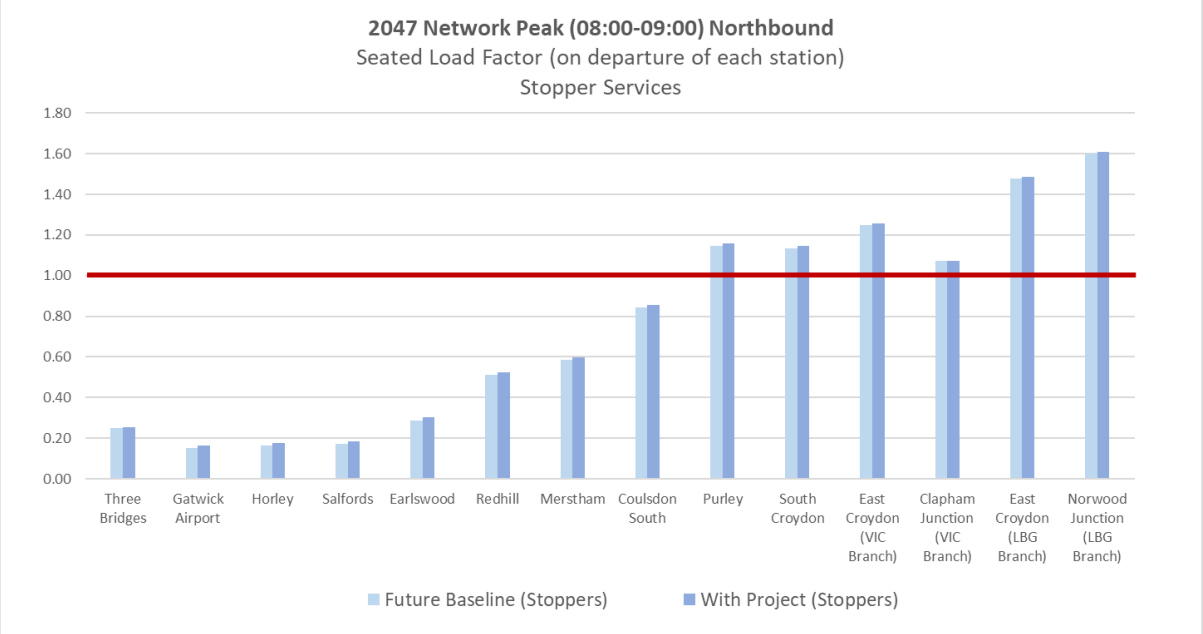


Table 12.9.29: 2047 northbound network peak standing capacity assessment (08:00-09:00)

Station	2047 network peak northbound - percentage of standing capacity occupied (08:00-09:00)							
	Future baseline 2047				With Project (percentage point change from future baseline) 2047			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
Three Bridges	1.6%	-	-	-	1.9% (0.4%)	0.0% (-)	0.0% (-)	- (-)
Gatwick Airport	10.7%	15.2%	-	-	12.7% (1.9%)	18.9% (3.7%)	0.0% (-)	- (-)
Horley	10.7%	16.5%	-	-	12.7% (1.9%)	20.2% (3.7%)	0.0% (-)	- (-)
Salfords	10.7%	16.5%	-	-	12.7% (1.9%)	20.2% (3.7%)	0.0% (-)	- (-)
Earlswood	10.7%	16.5%	-	-	12.7% (1.9%)	20.2% (3.7%)	0.0% (-)	- (-)
Redhill	10.7%	16.5%	-	-	12.7% (1.9%)	20.2% (3.7%)	0.0% (-)	- (-)
Merstham	10.7%	16.5%	-	-	12.7% (1.9%)	20.2% (3.7%)	0.0% (-)	- (-)
Coulsdon South	10.7%	16.5%	-	4.5%	12.7% (1.9%)	20.2% (3.7%)	0.0% (-)	6.5% (2.0%)
Purely	10.7%	16.5%	11.3%	12.2%	12.7% (1.9%)	20.2% (3.7%)	12.3% (0.9%)	14.2% (2.0%)
South Croydon	10.7%	16.5%	10.6%	11.9%	12.7% (1.9%)	20.2% (3.7%)	11.5% (0.9%)	13.9% (2.0%)
East Croydon (VIC Branch)	-	39.2%	41.9%	39.7%	0.0% (-)	42.2% (3.0%)	42.8% (1.0%)	42.3% (2.6%)
Clapham Junction (VIC Branch)	-	18.7%	12.2%	17.5%	0.0% (-)	20.3% (1.6%)	12.2% (0.0%)	18.8% (1.3%)
East Croydon (LBG Branch)	48.8%	-	29.3%	41.4%	49.7% (0.9%)	0.0% (-)	29.9% (0.6%)	42.2% (0.7%)
Norwood Junction (LBG Branch)	48.8%	-	36.9%	44.3%	49.7% (0.9%)	0.0% (-)	37.3% (0.5%)	45.0% (0.7%)

12.9.179 Diagram 12.9.27 shows that seating capacity is exceeded north of Gatwick Airport on the fast services for the network peak and exceeded on stopping services north of Purley. This occurs in the future baseline owing to background commuter flows into London. Table 12.9.29 shows the highest percentage of standing capacity occupied in the future baseline is 39.2% and 48.8% on the fast services to London Victoria and London Bridge respectively. On stopping services, the highest percentage of standing capacity occupied is 41.9%. The Project will not significantly increase the percentage of standing capacity occupied when compared the future baseline 2047 situation, with the highest increase being 3.7 percentage points on the fast services into London Victoria. The highest percentage of standing capacity occupied in the with Project scenario is 49.7%, leaving at least half of the total standing capacity available.

Northbound project peak (18:00-19:00)

12.9.180 Table **12.9.30** provides a summary of the increase in line loading by station in the northbound direction for the Project peak.

Table 12.9.30: 2047 percentage change in line loading – northbound project peak

Station	2047 project peak northbound							
	Change in line loading on departure				Percentage change			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
Three Bridges	22	39	9	70	2.6%	2.5%	2.9%	2.6%
Gatwick Airport	429	911	62	1403	18.9%	21.1%	11.6%	19.2%
Horley	429	911	61	1402	18.9%	21.1%	14.6%	19.5%
Salfords	429	911	61	1402	18.9%	21.1%	14.6%	19.5%
Earlswood	429	911	61	1402	18.9%	21.1%	14.6%	19.5%
Redhill	429	911	46	1386	18.9%	21.1%	11.9%	19.9%
Merstham	429	911	45	1386	18.9%	21.1%	11.5%	19.8%
Coulsdon South	429	911	45	1386	18.9%	21.1%	10.5%	19.7%
Purley	429	911	45	1386	18.9%	21.1%	10.5%	19.7%
South Croydon	429	911	45	1386	18.9%	21.1%	10.5%	19.7%
East Croydon (VIC Branch)	0	748	0	748	-	16.9%	-	16.9%
Clapham Junction (VIC Branch)	0	511	0	511	-	16.5%	-	16.5%
East Croydon (LBG Branch)	348	0	68	416	11.3%	-	6.1%	9.9%
Norwood Junction (LBG Branch)	348	0	68	416	11.3%	-	6.1%	9.9%

12.9.181 Table **12.9.30** shows that during the project peak hour, the Project contributes an additional 1,403 passengers in the northbound direction. Most of these passengers are expected to use the fast train services to London Victoria and London Bridge. The increase in passengers represents approximately 20% on fast services and 15% on the stopping services. To assess the impact on crowding, Diagram 12.9.28 shows the Seated Load Factor assessment and Table 12.9.31 shows the standing capacity assessment.

Diagram 12.9.28: 2047 northbound project peak Seated Load Factor

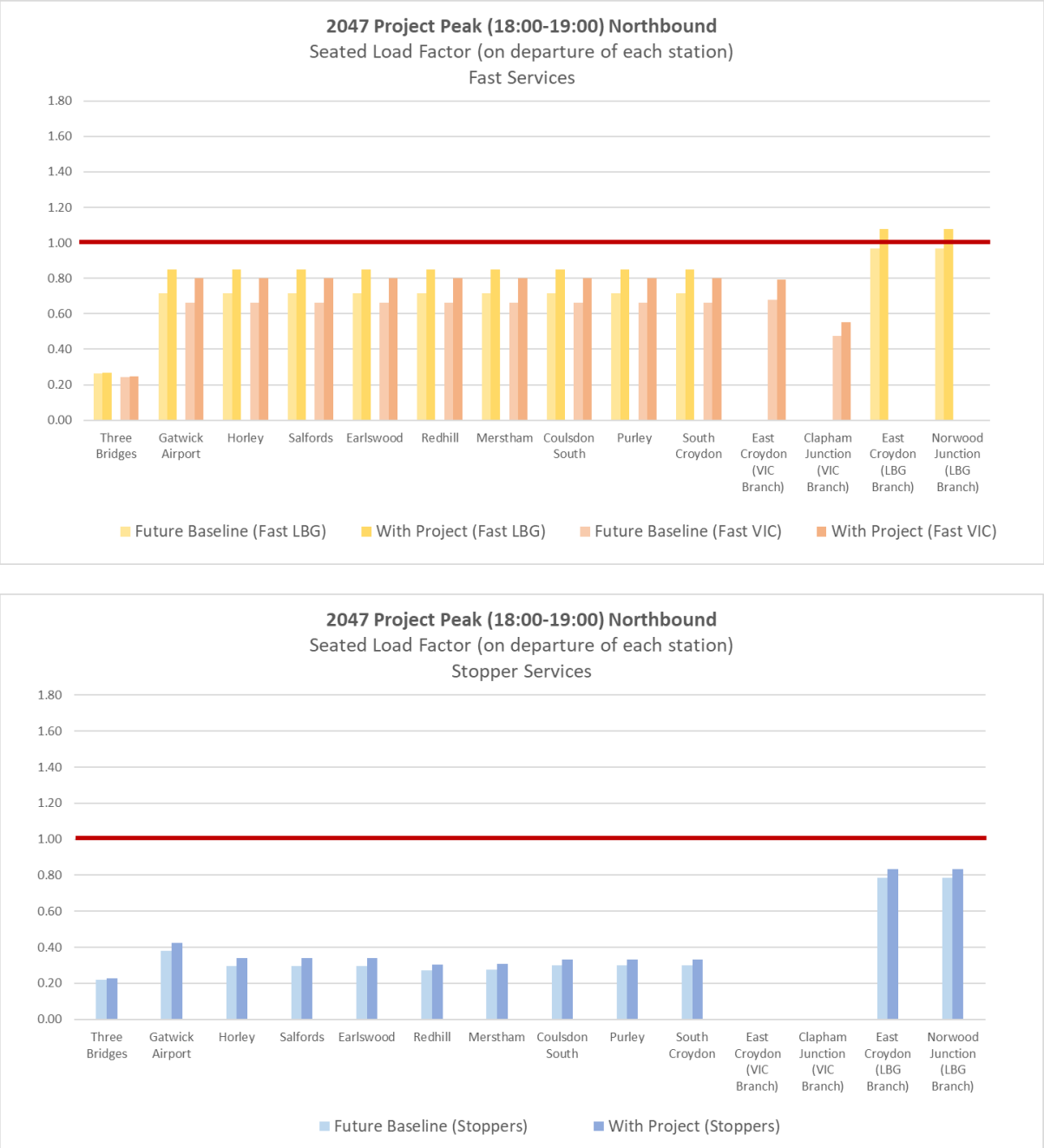


Table 12.9.31: 2047 northbound project peak standing capacity assessment

Station	2047 project peak northbound – percentage of standing capacity occupied							
	Future baseline 2047				With Project (percentage point change from future baseline) 2047			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
East Croydon (LBG Branch)	No standing passengers				5.5% (5.5%)	0.0% (-)	0.0% (-)	0.3% (0.3%)
Norwood Junction (LBG Branch)	No standing passengers				5.5% (5.5%)	0.0% (-)	0.0% (-)	0.3% (0.3%)

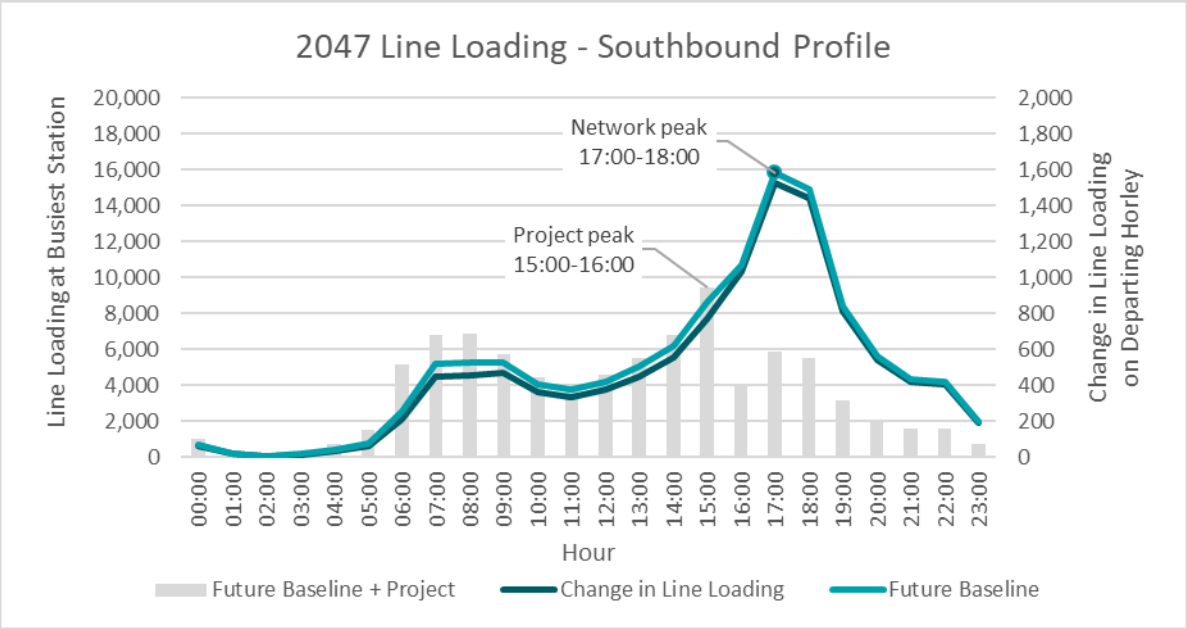
12.9.182 Diagram 12.9.28 shows that seating capacity is exceeded at East Croydon on fast services to London Bridge. Table 12.9.31 shows the percentage of standing capacity occupied at these two stations. There are no standing passengers on the fast services to London Bridge in the future baseline. The Project increases the percentage of standing capacity occupied when compared to the future baseline situation, with the highest increase being 5.5 percentage points on the fast services into London Bridge.

Southbound services

12.9.183 Diagram 12.9.29 shows the 2047 line loading profile for the future baseline and with Project scenarios. The peak hours for the southbound assessment are identified as follows:

- Network peak 17:00-18:00, based on the highest line loading for all services at the busiest station (southbound trains departing from East Croydon).
- Project peak 15:00-16:00, based on the highest line loading as the result of the Project, which for southbound is on departing or passing Horley station.

Diagram 12.9.29: 2047 southbound line loading profile



Southbound network peak (17:00-18:00)

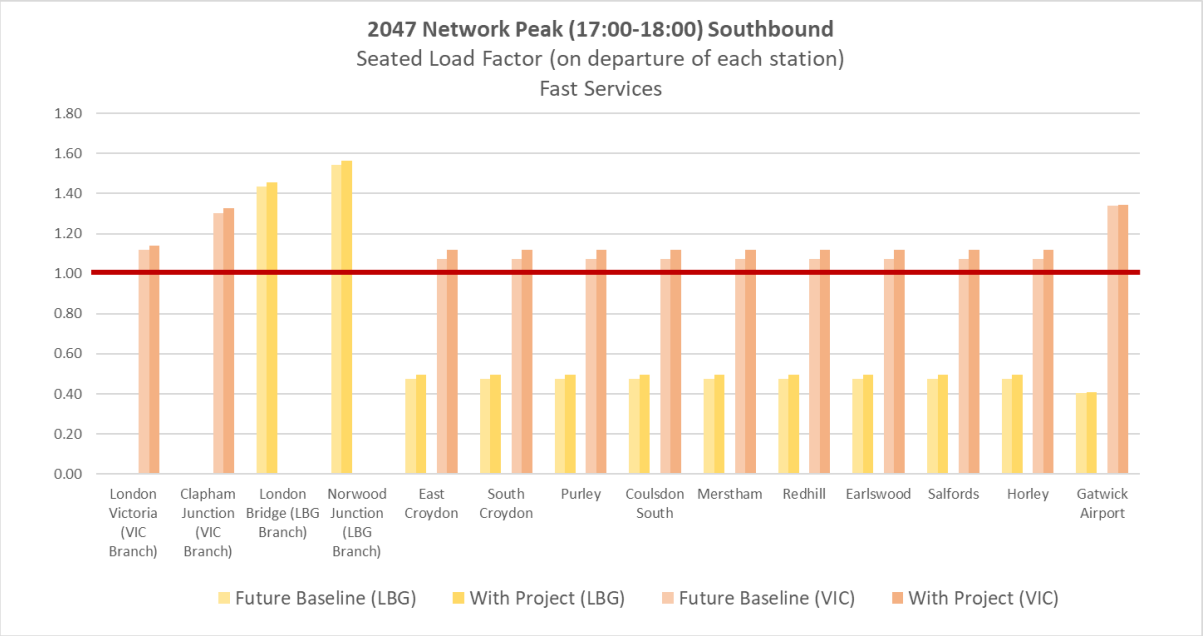
12.9.184 Table 12.9.32 provides a summary of the increase in line loading by station in the southbound direction for the network peak.

Table 12.9.32: 2047 percentage change in line loading – southbound network peak (17:00-18:00)

Station	2047 network peak southbound							
	Change in line loading on departure				Percentage change			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
London Victoria (VIC Branch)	0	132	0	132	-	1.9%	-	1.9%
Clapham Junction (VIC Branch)	0	179	0	179	-	2.2%	-	2.2%
London Bridge (LBG Branch)	95	0	33	127	1.3%	-	0.8%	1.1%
Norwood Junction (LBG Branch)	117	0	35	151	1.5%	-	0.9%	1.3%
East Croydon	227	283	26	535	4.2%	4.2%	0.8%	3.5%
South Croydon	227	283	26	535	4.2%	4.2%	0.8%	3.5%
Purley	227	283	28	538	4.2%	4.2%	1.2%	3.7%
Coulsdon South	227	283	30	540	4.2%	4.2%	1.7%	3.9%
Merstham	227	283	32	541	4.2%	4.2%	2.0%	3.9%
Redhill	227	283	60	570	4.2%	4.2%	5.2%	4.1%
Earlswood	227	283	60	569	4.2%	4.2%	6.1%	4.2%
Salfords	227	283	60	570	4.2%	4.2%	6.4%	4.2%
Horley	227	283	53	563	4.2%	4.2%	5.7%	4.2%
Gatwick Airport	42	8	7	56	0.9%	0.1%	1.0%	0.6%

12.9.185 Table 12.9.32 shows that during the network peak hour, the Project contributes an additional 570 passengers in the southbound direction. Most of these passengers are expected to use the fast train services from London Victoria and London Bridge. This represents around a 4% increase in passengers on the fast services, and approximately 6% on the stopping services. To assess the impact on crowding, Diagram 12.9.30 shows the Seated Load Factor assessment and Table 12.9.33 shows the standing capacity assessment.

Diagram 12.9.30: 2047 southbound network peak Seated Load Factor



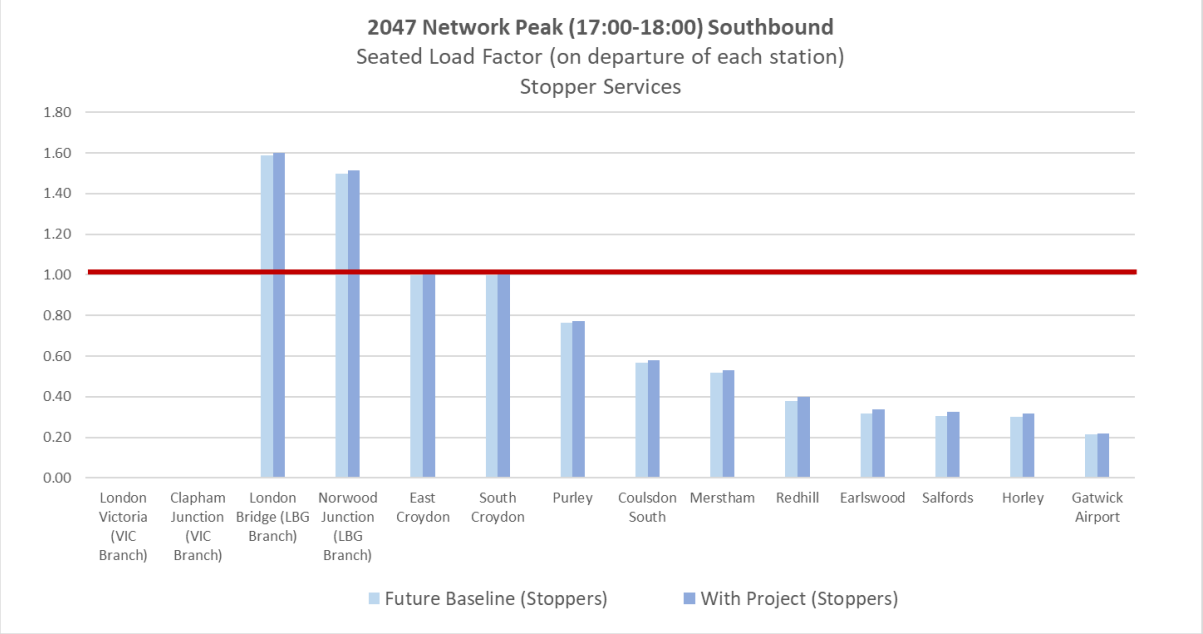


Table 12.9.33: 2047 southbound network peak standing capacity assessment (17:00-18:00)

Station	2047 network peak southbound - percentage of standing capacity occupied							
	Future baseline 2047				With Project (percentage point change from future baseline) 2047			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
London Victoria (VIC Branch)	-	19.6%	-	4.0%	0.0% (-)	23.1% (3.5%)	0.0% (-)	7.2% (3.2%)
Clapham Junction (VIC Branch)	-	49.2%	-	31.2%	0.0% (-)	53.8% (4.7%)	0.0% (-)	35.5% (4.3%)
London Bridge (LBG Branch)	29.7%	-	36.1%	31.9%	30.9% (1.2%)	0.0% (-)	36.9% (0.8%)	33.0% (1.1%)
Norwood Junction (LBG Branch)	36.9%	-	30.6%	34.7%	38.4% (1.5%)	0.0% (-)	31.4% (0.8%)	36.0% (1.3%)
East Croydon	-	12.2%	-	4.8%	0.0% (-)	19.6% (7.4%)	0.4% (-)	8.2% (3.4%)
South Croydon	-	12.2%	-	4.8%	0.0% (-)	19.6% (7.4%)	0.4% (-)	8.2% (3.4%)
Purley	-	12.2%	-	0.2%	0.0% (-)	19.6% (7.4%)	0.0% (-)	3.6% (3.4%)
Coulsdon South	-	12.2%	-	-	0.0% (-)	19.6% (7.4%)	0.0% (-)	- (-)
Merstham	-	12.2%	-	-	0.0% (-)	19.6% (7.4%)	0.0% (-)	- (-)
Redhill	-	12.2%	-	-	0.0% (-)	19.6% (7.4%)	0.0% (-)	- (-)
Earlswood	-	12.2%	-	-	0.0% (-)	19.6% (7.4 %)	0.0% (-)	- (-)
Salfords	-	12.2%	-	-	0.0% (-)	19.6% (7.4%)	0.0% (-)	- (-)
Horley	-	12.3%	-	-	0.0% (-)	19.7% (7.4%)	0.0% (-)	- (-)
Gatwick Airport	-	55.9%	-	-	0.0% (-)	56.1% (0.2%)	0.0% (-)	- (-)

12.9.186 Table 12.9.33 shows that for the network peak, southbound seating capacity is exceeded until reaching Gatwick Airport on the fast services out of London Victoria and until reaching East Croydon on fast services out of London Bridge. Stopping services have seating capacity exceeded until they reach Purley. This occurs in the future baseline owing to background commuter flows from London. Table 12.9.33 shows the highest percentage of standing capacity occupied is 49.2% in the future baseline, which is on the fast services out of London Victoria. The Project will result in a low magnitude of impact on the percentage of standing capacity occupied when compared with the future baseline 2047 situation, with the highest increase being 7.4 percentage points on the fast services. The highest percentage of standing capacity occupied is 53.8% with Project.

Southbound project peak (15:00-16:00)

12.9.187 Table 12.9.34 provides a summary of the increase in line loading by station in the southbound direction for the project peak.

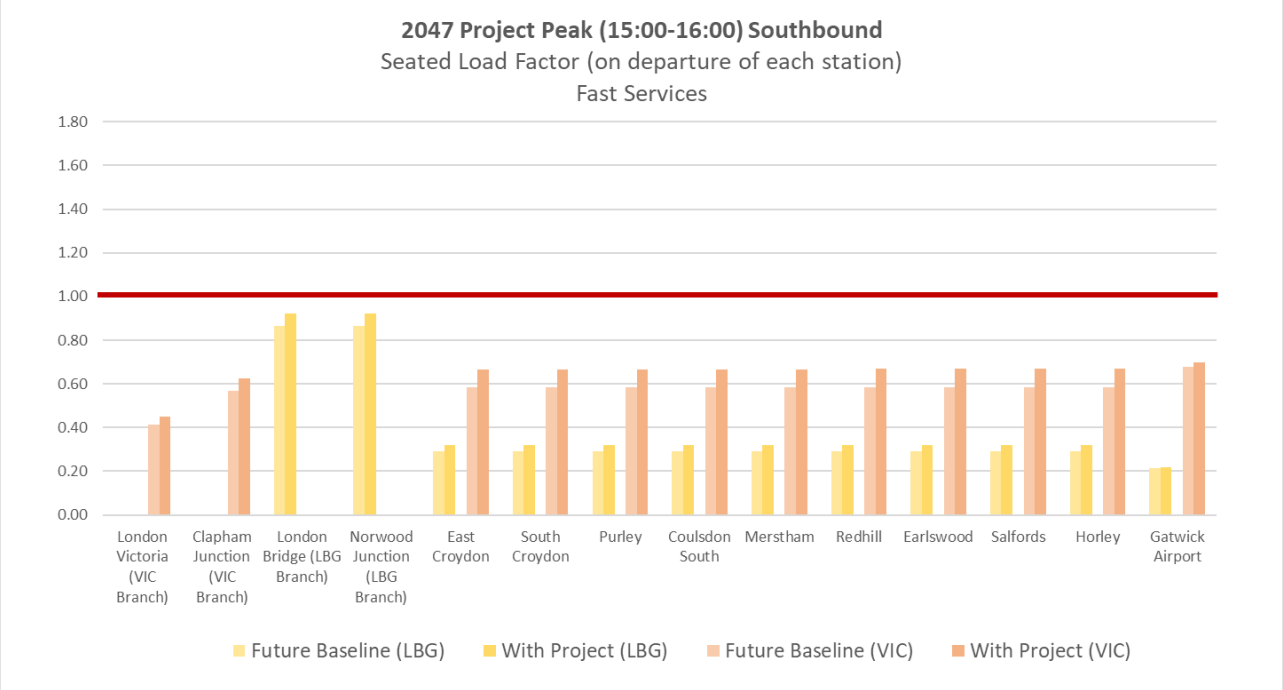
Table 12.9.34: 2047 percentage change in line loading – southbound project peak (15:00-16:00)

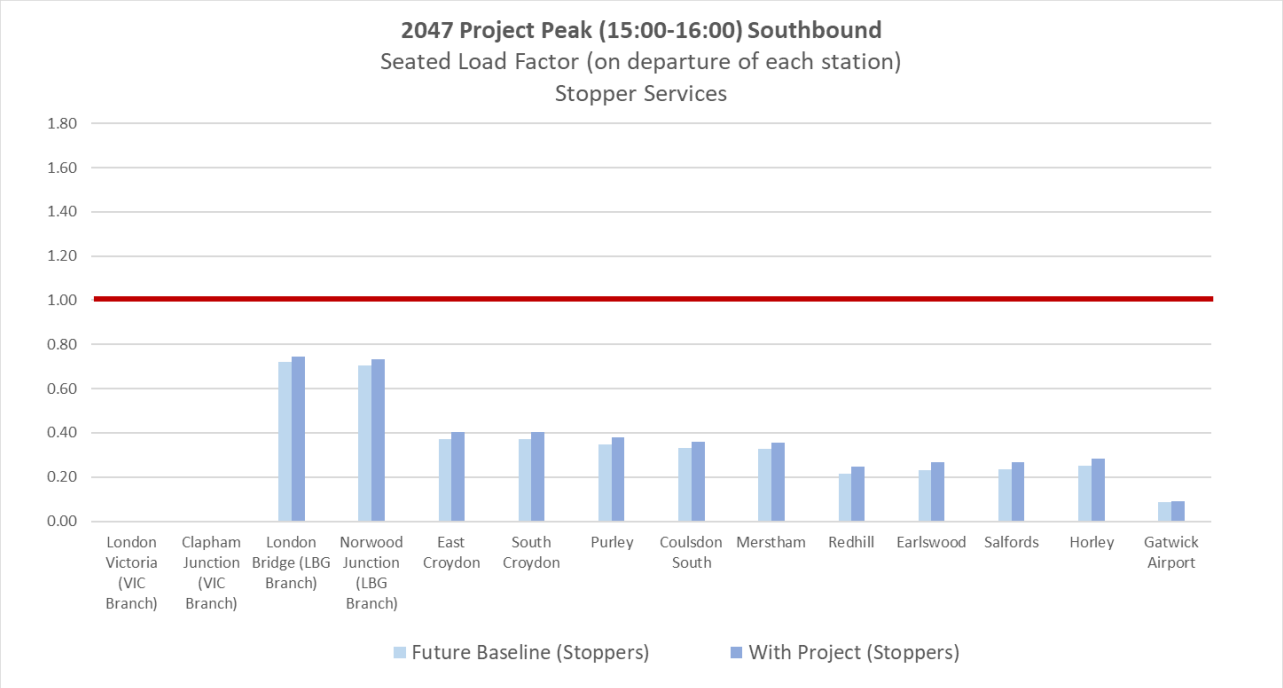
Station	2047 project peak southbound							
	Change in line loading on departure				Percentage change			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
London Victoria (VIC Branch)	0	214	0	214	-	8.7%	-	8.7%
Clapham Junction (VIC Branch)	0	332	0	332	-	9.8%	-	9.8%
London Bridge (LBG Branch)	275	0	81	356	6.5%	-	3.8%	5.6%
Norwood Junction (LBG Branch)	275	0	81	356	6.5%	-	3.9%	5.6%
East Croydon	329	494	89	911	10.5%	14.2%	8.0%	11.8%
South Croydon	329	494	89	911	10.5%	14.2%	8.0%	11.8%
Purley	329	494	89	912	10.5%	14.2%	8.6%	11.9%
Coulsdon South	329	494	89	912	10.5%	14.2%	9.1%	12.0%
Merstham	329	494	90	912	10.5%	14.2%	9.3%	12.1%
Redhill	329	494	100	923	10.5%	14.2%	15.6%	12.4%
Earlswood	329	494	100	923	10.5%	14.2%	14.5%	12.4%
Salfords	329	494	100	923	10.5%	14.2%	14.4%	12.4%
Horley	329	494	101	924	10.5%	14.2%	13.6%	12.3%
Gatwick Airport	41	124	10	175	1.8%	3.1%	3.9%	4.1%

12.9.188 Table 12.9.34 shows that during the project peak hour, the Project contributes an additional 924 passengers in the southbound direction. Most of these passengers are expected to use the fast

train services from London Victoria and London Bridge. The increase in passengers represents approximately a 14% increase in passengers on the fast services, and approximately 16% on the stopping services. To assess the impact on crowding, Diagram 12.9.31 shows the Seated Load Factor assessment.

Diagram 12.9.31: 2047 southbound project peak Seated Load Factor





12.9.189 Diagram 12.9.31 shows that seating capacity is not exceeded on any of the southbound services in the project peak and therefore no crowding issues are expected. Consequently, a 2047 southbound project peak standing capacity assessment is not required.

Summary on rail crowding

12.9.190 A summary of rail crowding by peak hour and direction is as follows:

- **Northbound** – The highest increase in line loading as a result of the Project is 21.1% (during the Project peak). The highest percentage of standing capacity occupied on train services with Project is 5.5% in the Project peak and 49.7% in the network peak, indicating busy trains into London but with spare standing capacity available. The Project accounts for up to a 5.5 percentage points change in standing capacity which represents a low impact of magnitude.
- **Southbound** – The highest increase in line loading as a result of the Project is 14.2% (during the Project peak). There is seating capacity available for the Project peak, and the highest percentage of standing capacity occupied on train services is 56.1% at the network peak, indicating busy trains from London but with spare standing capacity available. The Project accounts for up to a 7.4 percentage points change in standing capacity which represents a low magnitude of impact.

12.9.191 It should be noted that the Project does not assess committed improvements proposed by the rail industry as mitigation of its effects; instead, these improvements are applied in the future baseline, against which the Project is being assessed. Moreover, the last Control Period considered for improvements is CP7 (which is to 2029) so the modelling currently assumes no further improvements between 2029 and 2047, which is considered a conservative assumption. The overall magnitude of impact is considered to be low and the sensitivity of receptors in terms of public transport capacity is considered to be low to medium. Any effects to changes in crowding levels for 2047 are therefore anticipated to be **minor adverse**, which is not significant.

Crowding in station

12.9.192 The station crowding assessment has been completed for 2047 and the results are reported below. The AM peak used is 07:00-09:00 and the PM peak used is 16:00-18:00 for both the concourse and platform for all assessment years.

12.9.193 Diagram 12.9.32 and Diagram 12.9.33 show the Level of Service performance for circulation at the concourse level of the station for the peak hour in the AM and PM peak modelled periods.

Diagram 12.9.32: 2047 concourse LoS (AM peak period, 07:00-09:00)

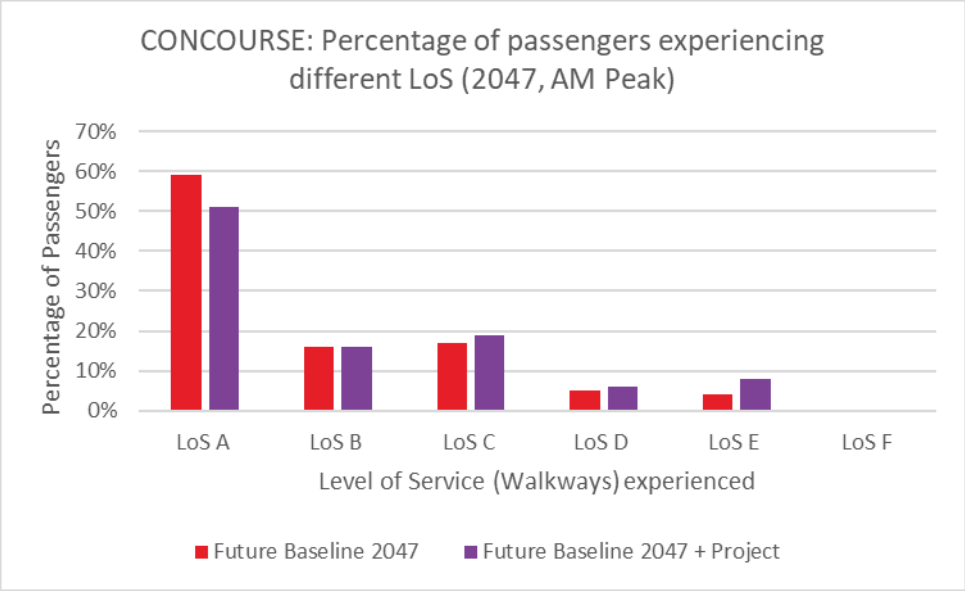
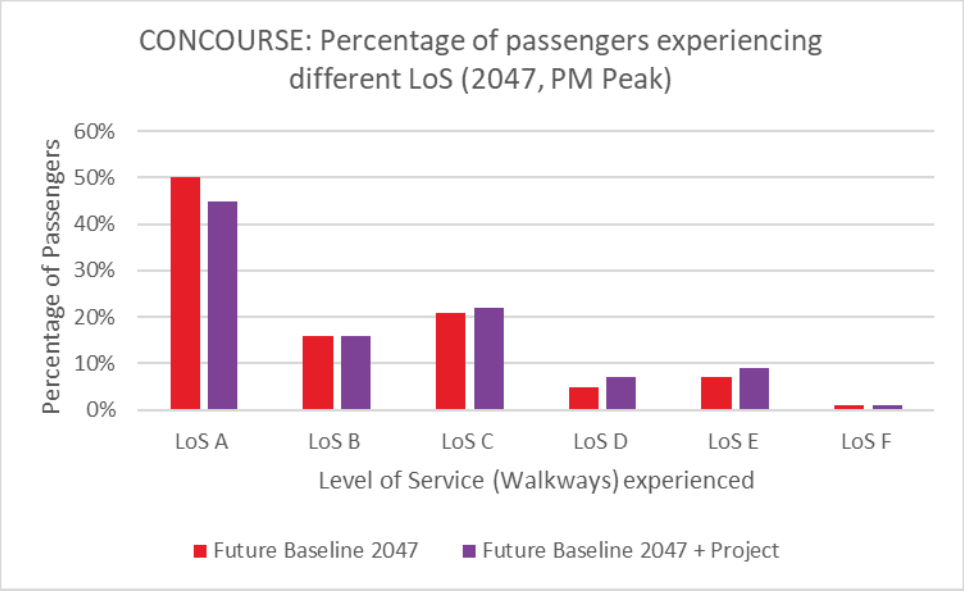


Diagram 12.9.33: 2047 concourse LoS (PM peak period, 16:00-18:00)



12.9.194 The percentage of passengers experiencing different Levels of Service varies but the assessment shows that station performance at concourse level would generally be expected to be LoS C or better. This represents a low passenger sensitivity to increases in crowding.

12.9.195 The PM peak period shows a very small percentage of passengers (1%) would experience a one level change to LoS E with the Project. This is expected to be the worst case and this magnitude of impact is considered as low**.**

12.9.196 The Level of Service performance for queuing and wating for the station platforms is shown in Diagram 12.9.34 and Diagram 12.9.35, excluding escalator elements.

Diagram 12.9.34: 2047 platforms LoS (AM peak period, 07:00-09:00)

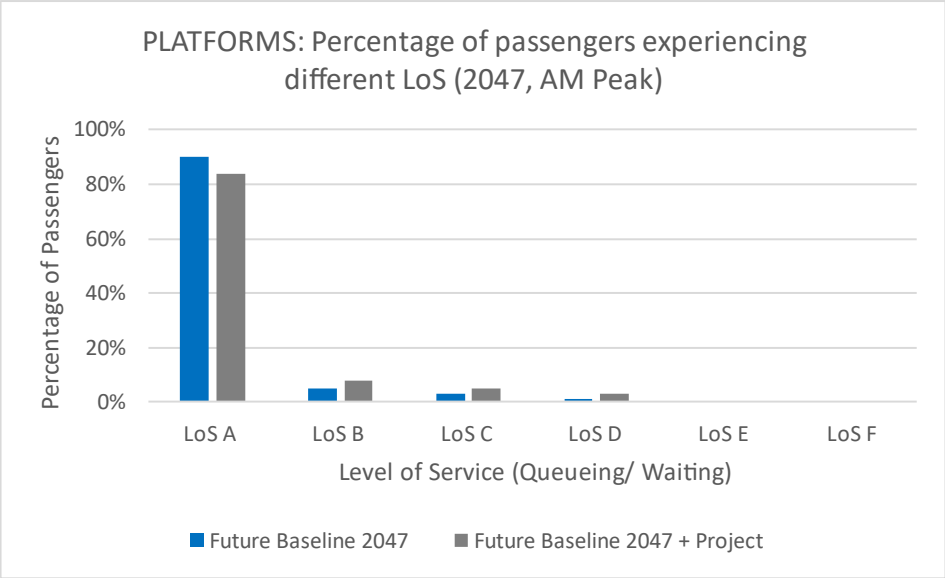
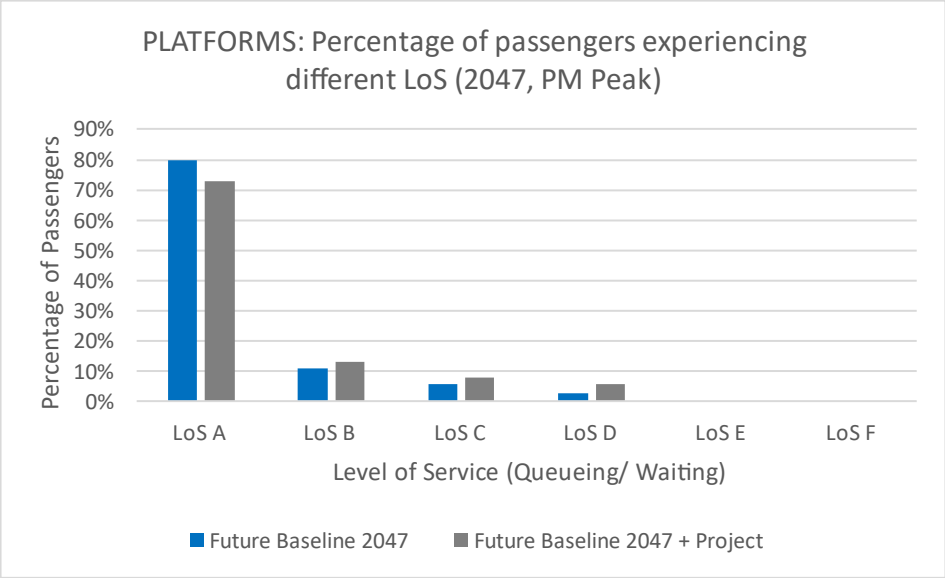


Diagram 12.9.35: 2047 platforms LoS (PM peak period, 16:00-18:00)



12.9.197 The percentage of passengers experiencing different Level of Service ranges varies but the assessment shows that the station performance at platform level would generally be LoS C or better, with a small percentage of passengers experiencing LoS D in the peak hour. In fact, most passengers will experience LoS A for 80% (PM peak) to 90% (AM peak) of the time.

12.9.198 Therefore, when considering the full assessment across the station, both the concourse and platforms, and both peak hours, the magnitude of impact of the Project on crowding is considered to be negligible to low. The sensitivity of receptors is considered to be low given that most passengers experience LoS C or better. The overall effect on changes in crowding levels for the railway station with the Project are considered **negligible adverse**.

Further mitigation and future monitoring

12.9.199 Further monitoring of GAL's performance against its surface access commitments is set out in the **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3). This monitoring will be ongoing at Gatwick to understand travel patterns and measures will be implemented to further encourage the use of sustainable modes of transport and achieve the committed mode shares. No additional mitigation is proposed other than that adopted as part of the Project (as set out in Section 12.7.3).

Significance of effects

12.9.200 No significant effects have been identified for this assessment year. No further mitigation or monitoring is required, and the significance of effects would therefore remain as presented above.

12.10. Potential changes to the assessment as a result of climate change

12.10.1 Climate change is not considered to have a direct impact on the traffic and transport topics assessed. However, changing travel behaviour in response to climate change concerns is expected to result in a long-term shift to lower emission vehicles and advances in technology which in turn will support improved telecommuting and flexible working. This may reduce the scale of background traffic flows and travel demand during peak hours.

12.10.2 A reduction in vehicle emissions and traffic volumes would result in an improvement for some of the elements of this assessment, such as pedestrian and cyclist amenity and driver delay. A greater demand for public transport could affect capacity and crowding on buses and rail services but it is expected that the frequencies of these services would increase with long-term demand.

12.11. Cumulative effects

Zone of influence

12.11.1 The Zone of Influence for considering cumulative effects related to traffic and transport is the same as that used for the core assessment described in previous sections.

Screening of other developments and plans

12.11.2 The cumulative effects assessment (CEA) takes into account the impact associated with the Project together with other developments and plans. The developments and plans selected as relevant to the CEA presented within this chapter are based upon the results of a screening exercise undertaken as part of shortlisting developments that might need to be considered (see **ES Appendix 20.4.1: Cumulative Effects Assessment Long and Short List** (Doc Ref. 5.3)). Each development on the CEA long list has been considered on a case-by-case basis for scoping in or out of this chapter's assessment based upon data confidence, effect-receptor pathways and the spatial/temporal scales involved.

12.11.3 In undertaking the CEA for the Project, it is important to bear in mind that the likelihood of other developments and plans being constructed varies depending on how far along the planning process they are. For example, relevant developments and plans that are already under construction are likely to contribute to a cumulative impact with the Project (providing impact or spatial pathways exist), whereas developments and plans not yet approved or not yet submitted are less certain to contribute to such an impact, as some may not achieve approval or may not

ultimately be built due to other factors. For this reason, all relevant development and plans considered cumulatively alongside the Project have been allocated into 'Tiers', reflecting their current stage within the planning and development process. Appropriate weight is therefore given to each Tier in the decision-making process when considering the potential cumulative impact associated with the Project (eg it may be considered that greater weight can be placed on the Tier 1 assessment relative to Tier 2 or Tier 3). Further details of the screening process for the inclusion of other developments and plans in the short list and a description of the Tiers are provided in Chapter 20: Cumulative Effects and Inter-relationships.

12.11.4 In line with the Planning Inspectorate guidance in its Advice Note Seventeen (Planning Inspectorate, 2019), the cumulative traffic and transport effects are inherently included in the future baseline scenarios.

12.11.5 Cumulative developments have been considered as part of the strategic transport modelling process (highways and rail) and in accordance with DfT guidance in TAG, an Uncertainty Log (as described in paragraph 12.4.26) was developed with input from local planning and highway authorities which identified all planned development and transport infrastructure projects within the zone of influence (or beyond, if planned infrastructure might be significant enough to affect conditions within the zone of influence). The Uncertainty Log informed the inclusion of schemes within the strategic models. The developments included in the future baseline scenarios have uncertainty levels of 'near certain' or 'more than likely'. This includes developments in the CEA short list (Tiers 1 to 3) which are expected to generate noticeable trips on the highway and rail networks, as well as a range of other developments which are within the wider strategic modelling area (as shown in Diagram 12.4.2). There is also an allowance for background traffic growth using TEMPro incorporated into the strategic modelling work and therefore the approach is considered to be robust.

12.11.6 The strategic highway modelling used for the ES includes background traffic growth based on the latest TEMPro growth factors with adjustments to consider cumulative development. Future year networks have been updated in consultation with National Highways and Local Authorities to reflect the committed schemes for which funding has been secured. The estimates of rail and station crowding for ES also include for background growth in line with Network Rail projections. This is described further in the **Transport Assessment** (Doc Ref. 7.4) and the **Transport Assessment Annex B – Strategic Transport Modelling Report** (Doc Ref. 7.4) contained in the annexes to the TA.

12.11.7 There are three developments within the vicinity of Gatwick that are considered in the Uncertainty Log as 'reasonably foreseeable' and therefore do not form part of the future baselines. This is in keeping with TAG Unit M4 guidance. Local stakeholders have indicated that they wish to understand the potential cumulative traffic and transport impacts related to these specific major developments in the area around the Airport. These comprise those shown in Table 12.11.1. Full details of each of the developments are provided in **ES Appendix 20.4.1: Cumulative Effects Assessment Long and Short List** (Doc Ref. 5.3).

12.11.8 These three developments have been added to the with Project scenarios, based on the best available information about the uses and floorspace proposed for those sites. The developments have been discussed with the local authorities and more information is provided in the **Transport Assessment Annex B – Strategic Transport Modelling Report** (Doc Ref. 7.4), which is annexed to the **Transport Assessment** (Doc Ref. 7.4).

Table 12.11.1 List of other developments and plans considered within CEA

Description of Development/Plan*	Planning Period	Distance from the Project	Date of Construction (if applicable)
Horley Employment Park	Emerging	0.4km	Not known – assumed to be 20% complete in 2029, 50% in 2032 and 100% in 2047 for purposes of assessment
West of Ifield	Emerging	1.5km	Not known – assumed to be 20% complete in 2029, 62%% in 2032 and 100% in 2047 for purposes of assessment
Gatwick Green	Emerging	2.5km	Not known – assumed to be 20% complete in 2029, 50% in 2032 and 100% in 2047 for purposes of assessment

** Other cumulative schemes from the CEA short list and the wider modelling area are considered within the future baselines for Traffic and Transport, in keeping with the Planning Inspectorate Advice Note Seventeen and TAG.*

12.11.9 The cumulative developments listed in Table 12.11.1 have been assessed against the with Project scenarios for the assessment years 2029, 2032 and 2047. In the absence of any anticipated construction methodology of the three schemes and the limited cumulative effects identified in the 2029 and 2032 with Project scenarios, it is not considered necessary to include a cumulative assessment including Horley Employment Park, West of Ifield and Gatwick Green for the Project's construction periods.

Cumulative development scenario: 2029

Severance

12.11.10 The highway flows are contained in **ES Appendix 12.9.1: Highway Flows and Driver Delay Review** (Doc Ref. 5.3). For the purposes of reporting, only the links which have a magnitude of impact of low, medium, and high adverse or beneficial are assessed in this section to focus on potential significant effects. These links and associated flows are shown in Table 12.11.2 for the with Project scenario and Table 12.11.3 for the cumulative development scenario. The net change in traffic flows are shown in Table 12.11.4.

Table 12.11.2: First full year of opening 2029 traffic flows – with Project

ID	Road	AM1			AM2			IP			PM		
		All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV
010	A23 London Road to North Terminal Roundabout	329	12	4%	270	20	7%	381	27	7%	663	17	3%
011	A23 Airport Way to South Terminal Roundabout EB	2045	87	4%	2030	104	5%	1861	105	6%	2194	53	2%
NT6	North Terminal Approach	197	20	10%	188	21	11%	208	25	12%	141	22	16%
cl66	Rusper Road, Hyde Drive	496	12	2%	606	11	2%	308	11	4%	560	10	2%
cy41	Ifield Avenue, Ifield Green-Warren Drive	445	16	4%	645	18	3%	536	23	4%	773	23	3%
rg04	Reigate Hill, Hartington Close-Brokes Road, A217, Reigate	1063	61	6%	925	55	6%	764	73	10%	1094	38	3%

Table 12.11.3: First full year of opening 2029 traffic flows – cumulative development with Project

ID	Road	AM1			AM2			IP			PM		
		All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV
010	A23 London Road to North Terminal Roundabout	434	12	3%	213	9	4%	323	27	8%	640	17	3%
011	A23 Airport Way to South Terminal Roundabout EB	1730	59	3%	1228	35	3%	1692	96	6%	2035	51	3%
NT6	North Terminal Approach	358	22	6%	272	19	7%	215	25	12%	140	22	16%
cl66	Rusper Road, Hyde Drive	303	27	9%	393	28	7%	239	29	12%	394	30	8%
cy41	Ifield Avenue, Ifield Green-Warren Drive	528	32	6%	869	32	4%	693	40	6%	930	34	4%
rg04	Reigate Hill, Hartington Close-Brokes Road, A217, Reigate	1148	62	5%	1207	62	5%	776	73	9%	1110	38	3%

Table 12.11.4: First full year of opening 2029 traffic flows – cumulative development net change (percentage change in brackets)

ID	Road	AM1			AM2			IP			PM		
		All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV
010	A23 London Road to North Terminal Roundabout	105 (32%)	0 (0%)	-1% (-1%)	-57 (-21%)	-11 (-55%)	-3% (-3%)	-58 (-15%)	0 (0%)	1% (1%)	-23 (-3%)	0 (0%)	0% (0%)
011	A23 Airport Way to South Terminal Roundabout EB	-315 (-15%)	-28 (-32%)	-1% (-1%)	-802 (-40%)	-69 (-66%)	-2% (-2%)	-169 (-9%)	-9 (-9%)	0% (0%)	-159 (-7%)	-2 (-4%)	0% (0%)
NT6	North Terminal Approach	161 (82%)	2 (10%)	-4% (-4%)	84 (45%)	-2 (-10%)	-4% (-4%)	7 (3%)	0 (0%)	0% (0%)	-1 (-1%)	0 (0%)	0% (0%)
cl66	Rusper Road, Hyde Drive	-193 (-39%)	15 (125%)	6% (6%)	-213 (-35%)	17 (155%)	5% (5%)	-69 (-22%)	18 (164%)	9% (9%)	-166 (-30%)	20 (200%)	6% (6%)
cy41	Ifield Avenue, Ifield Green-Warren Drive	83 (19%)	16 (100%)	2% (2%)	224 (35%)	14 (78%)	1% (1%)	157 (29%)	17 (74%)	1% (1%)	157 (20%)	11 (48%)	1% (1%)
rg04	Reigate Hill, Hartington Close-Brokes Road, A217, Reigate	85 (8%)	1 (2%)	0% (0%)	282 (30%)	7 (13%)	-1% (-1%)	12 (2%)	0 (0%)	0% (0%)	16 (1%)	0 (0%)	0% (0%)

12.11.12 Table 12.11.4 shows that within the whole study area, only six links will experience a change of more than 30% in traffic as a result of the cumulative developments. The following links are expected to have an increase of 30% to 60% (low impact):

- Link 010: A23 London Road to North Terminal Roundabout (negligible sensitivity) in the AM1 period;
- Link cy41: Ifield Avenue, Ifield Green-Warren Drive (medium sensitivity) in the AM2 period;
- Link rg04: Reigate Hill, Hartington Close-Brokes Road, A217, Reigate (medium sensitivity) in the AM2 period.

12.11.13 The above links would have a **minor adverse** severance effect.

12.11.14 The following link is expected to have an increase of 60% to 90% (medium impact):

- Link 011: North Terminal Approach (negligible sensitivity) in the AM1 period.

12.11.15 The above would mean a **minor adverse** severance effect on the North Terminal Approach.

12.11.16 The following links are expected to have a reduction in traffic of 30% to 60% (low impact):

- Link 011: A23 Airport Way to South Terminal Roundabout (negligible sensitivity) in the AM2 period.
- Link cl66: Rusper Road, Hyde Drive (medium sensitivity) in the AM1, AM2 and PM periods.

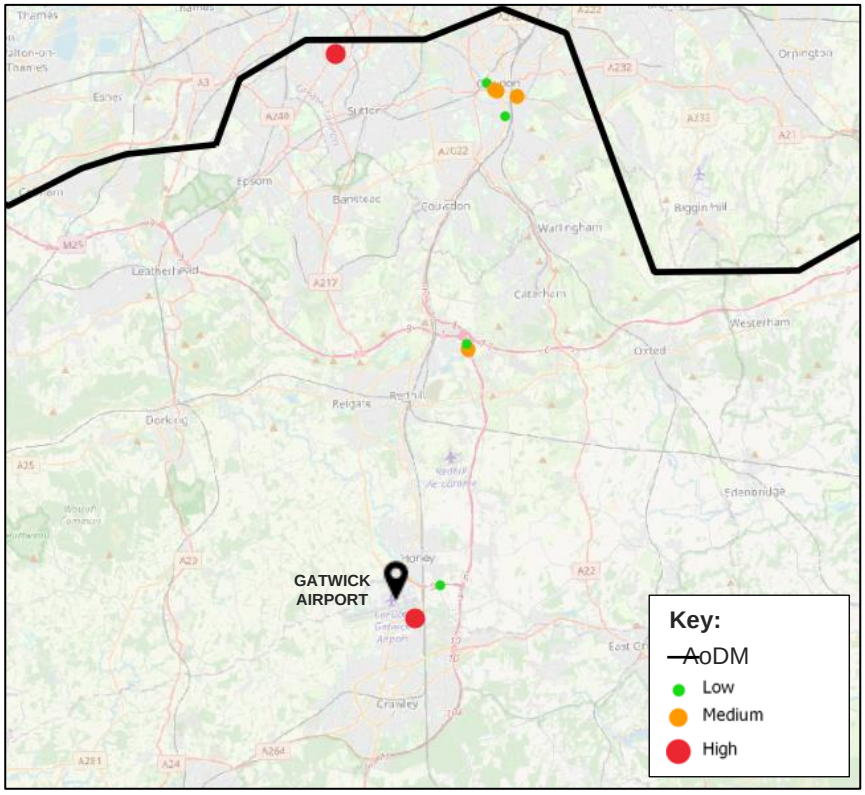
12.11.17 The above links would have a **minor beneficial** severance effect.

12.11.18 All other links will have a change of traffic of less than 30% and therefore the magnitude of impact on severance is considered to be negligible. The sensitivity of the highway links for pedestrians and cyclists range from negligible to high and the overall effect of severance is considered to be **minor adverse**, which is not significant.

Driver delay

12.11.19 Diagram 12.11.1 shows the magnitude of impact for driver delay for junctions where the V/C ratio is over 80%. The diagram shows driver delay for all time periods assessed and any overlaps in colours indicate different magnitudes of impact by time period. The highest magnitude of impact for each junction is considered.

Diagram 12.11.1: 2029 cumulative development magnitude of impact (all assessment time periods)



12.11.20 Diagram 12.11.1 shows that most junctions (over 1,000) have negligible or low magnitude of impact in terms of delay. Car driver and passenger sensitivity is considered to be medium for junctions where the V/C ratio is over 80%. For the junctions with negligible magnitude of impact, the driver delay effect is **negligible**. For those with a low magnitude of impact, the driver delay is **minor adverse**.

12.11.21 There are three junctions with medium and two junctions with high magnitudes of impact. Based on the work undertaken to assess the Project, described in Section 12.9, the junctions in Croydon and Sutton near the AoDM boundary are expected to have been identified because of model noise, causing the reassignment of background traffic along parallel routes with similar journey times in the model, which is behaviour that is considered unlikely to occur in practice. There is moderate impact identified at the M25/M23 junction and a high impact junction identified near the Airport. Without mitigation, the driver delay effect for these junctions would be considered to be **moderate adverse**. However, the promoters of the cumulative schemes would be expected to review and assess the impacts of their schemes in more detail, engage with National Highways and local authorities to determine whether mitigation is required and where necessary provide that mitigation to ensure their development is acceptable as part of the planning process. As such, and assuming the provision of such mitigation, the residual driver delay effect for these junctions would be considered to be **minor adverse**, which is not significant.

Pedestrian and cyclist delay

12.11.22 As shown in Table 12.11.4, there are increases as well as reductions in traffic along a very small number of routes. The levels of traffic change, especially when considered along with the pedestrian and cycle sensitivity for each link, are not expected to cause pedestrian and cyclist

delays. The magnitude of impact for pedestrian and cyclist delay is considered to be negligible. The sensitivity of receptors along the highway routes shown in Table 12.11.4 range from negligible to medium. The effect on pedestrian and cycle delays are expected to be **negligible adverse**.

Pedestrian and cyclist amenity

12.11.23 The threshold for an effect on pedestrian and cyclist amenity is when the traffic flows have doubled. None of the links show a doubling in traffic flow as a result of the cumulative developments.

12.11.24 The traffic composition can also affect pedestrian and cyclist amenity. The traffic flows contained in **ES Appendix 12.9.1: Highway Flows and Driver Delay Review** (Doc Ref. 5.3) shows that the highest increase of 9 percentage points in HGVs (number of HGVs divided by total vehicle number) are expected on Rusper Road (Link ID: cl66) in the IP period. The magnitude of this impact can be considered to be low. The sensitivity along this road is considered to be medium. The effect of the cumulative development on amenity is considered to be **minor adverse**, which is not significant.

12.11.25 For all the other roads, the predicted increase in the percentage of HGVs varies from -4 to +5 percentage points. The magnitude of impact is considered to be negligible to low. The sensitivity of the receptors along these links are considered to be negligible to high. The effect on pedestrian and cyclist amenity on all other roads is considered to be **minor adverse**, which is not significant**.**

Accidents and safety

12.11.26 The changes in the traffic flows are not expected to be significant and no changes to the highway layouts are known as the result of the cumulative schemes. The magnitude of impact is considered to be negligible. The sensitivity of receptors is negligible to high for pedestrians and cyclists, and low to medium for car drivers and passengers. The risk of accidents and safety for all road users is considered to be **negligible adverse**.

Hazardous loads

12.11.27 No changes to traffic routes are known as the result of the cumulative schemes and therefore the effect on hazardous loads is considered to be **no change**.

Effects on public transport amenity

Crowding on rail services

Northbound services

12.11.28 The peak hours for assessment are identified as follows, taken from the line loading profile shown in Diagram 12.9.3:

- Network peak 08:00-09:00, based on the highest line loading for all services at the busiest station (northbound trains passing or departing from Purley).
- Project peak 09:00-10:00, based on the highest line loading as the result of the Project, which for northbound is on departing Gatwick Airport station.

Northbound network peak (08:00-09:00)

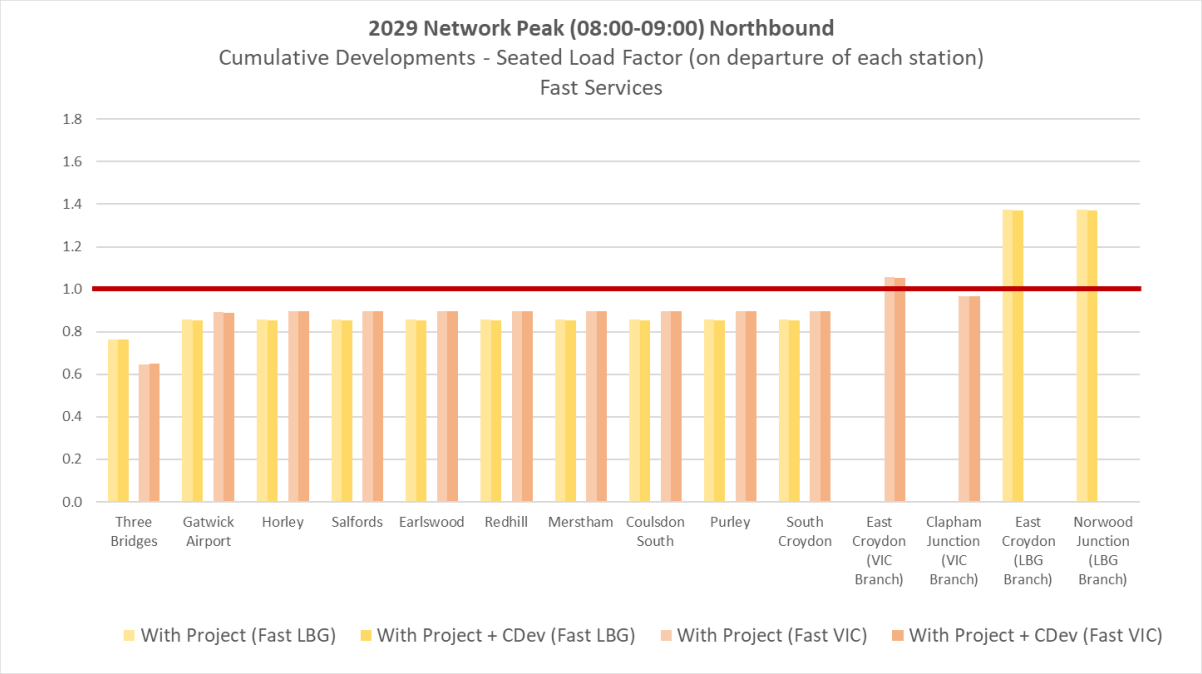
12.11.29 Table 12.11.5 provides a summary of the increase in line loading by station in the northbound direction for the network peak.

Table 12.11.5: 2029 cumulative development percentage change in line loading – northbound network peak (08:00-09:00)

Station	2029 cumulative development network peak northbound (08:00-09:00)							
	Change in line loading on departure				Percentage change			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
Three Bridges	6	6	5	18	0.2%	0.2%	0.8%	0.2%
Gatwick Airport	-8	-11	-1	-20	-0.2%	-0.2%	-0.4%	-0.2%
Horley	-8	-11	-1	-20	-0.2%	-0.2%	-0.4%	-0.2%
Salfords	-8	-11	-1	-20	-0.2%	-0.2%	-0.3%	-0.2%
Earlswood	-8	-11	-1	-20	-0.2%	-0.2%	-0.1%	-0.2%
Redhill	-8	-11	0	-18	-0.2%	-0.2%	0.0%	-0.2%
Merstham	-8	-11	0	-18	-0.2%	-0.2%	0.0%	-0.2%
Coulsdon South	-8	-11	-1	-20	-0.2%	-0.2%	0.0%	-0.1%
Purley	-8	-11	-3	-22	-0.2%	-0.2%	-0.1%	-0.2%
South Croydon	-8	-11	-3	-22	-0.2%	-0.2%	-0.1%	-0.2%
East Croydon (VIC Branch)	0	-10	-1	-11	-	-0.2%	0.0%	-0.1%
Clapham Junction (VIC Branch)	0	-3	0	-3	-	-0.1%	0.0%	0.0%
East Croydon (LBG Branch)	-8	0	-5	-12	-0.1%	-	-0.1%	-0.1%
Norwood Junction (LBG Branch)	-8	0	-4	-12	-0.1%	-	-0.1%	-0.1%

12.11.30 Table 12.11.5 shows that during the network peak hour, the line loadings with the cumulative developments are very similar to those in the with Project scenario. The cumulative development contributes an additional 18 passengers in the northbound direction. This is less than 1% on all services. To assess the impact on crowding, Diagram 12.11.2 shows the Seated Load Factor assessment and Table 12.11.6 shows the standing capacity occupied.

Diagram 12.11.2: 2029 cumulative development northbound network peak Seated Load Factor



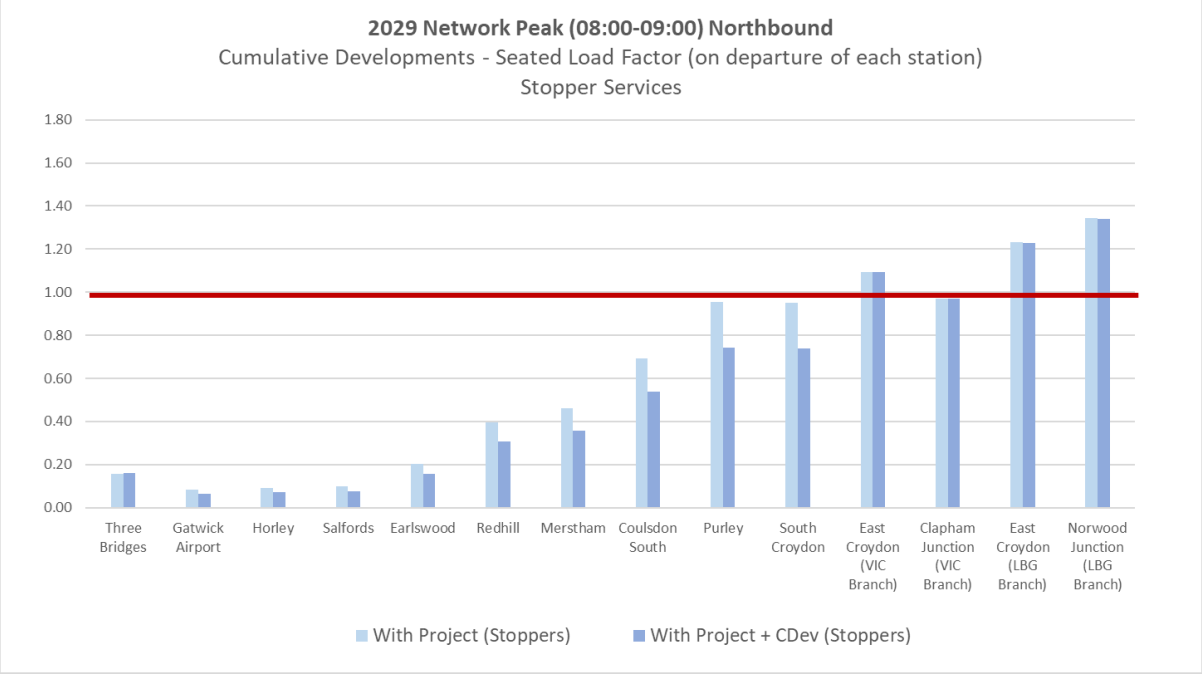


Table 12.11.6: 2029 cumulative development northbound network peak standing capacity assessment (08:00-09:00)

Station	2029 cumulative development network peak northbound – percentage of standing capacity occupied							
	2029 with Project				2029 cumulative development (% point change)			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
East Croydon (VIC Branch)	-	9.3%	15.6%	10.2%	- (-)	9.0% (-0.3%)	15.5% (-0.1%)	10.2% (0.0%)
East Croydon (LBG Branch)	28.0%	-	14.2%	22.7%	27.9% (-0.1%)	- (-)	14.1% (-0.1%)	22.7% (0.0%)
Norwood Junction (LBG Branch)	28.0%	-	21.1%	25.3%	27.9% (-0.1%)	- (-)	21.0% (-0.1%)	25.3% (0.0%)

12.11.31 Diagram 12.11.2 shows that seating capacity is exceeded leaving East Croydon (both Victoria and London Bridge branches) and Northwood Junction for all services. Table 12.11.6 shows the highest percentage of standing capacity occupied is approximately 28% with and without the cumulative developments.

Northbound project peak (09:00-10:00)

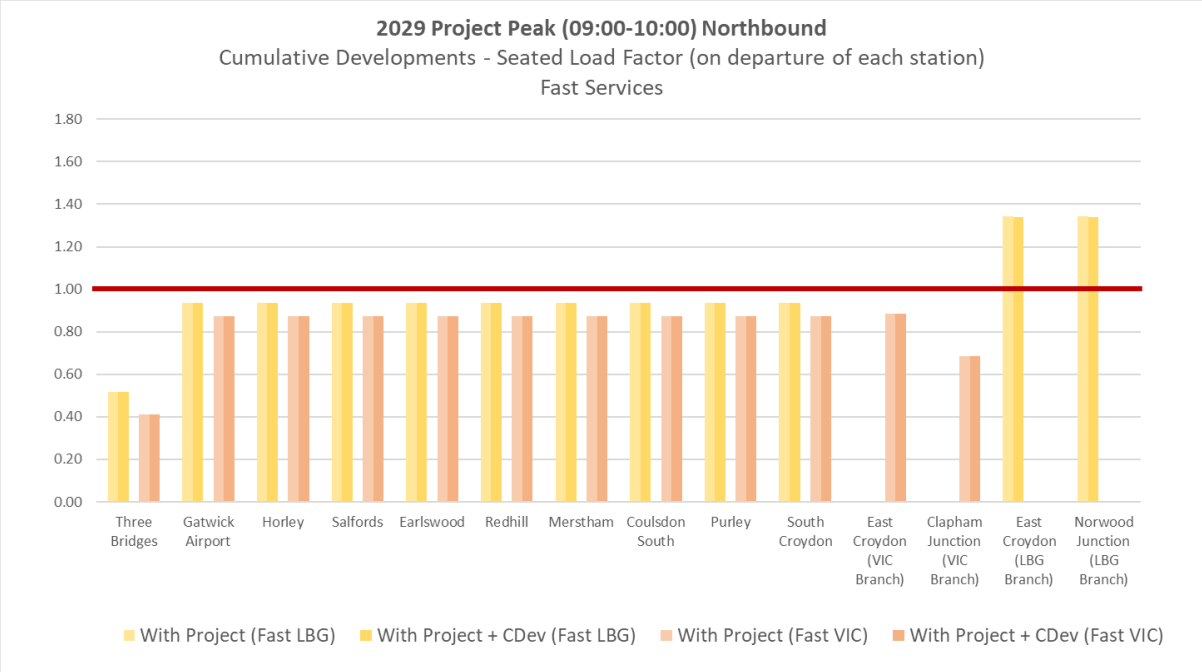
12.11.32 Table 12.11.7 provides a summary of the increase in line loading by station in the northbound direction for the Project peak.

Table 12.11.7: 2029 cumulative development percentage change in line loading – northbound project peak (09:00-10:00)

Station	2029 cumulative development project peak northbound (09:00-10:00)							
	Change in line loading on departure				Percentage change			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
Three Bridges	0	1	1	1	0.0%	0.0%	0.1%	0.0%
Gatwick Airport	0	1	1	2	0.0%	0.0%	0.2%	0.0%
Horley	0	1	1	2	0.0%	0.0%	0.2%	0.0%
Salfords	0	1	1	2	0.0%	0.0%	0.2%	0.0%
Earlswood	0	1	1	2	0.0%	0.0%	0.2%	0.0%
Redhill	0	1	1	2	0.0%	0.0%	0.1%	0.0%
Merstham	0	1	1	2	0.0%	0.0%	0.1%	0.0%
Coulsdon South	0	1	1	2	0.0%	0.0%	0.1%	0.0%
Purley	0	1	0	1	0.0%	0.0%	0.0%	0.0%
South Croydon	0	1	0	1	0.0%	0.0%	0.0%	0.0%
East Croydon (VIC Branch)	0	0	0	0	-	0.0%	0.0%	0.0%
Clapham Junction (VIC Branch)	0	0	0	0	-	0.0%	0.0%	0.0%
East Croydon (LBG Branch)	-1	0	-1	-2	0.0%	-	0.0%	0.0%
Norwood Junction (LBG Branch)	-1	0	-1	-2	0.0%	-	0.0%	0.0%

12.11.33 Table 12.11.7 shows that during the project peak hour, the cumulative development contributes an additional two passengers in the northbound direction. The increase is about 0.2% in passengers on the stopping services. To assess the impact on crowding, Diagram 12.11.3 shows the Seated Load Factor assessment and Table 12.11.8 shows the standing capacity occupied.

Diagram 12.11.3: 2029 cumulative development northbound project peak Seated Load Factor



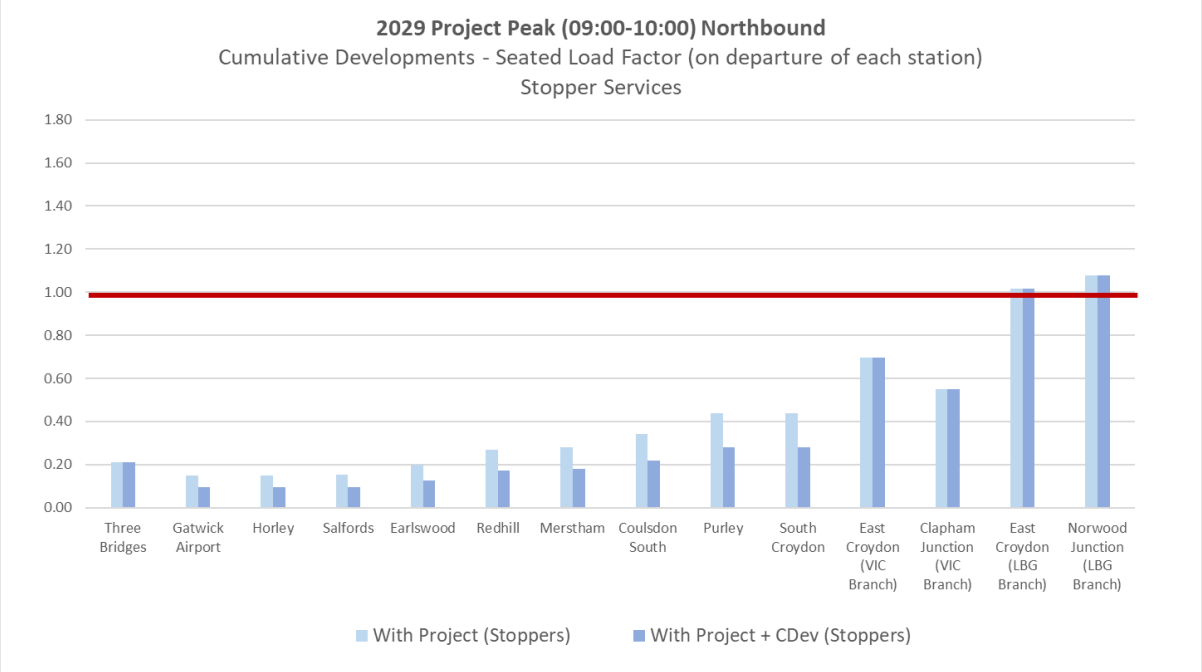


Table 12.11.8: 2029 cumulative development northbound project peak standing capacity assessment (09:00-10:00)

Station	2029 cumulative development project peak northbound – percentage of standing capacity occupied							
	2029 with Project				2029 cumulative development (% point change)			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
East Croydon (LBG Branch)	23.7%	-	1.1%	10.1%	23.6% (0.0%)	- (-)	1.1% (0.0%)	10.1% (0.0%)
Norwood Junction (LBG Branch)	23.7%	-	4.8%	12.3%	23.6% (0.0%)	- (-)	4.8% (0.0%)	12.3% (0.0%)

12.11.1 Diagram 12.11.3 shows that seating capacity is exceeded leaving East Croydon (London Bridge branch) and Norwood Junction. Table 12.11.8 shows the highest percentage of standing capacity occupied is approximately 24% with and without the cumulative developments.

Southbound services

12.11.2 The peak hours for assessment are identified as follows, taken from the line loading profile shown in Diagram 12.9.6:

- Network peak 17:00-18:00, based on the highest line loading for all services at the busiest station (trains departing southbound from East Croydon).
- Project peak 08:00-09:00, based on the highest line loading as the result of the Project, which for southbound is on departing or passing Horley station.

Southbound network peak (17:00-18:00)

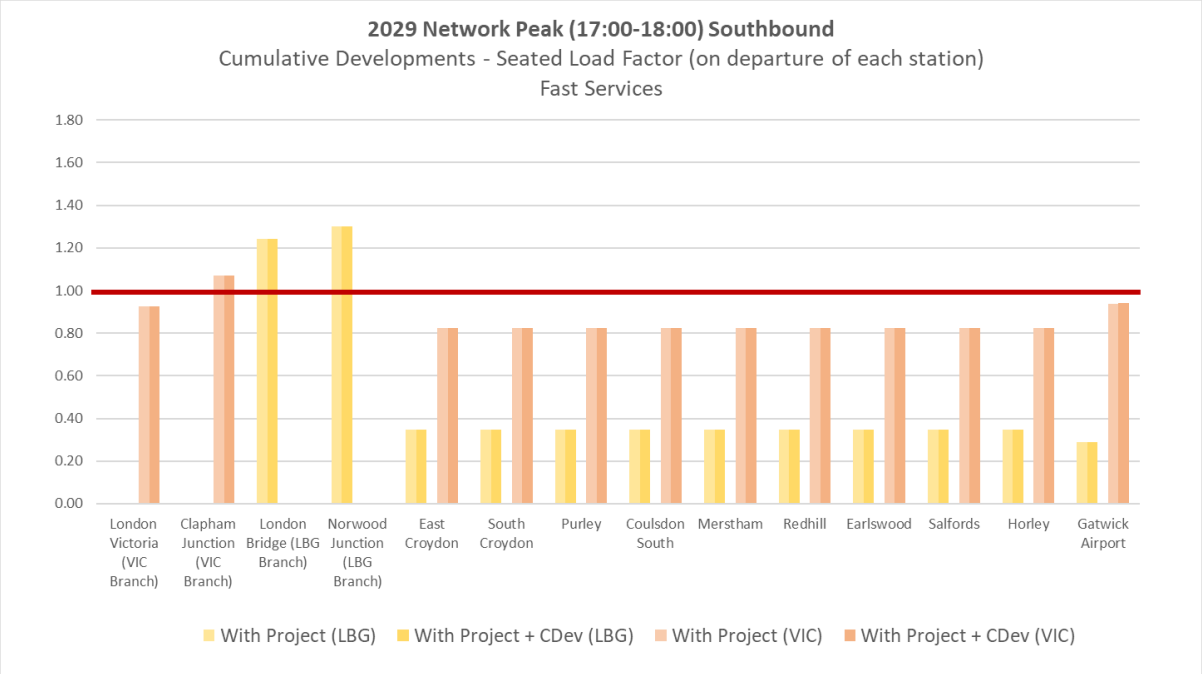
12.11.3 Table 12.11.9 provides a summary of the increase in line loading by station in the southbound direction for the network peak.

Table 12.11.9: 2029 cumulative development percentage change in line loading – southbound network peak

Station	2029 cumulative development network peak southbound (17:00-18:00)							
	Change in line loading on departure				Percentage change			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
London Victoria (VIC Branch)	0	-2	0	-2	-	0.0%	-	0.0%
Clapham Junction (VIC Branch)	0	-3	0	-3	-	0.0%	-	0.0%
London Bridge (LBG Branch)	-1	0	-2	-2	0.0%	-	0.0%	0.0%
Norwood Junction (LBG Branch)	-1	0	-2	-3	0.0%	-	0.0%	0.0%
East Croydon	1	-1	-1	-1	0.0%	0.0%	0.0%	0.0%
South Croydon	1	-1	-1	-1	0.0%	0.0%	0.0%	0.0%
Purley	1	-1	1	1	0.0%	0.0%	0.0%	0.0%
Coulsdon South	1	-1	1	1	0.0%	0.0%	0.1%	0.0%
Merstham	1	-1	1	1	0.0%	0.0%	0.1%	0.0%
Redhill	1	-1	1	1	0.0%	0.0%	0.2%	0.0%
Earlswood	1	-1	1	1	0.0%	0.0%	0.2%	0.0%
Salfords	1	-1	1	1	0.0%	0.0%	0.2%	0.0%
Horley	1	-1	1	1	0.0%	0.0%	0.2%	0.0%
Gatwick Airport	3	6	1	10	0.1%	0.1%	0.1%	0.1%

12.11.4 Table 12.11.9 shows that during the network peak hour, the cumulative developments contribute an additional ten passengers in the southbound direction and the line loadings are generally very similar to the with Project scenario. This represents around a 0.2% increase in passengers on all services. To assess the impact on crowding, Diagram 12.11.4 shows the Seated Load Factor assessment and Table 12.11.10 shows the standing capacity assessment.

Diagram 12.11.4: 2029 cumulative development southbound network peak Seated Load Factor



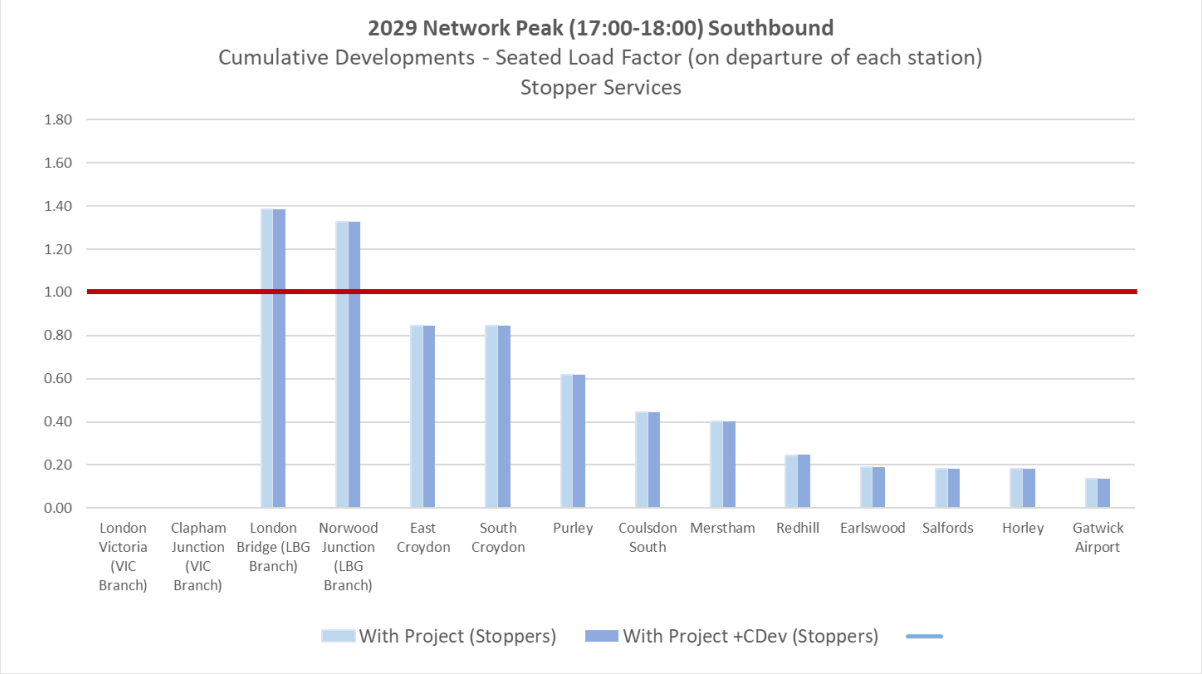


Table 12.11.10: 2029 cumulative development southbound network peak standing capacity assessment (17:00-18:00)

Station	2029 cumulative development network peak southbound – percentage of standing capacity occupied							
	2029 with Project				2029 cumulative development (% point change)			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
Clapham Junction (VIC Branch)	-	11.5%	-	-	0.0% (-)	11.4% (-0.1%)	0.0% (-)	- (-)
London Bridge (LBG Branch)	16.5%	-	23.7%	19.0%	16.5% (0.0%)	- (-)	23.6% (0.0%)	19.0% (0.0%)
Norwood Junction (LBG Branch)	20.4%	-	20.0%	20.3%	20.4% (0.0%)	- (-)	20.0% (0.0%)	20.3% (0.0%)

12.11.5 Diagram 12.11.4 shows that seating capacity is exceeded leaving Clapham Junction, London Bridge and Norwood Junction in the southbound network peak. Table 12.11.10 shows the highest percentage of standing capacity occupied is approximately 24% on the stopping services, with and without the cumulative developments.

Southbound project peak (08:00-09:00)

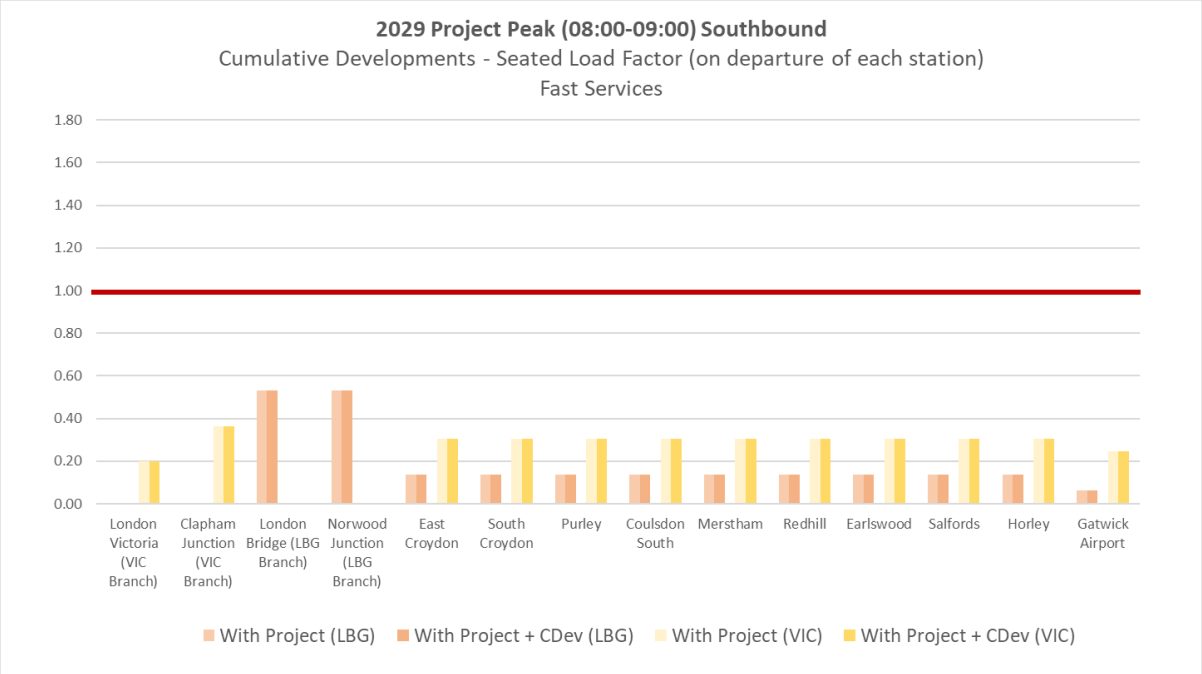
12.11.6 Table 12.11.11 provides a summary of the increase in line loading by station in the southbound direction for the Project peak.

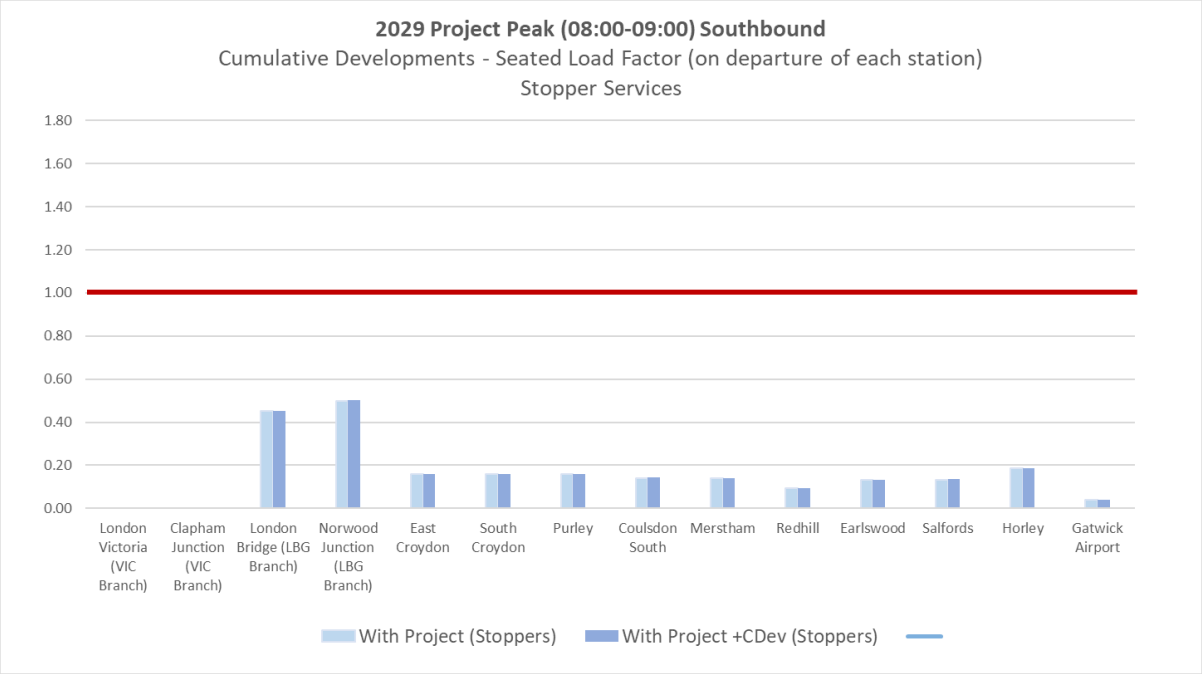
Table 12.11.11: 2029 cumulative development percentage change in line loading – southbound project peak (08:00-09:00)

Station	2029 cumulative development project peak southbound (08:00-09:00)							
	Change in line loading on departure				Percentage change			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
London Victoria (VIC Branch)	0	4	0	4	-	0.3%	-	0.4%
Clapham Junction (VIC Branch)	0	6	0	6	-	0.3%	-	0.3%
London Bridge (LBG Branch)	2	0	0	2	0.1%	-	0.0%	0.0%
Norwood Junction (LBG Branch)	2	0	1	3	0.1%	-	0.1%	0.1%
East Croydon	7	8	1	16	0.5%	0.5%	0.2%	0.4%
South Croydon	7	8	1	16	0.5%	0.5%	0.2%	0.4%
Purley	7	8	1	16	0.5%	0.5%	0.2%	0.4%
Coulsdon South	7	8	1	16	0.5%	0.5%	0.3%	0.5%
Merstham	7	8	1	16	0.5%	0.5%	0.3%	0.5%
Redhill	7	8	2	17	0.5%	0.5%	0.7%	0.5%
Earlswood	7	8	2	17	0.5%	0.5%	0.6%	0.4%
Salfords	7	8	2	17	0.5%	0.5%	0.5%	0.4%
Horley	7	8	3	18	0.5%	0.5%	0.5%	0.4%
Gatwick Airport	0	-3	-1	-4	0.0%	-0.2%	-0.7%	-0.3%

12.11.7 Table 12.11.11 shows that during the project peak hour, the cumulative developments contribute an additional 18 passengers in the southbound direction and generally the line loadings are similar to those in the with Project scenario. Most of these passengers are expected to use the fast train services from London Victoria and London Bridge. This represents around a 0.5% increase in passengers on the fast services, and approximately 0.7% on the stopping services. To assess the impact on crowding, Diagram 12.11.5 shows the Seated Load Factor assessment.

Diagram 12.11.5: 2029 cumulative development southbound project peak Seated Load Factor





12.11.8 Diagram 12.11.5 shows that seating capacity is not exceeded on any of the services and therefore no crowding issues are expected.

Summary on rail crowding

12.11.9 A summary of rail crowding by peak hour and direction is as follows:

- **Northbound** – The line loadings with the cumulative developments are generally very similar to those in the with Project scenario. The highest increase in line loading as a result of the cumulative developments is 0.2% (during the Project peak). There is seating capacity available in both network and project peaks until East Croydon and Norwood Junction. The highest percentage of standing capacity occupied on fast train services during the network peak is 27.9% (with cumulative development), indicating busy trains into London but with plenty of spare standing capacity available. The cumulative developments account for less than a 0.1 percentage point increase in standing capacity during the network peak which represents a negligible magnitude of impact.
- **Southbound** – The highest increase in line loading as a result of the cumulative developments is 0.7% (during the project peak). There is seating capacity available in the project peak, and the percentage of standing capacity occupied on stopping train services is around 23.6% in the network peak, indicating busy trains out of London. The cumulative developments account for less than a 0.1 percentage point increase in standing capacity which represents a negligible magnitude of impact.

12.11.10 The overall magnitude of impact is considered to be low and the sensitivity of receptors in terms of public transport capacity is considered to be low to medium. Any effects to changes in crowding levels for 2029 are therefore anticipated to be **minor adverse**, which is not significant.

Cumulative development scenario: 2032

Severance

12.11.11 The highway flows are contained in **ES Appendix 12.9.1: Highway Flows and Driver Delay Review** (Doc Ref. 5.3). For the purposes of reporting, only the links which have a magnitude of impact of low, medium, and high adverse or beneficial are assessed in this section to focus on potential significant effects. These links and associated flows are shown in Table 12.11.12 for the with Project scenario and Table 12.11.13 for the cumulative development scenario. The net change in traffic flows are shown in Table 12.11.14.

Table 12.11.12: Interim assessment year 2032 traffic flows – with Project

ID	Road	AM1			AM2			IP			PM		
		All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV
010	A23 London Road to North Terminal Roundabout	329	12	4%	270	20	7%	381	27	7%	663	17	3%
011	A23 Airport Way to South Terminal Roundabout EB	2045	87	4%	2030	104	5%	1861	105	6%	2194	53	2%
NT6	North Terminal Approach	197	20	10%	188	21	11%	208	25	12%	141	22	16%
cl66	Rusper Road, Hyde Drive	496	12	2%	606	11	2%	308	11	4%	560	10	2%
cy41	Ifield Avenue, Ifield Green-Warren Drive	445	16	4%	645	18	3%	536	23	4%	773	23	3%
rg04	Reigate Hill, Hartington Close-Brokes Road, A217, Reigate	1063	61	6%	925	55	6%	764	73	10%	1094	38	3%

Table 12.11.13: Interim assessment year 2032 traffic flows – cumulative development with Project

ID	Road	AM1			AM2			IP			PM		
		All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV
010	A23 London Road to North Terminal Roundabout	155	9	6%	189	8	4%	113	19	17%	449	11	2%
012	M23 Spur to South Terminal Roundabout WB	1851	4	0%	1957	3	0%	1208	12	1%	884	11	1%
NT3	Northgate Road	580	121	21%	464	123	27%	353	114	32%	317	75	24%
cl96	Tangmere Road, Ifield Drive-Rusper Road	310	38	12%	470	41	9%	375	34	9%	468	33	7%
cy41	Ifield Avenue, Ifield Green-Warren Drive	644	30	5%	962	30	3%	857	53	6%	967	29	3%
cy53	Jarvis Road, Croydon	200	6	3%	201	5	2%	186	2	1%	48	0	0%

Table 12.11.14: Interim assessment year 2032 traffic flows – net change (percentage change in brackets)

ID	Road	AM1			AM2			IP			PM		
		All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV
010	A23 London Road to North Terminal Roundabout	48 (45%)	0 (0%)	-3% (-3%)	88 (87%)	-9 (-53%)	-13% (-13%)	0 (0%)	-1 (-5%)	-1% (-1%)	-30 (-6%)	0 (0%)	0% (0%)
012	M23 Spur to South Terminal Roundabout WB	411 (29%)	0 (0%)	0% (0%)	521 (36%)	-4 (-57%)	0% (0%)	192 (19%)	3 (33%)	0% (0%)	77 (10%)	1 (10%)	0% (0%)
NT3	Northgate Road	64 (12%)	16 (15%)	1% (1%)	38 (9%)	25 (26%)	4% (4%)	6 (2%)	12 (12%)	3% (3%)	-47 (-13%)	11 (17%)	6% (6%)
cl96	Tangmere Road, Ifield Drive-Rusper Road	84 (37%)	13 (52%)	1% (1%)	118 (34%)	12 (41%)	0% (0%)	143 (62%)	11 (48%)	-1% (-1%)	78 (20%)	11 (50%)	1% (1%)
cy41	Ifield Avenue, Ifield Green-Warren Drive	152 (31%)	15 (100%)	2% (2%)	269 (39%)	14 (88%)	1% (1%)	267 (45%)	27 (104%)	2% (2%)	167 (21%)	7 (32%)	0% (0%)
cy53	Jarvis Road, Croydon	-54 (-21%)	-3 (-33%)	-1% (-1%)	169 (528%)	5 (inf)	2% (2%)	2 (1%)	0 (0%)	0% (0%)	1 (2%)	0 (0%)	0% (0%)

12.11.12 The above shows that, within the whole study area, only six links will experience a change of more than 30% in traffic as a result of the cumulative developments.

12.11.13 The following links are expected to have an increase of 30% to 60% (low impact):

- Link 012: M23 Spur to South Terminal Roundabout WB (negligible sensitivity) in the AM1 and IP period.
- Link cy41: Ifield Avenue, Ifield Green-Warren Drive (medium sensitivity) in the AM1, AM2 and IP period.

12.11.14 The above links would have a **minor adverse** severance effect.

12.11.15 The following link is expected to have an increase of 60% to 90% (medium impact):

- Link 010: A23 London Road to North Terminal Roundabout (negligible sensitivity) in the AM1 and AM2 periods.
- Link cl96: Tangmere Road, Ifield Drive-Rusper Road (medium sensitivity) in the IP period.

12.11.16 The above would mean a **minor adverse** severance effect on the A23 London Road to North Terminal Roundabout, and **moderate adverse** severance effect on Tangmere Road, Ifield Drive-Rusper Road, without further mitigation.

12.11.17 The following link is expected to have an increase of more than 90% (high impact):

- Link cy53: Jarvis Road, Croydon (medium sensitivity) in the AM2 periods.

12.11.18 The above would mean a **moderate adverse** severance effect on Jarvis Road, Croydon without further mitigation. As explained in Section 12.9, the Croydon area has been identified as an area with model noise.

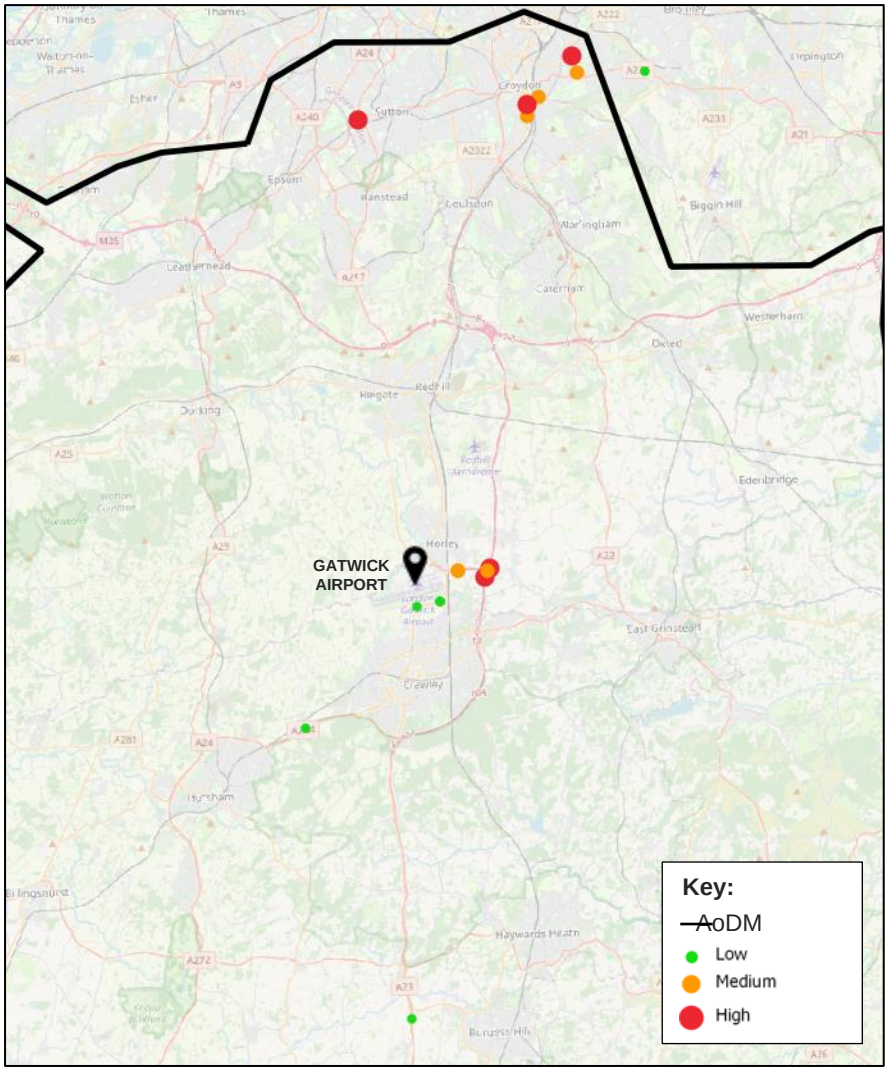
12.11.19 The moderate adverse effects identified above could be considered significant, but the promoters of the cumulative schemes would be expected to assess the impact of those schemes and offer mitigation where required, and the residual effect could be considered to be **minor adverse**, which is not significant.

12.11.20 All other links will have a change of traffic of less than 30% and therefore the magnitude of impact on severance is considered to be negligible. The sensitivity of the highway links for pedestrians and cyclists range from negligible to high and the overall effect of severance is considered to be **minor adverse**, which is not significant.

Driver delay

12.11.21 Diagram 12.11.6 shows the magnitude of impact for driver delay for junctions where the V/C ratio is over 80%. The diagram shows driver delay for all time periods assessed and any overlaps in colours indicate different magnitudes of impact by time period. The highest magnitude of impact for each junction is considered.

Diagram 12.11.6: 2032 cumulative development driver delay magnitude of impact (all assessment time periods)



12.11.22 Diagram 12.11.6 shows that most junctions (over 1,000) have negligible or low magnitude of impact in terms of delay. Car driver and passenger sensitivity is considered to be medium for junctions where the V/C ratio is over 80%. For the junctions with negligible magnitude of impact, the driver delay effect is **negligible**. For those with a low magnitude of impact, the driver delay is **minor adverse**.

12.11.23 There are six junctions with medium and five junctions with high magnitudes of impact as a result of the cumulative developments. Based on the work undertaken to assess the Project, described in Section 12.9, the junctions in Croydon and Sutton near the AoDM boundary are expected to have been identified because of model noise causing the reassignment of background traffic along parallel routes with similar journey times in the model, which is behaviour that is considered unlikely to occur in practice. There are moderate and high impacts identified at M23 Junction 9 and on the South Terminal junction identified near Gatwick Airport. Without mitigation, the driver delay effect for these junctions would be considered to be **moderate adverse**. However, the promoters of the cumulative schemes would be expected to review and assess the impacts of their schemes in more detail, engage with National Highways and local authorities to determine whether mitigation is required and where necessary provide that mitigation to ensure that

their development is acceptable as part of the planning process. As such, and assuming the provision of such mitigation, the residual driver delay effect for these junctions would be considered to be **minor adverse**, which is not significant.

Pedestrian and cyclist delay

12.11.24 As shown in Table 12.11.14, the levels of traffic change, especially when considered along with the pedestrian and cycle sensitivity for each link and the total traffic flows with the cumulative developments (Table 12.11.13), are not expected to cause pedestrian and cyclist delays. The magnitude of impact for pedestrian and cyclist delay is considered to be negligible. The sensitivity of receptors along the highway routes shown in Table 12.11.4 ranges from negligible to medium. The effect on pedestrian and cycle delays are expected to be **negligible adverse**.

Pedestrian and cyclist amenity

12.11.25 The threshold for an effect on pedestrian and cyclist amenity is when the traffic flows have doubled. As shown in **ES Appendix 12.9.1: Highway Flows and Driver Delay Review** (Doc Ref. 5.3), Jarvis Road, Croydon (Link ID: cy53) is expected to experience a doubling or more in flows as a result of the cumulative developments. The magnitude of impact on this link is considered to be medium. The sensitivity of this link is considered as medium in terms of pedestrians and cyclists. The effect of the cumulative development scenario on pedestrian and cyclist amenity could be considered to be **moderate adverse** for Jarvis Road, Croydon. However, the Croydon area has been identified as an area with model noise, as explained in Section 12.9, and as above, the promoters of the cumulative schemes would be expected to assess the impact of their schemes and provide further mitigation where required by the planning process. The residual effect could therefore be considered to be **minor adverse.**

12.11.26 The traffic composition can also affect pedestrian and cyclist amenity. The traffic flows contained in **ES Appendix 12.9.1: Highway Flows and Driver Delay Review** (Doc Ref. 5.3) shows that the highest increase of six percentage points in HGVs (number of HGVs divided by total vehicle number) is expected on A2011 Crawley Avenue Slipper Road, Balcombe Road-Crawley Avenue (Link ID: hl03) at the AM2 period. The magnitude of this impact can be considered as low. The sensitivity along this road is considered to be low. The effect of the cumulative development scenario on amenity is considered to be **negligible**.

12.11.27 For all the other roads, the predicted increase in the percentage of HGVs varies between -13 and 5 percentage points. The magnitude of impact is considered to be negligible to low. The sensitivity of the receptors along these links is considered to be negligible to high. The effect on pedestrian and cyclist amenity on all other roads is considered to be **minor adverse**, which is not significant**.**

Accidents and safety

12.11.28 The changes in the traffic flows are not expected to be significant and no changes to the highway layouts are proposed. The magnitude of impact is considered to be negligible. The sensitivity of receptors is negligible for high for pedestrians and cyclists, and low to medium for car drivers and passengers. The risk of accidents and safety for all road users is considered to be **negligible adverse**.

Hazardous loads

12.11.29 No changes to traffic routes are known as the result of the cumulative schemes and therefore the effect on hazardous loads is considered to be **no change**.

Effects on public transport amenity

Crowding on rail services

Northbound services

12.11.30 The peak hours for assessment are identified as follows, taken from the line loading profile shown in Diagram 12.9.15:

- Network peak 08:00-09:00, based on the highest line loading for all services at the busiest station (northbound trains passing or departing from Purley).
- Project peak 18:00-19:00, based on the highest line loading as the result of the Project, which for northbound is on departing Gatwick Airport station.

Northbound network peak (08:00-09:00)

12.11.31 Table 12.11.15 provides a summary of the increase in line loading by station in the northbound direction for the network peak.

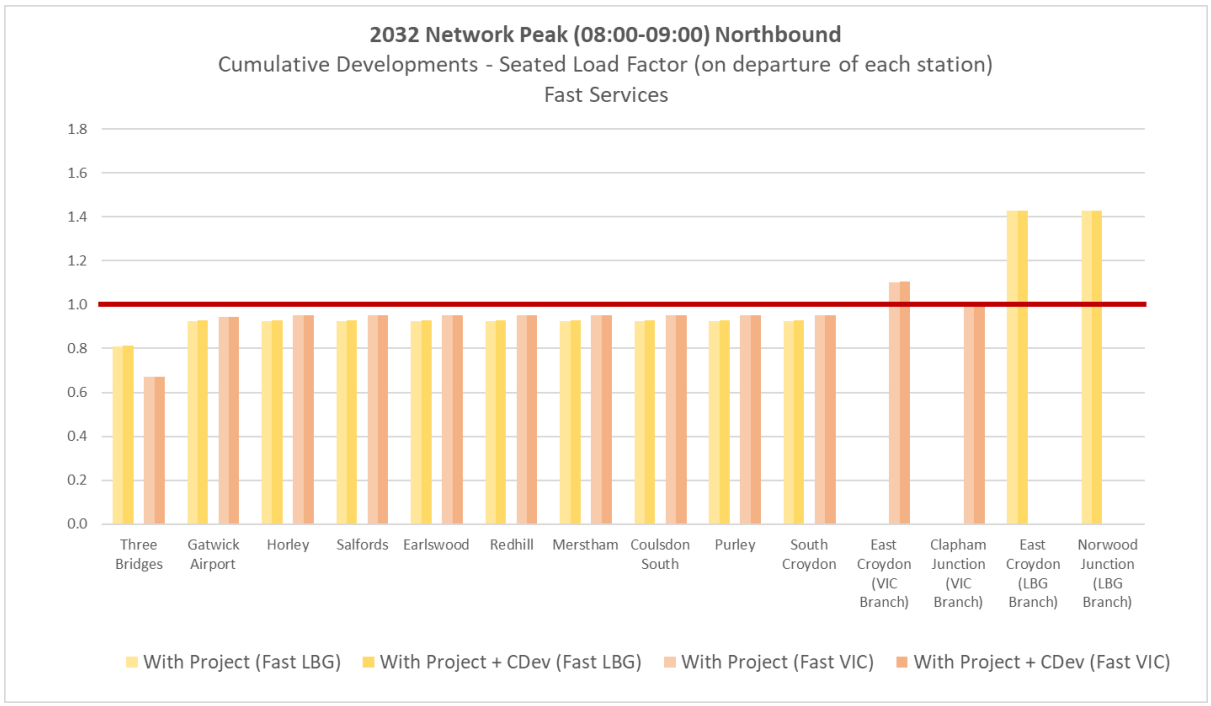
Table 12.11.15: 2032 cumulative development percentage change in line loading – northbound network peak (08:00-09:00)

Station	2032 cumulative development network peak northbound (08:00-09:00)							
	Change in line loading on departure				Percentage change			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
Three Bridges	21	11	9	41	0.5%	0.3%	1.3%	0.5%
Gatwick Airport	20	8	2	31	0.4%	0.2%	0.6%	0.3%
Horley	20	8	2	31	0.4%	0.2%	0.5%	0.3%
Salfords	20	8	2	31	0.4%	0.2%	0.5%	0.3%
Earlswood	20	8	2	31	0.4%	0.2%	0.3%	0.3%
Redhill	20	8	4	32	0.4%	0.2%	0.2%	0.3%
Merstham	20	8	4	32	0.4%	0.2%	0.2%	0.3%
Coulsdon South	20	8	5	33	0.4%	0.2%	0.2%	0.2%
Purley	20	8	6	34	0.4%	0.2%	0.1%	0.2%
South Croydon	20	8	5	34	0.4%	0.2%	0.1%	0.2%
East Croydon (VIC Branch)	0	9	2	11	-	0.1%	0.1%	0.1%
Clapham Junction (VIC Branch)	0	5	1	6	-	0.1%	0.0%	0.1%
East Croydon (LBG Branch)	8	0	4	12	0.1%	-	0.1%	0.1%

Station	2032 cumulative development network peak northbound (08:00-09:00)							
	Change in line loading on departure				Percentage change			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
Norwood Junction (LBG Branch)	8	0	5	13	0.1%	-	0.1%	0.1%

12.11.32 Table 12.11.15 shows that during the network peak hour, the cumulative development contributes an additional 34 passengers in the northbound direction. The increase in passengers is around 0.5% for fast services and 1.3% on stopping services. To assess the impact on crowding, Diagram 12.11.7 shows the Seated Load Factor assessment and Table 12.11.16 shows the standing capacity occupied.

Diagram 12.11.7: 2032 cumulative development northbound network peak Seated Load Factor



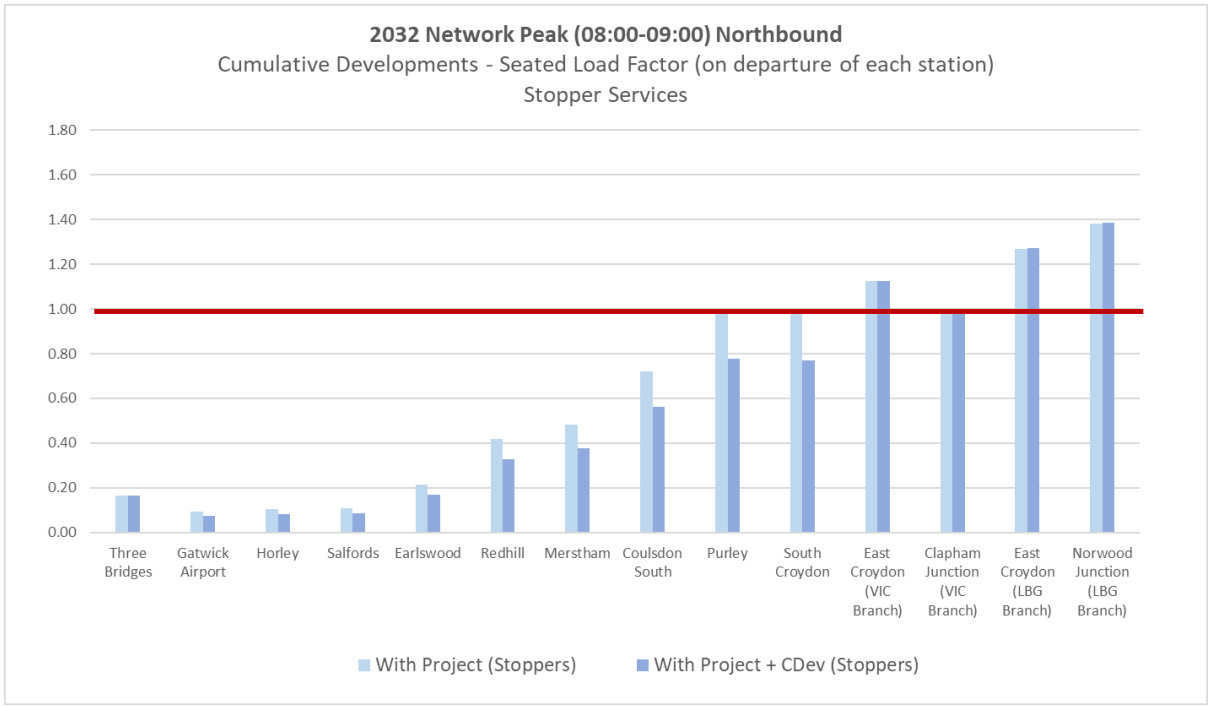


Table 12.11.16: 2032 cumulative development northbound network peak standing capacity assessment (08:00-09:00)

Station	2032 cumulative development network peak northbound – percentage of standing capacity occupied							
	2032 with Project				2032 cumulative development (% point change)			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
East Croydon (VIC Branch)	-	16.8%	21.0%	17.8%	- (-)	17.0% (0.3%)	21.2% (0.2%)	17.8% (0.0%)
East Croydon (LBG Branch)	32.1%	-	16.6%	26.3%	32.2% (0.1%)	- (-)	16.7% (0.1%)	26.3% (0.0%)
Norwood Junction (LBG Branch)	32.1%	-	23.5%	28.9%	32.2% (0.1%)	- (-)	23.6% (0.1%)	28.9% (0.0%)

12.11.33 Diagram 12.11.7 shows that seating capacity is exceeded leaving East Croydon (Victoria and London Bridge branches) and at Norwood Junction. Table 12.11.16 shows the highest percentage of standing capacity occupied is 32.1%, which occurs at East Croydon (London Bridge branch) and Norwood Junction. The cumulative developments will not significantly increase the percentage of standing capacity occupied when compared with the with Project scenario in 2032, with the highest increase being 0.3 percentage points on the fast services into London Victoria.

Northbound project peak (18:00-19:00)

12.11.34 Table 12.11.17 provides a summary of the increase in line loading by station in the northbound direction for the Project peak.

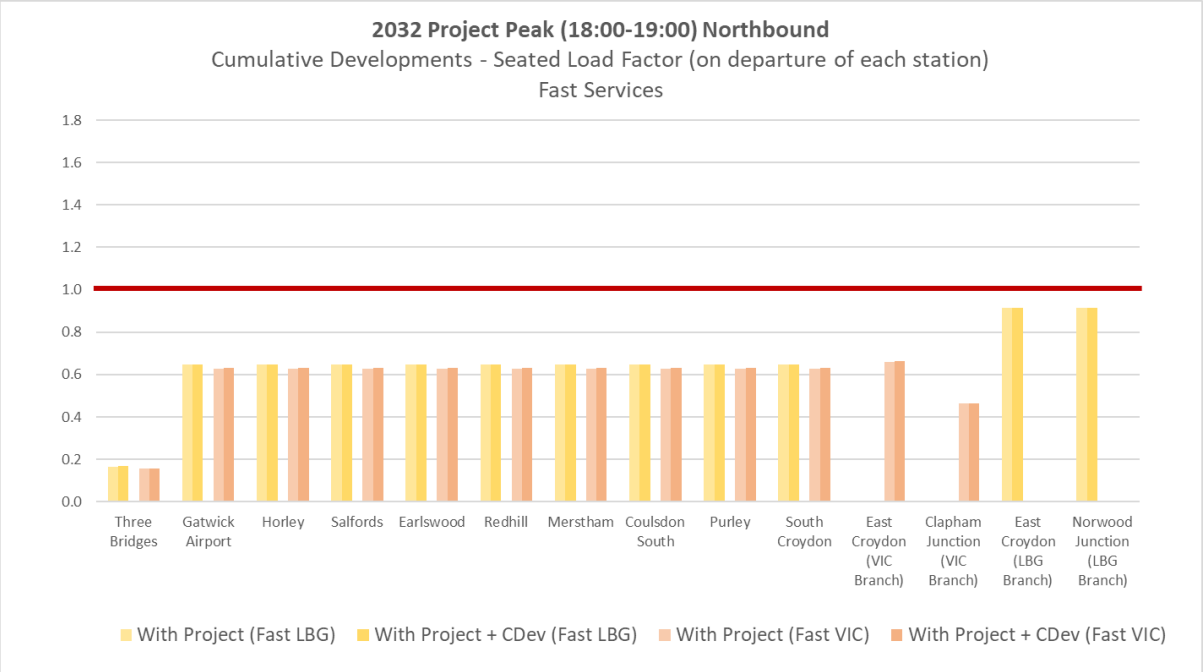
Table 12.11.17: 2032 cumulative development percentage change in line loading – northbound project peak (18:00-19:00)

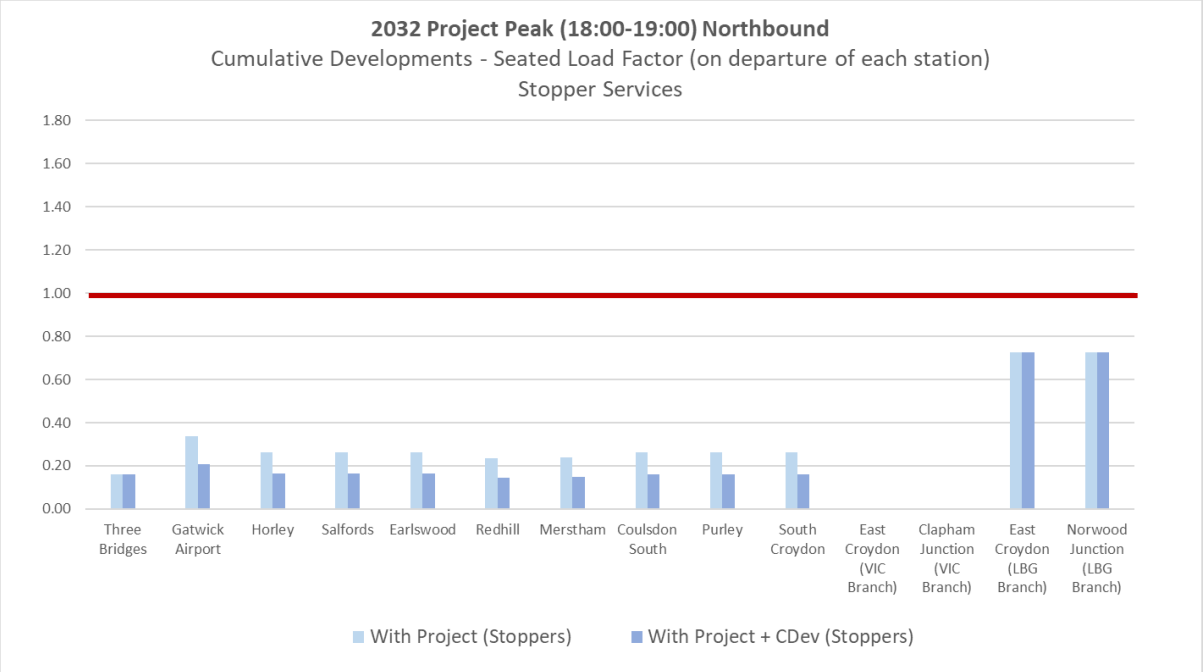
Station	2032 cumulative development project peak northbound (18:00-19:00)							
	Change in line loading on departure				Percentage change			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
Three Bridges	1	2	1	3	0.1%	0.2%	0.3%	0.2%
Gatwick Airport	4	10	1	15	0.2%	0.2%	0.3%	0.3%
Horley	4	10	1	15	0.2%	0.2%	0.3%	0.3%
Salfords	4	10	1	15	0.2%	0.2%	0.3%	0.3%

Station	2032 cumulative development project peak northbound (18:00-19:00)							
	Change in line loading on departure				Percentage change			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
Earlswood	4	10	1	15	0.2%	0.2%	0.3%	0.3%
Redhill	4	10	1	14	0.2%	0.2%	0.2%	0.3%
Merstham	4	10	1	14	0.2%	0.2%	0.2%	0.3%
Coulsdon South	4	10	1	14	0.2%	0.2%	0.2%	0.3%
Purley	4	10	1	14	0.2%	0.2%	0.2%	0.3%
South Croydon	4	10	1	14	0.2%	0.2%	0.2%	0.3%
East Croydon (VIC Branch)	0	9	0	9	-	0.2%	-	0.2%
Clapham Junction (VIC Branch)	0	4	0	4	-	0.1%	-	0.2%
East Croydon (LBG Branch)	2	0	1	3	0.1%	-	0.1%	0.1%
Norwood Junction (LBG Branch)	2	0	1	3	0.1%	-	0.1%	0.1%

12.11.35 Table 12.11.17 shows that during the project peak hour, the cumulative development contributes an additional 15 passengers in the northbound direction. The increase in passengers is less than 0.5% for all services. To assess the impact on crowding, Diagram 12.11.8 shows the Seated Load Factor assessment.

Diagram 12.11.8: 2032 cumulative development northbound project peak Seated Load Factor





12.11.36 Diagram 12.11.8 shows that seating capacity is not exceeded on any of the services and therefore no crowding issues are expected.

Southbound services

12.11.37 The peak hours for assessment are identified as follows, taken from the line loading profile shown in Diagram 12.9.18:

- Network peak 17:00-18:00, based on the highest line loading for all services at the busiest station (trains departing southbound from East Croydon).
- Project peak 15:00-16:00, based on the highest line loading as the result of the Project, which for southbound is on departing or passing Horley station.

Southbound network peak (17:00-18:00)

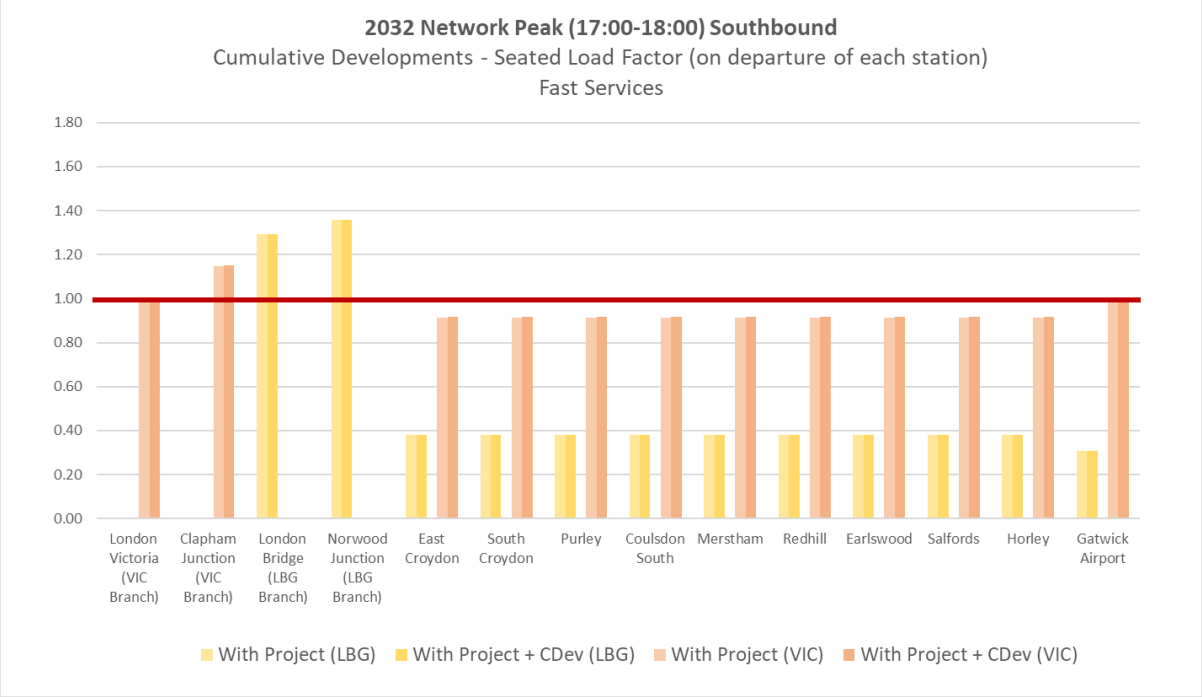
12.11.38 Table 12.11.18 provides a summary of the increase in line loading by station in the southbound direction for the network peak.

Table 12.11.18: 2032 cumulative development percentage change in line loading – southbound network peak (17:00-18:00)

Station	2032 cumulative development network peak southbound (17:00-18:00)							
	Change in line loading on departure				Percentage change			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
London Victoria (VIC Branch)	0	12	0	12	-	0.2%	-	0.2%
Clapham Junction (VIC Branch)	0	15	0	15	-	0.2%	-	0.2%
London Bridge (LBG Branch)	4	0	2	6	0.1%	-	0.1%	0.1%
Norwood Junction (LBG Branch)	4	0	1	6	0.1%	-	0.0%	0.1%
East Croydon	8	17	2	27	0.2%	0.3%	0.1%	0.2%
South Croydon	8	17	2	27	0.2%	0.3%	0.1%	0.2%
Purley	8	17	2	27	0.2%	0.3%	0.1%	0.2%
Coulsdon South	8	17	2	27	0.2%	0.3%	0.1%	0.2%
Merstham	8	17	2	27	0.2%	0.3%	0.1%	0.2%
Redhill	8	17	3	28	0.2%	0.3%	0.4%	0.3%
Earlswood	8	17	3	28	0.2%	0.3%	0.4%	0.3%
Salfords	8	17	3	28	0.2%	0.3%	0.5%	0.3%
Horley	8	17	3	28	0.2%	0.3%	0.5%	0.3%
Gatwick Airport	10	22	2	34	0.3%	0.3%	0.5%	0.5%

12.11.39 Table 12.11.18 shows that during the network peak hour, the cumulative development contributes an additional 34 passengers in the southbound direction. The increase in passengers represents less than 0.5% for all services. To assess the impact on crowding, Diagram 12.11.9 shows the Seated Load Factor assessment and Table 12.11.19 shows the standing capacity assessment.

Diagram 12.11.9: 2032 cumulative development southbound network peak Seated Load Factor



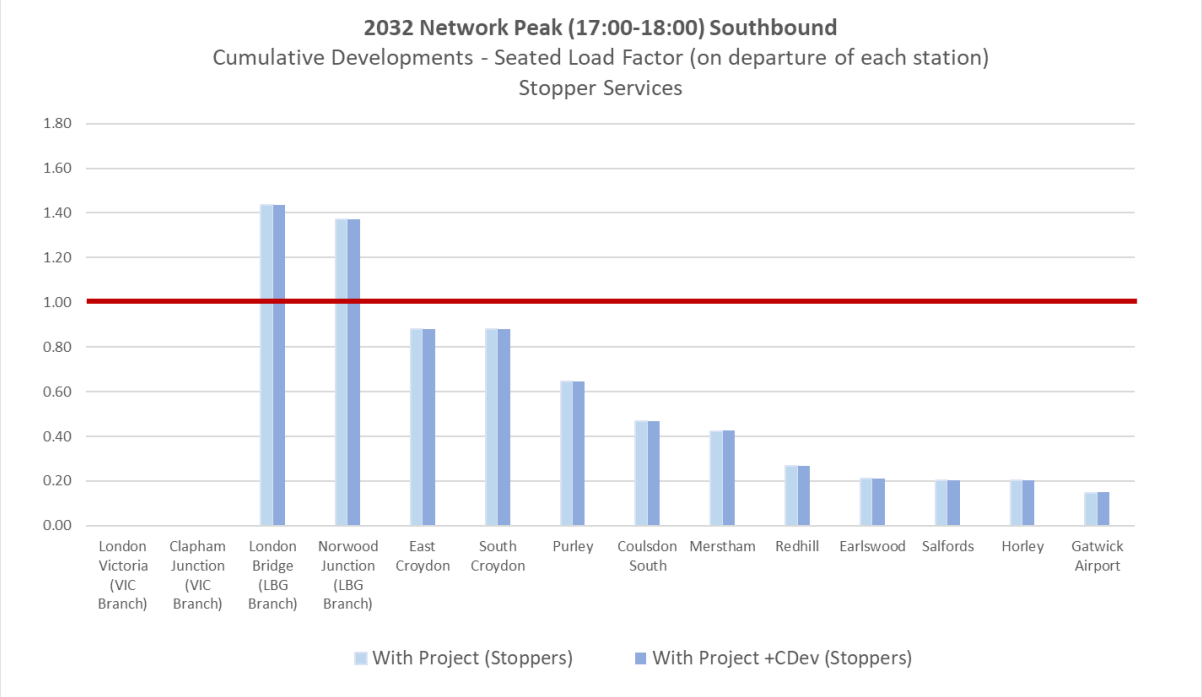


Table 12.11.19: 2032 cumulative development southbound network peak standing capacity assessment (17:00-18:00)

Station	2032 Cumulative Development Network Peak Southbound – Percentage of Standing Capacity Occupied							
	2032 with Project				2032 cumulative development (% point change)			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
Clapham Junction (VIC Branch)	-	24.0%	-	8.0%	0.0% (-)	24.4% (0.4%)	0.0% (-)	8.4% (0.4%)
London Bridge (LBG Branch)	19.9%	-	26.6%	22.2%	19.9% (0.0%)	- (-)	26.7% (0.1%)	22.3% (0.1%)
Norwood Junction (LBG Branch)	24.3%	-	22.7%	23.7%	24.3% (0.0%)	- (-)	22.8% (0.1%)	23.8% (0.1%)
Gatwick Airport	-	0.2%	-	-	0.0% (-)	0.8% (0.6%)	0.0% (-)	- (-)

12.11.40 Diagram 12.11.9 shows that seating capacity is exceeded as far south as East Croydon on the fast and stopping services for the network peak. Table 12.11.19 shows the highest percentage of standing capacity occupied is 26.7% (with cumulative developments). The cumulative developments will not significantly increase the percentage of standing capacity occupied when compared with the with Project situation in 2032, with the highest increase being 0.4 percentage points on the fast services (Victoria branch) on leaving Clapham Junction.

Southbound project peak (15:00-16:00)

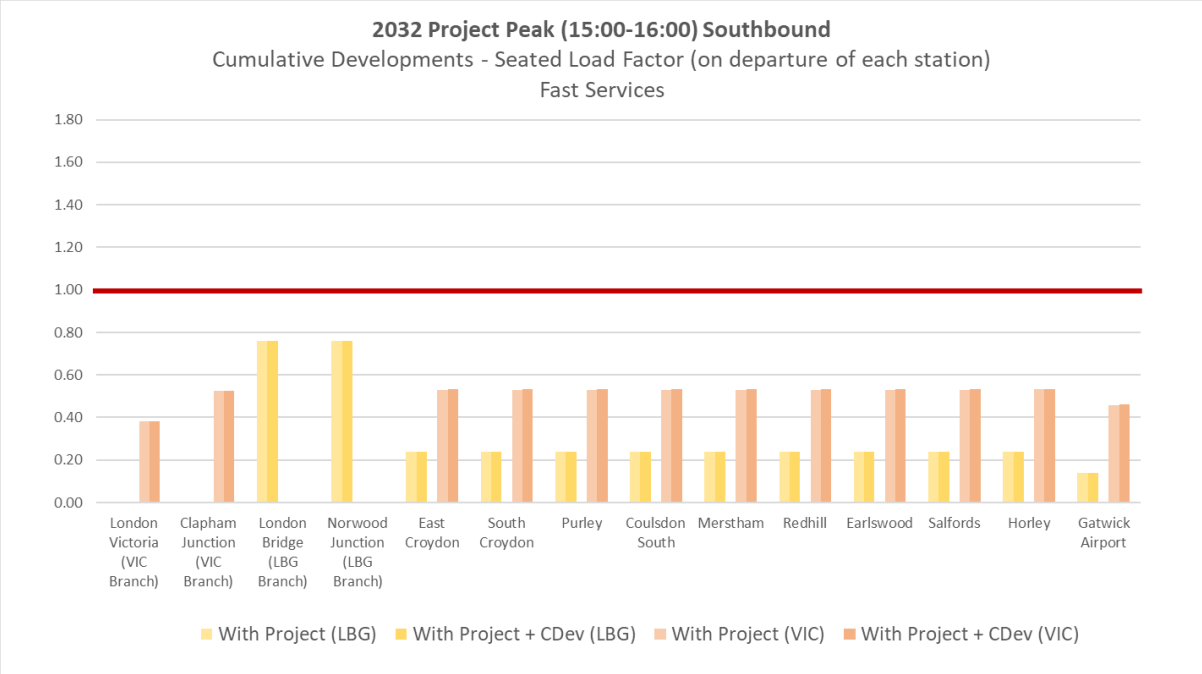
12.11.41 Table 12.11.20 provides a summary of the increase in line loading by station in the southbound direction for the Project peak.

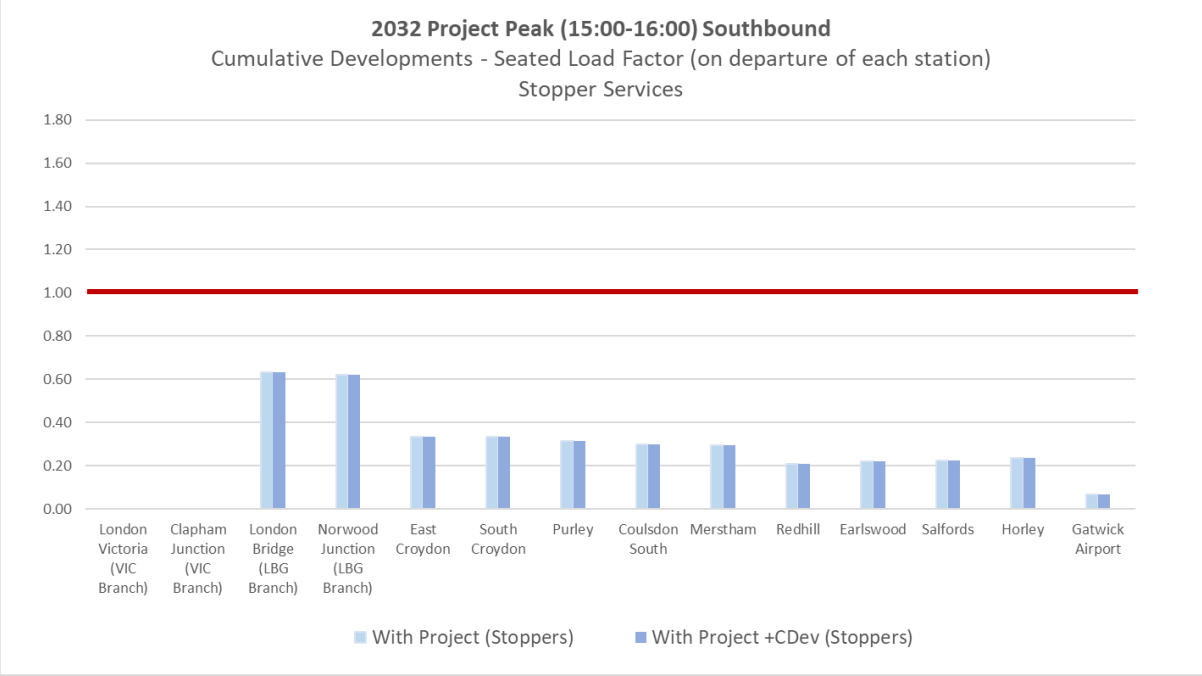
Table 12.11.20: 2032 cumulative development percentage change in line loading – southbound project peak (15:00-16:00)

Station	2032 cumulative development project peak southbound (15:00-16:00)							
	Change in line loading on departure				Percentage change			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
London Victoria (VIC Branch)	0	2	0	2	-	0.1%	-	0.1%
Clapham Junction (VIC Branch)	0	4	0	4	-	0.1%	-	0.1%
London Bridge (LBG Branch)	3	0	1	4	0.1%	-	0.1%	0.1%
Norwood Junction (LBG Branch)	3	0	1	4	0.1%	-	0.1%	0.1%
East Croydon	4	6	1	11	0.2%	0.2%	0.1%	0.2%
South Croydon	4	6	1	11	0.2%	0.2%	0.1%	0.2%
Purley	4	6	1	11	0.2%	0.2%	0.1%	0.2%
Coulsdon South	4	6	1	11	0.2%	0.2%	0.1%	0.2%
Merstham	4	6	1	11	0.2%	0.2%	0.1%	0.2%
Redhill	4	6	1	11	0.2%	0.2%	0.2%	0.2%
Earlswood	4	6	1	11	0.2%	0.2%	0.2%	0.2%
Salfords	4	6	1	11	0.2%	0.2%	0.2%	0.2%
Horley	4	6	2	11	0.2%	0.2%	0.2%	0.2%
Gatwick Airport	3	9	1	13	0.2%	0.3%	0.4%	0.4%

12.11.42 Table 12.11.20 shows that during the project peak hour, the cumulative development contributes an additional 13 passengers in the southbound direction. Most of these passengers are expected to use the fast train services from London Victoria and London Bridge. The increase in passengers represents less than 0.5% for all services. To assess the impact on crowding, Diagram 12.11.10 shows the Seated Load Factor assessment.

Diagram 12.11.10: 2032 cumulative development southbound project peak Seated Load Factor





12.11.43 Diagram 12.11.10 shows that seating capacity is not exceeded on any of the services and therefore no crowding issues are expected.

Summary on rail crowding

12.11.44 A summary of rail crowding by peak hour and direction is as follows:

- **Northbound** – The highest increase in line loading as a result of the cumulative development is 0.5% (during the network peak). There is seating capacity available in the

project peak, and the percentage of standing capacity occupied on fast train services during the network peak is around 32.2% (with cumulative development), indicating busy trains into London but with spare standing capacity available. The cumulative developments account for a 0.3 percentage point increase in standing capacity during the network peak which represents an insignificant magnitude of impact.

- **Southbound** – The highest increase in line loading as a result of the cumulative development is 0.5% (during the network peak). There is seating capacity available in the project peak, and the percentage of standing capacity occupied on stopping train services is around 26.7% in the network peak, indicating busy trains out of London. The cumulative developments account for up to a 0.4 percentage point increase in standing capacity which represents an insignificant magnitude of impact.

12.11.45 The overall magnitude of impact is considered to be **low** and the sensitivity of receptors in terms of public transport capacity is considered to be low to medium. Any effects to changes in crowding levels for 2032 are therefore anticipated to be **minor adverse**, which is not significant.

Cumulative development scenario: 2047

Severance

12.11.46 The highway flows are contained in **ES Appendix 12.9.1: Highway Flows and Driver Delay Review** (Doc Ref. 5.3). For the purposes of reporting, only the links which have a magnitude of impact of low, medium, and high adverse or beneficial are assessed in this section to focus on potential significant effects. These links and associated flows are shown in Table 12.11.21 for the with Project scenario and Table 12.11.22 for the cumulative development scenario. The net change in traffic flows are shown in Table 12.11.23.

Table 12.11.21: Design year 2047 traffic flows – with Project

ID	Road	AM1			AM2			IP			PM		
		All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV
010	A23 London Road to North Terminal Roundabout	217	9	4%	183	24	13%	166	21	13%	422	12	3%
011	A23 Airport Way to South Terminal Roundabout EB	652	33	5%	646	32	5%	559	35	6%	503	29	6%
012	M23 Spur to South Terminal Roundabout WB	1488	5	0%	1472	7	0%	1079	10	1%	837	10	1%
NT6	North Terminal Approach	458	18	4%	343	16	5%	56	13	23%	12	12	100%
a05	Bonnetts Lane, Charlwood Road, Lowfield Heath Road (South of the Airport)	732	4	1%	805	13	2%	680	8	1%	687	8	1%
cl29	Bewbush Drive, Lulworth Close-Mowbray Drive	398	7	2%	500	8	2%	401	8	2%	497	8	2%
cl31	Gossops Drive, Crawley Avenue-Overdene Drive	847	20	2%	966	21	2%	937	25	3%	849	19	2%
cl48	Fleming Way Slipper Roads	794	39	5%	1103	39	4%	820	33	4%	1161	39	3%

ID	Road	AM1			AM2			IP			PM		
		All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV
cl49	Fleming Way, Fleming Way Roundabout-Faraday Road	790	39	5%	1097	39	4%	813	33	4%	1151	39	3%
cl67	Rusper Road, Hyde Drive-Tangmere Road	887	38	4%	1048	43	4%	694	36	5%	926	33	4%
cl68	Tangmere Road, Rusper Road-Ifield Drive	887	38	4%	1048	43	4%	694	36	5%	926	33	4%
cl70	Rudgwick Road, Ifield Drive-Rusper Road	585	11	2%	701	13	2%	556	14	3%	779	12	2%
cl96	Tangmere Road, Ifield Drive-Rusper Road	334	25	7%	453	29	6%	313	23	7%	413	22	5%
cy41	Ifield Avenue, Ifield Green-Warren Drive	612	16	3%	770	14	2%	751	26	3%	891	17	2%
cy53	Jarvis Road, Croydon	40	0	0%	57	0	0%	63	1	2%	49	0	0%
cy54	Pampisford Road Croydon	659	34	5%	645	28	4%	512	22	4%	408	18	4%
sn06	The Street/High Street, Steyning By-Pass-Henfield Road	840	19	2%	895	20	2%	452	20	4%	804	13	2%

Table 12.11.22: Design year 2047 traffic flows – cumulative development with Project

ID	Road	AM1			AM2			IP			PM		
		All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV
010	A23 London Road, North Terminal-Longbridge Roundabout	280	10	4%	494	9	2%	151	20	13%	420	12	3%
011	A217 London Road, Longbridge Roundabout-Parking Entry	860	33	4%	1024	31	3%	556	35	6%	480	29	6%
012	A217 London Road, Parking Entry-A217 Reigate Road	1960	3	0%	1958	3	0%	1391	16	1%	941	13	1%
NT6	North Terminal Entry/Exit	431	18	4%	224	16	7%	44	13	30%	11	11	100%
a05	Longbridge Way	788	6	1%	831	8	1%	756	11	1%	404	5	1%
cl29	Manor Royal, Newton Road, Crawley	502	8	2%	658	8	1%	435	8	2%	537	7	1%
cl31	Crawley Avenue, Hazelwick Avenue, A2011	723	21	3%	734	20	3%	1074	25	2%	1122	19	2%

ID	Road	AM1			AM2			IP			PM		
		All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV
cl48	South Bridge Road, Bramley Hill-South End, A236	865	47	5%	1465	44	3%	851	40	5%	1141	44	4%
cl49	South Bridge Road, Lower Coombe Street-Bramley Hill, A236	864	47	5%	1468	44	3%	844	40	5%	1137	44	4%
cl67	Park Lane, Park Lane A212-Park Street	777	42	5%	1065	46	4%	956	43	4%	1234	41	3%
cl68	Lower Coombe Street, Roundabout-Southbridge Road, A212	777	42	5%	1065	46	4%	956	43	4%	1234	41	3%
cl70	Wellesley Road, Poplar Walk-Station Road, A212	575	4	1%	950	8	1%	753	11	1%	1064	11	1%
cl96	Cherry Orchard Road, Cedar Road-Leslie Park Road, Croydon	502	38	8%	642	40	6%	452	34	8%	513	32	6%

ID	Road	AM1			AM2			IP			PM		
		All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV
cy41	Lansdowne Road, Bedford Place-St James's Road A222	769	29	4%	1046	24	2%	1062	39	4%	1076	25	2%
cy53	Jarvis Road, Croydon	60	0	0%	55	0	0%	67	1	1%	49	0	0%
cy54	Wellesley Road, Sydenham Road-Landsdowne Road, A212	670	35	5%	664	29	4%	510	22	4%	589	18	3%
sn06	Upper Mulgrave Road, Mulgrave Road, Sutton	845	19	2%	906	20	2%	672	20	3%	812	13	2%

Table 12.11.23: Design year 2047 traffic flows – net change (percentage change in brackets)

ID	Road	AM1			AM2			IP			PM		
		All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV
010	A23 London Road to North Terminal Roundabout	63 (29%)	1 (11%)	-1% (-1%)	311 (170%)	-15 (-63%)	-11% (-11%)	-15 (-9%)	-1 (-5%)	1% (1%)	-2 (0%)	0 (0%)	0% (0%)
011	A23 Airport Way to South Terminal Roundabout EB	208 (32%)	0 (0%)	-1% (-1%)	378 (59%)	-1 (-3%)	-2% (-2%)	-3 (-1%)	0 (0%)	0% (0%)	-23 (-5%)	0 (0%)	0% (0%)
012	M23 Spur to South Terminal Roundabout WB	472 (32%)	-2 (-40%)	0% (0%)	486 (33%)	-4 (-57%)	0% (0%)	312 (29%)	6 (60%)	0% (0%)	104 (12%)	3 (30%)	0% (0%)
NT6	North Terminal Approach	-27 (-6%)	0 (0%)	0% (0%)	-119 (-35%)	0 (0%)	2% (2%)	-12 (-21%)	0 (0%)	6% (6%)	-1 (-8%)	-1 (-8%)	0% (0%)
a05	Bonnetts Lane, Charlwood Road, Lowfield Heath Road (South of the Airport)	56 (8%)	2 (50%)	0% (0%)	26 (3%)	-5 (-38%)	-1% (-1%)	76 (11%)	3 (38%)	0% (0%)	-283 (-41%)	-3 (-38%)	0% (0%)
cl29	Bewbush Drive, Lulworth Close-Mowbray Drive	104 (26%)	1 (14%)	0% (0%)	158 (32%)	0 (0%)	0% (0%)	34 (8%)	0 (0%)	0% (0%)	40 (8%)	-1 (-13%)	0% (0%)
cl31	Gossops Drive, Crawley Avenue-Overdene Drive	-124 (-15%)	1 (5%)	1% (1%)	-232 (-24%)	-1 (-5%)	1% (1%)	137 (15%)	0 (0%)	0% (0%)	273 (32%)	0 (0%)	-1% (-1%)

ID	Road	AM1			AM2			IP			PM		
		All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV
cl48	Fleming Way Slipper Roads	71 (9%)	8 (21%)	1% (1%)	362 (33%)	5 (13%)	-1% (-1%)	31 (4%)	7 (21%)	1% (1%)	-20 (-2%)	5 (13%)	0% (0%)
cl49	Fleming Way, Fleming Way Roundabout-Faraday Road	74 (9%)	8 (21%)	1% (1%)	371 (34%)	5 (13%)	-1% (-1%)	31 (4%)	7 (21%)	1% (1%)	-14 (-1%)	5 (13%)	0% (0%)
cl67	Rusper Road, Hyde Drive-Tangmere Road	-110 (-12%)	4 (11%)	1% (1%)	17 (2%)	3 (7%)	0% (0%)	262 (38%)	7 (19%)	-1% (-1%)	308 (33%)	8 (24%)	0% (0%)
cl68	Tangmere Road, Rusper Road-Ifield Drive	-110 (-12%)	4 (11%)	1% (1%)	17 (2%)	3 (7%)	0% (0%)	262 (38%)	7 (19%)	-1% (-1%)	308 (33%)	8 (24%)	0% (0%)
cl70	Rudgwick Road, Ifield Drive-Rusper Road	-10 (-2%)	-7 (-64%)	-1% (-1%)	249 (36%)	-5 (-38%)	-1% (-1%)	197 (35%)	-3 (-21%)	-1% (-1%)	285 (37%)	-1 (-8%)	-1% (-1%)
cl96	Tangmere Road, Ifield Drive-Rusper Road	168 (50%)	13 (52%)	0% (0%)	189 (42%)	11 (38%)	0% (0%)	139 (44%)	11 (48%)	0% (0%)	100 (24%)	10 (45%)	1% (1%)
cy41	Ifield Avenue, Ifield Green-Warren Drive	157 (26%)	13 (81%)	1% (1%)	276 (36%)	10 (71%)	0% (0%)	311 (41%)	13 (50%)	0% (0%)	185 (21%)	8 (47%)	0% (0%)
cy53	Jarvis Road, Croydon	20 (50%)	0 (0%)	0% (0%)	-2 (-4%)	0 (0%)	0% (0%)	4 (6%)	0 (0%)	0% (0%)	0 (0%)	0 (0%)	0% (0%)
cy54	Pampisford Road Croydon	11 (2%)	1 (3%)	0% (0%)	19 (3%)	1 (4%)	0% (0%)	-2 (0%)	0 (0%)	0% (0%)	181 (44%)	0 (0%)	-1% (-1%)

ID	Road	AM1			AM2			IP			PM		
		All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV	All vehs	HGV	% HGV
sn06	The Street/High Street, Steyning By-Pass-Henfield Road	5 (1%)	0 (0%)	0% (0%)	11 (1%)	0 (0%)	0% (0%)	220 (49%)	0 (0%)	-1% (-1%)	8 (1%)	0 (0%)	0% (0%)

12.11.47 The above shows that within the whole study area, only 17 links will experience a change of more than 30% in traffic as a result of the cumulative developments.

12.11.48 The following links are expected to have an increase of 30% to 60% (low impact):

- Link 011: A23 Airport Way to South Terminal Roundabout EB (negligible sensitivity) in the AM1 and AM2 period;
- Link 012: M23 Spur to South Terminal Roundabout WB (negligible sensitivity) in the AM1 and period;
- Link cl29: Bewbush Drive, Lulworth Close-Mowbray Drive (medium sensitivity) in the AM2 period;
- Link cl31: Gossops Drive, Crawley Avenue-Overdene Drive (medium sensitivity) in the PM period;
- Link cl48: Fleming Way Slipper Roads (medium sensitivity) in the AM2 period;
- Link cl49: Fleming Way, Fleming Way Roundabout-Faraday Road (medium sensitivity) in the AM2 period;
- Link cl67: Rusper Road, Hyde Drive-Tangmere Road (medium sensitivity) in the IP and PM period;
- Link cl68: Tangmere Road, Rusper Road-Ifield Drive (medium sensitivity) in the IP and PM period;
- Link cl70: Rudgwick Road, Ifield Drive-Rusper Road (medium sensitivity) in the AM2, IP and PM period;
- Link cl96: Tangmere Road, Ifield Drive-Rusper Road (medium sensitivity) in the AM1, AM2 and IP period;
- Link cy41: Ifield Avenue, Ifield Green-Warren Drive (medium sensitivity) in the AM2 and IP period;
- Link cy53: Jarvis Road, Croydon (medium sensitivity) in the AM1 period;
- Link cy54: Pampisford Road, Croydon (high sensitivity) in the PM period; and
- Link sn06: The Street/High Street, Steyning By-Pass-Henfield Road (medium sensitivity) in the IP period.

12.11.49 The above links would have a **minor adverse** severance effect.

12.11.50 The following link is expected to have an increase of more than 90% (high impact):

- Link 010: A23 London Road to North Terminal Roundabout (negligible sensitivity) in the AM2 periods.

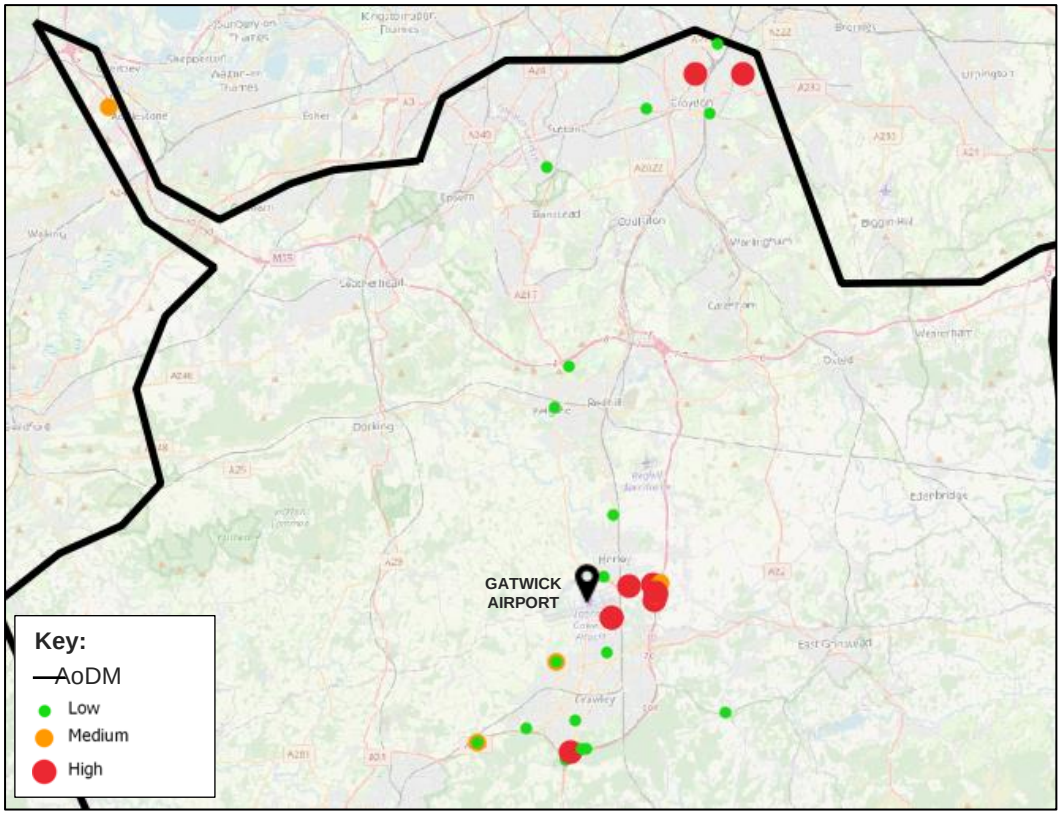
12.11.51 The above would mean a **minor adverse** severance effect on Jarvis Road, Croydon.

12.11.52 All other links will have a change of traffic of less than 30% and therefore the magnitude of impact on severance is considered to be negligible. The sensitivity of the highway links for pedestrians and cyclists range from negligible to high and the overall effect of severance is considered to be **minor adverse**, which is not significant.

Driver delay

12.11.53 Diagram 12.11.11 shows the magnitude of impact for driver delay for junctions where the V/C ratio is over 80%. The diagram shows driver delay for all time periods assessed and any overlaps in colours indicate different magnitudes of impact by time period. The highest magnitude of impact for each junction is considered.

Diagram 12.11.11:2047 cumulative development driver delay magnitude of impact (all assessment time periods)



12.11.54 Diagram 12.11.11 shows that most junctions (over 1,000) have negligible or low magnitude of impact in terms of delay. Car driver and passenger sensitivity is considered to be medium for junctions where the V/C ratio is over 80%. For the junctions with negligible magnitude of impact, the driver delay effect is **negligible**. For those with a low magnitude of impact, the driver delay is **minor adverse**.

12.11.55 There are five junctions with medium and nine junctions with high magnitudes of impact as a result of the cumulative developments. Based on the work undertaken to assess the Project, described in Section 12.9, the junctions in Croydon near the AoDM boundary are expected to have been identified because of model noise causing the reassignment of background traffic along parallel routes with similar journey times in the model, which is behaviour that is considered unlikely to occur in practice. There are moderate and high impacts identified at M23 Junction 9 and at other junctions near Gatwick Airport and Crawley. Without mitigation, the driver delay effects for these junctions would be considered to be **moderate adverse**. However, the promoters of the cumulative schemes would be expected to review and assess the impacts of their schemes, engage with National Highways and local authorities to determine whether mitigation is required and where necessary provide that mitigation to ensure their development is acceptable as part of the planning process. As such, and assuming the provision of such mitigation, the residual driver delay effect for these junctions would be considered to be **minor adverse**, which is not significant.

Pedestrian and cyclist delay

12.11.56 As shown in Table 12.11.23, there are a number of links which are expected to experience a level of traffic change of more than 30% during the peak hours. When considered along with the pedestrian and cycle sensitivity for each link, the total traffic flows in the cumulative development scenario (Table 12.11.22), and model noise, these changes are not expected to cause pedestrian and cyclist delays. The magnitude of impact for pedestrian and cyclist delay is considered to be negligible. The sensitivity of receptors along the highway routes shown in Table 12.11.4 ranges from negligible to medium. The effect on pedestrian and cycle delays is expected to be **negligible adverse**.

Pedestrian and cyclist amenity

12.11.57 The threshold for an effect on pedestrian and cyclist amenity is when the traffic flows have doubled. As shown in **ES Appendix 12.9.1: Highway Flows and Driver Delay Review** (Doc Ref. 5.3), A23 London Road to North Terminal Roundabout (Link ID: 010) is expected to experience a doubling or more in flows as a result of the cumulative developments. The magnitude of impact on this link is considered to be medium. The sensitivity of this link is considered as negligible in terms of pedestrians and cyclists. The effect of the cumulative development on pedestrian and cyclist amenity can be considered to be **negligible** for A23 London Road to North Terminal Roundabout.

12.11.58 The traffic composition can also affect pedestrian and cyclist amenity. The traffic flows contained in **ES Appendix 12.9.1: Highway Flows and Driver Delay Review** (Doc Ref. 5.3) shows that the highest increase of 10% in the percentage of HGVs (number of HGVs divided by total vehicle number) is expected on A2011 Crawley Avenue Slipper Road, Balcombe Road-Crawley Avenue (Link ID: hl03) in the AM2 period. The magnitude of this impact can be considered as low. The sensitivity along this road is considered to be low. The effect of the cumulative development on amenity is considered to be **negligible**.

12.11.59 For all the other roads, the predicted increase in the percentage of HGVs varies between -11% and +7%. The magnitude of impact is considered to be negligible to low. The sensitivity of the receptors along these links are considered to be negligible to high. The effect on pedestrian and cyclist amenity on all other roads is considered to be **minor adverse**, which is not significant**.**

Accidents and safety

12.11.60 The changes in the traffic flows are not expected to be significant and no known changes to the highway layouts are proposed. The magnitude of impact is considered to be negligible. The sensitivity of receptors is negligible for high for pedestrians and cyclists, and low to medium for car drivers and passengers. The risk of accidents and safety for all road users is considered to be **negligible adverse**.

Hazardous loads

12.11.61 No changes to traffic routes are known as the result of the cumulative schemes and therefore the effect on hazardous loads is considered to be **no change**.

Effects on public transport amenity

Crowding on rail services

Northbound services

12.11.62 The peak hours for assessment are identified as follows, taken from the line loading profile shown in Diagram 12.9.26:

- Network peak 08:00-09:00, based on the highest line loading for all services at the busiest station (northbound trains passing or departing from Purley).
- Project peak 18:00-19:00, based on the highest line loading as the result of the Project, which for northbound is on departing Gatwick Airport station.

Northbound network peak (08:00-09:00)

12.11.63 Table 12.11.24 provides a summary of the increase in line loading by station in the northbound direction for the network peak.

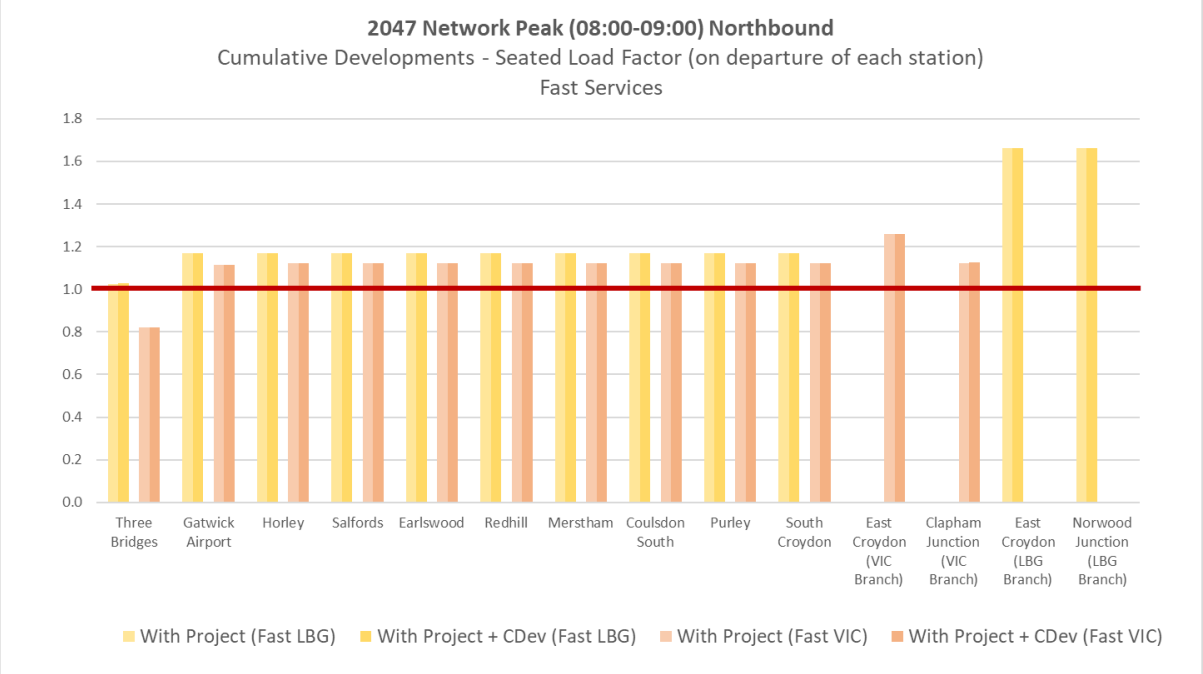
Table 12.11.24: 2047 cumulative development percentage change in line loading – northbound network peak (08:00-09:00)

Station	2047 cumulative development network peak northbound (08:00-09:00)							
	Change in line loading on departure				Percentage change			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
Three Bridges	17	14	14	45	0.3%	0.3%	1.4%	0.5%
Gatwick Airport	9	4	7	20	0.1%	0.1%	1.1%	0.2%
Horley	9	4	7	20	0.1%	0.1%	0.9%	0.2%
Salfords	9	4	7	20	0.1%	0.1%	0.9%	0.2%
Earlswood	9	4	7	20	0.1%	0.1%	0.6%	0.2%
Redhill	9	4	5	18	0.1%	0.1%	0.2%	0.2%
Merstham	9	4	6	19	0.1%	0.1%	0.2%	0.2%
Coulsdon South	9	4	5	18	0.1%	0.1%	0.1%	0.1%
Purley	9	4	6	19	0.1%	0.1%	0.1%	0.1%
South Croydon	9	4	5	18	0.1%	0.1%	0.1%	0.1%
East Croydon (VIC Branch)	0	5	0	5	-	0.1%	0.0%	0.1%
Clapham Junction (VIC Branch)	0	3	0	4	-	0.1%	0.0%	0.1%
East Croydon (LBG Branch)	8	0	5	13	0.1%	-	0.1%	0.1%
Norwood Junction (LBG Branch)	8	0	4	12	0.1%	-	0.1%	0.1%

12.11.64 Table 12.11.24 shows that, during the network peak hour, the cumulative development contributes an additional 45 passengers in the northbound direction. The increase in

passengers is around 0.3% for fast services and 1.4% for stopping services. To assess the impact on crowding, Diagram 12.11.12 shows the Seated Load Factor assessment and Table 12.11.25 shows the standing capacity occupied.

Diagram 12.11.12: 2047 cumulative development northbound network peak Seated Load Factor



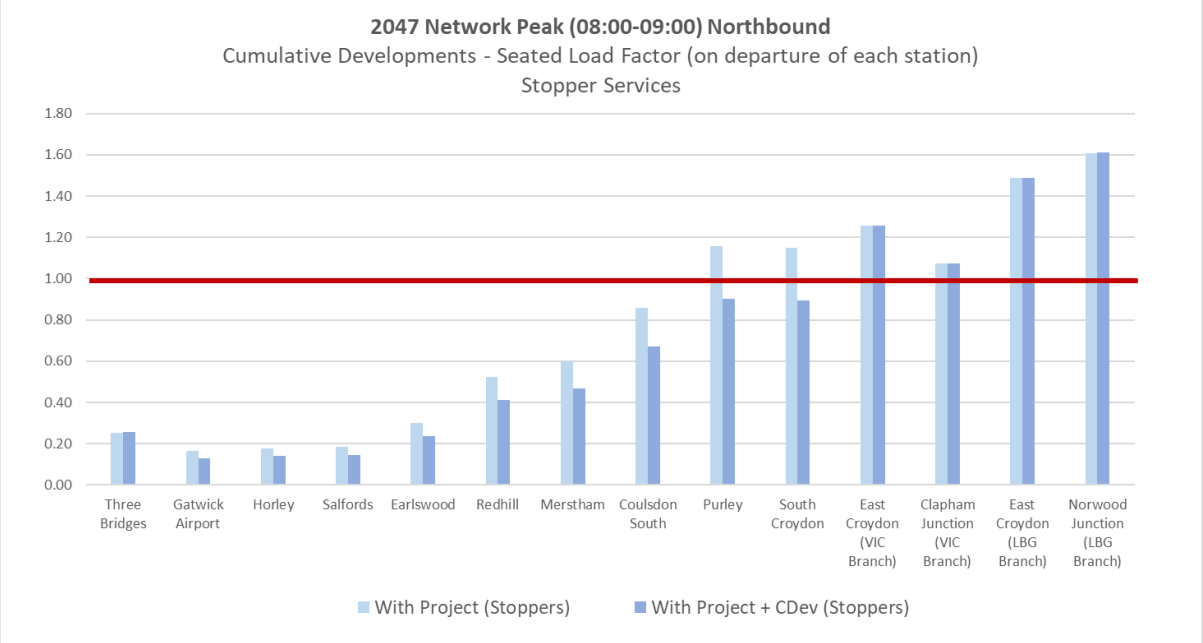


Table 12.11.25: 2047 cumulative development northbound network peak standing capacity assessment (08:00-09:00)

Station	2047 cumulative development network peak northbound – percentage of standing capacity occupied							
	2047 with Project				2047 cumulative development (% point change)			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
Three Bridges	1.9%	-	-	-	2.1% (0.2%)	0.0% (-)	0.0% (-)	- (-)
Gatwick Airport	12.7%	18.9%	-	-	12.8% (0.1%)	19.0% (0.1%)	0.0% (-)	- (-)
Horley	12.7%	20.2%	-	-	12.8% (0.1%)	20.3% (0.1%)	0.0% (-)	- (-)
Salfords	12.7%	20.2%	-	-	12.8% (0.1%)	20.3% (0.1%)	0.0% (-)	- (-)
Earlswood	12.7%	20.2%	-	-	12.8% (0.1%)	20.3% (0.1%)	0.0% (-)	- (-)
Redhill	12.7%	20.2%	-	-	12.8% (0.1%)	20.3% (0.1%)	0.0% (-)	- (-)
Merstham	12.7%	20.2%	-	-	12.8% (0.1%)	20.3% (0.1%)	0.0% (-)	- (-)
Coulsdon South	12.7%	20.2%	-	6.6%	12.8% (0.1%)	20.3% (0.1%)	0.0% (-)	6.6% (0.0%)
Purley	12.7%	20.2%	12.3%	14.3%	12.8% (0.1%)	20.3% (0.1%)	12.4% (0.1%)	14.3% (0.0%)
South Croydon	12.7%	20.2%	11.5%	14.0%	12.8% (0.1%)	20.3% (0.1%)	11.6% (0.1%)	14.0% (0.0%)
East Croydon (VIC Branch)	-	42.2%	42.8%	42.5%	- (-)	42.4% (0.1%)	42.9% (0.0%)	42.5% (0.0%)
Clapham Junction (VIC Branch)	-	20.3%	12.2%	18.9%	- (-)	20.4% (0.1%)	12.3% (0.0%)	18.9% (0.0%)
East Croydon (LBG Branch)	49.7%	-	29.9%	42.3%	49.8% (0.1%)	- (-)	30.0% (0.1%)	42.3% (0.0%)
Norwood Junction (LBG Branch)	49.7%	-	37.3%	45.1%	49.8% (0.1%)	- (-)	37.4% (0.1%)	45.1% (0.0%)

12.11.65 Diagram 12.11.12 shows that seating capacity is exceeded north of Gatwick Airport on the fast services for the network peak and exceeded on stopping services north of Purley. Table 12.11.25 shows the highest percentage of standing capacity occupied is 49.8% (with cumulative developments) on the fast services to London Bridge. The cumulative developments will not significantly increase the percentage of standing capacity occupied when compared with the with Project situation in 2047, with the highest increase being 0.2 percentage points.

Northbound project peak (18:00-19:00)

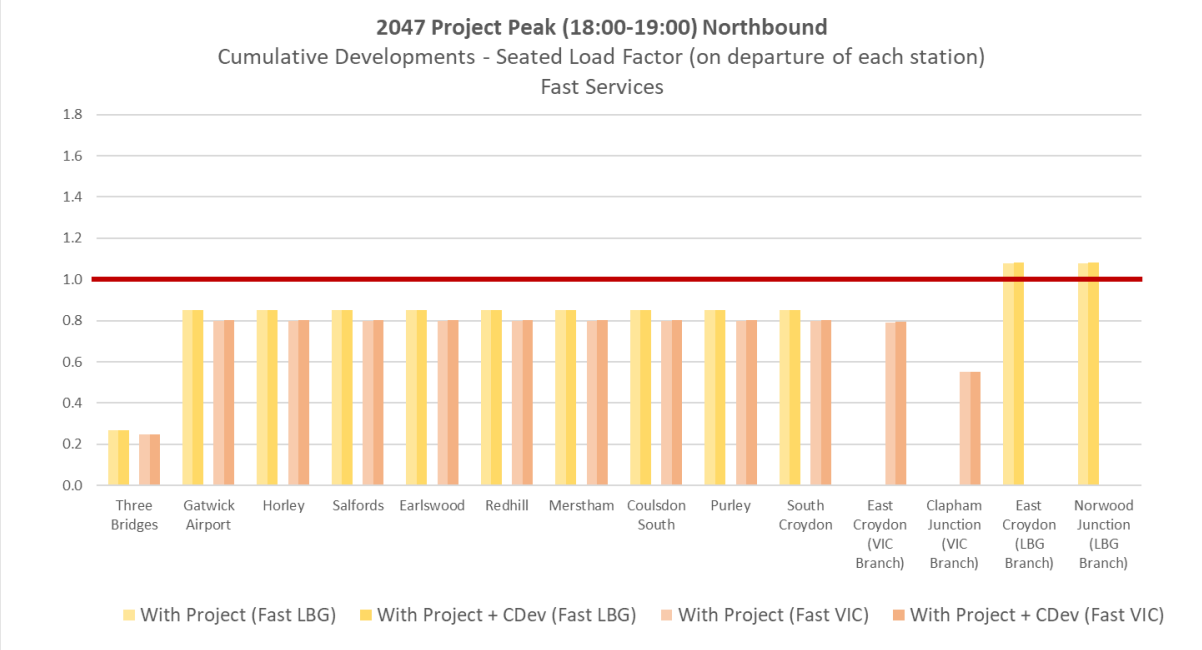
12.11.66 Table 12.11.26 provides a summary of the increase in line loading by station in the northbound direction for the project peak.

Table 12.11.26: 2047 cumulative development percentage change in line loading – northbound project peak (18:00-19:00)

Station	2047 cumulative development project peak northbound (18:00-19:00)							
	Change in line loading on departure				Percentage change			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
Three Bridges	0	2	2	4	0.0%	0.1%	0.5%	0.2%
Gatwick Airport	5	10	2	17	0.2%	0.2%	0.4%	0.3%
Horley	5	10	2	16	0.2%	0.2%	0.4%	0.3%
Salfords	5	10	2	16	0.2%	0.2%	0.4%	0.3%
Earlswood	5	10	2	16	0.2%	0.2%	0.4%	0.3%
Redhill	5	10	1	16	0.2%	0.2%	0.3%	0.3%
Merstham	5	10	1	16	0.2%	0.2%	0.3%	0.3%
Coulsdon South	5	10	1	16	0.2%	0.2%	0.3%	0.3%
Purley	5	10	1	16	0.2%	0.2%	0.3%	0.3%
South Croydon	5	10	1	16	0.2%	0.2%	0.3%	0.3%
East Croydon (VIC Branch)	0	7	0	7	-	0.1%	-	0.2%
Clapham Junction (VIC Branch)	0	4	0	4	-	0.1%	-	0.2%
East Croydon (LBG Branch)	4	0	2	5	0.1%	-	0.1%	0.1%
Norwood Junction (LBG Branch)	4	0	2	5	0.1%	-	0.1%	0.1%

12.11.67 Table 12.11.26 shows that during the project peak hour, the cumulative development contributes an additional 17 passengers in the northbound direction. The highest increase in passengers is 0.5%. To assess the impact on crowding, Diagram 12.11.13 shows the Seated Load Factor assessment and Table 12.11.27 shows the standing capacity assessment.

Diagram 12.11.13: 2047 cumulative development northbound project peak Seated Load Factor



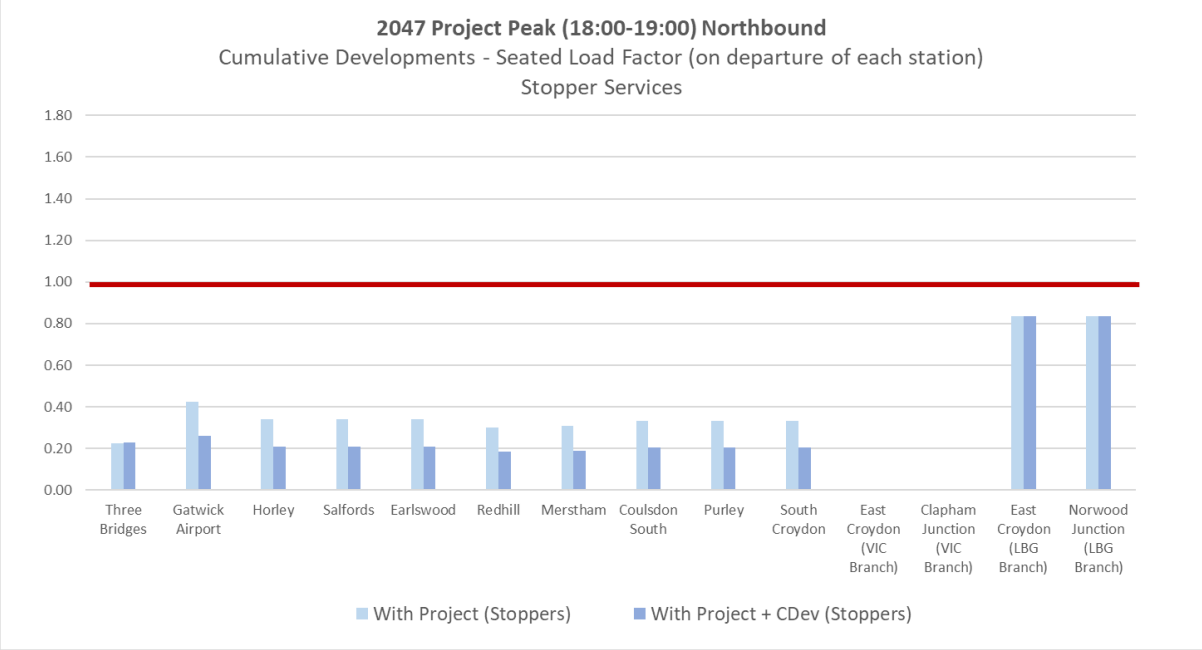


Table 12.11.27: 2047 cumulative development northbound project peak standing capacity assessment (18:00-19:00)

Station	2047 cumulative development project peak northbound – percentage of standing capacity occupied							
	2047 with Project				2047 Cumulative Development (% point change)			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
East Croydon (LBG Branch)	5.5%	-	-	0.4%	5.6% (0.1%)	- (-)	0.0% (-)	0.4% (0.0%)
Norwood Junction (LBG Branch)	5.5%	-	-	0.4%	5.6% (0.1%)	- (-)	0.0% (-)	0.4% (0.0%)

12.11.68 Diagram 12.11.13 shows that seating capacity is exceeded leaving East Croydon and Northwood Junction on the London Bridge branch. Table 12.11.27 shows the highest percentage of standing capacity occupied is 5.6% (with cumulative developments). The cumulative developments will not significantly increase the percentage of standing capacity occupied when compared with the with Project situation, with the highest increase being 0.1 percentage points.

Southbound services

12.11.69 The peak hours for assessment are identified as follows, taken from the line loading profile shown in Diagram 12.9.29:

- Network peak 17:00-18:00, based on the highest line loading for all services at the busiest station (trains departing southbound from East Croydon).
- Project peak 15:00-16:00, based on the highest line loading as the result of the Project, which for southbound is on departing or passing Horley station.

Southbound network peak (17:00-18:00)

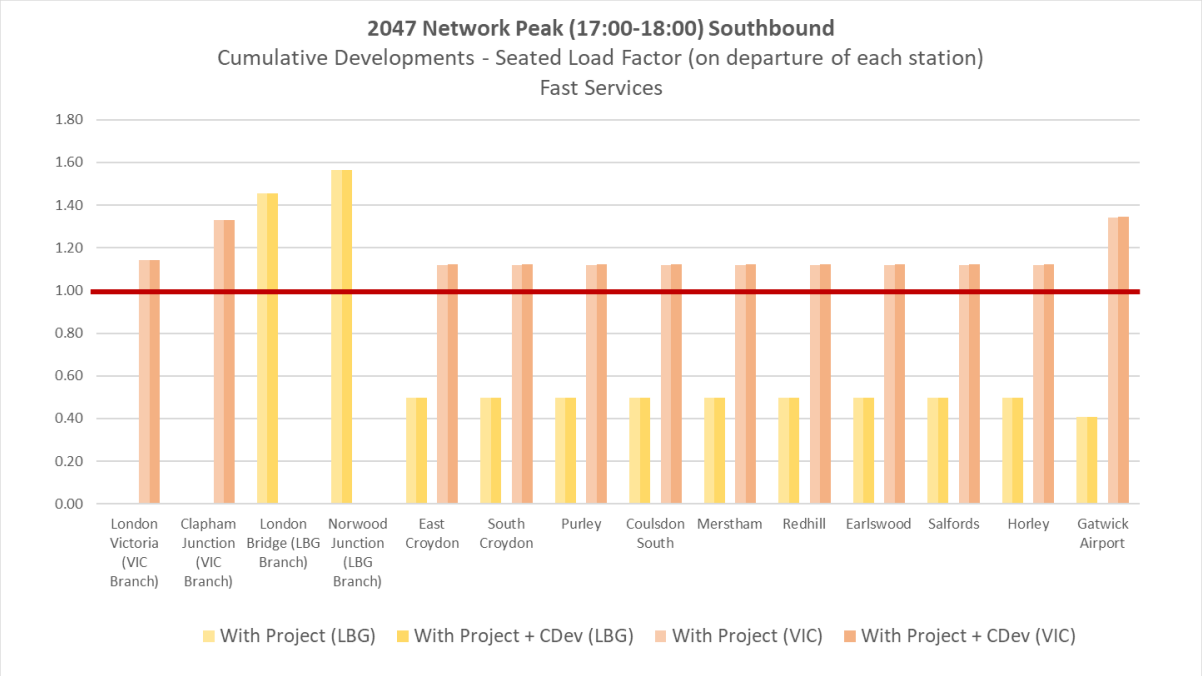
12.11.70 Table 12.11.28 provides a summary of the increase in line loading by station in the southbound direction for the network peak.

Table 12.11.28: 2047 cumulative development percentage change in line loading – southbound network peak (17:00-18:00)

Station	2047 cumulative development network peak southbound (17:00-18:00)							
	Change in line loading on departure				Percentage change			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
London Victoria (VIC Branch)	0	2	0	2	-	0.0%	-	0.0%
Clapham Junction (VIC Branch)	0	4	0	4	-	0.0%	-	0.1%
London Bridge (LBG Branch)	4	0	3	7	0.1%	-	0.1%	0.1%
Norwood Junction (LBG Branch)	5	0	3	7	0.1%	-	0.1%	0.1%
East Croydon	9	6	4	20	0.2%	0.1%	0.1%	0.2%
South Croydon	9	6	4	20	0.2%	0.1%	0.1%	0.2%
Purley	9	6	4	19	0.2%	0.1%	0.2%	0.2%
Coulsdon South	9	6	4	20	0.2%	0.1%	0.2%	0.2%
Merstham	9	6	4	20	0.2%	0.1%	0.2%	0.2%
Redhill	9	6	6	21	0.2%	0.1%	0.5%	0.2%
Earlswood	9	6	6	21	0.2%	0.1%	0.6%	0.2%
Salfords	9	6	6	21	0.2%	0.1%	0.6%	0.2%
Horley	9	6	6	22	0.2%	0.1%	0.7%	0.2%
Gatwick Airport	10	21	6	36	0.2%	0.2%	0.8%	0.5%

12.11.71 Table 12.11.28 shows that during the network peak hour, the cumulative developments contribute an additional 36 passengers in the southbound direction. This represents around 0.2% increase in passengers on the fast services, and 0.8% on the stopping services. To assess the impact on crowding, Diagram 12.11.14 shows the Seated Load Factor assessment and Table 12.11.29 shows the standing capacity assessment.

Diagram 12.11.14: 2047 cumulative development southbound network peak Seated Load Factor



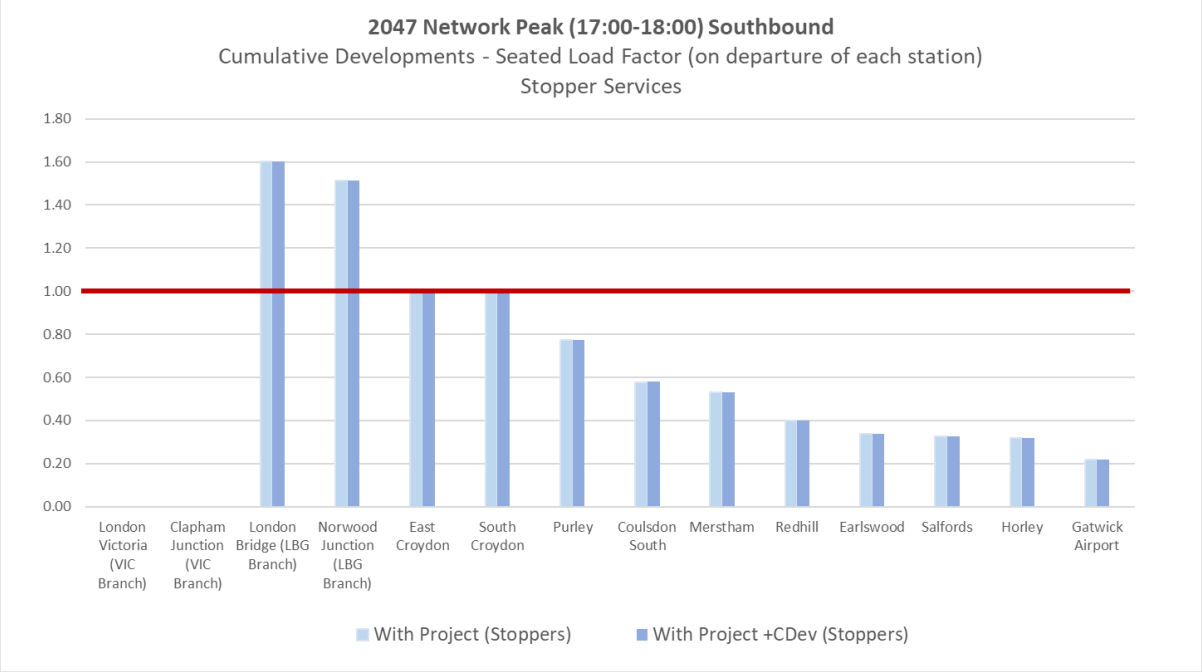


Table 12.11.29: 2047 cumulative development southbound network peak standing capacity assessment (17:00-18:00)

Station	2047 cumulative development network peak southbound – percentage of standing capacity occupied							
	2047 with Project				2047 cumulative development (% point change)			
	Fasts (LBG)	Fasts (VIC)	Stop pers	Total	Fasts (LBG)	Fasts (VIC)	Stop pers	Total
London Victoria (VIC Branch)	-	23.1%	-	7.2%	0.0% (-)	23.2% (0.1%)	0.0% (-)	7.2% (0.0%)
Clapham Junction (VIC Branch)	-	53.8%	-	35.5%	0.0% (-)	53.9% (0.1%)	0.0% (-)	35.6% (0.1%)
London Bridge (LBG Branch)	30.9%	-	36.9%	33.0%	31.0% (0.1%)	- (-)	36.9% (0.1%)	33.1% (0.1%)
Norwood Junction (LBG Branch)	38.4%	-	31.4%	36.0%	38.5% (0.1%)	- (-)	31.5% (0.1%)	36.1% (0.1%)
East Croydon	-	19.6%	0.4%	8.2%	0.0% (-)	19.8% (0.2%)	0.5% (0.1%)	8.3% (0.1%)
South Croydon	-	19.6%	0.4%	8.2%	0.0% (-)	19.8% (0.2%)	0.5% (0.1%)	8.3% (0.1%)
Purley	-	19.6%	-	3.6%	0.0% (-)	19.8% (0.2%)	0.0% (-)	3.7% (0.1%)
Coulsdon South	-	19.6%	-	-	0.0% (-)	19.8% (0.2%)	0.0% (-)	- (-)
Merstham	-	19.6%	-	-	0.0% (-)	19.8% (0.2%)	0.0% (-)	- (-)
Redhill	-	19.6%	-	-	0.0% (-)	19.8% (0.2%)	0.0% (-)	- (-)
Earlswood	-	19.6%	-	-	0.0% (-)	19.8% (0.2%)	0.0% (-)	- (-)
Salfords	-	19.6%	-	-	0.0% (-)	19.8% (0.2%)	0.0% (-)	- (-)
Horley	-	19.7%	-	-	0.0% (-)	19.9% (0.2%)	0.0% (-)	- (-)
Gatwick Airport	-	56.1%	-	-	0.0% (-)	56.6% (0.5%)	0.0% (-)	- (-)

12.11.72 Diagram 12.11.14 shows that for the network peak, seating capacity as far south as East Croydon on all services, and onwards to Gatwick Airport on fast services from London Victoria. Table 12.11.29 shows the highest percentage of standing capacity occupied is 56.6% (with cumulative developments). The cumulative developments will not significantly increase the percentage of standing capacity occupied when compared with the with Project scenario in 2047, with the highest increase being 0.5 percentage points.

Southbound project peak (15:00-16:00)

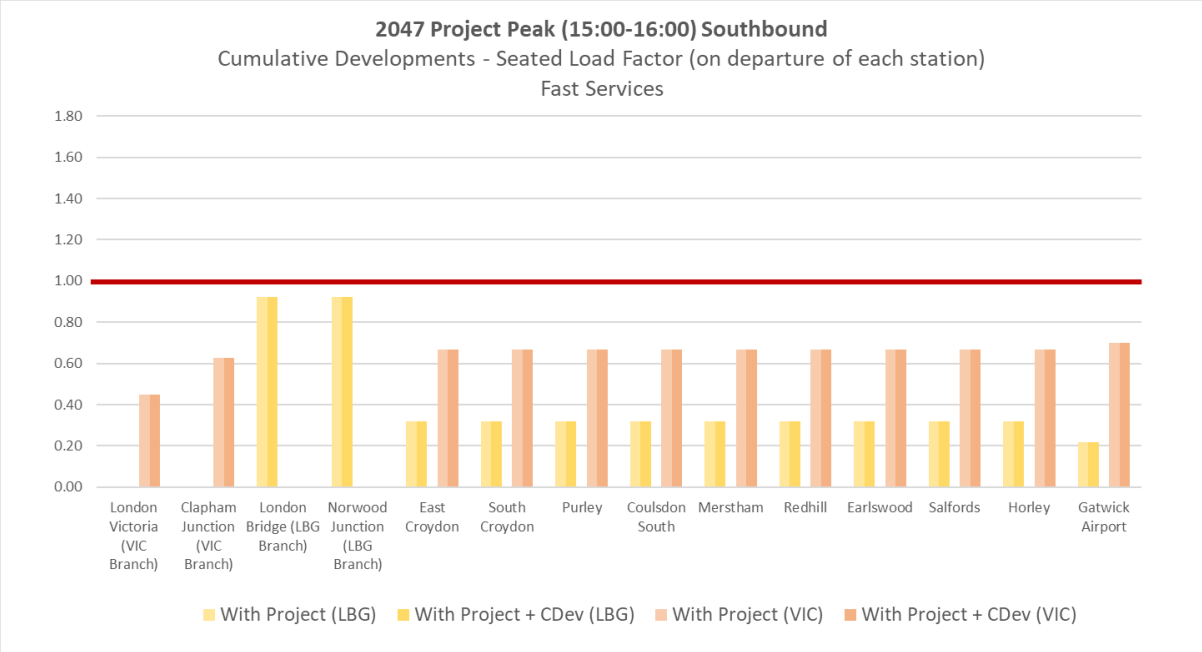
12.11.73 Table 12.11.30 provides a summary of the increase in line loading by station in the southbound direction for the Project peak.

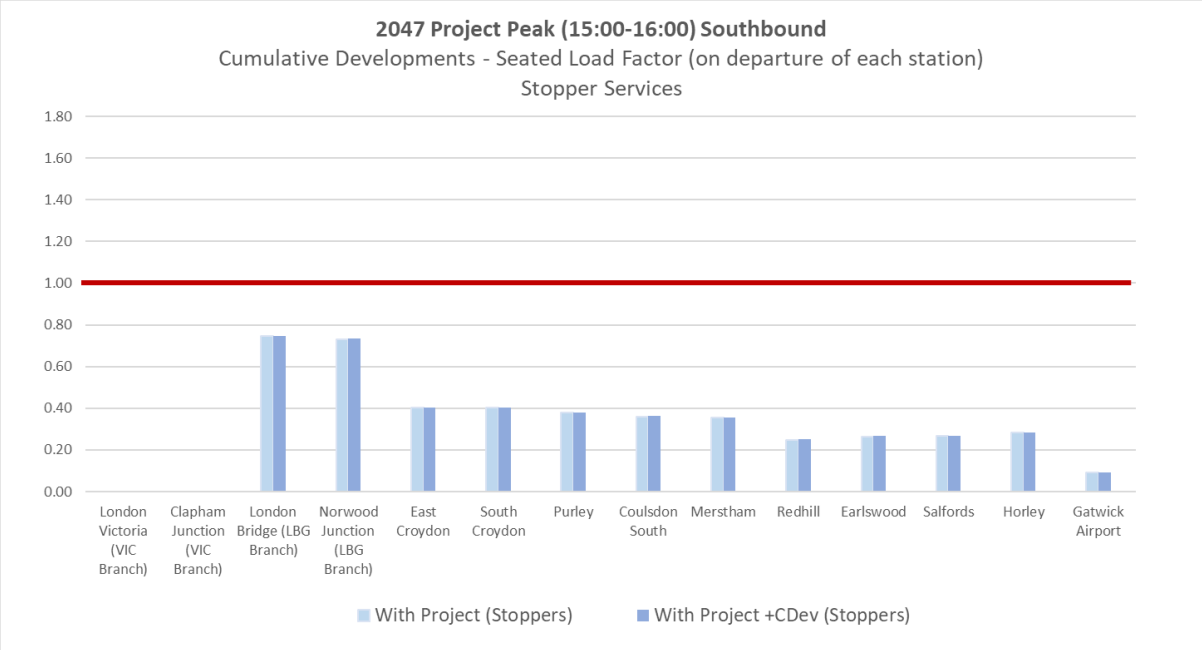
Table 12.11.30: 2047 cumulative development percentage change in line loading - southbound project peak (15:00-16:00)

Station	2047 cumulative development project peak southbound (15:00-16:00)							
	Change in line loading on departure				Percentage change			
	Fasts (LBG)	Fasts (VIC)	Stoppers	Total	Fasts (LBG)	Fasts (VIC)	Stoppers	Total
London Victoria (VIC Branch)	0	2	0	2	-	0.1%	-	0.1%
Clapham Junction (VIC Branch)	0	3	0	3	-	0.1%	-	0.1%
London Bridge (LBG Branch)	4	0	1	5	0.1%	-	0.1%	0.1%
Norwood Junction (LBG Branch)	4	0	1	5	0.1%	-	0.1%	0.1%
East Croydon	4	4	1	9	0.1%	0.1%	0.1%	0.2%
South Croydon	4	4	1	9	0.1%	0.1%	0.1%	0.2%
Purley	4	4	1	9	0.1%	0.1%	0.1%	0.2%
Coulsdon South	4	4	1	10	0.1%	0.1%	0.1%	0.2%
Merstham	4	4	1	10	0.1%	0.1%	0.1%	0.2%
Redhill	4	4	2	10	0.1%	0.1%	0.2%	0.2%
Earlswood	4	4	2	10	0.1%	0.1%	0.2%	0.2%
Salfords	4	4	2	10	0.1%	0.1%	0.2%	0.2%
Horley	4	4	2	10	0.1%	0.1%	0.2%	0.2%
Gatwick Airport	5	9	2	15	0.2%	0.2%	0.6%	0.5%

12.11.74 Table 12.11.30 shows that during the project peak hour, the cumulative development contributes an additional 15 passengers in the southbound direction. Most of these passengers are expected to use the fast train services from London Victoria and London Bridge. This represents around 0.2% increase in passengers on the fast services, and 0.6% on the stopping services. To assess the impact on crowding, Diagram 12.11.15 shows the Seated Load Factor assessment.

Diagram 12.11.15: 2047 cumulative development southbound project peak Seated Load Factor





12.11.75 Diagram 12.11.15 shows that seating capacity is not exceeded on any of the services and therefore no crowding issues are expected.

Summary on rail crowding

12.11.76 A summary of rail crowding by peak hour and direction is as follows:

- **Northbound** – The highest increase in line loading as a result of the cumulative development is 0.3% for fast services and 1.4% for stopping services (during the network peak). The highest percentage of standing capacity occupied on fast train services during

the network peak is 49.8% (with cumulative development), indicating busy trains into London but with spare standing capacity available. The cumulative development accounts for up to a 0.2 percentage point increase in standing capacity which represents an insignificant magnitude of impact.

- **Southbound –** The highest increase in line loading as a result of the cumulative development is 0.8% (during the network peak). There is seating capacity available in the Project peak, and the percentage of standing capacity occupied on fast train services is around 56.6% in the network peak. The cumulative development accounts for a 0.5 percentage point increase in standing capacity which represents an insignificant magnitude of impact.

12.11.77 The overall magnitude of impact is considered to be low and the sensitivity of receptors in terms of public transport capacity is considered to be low to medium. Any effects to changes in crowding levels for 2047 are therefore anticipated to be **minor adverse**, which is not significant.

Further mitigation and future monitoring

12.11.78 Committed developments are included in the future baseline which is in keeping with Planning Inspectorate Advice Note Seventeen. The assessment undertaken in this section addresses comments from local stakeholders to understand the effects from three specific major developments in the area around the Airport. The assessment shows that most of the effects are not significant. Some junctions and links are identified as potentially experiencing significant effects with the cumulative developments, indicating that further consideration of impacts and mitigation will be needed by scheme promoters and local authorities should these developments come forward. Where such mitigation is implemented, the residual effects would be considered to be **minor adverse** and not significant. These additional effects are not associated with the Project and therefore no future mitigation or monitoring are proposed as part of the Project.

Heathrow third runway

12.11.79 Heathrow's third runway (R3) is considered in Chapter 20 of the ES. Due to the uncertainty around when, or if, Heathrow's third runway (R3) will come forward, the modelling work assumes growth at Heathrow with two runways, based on the material published by Heathrow about its own future baseline, during its DCO consultation.

12.11.80 If Heathrow R3 was to come forward, air passenger demand at Gatwick would be likely to decline in the period immediately following the opening of R3. However, by 2047, there would be little difference between air passenger demand at Gatwick with or without Heathrow R3.

12.11.81 The Heathrow R3 surface access narrative is predicated on "no more traffic", which is to say that total car traffic to the Airport is to be maintained at broadly existing levels, albeit with variation in passenger and employee travel and therefore the distribution and timing of trips. Paragraph 5.38 of the Airports National Policy Statement (ANPS) states that "…*Heathrow Airport should continue to strive to meet its public pledge to have landside airport-related traffic no greater than today. To achieve this, it should set out and regularly review its plans to meet the mode share targets*". Despite local variations, given the overall strategy of no more traffic at Heathrow, it is not envisaged that there would be a material impact on the performance of the highway network should both proposals come forward. In terms of public transport, the network and catchments serving the two airports are different and therefore the cumulative effects of additional runways at Gatwick and Heathrow are unlikely to be materially different to those described in this chapter.

GAL will, however, keep this under review if and when any further detail on Heathrow's R3 proposals become available during the course of the Project's DCO Application.

12.12. Inter-related effects

12.12.1 The traffic and transport effects are not expected to have any inter-relationships with topics which have not been considered in this ES. There is potential for inter-related effects with the following topics; further information is provided in Chapter 20: Cumulative Effects and Inter-relationships:

- There would be inter-related effects between forecast traffic flows and air quality (Chapter 13), noise and vibration (Chapter 14), climate change (Chapter 15) and health and wellbeing (Chapter 18).
- The highway improvement works that form part of the Project are also expected to have inter-related effects with landscape and visual resources (Chapter 8) and socio-economic considerations (Chapter 17).
- Effects on public rights of way are considered as part of Chapter 19: Agricultural Land Use and Recreation and inter-related effects could be expected with the pedestrian/cycle assessments undertaken in this chapter and with health and wellbeing (Chapter 18).

12.13. Summary

12.13.1 This chapter has set out the assessment of the environmental effects of the Project on severance, driver delay, pedestrian and cyclist delay and amenity, accidents and safety, hazardous loads, and public transport services and users. The assessment has been undertaken in accordance with IEMA (1993) and DMRB (National Highways *et al*., 2020) guidance and professional judgement has been used for qualitative assessment where appropriate. This assessment for ES uses the best information available at the time of writing.

12.13.2 For the purposes of this assessment, the receptors are considered to be pedestrians, cyclists, bus and coach passengers, rail passengers, and car drivers and their passengers.

12.13.3 As part of the design development, surface access improvements form part of the Project, which comprise proposed highway and active travel improvements. The **ES Appendix 5.4.1: Surface Access Commitments** (Doc Ref. 5.3) also form part of the Project and set out the committed mode shares, interventions, and monitoring strategy. These will encourage more sustainable travel patterns amongst air passengers and staff, increasing public transport and active travel mode share in particular. The overall operation of the highway network will be an improvement on the future baseline, accommodating not only the growth associated with the Project, but also non-airport background growth.

12.13.4 The assessment shows that given the existing high traffic flows on the SRN and major road network, the Project is not expected to generate substantial traffic flows beyond the network in the immediate vicinity of the Airport. However, owing to model noise and the reassignment of background traffic along routes with similar journey times (as described in paragraphs 12.5.5 and 12.5.6), the strategic modelling work shows that there could be some increases in traffic flows in areas such as Croydon during certain times of day which are not as a result of the Project.

12.13.5 Within the vicinity of the Airport, there are segregated pedestrian and cycle routes which reduce the sensitivities of the highway links. The proposed highway improvements would also help

reduce conflicts and risk of accidents on the highway and improve walking and cycling infrastructure.

Table 12.13.1: Summary of effects

Receptor	Receptor sensitivity	Description of impact	Short/medium/long term/permanent	Magnitude of impact	Significance of effect	Significant/not significant	Notes
Initial construction period: 2024-2029							
Pedestrians and cyclists	Negligible to medium	Severance	Medium term	Negligible	Negligible adverse	Not significant	
		Pedestrian and cycle delay	Medium term	Negligible	Negligible adverse	Not significant	
		Pedestrian and cycle amenity	Medium term	Negligible Low for Fell Road, Croydon	Minor adverse for Fell Road, Croydon, negligible adverse for all other roads	Not significant	
		Accidents and safety	Medium term	Low	Negligible adverse	Not significant	
Public transport users	Low	Public transport amenity	Medium term	Negligible	Negligible adverse	Not significant	
Car drivers and passengers	Low to Medium	Driver delay	Medium term	No change to high	Moderate adverse for three junctions, up to minor adverse for all other junctions.	Not significant	The moderate adverse effects identified are due to model noise and the associated reassignment of background traffic.

Receptor	Receptor sensitivity	Description of impact	Short/medium/long term/permanent	Magnitude of impact	Significance of effect	Significant/not significant	Notes
		Accidents and safety	Medium term	Low	Negligible adverse	Not significant	
		Hazardous loads	Medium term	Negligible	Negligible adverse	Not significant	
First full year of opening: 2029							
Pedestrians and cyclists	Negligible to medium	Severance	Medium term	Negligible	Negligible adverse	Not significant	
		Pedestrian and cycle delay	Medium term	Negligible	Negligible adverse	Not significant	
		Pedestrian and cycle amenity	Medium term	Low for Northgate Road. Negligible for all other roads	Negligible adverse	Not significant	
		Accident and Safety	Medium term	Negligible	Negligible adverse	Not significant	
Public transport users	Low	Public transport amenity	Medium term	Low	Minor adverse for rail crowding, Negligible adverse for station crowding	Not significant	
Car drivers and passengers	Low to medium	Driver delay	Medium term	No change to medium	Moderate adverse for two junctions, up to minor adverse for all other junctions.	Not significant	The moderate adverse effects identified are due to model noise and the associated

Receptor	Receptor sensitivity	Description of impact	Short/medium/long term/permanent	Magnitude of impact	Significance of effect	Significant/not significant	Notes
							reassignment of background traffic.
		Accidents and safety	Medium term	Negligible	Negligible adverse	Not significant	
		Hazardous loads	Medium term	No Change	No change	Not significant	
Highway construction period: 2029							
Pedestrians and cyclists	Negligible to medium	Severance	Medium term	Negligible	Minor adverse	Not significant	
		Pedestrian and cycle delay	Medium term	Low for Longbridge Roundabout. Negligible for all other roads	Minor adverse for Longbridge Roundabout. No change for all other roads.	Not significant	
		Pedestrian and cycle amenity	Medium term	Low for Northgate Road. Negligible for all other roads	Negligible adverse	Not significant	
		Accident and Safety	Medium term	Low	Minor adverse	Not significant	
Public transport users	Low	Public transport amenity	Medium term	Negligible	Negligible adverse	Not significant	
	Low to medium	Driver delay	Medium term	No change to medium	Moderate adverse for nine junctions, up to	Not significant	The moderate adverse effects are

Receptor	Receptor sensitivity	Description of impact	Short/medium/long term/permanent	Magnitude of impact	Significance of effect	Significant/not significant	Notes
Car drivers and passengers					minor adverse for all other junctions.		because of junctions being temporarily affected by the construction works, or due to model noise and the associated reassignment of background traffic.
		Accidents and safety	Medium term	Low	Minor adverse	Not significant	
		Hazardous loads	Medium term	Low	Negligible adverse	Not significant	
Interim assessment year: 2032							
Pedestrians and cyclists	Negligible to medium	Severance	Long term	Low to high	Minor adverse	Not significant	
		Pedestrian and cycle delay	Long term	Negligible to low	Negligible to minor beneficial	Not significant	
		Pedestrian and cycle amenity	Long term	Negligible to low	Minor adverse	Not significant	
		Accident and Safety	Long term	Negligible to medium	Minor beneficial where highway	Not significant	

Receptor	Receptor sensitivity	Description of impact	Short/medium/long term/permanent	Magnitude of impact	Significance of effect	Significant/not significant	Notes
					improvements are part of the Project, negligible adverse for all other roads.		
Public transport users	Low	Public transport amenity	Long term	Negligible to low	Minor adverse for rail crowding, negligible adverse for station crowding	Not significant	
Car drivers and passengers	Negligible to medium	Driver delay	Long term	No change to medium	Moderate adverse for seven junctions (including merges / diverges), up to minor adverse for all other junctions.	Not significant	Further assessment of the junctions shows no capacity issues are expected.
		Accidents and safety	Long term	Low to medium	Minor Beneficial at junctions where highway improvements are part of the Project, Negligible Adverse for all other roads	Not significant	
		Hazardous loads	Long term	Negligible	Negligible Beneficial	Not significant	
Design year: 2047							

Receptor	Receptor sensitivity	Description of impact	Short/medium/long term/permanent	Magnitude of impact	Significance of effect	Significant/not significant	Notes
Pedestrians and cyclists	Negligible to medium	Severance	Permanent	Low to high	Moderate adverse for Southbridge Road, Croydon and Spierbridge Road, Storrington. Up to minor adverse for all other roads.	Not significant	Moderate adverse effects due to model noise and not associated with the Project.
		Pedestrian and cycle delay	Permanent	Negligible to low	Minor beneficial where highway improvements are part of the Project, negligible adverse for all other roads.	Not significant	
		Pedestrian and cycle amenity	Permanent	Negligible to low	Minor beneficial where highway improvements are part of the Project, minor adverse for North Terminal Roundabout and M23 Gatwick Interchange, moderate adverse for Southbridge Road.	Not significant	Moderate adverse effects due to model noise and not associated with the Project.

Receptor	Receptor sensitivity	Description of impact	Short/medium/long term/permanent	Magnitude of impact	Significance of effect	Significant/not significant	Notes
					Negligible adverse for all other roads.		
		Accidents and Safety	Permanent	Negligible to low	Negligible to Minor Adverse / Beneficial	Not Significant	
Public transport users	Low	Public transport amenity	Permanent	Negligible to low	Minor adverse	Not significant	
Car drivers and passengers	Low to medium	Driver delay	Permanent	No change to medium	Moderate adverse for 22 junctions, up to minor adverse for all other junctions.	Not significant	Moderate adverse effects due to model noise and not associated with the Project. No mitigation is required.
		Accidents and safety	Permanent	Negligible to low	Minor beneficial at junctions where highway improvements are part of the Project, negligible adverse for all other roads	Not significant	
		Hazardous loads	Permanent	Negligible	Negligible beneficial	Not significant	

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The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017

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12.15. Glossary

Table 12.15.1: Glossary of Terms

Term	Description
AADT	Annual Average Daily Traffic
AM	Morning (eg AM peak)

ANPR	Automatic Number Plate Recognition
AoDM	Area of Detailed Modelling
AQMA	Air Quality Management Area
ASAS	Airport Surface Access Strategy
BC	Borough Council
CAA	Civil Aviation Authority
CC	County Council
CDev	Cumulative Developments
CIF	Common interface file
CIP	Capital Investment Programme
CL	Citi Logik
CP5	Control Period 5
CP6	Control Period 6 (2019-2024)
CP7	Control Period 7 (2024-2029)
DC	District Council
DfT	Department for Transport
DLR	Docklands Light Railway
DMRB	Design Manual for Roads and Bridges
EIA	Environmental Impact Assessment
ES	Environmental Statement
GAL	Gatwick Airport Limited
GPS	Global Positioning System
HGV	Heavy Goods Vehicle
IEMA	Institute of Environmental Management and Assessment
IP	Interpeak
LBG	London Bridge
LoS	Level of Service
LTP	Local Transport Plan
LUL	London Underground Limited
MCC	Manual Classified Counts
Mppa	Million passengers per annum
NCR	National Cycle Route
NDL	North Downs Line
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
NPS	National Policy Statement
ORR	Office of Rail and Road
PEIR	Preliminary Environmental Information Report
PGC	Passenger Guidance Capacity
PINS	Planning Inspectorate
PM	Evening (eg PM peak)
PR	Periodic Review
RIS	Road Investment Strategy

SACs	Surface Access Commitments
SERTM	South East Regional Transport Model
SRN	Strategic Road Network
TA	Transport Assessment
TAG	Transport Appraisal Guidance
TEMPro	Trip End Model Presentation Program
TfL	Transport for London
TFSG	Transport Forum Steering Group
tph	Trains per hour
V/C	Volume to Capacity
vehs	Vehicles
VIC	London Victoria